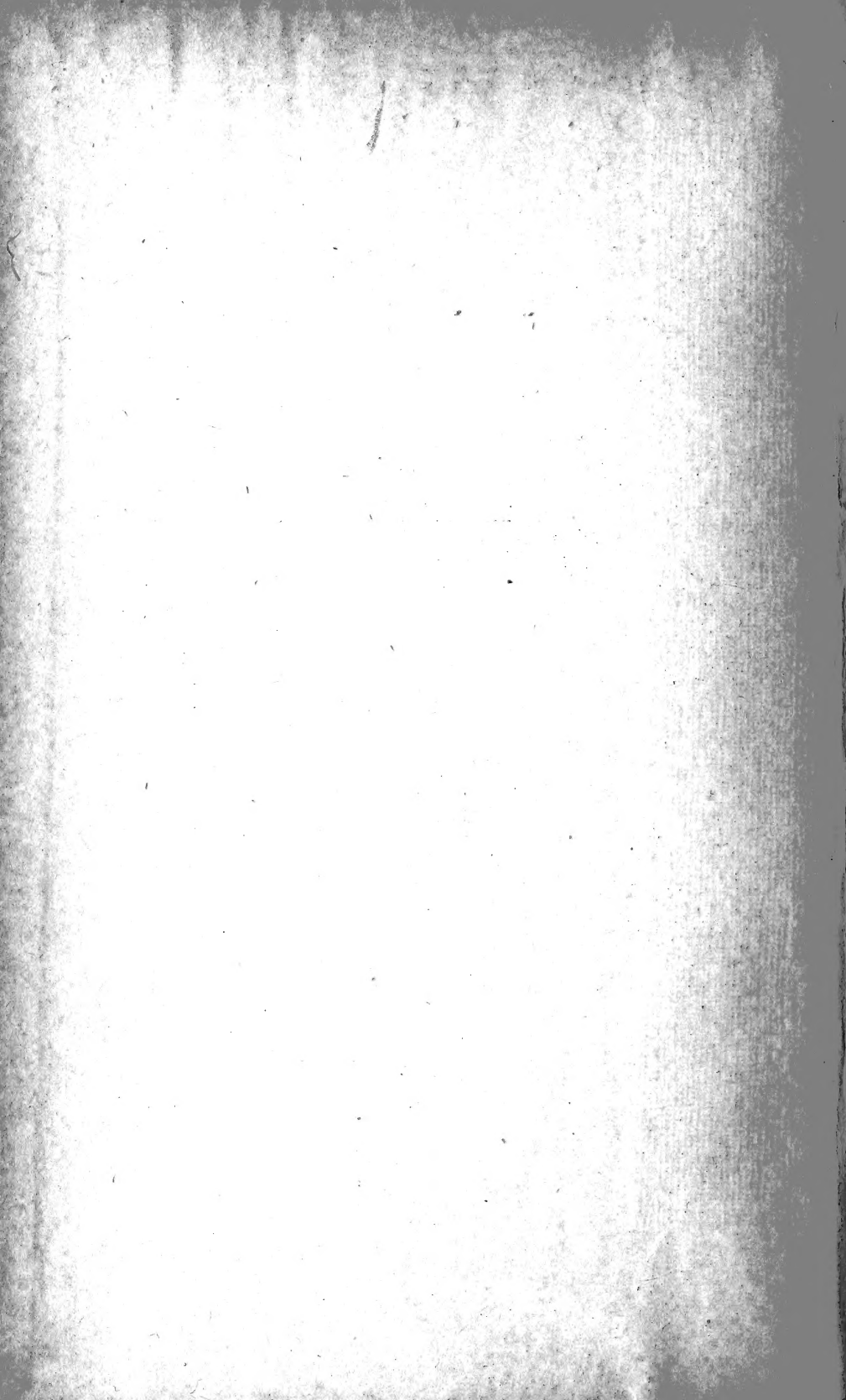




EXCELSIOR

Forest Commission

1894.



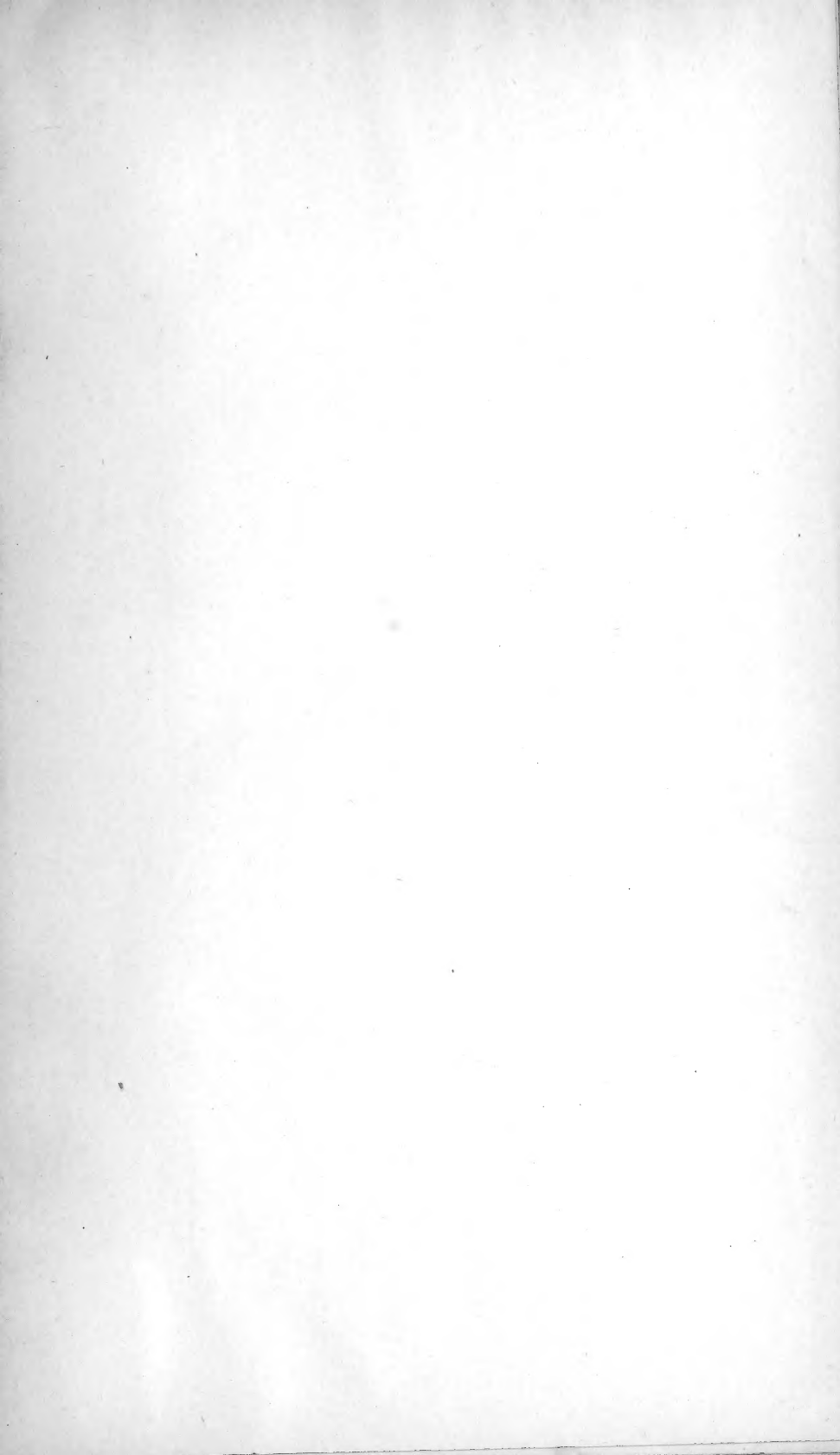
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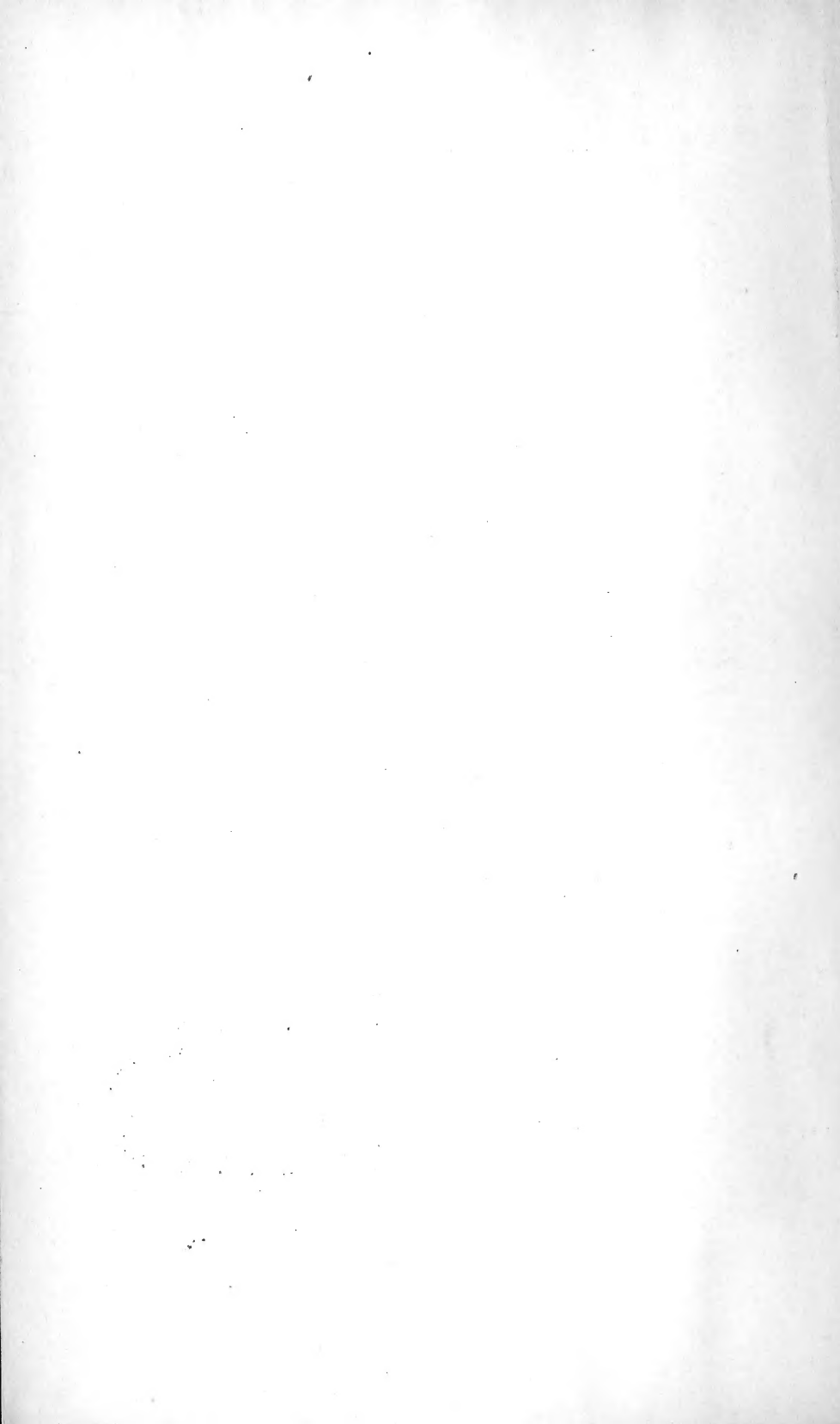
COMPLIMENTS OF

A. H. Cluney

STATE FISH CULTURIST.







508.73

STATE OF NEW YORK.

9th

ANNUAL REPORT

OF THE

FOREST COMMISSION

FOR THE

YEAR 1894.

TRANSMITTED TO THE LEGISLATURE JANUARY 31, 1895.



ALBANY:
JAMES B. LYON, STATE PRINTER
1895.

1898

STATE OF NEW YORK.

No. 101.

IN ASSEMBLY,

_____ JANUARY 31, 1895.

ANNUAL REPORT OF THE FOREST COMMISSION.

ALBANY, *January* 31, 1895.

Hon. HAMILTON FISH,

Speaker of the Assembly:

Pursuant to chapter 332, Laws of 1893, we have the honor to submit herewith our annual report, and would respectfully ask permission to supplement the same with a further communication at an early date.

FRANCIS C. BABCOCK,
SAMUEL J. TILDEN,
CLARKSON C. SCHUYLER,
NATHAN STRAUS,
WILLIAM R. WEED,

Commissioners.





G. H. Rison, Photo.

ON MOREHOUSE LAKE.

ANNUAL REPORT.

FINANCIAL STATEMENT.

The Legislature granted this Department, in the annual appropriation bill passed April 17, 1893, an allowance of \$30,000 for the maintenance of its work. Like all appropriations in the bill referred to, this money was not available until October 1, 1893, it being a provision for the expenses of the Commission during the fiscal year beginning on that date. Of the \$30,000 thus provided in the appropriation bill, \$18,500 was specially designated for salaries, and \$11,500 for "traveling expenses of the Commissioners and officials, for printing and office expenses, for fees of attorneys and witnesses, and for the prevention of fire."

Besides the \$30,000 thus granted in the regular appropriation bill, an additional sum of \$5,500 "for deficiency in appropriation for compensation of foresters" was given to the Commission in the annual supply bill, which became a law May 18, 1893. The latter sum, like all items in the supply bill, was placed to the credit of the Department on the date mentioned, making the total appropriation \$35,500 for the fiscal year 1893-94. This amount was still further increased by the sum of \$6,873.43, the unexpended balance standing to the credit of the Forest Commission on the Comptroller's books at the close of the preceding fiscal year, September 30, 1893.

As has always been the rule in this Department, the expenditures were kept well within the limits of the appropriations, and in the following statement it will be seen that there was an unexpended balance on hand, to the credit of salaries and expenses, of \$4,398.16.

FOREST COMMISSION — STATE OF NEW YORK.

Annual statement for the fiscal year ending September 30, 1894.

RECEIPTS.

From appropriation for salaries	\$24,000 00
From appropriation for expenses	11,500 00
From unexpended balance, 1893, salaries	5,509 32
From unexpended balance, 1893, expenses	1,364 11
	<hr/>
	\$42,373 43
	<hr/> <hr/>

EXPENDITURES.

For salaries	\$25,128 00
Employes' expenses	4,734 67
F. G. Babcock, Commissioner, expenses	186 04
S. J. Tilden, Commissioner, expenses	127 54
C. C. Schuyler, Commissioner, expenses	226 07
William R. Weed, Commissioner, expenses	712 19
Legal expenses	3,972 65
Printing	90 00
Stationery	269 65
Postage	203 00
Expressage	416 16
Telegrams	134 78
Telephone	73 60
Messenger service	36 75
Office library	160 66
Office furniture	95 50
Newspapers	27 88
Press clippings	45 35
Surveying	446 00
Annual reports	363 37
Adirondack map	372 00
Miscellaneous	153 41
Balance unexpended, salaries	4,381 32
Balance unexpended, expenses	16 84
	<hr/>
	\$42,373 43
	<hr/> <hr/>

In addition to the regular appropriation for carrying on the work of this Department, a special item was inserted in the sup-

ply bill for the maintenance of the Catskill deer parks, the care and management of which devolves by law on the Forest Commission. This item appropriates "for the maintenance of the Catskill deer park, as provided in chapter 562, Laws of 1887, including the purchase of live deer and other game, \$2,750, of which sum an amount not exceeding \$250 may be expended by the Commission in completing the public path leading to the summit of Slide mountain included within the Preserve; and for inclosing with wire fence such number of additional acres as may be deemed necessary by the Forest Commission for the use of said park, \$1,500, or so much thereof as may be necessary."

At the beginning of the fiscal year — October 1, 1893 — there was standing to the credit of the deer park account the sum of \$3,724.36, not including the \$1,500 appropriated for the erection of wire fences which were not built, any further enlargement of the deer park being deemed unnecessary. Of this \$3,724.36, there was expended during the fiscal year of 1893-94, the sum of \$2,492.29, part of which was expended in capturing live deer in the Adirondacks with which the park is mostly stocked. These deer were taken alive by the Superintendent and Foresters acting under his instructions, the cost of each animal thus obtained being much less than when purchased, as had been done previously. At present there is a herd of fifty-three deer in the park, the greater number of which are does. All of them will be taken out of the park and turned loose in May, or as soon as there is enough "browse" in the woods to furnish them with food.

This expenditure of \$2,492.29 includes, also, the salary of the deer keeper, who receives \$35 per month and house rent, a keeper's lodge having been built in 1888 for that purpose; the purchase of grain for feeding the herd during the winter; and the sum of \$116.71 which was expended on the bridle path leading from the park through the Forest Preserve to the sum-

mit of Slide mountain. The balance on hand to the credit of the deer park on September 1, 1894, was \$1,272.07. The expenditures on the bridle path in addition to the \$116.71 just referred to, included the sum of \$250 as per item in the supply bill.

There was also an expenditure of \$472 in connection with the publication of the large Adirondack map recently issued by this Department. Of this amount, \$372 was paid from the regular expense account established by the annual appropriation, and \$100 from a balance remaining from the original appropriation made in 1892 for that purpose.

The Comptroller has, furthermore, charged this Department with the sum of \$1,794.01 for the "purchase of lands in the Forest Preserve, also traveling and other expenses in connection with the same." This item in the Comptroller's report is liable to convey a wrong impression as to the cost of carrying on this Department. The purchase of lands is intrusted in part to the Forest Commission, but the money expended for the purchase of lands should not be included in the cost of the maintenance of this Department. The Comptroller, in his report, has also charged this Department erroneously with \$852.35 for "examining titles and surveying lands owned by the State on Slide mountain." This appropriation was made for the State Engineer and Surveyor, and so specified; and it should have been charged to that Department, the Forest Commission having had nothing whatever to do with it.

Revenues.

The Forest Commission is annually in receipt of moneys from various sources, but the revenue thus obtained is not available in any way for carrying on the work of the Department, and all such moneys, as fast as received, are turned over immediately to the State Treasurer, with a memorandum explaining the sources from whence they came. During the fiscal year ending Septem-

ber 30, 1894, the receipts from the various sources referred to were :

From trespasses on State lands	\$1,047 37
From the sale of dead and fallen timber	438 03
From the sale of wild hay on State lands	25 00
From leases of Adirondack camp sites	1,005 00
	<u> </u>

The receipts from trespasses represent twenty-seven different cases, the amount received from each being comparatively small, as in each instance the work was discovered by the Foresters and the logs seized before the operations of the trespassers had been carried on to any great extent.

Actions were commenced in twenty-two cases, for the prosecution of which a competent and reputable attorney was designated by the Forest Commission in accordance with the law. The law provides, however, that the appointment of an attorney by the Forest Commission must be approved by the Attorney-General and the Comptroller. The Attorney-General approved the appointment of the attorney thus designated by the Commission. The Comptroller, for reasons unknown to us, withheld his approval, and these prosecutions have consequently been delayed.

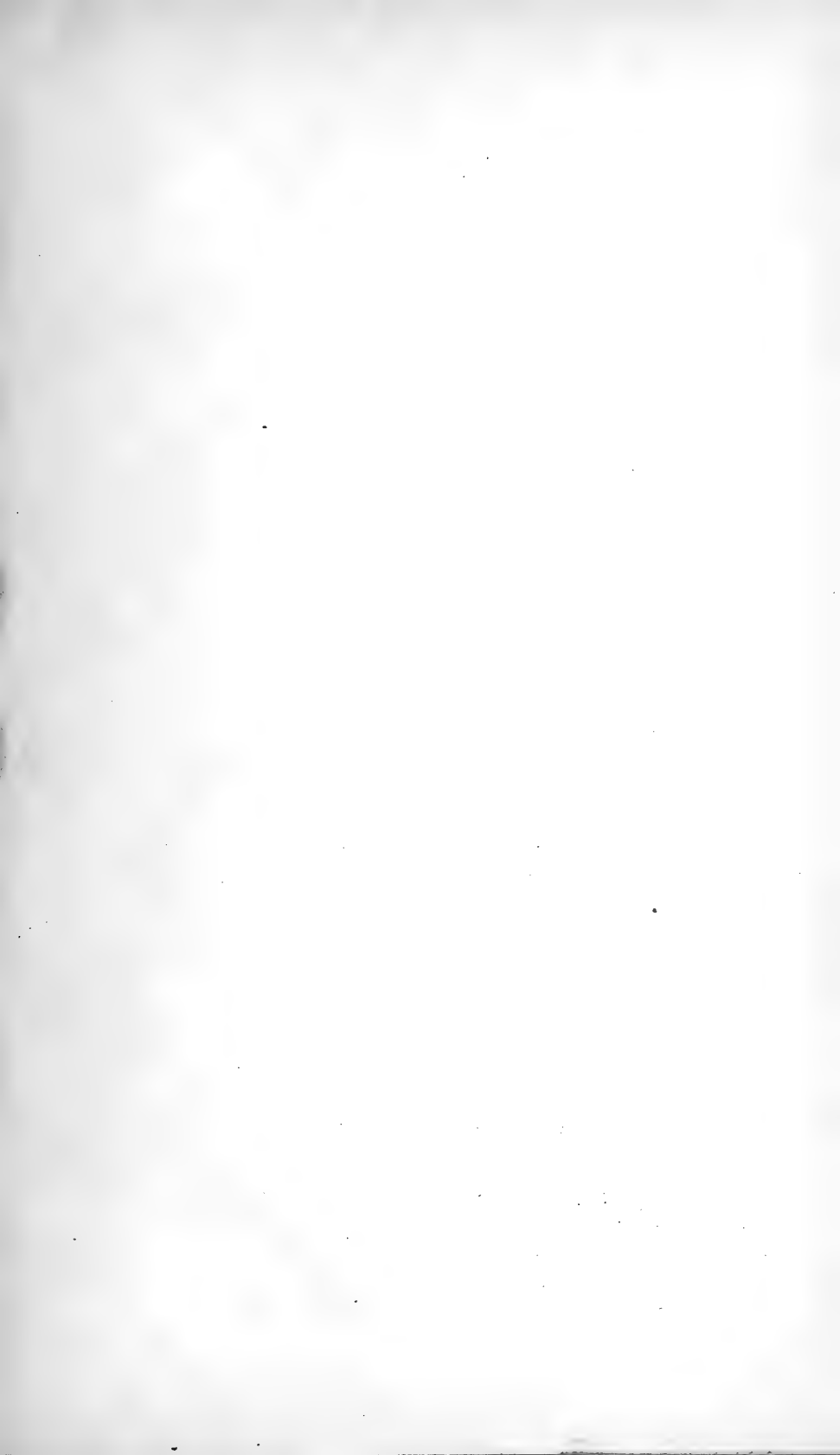
FOREST FIRES.

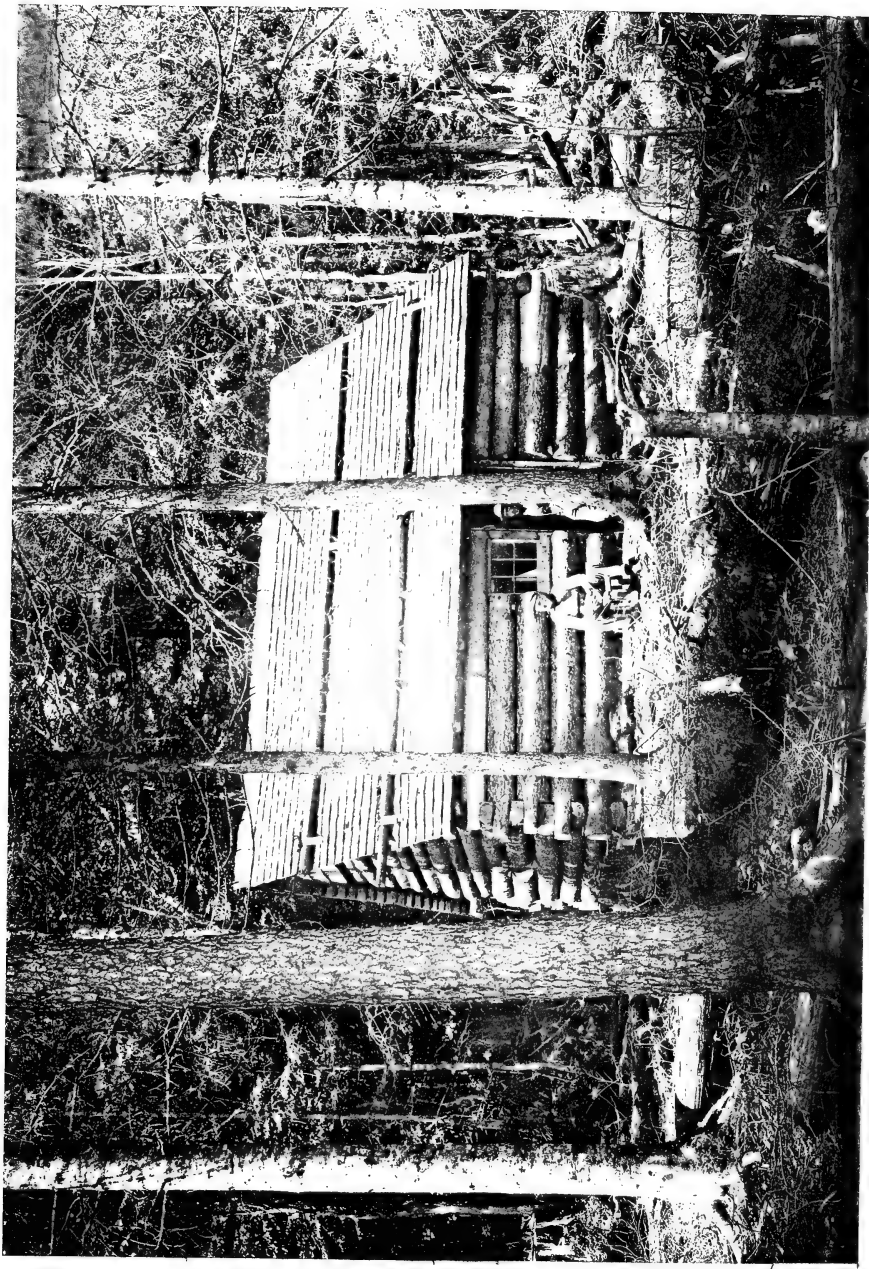
In accordance with the requirements of the State Forestry Law,* we submit herewith, as usual, our annual report on the woodland fires which have occurred throughout the State during the year 1894, together with the reports from the various firewardens, the publication of which is also required by the law referred to. These reports embrace not only the fires which have occurred on the Forest Preserve in the Adirondack and Catskill regions, but include also all woodland fires that have happened in other portions of the State throughout its entire extent.

Owing to the extremely dry season, the records show no decrease in the number of fires as compared with those of the previous years. At the same time, in view of the widespread and destructive fires which were so common previous to the organization of the present system, we feel that there is abundant reason for congratulation. The most of the fires during 1894 occurred in the woodlands and barrens which are scattered throughout the farming districts, the fires in the Adirondack and Catskill forests being few in number and doing but little damage.

There were only a few fires in the Adirondack Park, as will be seen by examining the reports of the firewardens submitted herewith. It should be remembered that the Adirondack Preserve embraces lands that are not in the Adirondack Park, some of these outside tracts being situated many miles from the park boundary and consisting mostly of waste land.

* "The firewarden of every town in which a forest fire of more than one acre in extent has occurred within a year shall report to the Forest Commission the extent of area burned over, to the best of his information, together with the probable amount of property destroyed specifying the value of timber, as near as may be, and amount of cordwood, logs, bark or other forest product, and of fences, bridges and buildings that have been burned. He shall make inquiries and report as to the cause of such fires, if ascertainable, and as to measures employed and found most effectual in checking their progress. A consolidated summary of these returns by counties and of the information as to the same matter otherwise gathered by the Forest Commission shall be included in their annual report." [Laws of New York.]





J. M. Schuler, Photo.

A GUIDE'S CAMP.

In adjoining States large areas of woodland have been destroyed, while in the great States of the northwest, particularly Minnesota and Wisconsin, there have been forest fires this season which, in extent of area, destruction of timber, and loss of life, have not been equalled in previous records.

The comparative immunity which our State has enjoyed during the past season is due largely to the system under which the town firewardens and their deputies are organized. It is an admirable plan, and each year further demonstrates its practical value. It is particularly well calculated to deal successfully with the fallow fires of the farmers, from which source mostly all our destructive forest fires have started. These fallow fires are the most dangerous, because they are always started on clearings adjoining timber lands, and, worse than all, are invariably started in a dry time; the dryer the time the better for the farmer, who always wants to get a "clean burn" on his clearing.

The printed rules of the Forest Commission, posted everywhere in our woodland districts, require that a farmer who intends to burn a fallow field or piece of brush-land shall give timely notice to the nearest firewarden, so that this official may be present and see that the necessary precautions are taken to prevent the fire escaping from the farmer's land into the neighboring forest. These rules are printed plainly on large placards which are posted conspicuously in hotels, stores, post-offices, schoolhouses and sawmills. For outdoor use the rules are printed on white muslin posters, which are nailed on barns, fences and trees along the trails and "carrys" leading through the forest. Over 10,000 copies of these rules are kept posted all the time throughout the Adirondack and Catskill region. As frequent reference is made to these rules in the firewardens' reports, we give here the text of these notices in full:

LOOK OUT FOR FIRE!

Rules and Laws.

Fires for clearing land near a forest must not be started until the trees are in full leaf. Before lighting such fires two days' notice, at least, must be given to the firewarden and occupants of adjoining lands. After such fires are lighted competent persons must remain to guard them until the fire is completely extinguished, and the persons

starting such fires will be held responsible for all damages, notwithstanding notice has been given to the firewarden.

Fires will be permitted for the purposes of cooking, warmth and insect smudges ; but before such fires are kindled sufficient space around the spot where the fire is to be lighted must be cleared from all combustible material, and before the place is abandoned fires so lighted must be thoroughly quenched.

All fires other than those hereinbefore mentioned are absolutely prohibited.

Hunters and smokers are cautioned against allowing fires to originate from the use of firearms, cigars and pipes ; and all persons are warned that they will be held responsible for any damage or injury to the forest which may result from their carelessness or neglect.

Girdling and peeling bark from standing trees are prohibited. Fallen timber may be used for firewood and camp construction.

Foresters, firewardens and all citizens are requested to report to the Forest Commission immediately all cases which may come to their knowledge of damage or injury to forest trees arising from a violation of these rules.

By order of the Forest Commission:

C. O. McCREEDY, *Secretary.*

Laws of the State New York — Chapter 332, Laws of 1893.

AN ACT to establish a Forest Commission, etc.

SECTION 102, Sub. 8. The Forest Commission shall cause rules for the prevention and suppression of forest fires to be printed for posting in schoolhouses, inns, sawmills and other woodworking establishments, lumber camps and other places, in such portions of the State as they may deem necessary. Any person maliciously or wantonly defacing or destroying such notices shall be liable to a fine of five dollars.

SEC. 115. Any person who shall wilfully or negligently set fire to or assist another to set fire to any waste or forest lands belonging to the State or to another person, whereby the said forests are injured, or who suffers any fire upon his own land to escape or extend beyond the limits thereof, to the injury of the woodlands of another or of the State, shall be liable to a fine of not less than \$50 nor more than \$500. He shall also be liable in an action for all damages that may be caused by such fires.

From the Penal Code.

SECTION 413, Sub. 4. A person who, having been lawfully ordered to repair to the place of a fire in the woods and assist in extinguishing it, omits without lawful excuse to comply with the order is guilty of a misdemeanor.

_____,
Firewarden for the Town of _____.

For the past ten years the forest regions of New York have been continuously and faithfully posted with these notices. As a result the people have been educated in regard to the use of fire to a point where carefulness has taken the place of carelessness. The indifference of former years has been succeeded by a lively interest, while everywhere there seems to be an active desire to co-operate in all measures tending to the suppression of further damage to our forests from fire.

New York was the first State to formulate and enact practical laws for dealing with this great element of forest destruction. The law of 1885, establishing a Forest Commission, contained the essential features of the present one for the prevention of forest fires. Since then a few other States have adopted the same system.* Maine was the first to follow, the law of that State relating to forest fires having been copied, with but slight change, from that of our own. New Hampshire has a well organized Forest Commission of five members, which is working on the same lines. New Jersey and Pennsylvania have, during the past year, established Commissions also, and active measures are being taken in those States to protect the remainder of their forests from fire.

The Forestry Commission of Pennsylvania has prepared and introduced a bill in the Legislature which is well adapted to the prosecution of its work. This bill, so far as it relates to forest fires, resembles the law of New York in all essential points. Among the important and commendable provisions in which it differs from our law, is the one providing that the expenses of the firewarden and the *posse* warned out to fight a forest fire shall not be borne wholly by the town, but that half of the cost shall be reimbursed by the commonwealth. In our law the entire expense of fighting a forest fire and the services of the firewarden are a town charge.

* The forestry laws of these States will be found in an appendix.

Another important and wise provision of the Pennsylvania law is the paragraph requiring that in woodland counties all farmers who may want to start fires on their premises for the purpose of clearing land shall notify a firewarden, and must not start such fires without his written consent. Now we have the same rule in New York, but it is one of the regulations imposed by the Forest Commission and is not a part of the law. This very important rule should be incorporated in our forestry law, and its violation should be a misdemeanor punishable by a severe penalty.

In presenting here the reports of the firewardens we have included all that were received, although some of them relate to fallow fires or to fires on waste lands, in which little or no loss occurred. Some of the reports are mere statements as to freedom from fire, while in some the damages are estimated at an amount which the facts, as recited, would hardly indicate. It was deemed best, however, to submit them all, although some of them are omitted in the recapitulation.

Each firewarden or supervisor in the 955 towns of this State (not including cities or villages) was written to and supplied with a blank form and stamped envelope with which to make report of any and all woodland fires that occurred in his town. If there had been no fire he was directed to return in the stamped envelope a statement to that effect. By this plan information was received from every town in the State. The statements showing that a woodland fire had occurred are as follows:

Essex County.

Sylvester A. Reid, firewarden for the town of St. Armand, Essex county, reports:

I have five fires to report as happening during the past season. The first was started by R. L. Hayes for the purpose of burning a piece of dry grass about one rod square on Lot 123. It burned a few fence rails and about three acres of second growth timber on Lots 142 and 143, but not bad enough to kill but a small portion of it. I saw the smoke from my house when it first started and drove down there immediately with two men. After a hard fight of two or three hours we succeeded in stopping it. The damage was about \$5.

The second fire started between the river and Moose pond, near where Mr. Hayes was clearing some land. I had seen smoke arising in that vicinity several times. On the 12th of June it commenced burning and burned until the 17th; then rain came and put out the fire. It started on Lot 164 and burned over Lots 125, 144, 145 and 146, in all about 200 acres. It is claimed that no damage was done, as the land had been burned over before. This land would in time be covered with a second growth forest if it was not burned over repeatedly, but it never can if the fire runs over it every few years.

The third was a fallow fire started by John Mahar. He notified me before that he wanted to burn this fallow on the 14th of June. On that day he sent a man to inform me that he was going to start the fire, but that he had all the help that would be necessary to take care of it. Soon after lighting it the wind rose from the south and blew the flames on to the lands of T. Clark, where it ran through an old fire slash. Some timber was killed, which he cut for firewood this winter. About the only damage done was the burning of a large pile of his own wood. About seven acres were burned over.

The next fire was caused by burning a fallow on Smith's land on Lot 48, June 16. It ran over about five acres, injuring a small piece of standing timber, which can be cut this winter, and doing no particular damage.

The fifth fire was caused by clearing land on Lot 65, burning over about 10 acres. No damage was done, except that it took five men a half day to keep it out of the woods.

Sidney Jacobs, firewarden for the town of Willsboro, Essex county, reports:

I was called out by only one fire during the past season. This one started on the 28th of August, at about 8 o'clock in the morning, and was extinguished on the 2d of September. It ran over about 200 acres of what is known as the Fairchild lot. The damage will amount to about \$200. The cause of the fire is unknown.

H. C. Pine, firewarden for the town of Chesterfield, reports as follows:

On April 16th a fire started on the lands of Asahel Adgate and Allan Simpson. It was started by sparks from a locomotive on the Keeseville, Ausable Chasm and Lake Champlain railroad. It damaged the timber to the extent of \$50, and burned \$25 worth of fencing. This

fire occurred in the northern part of the town. It was extinguished the same day.

On June 17th a fire started in the eastern part of the town, which burned over about three acres. It was caused by a farmer who was burning fallow land. It was extinguished promptly the same day and no damage was done.

On the same day another fire started in the eastern part of the town, which burned over 52 acres adjacent to the Delaware and Hudson railroad, and was caused by sparks from a locomotive. It burned 145 rods of fence, causing a loss estimated at \$58, and damaged 52 acres of land, about \$208.

On April 27th a fire burned over about 50 acres near Fordway mountain. It burned 40 rods of fence, valued at \$20, no other damage being done by it. This fire is supposed to have been caused by hunters. On June 1st about 30 acres were burned over in the northern part of the town. This fire was started by sparks from an engine on the Keeseville, Ausable Chasm and Lake Champlain railroad. No damage was done.

On August 2d some tramps started a fire in the eastern part of the town adjacent to the land of the Delaware and Hudson railroad. No damages.

On August 25th some fishermen started a fire near Augur lake, which burned 75 acres of second growth timber. Damages are estimated at \$100.

On August 27th a fire was started in the south part of the town, caused by sparks from an engine on the Delaware and Hudson railroad. About 10 acres were burned over, inflicting a damage estimated at \$25. In addition 20 rods of fence were burned, causing a loss of \$10.

Lemuel S. Parkhurst, firewarden for the town of North Elba, Essex county, reports :

On April 17th John Ryan, forester at Saranac Lake, telegraphed me of a fire on Lot 54, Township 11. I went immediately to said lot and found the fire extinguished. It had burned over nearly all of this lot and a part of Lot 55. This land was covered with a small growth of poplar and some second growth of white birch, not very thick. It killed or damaged a good deal of it. This fire started on a lot north of Lot 53, occupied by Will Harvey. I talked with him about it, but he says that he does not know anything as to how the fire originated. No doubt it was started to burn over the beaver meadows on these lots, but no one seems to know anything about it.

Frank C. Parker, State Forester, reports, September 22d, as follows:

Last week, while patrolling my district in the North River Head Tract, I found a fire burning in the "duff" on lot 23. Some Italians with a dancing bear had encamped in the woods near the roadside, where they had built a fire against an old stump and had not put it out properly. I fortunately discovered it in time, and, with shovel and hoe and a number of pails of water, extinguished it. The place was a dangerous one, for there was a large quantity of "duff," and had the fire gotten headway it would have taken a great deal of time and labor to extinguish it.

Franklin County.

W. E. LaFountain, firewarden for the town of Altamont, Franklin county, reports:

To the HON. STATE FOREST COMMISSION, *Albany, N. Y.*:

GENTLEMEN.—As firewarden of the town of Altamont, Franklin county, N. Y., I would respectfully submit the following report:

Owing to the fact that I am compelled to be away from home a great deal of the time during the spring and summer, I took advantage of the rules of the Forest Commission in regard to the division of a town into fire districts and divided this town into three districts, as follows: (1) "Tupper Lake Junction"* district; (2) "Village of Tupper Lake" district; (3) "Moody" district, and appointed a deputy in each. I am now convinced that there would have been some bad fires in this town had I not done so, as a number of fires were started, but, owing to the promptness of the deputies, they were got under control without doing any damage to speak of, except one fire that was started at some point on the southerly shore of Big Tupper lake, in the township of Atherton, St. Lawrence county, which spread with great rapidity for considerable distance along the shore of the lake in St. Lawrence county and extended back easterly across the county line, burning and killing the timber on a few acres on the northwest corner of Litchfield Park, Township 25, Franklin county; also a small tract on the southwest corner of King Park, in the same township. I think this fire was started by some fishermen at Big Tupper Lake, who built a camp-fire on or near the shore and left it burning.

* Tupper Lake Junction is the name of the railroad station at the intersection of the New York Central (A. & St. L.) and Northern Adirondack railroads.

However, I consider that we were very fortunate, in this immediate vicinity, in not having more forest fires, as we are exposed to a great many risks. It was very dry here last summer, and at other parts, where there was less risk, there was more or less damage done by fire.

P. H. McCabe, firewarden for the town of Malone, Franklin county, reports :

Notice was given on the 10th day of April that a fire was running on the farm of James McCormic, $3\frac{1}{2}$ miles south of Malone. It burned about 20 acres of brush and pasture land and about 400 rails. Cause unknown. A rain put it out.

On April 15th I was notified that a fire was running on the farms of Carlin and S. A. Childs. I notified help, and we put it out without much trouble. It burned about 60 acres of pasture and second growth timber and some rails before I got there. Damage about \$100. Cause of fire is supposed to be started by some men setting hop poles situated four miles south of Malone.

On April 19th I was again notified that a fire was running on the farm of Patrick Lawless. It burned over 20 acres of culled timber. Cause of fire unknown. Situated six miles south of Malone.

A. N. Skiff, firewarden for the town of Franklin, Franklin county, reports :

On the morning of April 17th I was informed by certain persons that as they were driving on the pike from Rainbow to Bloomingdale they saw a little smoke on the east side of the road. They noticed two men about 20 rods from the fire, coming towards them. They spoke to them, and accused them of starting the fire. These men denied it, saying that the fire had just been set in some hay that had been pulled off from loads of hay that had been drawn past there, and in some dead grass. My informants were of the opinion that as it was so early in the morning the fire would soon die out of itself. About 9 o'clock I saw a great smoke arising in that vicinity. I drove there immediately, having left word for my boy and man to come with another team as soon as they could get there. I called out 14 men and three teams and finally had it subdued by four o'clock so that we could hold it. It burned up Archie Swinger's fence and John Thompson's fences on Lot 286. The fire was set on Lot 315 (State land) on the east side of the road. It ran over Lot 314 (State land) along the south side of the lot. Also on Lot 315, all in Township 10, Old Military Tract. It burned over about 40 acres of second growth timber of inferior quality, killing about every tree.

On May 14th I saw smoke on the land near Smith & Leonard's side-track, which runs from their sawmill to the A. & S. L. R. R. Taking what help I had, and calling out a lot of Mr. Roake's men, we cut the fire off and extinguished it. It was burning on Lot 309, Township 10, Old Military Tract, and was started by a locomotive which was standing on the side track. It was extinguished before any damage was done.

On May 15th I saw a big smoke which I thought was near the Kushaqua hotel. I took what men I had and went there. I found the fire was at the west end of Round Pond, and near the hotel. I called the men out that were at work on the hotel, and cut the fire off. On the 17th it broke out again, and I called out help and put it out the second time. This fire caught from a locomotive on the A. & S. L. R. R., the fire occurring on their land.

On June 15th I was at Loon lake, and Mr. Chase asked me if there was any fire on the Oregon plains, near Smith & Leonard's mill. I told him that there was a little, and he wanted me to go back and put it out. I went back, and when within about two miles of the mill I saw a man coming toward me. He was walking very fast, and I could smell smoke. I traveled as fast as I could, and about 50 rods further I could see a fire ahead of me. On driving up to it I found that it was set on the south side of the road, and had been burning more than 10 or 15 minutes. It was burning about eight feet from the wheel track. I drove on a little ways, and met two men and two boys. I asked them to stop and do what they could to hold the fire until I could drive to the mill and get help. They had some dinner pails in which they carried dirt and threw it on the fire, and thus kept it down until I got men from the mill with shovels who put it out. This fire was on Lot 215, Township 10. It did no hurt, but if I had not come along as I did it would have been a big fire.

On the 23d of August Forester Tormey came to my house and informed me there was a fire near the mouth of the Little North Branch. He said he would go over there immediately, and told me to come as soon as I could. My team had gone for a load of hay, but it returned in a few minutes and I then took my two men with shovels and pails and drove to the Littlejohn shanties, where I was to find Mr. Tormey. When I arrived Mr. Tormey was not there. We could not see any fire but it was very smoky. Looking up the North Branch we could see a black smoke rolling up above the tops of the trees. We then concluded that Forester Tormey had gone on to Louis Noble's shanty, where we found him. The men there said there was no fire. I said there

was, for I saw the smoke. Seymour Doty said the smoke I saw was from the stovepipe, where an old man had been burning straw. I asked him if there was not some fire or smoke up at the dam which was about one-half a mile from the shanty. He said there was not, for he had just come from there; had been after his fish pole, and that his feet were wet where he crossed the brook. We went up to the dam and found the fire burning about 10 rods westerly. I should say that this fire was started the day before, and there were men's tracks in the ashes. About eight rods west there was another fire which had been set about an hour before I got there, the smoke from which we saw at the Littlejohn shanty. We subdued it as well as we could. The duff was very deep. I went to the Noble shanty and looked it over. I do not think there had been any straw in it for six months.

Fulton County.

Henry Cool, firewarden for the town of Stratford, Fulton county, reports:

On April 30th a fire occurred near Hall's mill on lands belonging to J. D. Ives and Willard Edick, burning over about 25 acres. No great damage was done, as the land was mostly grown up to brush, etc. It was extinguished by cutting brush, back firing and carrying water.

On May 2d a forest fire occurred on Lot 33, Jerseyfield Patent, on lands belonging to Charles Hall and the State. It burned over 15 or 20 acres, doing considerable damage to the standing timber; should say about \$50 damages. This fire originated through James Henneshaw burning brush on his farm for the purpose of clearing land. It was extinguished by raking up leaves, back firing and carrying water.

On May 3d another fire occurred on this same lot, but farther west, which burned over about five acres. No great damage was done. This fire was supposed to have been set by some fishermen, names not known. It was extinguished by whipping it with brush and carrying water.

On May 14th a fire was discovered on the lands of Philip Smith which burned over about 10 acres. No material damage. It originated through Willard Edick burning brush to clear up land. It was extinguished by a heavy rain, which came up shortly after I arrived on the spot.

On May 16th there was a forest fire on the lands of Jason Hall and a part of Lot 62, Jerseyfield Patent. It burned over 25 or 30 acres, doing no great damage, the land being covered with brush and scrubby

growth. It was extinguished by letting it run to a swamp, where we carried water and put it out.

On May 18th there was a forest fire on the lands of Peter Miller, the Johnson lot, and on Lot 61, belonging to the State. The damage to standing timber was considerable—should say about \$100, half of which was on State property. We extinguished it by raking up leaves, back firing, carrying water, etc. The origin of this fire could not be ascertained.

The above are all of the forest fires of which I was notified. At the fire near Hall's mill I hired two men to help extinguish it, and at the fire on Lot 62 I hired two men and Peter Miller's men. With these exceptions I had volunteer help enough to extinguish the fires.

Frank Holmes, firewarden for the town of Mayfield, Fulton county, reports:

On April 17th a fire started on land owned by Cyrus Anible, in the town of Northampton, and crossed the line into the town of Mayfield, burning over about 60 acres of partly cleared land owned by George Warner and Henry Bushnel. Being notified of the extent of the fire, I ordered out three men, and with them went immediately to the place. We began to extinguish it with water, and in that way soon succeeded in getting it under control. The damage was not very material.

I would like a dozen more cards of fire rules and instructions, as I have found several who were not able to read, but who have some fallows to burn. I have given them cards to carry home, so that some of their family could read the rules to them.

Hamilton County.

William B. Meveigh, firewarden for the Town of Lake Pleasant, Hamilton county, reports:

I herewith make returns of fires which occurred within my district during the year 1894, and which were as follows:

There have been no forest fires of any account during the past year. Mostly all of them were fallow fires started by residents and all attended to carefully by owners of the land. Where residents had intended to burn fallows I was generally notified of such intention, and there seems to be a general disposition on the part of the citizens of this town to obey the law in this respect. All of which is respectfully submitted.

P. Hanley, firewarden of the Town of Wells, Hamilton county, reports :

The following is my report as firewarden for the Town of Wells, Hamilton county, for the year 1894:

On account of a very dry summer many fires started in this section, but, through hard work and constant vigilance, they were extinguished, so that but slight damage was done. I attended 18 fallows for clearing land and was on duty in each case. I succeeded each time in keeping the fire from spreading into the woods, thereby preventing any damage to standing timber.

There were also some forest or woodland fires, but in each case, with the aid of a number of men whom I warned out, I succeeded in putting out the fire before any damage was done.

Tuffield D. Depan, firewarden for the Town of Indian Lake, Hamilton county, reports :

On May 22d there was a fire on the south half of Township 19, of Totten & Crossfield's Purchase, which burned over about three acres. Part of the land was only lightly burned over. About one-quarter of the territory was severely burned. The timber on this tract was composed of spruce and hardwood. We had to fight these fires by getting on the ground early in the morning* and using hoes, axes, etc. This land was valued at about \$3.00 per acre.

On the same day, May 22d, there was a big fire on Township 17, Totten & Crossfield's Purchase, which burned over about 4,000 acres of land, including 1,280 acres, known as the Gospel, School and Literature lot. This territory was heavily timbered with spruce, hemlock, balsam and hardwood. Part of this territory was scorched but lightly, while a great portion of it was burned severely, destroying all the timber on that portion. This land was valued at about \$4.00 per acre. A good deal of this territory had been lumbered over, but there was a heavy second growth of spruce growing on the land. It is generally supposed that this fire was set intentionally, for some reason or another. It started at a point along the line of the Blue Mountain stage road. A large number of men were ordered out to fight this fire, but we could not do anything with it. It was finally extinguished by a rain storm.

* The firewarden here has reference to the fact that forest fires die down during the night, and for that reason are more easily controlled early in the morning.

On the same day, May 22d, a fire started on Township 15, of Totten & Crossfield's Purchase. This fire burned over about 1,500 acres, of which 200 acres only had been lumbered, principally hard wood, with some second growth mixed through it. This land was valued at about \$2.75 per acre. This fire was started, as is generally supposed, by a farmer who lives on a piece of adjoining land, and who, in burning a fallow, allowed the fire to escape from his premises. The rain put this fire out, also, as it was about impossible to fight it.

On the 25th of August a fire started in the forest on Township 33, Totten & Crossfield's Purchase, which did not amount to much, as it was attended to right off, and put out before it did any damage.

Herkimer County.

Henry Conklin, firewarden for the town of Wilmington, Herkimer county, reports:

On the 8th of May a forest fire occurred in the Remsenburgh Patent, on Great Lots 63 and 64. It is supposed that it was caused by some fishermen who had been smoking and carelessly threw down a lighted cigar stump. On Lot 63, which is owned by John V. Flansburg, about 50 acres were burned over before the fire could be put out, causing damage to the amount of nearly \$50. There was but slight damage done on Lot 64, as the fire was nearly extinguished at dark by the men that worked there. At night there came a heavy rain which put it out entirely. This fire on Lots 63 and 64 burned over about 100 acres; but nearly one-half of this land is an old brier patch and old clearing, with no valuable timber on it. In the south part of the town quite a good many of the farmers burned their fallows in the fore part of May, but were very careful that no fire got into the forest, or beyond control or off of their own land.

I have made inquiries as to the north part of the town, and can not learn that there were any fires there. I spent two days posting notices in my part of the town, and sent a package of posters to Mr. David Charbonneau, whose post-office address is at Old Forge, Herkimer county, N. Y. I have forwarded his appointment as district firewarden as per instructions from you. I did not go to Old Forge and the territory beyond it to post any notices, because I supposed that Mr. Charbonneau would attend to that.

Charles L. Ives, firewarden for the town of Salisbury, Herkimer county, reports:

There were two small fires on Spruce creek, one on August 31st, the other on September 1st. The property is owned by private individuals.

The extent of the burned land will exceed five acres, and the loss was small. It was caused by camp-fires made by fisherman.

Lewis County.

M. A. Samson, firewarden for the town of Diana, Lewis county, reports :

On September 3d a fire started at Ungabund Pond, and on the same day another one at Indian River Pond, supposed to have been caused by fishermen, but nothing is positively known as to the cause. These two fires were about one mile apart, and when they ran together it made a front of burning woods three miles in length, and a strip of territory one and one-half miles wide. The timber destroyed was principally hard wood. The damages will probably amount to \$1,000. The land belonged to private owners. The means used to extinguish this fire were digging a small ditch, and keeping the ditch wet, and where water could not be procured we threw fresh dirt from two to three inches in depth. To fight a fire properly, commence in the morning, say at 4 o'clock, and ditch in front of the fire. Keep the ditch wet, and the flames will stop as soon as they reach it. All stubs on the side of the fire that will catch and throw sparks, should be cut.

There were some other fires in this town, but no damage of any account was done by them.

St. Lawrence County.

Allen Olmstead, State Forester in St. Lawrence county, reports :

Forester Sanford and I returned from Silver Lake yesterday, where we found everything all right. I should judge about one acre had been burned over on land which was covered with small brush and briers. We found smoke in three or four places under the roots of some old pine stumps ; but it was where it could not possibly do any harm. It rained very hard. I left Sanford at the forks of the road, and walked to Childwold Park, as I wanted to see if there were any fires in that section. I saw only one small place that had been burned. One man told me that there had been a small fire at Lake Pleasant, but that it had been put out.

William Humes, State Forester, reports :

On Monday, May 14th, a fire broke out three and one-half miles east of Benson Mines, St. Lawrence county, on lands owned by the Remington Paper Company, of Watertown, N. Y. The fire was

started by parties who were clearing land, and who allowed their fallow fires to run beyond their premises. This fire continued to burn until May 18th, burning over, I should judge, about 1,000 acres of waste land, doing but little damage.

On the same day, May 14th, another fire was set by parties who were clearing land near Oswegatchie, which raged with great fury until May 18th, burning over about one-half of the 68 acres owned by the State, in Great Lot No. 30, town of Fine. This fire was prevented from running any further by the firewarden, who called out a large force of men, which prevented any further damage.

H. C. Pearson, firewarden for the town of Pitcairn, St. Lawrence county, reports :

Between August 15th and August 25th there were several forest fires in this town. About 300 acres were burned over, mostly stripped land. The damage was, perhaps, \$300. These fires were set by the railroad, and by hunters. Men were employed by the firewarden at the expense of the town to prevent the fires from spreading. The expense was about \$30. Means should be employed to make the railroad companies observe the law.

Saratoga County.

E. W. Eldridge, firewarden of the town of Malta, Saratoga county, reports :

On March 31st, about 4 o'clock P. M., a fire broke out in the woodlands owned by R. W. Hill, situated on the highway leading from Wiggins' Corners to the south end of Saratoga Lake. I summoned the necessary aid, and after two hours' hard fight, the fire was brought under control. About two acres were burned over. The damages were slight. Origin of the fire is unknown. The method used in extinguishing this fire was fighting it back with green boughs, and throwing on fresh earth.

Anson J. Larkin, firewarden of the town of Ballston, Saratoga county, reports :

On April 17th I was notified of a fire in the lake woods. Securing help immediately I repaired to the place where I found some railroad ties burning in the woods of Philip Ostrander. They were old railroad ties which had been thrown over the fence and off from the railroad lands. About one-half to three-quarters of an acre, which was covered thickly with young thrifty trees, was burned over. Some

person had already been there and put out most of the fire in the leaves. We found one place where the fire was just starting into the leaves again, and would probably have got a new start before morning. Some six small piles of ties had been consumed, and pieces were yet on fire with beds of live coals. If the wind does not start up to-night I presume it will be out by morning.

Reuben E. Cronkhite, firewarden for the town of Greenfield, Saratoga county, reports :

The first week in May a fire occurred in Corinth. It crossed the line of Greenfield and burned five acres of brush on lands of Thomas Bowman, causing but a slight damage there ; also 20 acres of nice young timber on the lands of James McQueen, which was damaged to the amount of \$200.*

On May 14th a fire occurred in the western part of the town near Mount Pleasant. Some five acres of brush were burned. The damage was very light.

We have been very much favored considering the fires in adjacent towns. This town is well supplied with fire notices.

Edward McDonnell, firewarden for the town of Half Moon, Saratoga county, reports :

On March 23d sparks from an engine on the D. & H. R. R. started fire on the farm of W. F. Wilson, which burned over about seven acres of woodland before it was got under control.

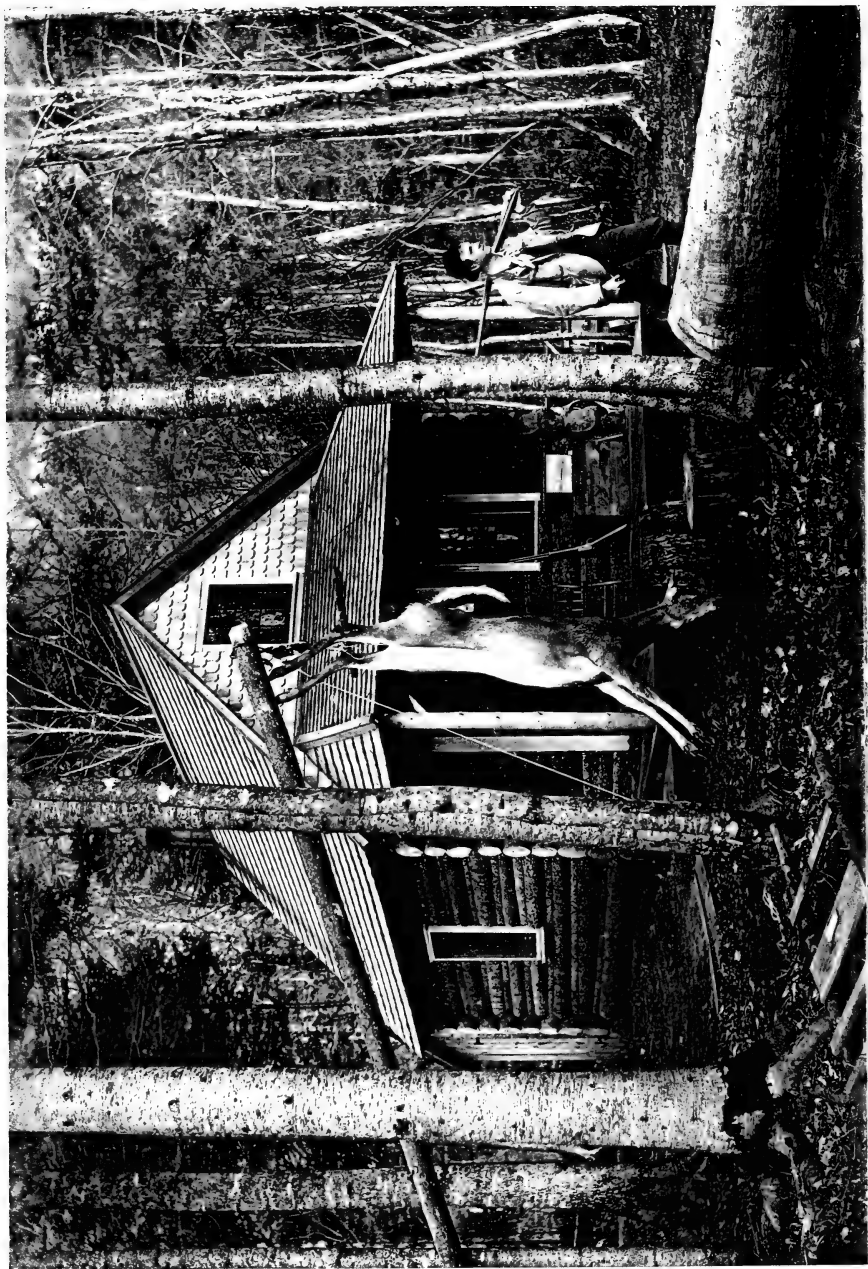
On April 9th, on the same farm, about four acres were burned over, the fire being caused by sparks from a locomotive. I estimate the damages at \$100.

On May 17th, on the McDonnell farm, about six acres of meadow land was burned over by sparks from a locomotive on the D. & H. R. R., causing a damage of about \$10 per acre.

August 17th another fire on the McDonnell farm was caused by sparks from a locomotive. It burned over meadow and pasture lands, together with 22 panels of fence. Amount of damage \$60. With the assistance of four men it took several hours to control this fire, as there was a brisk wind blowing.

Several other fires occurred that were put out promptly and with trifling loss, all started by sparks from D. & H. locomotives. Telephone linemen generally observe the law regarding injury done to trees in stringing their wires. I have kept the fire notices well posted, although there have been several of them destroyed. I would like a few more card posters.

* This estimate is probably too high.



G. H. Rison, Photo.

A LODGE IN THE WILDERNESS.

Warren County.

William H. Burnett, firewarden of the town of Queensbury, Warren county, reports :

On the 17th day of April I noticed that a forest fire was running on French Mountain. I warned out four men and put it out after it had burned over about one acre. It did no damage except burning up some fences. It was caused by a burning fallow started for clearing land which was not properly guarded.

On May 16th a fire ran over quite a large tract of timber in the swamp near Glens Falls, burning a small undergrowth, but not doing much damage otherwise. I arrived there afterward and found that a large number of persons had been engaged in extinguishing it. The origin of this fire is unknown at present.

On May 17th I saw smoke arising over the woods on French Mountain, near the southerly part and east of Bloody pond. I went there with four men, and notified others on the way besides. After working there until 2 o'clock in the morning we succeeded in putting the fire out. It ran over several acres of small timber which was burned over three years ago. It did not do much damage except burning up a small house in the woods which had been unoccupied a number of years. The cause of this fire is not yet known, although some say that it was started by an engine on the railroad; but there is no proof of this. Others say that some fishermen built a fire to cook by, after which they left the spot allowing the fire to spread. In either case no one seems to know as to the exact facts.

Please send me some more fire notices for posting, for I see that nearly all the notices are weather-beaten and worn out. They should be replaced. I have no trouble in getting men to fight fire. They are all willing to work when called out, and sometimes before being warned out.

On September 6th a forest fire was running in the woods on what is known as Buck Mountain, in Washington county, near the county line at the Kattskill House on the shore of Lake George. I called out four men to fight the fire, and we worked until dark before getting it under control. I left two men to watch this fire for two days, until all the danger was passed. The amount of damage was very little, as the timber was all second growth and quite small at that. It burned over 10 or 12 acres. This fire was started by a man who was trying to smoke a hive of bees out of a tree. I have not arrested him yet, but

will investigate the case before a justice of the peace, and then if proper proof can be obtained I will arrest him for the offense. I received a package of fire notices, for which I am much obliged.

Daniel Sheehan, firewarden for the town of Johnsburgh, Warren county, reports:

A fire started June 4th on the East Gore, on Lots 24 and 25, owned by Patrick Moynehan. I warned out 10 men and outed it. The damage was about \$50. It burned over 100 acres.

Washington County.

A. C. Vaughn, firewarden for the town of Fort Ann, Washington county, reports:

On the 28th of August I was notified that a forest fire had started at Crossetts Pond in this town. I went there immediately and found quite a fire upon the two islands in the pond, containing some 24 acres of land. From one of the islands there was a neck of land extending on to the main shore. We cleared off this neck to confine the fire and keep it from reaching the shore, as it is all timber lands for miles around this vicinity. The fire consumed all of the timber upon the two islands, some 24 acres in extent. Expenses for assistance amounted to \$15.

Thomas M. Cooper, firewarden for the town of Dresden, Washington county, reports:

April 17th there was a fire on lands owned by Chris. Williams, which burned over 12 acres and destroyed three acres of wood. The damage to small timber will amount to \$50. Cause of fire unknown.

On April 19 another fire burned over 125 acres of young timber, damaging timber to the amount of \$200. This fire caught from a garden fallow set by a man who was living in the woods alone in a shanty.

On September 6th there was a forest fire on lands owned by Willis Foster, near Rocky Pond, which burned about 25 acres of young timber near a summer camp site. I estimate the damage at \$500.

Before the Forest Commission was created the damage each year to forest lands would have been ten times the amount of damage this year.

CATSKILL PRESERVE.

Sullivan County.

Newcomb Mapes, firewarden for the town of Bethel, Sullivan county, reports :

I have to report a hard fought three days' fire in my district, May 2-5, inclusive. It was started at Black Lake by Eugene Schoonmaker, on the Shafer farm. He notified me in accordance with the rules of the Forest Commission that he wanted to burn over some meadow land on his farm on Saturday, April 28. I responded to the notice in the morning of that day and looked over the ground, which adjoins a tract of wild land. I directed him to plow all around the piece he wished to burn, and get five or six men to assist him, and not to set fire until four o'clock in the afternoon, as it was quite dry. In the afternoon of that day it rained, so that he could not burn it over ; but on the morning of May 2d he fired it without taking any precaution whatever, and without notifying me again. In less than 10 minutes the fire was beyond his control, running faster than a horse. I had notified Schoonmaker when he applied for permission to burn this fallow that he must assume all risk and expenses in case of accident or if the fire got away from him. So as soon as he found that the fire had got the best of him he sent for me, and I repaired to the place at once. I found Mr. Schoonmaker with quite a number of men fighting the fire, but before it could be subdued the flames ran over about 400 acres. In its course the fire burned a shanty owned by John Rape, which was used in storing hay, and ran over about 100 acres of his land, doing but little damage to it, however, with the exception of his buildings. His loss will not exceed \$50. From Rape's property it extended to the lands of Mr. George Wells, burning over nearly 100 acres ; but Mr. Wells told me that he had not considered it had damaged him any as he got a good burn on a fallow which he had cut. From there it burned over lands owned by heirs of the Tillotson estate to the extent of over 200 acres. A part of this tract is covered with a growth of young thrifty maple, birch, poplar, beech, etc. In the latter case it would be hard to estimate the damage, as the land is good for no other purpose than woodland ; but this fire has set back the growth from five to 10 years. Mr. Schoonmaker did all that was possible to extinguish the fire, and did not leave it, night or day, until the rain which came on the 5th. We used hoes and plowed furrows where we could get a team. We found that fresh dirt was very effectual in stopping the spread of the flames.

I have to report another forest fire which has burned over thousands of acres of land in this and the adjoining towns. This fire commenced on Sunday morning, May 13th, and was started by some person unknown. Everything being as dry as tinder, it spread with frightful rapidity. I was on the spot as soon as I could get there, but about the only thing that could be done was to back fire from roads and streams in the immediate neighborhood of farm buildings to save that class of property. In this way we worked and retreated for about five miles before the flames. No buildings were burned. I should estimate that from three to five thousand acres of ground was burned over in the town of Bethel, and probably more than that amount in the town of Highland. The land was owned by Hon. R. Morrison, who had about 1,000 acres burned. Mr. Chapin had a large tract burned. Mr. John French, Mr. B. French and others in the town of Highland sustained damages. Mr. Hull had about 1,000 acres burned, also Mr. Willis Glass. The most of this territory was composed of barrens, a little of which was scrub oaks and pitch pine, although in the swales a good deal of young oak, maple, beech, poplar, etc., was destroyed, causing altogether quite a loss in young timber. The fire continued to burn from Sunday, May 13th, to Thursday, the 17th. I had from 12 to 20 men at work during this time. Finally the rain came and put it out.

The general opinion here is that this fire was set for the purpose of promoting a better growth of huckleberry bushes. A reward should be offered for the detection and conviction of the incendiary.

W. D. Spurling, firewarden for the town of Delaware, Sullivan county, reports :

A fire started on the last of March and continued to break out at intervals during the month of April. It was very dry, and there was no water to be had. It was impossible to keep it under control. As fast as we extinguished it in one place it would break out in another. It burned over about 500 acres of barrens, all small brush, and consequently no great damage was done. It started from an engine on the Erie railroad.

William Rudick, firewarden for the town of Lumberland, Sullivan county, reports :

We had a large fire at Lebanon Lake which burned over 600 acres. The damage is estimated at \$600. During the season six fallows in this town were burned for clearing land, but no forest fires resulted from them.

David Deyo, firewarden for the town of Hurley, Ulster county, reports :

On March 31st a farmer in this town started to burn brush, and the fire got the best of him. I was sent for, and went there with sufficient help and put it out. It burned over about 20 acres, doing little or no damage, as there were no fences on the farm, and it was so early in the season that the buds had not started.

The next day about noon the wind started this fire again in the woods. I called out sufficient help to fight it. On account of the wind we had to back fire about 75 acres. The timber being good size and the wind strong, the fire moved so fast that it did not do much damage.

April 2d I was again called out again. Some parties who were piling cordwood started a fire to take dinner, and left it without putting it out. The wind started it up, and we had to back fire to stop it. It burned over about five acres. No damage was done, as the cordwood did not burn, and it was too early in the season to harm the young timber.

On July 4th I was called out to fight a forest fire about two miles away. I found the fire between two roads, and burning nearly to the road. So we stopped the fire at the roads. No cordwood was burned, and very little damage was done, for the land is so poor that no timber will grow on it. About 20 or 30 acres were burned over. I could not learn how the fire started.

On August 21st I was called to go to a fire about five miles away; I was absent from home that day, and so my son acted as firewarden in my place. Near Morgan Hill, where the fire was burning, there was plenty of help, but the men had to back fire along the roads in order to stop the progress. No great damage was done. No cordwood nor logs were burned, but 100 acres or more was damaged slightly. The land was rough, and nothing growing on it.

On August 23d I was called on to go to a fire in the north part of the town. We worked until 3 o'clock when we had the fire out, as we supposed. We think it started from sparks from an engine on the Ulster and Delaware railroad. About 10 acres were burned over. Damage little, if any.

On August 24th, the next day, I was called out, as this fire had started up again. It was a very dry time, and it was impossible to stop it without back firing one and one-half miles to a road called the Stone road where we finished. About 12 acres of land were burned over; but, as there was no timber growing on it, no damage was done. On August 25th

I was called out again. I was not at home, so my son went with sufficient help, but he had to back fire again to the same road. About 50 or 60 acres were burned over, with a loss of about five dollars per acre. My son thinks some one set fire again where we left it the day before as the fire was completely out when we left.

On August 26th I was called on again as the fire had started up afresh, and was burning everything clean before it. As the timber had just been cut last winter, it did very little damage, burning only 12 cords of wood. We back fired and watched it until 3 o'clock next morning, as there were 60 cords of wood within 30 feet of the fire. About 30 or 40 acres were burned over.

August 29th I was called out by a fire in this town which was not very large; perhaps 25 acres were burned, doing damage to about \$50. No cordwood or logs were burned. I think it was set on fire intentionally, or else it followed a root under the ground outside the back fire.

September 2d I was again called out, and we back fired along the road. This fire did not burn over many acres, but burned it clean, as it was very dry. No logs, or bark, or cordwood was destroyed. I estimate the damage at about \$75. Cause of fire unknown.

After this last fire I made the remark that all fires after that must be put out without pay, as the bills already were so large that farmers could not pay them; and that was the last fire we had. There were quite a number of bills for fighting fire that the town board of auditors cut down considerably, and there were some which were not allowed at all.

Joseph H. Riseley, State forester in the Catskill district, writes as follows:

ALLABEN, N. Y., October 3, 1894.

Col. WILLIAM F. FOX, *Superintendent State Forests*:

DEAR SIR.— I suppose you have read in the papers the accounts stating that the forest fires were destroying the deer park fence, and that the deer were getting out. There is no truth in it at all. There have been no fires at all near the deer park, with the exception of about two acres of fallow land which were burned over by a farmer on Big Indian creek. As he did not allow the fire to escape from his own premises, no damage was done. There have been no fires within 15 miles of the deer park. There were several small fires, which were put out immediately and without much damage.

Yours truly,

JOSEPH H. RISELEY,

Forester.

Patrick Johnson, firewarden for the town of Shandaken, Ulster county, reports:

On May 15th I saw smoke arising over the mountain from Bushnellsville, near the line of Green county. It was running fast toward the center of our town. I warned out four men, and taking them with me started on a ridge ahead of the fire. We dug a trench up the mountain, and back fired it. By night we had it under control. Next morning I took one man with me, and before sundown it was out of danger. It burned over about 150 acres, mostly brush and rocky land. I might say that there was no damage done. This is the only fire that happened in my district during the year. I have attended seven fallow fires in the way of clearing land, and did not let one of them break away into the woods.

George W. Lewis, firewarden for the town of Olive, Ulster county, reported:

No fires have occurred in the mountains this season, owing to the extra posting of notices of the Forest Commission, and to the warning of tourists going up the mountain for the view to be extra cautious, as there was no water to put out even the smallest fire. We had no water for five weeks, except what was brought up in pails from a spring one mile below us.

Mark C. Riseley, firewarden of the town of Woodstock, Ulster county, reports:

On August 11th I was called on by Egbert Howland to stand guard while he burned a fallow. He burned 19 acres without allowing the fire to escape from his land.

On August 25th a forest fire broke out south of Woodstock, which burned over an area of about 500 acres, mostly second growth timber. Damage about \$500. We had to back fire in order to stop it. It was started by an incendiary.

On August 27th I was called on by Walter Traub to assist him in burning a fallow. He burned four acres with good results; and on August 28th I was called on by Michael Platsider, who burned over two acres of his brush land with good results.

COUNTIES OUTSIDE THE PRESERVE.

Marvin Cardot, supervisor of the town of Arkwright, Chautauqua county, reports :

About the 1st of September last a fire broke out on Lot 52. This lot, with some adjoining lots, has been denuded of timber during the last 30 years, and is growing up to brush and briers. The land being of little value for farming purposes, but little effort was made to clear it except for pasture in some places. The fire burned over about 350 acres without doing any damage so far as I can learn. No effort was made to stop it, for no one seemed to care so long as it did not escape from the slash. It was reported that this fire was set by berry pickers who were making coffee.

E. J. Griswold, supervisor of the town of Sheridan, Chautauqua county, reports :

There was only one fire of any extent in this town during the past year. This one burned over about six acres. The damages were probably \$200. Some 20 rods of old fence and 20 cords of wood were burned; the balance of the damages being the loss on standing timber. This fire was started for the purpose of burning some old stumps. It spread into the timber, and as it was a very dry time it could not be checked, but was put out by rain.

Dutchess County.

I. P. Carman, supervisor of the town of Pine Plains, Dutchess county, reports :

We had a fire on Stissing mountain, in the western part of this town, in October. It is supposed to have been caused by the railroad. It burned over about 1,000 acres of timber land and destroyed 100 cords of wood. The damages were estimated at \$1,500. I could not extinguish the fire, but kept men on duty watching it to prevent it from leaving the mountain until it rained.

Edwin Knickerbocker, supervisor of the town of Stanford, Dutchess county, reports :

A fire broke out on Stissing mountain, in the northern part of the town of Stanford, about August 25, 1894, and burned about two weeks. It run over about 1,000 acres of mountain land in Stanford, burning up

about 150 cords of firewood and doing about \$2,000 damages. I could not learn the cause or origin of this fire, but there are three railroads that run parallel with the mountain range on the east side and within a few rods of it. The fire was undoubtedly caused by sparks from the engines, it being a very dry time. It occurred during the great drouth, when there were so many forest fires throughout the country, and it was very difficult to extinguish it; the fire would smoulder and burn in them for days, and then break out in a new place several days after it had been extinguished. The roots of the trees would burn under ground several feet, and then break out at some distance beyond where it had been put out. We finally conquered it in our town by calling out a force of men strong enough to extinguish it, and leaving a guard to watch it for a few days and extinguish it immediately as soon as it broke out again.

J. E. Munger, supervisor of the town of Fishkill, Dutchess county, reports :

A fire occurred here in the latter part of August which consumed about 10 acres of brush and young chestnut trees on the side of the mountain. This has been the only fire hereabouts, of this sort, for three years.

Jefferson County.

E. B. Johnson, supervisor of the town of Lyons, Jefferson county, reports :

In the month of August about 100 acres of woodland situated about one-half mile north of Chaumont, N. Y., were burned over. This fire originated from a burning saw mill in that village. The value of the wood land destroyed is probably about \$1,500. As the fire occurred in a very dry time we found it difficult to subdue it. Almost the entire community was warned out one day, and fought the fire. The burning area was surrounded with barrels, which were kept filled with water, and watchmen were employed night and day to prevent the flames from spreading. This method was continued until we had a heavy rain which extinguished the fire.

Orange County.

C. T. Knight, supervisor of the town of Monroe, Orange county, reports :

Last summer about 100 acres were burned over on the south boundary of our town, causing a loss of \$250 or \$300 to young timber

growth. Cause of the fire unknown. The usual means were used in putting it out, and a force of men back firing and beating it out with brush.

Harland Eustice, supervisor of the town of Cornwall, Orange county, reports:

In June last, 250 acres on the north side of Storm King Mountain were burned over. This land was owned by the Peter Brown estate, Mr. Pagenstecker and W. E. Gwyn. On the south side of Storm King Mountain about 20 acres were burned over. Damages, \$75. The fire was caused by a camping-out party. The land on the south side of the mountain was owned by Mr. Tefft, who employed men to extinguish it.

Rensselaer County.

Charles Z. Bennett, supervisor for the town of Grafton, Rensselaer county, reports:

There was a fire on the 14th of August in this town, which burned over about 300 acres of wood land, and destroyed quite a good deal of cordwood. This fire was in the northwest part of our town. The damage was from \$3,000 to \$4,000, as near as I could judge. It was put out by digging trenches up the mountain side. This fire was started by some one, but no one knows how.

Rockland County.

Alexander Rose, supervisor of the town of Stony Point, Rockland county, reports:

A fire occurred April 15, 1894, in the western part of the town. Number of acres burned over, 1,400. The land was covered with young standing timber, oak and chestnut, from three to 25 years old. It was valued at \$7,000 to \$10,000. The fire was of incendiary origin. It was extinguished by back firing.

Steuben County.

Lorenzo Hurlburt, supervisor of the town of Dansville, Steuben county, reports:

On April 4th a fire caught from where W. C. Griswold was boiling sap, and carried by the high wind, ran over about 18 acres. The principal damage was to George Flickinger's land, burning over 10 acres that were covered by a heavy growth of last year's grass that had been allowed to remain to be plowed under as a fertilizer; also, a quantity

of rye straw and grass, about \$40. A fence was burned with a loss of \$8. An effort was made to extinguish the fire by whipping it with brush, which was of no avail, on account of the wind. The fire occurred in the western part of the town. So far as I am aware there were no other fires.

Among the documents turned over to me by my predecessor I found this blank, together with stamped envelope, instructions, etc., showing that he had made no report as firewarden. This report may be too late to be of any use, but I send it for what it is worth.

Suffolk County.

James H. Pursin, supervisor of the town of Southampton, Suffolk county, reports :

A forest fire occurred north of Southampton village early in the summer. The area burned is estimated at about 1,200 acres. The timber was of all sizes ; some of the land had recently been cut over, and part of it was covered with a growth of 30 or 40, and, in some instances, more years. A conservative estimate of the damage done would be \$7 or \$8 per acre. The large wood is being cut for fuel. The principal damage was to that which was unfit for fuel, and where the growth was entirely lost. The cause of the fire is unknown. It was extinguished by throwing earth upon it, starting back fires along roads, etc.

Tioga County,

J. W. Allen, supervisor of the town of Richmond, Tioga county, reports :

There was a fire in this town which burned over land to the extent of 100 acres. Damage, nothing. The fire passed over a section of land from which all valuable timber had been removed.

L. W. Hull, supervisor of the town of Spencer, Tioga county, reports :

About 125 acres of land have been burned over during the past year in this town. The land was mostly covered by what is termed "slashings." Damage is estimated at \$250. The fire was caused by farmers, who were burning fallows for clearing their land.

SUMMARY.

Pursuant to the law requiring that "A consolidated summary of these returns by counties shall be included in the annual report," we have made the following recapitulation :

Adirondack Counties.

Date.		COUNTY.	Acres.	Damage.	Cause.
1894.					
March	23.	Saratoga	7	\$20	Railr'd locomotive.
April	9.	Saratoga	4	15	Railr'd locomotive.
"	10.	Franklin	20	50	Unknown.
"	15.	Franklin	60	100	Camp fire.
"	16.	Essex	20	75	Railr'd locomotive.
"	17.	Essex	160	200	Clearing land.
"	17.	Fulton	60	60	Clearing land.
"	17.	Washington . .	12	50	Unknown.
"	19.	Franklin	20	40	Unknown.
"	19.	Washington . .	125	200	Clearing land.
"	27.	Essex	30	20	Hunters.
"	30.	Fulton	25	50	Clearing land.
May	2.	Fulton	20	50	Clearing land.
"	3.	Fulton	5	10	Fishermen.
"	3.	Saratoga	20	200	Clearing land.
"	8.	Herkimer	50	100	Fishermen.
"	14.	Fulton	10	20	Clearing land.
"	14.	St. Lawrence . .	1,000	2,000	Clearing land.
"	14.	St. Lawrence . .	34	200	Clearing land.
"	16.	Fulton	30	30	Not stated.
"	17.	Warren	10	20	Railr'd locomotive.
"	18.	Fulton	50	100	Unknown.
"	22.	Hamilton	200	600	Not stated.
"	22.	Hamilton	4,000	12,000	Incendiary.
"	22.	Hamilton	1,500	4,000	Clearing land.
June	1.	Essex	30	30	Railr'd locomotive.
"	4.	Warren	100	50	Not stated.
"	12.	Essex	200	400	Clearing land.
"	17.	Essex	52	266	Railr'd locomotive.
August	1.	Herkimer	5	10	Fishermen.
"	2.	Essex . . . . .	.....	.....	Tramps.
"	10.	Franklin	25	125	Fishermen.

Adirondack Counties — (Continued).

Date.	COUNTY.	Acres.	Damage.	Cause.
1894.				
August 15.	St. Lawrence .	300	\$300	Railr'd locomotive.
" 25.	Essex	75	100	Fishermen.
" 27.	Essex	10	35	Railr'd locomotive.
" 28.	Essex	200	200	Unknown.
" 28.	Washington ..	24	100	Not stated.
September 3.	Lewis	350	1,000	Fishermen.
" 6.	Warren	10	20	Bee hunter.
" 6.	Washington ..	25	500	Not stated.
" 15.	Essex	10	20	Tramps.

Catskill Preserve.

March 31.	Sullivan	500	500	Railr'd locomotive.
April 1.	Ulster	20	50	Clearing land.
" 10.	Sullivan	600	600	Clearing land.
May 2.	Sullivan	400	800	Clearing land.
" 13.	Sullivan	6,000	6,000	Incendiary.
" 15.	Ulster	150	150	Not stated.
August 23.	Ulster	10	25	Railr'd locomotive.
" 25.	Ulster	500	500	Incendiary.
" 29.	Ulster	25	50	Incendiary.

Counties Outside the Preserve.

April 4.	Steuben	18	100	Sugar makers.
" 15.	Rockland	1,400	7,000	Incendiary.
June 4.	Orange	270	75	Campers.
" 15.	Suffolk	1,200	8,400	Unknown.
.....	Tioga	125	250	Clearing land.
August 14.	Rensselaer . . .	300	3,000	Incendiary.
" 24.	Orange	100	300	Unknown.
" 25.	Dutchess	1,000	2,000	Railr'd locomotive.
" 28.	Jefferson	100	1,500	Saw-mill.
September 1.	Chautauqua . . .	350	350	Berry pickers.
" 4.	Chautauqua ..	6	200	Clearing land.
October 1.	Dutchess	1,000	1,500	Railr'd locomotive.

Total acres burned over, 22,962. Damages, \$56,716.

A classification of the various causes shows the following result :

From clearing land	16
From railroad locomotives	12
From fishermen	6

From incendiaries	6
From camp fires	2
From tramps	2
From hunters	1
From berry pickers	1
From sugar makers	1
From bee hunter	1
From saw-mill	1
From causes not stated	6
From causes unknown	7

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In addition to the above causes, there was an instance in which a fire was caused by lightning. This occurred in the forest on Buck mountain, Township 22, west side of Long Lake, Hamilton county.

The lightning was seen to strike a dead "stub," and a column of smoke was observed immediately. The rain soon put the fire out, as it occurred in July, a month in which fire will not run very far in the woods, but it smouldered for several days in the humus or "duff" as it is called. As no area of timber land was burned over, this account does not appear in the foregoing reports.

People who have never been present at a forest fire have but a faint idea of the resistless energy and the appalling scenes which characterize one of these events. To the direful phenomena is added not only the destruction of property but too often a loss of human life.

For many years New York has been exempt from extensive fires like those which, in other States, have swept over vast areas of forest territory, leaving behind them a scorched and blackened waste. This exemption is largely due, as before stated, to the organization and work of the firewardens. Their successful management is entitled to something more than a passing notice. Some description of the services which they render, in case of need, seem pertinent to this subject.

A Forest Fire.

It is spring time, and under the influence of the sun and warm south winds the melting snow has disappeared from the recesses of the woods. The dead leaves of the previous fall, which lie

thickly beneath the trees, have become as dry as paper. A fire is started in these leaves. It may have caught from a burning match carelessly thrown aside, or from the embers of some abandoned camp fire, or, more likely, from fires started by some farmer for clearing land.

The slender column of ascending smoke is seen and watched until its increasing volume announces that the woods are burning. Word is quickly sent to the local firewarden, who may already have noticed the danger signal. Quickly harnessing his horse to the old, mud-bespattered buckboard, the warden drives hurriedly in the direction of the fire, stopping here and there on his way to "warn out" his neighbors to follow him and help "fight fire." Perhaps he hitches up a big farm wagon, throws into it some axes, shovels, hoes, pails or brooms, and collects his little *posse* of fire fighters on the way. If he is familiar with the locality in which the fire appears to be, he may order some neighbor to get a team and plow, and follow them to the place.

Leaving their wagon on the road the party plunges quickly into the woods, climbs some hill or crosses some swamp, and soon find themselves face to face with the crackling flames. The fire warden makes a quick survey of the situation, and then gives his orders promptly. If the fire has not attained much headway it is fought on all sides by raking and sweeping the dead leaves away from it, until a surrounding space has been laid bare, across which the creeping flames may not pass. Some of the men cut branches of trees and with the boughs whip out the little fires as they advance. Some use shovels and throw fresh earth on the smouldering leaves or fallen timber which may be burning. If there is a stream or pond near by water may be carried and used to "wet down" the layers of dry, dead leaves along the edge of the fire. Brush fences are cut away or torn aside, and perhaps, some trees are felled by way of precaution. If the surface of the ground will permit, a plow may be brought into use and wide furrows of fresh earth are turned up on every side. If there is no wind and the work was commenced in time, the little band of fire-fighters soon get the flames under control and the danger is past. Leaving some trusty men to watch the smoulder-

ing fires, or to extinguish every spark, the firewarden and his men return to their homes.

But this good fortune does not always attend them. The fire may have occurred during some period of excessive heat and drought; the wind may arise, as it is very apt to do, and the men who have employed every means that skill and experience would suggest find themselves baffled and driven back by the advancing flames. The men hold their ground manfully, working until their faces blister with heat and their eyes smart with the hot, blinding smoke. Overcome by the heat and choked with the stifling smoke, they often fall back for fresh air, and, gasping for breath, throw themselves exhausted on the ground. The fire which hitherto had been burning in the underbrush and dead leaves along the ground mounts into the tree tops, where, fanned by the rising wind, it roars and crackles with an appalling sound that tries the strongest nerves. It flashes from tree to tree, and as it catches in some dry, resinous pine or spruce, the tree bursts into flame with a roar that makes the bravest fire-fighters fall back.

The flames, driven by the high wind, advance so rapidly that the men quit their work and run for their lives. The forest for a long distance is a seething mass of flame, whose roar fills the air a mile away. Faster the flames sweep onward, while before the advancing fire run the startled herds of game, large and small, which instinctively hurry along in their effort to escape, while above the wild roar of the flames may be heard the shrill cries of the frightened birds whose wheeling flights precede the drifting smoke.

But the party of tired and smoke-begrimed men do not give up the fight without further effort. Their number is reinforced by others who have repaired to the spot in response to the increasing danger or calls for help. Rapidly the party travels to some place ahead of and in the path of the advancing fire. A line of defense is hastily selected—some road, clearing or stream—and then the “back-firing” commences. Torch in hand, the men pass rapidly across this front and set fire to the woods. These newly kindled flames burn backward toward the main fire, which meets them and then dies out for lack of material. The burned area is now watched carefully on all sides lest

the fire should break out again into the adjoining woods ; but the heavy showers that so often follow a large forest fire puts an end to all further danger and the watchers are at liberty to leave the ground.

Sometimes a fire covering considerable area is managed so that it is soon under control ; but still it burns obstinately, although it does not spread. In such cases the men often cease work during the heat of the day, but resume the fire-fighting after the sun is down, or at daybreak, having learned by previous observation and experience that a forest fire burns fiercest while the sun is high ; and that it dies down at nightfall, after which the flames are easier controlled and extinguished, especially in the early morning, the damp night air evidently checking the intensity of the fire. Moreover, the wind which blows more or less strongly during the day is very apt to subside at sunset.

Forest Fires in Other States.

We append here some descriptions of the forest fires which are constantly occurring in other States. These reports were culled at random from the public press, and refer to fires during the past year only. A similar collection of direful tales could be compiled each season, but the story of 1894 is sufficient.

While these extracts are not strictly within the province of this report, they may prove useful in calling attention to the terrible nature of forest fires, and the impending evil that is always threatening the forests of New York. The fires reported by our firewardens are so small and unimportant compared with those which have desolated large areas in other States, that our citizens have good cause for congratulation. We have room for only a small part of the many accounts reported from every other State, but the extracts given here are sufficient to form a history, hitherto unpublished, of the great forest fires of 1894.

Minnesota.

(From the New York Sun, September 4, 1894.)

HINCKLEY, Minn, September 3.—Forest and peat fires had been raging within a short distance of Hinckley for some weeks, but no apprehension had been felt by the inhabitants, and no preparations had been made for emergencies.

On Saturday afternoon the fire approached, fanned by a strong wind. The smoke grew denser as the day advanced, and it soon became dark as night.

About 4 P. M. the wind changed, and the residents of the doomed town saw the flames were bearing down upon them. As the alarm rang through the streets, the people rushed from their homes, and when they caught sight of the red, on-rushing sea of fire, they became panic stricken.

The fire shot across the town and the people fled in all directions. They ran wherever they thought they could find refuge. A large number ran to a pond some three or four acres in extent and three or four feet deep. Women and children ran side by side with cattle into the pond and crouched close to the water, for the smoke hung low and the flames were dangerously close.

The largest crowd of people rushed to Grindstone river, a small, shallow stream which it was thought would afford protection from the flames. But the water was too low, and all miserably perished. There the relief parties found the bodies lying in the water and trampled by the fleeing cattle.

Just as the flames were raging fiercest, a train arrived over the Eastern Minnesota, and 500 people clambered aboard. It was a godsend to the people, who offered up prayers of thankfulness as the engineer sent the train at rapid speed away from the burning town and back to safety in Superior.

Another party had rushed for the limited on the St. Paul and Duluth, but as the fire cut off their way in that direction, they ran to a shallow pond near by. There, like rats in a trap, they perished, one and all. One hundred and five bodies were removed from the miserable pond by the relief committee, where they had been literally roasted to death. There was absolutely no escape.

East of the village there was a stagnant pool of rain water. Over 100 people sought refuge here, and of these only one man is known to have perished. The immense plant of the Brennan Lumber Company, with saw-mills, planing-mills, stables and 28,000,000 feet of pine lumber, was wiped out in almost less time than it takes to write it. With the stables were consumed 90 head of splendid horses. The financial loss to the company alone will reach \$500,000, on which there is an insurance of about one-half.

TERRORS OF SATURDAY NIGHT.

Those who remained in Hinckley will never forget the terrors of Saturday night. As the flames subsided and the shadows of night closed down over the ill-starred town, the people left their places of refuge and made their way over the smouldering embers through the one street of the village.

The fire had spent its force, but the ruins still glowed red through the dense cloud of smoke, marking the spots where a few hours ago were the homes of a prosperous and happy people. Guided by the weird light, men moved about as if dazed, locating the spots where their homes had stood. The air was filled with moanings of the wounded, for whom no assistance could be had, and with sobbings of those who had lost friends or possessions, or both. When the terrible night was ended, and the light of another day dawned upon the scene of desolation, a few energetic spirits recovered from the blow and began to organize for the work of recovering the bodies.

Two hundred and twenty-three bodies have been buried here, only 23 of which have been identified.

HINCKLEY, Minn., September 3. — A United Press reporter boarded the first train out of Pine City for Hinckley at 7 o'clock this morning. It was a work train, but carried many members of the different committees appointed at Pine City last evening. As the train neared Mission Creek the first evidences of the great fire became apparent. The whole country was blackened. The telegraph wires were down and the scene was one of desolation.

At Mission Creek a small shanty was the only house left standing. The depot buildings and the mill were a mass of smoking ruins. The train proceeded slowly three miles further to Hinckley. The roundhouse and coal sheds of the Eastern Minnesota road only remained. West on this line was a long line of smoking ruins of freight cars.

At Hinckley the gaunt skeleton of the public school alone remained standing in the center of the village itself. Alongside the railroad track were two score of boxes filled with the bloated and disfigured remains of victims of the fire. Some of the inscriptions of the coffins read as follows:

“Supposed remains of Mr. Blanchard, horribly distorted.”

“Girl 10 years old, no clothing.”

“Three children of Mrs. Martinson.”

In the next box lay Mrs. Martinson herself. Then came John Wendlund and child and a number more unidentified.

“If you want to see a pitiful sight,” a resident of the village said, “go out to the cemetery.” The reporter picked his way through the deserted avenues of the village, encountering the bursting remains of horses, cows, cats, chickens and dogs. He overtook Hans Paulson, an employee in the Brennan mill. “I am going out to the cemetery to see if I can find my wife and four children,” he said; “I lost them all.”

The rain was pouring in sheets. At the cemetery, a mile and a half from town, a half dozen men were digging a trench. A heap of bodies lay on a knoll in the middle of the cemetery. There were 96 naked bodies, men, women and children, scorched, blackened, distorted, bowels and brains protruding, hands clutched in their final agonies, hair singed from heads, old, young, middle aged, male and female, all in a promiscuous heap.

In another corner of the cemetery were 45 more bodies covered with quilts. All were interred late this afternoon. Hans Paulson, the man who had accompanied the reporter, delved among the pile of bodies, five feet high, and finally pulled out the remains of a little female child with only slight shreds of white clothing remaining on her body. He scanned the face, examined the clothing and then broke out in lamentations.

He kept up the quest for the others in the driving storm. Among the ruins of Hinckley a beautiful girl was making a vain search for her trunk. She was dressed in a light-colored calico dress which some good Samaritan from Pine City had given her. Her experience was a dramatic one.

“My name is Mollie McNeill,” she said, “and I have lived with my mother and sister in Hinckley the past 16 years. I noticed the fire coming at 3:30 o'clock on Saturday afternoon and rushed out of the house and started up the railroad tracks; on both sides and in front of me was a wall of fire and smoke. How I ever got through I do not know, for people were falling on every side of me. Twice my dress caught fire.

"A mile north of Hinckley I saw an engine. The engineer helped me on and a news agent carried me back to the baggage car. All the cars got on fire and I saw men crazy with fear jump right through the windows into the flames. The train backed up to Skunk Creek, where I remained in the swamp all night. I put my face in the mud to cool it and someone plastered mud all over my hair. Of course, I thought my mother and sister were lost, and you may imagine my joy when I found them safe and sound in Pine City yesterday at noon."

A local searching party this morning found the body of Thomas Dunne, aged 22, late operator at the St. Paul and Duluth station. When the fire started he remained at his post and it was only when the advancing flames drove him from the station that he left his key. He hurried over to the river and perished there with numerous others. His brother was among the searching party that found his body, and he secured his watch and ring, which was the only means of identification.

Robert Dowling, baggage agent at the Hinckley station of the St. Paul and Duluth, was going about the streets with a badly scorched hand and face. He says that there was a large crowd of people at the station waiting for the Duluth limited, due at 4:20 P. M., when the fire came down upon the town. Dowling started for home, but he could not get near the house. He ran up the track, and fortunately got on the limited a mile north of town. In trying to save a lad from jumping from the train he burned his hand. The boy jumped into the flames alongside the track and perished.

SOME OF THE DEAD.

This evening there are 21 coffins containing charred and blackened remains alongside the track at Hinckley. Nos. 1, 2, 3, 4, 5, 6 and 8 were unidentified absolutely. No. 12, Mrs. Sherman and two children; No. 13, two Sherman children; No. 14, Mrs. Hathen and youngest child; No. 15, two children of Mrs. Hathen; No. 16, supposed to be children of Mrs. Hanson; No. 17, Mrs. Costigan and boy; No. 18, two children, supposed to be Costigan's boy of seven and girl of five years; No. 19, unknown; No. 20, Ole Nelson; No. 21, boy 12 years old, supposed to be young Currie. These are in addition to the bodies already deposited and awaiting burial in cemetery trenches.

John Blanchard, a St. Paul and Duluth car repairer, who came up from Pine City this morning, after escaping to that town Saturday, was looking for the remains of his wife and children. He found them in coffins at the cemetery, and had them removed for shipment to Pine City for burial.

Lee Webster, president of the village council, reports that his wife is still missing. He was at the cemetery this morning, but failed to identify his wife's remains among the dead.

It is now the generally accepted belief that many more people would have been saved at Hinckley had they gone to the river or stayed in the gravel pits, but every one was panic-stricken. Many who started for the gravel pits lost heart when there and pressed onward to the river, and then many of the latter pressed on beyond the river to a neighboring swamp. All these latter lost their lives. Nels Anderson and family of six are missing. John Anderson, brother of Nels, perished, together with his wife, daughter and son.

At 1 o'clock this afternoon a car came up from Pine City loaded with provisions, bread, canned beef, etc. The car was guarded by soldiers of the First Regiment. The men who had been working since yesterday in the cemetery without food were first attended to.

Then the crowd of homeless refugees who surged around the car were fed. The caboose which came up on the train was started back to Pine City, and it was crowded with refugees. Among them were Ira Smalling, wife and infant. On Saturday morning last these people started for Grindstone on a fishing excursion. The fire overtook them and they put out into the lake and floated around nearly all Saturday night and finally landed in North Shore. But the fire followed them up and they went to an Indian camp and walked 14 miles to Hinckley this morning. Of course their home was destroyed.

Wells DeLong and wife, who lived two miles east of the Great Northern track, were driven from home by the fire. They ran down the bank from their house and took to the creek. When they arrived at the creek there was a great number of bears, wolves, skunks at the water's edge, but all were so frightened that they did not attack the fugitives.

The caboose going back to Pine City was crowded. Many were uncertain as to loved relatives, and others knew but too well that all they loved on earth had perished. It was pitiable scene. These people had loaves of dry bread which they had got from the supply car, and these they ate ravenously. Many of them had not eaten since noon last Saturday.

THE PRESENT SITUATION.

It is difficult to portray the situation at Hinckley. A few refugees, a half score of searchers, a team of two transporting boxes containing dead bodies, the place where a town had been — that is the picture. The brick veneer which constituted the outer covering of some of the buildings has fallen into the cellars. It is like looking over the tract of a cyclone. A few curious relic hunters delve among the ruined household goods, but their quest receives little reward.

Probably 200 of them left town on foot or on vehicles plunging into the woods to the north, across the Grindstone river, which skirts the town on the north. Over the hill that rises beyond the Grindstone is a swamp, and to this most of the people with teams headed, but it proved no protection. The fire gave them no opportunity to go further. Some abandoned their teams and ran into the lower portion of the morass, but the fire sought them out. Not one was left to tell the tale, and there yesterday morning, in a space of little more than four or five acres, were counted over 130 corpses.

There were families of five, six, and seven, and there they lay, the men generally a little in advance. the mothers surrounded by their little ones, cut off by the most horrible of deaths.

Nearly all the bodies were nude, the fire having burned every vestige of clothing and blackened and charred many of the corpses beyond recognition, and whole families were wiped out as they were and some of the bodies completely incinerated. Identification is absolutely out of the question.

As night closed in the people began to come out from their hiding places and make their way over the hot embers of their town. They were absolutely

dazed by the catastrophe, and the night was spent in an endeavor to find relatives or ascertain their whereabouts. Communication with the outer world was cut off for hours as completely as if they were on a desert island. The fire had spent its force, but the air was filled with smoke, through which gleamed the dull blaze of smouldering fire in the more substantial stocks of goods. Two huge heaps of coal, which marked the location of the Duluth coal sheds, were blazing, and by the fitful light people wandered about picking out the places where only six hours before their homes had stood.

(From the New York Tribune, Sept. 5, 1894.)

DULUTH, Minn., Sept. 4.—The death roll resulting from the forest fires increases, and now more than 650 persons are known to be lost, the greater part women and children. The greatest percentage of deaths occurred among settlers, where whole families were swept out of existence in the twinkling of an eye. In every part of the fire-swept district the finding of bodies hourly swells the list. Early this morning a party of 30 experienced woodsmen left here by special conveyance to scour the woods for bodies of settlers in out-of-the-way cabins and clearings. They are expected to bring back appalling reports.

In a stretch of territory 26 miles long, and from one to 15 miles wide, not a single human habitation has been left standing, except a section house at Miller; and in every part of the track of the flames the bodies of men, women, children, horses and cattle were found. The position of every body found outside of Hinckley shows that shelter of some kind was sought by the agonized sufferers, and the dead are found in holes behind overturned stumps, trees, marshy depressions and in every water course.

The general shape of the fire-swept district is like a huge cigar, with a southwestern end about Mission Creek, and the upper terminal a few miles east of Finlayson or Rutledge. From this a number of branches extend northward beyond the tracks of the Eastern Minnesota Railway. The work of the flames has been complete and cyclonic in character. Where the fire raged not a single tree is standing except as a blackened stump. Thousands of overturned trees are lying prostrate, and the roots were burning fiercely up to last night, when the welcome rain fell. At Brookdale, a little town on the Eastern Minnesota Railroad, south of Hinckley, about 90 persons took refuge in the water of a small creek. Out of this place 67 dead bodies were taken and buried.

It is reported that the settlement at Sand Lake, nine miles west of Finlayson, containing about 100 Finns, is wiped out. If so, the people are probably dead. Pine Lake, two miles toward Finlayson, is all right, and so the other town may be safe.

Another town has fallen a prey to devouring flames, making nine in all that have been consumed. The village of Granite, on the Omaha road, two miles south of Baronette, is the latest victim. A good share of the town, a saw-mill and 5,000,000 feet of lumber were consumed. No lives were lost.

The mail agent on the Omaha northbound train, which arrived here last night, said that the face of the entire country is so completely changed by the

disasters that he would not know it was the same as he has been in the daily habit of passing. O. F. Murray, the Eastern road's operator at Hinckley, has not been found, and it is feared that he is dead. Murray was the man who telegraphed here the first report of the disaster, saying that the fires were coming up like magic, and a minute later sent word that he must leave the instrument as the flames were on him.

A STATION AGENT SAVES 500 LIVES.

Mr. Bullis, agent of the Eastern Minnesota at Sandstone, arrived here last night. It was through his heroism that the 500 refugees on the eastern train, which arrived here on Sunday night, did not suffer the same fate as hundreds of others. Sandstone Station is a mile out of the town, and Kettle river, crossed by a great bridge, flows between. Bullis was at his instrument when the eastern train, bringing 500 refugees, passed back into Sandstone. He flagged the train in the darkness, went back to his burning office, telegraphed north to stop all south-bound business, in order to give a free road, and sent the train back as quickly as possible, knowing that the bridge might catch fire at any moment. When the train arrived at the 1,500-foot bridge, Flagman Jessmer saw it burning brightly in several places; but he at once decided that the chance of getting over was preferable to sure death on the tracks, and it went on. Five hundred lives bless the promptness of these two men.

After Jessmer left the bridge he hurried with his wife and three children to Sandstone and found the people in the river. They were in the water there for three or four hours. Word came in last evening that 51 bodies were buried at Sandstone yesterday afternoon, and 12 are still missing. A relief train left here for that place, and started back at 8 o'clock last night, bringing 50 more survivors and 20 or more injured on stretchers.

The water-power village, two miles west of Sandstone, was in the direct line of the cyclone of flames, but only three buildings were destroyed. It is a quarry village, and is on the river side close under a high hill. When the flames reached the hill they darted over it and were lost in space high above the houses, while another column circled around the hill, spanned the river in an instant, licking up the brush on the other side, and then recrossed the river at the village, setting fire to three houses. The population turned out with an engine and kept the fire from spreading. The hill saved the place from total destruction and the loss of a greater percentage of lives than at Hinckley or Sandstone, for there was no room to escape. The next morning the water people, discovering the destitution of the Sandstone people, telegraphed them to come over and share what they had, and in a short time the place was cleaned out. Two cows which were badly injured by the flames furnished meat for the hungry, and half-baked potatoes were dug from gardens. There is not a thing to eat in the whole district.

A DRY WELL HIS REFUGE FROM THE FLAMES.

Oliver Dubois, a French-Canadian farmer, living on the outskirts of Sandstone, was among the 250 refugees who reached here from that place. He saved his life by jumping into the bottom of a dry well, and was one of the

few who took such a refuge and survived. Mr. Dubois was a little way from his home. His family were absent. He heard in the south a great roaring, and thought a tornado was coming. The blackness of the sky added to the belief. There was a well a few feet away, into which he jumped. It was about 12 feet deep, and was dry. Above he could see the rolling cloud of flames high in the air, and then down close to the ground. The well grew stifling, and the air seemed to be so exhausted that he could breathe only by digging a hole in the damp earth and pressing his face to the side. When one place became stifling he would try another spot. The well filled with smoke and gas, and after a time which seemed endless, but which was probably about half an hour, he managed to climb out so weak he could hardly walk.

"Then I started to town," he said. "It began to grow lighter, so I could see the street. I stood in the center of Sandstone and called. Not a sound came in answer. I called again and again, but the place I had been in only two hours before was as still as the grave. I walked toward the river shivering with fear. On the way I counted bodies, bodies — more than 50 of them. I climbed down the river bank, and there, crouched in the water, I found the people. During the passage of the fire, women had held their screaming children in the water, and had stood mouth-deep in it themselves."

THE BODIES RECOVERED NUMBER 450.

PINE CITY, Minn., Sept. 4. — The General Executive Committee in charge of the relief work in this section has made a report of the dead bodies recovered thus far, as follows: Hinckley, 271; Sandstone, 77; Miller (often called Sandstone Junction), 15; between Skunk Lake and Miller, 12; Pokegama, 26; in lumber camps, 50; total, 450.

Sixty-two bodies have been buried thus far in Sandstone, not counting the numbers which have been found in the outlying country, and buried where found. Ghouls are at work in that neighborhood. To-day a party from Duluth, under the direction of James Bailey, came down to help bury the dead, and while searching around at noon, came upon a gang who had broken open and rifled some safes. When Bailey and party met them the scoundrels had just found a cistern from which they had hauled 15 dead bodies, which they had robbed of rings, trinkets, etc. Bailey's party were unarmed, and the ghouls made their escape.

The fire was seen by the Sandstone people four hours before it struck the town, and every thing was packed up in readiness to move to Kettle river, east of the village. Before any one was aware of the real danger, the fire came upon the town from the north, east and west, setting the whole town ablaze inside of five minutes. Many were unable to reach the river, and died in the streets. A blacksmith was burned to a crisp in his shop, where he was shoeing a horse, so sudden was the fire. Not a thing was saved, and in 30 minutes the whole town was swept off the earth. Those who reached the river remained there the most of the night. The survivors are entirely destitute. President Hill, of the Eastern Minnesota branch of the Great Northern, came up from Hinckley this morning. He had to walk nine miles in order to reach Sandstone. "The scene of death and ruin along the road is a terrible one," says Mr. Hill, "not a sign of life is any where to be seen. All is a blackened,

charred mass of ruins. Dead animals and human beings are everywhere, and they are burned wherever found."

Judge Nethaway, of Stillwater, has been one of the most active in relief work, and has been all over the surrounding country. Seven miles northwest of Hinckley to-day he came to a spot where a farm house had stood. In front was a well, and over to the left could be seen five human bodies and the bodies of several animals. Judge Nethaway went at once to the well to see if any one was there, and found down in the bottom a 12-year-old boy in eight inches of water, who had lived there since Saturday with nothing to eat. The little fellow was pulled up, and said he had been put down there when the fire was seen, and an "awful bad smoke had passed over him, and it was awful hot."

At Hinckley to-day the full realization of the awful calamity is just beginning to be felt. The work of rescuing dead bodies continued. Many of the survivors are returning, and are living in tents. To-day a large number of bodies were recovered. Coroner Cowan sent out 57, while 68 were buried in the graveyard, and more were being brought in all the time.

AID REACHES HINCKLEY AND PINE CITY.

HINCKLEY, Minn., September 4.—The special train sent out by the citizens of Minneapolis bearing supplies and medical relief to the suffering people of Hinckley and the neighborhood had on board 11 physicians and surgeons, with a full supply of drugs and instruments and 50 canvas cots. Pine City was the main objective point, for it was there that the relief supplies were to be distributed and the temporary hospitals had been opened. The medical committee were met at the station by the wife of Dr. Barnum, the local physician, who, with her husband, had been working day and night from the time the first victims were brought in until both were almost completely worn out. "Oh, we're so glad you've come," almost sobbed the little woman to Dr. McDonald as he stepped from the train.

The platform was crowded with people with blackened and scarred faces and bandaged hands and arms. Near the edge of the platform rested a coffin, in which was inclosed the body of General Passenger Agent Rowley of the Winnipeg and Duluth road. He was one of the passengers on Engineer Root's ill-fated train, and his body was found yesterday morning a short distance from the burned train, but so charred and disfigured that its identity was established only by the name printed on the inside of the burned fragment of a linen collar. Mr. Rowley had been in the habit of coming down from Duluth every Saturday to spend Sunday with his family at Merriam Park and he was on his way home when he met his death.

It was found that there had been much misrepresentation, as far as Pine City was concerned, regarding the number and condition of the injured and the necessity for supplies. Instead of 200 injured to be cared for, there were barely 20 and many of these had not been seriously hurt. All the injured have been brought in, too, and it was learned that those at Duluth scarcely outnumbered those at Pine City. Most of those who escaped received no physical hurt whatever. The most severe and dangerous cases in Pine City

have been taken to the improvised hospital at the rink, and here nine members of the medical relief force set to work, while the other two went on to Hinckley. Only about 12 patients were being cared for at the rink, but the blackened, blistered faces, the burned and sightless eyes, the parched and swollen lips, feebly moaning all the time, and the bandaged hands tossing to and fro made a sad sight. Nearly all the patients were Scandinavians. Only two of the cases at the rink are considered especially dangerous. The first is that of Mrs. Westerland, who saw her husband and baby drowned before her eyes. The intense mental shock and the inhalation of flames and hot air have rendered her recovery extremely doubtful. The other case is that of Mrs. M. A. Greenfield, who was terribly burned about the abdomen, and is now a raving maniac. Mrs. Matilda Oleson was another badly burned patient. She lost five children and her husband, but jumped into the river and managed to save her own life, as well as that of a man nearly suffocated, whom she covered with a blanket.

Mollie McNeil, of Hinckley, told of what was perhaps the most remarkable escape on record in that day of thrilling escapes. When the fire began to sweep over the town, determined to save what little she could, and not realizing the awful danger which she would encounter, she carried with her three dresses, two hats and a well-filled satchel. As she rushed from the house the smoke was so dense that she could scarcely see a rod ahead, and the flames were leaping behind her, but she made for the direction of the St. Paul and Duluth tracks. As she crossed a wagon bridge spanning the road near the tracks, the entire structure burst into a mass of flames. She threw her satchel away and pressed on toward the tracks. Once there, the heat was so intense that she had to drop the dresses, and the hat soon followed. On she sped between the rails, the ties burning beneath her feet, and two seething walls of fire leaping along beside her. Again and again she stumbled over dead bodies in the way. At one place she saw a man kneeling in the attitude of prayer, but stone dead and burning. At another, a mother and four children fell exhausted in her path, never to rise again.

After she had run about a mile and was ready to drop with the heat, she ran against Engineer Root's train, which was just about to back up, after having taken on its load of terror-stricken fugitives. The fireman pulled her into the cab, and when she regained consciousness she was removed to one of the coaches. Had she been a moment later the train would have backed away from her, and she would have perished. The rest of that ride everybody in the Northwest knows to-day, but not all of the sorrowful scenes that took place within the car. Miss McNeil says that she saw one man, crazed with fright and despair, kiss his wife goodby, and then deliberately plunge headlong through the glass window out into the flames.

THE COUNTRY A DESOLATE WASTE.

Leaving Pine City, the United Press correspondent went to Hinckley, 13 miles distant, in a handcar. Words utterly fail to describe the desolation that marked the country on every hand, as he neared the place of the terrible dis-

aster. As one man expressed it, "It looked as if no one had lived there for a thousand years, and never would again." Not only had every green and living thing been licked up by the flames, but the soil itself was blackened and consumed, and the earth torn up in great holes and patches. Nothing but a dreary, desolate waste remained. Yesterday morning, a few miles the other side of Hinckley, a little live calf was picked up. How it came there or how it could ever have escaped in such a fire-swept region no one knows. Not a vestige is left standing of the town except the charred walls of the schoolhouse and roundhouse, and two iron safes.

At the time of this writing 200 dead bodies have been gathered at Hinckley. Prof. Hayes, of the Hinckley schools, personally found 121 dead bodies on Sunday and eight more to-day. By this time most of them have been buried, but when the correspondent came upon the scene they were lying in two great heaps—one containing about 100 bodies, piled indiscriminately to a height of five feet. Naked, charred, blackened, torn, most of them are absolutely beyond recognition, and those which have been identified were distinguished only by some trinket or mark upon the linen. Trenches were being dug, and into these the bodies were tumbled, some in boxes. The hasty work is hardly to be wondered at, when it is known that not more than five or six men are there to perform the offices of burial. It was only toward evening that friends and relatives began to come in from Duluth and other points to assist in the sad services. Other bodies are being found constantly in groups of eight or ten.

Grindstone Lake, 10 miles north of Hinckley, has been the camping ground for several summers of parties from Hinckley. This year a larger number of persons were camped there than usual, so when a fire was seen to be encroaching on Neal's place, three-quarters of a mile from one of the camps, several of the men started for the scene. John Patrick and two men named Ellsworth and Collins were among the number. Others were fighting the fire when the three men arrived, and it was supposed that they could get it under control. The party had hardly reached the place, however, when they discovered flames shooting out over the tops of timber back of their own camp. Patrick started back along the shore, while the others got into a small skiff and paddled as fast as they could, hoping to reach the camp before it was overwhelmed. While they were still some distance away they saw the women rushing into the lake and the camp outfit going up in flame and smoke.

Patrick had not gone far before a mass of fire darted across the lake more than a mile wide, where he stood, and he fell before it as it sped on through the forest. His clothing was ignited and for a time he was completely dazed. When he recovered his senses the fire was all about him, and only a narrow pathway through to the water at the edge of the lake remained. The bank shelves off steep along the lake and offered an avenue of escape. As he was splashing through the water a stray dog fell in behind him and went along in his company. The two had an encounter a little later with a large black bear, which under ordinary circumstances would have attacked them, but the beast sat in the water and only moved aside a few inches so that they could pass.

FLED INTO THE LAKE FOR REFUGE.

Patrick finally reached a space where the road opened out from the lake, and here met 21 homesteaders and their families, who had been fleeing through the blinding smoke ahead of the flames. All the members of the party threw themselves into the lake and remained there until the flames had passed over. None were seriously injured, but all were so exhausted as to be unable to go further that night. They lay on the banks of the lake until morning, and then started back over the road by which they had come, in the direction of Sandstone Junction. Patrick has not seen or heard of them since. Eleven of the settlers, one a woman with an infant five weeks old, got into a canoe and paddled out into the lake.

WEST SUPERIOR, Wis., September 4.—Nearly all those who survived the terrible forest fires in northern Minnesota have now been removed to places of safety in Superior and Duluth, and, as a heavy rain has quenched the flames, there will be no further casualties. The work of searching for the dead is making good progress. Yesterday afternoon 54 bodies were buried at Sandstone, most of them charred beyond recognition and were buried wherever found. When the relief train reached Sandstone not a sign of a building was left in the town. Around or in the ruins of each house were found several human bodies. The living inhabitants of the town were brought into Superior at midnight. At Hinckley 328 bodies were lying in the street. At Pokegama, on the St. Cloud division of the Great Northern, there are 28 corpses. They are still lying unburied, the rest of the people having left the place. At Partridge only two are dead, though not a building is standing. It is almost impossible to tell where Partridge was, as the whole surrounding country is in ashes.

HOW HUNDREDS AT HINCKLEY WERE SAVED.

William Best, engineer of the passenger train on the Eastern Minnesota road, which saved many lives, said to day :

Soon after leaving Superior, at 1:15 P. M. on Saturday, I had to light the headlight, owing to the dense smoke which turned day into night. The heat as we approached Hinckley increased. I expected that when we reached that point we would get in the open and escape the smoke. My surprise was great, therefore, when we found the fire right upon the town. It took but a glance to see that the town was doomed. The wind blew at a great velocity, and the flames fairly leaped through the air. The people, taken by surprise, were helpless. Almost in an instant the town was swept by billows of flames. We could not pass Hinckley, and there was no use to look for orders, for communication was cut off. It was one of those cases where men have to make up their minds in an instant what is to be done and do it without hesitation. Here were hundreds of panic-stricken people who were doomed if they were not instantly rescued. On the other hand, the safety of the train and its passengers lay in prompt retreat. To stay and rescue as many as we could was our duty, of course, but the great question — and upon it hung the lives of many hundreds — was how long dare we wait.

“Ed” Barry was there with No. 23, in charge of the engine, and W. D. Campbell, the conductor, as plucky and brave fellows as ever passed a mile-

post. We knew we were safe in making time, for we could return on No. 23's time, and, as this train had the right of way, we knew that no other train would dare to stay on the main line without orders, if moving south. We hastily coupled a portion of Campbell's freight train, with the engine ahead, on to the rear of our train. The flame-pursued people rushed toward our train and piled into the cars. Some of them were aged, and there were women and children who had to be helped aboard. We had to shift the position of the train several times to prevent it taking fire. We were almost breathing fire as it was. We saw people fall down, overcome by the heat and smoke. I saw mothers with their babes make a despairing effort to shelter their helpless charges.

A few of our passengers became panic-stricken and wanted me to pull out, regardless of the sufferers at Hinckley, but none of us thought of doing such a cowardly act. We got about 100 Hinckley people aboard, maybe more, and slipped off to take the others who had run up the track. We could not rescue all the people, for they could not get on the train. As many as came to us were taken.

ST. CLOUD, Minn., September 4.—Near Milaca a family of five took refuge in a well. The fire extended to the woodwork surrounding it, and after the woodwork was burned off, the well caved in, and all five perished by drowning. A dispatch from Mora, Minn., says that many of those injured in the Pokegama fire are dying, and that the number of deaths may exceed 50. A carload of merchandise for distribution among the sufferers of Pokegama was sent out from here yesterday afternoon, and is being distributed there now by a committee of the City Council.

[From the *New York World*, September 4, 1894.]

HINCKLEY, Minn., Sept. 3.—For miles and miles, as far as the eye can see, there is a scene of desolation and horror. A desert of charcoal, sprinkled with shapeless lumps of charred flesh. That is a picture of the fire-scourged region of Minnesota, of which the town of Hinckley is the center.

The fire spared nothing save in caprice. It devoured forests, towns, men and women, cattle, railways, factories and the peaty surface of the earth. To-day the smitten region lies bald and ashy, still glowing here and there with flames. A leaden sky overhead promises the prayed-for rain.

Through all this fire-scorched region hundreds of families lie helpless, shelterless, without food. They know not who are their dead, and if they did they have not a penny for decent burial.

The afflicted country is most easily entered from St. Paul. It is 75 miles north of that city in the pine country. The first train out of St. Paul since the calamity passed through northward to-night. Its passengers saw more and more frequent strips of timber flaming and smoking. Sometimes the fire had burned too much to complete the work. It had left the tall pine trees like skeletons. Again, the fire had eaten deeper and left the ground a tangle of fallen trunks. In other places the stumps had been eaten away below the surface of the earth. Whichever way one looked the fire seemed to have extended in every direction clear to the horizon.

There is no such place as the village of Mission Creek. A lonely log cabin, a half dismantled slab "shack" and acres of cinders are all there is of it. Where the great lumber mills were there is a warped engine and a tangle of half-melted iron smokestacks. The switch yard is marked by the burned car wheels and trucks. The tracks are tangled and twisted like snakes. A few disconsolate lumbermen, with hair and eyebrows singed, linger about the place. A few cows, some of them blind and their hoofs burned off, hobble through the ashes.

Mission Creek has no place in the map of Minnesota to-day.

HINCKLEY'S DAY OF MOURNING.

Three miles further north was Hinckley. There were something like 160 funerals in Hinckley to-day, or, rather, one great funeral over 160 bodies. Hinckley had 1,200 souls, and it was here the fire did its most awful work. It was here that the Duluth limited was caught and burned to the wheels. It was here that the crazed population rushed into the Sandstone river or the muck of Skunk lake—some to die by drowning, some to suffocate in the mud, more to be eaten up by the fire, a few to make miraculous escapes. Hinckley was the pivot on which this fiery whirlpool revolved over 600 miles of pine forest, farms and towns.

This is Hinckley to-day: Two railway tracks in ashes, a wooden round-house, a water tank and a tool-house. The fire jumped these buildings, but it left nothing else in Hinckley. One can follow the plan of the town by the straight lines of ashes crossing each other at right angles. These were the sidewalks. Inside them are higher heaps which marked the buildings. The brick walls of the schoolhouse are standing. It was the only building in town not made of pine. The rest of Hinckley is flat and bare, nothing but ashes.

MAKING COFFINS.

To-day there was one sign of activity on this flame-scourged place. At a pile of lumber just west of the tracks the carpenters were hammering busily. They were making coffins, knocking them hastily together as a man would soap boxes. As fast as the carpenters could finish them they were claimed. Bodies and scraps of bodies came in on handcars and on wrecking trains. They were borne in by men who had picked them up here and there in the ashes.

AID FOR THE SURVIVORS.

At least five trains came into what was Hinckley during the day bearing provisions and blankets and tents. There were few for these supplies to benefit though, for the population was scattered or dead. A detachment of the Minnesota troops set up a trim row of tents along the railway track, and these, the only habitations in Hinckley, were given over to the grave-diggers and the body-finders. Men of the regular army, also, were on hand to give aid. Captain Hale, of the Third Infantry, and 20 of his men, from Fort Snelling, had come early in the day by special orders with tents for the sufferers. But Captain Hale found that the State troops had provided an abundant supply of tents, so he busied his men setting up those already on hand, and on the early

morning train returned to his post. Many of the tents were set up at Pine City, where all those injured in the fire had been removed.

For an hour this morning a drizzling rain fell, a mocking shower that came too late to save. The fires themselves had not even done the small good of clearing the lands they scourged.

It is like a journey through Inferno, this trip through these burned pine lands. It is the terrible loneliness of it all that is most oppressive. How many men, women and children have died by this fire no one can guess to-night, and perhaps no one will ever know. The forests about Sandstone and Hinckley and Shell Lake and Baronette were speckled with the clearings of thrifty settlers. These clearings the fiery storm swept over. How many of the inhabitants fled in safety to railway towns; how many of them were trapped in their cabins and miserably consumed; how many of them were run down by the fiery tide as they fled into nothingness, nobody will ever be able to do more than guess. Many a settler, unknown, almost, to his near neighbor, has been burned.

STILL MORE DEAD.

By 5 o'clock this evening 150 bodies had received burial, and the laborers thought their day's toil was over, but it was not. Searching parties found 30 bodies along the line of the Duluth road. Each lay with its head to the northwest, and, with the exception of the women, with arms extended as if making a last appeal for aid when caught by the relentless whirlwind of flame. The women's bodies spoke eloquently of mother's love. Each had a child, some had two, one had five, clasped and sheltered within her poor, burned arms. One mother had absolutely stripped herself of her raiment, wrapped her two babies in it, dug a hole in the ground with her hands, placed her darlings in it, and then calmly laid down over them, yielding her life for a possible chance of saving theirs; but her self-sacrifice was in vain; yet not absolutely so, for the babies died of suffocation, and by their features the identity of the heroic mother was learned.

By the side of a great stump laid the body of a young woman with a newborn babe by her side.

In a dried-up drain leading to Skunk lake was found the body of Auditor Rawley, of the Winnipeg railroad. He was on the burned train. Becoming crazed with fear, he jumped into the smoke and flames. The location of the body showed that he made a mad struggle for life. The body, strange to say, was not badly burned. It was taken to Duluth for burial.

The train brought in ten other bodies, three of males, found in the wood, and a family consisting of a man, woman and four children huddled together on the homestead farm three miles this side of Skunk Lake.

NIGHT FUNERALS.

When these accessions to the list of dead came to hand it was found to be absolutely necessary to bury them at once. There is only one lantern in Hinckley, and that is a red one. The remnants of Saturday's blaze still furnishes enough light for the dwellers on the charred sites of their former homes, and with this red signal light another procession started for Birchwood.

To the north was a solid line of flame, fed by tons of coal which line the tracks of what were once the Minnesota yards. To the east a fitful light hung in the sky, tongues of fire every once in a while shooting upward and proclaiming that the end was not yet.

There were graves and caskets waiting for the newcomers, and side by side in the great trench they were placed, then came the benediction, then a fearful wail from a Swedish woman whose reason fled when she returned from St. Paul last night to find herself a widow. Friendly hands sought to conduct her to one of the half-dozen tents which stand in what was Main street, but she would have none of their sympathy, none of their advice — she could not tell where her dead lay, she would watch over all, and she did.

TERRIBLE SUFFERING.

Mrs. E. M. Saunders, one of the most delicate and refined society women of St. Paul, was bound home on the limited that awful Saturday afternoon. She had in her car her own four children and four others. At 4 o'clock the smoke was so thick that it was impossible to see across the car. Then the blaze burst in through the car windows. Mrs. Saunders and her children crouched in a corner of the car, and C. D. O'Brien, an attorney well known in St. Paul, did what he could to fight the growing fire off them. Mrs. Saunders covered the children with her skirts as best she could.

When the heroic engineer, Root, stopped the train at a place where everybody thought was Skunk Lake, Mrs. Saunders marshalled her little ones and started despairingly through the flaming forest. They came upon a place that looked like water, but it was only a barren waste of hot sand. In this sand Mrs. Saunders buried all the children and herself. But the heat grew more and more terrible, and they had to hunt a new place of shelter. They finally floundered into the morass of Skunk Lake. There the brave woman buried all the youngsters in the mud and muck and slime of the lake, and protected herself in like fashion. There they all lay half smothered from 5 o'clock Saturday afternoon until 4 o'clock Sunday morning, and they all came out alive and but little hurt.

DULUTH, Minn., September 3.—It is the opinion of railroad surgeons who have been over the burned district in this State that the number of dead will reach fully 1,000. Four hundred bodies have already been found, while all through the woods for a distance of 40 miles hundreds of others are doubtless scattered thickly.

Every bit of news from the front increases the previously made estimates of losses of life. There will be no accurate statement until parties of searchers are sent out and dropped off the trains at intervals of a mile or two, and a thorough patrol of the burned district is made.

ST. PAUL, September 3.—D. C. O'Brien, a well-known St. Paul attorney, and his son Richard were passengers on the train that was burned at Skunk Lake. They were both badly prostrated. Richard tells this story:

“We reached Hinckley about 4 o'clock in the afternoon and found the town on fire. Fleeing residents stormed our train and crowded into it until there was not room for another soul on board. We did not realize that it was so

serious until the train began backing up, and then there were some sights on the train which can never be fully described. Men and women cried like children, and in my coach I saw two men become crazed and jump through the windows of the moving train to death.

“When we reached Skunk Lake we all made a rush for the water. Father and I clung to each other and were never separated. The heat when the fire passed over the water was terrific. We had our overcoats wet and thrown over our heads, and the fire burned the coats to a crisp. We were in the water about four hours before the fire died out so that we could get to the shore, and it was about 5 or 6 o'clock in the morning before the men came with handcars from Mission Creek and took us to the worktrain which carried us to Pine City.

“The engineer of that train is a hero. He ran his engine to the lake when, as I have since learned, the heat was so intense that his coat was burned from his back. In our own coach the windows were broken by the heat.

“After we got out of the water Conductor Tom Sullivan, of the train, started for Rutledge, 13 miles north, over the route we had just traversed, to give the alarm, and I have since heard that when he told the station agent at Rutledge that his train was burned he went stark mad.

“On the way back to Hinckley, over the six or seven miles between that and Skunk Lake, I counted 28 bodies. At one place alongside the track, near Hinckley, I saw the body of a woman burned beyond recognition. On her poor, burned arm the woman clasped the body of an infant. The bodies of five other children, which, I presume, belonged to her, were lying near by, burned to a crisp.”

THE RUSH AT HINCKLEY.

James E. Lobdell, a traveling agent for Noyes Bros. & Cutler, of St. Paul, was a passenger on the burned train.

“It was 4 o'clock in the afternoon when we showed up at Hinckley,” said Mr. Lobdell. “Before the train had come to a full stop a crowd of men, women and children began clambering aboard. Men fought for a foothold on the platforms, while weeping mothers passed their babes through the car windows, willing to sacrifice themselves. The passengers became badly frightened when they learned the cause of the mad scramble, and women fainted in their seats and children screamed. As the train started back we could see the sparks flying past us. Conductor Tom Sullivan passed through the train and tried to calm the passengers by telling them that the train was being backed to Skunk Lake, where we would all find protection in the water. We were only 10 minutes running to Skunk Lake. The conductor told us the fire was close behind us. The passengers scrambled off pell-mell, and rushed for the shallow water. The roar of the flames could be heard south of us, toward Hinckley, even before we reached the swamp. A number of the women fainted before getting to the water, and were picked up by the male passengers.

“HOURS OF TORTURE.

“I had a small traveling grip along with me, and carried it into the water. We had been in the lake scarcely half a minute when, through the wall of smoke, there burst a sea of flame. Somebody shouted, ‘Get under the water

for your lives.' I felt as though I was burning up. My mouth got dry, and I could feel my tongue swelling. My eyeballs seemed starting out of my head. For a moment I felt the flames above and all around me. I think I lost consciousness. I don't know how long I was under the water, but it seemed an age. When I raised my head the flames had jumped across the lake. All around the lake the woods were on fire, and a wall of flame, seemingly 15 or 20 feet high, completely hemmed us in. By this time our train was a mass of flames, and the heat from it finally obliged us to again seek relief under the water.

"How the women and children stood it is a mystery. As some poor creature became overcome and swooned she was supported and cared for until the awful heat had passed. For four long hours we stayed in the swamp, with the water to our waists, waiting for the shore to cool. When that time arrived it was found that Mr. Holt, Mr. Anderson and myself were the strongest of the party, and so we offered to go for relief.

" THROUGH FIRE.

"In my grip were a couple of dress shirts and a night robe, besides some other articles of wearing apparel. We tore the shirts into strips and wound the cloth about our feet till they were pretty well protected from the burning cinders over which we must pass. Then we wrapped our coats about our heads, after saturating the garments thoroughly in the water, and started on our journey to Hinckley. We stumbled and struggled on, now running through a wall of flame and anon barely escaping being crushed beneath a falling telegraph pole or a giant tamarac burned in twain. We stumbled over dead bodies, and on the way to Hinckley we counted 29 lying alongside the railroad track. Some of these had been riding on the platform, and had been overcome by the heat and fallen to the track.

" HELP AT LAST.

"At last, more dead than alive, we arrived at what once was Hinckley. There was not a living person in sight. The Hinckley bridge was unsafe to cross, but the river was low and we waded. On the way across we found five bodies in the water — two children, one woman and two men. Reaching the other side, we took the railroad track again and started for Mission Creek, four miles south of Hinckley. We had gone but a short distance when we came to an abandoned handcar, which we placed on the track, and on it rode into Mission Creek. We found that city, too, a complete ruin. Not a house remained standing. A few miles further on we came to a work train, and this took us to Pine City, which place we reached at 11 o'clock at night.

"A relief party was at once organized, and started on the work train for Skunk Lake.

"Mr. Anderson, who accompanied me, lost \$20,000 in government bonds which he had with him in a grip, which was burned on the train."

LONDON, September 3.—Most of the London newspapers make editorial comments this morning upon the disasters by the forest fires in Minnesota and Wisconsin.

The Daily News says that the action of Engineer Root and Fireman McGowan in sticking to their engine when death stared them in the face was of the purest heroism, and all the English-speaking world will pray that Root may have better fortune than his immortal prototype of the Mississippi boat, Jim Bludsoe. Englishmen, *The News* says, will probably ask to be allowed to do something in recognition of this astonishing deed.

The Morning Post says: Americans seem rather stimulated than depressed by these rebuffs. We do not doubt that the towns lying in ashes to-day will be rebuilt and repeopled to-morrow, and the stream of commercial and industrial life flow on unchecked.

ST. PAUL, September 3.—It is feared that many well-known residents of St. Paul have perished in the forest fires of Hinckley and the neighborhood. Large numbers of sportsmen have left St. Paul within the last 10 days to hunt prairie chicken near Hinckley, Mora, Sandstone and other points, and few of these places have escaped the flames. If these sportsmen were in the forest nothing could save them, unless they were close to some large body of water.

SANDSTONE, Minn., September 3.—All that now remains of what was once the prosperous village of Sandstone is a small shack used by the Sandstone Company for an office. Crowded into this building were 200 people, who had lost their homes and everything they possessed except the clothing which they wore.

Late to-night a family of five dragged their weary footsteps into this burg almost starved and nearly naked. They lived on a farm west of Mission Creek, and to a potato patch their presence in this land of the living is due. Like the residents of Mission Creek they crawled into the patch, and crouched among the green tops of the plants until the flames had spent their fury. They had companions in that patch, not men nor women, but a herd of affrighted deer. The animals lost their fear of human beings and huddled close to the children. The father crept up to a young buck, stuck a knife into its throat and killed it. Until to-day that family lived on venison and baked potatoes.

Wisconsin.

(From the *Milwaukee Sentinel*, July 28, 1894.)

CHIPPEWA FALLS, Wis., July 27.—A report received here at midnight says there is no hope of saving anything at Phillips. The courthouse and nearly every business house in town have been burned and the people are homeless. The men sent their wives and children to the clearings north of the town, and made a brave struggle against the flames, but it was hopeless, and it is doubtful if more than a few houses were saved.

Phillips, one of the most thriving lumbering cities in northern Wisconsin, 267 miles northwest of this city, on the Wisconsin Central line in Price county, was almost totally destroyed by fire last night and about 3,000 people were made homeless.

There will probably be a large loss of life due to the fire and explosions of powder and dynamite. The entire town is swept away, and the loss to property will be many hundreds of thousands of dollars. At 2 o'clock this morn-

ing, the operator stationed at Phillips, who was obliged to flee for his life, telegraphed from Prentice to the local offices of the Wisconsin Central road as follows :

"The town is practically all gone. There may be a few dwellings left. I think when count is made there will be some lives lost. There are a class of men which we call "lumber jacks," who got into some of the saloons and were dead drunk. Some of them might have been burned up. Another lot of people crossed the bridge over the lake at the box factory, intending to go that way to get away from the fire. It will be surprising if all got away safely, as the wind was in their rear and blowing dense clouds of smoke toward them. Estimate about 20,000,000 feet of lumber destroyed."

The largest loss will fall on the John R. Davis Lumber Company, whose plant, valued at nearly half a million of dollars, is a total loss. The general store, conducted by the company, is also a total loss. A large tannery, several churches, the courthouse, the depot, the public school, and all business and dwelling-houses are swept away. Only heaps of ashes remain. The lumber that was burned alone is estimated to be worth \$300,000.

Forest fires first reached the town on Thursday evening. The woods were exceedingly dry, and at one time it seemed as though the entire town would be swept away. The residents fought hard, and as the wind decreased got the fire partially under control. Last evening the wind reached a high velocity and swept down from the north.

CITIZENS FLEE FROM TOWN.

At 10 o'clock last night the telegraph operator in charge of the office of the Wisconsin Central depot at Phillips telegraphed General Superintendent Collins in this city that the people had given up all hopes of saving the town, which was a mass of roaring flames. A few minutes later telegraphic communication was cut off, and Mr. Collins thought that the depot has been burned and that the operator had to leave his post, which proved later to be the case.

ABANDONED THE FIGHT.

The fire assumed such proportions that the men who were fighting it began to make preparation for the safety of the women and children, who, panic-stricken, were packing up such valuables as could easily be saved. The John R. Davis Lumber Company had 10 empty box cars on its tracks, in which women and children were placed and hurried out of the burning city to some place of safety on the Elk River branch of the Wisconsin Central road.

The scenes about the depot were described by the operator as beyond his power to tell. Men, women and children were all separated. Some went to Prentice, while others went to other towns, and it will be days before all the members of families can be again united.

At 10 o'clock the depot, from which the operator was communicating with General Superintendent Collins, in this city, caught fire and was totally

burned. After that no more news as to the situation could be learned from Phillips.

Chelsea and Whittlesey, two towns on the Wisconsin Central road, 30 miles south of Phillips, are in imminent danger of being swept away.

The towns are in the wilds of Taylor county, and are surrounded by dense forests on all sides. It will be utterly impossible to save either if the high winds continue and the fire spreads.

FIELD, Wis., July 27.—Five hundred women and children from Phillips are in the woods here without shelter or food, and as the supplies are very short here a requisition on Ashland was made. Whatever happens there is bound to be great suffering among the unfortunate people. They can not escape from the blinding, stifling smoke that travels through the forests and openings, and this, together with their agony of mind, makes their condition most pitiful. There is not room in the houses of this little town to shelter the homeless, but everything that can be done to relieve them will be done by the citizens.

RELIEF TRAIN CUT OFF.

A relief train which left Ashland for this place has been cut off by the flames which are rapidly eating their way in every direction in this vicinity, so that it is impossible to tell at what moment Fifeild may be swept away and her citizens also driven into the woods perhaps to meet the elements where escape is impossible.

(From the Milwaukee Wisconsin, July 31, 1894.)

PHILLIPS, Wis., July 31.—The forest fires are still burning around here, and the citizens had to turn out last night and fight a fire which threatened to destroy the poor farm, the fair grounds and the timber on the east side of Elk Lake. The wind had got around in the northeast early in the day, and the fire which had done so much damage last Friday was coming on a back tack. Scores of people were still in shelter in the fairgrounds, and they sent an alarm to relief headquarters. The bridge connecting the town proper and the road leading to the fair grounds was burned in Friday's fire, and the 150 men who responded to last night's alarm had to be ferried across the river. The men were armed with buckets, shovels and axes, and they reached the scene none too soon. The fire was coming over the hills with a terrible roar, and unless its direction could be changed what little was left of Phillips on the east side of Little Elk River would be a heap of ashes the same as the district west of the river. The fire brigade, reinforced by a contingent from Prentice, stretched out over a territory a quarter of a mile wide. Brush was cut all around the poor farm and "back-fired." The attempt was successful, and about 9 o'clock the fire shot by to the north of the poor farm and fair buildings. From the direction in which the fire came it was feared that the township of Emory has been wiped out. Fires have been seen all day near the town of Worcester, south of here, but no reports have reached here yet.

The last of the bodies of those known to be missing was recovered from the lake yesterday, and all were buried in the little cemetery near the fair grounds, except the bodies of Frank Cliff and child, which were shipped to a neighboring town. It is still impossible to tell whether more than the 13 persons, whose bodies have now been recovered, lost their lives in Friday's fire. The city authorities opened a register this morning, and are having everybody

enter his name. In this way it is hoped to find out just who is missing. Some of the persons who saw the fire reach the lake say that they are sure that some of the people who sought safety on the logs must have been overcome by the heat and drowned in the lake. It is also said that seven persons who were in a boat were caught under the railroad bridge north of here when it fell.

Most of the people who were cared for at Prentice, Saturday and Sunday, returned to Phillips yesterday. The sheeting which the Milwaukee relief train brought up Sunday has been converted into tents, and about 1,200 persons found shelter under them last night. The people are well protected so long as the fair weather lasts, but a hard rain storm would cause great suffering. A number of people are now sick from the exposure to the damp night air, the use of poor water and insufficient clothing. A large quantity of medicine was received from Milwaukee this morning, and the doctors have opened a dispensary in a little shanty.

Clouds of smoke from the forest fires, made doubly pungent and blinding by mixture with a fog from the little lake, formed a pall for the ghastly ruins of the once pretty and prosperous city of Phillips, Sunday morning, when Governor Peck reached there with the relief train. The Governor, of course did not say so then, but he afterward confessed that he had never before seen such a cold and cheerless spectacle. On one side of the railroad track which divided the city, one could get a dim view of the lake, in which three families and perhaps others had lost their lives in trying to fly from the flames. On the other side the smoke was so dense that a person could not even see an outline of the ashy heap which was all that remained of the business and residence portion of Phillips.

All day long the boom of dynamite explosions could be heard. The dynamite was being used by persons who were searching the lake for the bodies of the dead. Four were found and were removed to the box car which had been pressed into service as a morgue. The complete list of the dead will not be known until everybody returns to Phillips, and a sort of census is taken. Sunday there were about 300 persons at the county fair buildings, about a mile from the city. A thousand or more were being cared for at Prentice, and scores of families fled to the towns north. The death list up to noon, Sunday, included only the families which met death in the lake, and one person whose body was found in front of where Postmaster Sackett's house stood. Several persons claim that there was a large party on the bridge leading to the fair grounds when it caught fire and fell into the river. It was also reported that several children took refuge under the mill tramways. All that remains of the tramways is twisted rails.

PHILLIPS, Wis., July 30.—A conservative estimate of the total loss places it at about \$750,000. Of this the John R. Davis Company is credited with a loss of about \$350,000. The loss on the Shaw tannery, located just north of the city, will be about \$200,000, and the losses on stores, residences, etc., will reach \$200,000.

The loss of life occurred during the first fire. The families of Dave Bryden, James Locke and Frank Cliss made for a floating boathouse and pushed it out into the lake, thinking that the wind would drive the house to a place of safety across the lake. Instead, the draft created by the terrible fire drew the boathouse in toward the flames on shore. The families then got into the little

boats. The frail craft were overloaded, and as the occupants leaned over the sides to get water to sprinkle on their bodies, one boat after another capsized. All were drowned with the exception of Mrs. Cliss, who was found Saturday morning hanging to an overturned boat. Her face and hands were burned and around her neck were clasped the arms of her dead child. It is thought that Mrs. Cliss will recover. The bodies of Mrs. Bryden and two children, James Locke and two children, and Frank Cliss and one child were recovered Sunday, leaving only the bodies of Mrs. Locke and two children still in the water so far as known.

(From the New York Times, August 31, 1894.)

CHIPPEWA FALLS, Wis., August 30.—Forest fires in this section of north-western Wisconsin have been intermittent for two months, and the aggregate loss is not less than \$3,000,000 among the pine-land and sawmill owners, besides the loss to individuals. Reports to-day are that fires prevail on the outskirts of Prentice, which was almost destroyed a few weeks ago, and fire apparatus has been sent there from this city.

The village of Vesper, in Wood county, was almost destroyed yesterday, and 20 families are reported homeless. At Mason City, 100 miles distant, citizens are exhausted by the continued fighting of fires. At Lafayette forest fires have devastated the homes of six farmers.

Fire again prevails in Phillips, which was almost destroyed in a recent conflagration. A fire engine and crew sent from this city are now engaged in the outskirts keeping back the flames. Fire is at present burning at Silver Spring Park, four miles from this city, and the plant of the Chippewa Spring Water Company, a large concern that ships to all parts of the country, is in danger.

Fires are burning between Chippewa Falls and Spooner, a distance of 200 miles, along the tracks of the Chicago, St. Paul, Minneapolis and Omaha railroad. A number of towns are in danger, protection from the flames being almost impossible.

Fires are sweeping with terrific fury throughout the forests of Burnet and Washburn counties, close to the railroad tracks, and passengers say the country is like a sea of fire. The Wisconsin Central and the Omaha railways have been heavy losers by fires, their tracks being damaged for miles. A number of freight cars were lost by the latter road at Mason.

Phillips is the greatest sufferer by the fires, not a building out of 280 being left.

The principal losers are the J. R. Davis Lumber Company, Jacob Leinerkugel and Owen Lappin of Chippewa Falls. The most extensive cranberry farm in Wisconsin, five miles from this city, owned by Aglum & Donovan, was destroyed yesterday. The loss is \$5,000, with no insurance.

The Chippewa Lumber and Boom Company of this city, one of the biggest concerns of the kind in the United States, has lost in the neighborhood of \$1,000,000 in standing pine. The heaviest losers are:

Chippewa Lumber and Boom Company, Chippewa Falls, \$500,000; J. R. Davis Lumber Company, \$1,000,000; White River Lumber Company, Mason, \$200,000; Lake Superior Lumber Company, Nebogomain, \$50,000; Jump River

Lumber Company, Prentice, \$200,000; Wisconsin Central railroad, \$50,000; Chicago, St. Paul, Minneapolis and Omaha, \$100,000; Jacob Leinerkugel, Chippewa Falls, \$10,000; Owen Lappin, Chippewa Falls, \$5,000; town of Phillips, \$200,000.

The losses to the lumber companies are mainly on standing pine, on which there was no insurance.

CHIPPEWA FALLS, Wis., September 3.—Northwestern Wisconsin is one sea of flames, and reports are coming in to this city constantly of fatalities caused by the great conflagration. The towns of Rib Lake, Marengo and Bradshaw have been completely wiped out, and at the latter place three people lost their lives. Many others are missing and it is impossible to estimate the extent of sufferings by the people. Yesterday a message was received here from Caddot asking for aid. The town was threatened and the inhabitants were panic-stricken over their danger.

READY TO FLY FOR LIFE.

A force of men from Chippewa was sent up and until 10 P. M. yesterday the inhabitants struggled to preserve their homes from destruction. Several buildings on the outskirts burned, but the fire was prevented from spreading and preparations made for a hurried flight in case the town fell a prey to the fire. Wagons loaded with household goods stayed in the street and the scene was one of indescribable confusion.

At 10 P. M. yesterday the fire had abated in the vicinity of Caddot and for the present the village is safe. Almost two miles away, in a dense forest which terminates at the limits of the town, the woods are in a vast blaze and the wind is carrying the flames with great rapidity toward the town.

If no rain falls before this evening it will be certain to be wiped out. The inhabitants realize this fact and already quite a number have taken refuge in the city, while the others are prepared for flight on a moment's notice. A special train and a fire engine were sent up. The town of Caddot has about 500 inhabitants and is situated in the midst of a dense forest, where escape is practically impossible. No news has been received from the party sent to the rescue of the village, and fears are entertained for its safety.

EAU CLAIRE, Wis., September 3.—Wires to points on the northern division of the Omaha road have been down since last night, and information of the situation up north is lacking. Railroad men say the whole region to Cartwright, to Bashaw and to Haugen has been on fire since Saturday afternoon.

TWELVE SAVED BY THE CARS.

The Omaha train, arriving here at 5 P. M. yesterday, which came through Bashaw, took 12 men, women and children from the burned village to Rice lake, the conductor backing the train to get the refugees after he had run through without stopping. The Northwestern Lumber Company has reports of fresh breaking out of fires along the Eau Claire river. One of the companies said that they already had 50,000,000 feet of pine burned on the Eau Claire and did not believe there would be a green tree left when rain comes. One of the Eau Claire owners of the Barronnett Lumber Company's plant says the loss there is \$250,000. A special from Cadott says the village is surrounded by fire.

TURTLE LAKE, Wis., September 3.—The evening train from Minneapolis was detained by fire at Joel, seven miles west. For two miles it ran through a dense cloud of smoke, with fire on both sides of the track, sometimes so close as to scorch the faces of the passengers and train crews. The engineer was obliged to feel his way and keep a close watch on culverts and trestles.

Turtle Lake was threatened all day yesterday. During the afternoon a bad fire approached the south side of the town, fanned by the brisk breeze which was blowing all day. The entire male population turned out and succeeded in saving the town. At night the wind went down, and, though the fires lit up the skies in all directions, the town was safe.

A TRAIN STALLED.

A passenger train went up to Cumberland, about 13 miles north, Saturday, and has been unable to proceed in either direction. Granite Lake, Barronett and Shell Lake were wiped out, and yesterday afternoon the hamlet of Comstock, eight miles north of here and five miles south of Cumberland, was destroyed. At all these burned stations the tracks are burned and warped, and no trains can move. The telegraph wires are practically useless, though an attempt was made to get them in shape yesterday afternoon.

The Omaha company loses many culverts and trestles. All wagon-road bridges are burned, and communication with the burned districts is practically shut off. Everybody in Turtle Lake is worn out, working day and night for the past 72 hours, and with the present respite efforts have been relaxed.

PRENTICE, Wis., July 30.—Fires could be seen last night about five miles west of here in the vicinity of Melrose. George Peterson, a lumberman, came in last night. He has been all through the country which was traversed by fires. He said the fire started in the woods in the western part of the county, and it has burned the best part of four townships.

BOILED FISH;

Northwest of Phillips he saw a spring creek that runs through the woods and empties into Wilson's creek. In that creek the water must have boiled, said the lumberman. So intense was the heat that the fish in the stream were partly cooked. The whole stream was literally covered with the fish.

WEST SUPERIOR, Wis., July 30.—The Rev. J. H. Nason, who went to Phillips in charge of the supply train sent from here, returned to Superior to-day. He said that the reports of 20 lives having been lost were far short of the truth. The total loss of life will be at least 40. Eleven bodies had been recovered up to noon to-day.

Many of them were recovered from the bottom of the lake and easily identified. Those who escaped had only the clothing on their backs. The hair was singed and faces scorched on many of the fugitives.

On account of the intense heat and strong wind a dozen fire departments, had they been on hand when the first house was ablaze, could not have averted the calamity.

"The wonder is that so many escaped," said Mr. Nason.

In attempting to escape from the fury of the flames one party of 17 took refuge in a boathouse some distance out in the lake, reaching it by means of a sidewalk built on piles in the water.

The flames slowly began to burn the sidewalk, and as the only means of escape back to land was thereby cut off, the occupants were obliged to stay in the boathouse while the structure was burned over their heads. Only two out of the 17 escaped.

Eight cars of supplies contributed by surrounding cities have arrived at Phillips, but a great quantity of food, bedding and lumber is still needed.

HUNDREDS FLEE FROM THEIR HOMES AND OTHERS ARE FIGHTING THE FLAMES.

ASHLAND, Wis., September 3.—Smoke and dirt-begrimed settlers of the forest have been straggling into Ashland all the forenoon with tales of the loss of homes and everything on their farms. They are taken into the homes here, and everything possible is being done for their comfort and relief.

A straggler who walked in from Benoit this morning says that everything is gone there but the mill and lumber. At Ashland Junction a passenger train got into the flames, and caused great consternation among the passengers. Women and children screamed, and it was almost impossible to quiet them.

Unless rain takes place soon, the results will be ruinous. All the way from Superior to Chippewa Falls the train on the Omaha road, on which I came down, was hardly out of sight of the light of forest fires. For a hundred miles square, the forest is ablaze pretty generally. Many homesteaders have had their places completely destroyed. The fire has run through the pine slashings, but the worst fires are in the standing timber. I never saw such fires as from the car window this side of Hayward. The flames ran up the high trees, and burned the needles and trees very quickly. The fire was so hot that the car windows on the train I came with were broken by the heat. We had to stop the train a dozen times between Hayward and Chippewa Falls to put out the burning trees and culverts, and see if the small bridges which had been charred by the flames were sound enough to carry the train across.

ASHLAND, Wis., July 27.—Communication is now shut off with Fifield, and it is feared that town is destroyed. It is thought here that the fire which swept Phillips has reached Fifield.

At 7 o'clock Ed. Ensign, a well-known lumberman, telegraphed to the mayor here from Fifield for bread and meat to be sent down there at once; that there was "500 women and children between Fifield and Phillips without food, and the fire raging fiercely around them." The mayor and a committee are now gathering supplies which will be sent down in the morning, if a train can get through the flames. Mr. Bartoe, whose family resides at Phillips, received the following message at 6 o'clock from Fifield:

LOSS OF LIFE FEARED.

"Your wife and baby are in the woods near Phillips without food and clothing."

He is half crazed with grief, but is unable to send any help. It is feared that many lives are lost, as the hundreds of women and children in the woods, and fire all around them, some must perish surely.

DULUTH, September 3.—Soon after noon Saturday there sprang up a fierce wind that blew vast volumes of smoke into Duluth, while travelers against the wind soon had their eyes filled with ashes and cinders. The air was as from a furnace even at a distance of 70 miles from the nearest blazes of magnitude, and the light of day was long before 4 o'clock completely obscured, so that lights were turned on all over the city.

PRATT JUNCTION, Wis., July 27.—Forest fires are burning along the line of the Chicago and Northwestern railway, north of Antigo. The stage left Pelican Lake for Crandon this afternoon, but it was compelled to return on account of the fire along the road. Everything is very dry and much damage will be done unless rain comes soon.

BRIDGES AT MASON AND FOREST CITY DESTROYED.

HAYWARD, Wis., July 27.—The bridges at Mason and Forest City have been burned. It is reported that the mill and lumber yard at Mason are burning. Wires are down and it is impossible to get any definite information. The country surrounding this town is all afire. The smoke is very dense. If no rain falls soon there is imminent danger to all towns in this vicinity. A crew leaves here to-night on a special train to repair the bridges.

GRAND RAPIDS, Wis., July 27.—Extensive fires are running in the woods and marshes north and west of here. The cranberry marsh owned by Dr. Witter was burned, and much of the extensive Spofford marsh has been destroyed. The fire is very near the city of Centralia. Great volumes of smoke are rising on a heavy wind. Thermometers indicated as high as 106 in the shade to-day.

MEDFORD, Wis., July 27.—What is known as Powell's Mills, eight miles west of here, sent word early this morning asking for assistance on account of forest fires. The hand engine and 700 feet of hose was despatched at once with teams, and 100 men went to the rescue and arrived none too soon to save the mill, residence, barns, etc., for the time being. At 8 P. M. the wind was going down. There will be no imminent danger until morning. Small farmers in the vicinity moved their families and what things they could gather on a wagon, and came to the mill site. For two hours this afternoon 150 men, women and children were confined on five acres of ground surrounded by one seething mass of flames, and one must see a forest fire to realize how much danger there is with stifling clouds of smoke, and all communication or means of escape cut off. It was a case of pump or take to the mill pond. Horses, sheep and chickens are dying by the side of the road, burned to a crisp. Great fears are entertained for a dozen farmers who live northeast of Powell's Mills, whose one road or exit is surrounded by fire.

ASHLAND, Wis., September 4.—An unknown steamer and consorts have gone ashore in the dense smoke on Sand Island, about 50 miles from here.

(From the New York Tribune, September 3, 1894.)

CHICAGO, September 4.—From the revised returns received to-night from the burned regions of Minnesota, Wisconsin and Michigan, the following are the totally and partly burned towns and counties:

Minnesota—Towns totally destroyed: Hinckley, Pokegama, Sandstone, Sandstone Junction or Miller, Partridge, Cromwell, Curtis, Cushing, Mission Creek. Partly destroyed: Finlayson, Mansfield, Rutledge, Milaca. County totally destroyed, Pine. Counties partly destroyed: Kanabec, Carlton, Benton, Aitken, Mille Lacs, Morrison.

Wisconsin—Towns totally destroyed: Comstock, Benoit, Barronett, Poplar, Marengo, Granite Lake. Partly burned: Spencer, High Bridge, Ashland Junction, Fifield, Washburne, Cartwright, Grantsburg, Turtle Lake, Rice Lake, Muscoda, Bashaw, Shell Lake, South Range. Counties partly burned: Barron, Washburn, Florence, Ashland, Taylor, Chippewa, Burnett, Marinette, Price, Grant, Douglas, Marathon, Bayfield.

Michigan—Towns partly burned: Trout Creek, Ewen, Sidnaw. Counties partly burned: Houghton, Ontonagon (almost total except in towns), Huron, Macomb.

(*Portland Oregonian, August 8, 1894.*)

Even as the awful power of that natural phenomenon which men call fire was most lamentably shown at Phillips, Wis., the other day, so also have been gloriously exhibited during the period that has since elapsed, those optimistic and sympathetic elements of human nature without which man could never have been able to make this earth a fit habitation for anything but howling wild beasts. Already the blackened remains that were left by the forest fires have been partially cleared away, and the timbers of fresh houses and stores and mills are beginning to show themselves, bright and new, against the charred soil, and, thanks to the practical and charitable form which the sympathy of their fellow men and women in various parts of the country has taken, none of those left homeless and destitute has suffered longer than was actually necessary to convey supplies from the places of giving to the place of need. These are things that should and do fill the minds of all good Americans with pride and satisfaction. Disaster will come, in America as elsewhere, but it can not cast down Americans for long, nor will Americans who have themselves escaped calamity ever turn a deaf ear to the cry from those who have suffered.

There are destructive fires somewhere in the forests of the United States every year, but in 1848, 1854, 1871, 1884, 1887, 1889 and 1891, the destruction was so great as to render those years especially notable. The fires of 1884 were mostly in the valleys of the Ohio and Wabash, and an enormous amount of property was destroyed. Fortunately, no lives were lost, and this was due principally to the fact that the region visited abounds in small watercourses, to the shallow valleys of which the people retreated, and from which the flames turned back, most of the damage being done on the ridges. Many people saved their lives that year by rushing into soft swamps and bogs and burying themselves up to their necks in the moist ooze. The fires of 1871 devastated Wisconsin, as have the fires of this year, and were almost contemporary with the great conflagration which destroyed the metropolis of the Middle West. The fires of 1881 were in Michigan, and those of 1887 swept over Kansas, Nebraska and the Indian Territory. Prairie fires began where the woods left off, and carried the sheet of flames across vast stretches of level country to other forests. Thousands upon thousands of valuable range cattle were destroyed that year.

The horrors of forest fires aside, no phenomena of nature, unless it be volcanic eruptions, produce spectacles half so grand. The sky is filled with dense black smoke, which hangs over the doomed territory like a huge murky canopy, and through which the rays of the sun struggle red and faint. Below, the flames, crimson, pale yellow, and sometimes so intense as to be almost white, blaze and roar in fiery billows. At night their glare is reflected upon the inky mass above, and they cast long, weird shadows, sometimes miles away. There are times when so great is the amount of air consumed by the blazing forests that the rushing current of supply comes to be like a rushing, mighty wind. So strong have these air streams been in cases as to lift people from their feet and blow down light buildings. So fierce a fire as this progresses with amazing rapidity, and the hapless wretch who is overtaken in the recesses of the woods by such a fire is hopelessly lost.

There were many such instances during the great fires that swept parts of Michigan in 1881. For a fortnight previous to the outbreak of flame and smoke, the stagnant air had been murky with the smoke of bush fires. It was so thick as to turn day almost into night. Objects could not be seen a dozen feet away. Whence come the smoke no one knew, but all were apprehensive of impending horror. The heat was overpowering. The thermometer registered for days above the hundred mark. On the morning of September 7 the deadly calm was broken by a slight breeze, which increased momentarily, and before noon was blowing a gale. With it came the flames, red, remorseless and swift. The settlers had no time for flight or fight.

What was to be done must be done without delay. Men who were in the fields and in the woods had scarcely time to reach their homes. Some of them, indeed, never did, but fell, overpowered, to be first smothered and then slowly roasted to death. Women gathered their children in their arms and started for the nearest water. Some of these, too, were overtaken and perished miserably. Others found their way to streams and lay down in the water, while the roaring flames passed over them. Some who took refuge in shallow water perished after all, the fire first licked up the water and then roasted its victims. Many who were saved had to completely submerge themselves, and only lift their heads, when at the point of asphyxiation, for air. Some descended into wells for safety, but most of these died, for the all-devouring flames above sucked up the fresh air, and in its place deadly, suffocating vapors filled the holes of refuge. It is estimated that fully 1,000 lives were destroyed by the fires of 1881. After the blessed rain came and extinguished the blaze and cooled the glowing beds of embers so that relief parties were able to traverse the devastated districts, bodies were found in all sorts of places and lying in all sorts of distorted attitudes, showing how horrible had been their death. Sometimes the clothes were not more than half consumed. Hundreds who escaped death were lastingly and horribly disfigured. Hands and feet were missing or drawn out of shape by reason of burned tendons. One man's face was literally baked, so that most of the flesh fell from the bones, and yet he lived, a ghastly, grinning spectacle.

The fire played many curious pranks. In one case every building in the village save the church and ginmill was destroyed. The parsonage, whose walls were not more than 30 feet from the church, was totally consumed.

No stick of timber a foot long remained, nothing but ashes, while not so much as a mark of fire was seen upon the house of worship. Considerable tracts of cleared land, surrounded by forests, were burned completely over. Fences, houses and growing crops shared in the general destruction. Yet one field of ripe oats close by the edge of the forest escaped, while next to the oats 50 acres of corn, still somewhat green, were completely destroyed. Great masses of burning debris were carried long distances by the winds which accompanied this fire, and fleeing families in wagons, in more than one case, were obliged to abandon the burning vehicles. One wagon so left was found after the danger was passed quite uninjured with the exception of one wheel, which was entirely destroyed. Two or three small settlements in the midst of vast tracts of woods escaped as if by miracle, and more than one town was saved at the last moment by a seeming providential change of wind.

The loss of human life was not so great near the shore of the lake as elsewhere, for there the people rushed into Huron's friendly waters by scores and hundreds, remaining there until the flames had done their work in that particular locality. The mortality among domestic animals was quite as great as among persons, and many carcasses of horses, cattle, sheep and hogs were found where they had fallen in their flight.

No more dramatic incident connected with a forest fire has ever been reported than that which occurred at Moore's Run, near Coudersport, Pa., in May, 1891. The fires had encompassed the towns of Austin, Costello, Galeton and Moore's Run for several days, but the inhabitants had little fear of danger to themselves. Every day farmers and lumbermen sought refuge in these places of supposed safety, and every day were made welcome and cared for. On Saturday, the 9th of the month, however, the fire had approached in snaky lines so near the towns as to make it evident that unless there was some good fighting done the towns themselves must shortly suffer.

So, from Austin 75 men were sent upon a railroad train of box cars to Moore's Run. There they dug trenches, piled up embankments and lighted back fires, working with the fury of desperation, hoping to stop the destroying progress of the blaze. The night had nearly arrived and they were beginning to relax their efforts a little, both from exhaustion and because they thought their work had been nearly accomplished, when one of their number, who had stopped for a moment, turned pale in the lurid light of the setting sun and flickering flame. He did not need to tell his comrades the cause of his emotion. Their gaze followed his outstretched hand, and they saw, as he had seen, that the fire had flanked them and had crossed the railroad track at a point where it passed between trees and huge "skids" of logs, between them and the villages they had worked to save.

It was useless for them to continue work at that point; the only thing that could now be done was to save their own lives. The engineer and fireman, who had been working as heroically as the rest, climbed to their perches in the cab, while the others clambered hastily upon the flat cars. With trembling hands the engineer pulled back the lever, his idea being to make a quick dash through the flames that reached hungrily across the track a few hundred yards away. There was no time for discussion upon that point. Each looked into his neighbor's face and read there tacit consent. It could not be seen

from the starting point how long the tunnel of flame through which they must pass was, and they all understood that no matter how fast the engineer's drivers might rush them through its fiery horrors they were in danger of severe scorching and perhaps suffocation. They could only huddle together in groups upon the flat cars and wait. As they approached the danger point the heat became intense and the smoke overpowering, and to prevent themselves from inhaling the superheated air they covered their faces with their coats, and the engineer, who, in his frenzied fear, had forgotten that such heat would certainly spread the rails, opened the throttle wider.

Obedient to his hand, the ponderous machine and cars plunged into the blazing inferno. Then there was a jolt, a seeming pause of an instant's duration, and the entire train was overturned in that awful place. There were shrieks of despair and cries of fear and pain. It did not seem to be two seconds before every car was blazing as if it had been soaked with oil. Fortunately the train fell away from the log heap, and so but few comparatively perished, but six or eight of the brave fellows were literally roasted to death, and not a man of the party escaped burns more or less serious.

In 1884 the fires were also in the mountains of Pennsylvania, and it was that year that the smoke from the blazing forests reached as far as New York. On May 2, for the forest fires were early in the year, a strong west wind swept from Pennsylvania across New Jersey and to the metropolis. It carried with it great billows of the densest smoke, which rolled along the waters when the North river was reached, and enveloped the ferry-boats as in a murky fog. It surrounded the piers and then enveloped the topmasts of the ship. Through the wide streets it rolled black and penetrating and over the whole city it spread the smell of burning wood. A pale, greenish pallor was on everything, the sun became a dull red ball in the sky and the waters of the rivers were like blood.

Although forest fires almost always begin after long periods of drought and when the forests are tinder-like for the lack of moisture, yet some of the most destructive conflagrations of this sort have occurred as early as April and May, when every tree was seemingly in most vigorous condition to fight the red-tongued destroyer. It has been observed that fires started under such circumstances burn quite as fiercely as those which rage in dried timber, and then when a fire, after eating its way through a belt of sapless trees, strikes evergreens or trees, that because of their growing upon the banks of running streams are green and full of sap, there seems to be no diminution in its fury, if, indeed, it does not burn even more fiercely. These facts have excited much interest among lumbermen and settlers in wooded regions for many years, and many theories have been put forward to explain them. One is that a forest fire is sure to be preceded by a peculiar condition of the atmosphere; that there is a paucity of moisture in the air. Another is that once a fire is started among dry trees the hot air and smoke driven in its advance prepares the way for the on-rushing flames. Those who hold this theory point out the fact that water in some forms actually aids combustion, and that certain oils mixed with vapor of water and burned produce more intense heat than can otherwise be obtained. Possibly just that combination is furnished when a forest fire reaches green timber.

There are several ways of fighting forest fires without water. The people of the unfortunate city of Phillips, Wis., that has just been destroyed, used dynamite with some success after their waterworks had been destroyed. "Burning back" is a favorite method. It consists of cutting down the trees in a belt of timber so wide that the flames can not reach across it, and then setting fire on the side of the cleared belt nearest the blaze. When the two fires meet they die for lack of material. This method is sometimes rendered of no effect by high winds, which occasionally carry the sparks over distances that are almost incredible. A favorite method of preventing forest fires' progress over cleared ground is to plow over as broad a belt as there is time for, but it is obvious that this plan is not of much value unless the air is still.

(*Milwaukee Sentinel*, September 17, 1893.)

RAIN ONLY CAN BRING RELIEF,

Rain was never prayed for with more fervor by the residents of northern Wisconsin than it has been the past three weeks. For nearly a month the forest fires have been burning continuously, and for the last two or three weeks they have been of serious proportions. Standing timber worth millions of dollars has been sacrificed, while hundreds of poor settlers have seen not only their homes, but all their possessions, swept away before the angry flood of flame, which has assumed such proportions as must be seen to be appreciated. While estimates by experienced lumbermen place the loss to standing timber at fully \$6,000,000, the hardships because of this tribute to the flames will be but slight in comparison to the suffering which must be felt by poor homesteaders whose all has been burned in the fires. That there will be widespread suffering and destitution there can no longer be any doubt.

THE EXTENT OF THE CONFLAGRATION.

Some idea of the immense extent of the burning forests can be obtained when it is known that the fires extend from Shawano, Lincoln and Portage counties on the south to Lake Superior on the north and westward from Marinette and Oconto counties to Sawyer, Barron and Chippewa counties. Through the forests which cover this broad acreage the fires are burning with more or less malignity everywhere, although at no place have they been more severe than in the vicinity of Marshfield, along the lines of the Wisconsin Central, the Milwaukee, Lake Shore and Western, and the Chicago, St. Paul, Minneapolis and Omaha railways. Here they have been a veritable fiery furnace, and fanned by high winds, at times approaching a hurricane, which have prevailed the past few days, the flames have wrought almost untold damage. But nowhere has the fight against the flames been more successful than in this district.

At McMillan, which has been the key point to the situation, the battle has been a particularly desperate one, and if in the end Frank McMillan saves his home and plant, which now seems probable, he may well think his escape almost miraculous.

HE'S A GREAT FIRE-FIGHTER.

As a forest fire-fighter Mr. McMillan has a reputation in the northern country, and it has been his generalship which has so far saved his plant. For sixty

hours previous to yesterday morning Mr. McMillan never slept, and the brave band of men with him have kept him company in his long vigil. For two weeks the fires have been burning in the vicinity of his mill, but they did not become particularly dangerous until Wednesday morning, when the guards, who like sentries have been watching the fires from the outposts, gave the warning that a mountain of flame, at some places a hundred feet high, when a tall tree had been caught in the fiery furnace and borne on a high wind, was moving like one vast army toward the mills. The long line of curling white smoke which hourly approached nearer and nearer to the mills, told how fast the terrible devastator was approaching. Preparations were made as for a battle, for such indeed it was.

THE BATTLE WITH FIRE AT McMILLAN.

A long line of men was stationed in front of the approaching fire. By the side of each man was a huge hoghead, which was kept filled with water, and from which the men, who were armed with pails, poured water on the brush in front of the fire, as fast as the advance guard of the flames crept through the underbrush to the point where the first stand, which was in a long clearing directly in front of the burning woods, had been made by the fire-fighters. Hardly 40 feet apart were the men and the barrels beside them were kept filled with water by a long line of tank wagons. Thus was begun the real battle with the flames. Trees and underbrush were chopped away to prevent their gaining strength, but all in vain. Despite the efforts of the men the flames swept past them, driving them back, inch by inch, until a last stand was made at the tracks of the Milwaukee, Lake Shore and Western railway, which runs for half a mile along the side of the lumber yard. The grade of the roadbed here gave the men a vantage ground by which they won their battle. To the very edge of the tracks the flame ran, and so dense was the smoke from the fires that at times it seemed as if the men must desert the redoubt in which they stood. Time and again an assault would be made by the fire, and the flames would succeed in getting a start in the stumpage on the outside of the yard. Before, however, the fire could spread, it would be stamped out, only to renew the attack with greater severity a moment later. Meantime in the lumber yard a reserve force was not idle. Flying cinders from the furnace across the way every minute found a lodging place in the piles, which, however, had been thoroughly wet down by the hose from the mills. To prevent these cinders from doing any damage was the business of the men in the yards and to their untiring watchfulness is due much credit.

A RIDE THROUGH FIRE.

It was just 12 o'clock Friday when *The Sentinel's* special correspondent reached McMillan. The fire was then at its height. So heavy was the smoke from the flames that the forms of the men could hardly be discerned as they stood at their posts along the railroad track. At the farthest outpost Mr. McMillan was found, and the reporter accompanied him in a round of the line.

Hardly 20 rods away was the advance guard of the fire, the smoke from which rolled in one solid cloud with the wind. It was an awe-inspiring sight.

According to old soldiers it had an appearance akin to that of a battle in which large armies were engaged. Suddenly from that awful pall of smoke a gleaming sheet of flame would be seen to shoot up. It was the light from some tree taller than its companions, which had been attacked by the fire. Then again a crash would be heard as some tall tree fell in a helpless ruin. As far as the eye could reach the line of white smoke continued. Not one point of attack escaped Mr. McMillan. Amid the deafening roar caused by the flames in the underbrush, he gave his orders as coolly as if the surroundings were not unusual. A stump which offered an opportunity for the lodgment of a spark he would order cut away or the wetting down of some logs into which he feared the flames might spread. Messengers like army soldiers were running to him every minute for orders and to tell him of the situation at various points. These he received and gave instructions as to what should be done. Nothing was forgotten, and no battle with men could have been more skillfully planned and carefully executed.

BORNE ON A HURRICANE.

About 3 o'clock the wind increased from a gale to a hurricane. Flames took the place of smoke, and yet not one muscle changed in Mr. McMillan's face. To men who were apparently exhausted he gave encouragement, and in the face of a veritable sea of flames no one hesitated.

"If I can save that plant till sundown," he said, "I can save it for good, for this wind can not keep up longer than sundown. If we fight it through this gale, we can save it any time and under any circumstances. I have fought fires for 30 years and have never seen as bad a one as this. Even the terrible year of the Peshtigo fire was not a marker."

Mr. McMillan's prediction was true. At sundown the gale decreased in violence and although a close watch of the plant was kept all night the danger was practically over for the time being, with the lull in the wind. But the terrible fight that he and the gallant band of 400 or more men, who at various times served under him, had in the battle with the flames will long live in the historical annals of northern Wisconsin. The men who were members of that band embraced every profession in life, doctors, merchants and lawyers, and even one minister, the pastor of the Presbyterian church at Marshfield, who worked side by side with the mill employés, in the fight against the flames.

BACK-FIRING AT COLBY.

At some of the smaller points other methods than that taken at McMillan were adopted for fighting the flames. At Colby, thousands of feet of logs were saved by back-firing, which consists of burning over all grasses between the spot, which the men fighting the fire are attempting to protect, and the woods in which the flames have their stronghold. In this way the fires are burned out before the property which is endangered by the flames is destroyed. When there is a clearing in front of the fires, the ground there is sometimes plowed and the flames thus hemmed in. These methods are, however, only effective when the line of the active fire is short, and even then the plowing of the ground often does little good, the cinders from the fire leaping over the plowed earth to the groves on the other side.

Some idea can be gained of the rapidity with which the fires travel when it is stated that a gang of men sent out by Mr. McMillan Thursday to fight a fire which was working toward his plant from the west, suddenly discovered that the fire had got away from them and that it was burning brightly back of them toward the plant. The men at once started to give the alarm, but before they could reach the boundary at the Milwaukee, Lake Shore and Western tracks the fire had reached there and was already being fought from in front by a gang under Mr. McMillan's personal direction.

A BRILLIANT SCENE AT NIGHT.

The sight of the fires at night is even more imposing than in the daytime, as the sky for miles around the vicinity of the flames is one brilliant canopy of red. Marshfield was lighted up Friday night on all sides by the fires. In the southwestern sky the illumination was particularly brilliant and the reflection of the flames from the burning woods was a sight worth going miles to see. The electric display at the World's Fair is not "in it" with the panorama of blazing forests presented to the people of Marshfield.

Major W. H. Upham had a mill at Kewaunee at the time of the great forest fires which destroyed Peshtigo. Kewaunee's escape from destruction at that time was a narrow one, a kind providence sending a rain storm just as the fires reached the village. According to Major Upham, the fires this year resemble the famous Peshtigo fire in the rapidity of their spread and the terribleness of their attack on everything within their reach. He says they are undoubtedly the worst that have occurred in Wisconsin since that date.

ASHLAND, Wis., September 17.—The forest fires which have been creating such havoc further south, have now reached the extreme northern limits of the State. To-day a dense pall of smoke, filled with cinders from the burning forest, has hung over this city. At noon the people in the churches were called from worship to face the dread foe. The smoke and cinders are almost blinding.

It has been an exciting Sunday in Ashland. Settlers have been coming in all day from the surrounding country, flying for their lives from the fires that have burned their homes and all their possessions. They tell pitiful tales of suffering and death.

SWEEPING DOWN ON THE CITY.

The city itself was most seriously threatened, surrounded as it is by woods, except on the lake front. The fire department was early called out to fight the flames, which were rushing in on the town from the Odanah Indian reservation. A thousand citizens this afternoon joined them in the battle against fire. At 3 o'clock a cry of despair went up from the throngs of fire-fighters and spectators gathered near the Milwaukee, Lake Shore and Western railway yards. The water-works had given out and there was no water, on which alone depended the safety of the city. Chemical engines were quickly sent for, but they were only playthings against the fire, fanned as it was by a high wind. There are very few wells in the city, and the situation was most serious. It seems the water-works engines were carrying 125 pounds pressure all day. It was when the cry for more pressure induced the engineers to allow

150 pounds to be indicated that important mains were burst and lessened the water supply to the ordinary amount.

A DESPERATE BATTLE WITH FIRE.

The railway men were equal to the emergency. Thirty "dead" locomotives were fired up in almost no time, and plucky engineers were soon moving all the rolling stock to places of safety on the lake front.

Quantities of household goods were burned and over 100 families are homeless. Hundreds of men remained at their posts fighting the flames as best they could. Even with wet sponges and goggles they could not long remain in the intense heat and suffocating smoke, and when they could stay no longer others took their places. Twenty or more were completely overcome and had to be removed to the hospital. Many women and children fled in terror, and in their mad flight did not stop until the lake front was reached, believing that safety could only be found in the waters which the fires could not reach. Others were only saved by desperate efforts of the officers with patrol wagons.

All day settlers have been coming in, many nearly exhausted in their race for life with the pursuing fire. Timber and vegetation burns like straw, as there has been no rain since July 10. A woman and babe, supposed to be the wife and child of a settler, were picked up in an insensible condition to-night near the White River road. The child died soon after arriving here. The mother is in a delirium and it is supposed her husband perished on the Odanah reservation.

Indians are camping on a raft in Bad river and are said to be hemmed in by an archway of flames. It is feared there must be great loss of life there.

Three families near Marengo have perished and there was a call for help from there, but none could be sent. One settler name Egstrom was driven crazy by the loss of his wife and family of two children. His hair and eyelashes and clothes were burned from his body when he was rescued.

At Parishville the large iron plant is reported to be burning.

OVER 200 SQUARE MILES ABLAZE.

As nearly as can be estimated there is a sea of fire over 200 square miles of territory and it is rapidly sweeping north, burning everything in its path and driving before it the homesteaders whom it has not overwhelmed. The damage to standing timber is enormous and is roughly estimated by lumbermen as not less than \$5,000,000. It is impossible to get details, but when the story of to-day's disaster is fully told it is feared that the death list will be found to have run into the hundreds.

OSHKOSH, Wis., September 15.—The fires to the north of this city have been the cause of a peculiar phenomenon. The city is enveloped with strong, pungent smoke and the sun is so obscured that even at noon it had the appearance of an eclipse. The city is in a state of semi-darkness, and has been so for several days.

MARINETTE, Wis., September 15.—The smoke was so dense in the city to-day from the forest fires that the public schools had to be closed. A thunder shower toward evening brought great relief.

Forest Fires Cause Lake Wrecks.

DENSE SMOKE, LIKE A PALL, SETTLES OVER THE WATER — VESSELS INJURED—

The forest fires which are causing such widespread destruction through Wisconsin and the upper end of the lower Michigan peninsula have covered the lake with a thick pall of smoke, and navigation has become decidedly dangerous. A half dozen wrecks have occurred the last few days, and the captains of incoming boats report that the smoke is becoming steadily worse.

The steamer "W. H. Barnum," which stranded Thursday afternoon on the Wisconsin shore four miles above Cleveland, reached Milwaukee yesterday and went into dry dock for repairs. After his boat struck the beach Capt. G. W. Case went ashore to summon assistance. He succeeded in getting the wrecking tug "Arctic" from Manitowoc to go to the wreck. Yesterday morning the captain went to where he supposed his steamer lay. The smoke was so thick that he could only see a short distance, and he spent all the morning trying to locate the wreck. At noon the smoke lifted from the water slightly, and then he saw that his boat was certainly gone. The tug had succeeded in pulling it off the beach, and the mate did not wait for the captain, but came on to Milwaukee.

The most serious wreck on account of the smoke was that of the big Chicago schooner "James Mowatt," which went on the rocks at Keweenaw Point, Lake Superior, 12 miles north of Eagle River, Thursday evening. Capt. Calvin N. Becker succeeded in getting the crew ashore in safety. Telegrams from Calumet, Mich., last night, said the boat was in danger of going to pieces before morning. The wreck lies in an exposed position with a heavy sea breaking over it.

BLACK RIVER FALLS, Wis., September 17.—A. S. Irows' cranberry marsh, northeast of this city, was totally destroyed by fire. The loss is about \$15,000, which includes several buildings on the marsh in which were stored about 1,500 barrels of cranberries.

CUMBERLAND, Wis., Sept. 2.—Baronette, with 500 population, eight miles north of this city, and Granite Lake, a small town four miles north of here, were completely wiped out of existence last night. The people barely escaped with their lives, and have been brought to this city. Five families are still missing, and it is thought they may have perished in the flames. Great excitement prevails here. Fifty million feet of lumber was burned at Baronette and 5,000,000 feet at Granite Lake. The fire is raging violently over a territory 10 miles square southeast of this city, and hundreds of farmers are homeless, barely escaping with their lives. The damage is impossible to estimate at this hour. The wind is blowing a gale, and there is great apprehension with fire completely surrounding the city.

South Dakota.

(From the Omaha Bee.)

DEADWOOD, S. D., September 15.—[Special telegram to THE BEE.]—A sleepless, restless, anxious night was spent by the residents of Deadwood, and this

morning they came to business with bloodshot eyes and the marks of a hard night generally upon them. Nearly the entire male population put in the night fighting the forest fire north of the city, which for hours threatened to sweep all before it. Bankers, lawyers, merchants, doctors, laboring men, everybody took a hand in the fight, and by their exertions managed to save the city.

At 11 o'clock last night the fire had reached a point on Forest Hill, only a mile distant from town. The track of the flames was two miles wide and lay through a region thick with dry brush and timber. The wind was blowing a gale, rendering it impossible by reason of the heat and smoke to approach nearer than 100 feet to the blaze. The flames were leaping to the tops of pine trees and jumping 100 feet high. Along the line of this wake of fire were scattered 1,000 men or more with axes, shovels and pine boughs, cutting down trees, building brakes and fighting back the ever-advancing flames.

CONQUERED BY HARD FIGHTING.

All night long they battled, while reinforcements kept pouring in from Lead City and neighboring towns. Still the fire advanced, helped on by the wind, and the contest seemed hopeless. Just when the men were exhausted and all hopes almost given up, the wind veered and blew away from town for about half an hour. The precious moments were taken advantage of. A swath 100 feet wide was cut in front of the fire, the timber carried off, and when the wind again changed and blew toward the city, the flames found nothing to feed on. Occasionally they would leap across the clearing, but hundreds of men were ready to beat them out.

So all night the fight lasted and now it is thought all danger is past. Five hundred men still remain to watch the flames, but unless a high wind arises no apprehension is felt. The damage to growing timber is so vast that it can not be estimated, in addition to which the city has expended about \$10,000 in controlling the flames.

For the first time in a week the inhabitants will sleep in security to-night. A hundred men are engaged to-night in beating out incipient fires and guarding against another outbreak. All of the districts where the fire threatened Deadwood are under control, except a space in City Creek gulch, where the flames have gained the heavy timber and can not be extinguished. A cordon of men is stretched around this place, guarding against a nearer approach of the fire.

Desolation for miles and miles marks a scene where a few days ago a heavy growth of underbrush and large timber flourished. The hillsides and valleys are black with the ruin, while the smoking timbers of cabins scattered here and there mark where many prospectors have been driven forth by the flames.

The strictest watch will have to be kept over the burnt district, as the least wind starts into activity the smoldering fires. The fire in Two Bit gulch is still raging fiercely, sending up dense volumes of smoke and destroying an immense amount of valuable timber. No important towns are in its track and by no possibility is it thought it can reach Deadwood.

Michigan.

(From the Detroit Free Press.)

SAGINAW, Mich., August 28.— Fires are causing heavy damage along the line of the Saginaw, Tuscola and Huron railroad, and yesterday trains were hauling water to quench the flames. Several farm buildings have been destroyed. The smoke is so dense here that objects 100 feet distant can not be distinguished.

Much timber and farm property have been destroyed on the western division of the Flint and Pere Marquette, and Toledo and Ann Arbor, and North Michigan roads. It is estimated that over \$1,000,000 damage has been done in the Saginaw valley and northern Michigan.

ISHPEMING, Mich., August 30.— Bush fires are burning in every county of the upper peninsula of Michigan. There is little wind, and smoke settles at night in a dense cloud over the cities and villages. At times the cloud is so dense that an arc light is invisible at a distance of 150 feet, and nothing can be seen across the street. The season has been unusually dry, and fires have been burning most of the time since May.

Considerable damage has been done in every county, but Ontonagon has suffered the heaviest loss. It is in this county that the heaviest reserves of pine are growing, as it was opened to settlers and lumbermen but a few years ago.

The Diamond Match Company has been the heaviest loser by fire. Of the 250,000,000 to 300,000,000 feet of standing pine burned in Ontonagon county, the Diamond Match Company has lost over 100,000,000 feet. The lumbermen have already put crews in the woods cutting damaged pine. The Diamond Match Company will cut at least 100,000,000 feet and as much more as possible, as against 55,000,000 feet last season.

BAY CITY, Mich., August 30.— The forest fires northwest of this city are becoming a source of alarm to the residents of this portion of the county, and unless rain comes at once great suffering will be caused those who have homes in the path of the fire. Dr. McTavish reports that the fire had reached the Beaver road, near what is known as the Chip road, and yesterday eight families had to take what little household and personal goods they could find and move into the village of Kawkawlin.

A resident of Bay City was informed that some timber land belonging to him near Midland was being damaged by fire. He drove in that direction, but, on account of fires and smoke, he could not get within two miles of his property.

HARRISVILLE, Mich., August 30.— Forest fires that have burned with intermittent vigor have almost devastated the locality lying between this city and West Branch, 84 miles distant, along the line of the Michigan Central railway. Many families have lost everything, and are suffering from exposure and hunger.

Crops, fences, and entire sections and townships of valuable timber have been destroyed, and the only salvation for the little property remaining, is rain.

GLADWIN, Mich., August 30.— Stevens Station, a small mill hamlet between here and Pinconning, has been practically destroyed by fires that have been raging for the past 10 days.

MACKINAW CITY, Mich., September 3.—Navigation through the Straits is so dangerous on account of the dense pall of smoke from the forest fires which hang over the lake that vessels can not proceed through St. Mary's river except at great risk. The big steamer "Manitou" on arriving at Mackinac Island was turned back to Chicago.

IRONWOOD, Mich., September 3.—Tremendous forest fires are prevailing throughout the upper peninsula of Michigan and northern Wisconsin. The district between Watersmeet and Bessemer, over 50 miles, is a mass of flames, and homesteaders are making desperate efforts to escape. Gogebic has been destroyed, and it is expected that Wakefield will experience a similar fate. Ironwood, Bessemer, Hurley and Saxon are surrounded by fires. There is very little water, and thousands of men are out with picks and shovels, and succeed in keeping the flames back only by throwing dirt upon the burning stumps and brush.

NORWAY, Mich., September 3.—Forest fires have been raging for several days, and yesterday the flames encircled this city. Several hundred men are assisting the fire department to extinguish the flames. It is impossible to see more than 20 rods on account of the dense smoke. Many thousands of cut logs and posts have been consumed. A few miles from here Halems & Sons had 100,000 feet of logs on skids burned. Joseph E. Bergensen, a logger and farmer, had a new barn and stock burned.

ISHPEMING, Mich., September 3.—The gravity of the situation continues to increase every hour. The long-continued drought displays no sign of abatement, while every morass adjacent to the city is aglow with flame. A dense cloud of smoke envelops the country for many miles, obstructing business and offering constant menace to travel. Dust and ashes are falling in showers.

Much credit is due to the railroad for its service to the suffering. Box cars are furnished, and into them the household goods of the homeless are being taken. No one is yet reported missing from Ishpeming, but the rapid approach of the fire and the inflammable condition of vegetation, together with a vitiated atmosphere and a temperature registering at blood heat, all threaten great damage.

(From the New York Tribune.)

DETROIT, September 4.—Reports from northern Michigan show that yesterday's rains were general, and that the forest fires have been materially checked where they have not been entirely extinguished. In the counties of Dickinson, Houghton and Ontonagon, in Michigan, and Florence and Marinette, Wisconsin, it is estimated that 700,000,000 feet of white pine and hemlock have been scorched.

EWEN, Mich., September 4.—The heavy rain of last night has cleared the air of smoke, and has deadened the fires. A refreshing breeze off Lake Superior has lowered the temperature about 50 degrees. It is thought that nearly every foot of standing pine in Ontonagon county is burned—fully 500,000,000 feet. The Nester estate has lost 90,000,000 feet; Trout Creek Lumber Company, 20,000,000 feet; Diamond Match Company, 150,000,000 feet. The rest is owned by homesteaders at Paynesville and Bruce's Crossing. Many cattle and horses were burned, but no human lives were lost.

KILMANAGH, Mich., September 4.—A tract of timber south of this village has been burning for several days. Yesterday a strong wind began blowing from the south, and the fire spread rapidly toward the town. Business was suspended and everyone turned out to fight the fire. At a critical moment the wind changed, and the town was saved. The timber loss in this county by fire will reach \$50,000.

(From the Detroit News, September 4, 1894.)

MARQUETTE, Mich., September 4.—From Ironwood came the following dispatch: "This city is now in no danger from forest fires. Rain fell yesterday afternoon for nearly two hours. Yesterday the fires crept up over the Gogebic range around the Norris mine and were advancing on the city from that direction."

In explaining the reason for fires, one railroad official said that it was all owing to the great amount of brush and rubbish left in the rapid construction of railroads, and also the great amount created in logging. No precautions had been taken to clear up the stuff and burn it.

A vast amount of the territory burned over by the fires this year had not been visited by fires in years before and the accumulation of dead material has given a lasting existence to the flames which will take days of rain to effectually extinguish.

Every town damaged by fire has been remarkably negligent in the matter of clearing up around the suburbs. Stumps and brush heaps have been left along the tracks and in vacant lots.

At Ishpeming dust and ashes fell in showers. The district between this town and the Mead river was a lake of fire. The Salisbury location was in a panic, and only the hardest work saved the miners' homes.

EVIDENCE OF INCENDIARISM.

IRON MOUNTAIN, Mich., September 4.—Heavy rains throughout the fire belt have deadened the flames to such an extent that no more danger is apprehended.

The whole country to the north and east of here has been a mass of flames, and the damage to crops and timber will aggregate many thousands of dollars.

The intense heat may be judged from the fact that vegetables were cooked in the ground. Captain John Perkins lost 1,700 bushels of potatoes and 1,000 bushels of turnips in this manner.

On the Ontonagon division of the Chicago, Milwaukee and St. Paul road the fire belt extends from Channing to Rockland, on both sides of the road. The damage here is chiefly to standing pine, and it is not possible to estimate the damage in dollars and cents until it has been thoroughly examined. It is estimated that 200,000,000 feet of timber has been scorched, but if the timber is lumbered at once the loss will be about 10 per cent. The railroad is badly warped in many places and it is not considered safe to operate trains.

Conductor Hilka, who came down from the fire belt last night, says the flames attacked the roadbed, and the ties are burning.

There is considerable evidence that many of the fires were of incendiary origin, set by men who knew that the scorched pine would have to be cut at

once, thus giving them work. The fires will also force into the market much pine that was held by non-logging capitalists for the purpose of speculation. At any rate, hundreds of men will be given immediate employment.

In the counties of Dickinson, Houghton, and Ontonagon, in Michigan, and Florence, and Marinette, in Wisconsin, it is estimated that 700,000,000 feet of white pine and hemlock have been scorched.

EWEN'S NARROW ESCAPE.

EWEN, Mich., September 4.—The fires in the vicinity of Ewen are abating. Telegraphic communication has been cut off since Saturday. In Ewen the loss was about \$4,000. The entire town seemed doomed, but was saved by hard fighting.

The smoke was so thick that several were overcome.

It is thought nearly every foot of standing pine in Ontonagon county is burned—fully 500,000,000 feet. The Nester estate has lost 90,000,000; Trout Creek Lumber Company, 20,000,000; Diamond Match Company, 150,000,000. The balance is owned by homesteaders at Paynesville and Bruce's Crossing.

Many cattle and horses were burned, but no human lives were lost, though there have been many perilous situations and narrow escapes.

Pennsylvania.

(*Easton Argus, Pa., December 1, 1894.*)

SHAMOKIN, Pa., November 30.—Destructive forest fires are burning on the Line and Henry mountains, and, although every possible means to extinguish them is being made by the coal companies owning the land, the flames continue to rage. On the summit and sides of the Henry Mountains are many openings leading into the workings operated by the Mineral Mining Company, and this company had a score of men at work last night fighting the flames. The best the fire fighters could do was to keep the flames from spreading on the Line Mountain. No headway could be made against the fire. It is apparent that the entire tracts of woodland on the mountains will be destroyed. How the fires originated is not known.

(*New York Sun, May 20, 1894.*)

“While I was trout fishing in northern Pennsylvania last week,” said a New Yorker, “I noticed on the mountains along the creeks ominous pillars of smoke rising in many places among the trees. The evident regularity and system with which the fires that caused the smoke were built excited my curiosity, and I asked a native of the region what their origin was and their object.

“‘Oh,’ he replied, ‘they are the work of the huckleberry farmers. That’s the way the bushwhackers cultivate huckleberries.’

“Then, by further inquiry, I learned that there is a tribe of shiftless persons in all those mountain regions who have no regard for law, property or life, and among whose work of outlawry is the systematic firing of woods simply to increase the area of huckleberry bushes, by the picking of berries from

which those people eke out a miserable existence. It seems that huckleberry bushes spring up quickly and surely wherever forest fires sweep over those hills, and the unscrupulous persons who depend on them do not care what damage to life or property results so long as they increase the berry crop. The huckleberry farmer does not need to own an inch of land. If he has the title to one simple lucifer match he can put thousands of acres under cultivation in a very short time. He has only to light it and touch it to the dry leaves and branches on the ground, either in early spring or late fall, and his cultivation is soon under way. No matter what had grown on the ground before these incendiary fires sweep over it, huckleberry bushes will never fail to grow from the ashes and scorched soil.

"My informant assured me that nine out of 10 of the destructive and frequently fatal fires that annually devastate those hills are started by these outlaws. There is a strict and severe law against this business, and lumbermen, tanners, and every one interested in keeping fires out of the woods are well aware as to who starts them, but a case is yet to be reported where they have taken any measure to prevent the incendiarism or bring the incendiaries to justice.

"Two years ago fires started in this way destroyed a million dollars' worth of property and eight lives, among the latter Superintendent Badger, of the Sinnemahoning Valley railroad, who, with a force of men, had gone to fight the progress of the fire along the line of the road. He and his men were surrounded by the flames, and he and seven others perished. Yet none of the wretches, who were responsible for the uncontrollable conflagration, was ever molested, and they are firing the woods just the same this year. There were 30 miles of country in Tioga and Lycoming counties burning at one time this spring."

(*Philadelphia Bulletin*, May 12, 1894.)

FIRE IN PENNSYLVANIA FORESTS.

In a single stretch of woodland north of Westport, Pa., one Williamsport lumbering firm lost last week 3,000,000 feet of logs owing to forest fires. The firm estimates the market value of these logs at \$13,000, which, of course, does not take into account the damage to standing timber caused by the same fire, or the destructiveness of that blaze with reference to growing shrubs and sprouts. The *Scranton Truth* says it never has been able to get a satisfactory approximation of the fatal yearly loss to Pennsylvania from forest fires; but the amount must be enormous. In its own community it knows it is a serious present loss, without calculating at all the tremendous sacrifice which is tallied upon the future.

CONNELLSVILLE, Pa., August 28. — Fierce mountain fires are raging all along the Chestnut Ridge north and south of here. Many of the mountain farmers are plowing furrows around their homes and grain stacks to ward off the fire.

The long drouth has left the underbrush in such a condition that the flames travel with great rapidity. The smoke was so dense here this afternoon that electric lights had to be lighted at 4 o'clock.

KANE, Pa., September 3. — A stiff gale from the southeast all day has freshened up the many forest fires burning in this section, and to-night the bright glare is visible in all directions.

Fire along the line of the Pittsburg and Western, between Mount Jewett and Ormsby, prevented trains from coming through to-night. The roaring of the fire can be heard for a mile. Much valuable timber is being destroyed.

Any change in the wind and the north end of the Kane oil field will get a scorching. The fire threatening the south end of the Kane field on Martin Run a week ago has broken out anew to-day.

Forest fires near Johnsonburg, in the heart of the timber district, are destroying millions of feet of lumber. Authentic reports say fires along the Pittsburg and Western in Elk and Forest counties have destroyed several mills within the last few days. The Bradford train, leaving Smithport at 5 o'clock to-night, got only as far as Ormsby Junction, and put back to the county seat on account of forest fires.

MILFORD, Pa., September 3.—The residents of Milford and vicinity turned out to-day to fight the forest fires which are doing great damage in this section of Pennsylvania, threatening the various summer houses, clubhouses and farm buildings. Fires started to-day, also, on the Jersey side of the Delaware river, and are raging fiercely. Sullivan county fires are doing immense damage to timber. Navigation on the Delaware and Hudson canal has been stopped two weeks for want of water, and the Delaware river is a mere rivulet. The air is thick with smoke and pasture so scant that the milk supply is already becoming short.

BRADFORD, Pa., September 3.—Forest fires are raging all along the line of the Buffalo, Rochester and Pittsburg railroad. Reports from all points on the narrow gauge roads state that the woods are on fire for miles, and the damage will be heavy unless rain should fall. The woods along the pike to Corydon are on fire for miles, and oil property in the vicinity of the west branch is threatened. Should the fire spread to the oil field, serious consequences would result.

The woods along the Bradford, Bordell and Kinzua railroad, between here and Smithport, are reported on fire and valuable property is in danger of being destroyed. On the big level between Mount Jewett and this city and the head of the west branch, the woods are ablaze, and several oil well rigs are reported burning.

At Songbird and Quintuple the woods are a roaring mass of flames, and valuable oil property is being devoured by the flames. A report reached here this evening from Lewis Run, stating that the woods are ablaze and the people fighting the fire to save their property.

KANE, Pa., September 3.—Forest fires are within a mile of town. Should no rain fall, the damage and loss to property will be great. Men are watching the fire, and are preparing to prevent it from reaching the oil wells and nitro-glycerine magazines, located close by.

RUSSELL CITY, Pa., September 3.—Word has been received here that the forest fires have reached the Watson farm in Forest county, and several oil wells are now burning. The loss will be heavy, as there are a large number of wells on this farm, and it is feared the fire will spread to adjoining oil property. There are no indications of rain, and should the wind rise it would sweep the entire field.

WILKESBARRE, Pa., September 3.—Forest fires are reported as burning fiercely in the Pine Creek lumber region, and valuable property is in great danger there. Owners of mills and lumber in that neighborhood who reside here have been notified that there is imminent danger of serious losses, and have been advised to come on without loss of time.

The fire has been burning in the Babbs Creek district since Saturday, and to-day it climbed over the mountain, and for a time it looked as if the town of Balltown, in Forest county, would be destroyed. This, also, was saved by hard work, and it is now said to be out of danger. At other points the woods have been back-fired for a distance of six miles in order to save property. Forest fires are also reported from Potter county.

BRADFORD, Pa., September 4.—The forest fires are still burning fiercely, and there are no indications of rain. The woods surrounding Kushequa, a lumber camp, are on fire and the place is threatened. Assistance has been asked of this city, and a steamer and a number of firemen have left for the scene. Millions of feet of lumber have been destroyed. The fire still rages near Johnsonburg. Advices from Kane say the fire is still raging there, and that a house occupied by a man named Shelby was destroyed last night, and the family had a narrow escape from death. Reports from Mount Jewett say the large sawmill of James Doyle & Co. is on fire, and that the forest fires are rapidly encroaching on the town. The town has but one hose company.

A large force of men are fighting the flames.

MILFORD, Pa., September 4.—After fighting the forest fires for a week they have at last been gotten under control. The fires reached with an eighth of a mile of this town last night, but at 5 o'clock this morning the flames had entirely disappeared. Thousands of feet of lumber have been burned.

COUDERSPORT, Pa., May 11.—To-night the pretty little lumber and farming towns of Austin, Costello, Galeton and Moore's Run are on the verge of a panic, two especially being threatened with annihilation from fires that seem to form an impenetrable wall on every side. For several days past the skies have been lighted with fires, apparently in every direction, but little fears were entertained by people living in the towns. In spite of every effort, however, the flames crept steadily toward the towns. At Moore's Run, on the Sinnamahoning road, a train load of 75 men, sent out from Austin last night, had been fighting back the fire by every conceivable means, but were finally obliged to retreat. The men hastily boarded the train and started to make a run to another point, when it was found they were hemmed in by the forest fire on one side and a huge skidway of logs on the other. It was finally decided to dash past the burning skidway, and the engineer and fireman, with their faces covered with dampened cloths, and their hands and arms wrapped in wool, mounted the little engine and pulled out through the wall of fire. The 75 exhausted men gathered in groups on the flats for protection, or lay on their faces on the floor. As the blazing furnace of logs was approached the heat became unbearable, and the smoke so blinding and stifling the men were obliged to cover their mouths with cloths. Just opposite the millions of feet of burning logs, where the heat and smoke and flames were the greatest, a terrible thing occurred. The engineer had forgotten that such great heat would surely spread the rails, and he pulled the throttle wider in the hope of sooner escaping from a torment of heat and smoke. Then there was a lurch, an

ominous heaving and a shriek of despair as the train toppled over into the hell of fire beneath. A scene ensued never to be forgotten by those who escaped, though every man will bear to his grave a mark of that awful moment. The cars caught fire like so many paper playthings, and the men within, half blinded and scarcely realizing anything except that they were being slowly roasted to death, struggled fearfully to regain the track, where safety lay, for a time at least. Those uninjured from the fall and only smarting from the pain of the intense heat, bravely turned their burned, blackened hands to aid their more unfortunate fellows. At this hour it is impossible to secure details, though enough is known of the scene that followed the hurling of the struggling mass of men into the furnace of flame to say its like had never occurred before. Superintendent Badger, of the Sinnamahoning Valley road, in charge of the relief train, and who had worked the hardest of all to save the properties of others, when the train ditched and rolled over so suddenly, must have been injured so as to be unable to help himself, and owing to the smoke and panic he was not found until too late — jammed in the wreck he had evidently slowly burned to death. At this time — 9.30 — it is known that six others also miserably perished at once or died soon after, and 30 others of the party were badly burned, many probably fatally, owing to the fears that they inhaled the flames that seemed to fairly spring into their faces. Seven others of the party are missing and their fate is unknown, though they are likely in the charred wood of the logs or train. Relief parties started for the scene as soon as the fearful news spread, many male relatives of the men injured insisting on accompanying the train, though they will hardly be able to reach the place of the wreck unless the fires have burned themselves out. Owing to the great devastation done to everything in the way of the fire, communication is badly interrupted, and it is impossible to learn the names of the men burned or those still missing. As to the damage, it is known 40,000,000 feet of hemlock logs and timber and 25,000 cords of valuable bark have already been destroyed, and the fires are raging without any appreciable diminution. This evening the people are praying for rain, as it seems nothing but a drenching will quench the flames that have grown so fierce; they must either be extinguished by the floods of heaven or burn out for lack of material. A million beacon lights seem to be burning from every mountain and hillside, and the air is so oppressive many workers faint from exhaustion, and are dragged away from a flame that has done nothing as yet but steadily advance.

Late dispatches from Austin confirm former reports. The body of the superintendent has been found burned to a crisp. The entire party would have perished in the burning train or forest fire had they not immersed themselves in a creek. The fires have been raging 48 hours. Twelve solid miles of lumber in one district have already been burned and the end is not yet.

PITTSBURG, August 28.—This city and the surrounding country was this afternoon enveloped in a pall of the characteristic smoke of burning forests. It appeared rather suddenly, and its intensity deepened so as to bring on the appearance of nightfall fully an hour ahead of the usual time.

Inquiry at the local United States weather bureau developed the fact that they had heard that similar dense smoke had been reported at Cleveland, Grand Haven, Mich., Louisville and Cincinnati. Observer Grant said he had noticed its strong smell, like that of a burning forest.

New Jersey.

(From the New York Tribune, July 17, 1894.)

The New Jersey Forest Fires.*

ALMOST SEVEN THOUSAND ACRES BURNED OVER AND THE FLAMES STILL RAGING.

PORT REPUBLIC, N. J., July 16.—The forest fires in this section are still far from being under control. The flames to-day made as rapid progress as on any day since they started, almost a week ago. All day long in the burning section the flames shot high above the tree tops and dense clouds of blinding smoke rolled away with the strong wind which blew from the east. The fire promises now to be the most destructive in the history of South Jersey. The same section has been burned over before, but not so great an area at one time. The shifting wind makes it almost impossible to fight back the flames. When they are stopped in one direction they break out in another. Nothing in the path of the flames is saved except where the people have time to take their goods away.

The village of Bridgeport, in Burlington county, was in great danger to-day. The fire was making straight for the village, and had burned four houses and a lumber mill belonging to Bartlett Brothers, when a sudden shift of the wind sent the fire fiend off at a tangent to wreak ruin in a section that was thought to be safe. Between 6,000 and 7,000 acres of timber land have now been burned over. The wreck in the burned district is complete. Little remains save the burned and blackened trunks of the trees. The needles and cones which were green a few days ago have been killed and dried as they hung on the trees by the fiery breath which precedes the flames. Once dried, they fall off and add to the already too plentiful supply of fuel which incrusts the ground in the shape of pines and needles of other years. The small branches of the living trees are killed and dried of sap and burn on the trunks.

When the fire has passed a point in the woods it leaves a glowing mass of fire on the earth several inches thick. This continues to burn and smolder for hours, sometimes for a day or more. This is what completes the ruin, for although the limbs of the trees are gone there would be a chance that the trunks would grow again but for this bed of fire. This kills the roots and chars the trees at the ground. The result is the trees never grow again.

This afternoon, after the fire turned from Bridgeport, it took in the little farm and house of a widow named Lottie Cramers. Everything went and the place is in ashes to-night.

On Saturday night the people of Egg Harbor and its vicinity were called on to fight back the flames from that place. The church bells in the village were sounded as a warning. Several hundred men turned out. They turned the fire aside by back-firing — fought fire with fire — but they may have to do their work all over again within a few hours. When the fire turned to-day it started in the direction of Mullica river, Absecon and Egg Harbor. A heavy rain is about all that can save the loss from the fire from running far into the hundreds of thousands. A conservative estimate on the loss on buildings and

* The forest fires in New Jersey in 1895 were still more extensive and destructive.

personal property in the burned section fixes it at \$16,000, but this is trifling alongside the loss on timber. Telegraphic communication with some of the villages is cut off, and news is hard to obtain.

(From *The Philadelphia Press*, September 16, 1894.)

TRENTON, N. J., September 15. — No State in the Union has suffered in a general way so much from forest fires as New Jersey. They are of annual occurrence and the losses during the last 10 years go into the millions. No one has kept the statistics, but the general facts have been sufficiently alarming to arouse much interest and make the subject of forest fires and their protection one of constant agitation. This summer over 100,000 acres of forest land were damaged, farm buildings destroyed, and small communities made desolate. The prediction is made that unless something is done, and that quickly, the wilderness of New Jersey will become a desert of shifting sands and a menace to the agricultural interests of the State.

New Jersey appreciates its dilemma, and the problem is receiving the attention of scientific minds, encouraged by the State authorities. The recent agitation has not been in vain, because laws have been enacted and organization effected that will be beneficial to the owners of these vast tracts of woodland. There is no doubt but that the matter will receive the attention of legislators next year. Such legislation would be in the line of the recommendations that have several times been made to the Legislature by the Governor. The State Geologist, in his reports from time to time, has called attention to the ravages of fire and even suggested several practicable plans for the prevention and the successful fighting of forest fires.

New Jersey has just reason to be alarmed about forest fires, for she has 1,200,000 acres of land remaining in forests in what is known as the pine country, which embraces Salem, Cumberland, Monmouth, Ocean, Atlantic and Burlington counties.

STATE GEOLOGIST AT WORK.

The State Geologist has assigned John Gifford, of May's Landing, to make a special study of the pine country, with a view of devising plans not only for the preservation of the forests, but for turning considerable of the area into tillage land, and to devise a plan for the prevention of forest fires. One result of his investigation has been the production of a large amount of useful information and the beginning of an organization especially adapted to the preservation of forests and of a general education of the residents of the pine land in such matters as appertain to their own safety and protection.

Mr. Gifford contends that the woodman's arch enemy is the forest fire. He has had during the past four months ample opportunity to study, himself, the ravages of the fire fiend, because forest fires have extended well around the pine belt of West Jersey, destroying thousands upon thousands of dollars' worth of property, and some of the fires would have been raging yet were it not for the recent heavy rains. The damage will go up into the hundreds of thousands of dollars, because not only woodland was destroyed, but many of the small stopping points of three or four

houses were wiped out of existence. One of the most notable landmarks of South Jersey was consumed 10 days ago while the fires were raging in the upper part of Atlantic county. It was Doughty's tavern, off from Buena Vista, which has been for half a century the favorite abiding place of sportsmen in quest of deer, quail, grouse and pheasant. There is not a gunner in the Eastern States but that has visited this old-fashioned hotel or has heard of some of the great conquests made by those who annually frequent it during the shooting season. Cranberry bogs to the value of \$75,000 were destroyed, which had the effect of making the New Jersey crop exceedingly short and defeating the cranberry growers in their new scheme of making liberal shipments to England, where last year the cranberry was introduced under favorable circumstances.

Mr. Gifford states that nearly every town in South Jersey which is near the woods has been threatened more than once by flying sparks, and many families have been obliged to flee in the night for shelter, with the flames rushing after them at the speed of a horse. Whole townships have been burned, valuable industries destroyed, and, in fact, several localities depopulated entirely because the industries that had been established there were obliged to leave the pine lands because of the danger from forest fires.

SOLVING THE PROBLEM.

New Jersey has been endeavoring to solve the forest fire problem, and for years an agitation has been going on, materially assisted by the State Geological Survey, and the timber-owners now believe they are beginning to see some practical way of meeting the emergency. In 1891 a general law was enacted relative to forest fires, fixing the penalty of those caught setting fire to property, and during the present year a valuable supplement was made to that law.

As a student of the subject, Mr. Gifford says that what is everybody's business is nobody's business, and, in consequence, there is no united action in either the prevention or the fighting of forest fires. When a fire is discovered a few trusty men come to the rescue of the property-owner and fight as long as human endurance will allow them. Forest fires, he contends, start in the following ways: First, by railroads; second, by scoundrels; and third, by careless individuals. There is no doubt but locomotives going through the pine land are responsible for many conflagrations. It became incumbent upon the railroads to use spark arresters on the smokestack of the engine, and by having places especially prepared for the dumping of hot coals, and also in having each side of the track well plowed. The engineer, however, frequently becomes careless and removes the spark arrester, dumps live coal wherever he pleases, and fires are the result.

The woods are frequently set on fire by spiteful men, who either have a grudge against the land-owner, or burn another man's property to increase the value of their own. Two of the most destructive fires in South Jersey this summer were caused by a careless man burning brush, and another man getting square with a neighbor by the use of a torch at midnight. Tramps and gunners as well as other individuals trespassing in the woods, and especially boys, throwing matches carelessly about, or a lighted cigar stump thrown into dry leaves, are some of the causes of the fires.

(From the Philadelphia Press, November 26, 1894.)

The terror of South Jersey is a forest fire, one of those awful conflagrations which every spring, before there is any budding vegetation, sweeps with fiendish devastation miles and miles of the great region known as "The Pines." Sometimes houses and barns are swept away in the flames and frequently villages and hamlets that are surrounded by woods are endangered. This is why the forest fire is so terrible. Many square miles of great pines and oaks are annually burned, and April, May, September and October seem to be the months of fires.

How they originate is often mysterious, though occasionally it is by sparks blown from chimneys or from brush fires, while many, no doubt, are the work of incendiaries. But whatever their origin, they are alarmingly frequent and all are terrible. They are seldom checked save by waterways and rainfalls, and occasionally one will burn itself out by a shifting of wind, but nearly all the ruralists become fire-fighters. Fighting forest fires is hard work and often hot work. Occasionally there are commendable exhibitions of bravery and heroism. Seldom, however, are human lives lost, although animal nature furnishes a great many victims.

Fires in The Pines must be seen to gain a true idea of what they really are, and why so terrible? Imagine, if you can, a flying ember lodging in the dead leaves that carpet a great forest of stately, odorous pines, and then smoldering, perhaps, for hours until a whiff or two of air fans flames into life—flames that leap playfully about from leaf to leaf for a time. They seem very innocent, and some die so easily in the capricious breeze as to suggest no feeling of alarm. In time they noiselessly reach a towering pine that stands near and search around its base until an exuding line of sap is found. Up this the flames leap like lightning, and then go scurrying out on each waving branch and in an instant the tree is all aflame.

The fire has begun. The heated air leaves a vacuum that is almost instantly filled and the flames leap from tree to tree until the forest wears an infernal appearance. All animated nature quickly takes the alarm, and ahead of the fire flees a confused lot of rabbits, opossums, raccoons, squirrels, occasionally a deer, and all the furred denizens of the wood, terror-stricken and all running a neck-and-neck race with death. The air above is filled with birds, many screaming in terror and all flying for life. Occasionally some of these get lost in the smoke and fall suffocating to be consumed in the angry flames. It is wonderful to see how quickly the denizens of the forest take the alarm and how universal it is, even snakes and tortoises joining in the wild race for escape. Many of the creatures, of course, become exhausted and are overtaken by the seething sea of flame. In their flight there is no exhibition of the predatory instinct, and the rabbit and his enemy, the weasel, run side by side.

While the flames are raging in the tree tops fire, also, is sweeping the ground, withering everything touched by its breath, and leaving in its wake the seared and blackened skeletons of bushes and young trees, with here and there the half-burned bodies of animals. Forest fires usually travel with great speed if the trees be the resinous pines, for, besides their inflammable material, among the tops the air is freer than below, and the breezes cause the flames to make

gigantic leaps, but sparks and embers kindle new fires on the ground, so that the flames below almost keep pace with those above.

The work of fire-fighting is done in many interesting ways. The lone settler, when he sees that the inevitable course of the flames is toward his little home, summons his wife and family and starts a counter-fire at the edge of the clearing, keeping it under control by beating it with small branches of bushes and trees. When this has burned itself out he goes further into the woods and burns still more and more until on the endangered side there is a large burned tract over which no other fire can rage. Then, if the great fire be near by that time, he wets the roofs of his buildings, so that flying sparks can not readily ignite them. Then he rests comparatively secure. This is the best and most effective manner of fighting forest fires and is the one usually used. Occasionally, though, in spite of all precautions, houses and barns are burned, and more than one family has fled for life before the flames. A few years ago an entire hamlet in a lower county was wiped out. Fire had been raging in the surrounding woods for several days, but, as the wind held steadily in one direction, no danger was thought to threaten the hamlet. Suddenly the wind shifted, and the flames swept with fiendish vigor, like racers, upon the devoted settlement. Over the five miles of graceful pines they roared and raged, and in a few minutes — alarmingly few — and before counter-fires could be burned the flames had reached the western edge of the clearing. There they paused as though baffled, meanwhile licking up the underbrush and dead leaves.

Then the church bell rang joyously. The hamlet was saved! But the joy was short-lived. The wind increased suddenly to a gale, a big pine standing near the church was fired, and in an instant a great long arrow of flame shot from its top and struck the belfry. At once the cedar shingles were flame-swept, and as the resounding bell tolled the structure fell in. The main building soon followed, and then the entire hamlet was burning at one time. So quick and terrible was the work of destruction that the inhabitants saved but little of their worldly possessions.

The situation of the people was perilous and pitiful. They had to remain on the scene. Escape was impossible, for fire soon raged in the woods surrounding the clearing and the forest for miles around was a mass of flames. It was some eight or 10 miles to the next village, the nearest place where shelter and food could be found. So there, by the ashes of their homes and surrounded by a few terrified domestic animals that had escaped destruction, they sat in sad silence through all that long day and night of terror before it was safe to wearily tramp to the next settlement.

A forest fire at night is awfully weird and grand in appearance, far exceeding in magnificence any pyrotechnic display, and needs only to be seen to be appreciated. Oh, the wild revelry of the flames, transforming the great woods into a veritable glowing inferno! The grandeur, the force and fiendishness of the scene awe the beholder. Smoke, like a pall drawn over the sky, shuts out the moon and stars, making the blasting blaze below more keen and creating a background against which the finer details, the intricate embroidery and delicate, unique engraving of the flying flames stand out in bold relief. Nearly all the time serpents of fire are wriggling from the branches, while occasionally a python of flame enfolds a tree top and then with venomous hiss

darts in insane rage into the dense blackness above. The picture then is tragic and excels the artistic.

But as extremes often produce their own remedy, so in the case of the forest fire, the attendant atmospheric changes bring a heavy extinguishing rainfall. Then the sodden, charred country, with its myriads of blackened skeletons of trees, looks like a picture of desolation and death, or of life with the sunlight and song left out.

Massachusetts.

(*Boston Herald*, May 15, 1894.)

HINGHAM, May 14, 1894.—The fiercest and most destructive forest fire which ever devastated this section of the State started in the woods in South Hingham yesterday afternoon and at this hour (midnight) is still raging as furiously as ever.

The danger to the farmhouses and dwellings in the vicinity of the woods was so alarming last night that an alarm was rung in, calling out the Hingham fire department to assist the citizens in subduing the flames.

It was late in the afternoon when the alarm was given, and before any really effective work could be done toward beating out the fire, darkness settled down and the fire-fighters were compelled to reluctantly abandon their efforts.

The residents and occupants of the dwellings and farmhouses scattered through the territory and around the outskirts of the circle of the fire passed a sleepless night and performed fire patrol duty to guard their endangered homes from being licked up by the fiery elements.

The flames continued to spread through the night and when morning broke several miles of heavily timbered woodland had been covered by the fire.

The flames lighted up the heavens last night for miles around and presented a magnificent spectacle to the residents in the adjoining towns of Weymouth, Abington, Rockland, Norwell, Scituate, Cohasset, Braintree, Randolph, Whitman, Bridgewater, Quincy and other places.

This morning it seemed as if the fire was going to get the advantage of the citizens who were fighting it, and another alarm was given to call out the fire department.

All day long the firemen and several hundred citizens, under command of Chief Engineer George Cushing, have been hard at work endeavoring to check the progress of the flames, but with discouraging results, and when darkness shut down to-night, and put a stop to further efforts in that direction, the fire was burning as vigorously and defiantly as ever.

There were a number of narrow escapes from fatalities among the brave fellows who were fighting the fire to-day. Several instances have been reported where the fighters had got into the bushes and lost their way, and were in imminent danger of being surrounded by the element which they were combating and being burned to death.

Fortunately, however, no serious mishap has yet happened, and the only casualties reported are the slight burns sustained by some of the more venturesome or more careless of the fire-fighters.

The territory devastated by the flames covers a stretch reaching from the East Weymouth line to Norwell, and about three miles wide, or about nine square miles.

The timber land burned over was some of the most valuable in this part of the State, and was owned mostly by small holders. There were a few owners whose holdings would amount to 100 or more acres each, but the larger part of it was held in small amounts.

It is impossible to give a list of the owners or to estimate correctly the amount of damage done to the cut and standing wood, but it is claimed that the loss will amount to between \$10,000 and \$15,000.

The homesteaders whose places are endangered are to-night doing watchmen's duty in patrolling the edge of the fire circle to protect their property from destruction. It will be an anxious vigil for the men, who are completely exhausted from the effects of their arduous toils of the past 30 hours, and whom only dire necessity would compel to perform the task.

MAN BURNING BUSHES CAUSES A DISASTROUS FOREST FIRE IN WEST DUXBURY.

[Special Dispatch to the Boston Herald.]

DUXBURY, May 14, 1894.—A man burning bushes in William Baker's cranberry bog at Tarkill village, West Duxbury, was the cause of a very disastrous forest fire. The brush fire became unmanageable, and spread out through the woods. Charles Chandler's place on the Pembroke and Boston road was in great danger, being saved by plowing around it. Even then the flames ran within a few feet of his barn.

From this point the fire ran in a southerly direction, coming out on the highway, which it jumped easily, impelled by a strong northwest wind. The range of houses on the northern side of the road was saved by plowing and an active shovel brigade.

Where the fire crossed the road at Four Mile Hill, the highway is nearly 50 feet wide, but this was no barrier to the flames. Nahum Sampson's house was on the opposite side of the road. Buckets, tubs, hand-force pumps and other improvised fire quenchers were brought into use, and the house and buildings were saved after a sharp fight.

The flames, which at times reached 50 feet in the air, ran through a heavy growth of large pine, with considerable good oak wood in scattering lots, traveling toward Horatio Chandler's, some two miles away. All precautions possible were taken against its reaching the buildings, although they were puny when compared with the devouring element. Fortunately, just before the edge of the woods was reached, the wind came out to the eastward, and drove the flames away and toward Mr. Chandler's sawmill, a mile distant. Scattered around the mill were hundreds of thousands of feet of box board piled for seasoning, and cords on cords of edgings and slabs were near by.

Trenching was resorted to to save the mill and lumber, but the outcome seemed dubious indeed, when a shift of wind to southeast swung the line of fire back toward the burned district.

The length of the entire tract burned is about three miles and it is estimated that anywhere from 2,000 to 3,000 acres are now a blackened waste. The burnt track is about three-quarters of a mile wide.

Crofton Shute and Edward O'Neil were fighting the fire in the woods and were surrounded by fire before they were aware of it. They were forced to run through the flames. Shute was badly burned about the face, and O'Neil's hands suffered severely.

Smoke from the fire reached Plymouth and burned leaves fell in Kingston.

Tarkill had more visitors to-day than it has had for a year, people from the surrounding towns coming in squads to see the magnificent spectacle.

Miles Burned Over.

FIRES RAGING IN THE WOODS NEAR SEAKONK AND IN SOUTH REHOBOTH.

SEAKONK, May 14, 1894.—Since last night a forest fire has been raging in Barney's woods, in the westerly part of the town, and to-night it is still eating up the wood over a wide area to the southeast. The farmers fear there is little hope of stopping it. The high wind carried the fierce flames toward Rulin's river, everything going before them. Scores of piles of cordwood were destroyed, and the damage already done will reach hundreds of dollars. All day gangs have been fighting the flames, but without success.

A forest fire is raging in South Rehoboth, and a tract of woodland three miles square has been burned over. The highways three miles distant are filled with a dense, suffocating smoke, which greatly annoys travelers and residents.

Yesterday a fire, started from a match in the Newman cemetery, swept the place from one end to the other. The stones were blackened and damaged by the heat, and fences were leveled to the ground.

The origin of the other fires is not known.

MUCH CORDWOOD DESTROYED.

HAVERHILL, May 14, 1894.—Extensive forest fires have been raging three days just over the State line, in Rockingham county, N. H. In Plainstow much cordwood, belonging to various parties, has been destroyed.

THREE FIRES RAGING AT ONCE — COTTAGE DESTROYED AT BIG SANDY POND.

PLYMOUTH, Mass., May 16.—This afternoon three forest fires could be seen from Burial hill, and to-night a heavy cloud of smoke hangs over the southerly part of the town.

The most extensive of these started about noon, near Big Sandy pond, in the southerly part of Plymouth township, about 14 miles from the business part of the town. The fire probably originated from burning brush, as it started near a big cranberry bog.

A summer cottage on the shore of Big Sandy pond, owned by persons living in Taunton, was burned in spite of great effort to save it by a gang of men.

This evening the firewards started for the scene with men and provisions. A shifting wind has spread the fire, which is now covering about four square miles and traveling northward.

The land is wooded with standing oak and pine. Within a radius of about four miles are the settlements at Long pond, White island pond and Cedarville.

There are also many large cranberry bogs in this vicinity. The firewards

think that the fire is likely to keep on burning through the night and to-morrow, the woods are so dry.

The second fire seems to be off toward Middleboro, and is burning at a furious rate, but no word can be had as to the extent of country burned over or damage done.

ATTLEBORO, May 16.—This town has been surrounded all day by burning woods, and in some cases the fires have caused serious damage. The most destructive was the one at East Mansfield, which burned fully over 2,000 acres of old woodland, destroying great numbers of pine and oak trees, besides hundreds of cords of wood cut last winter. Another fire at West Mansfield also did considerable damage. The long continued dry weather with the high winds has rendered everything very inflammable.

SEEKONK, May 16.—The forest fire set by tramps at noon yesterday about a mile north of Perrin crossing, on the Indian Point branch of the consolidated road, burned over 1,500 acres before it was subdued at an early hour this morning. A gang of 150 railroad section hands and others fought the blaze over 12 hours.

SANDWICH, May 16.—The woods of Plymouth county seem doomed to destruction by forest fires, and unless there is a rain storm within 24 hours, the country in and around White Island Ponds will be entirely devastated.

For weeks but little rain has fallen in this vicinity, the ground is dry, the trees are backward in their growth, and everything in the woods is in the most favorable condition to furnish food for the flames.

The fire which broke out in the woods north of Sagamore is still burning to-night. The villagers fought it all day. No alarm has been felt for the village itself, as the fire is now about five miles away. By reason of the wind changing several times during the day, hundreds of acres of valuable woodland have been swept over. At one time the fire made quite rapid progress toward Little Herring and White Island Ponds.

FRANKLIN, Mass., May 16.—An extensive forest fire has been raging in Wrentham and Norfolk for two days.

To-day another started near the railroad at City mills, Norfolk, and hundreds of acres were burned over. The house and barn of John F. Wall were set on fire to-day and consumed with part of the furniture. The loss will be several thousand dollars. The fire in the woods is still burning. The Glenwood mill is in imminent danger to-night and strenuous efforts are being made to save it.

Maine.

FOREST FIRES CAUSING THE LOSS OF THOUSANDS OF DOLLARS IN MAINE.

PHILLIPS, Me., May 14, 1894.—The loss by forest fires in Coplin plantation is many thousands of dollars in valuable timber, principally spruce. Coplin is bounded by Eustis on the north, Mt. Abram on the east, Lang plantation on the west and Redington on the south, Bradstreet Bros., of Gardiner, Me., being the owners. The fire has also caused a heavy loss in Lang plantation, owned by Lawrence Bros., of South Gardiner.

In Redington township forests are burning.

MILFORD, May 14, 1894.—Brush fires have raged in the vicinity of Milford for several days past, doing much damage to the standing and cut wood. This afternoon the stone sheds at Hawyard's quarries were burned while the owner was assisting in fighting the fire in adjacent property.

(*The Boston Globe*, May 17, 1894.)

SKOWHEGAN, May 16.—Forest fires are raging in the vicinity of Dead river. Ashes and cinders are found 50 miles from the fire. Great damage is being done in the timber lands around Eustis. The fire extends many miles, and settlers are leaving their homes seeking a place of safety.

This is one of the most extensive lumber regions of Maine, as well as a good farming country. The flames sweep along at a terrific pace, fanned by a fierce northwest wind. Every home in the vicinity of Dead river is in danger of being destroyed. Mothers are carrying their children many miles through the woods on their backs.

KENNEBUNK, Me., May 16.—A destructive forest fire has been raging for three days in the valuable timber land at Day's siding, about five miles from this town.

Some 600 acres have been burned over, a space two miles long by half a mile wide, and the fire is not yet under control. It is thought to have been set by a freight train on the eastern division of the Boston and Maine, late Monday afternoon.

At noon it was spreading toward this village. The residents and the Boston and Maine section men have been doing good work in fighting the fire.

Many houses and barns have had narrow escapes from being burned. It is thought the fire will not be extinguished for several days, perhaps not until it rains.

CORNISH, Me., May 16.—This town has a big forest fire. It was of incendiary origin, and was discovered late yesterday afternoon on a large tract of timber land near the railroad station.

After a hard fight by the residents of the village, they succeeded in saving the building and valuable timber on the opposite side of the road. At one time the pretty little village was threatened. This danger was averted by setting back fires and digging trenches.

CHERRYFIELD, Me., May 16.—An extensive forest fire has been raging since Saturday on lands owned by C. P. Nichols and the heirs of David W. Kimball, Alexander Campbell and James W. Moore in Townships 10 and 16. A hundred men have been fighting the fire since Monday morning, and it is now under control. The damage is estimated at \$25,000.

WELLS DEPOT, Me., May 16.—Citizens living in the neighborhood of Wells Depot have been engaged some time in fighting fire in a forest adjoining the western division of the Boston and Maine. Many acres of valuable woodland have been burned over. The fire is not yet under control.

SACO, May 16.—A fire raged in the woods on the new old Orchard road last night, but was extinguished by farmers after burning over several acres of land.

PORTLAND, Me., May 16.—Information received here to-day from Hastings, where a forest fire has been raging several days, is to the effect that 40,000 logs, or about 8,000,000 feet of lumber, belonging to the Wild River Lumber Company, have been destroyed. The loss is about \$8,000, on which there is no insurance. The latest news received this evening indicates that the fire-fighters have it under reasonable control, and that not much further damage is to be feared.

Hastings escaped, but many valuable lumber camps were burned with all the outfits for carrying on lumbering operations. No estimate of the loss has been as yet made. The yarded stock escaped.

New Hampshire.

NASHUA, N. H., May 16.—An extensive forest fire has raged all this afternoon and evening in the reservoir district, burning over a very large territory.

Connecticut.

ROCKVILLE, Conn., May 16.—Tolland's forest fire, which started Sunday afternoon, was still burning to-day in the vicinity of Square Pond, having burned over nearly 1,000 acres.

A big gang of men has fought the fire day and night.

A number of houses and barns were saved only by setting back-fires.

The total loss will be \$3,000.

Ohio.

(*Akron Republican, O., October 22, 1894.*)

The swamp fire west of the city is assuming proportions that threaten to cause great damage unless some prompt measures are taken to extinguish the same. During the last 36 hours the fire has made great headway and is now burning with a fierceness that surpasses any fire that has occurred in the vicinity for years. The farmers residing in the vicinity fully realize the gravity of the situation and are working night and day to check the flames.

Mayor Watters drove to the place yesterday afternoon, and found about 40 men and an equal number of women working might and main to drive back the flames. These parties worked until night, when another crowd took their place, keeping at the task until this morning, when they were in turn relieved. A dead line or ditch has been built at the east side of the swamp for a distance of three-fourths of a mile, and so far this has checked the fire in that direction. The trees and timber are suffering to an enormous extent. The leaves being dry they readily ignite and blaze up to such an extent that the tree proper is fired. Every few moments a loud crash announces that timber has fallen to the ground. This is kept up continually, night and day.

The muck of the swamp, which is several feet in depth, is the best means of spreading the conflagration. This stuff burns like tinder. There seems to be no means of extinguishing the blaze until a heavy rain or heavy fall of snow comes. The nearest point from which water could be secured, in case one of the local fire engines went to the scene, is White Pond, fully a mile distant.

The number of acres so far destroyed, and, in fact, they are practically ruined, for the soil has all been burned down through to the clay, is about 600 acres, 400 in Portage township and 200 in Copley. The present conflagration is located on a piece of land never before visited by a fire.

The fire was started about 30 days ago on the farm of Royal Brockway, from a brush heap which was being burned. The loss to the timber will amount to about \$30 per acre, making a total at present of over \$18,000, while the loss of soil will more than double this. The swamp runs from the Copley road, on the south, to the Hawkins estate, on the north, and is east of the Medina road. Any amount of game is being chased from the swamp by the flames, rabbits coming out in droves.

YOUNGSTOWN, O., September 4.—A field fire, which nearly consumed the town of Church Hill, six miles north of this city, started in a pasture last evening. The entire town of several hundred people turned out to fight the flames, and save their homes and property. Nearly all wells and springs were dry, and the task taxed to the uttermost the strength and resources of the villagers. Fifty acres of pasture and woodland were burned, and it was not until this morning that the danger to the town was over.

Virginia.

Heavy Loss by Forest Fires in Virginia.

FREDERICKSBURG, Va., April 3 (Special).—Property to the value of more than \$100,000 has been destroyed by forest fires in Spottsylvania and Caroline counties, in the last two days. There has been no rain for several weeks, and the woods are as dry as tinder. St. Margaret's Episcopal Church, in Caroline county, one of the oldest churches in the country, was destroyed yesterday. It was built long before the Revolution, with bricks brought from England. The people of the neighborhood tried hard to save the old church, but finally had to let it go and turn their attention to saving their homes and stock. Two schoolhouses and several barns were burned. The old Concord Academy and Lewis Kidd's house, in the same county, were soon in ashes. The fire ran along the fencing in Spottsylvania county for miles. Hundreds of acres of woodland have been burned over. The Tazewell Female Seminary was destroyed by fire yesterday; all the young women escaped, but they saved none of their clothing excepting what they had on when they fled from the blazing building.

Arkansas.

ARKANSAS CITY, Ark., November 29.—The woods are all burning in this vicinity to-day, and this afternoon the smoke was so dense one could not see across the street. The damage to the grazing lands in the bottoms will be immense. One house reported burned by the fire to-day. It is feared that some hunting parties have perished back in the swamps of this county. It can not be told positively for a day or two. Steamboats can not pass this city now, and it will likely be some days before they can do so, as the fire will certainly continue a week longer unless there is rain. The woods are very dry, there having been no rain for months.

Pacific Coast.

(*Boston Transcript, September 15, 1894.*)

“Investigations made by the Department of Agriculture appear to show that most fires of this kind are caused by farmers who in clearing land allow the fire to escape into the forest. Careless hunters come next in degree of responsibility for such disasters. They leave fires burning in abandoned camps because they do not care to take the trouble to put them out. Railways, of course, are accountable for the destruction of great areas of forest annually. They should be compelled to use spark-arresters, and to pay for the harm they do in this way. Forest fires are frequently occasioned by no human agency, but by lightning; and it has been alleged that they are sometimes caused by the spontaneous combustion of decomposing pyrites.

“Forest fires and their effects may be studied to the greatest advantage in that great belt of coniferous trees which stretches through the British possessions in the northern part of this continent 4,000 miles from the east coast of Labrador to the Rocky Mountains, continuing beyond to Alaska. This belt, averaging about 700 miles in width, consists chiefly of spruce, tamarack, pine, fir and cedar. The open spaces are covered with reindeer mosses, which in summer are as dry and inflammable as tinder. The Indian hunter of that region, knowing how destructive forest fires are to the animals on which he depends for food and furs, takes all possible care to prevent them. The country has not been invaded to any extent by white men. Yet fire runs through every part of it at one period or another. It is said that these fires are caused by lightning usually.

“The best authority on those great woods of the north is Robert Bell of Ottawa. He asserts that fires are actually necessary for the reproduction of some of the trees. The cones of the Banksian pines never open unless they are scorched. But when fire sweeps through the forest, the cones of this species gape, and the seeds which they contain are scattered by the wind. It is this kind of pine that first clothes areas that have been reduced to nakedness by the flames.

“Fire may be set in those northern woods at a season when it will not run, but it is astonishing how long it will smolder in the deep moss and under logs and roots, until, after weeks or perhaps months, a dry time comes and a favoring wind fans it into activity. The heaviest rains and the snows of a whole winter sometimes fail to extinguish or smother these smoldering fires. The trees newly killed by fire are quickly attacked by boring beetles, which, finding thus an inexhaustible supply of food, swarm in the forests of that region, the creaking noise of millions of their larvæ making an incessant chorus.

“‘Picture to yourself,’ says Robert Bell, ‘a vast area of extent practically unlimited, densely crowded with spruce, balsam, tamarack and Banksian pine. The trees are so close together that their branches touch and intermingle. The ground is deeply covered with dry moss. After prolonged hot weather and drought the moisture becomes thoroughly dried out of leaves and branches, leaving the resin and turpentine ready for ignition. All the conditions are now favorable and only await a spark of fire to give rise to the wildest scene of destruction conceivable. When fire has once started the pitchy trees burn rapidly, and the flames rush through the tops and high above

them with a roaring noise. Should [the atmosphere be calm, the ascending heat soon causes the air to flow in, and after a time the wind acquires great velocity.

“An irresistible front of flame is soon developed, and it sweeps forward, devouring the forest before it like the dry grass in a running prairie fire, which it resembles, but on a gigantic scale. The irregular line of fire has a height of 100 feet or more above the trees, or 200 feet from the ground. Great shoots of flame appear to disconnect themselves from the torrent and leap upward and explode, or dart forward, bridging over open spaces, such as lakes and rivers, and starting the fire afresh in advance of the main column, as if impatient of its slower progress.

“These immense shooting flames are probably due to the large quantities of inflammable gas evolved from the heated tree tops just in advance of the actual combustion, and they help to account for the speed of some of the larger forest fires, which have been known to travel at the rate of more than 10 miles an hour.

“The wild animals appear to understand the significance of the roaring noise and the clouds of smoke in the sky in advance of these conflagrations. Terrified deer, bears, wolves and lynxes, followed by multitudes of hares and other small mammals, seek safety in flight; but all of the latter are soon overtaken and destroyed. Should some of the larger creatures be so fortunate as to reach a lake or river in time, they may escape along with the beavers and otters. The birds flutter up in confusion in advance of the wall of fire and appear to drop back into the flames.’

“Prof. Sargent calls attention to the fact that the forests of the northern Pacific coast offers an exception to the law, otherwise general, that change of forest crop follows a forest fire. The fir forests of West Washington and Oregon, when destroyed by fire, are quickly replaced by a vigorous growth of the same species, and the fires which have consumed great bodies of the California redwood have not prevented the reproduction of those trees by seeds and shoots.”

(Forest and Stream, September 8, 1894.)

A proper system of forest guardianship could not be had for nothing. If it were efficient it would cost something. But if it is worth while for a city to support a paid fire department to prevent loss within its limits, why should it not be worth the while of a State to support a system of forest guards to protect its citizens, their dwellings and its own standing timber? The taxes for the support of such a force should naturally be borne in large degree by that portion of the community whose interests are especially to be served by the prevention of fires.

French Law to Prevent Forest Fires.

(Boston Herald, February 15, 1894.)

The disaster to American forests every year is so great that the new French law for the prevention of forest fires, enacted August 19, 1893, will be eagerly examined to see how far its provisions can be applied to the extinction and

prevention of these fires in the United States. The destruction of property from these fires was formerly so great in France, especially in the southeastern section, that a law was enacted in 1870, to be enforced for 20 years, and to be regarded as an experiment to see what could be done. It was the result of this legislation that led to the new law for the prevention of fires. Its first provision is to prohibit during the months of June, July, August and September all fires in forests or shrubby waste lands, or within a distance of 200 metres from their boundaries. Among the fires prohibited during the close season is the so-called *petit feu*, by which strips of undergrowth were carefully burned every six or seven years in the cork forests. The ninth clause directs landed proprietors who have adjoining lands with woody growths on them to keep a strip of land, from 20 to 50 metres, between the two estates entirely free from shrubs or conifers. Another clause enacts that similar bare strips 20 metres broad shall be kept up along all lines of railway through a wooded area, and that these strips in adjoining property shall be kept clear at the expense of the railway companies. All proprietors whose woods are cut down in clearing these strips are to obtain indemnities. This is a new provision, and is aimed in favor of the extension of railways. In the handling of fire, if a counter fire is started to head it off, no indemnity arises for woods burned under such circumstances. The fires heretofore in France have been frequently caused by sportsmen or poachers during the dry season, and this has led to the delay of the shooting season until the September rains set in. The construction of a network of roads greatly facilitates fire protection by making the forests accessible and by increasing their value, and the government offers a bonus of \$1,000 a mile for roads constructed in the forest districts

Severe penalties are exacted where the forest law is transgressed, and if the railway companies do not clear the fire lines on their roads the French forest department clears them at their expense. This is the substance of this new French law. It is much more detailed than the provision for firewardens enacted by the New Hampshire Legislature last year, and its application to the railway lines is so obvious that it ought to be considered by every State Legislature in the country, and enforced by adequate penalties where it is not observed.

During the 20 years that a provisional law was in force in France, it was found that the forest fires had diminished by one-half. That the French law could be repeated in any American State is not to be expected; but that some modification of this law is necessary is indicated by the large fires which yearly destroy thousands of acres of valuable forest in every part of the country.

(*New York Herald*, September 9, 1894.)

Shall we arm ourselves against the comets? Are they, and notably that supposedly lost one of Biela, most dangerous to the world's physical welfare? Are their tails filled with destruction and is their path so near the earth that it superheats the air and thereby induces combustions which result in the great forest fires of the west, and such a holocaust of flame as the great Chicago conflagration?

If we believe in all these things we believe with Bacon's great friend, Ignatius Donnelly, and find a parallel and a prediction in his "Ragnaroc." The parallel is between the Chicago fire and the forest fires of the same year (1871) and the great conflagrations which have just brought such disaster in Michigan, Minnesota and Wisconsin.

Mr. Donnelly expresses the view that the great forest fires of 1871 in the northwest and the great Chicago fire were due to the presence of portions of Biela's comet, which, in places, hurled its combustible gases and vapor against the earth.

DONNELLY'S ARGUMENT.

In "Ragnaroc" Mr. Donnelly begins the subject of the great fires in 1871 by quoting from Humboldt's "Cosmos," as follows: "It is probable that the vapor of the tails of comets mingled with our atmosphere in the years 1819 and 1823."

After noting the strange action of the comet, Mr. Donnelly continues: "It is true that the earth came near enough in 1872 to attract some of the wandering gravel stones toward itself, and that they fell blazing and consuming themselves with the friction of our atmosphere, and reached the surface of our planet, if at all, in cosmic dust. But where were the rest of the assets of these bankrupt comets? Did anything out of the usual order occur on the face of the earth about this time?"

Mr. Donnelly answers his own question by describing the great forest fires of the northwest which broke out on the morning of Sunday, October 8, 1871, and most graphically pictures the scene as follows:

THE FURNACE-LIKE AIR.

"The summer of 1871 had been excessively dry; the moisture seemed to be evaporated out of the air, and on the Sunday above named the atmospheric conditions all through the northwest were of the most peculiar character. * * * There was a parched, combustible, inflammable, furnace-like feeling in the air that was really alarming. It felt as if there were needed but a match, a spark, to cause a world-wide explosion. It was weird and unnatural. I have never seen nor felt anything like it before or since. Those who experienced it will bear me out in these statements."

How much like this drought of 1871 has been that of the past summer, for daily, for weeks at a time, we have heard of the great need of rain in the northwest.

"At that hour," continued Mr. Donnelly, "half-past 9 o'clock in the evening, at apparently the same moment, at points hundreds of miles apart, in three different States — Wisconsin, Michigan and Illinois — fires of the most peculiar and devastating kind broke out, so far as we know, by spontaneous combustion."

In going into the details of the conflagration the writer describes the very country where the great fires of last week have been raging.

He quotes largely from the "History of the Great Conflagration,"* and the descriptions bear such a close resemblance to these of which we have within a

* The burning of Chicago.

week been reading, that for comparison they are placed in parallel columns with the reports in *The Herald* on last Monday, Tuesday and Wednesday.

THE FIRE OF 1871.

At sundown there was a lull in the wind and comparative stillness. For two hours there were no signs of danger, but in a few minutes after 9 o'clock, and by singular coincidence, precisely the time at which the Chicago fire commenced, the people of the village heard a terrible roar. It was that of a tornado crushing through the frost. Instantly the heavens were illuminated with a terrible glare. The sky, which had been so dark a moment before, burst into clouds of flame. A spectator of the terrible scene says the fire did not come upon them gradually from burning trees and other objects to the windward, but the first notice they had of it was a whirlwind of flame, in great clouds from above the tops of the trees, which fell upon and entirely enveloped everything. The poor people inhaled it, or the intensely hot air, and fell down dead. This is verified by the appearance of many of the corpses. They were found dead in roads and open spaces, where there were no visible marks of fire near by, with not a trace of burning upon their bodies or clothing. At the Sugar Bush, which is an extended clearing, in some places four miles in width, corpses were found in the open road, between fences, only slightly burned. No mark of fire was upon them; they lay there as if asleep. This phenomenon seems to explain the fact that so many were killed in compact masses. They seem to have huddled together in what were evidently regarded at the moment as the safest places, far away from buildings, trees or other inflammable material, and there to have died together.

The heat has been compared to that engendered by a flame concentrated on an object by a blowpipe, but even that would not account for some of the phenomena. For instance, we have in our possession a copper cent taken from the pocket of a dead man in the Peshigo, Sugar Bush, which will illustrate our point. This cent has been partially fused, but still retains its round form, and the inscription upon it is legible. Others in the same pocket were partially melted, yet the clothing and the body of the man were not even singed. We do not know in what way to account for this, unless, as is asserted by some, the tornado and fire were accompanied by electrical phenomena.

It is the universal testimony that the prevailing idea among the people was that the last day had come. Accustomed as they were

THE FIRE OF 1894.

The coming of the flames sounded like thunder, and with such rapidity did they move that persons who lingered to save property or neglected to seek safety in the river perished.

Survivors say there was a cyclone of flame. It could be likened only to the rolling up of a hurricane or the bursting of a tornado, the wind being fire, and the smoke death. Before the fire struck the devoted settlements there was a mighty wind, chimneys being blown down, barns toppled over and haystacks leveled. It blew at the rate of 60 miles an hour.

The fire, pushed by the terrible gale, went onward with the leaps of a demon. Stumps, logs and buildings, thousands of feet from the nearest flames, burst into fire, as if the air was powder, and were consumed in an instant. In a farming section, fully 20 miles long, the fire licked up all the vegetable matter in the soil itself, and there is nothing now left of prosperous farms but burned and broken rock, covered by a few inches of ashes.

The woods on either side were lashed by a fierce wind, blowing at the rate of 80 miles an hour. On through this weird scene the limited speed, the situation growing more alarming at every mile. As the train neared Hinckley it was discovered that the fire had reached the railroad, but on it sped, the engineer hoping to pass Hinckley in time to escape the danger. It was not until the train had come within a mile of Hinckley that the engineer discovered his train was burning, and that it would be impossible to pass.

On either side of the engine there was a stream of flame, but never for an instant did Engineer Root flinch. To remain was apparently certain death to him, but could he hold out for four miles the passengers might possibly escape. To have deserted his post would have been death to all on board. Back of him stood the trusty fireman, who occasionally poured water on him.

At Skunk Lake 60 more women, children and men found refuge in the shallow water and dirty mud, the women walking out in the water until it reached their waists. With their hands they bathed their burned faces in mud and water. Many of them were seriously burned on the train. Many lay in the mud, covering themselves with it, and as often as it became baked a fresh coat had to be added.

Many, on leaving the train, rushed off toward a marsh, and others ran further along the

to fire, nothing like this had ever been known. They could give no other interpretation to the ominous roar, this bursting of the sky with flames and this dropping down of fire out of the very heavens, consuming instantly everything it touched.

No two give a like description of the great tornado as it smote and devoured the village. "It seemed as if the fiery fiends of hell had been loosened," said one. "It came in great sheeted flames from heaven," said another. "There was a pitiless rain of fire and sand." "The atmosphere was all afire." Some speak of "great balls of fire unrolling and shooting forth in streams." The fire leaped over roofs and trees, and ignited whole streets at once. No one could stand before the blast. It was a race with death, above, behind and before them.

"The heat increased so rapidly, as things got all afire, that when about 400 feet from the bridge and the nearest building I was obliged to lie down behind a log that was aground in about two feet of water, and by going under the water now and then and holding my head close to the water behind the log I managed to breathe. There were a dozen others behind the same log.

"The fire suddenly made a rush, like the flash of a train of gunpowder, and swept in the shape of a crescent around the settlement. It is almost impossible to conceive the frightful rapidity of the advance of the flames. The rushing fire seemed to eat up and annihilate the trees."

track. It is thought that many of these are lost. Some few died of suffocation within a few rods of the pond. Many women had their clothes partially burned and torn from their bodies. One mother was found nursing her child to prevent it being suffocated.

In four miles 44 bodies were found, some burned beyond recognition and others unscarred, having died from suffocation. It was a four or five mile run back to Skunk Lake, which is little more than a mud hole, the mud and water covering not more than an acre. The train had gone but a short distance before it was surrounded by the devouring flames. Hot blasts of flame struck the cars, setting them on fire in places and breaking the windows on both sides.

The baggage car was soon a mass of flames, which streamed back over the tender and the engine, setting fire to the engineer's clothes and scorching his face and hands.

At the spot where once was the abode of Frank Anderson, nothing remained but a cellar and several bodies. The wife lay in the yard. Near by was the body of one of her children. In the cellar were four other children and the husband. He was burned to a crisp.

It was the most awful sight I ever witnessed, said he. Where the St. Paul and Duluth and the Eastern railway of Minnesota cross, near Hinckley, I saw a heap of half-roasted bodies. I should think there were from 20 to 25 in the group, men, women and children. Their clothing was nearly all burned off, but many of them still had shoes on their feet. It appeared as though these unfortunates had tried to get away from the flames, and that they all became overcome with the heat at the railroad crossing, and that the fire fiend found them easy victims. Their faces were all badly bloated; still I think their friends could readily recognize them. I should think from all the reports that there were probably 500 that perished in the timber near Hinckley. I saw from 70 to 75 lying dead on the ground at Hinckley myself.

Mr. Donnelly, in writing of the great Chicago fire, synchronous with forest fires, says: "The fire was spontaneous. The story of Mrs. O'Leary's cow having started the conflagration by kicking over a lantern was proved to be false. It was the excess of gas from the tail of Biela's comet that burned up Chicago."

To substantiate this theory of spontaneity Mr. Donnelly quotes from the city fire marshal's evidence and report:

"I felt in my bones that we were going to have a burn. We got the fire (in the barn) under control, and it would not have gone a foot further; but the next thing I knew they came and told me St. Paul's Church, about two quares north, was on fire. The next thing I knew the fire was on Bateham's planing mill."

Also, there is quoted a remarkable sentence from a press report sent out by an eye witness, which is as follows: "Buildings far beyond the line of fire, and in no contact with it, burst into flames from the interior."

"It must not be forgotten," says Mr. Donnelly, "that the fall of 1871 was marked by extraordinary conflagrations in regions widely separated. On October 8, the same day the Wisconsin, Michigan and Chicago fires broke out, the States of Iowa, Minnesota, Indiana and Illinois were severely devastated by prairie fires while terrible fires raged in the Alleghanies, the Sierras of the Pacific coast and the Rocky Mountains, and in the region of the Red river of the north.

Forestry Associations.

In addition to the State Forest Commission there are various local forestry associations in this State which have taken an active part in promoting the public welfare in this respect. These associations have accomplished much in awakening and stimulating public interest in forestry matters, tree planting, arboriculture and other kindred subjects. This department desires to acknowledge the assistance and support derived from their efforts, and trusts that the public-spirited citizens who have identified themselves with this noble work will continue in their highly commendable enterprise.

There are three prominent organizations of this character,—The New York State Forestry Association, of New York city; the Adirondack League Association, of New York city; and the Genesee Valley Forestry Association, of Rochester, N. Y.

The New York State Forestry Association

was organized in 1885, its inception being largely due to the efforts of Edmund B. Southwick, Ph. D., with whom the idea seems to have originated, and who sent out the first letters of invitation to a number of men interested in the work. The first meeting was held in Dr. Southwick's office, in the Arsenal building, Central Park, New York city, at which time officers were elected and plans formed for the first public meeting, which was held in the city of Utica in the autumn of 1885.

The aims and objects of the association have always been the conservation of the interests of the State in the protection of its woodlands, watercourses and game; to further the interest in Arbor Day and its general observance; to encourage the formation of societies for tree planting and tree protection; to keep alive the interest in village improvement societies; to prevent railroad companies from constructing lines through lands in the Forest Preserve; to prevent the damming of streams and destruc-



J. M. Schuler, Photo.

A LUMBERMAN'S HOME.

tion of timber by the overflow on forest lands belonging to the State; and to respectfully urge the Legislature to act favorably on all measures introduced in favor of forest preservation, or the extension of the Forest Preserve, through purchase of lands.

To this end public meetings were held at which speeches were made and papers on forestry matters were read and discussed. Active efforts were made to arouse public opinion and stimulate sentiment in favor of forest preservation. The association exerted a strong influence also in securing the passage of laws which greatly facilitated the work of the Forest Commission.

At a large and enthusiastic meeting held a few years since at the Museum of Natural History in New York city, under the call and auspices of this association, the following resolutions, moved by William Potts, and seconded by Grover Cleveland, were adopted. They furnish some idea of the aims and intent of the association:

WHEREAS, The commercial prosperity of the State of New York is largely dependent upon the free and safe navigation of the Hudson river and of the Erie canal, which in turn draws its water from the Black river; and,

WHEREAS, For this reason the public interests imperatively demand the retention of the forest covering upon the mountain slopes from which these rivers take their rise, because without this covering the liability to alternate disastrous floods and low water will be greatly increased; and,

WHEREAS, The preservation of these forests is generally conceded to be almost of the utmost importance to public health; and,

WHEREAS, Their removal is progressing with great rapidity, and in many cases if once removed they can never be restored.

Resolved, That pending the completion of the arrangements necessary for the establishment of this absolute control, the Legislature be urged to pass such measures as may be practicable to minimize the further destruction of timber in this district.

Resolved, That to this end we urge the passage of laws:

1. To prohibit the building of railroads over any State lands in the Adirondack region without previous consent of the

Commissioners of the Land Office and the State Forest Commission, after an adequate public hearing.

2. To prohibit the building of dams in this region by means of which any lands belonging to the State may be flooded, and the forests thereon may be destroyed.

3. To increase the efficiency of the State control in the direction of preventing forest fires, protecting and punishing trespassers upon State lands, renewing the forests upon the denuded and burnt districts, and introducing a thorough, conservative, scientific forest administration.

Resolved, That so far as these provisions may be needed to maintain favorable conditions in the Catskills, the Helderberg and the Shawangunk mountains, and elsewhere throughout the State, they be extended to cover these districts.

The officers of the New York State Forestry Association are :

President.

Morris K. Jesup.

Vice-Presidents.

Charles K. Adams,	Seth Low,
W. R. Bergholz,	Clinton L. Merriam,
Grover Cleveland,	Warner Miller,
Willard A. Cobb,	John S. Newberry,
Jesse D. Crary,	Ellis H. Roberts,
Mrs. D. G. Croly,	Carl Schurz,
Wm. C. Doane,	John C. Smock,
Mrs. Henry Herrman,	Richard S. Storrs,
Warren Higley,	Egbert L. Viele,

Harrison E. Webster.

Treasurer.

Henry A. Oakley, 18 Wall street, New York.

Recording Secretary.

E. B. Southwick, Arsenal Building, Central Park, New York.

Executive Committee.

William Potts, <i>Chairman</i> ,	A. W. Gleason,
Daniel S. Martin,	Alfred Wagstaff,
Wm. A. Stiles,	Edward P. Ingersoll,
Benjamin Strong,	F. S. Witherbee,
Edward M. Shepard,	Albert S. Bickmore.

THE ADIRONDACK PARK ASSOCIATION

was organized in 1890 for the purpose of arousing public sentiment in favor of the purchase, by the State, of the entire tract situated within the boundaries of the Adirondack Park, which, when purchased, should be held as a forest preserve, natural sanitarium, and source of water supply. This organization was the outcome of special efforts and appeals to the public made by Drs. Alfred L. Loomis, Martin Burke, George H. Fox, W. M. Polk and E. C. Janeway, prominent physicians of New York city, who understood the necessity of some practical legislation that would insure the preservation of the Adirondack forests. They saw also the need of some organization composed of strong, influential men as an important factor in securing the desired legislation at Albany.

The constitution was drawn by Mr. Amasa Thornton, the active and efficient secretary of the association, and was engrossed on parchment. It states that "its object shall be the preservation of the Adirondack forests, and by practical means the establishment of a State forest park therein." The officers consist of a president, vice-president, secretary and treasurer, and an executive committee which has "full power to make all rules and necessary by-laws for the government of the association."

The officers of the association are:

President.

Dr. Alfred L. Loomis.*

Vice-President.

John Claffin, Esq.

*Deceased.

Secretary.

Dr. Martin Burke.

Treasurer.

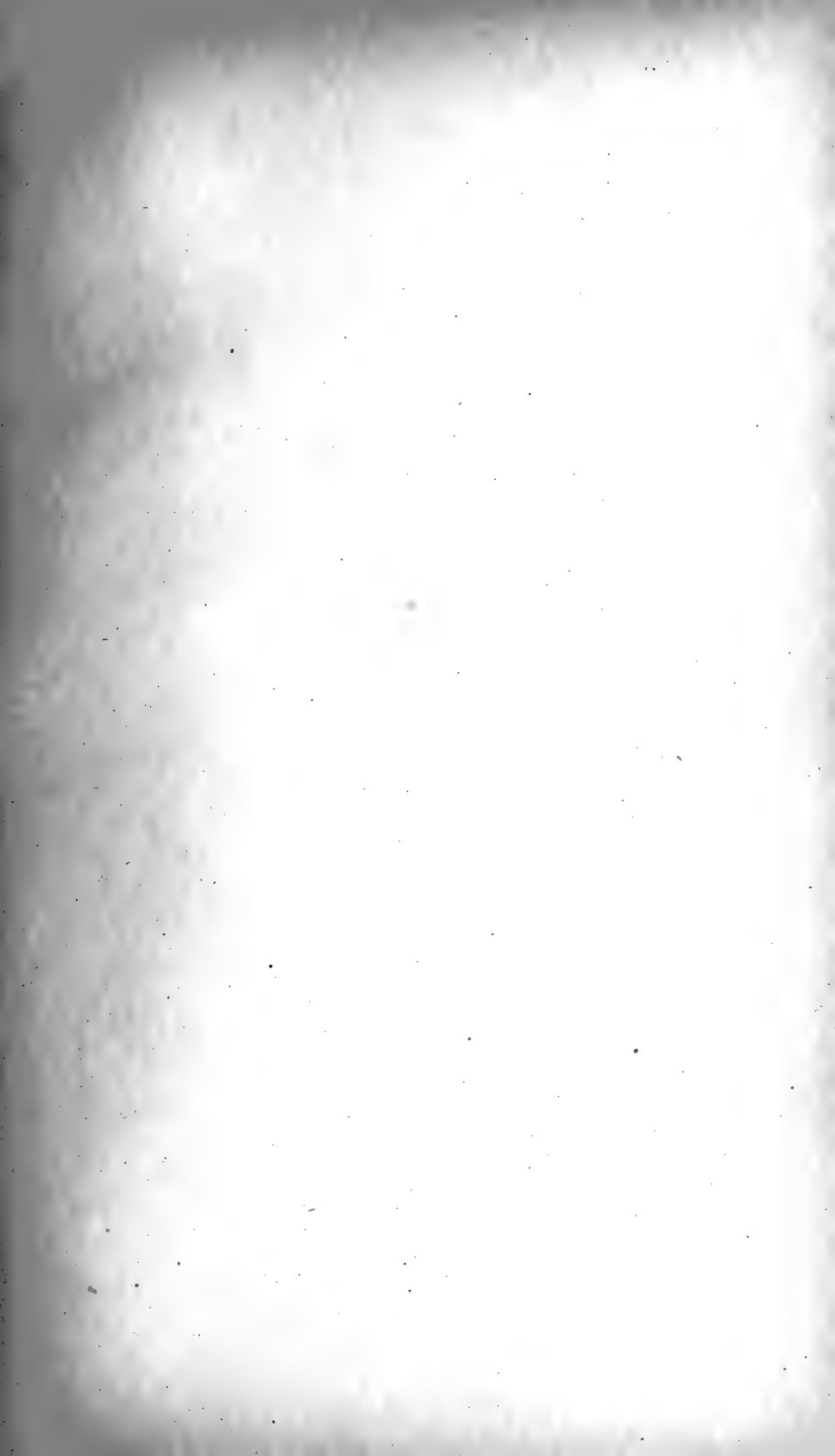
Hon. Charles E. Coon.

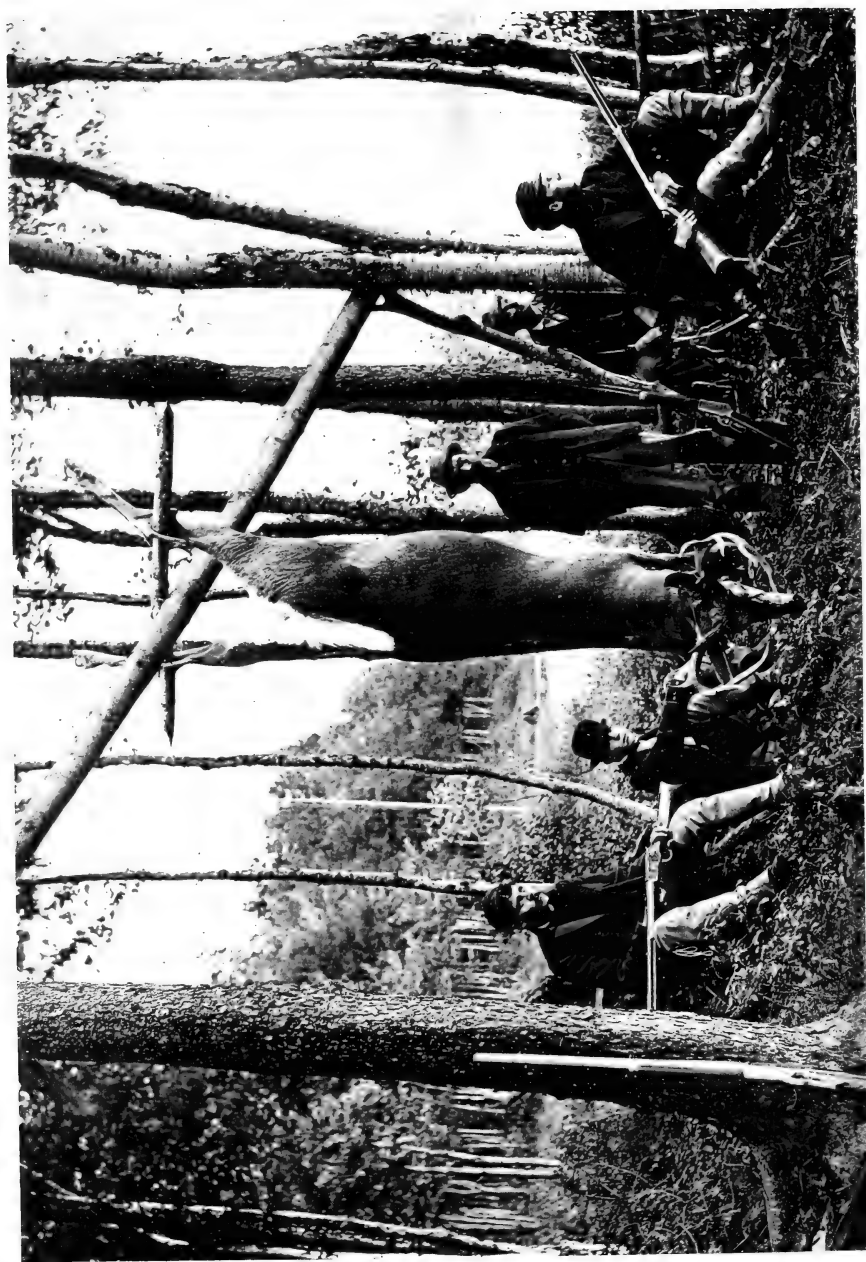
Executive Committee.

Edward Lauterbach, <i>Chairman.</i>	Amasa Thornton, <i>Secretary.</i>
Chauncey M. Depew, New York.	Richard Croker, New York.
Thomas C. Platt, New York.	Thomas F. Gilroy, New York.
Felix Campbell, Brooklyn.	Robert Lenox Banks, Albany.
Darwin R. James, Brooklyn.	William A. Beach, Syracuse.
James J. Belden, Syracuse.	William R. Weed, Potsdam.
Edward F. Jones, Binghamton.	C. W. Hackett, Utica.
W. L. Strong, New York.	Samuel A. Beardsley, Utica.
William R. Grace, New York.	A. S. Draper, Albany.
Warner Miller, Herkimer.	Maurice J. Power, New York.
Arthur S. Hamilton, Rochester.	S. V. R. Cruger, New York.
C. C. Shane, New York.	George H. Sharpe, Kingston.
Warren Higley, New York.	E. L. Trudeau, Saranac Lake.
H. H. Warner, Rochester.	Samuel O. Gleason, Troy.
Pascal P. Pratt, Buffalo.	Daniel N. Lockwood, Buffalo.

The membership includes many other prominent citizens, among them Whitelaw Reid, Charles A. Dana, Jesse Seligman, St. Clair McKelway, J. Edward Simmons, Edward Cooper, Sereno E. Payne, Henry Clews, Samuel B. Ward, Henry J. Coggeshall, James H. Manning, C. P. Vedder, Ashbel P. Fitch, W. C. Whitney, John J. Linson, Oswald Ottendorfer, Daniel S. Lamont, Levi P. Morton, C. L. Tiffany, C. P. Huntington, W. S. Webb, Hugh J. Grant, Henry Hilton, H. M. Flagler, George H. Daniels, Amos J. Cummings, John D. Rockefeller, Roswell P. Flower, Nathan Straus, Charles H. Babcock, William Brookfield, J. Pierpont Morgan and Murat Halstead.

The association has rendered valuable assistance in securing the passage of the present laws governing the forestry interests of the State. The report of the committee on forestry, of this association, of which the Hon. Warner Miller was chairman, was made in December, 1890, and contained many recommendations that have been incorporated in the laws of the State.





G. H. Rison, Photo.

WATCHING FOR ANOTHER ONE.

THE GENESEE VALLEY FORESTRY ASSOCIATION.

was organized in 1891, for the purpose of arousing public sentiment in western New York upon the subject of forest preservation and the replanting of waste places with timber trees for a future supply; and to encourage a love for the care and preservation of the trees in Rochester and its vicinity. To accomplish this the association held meetings for the public discussion of forestry questions, the meetings being held in various villages throughout that locality as well as in the city. The association has been instrumental in securing control of the trees in the streets of Rochester and the care of all the small parks with the park commissioners, who will greatly beautify them.

But the feature of their work which interested and benefited the public most was the successful means taken to destroy the cocoons of the tussock moth and other insects that were destroying shade trees. Warned by Prof. M. V. Slingerland and several of the entomologists who attended the Rochester meeting of the American Association for the Advancement of Science, the Genesee Valley Forestry Association called attention to the danger which threatened their shade trees, and offered to provide men to spray the trees at a slight expense, but no applications were made for their services. The association then published directions for the destruction of cocoons, and made the following offer to the pupils of the public schools:

“If you examine the bark of the trees, joints of the fences, and rough places on buildings, you will find cocoons containing eggs, and others containing pupæ, of insects that will soon hatch, producing caterpillars that will feed on the foliage of trees. The eggs and the pupæ should be destroyed immediately. You can do a good work for the public by gathering these cocoons.

“We will offer the following prizes: To the three scholars in different schools gathering the largest number of cocoons, \$5 each; to the three scholars in different schools gathering the next largest number of cocoons, \$3 each; to the three scholars in different schools gathering the next largest number of cocoons, \$2 each. Any scholar who shall gather a larger number than was reported last year (44,900) will be paid \$10 as a first prize.

“No rewards will be given for less than 1,000 cocoons. Cocoons must be done up in neat paper packages or boxes, and delivered

to the principal of the school, with the name of the scholar and signature of witness to correctness of the account. Teachers will please see that cocoons are burned. Rewards will be paid by Superintendent Noyes.

"It is hoped that the teachers of the public schools will feel sufficient interest in the preservation of the city's shade trees to urge this proposition on the attention of their pupils, and encourage them to do their best to win the prizes offered by the association.

"By June 1st the principals can certify to the superintendent the names of pupils competing, and the number of insects destroyed by each."

The boys and girls went to work early and late, and the result is well told in *Garden and Forest*, July 11, 1894, from which we quote:

"PRACTICAL WORK FOR FORESTRY ASSOCIATIONS.

"Forestry associations have done as yet little more than talk. This is quite natural and legitimate, since their first object is to make propaganda for an enlightened, general appreciation of the necessity of rational forest treatment. Many persuasive arguments must be used before such an appreciation can be sufficiently widespread to lead to action. Meanwhile, here and there the opportunity for direct active and practical work presents itself, if not in behalf of the forest, at least in behalf of the trees in our streets and parks. These are nearer objects to many than forests; they belong to the public, and interest in them may well serve the useful purpose of inculcating that love and intelligent appreciation for trees everywhere which may ultimately lead to the establishment of a sound forest policy for the country.

"The planting of ornamental trees on Arbor Days and other occasions has been often encouraged by forestry associations, but the Genesee Valley Forestry Association, of Rochester, has entered another field of usefulness in freeing the shade trees of the city from insect pests. Last year the association offered a series of prizes to the children of the public schools for gathering the cocoons of caterpillars with encouraging success. This year, in addition to the previous prizes, a special prize of \$10 was offered to all who would bring a larger number than was brought



G. H. Risson, Photo.

ADIRONDACK GAME.

in 1893 by any one pupil (44,900). As a result, on June 20 each of 65 scholars received a \$10 gold piece, with an extra \$5 each to the two boys who had the largest count. The total number gathered and certified to by the teachers was 8,800,200, and the city is relieved of a pest which has in former years driven many families into the country at an earlier date than they would otherwise have sought their summer outings. The money for the prizes, which amounted to considerable more than had been anticipated, was subscribed by citizens, the common council adding \$100, and money was never spent more effectively for such a purpose.

“Now, all this is the result of talking in the first place. The Genesee Valley Forestry Association owes its origin to public talks by two members of the American Forestry Association. One of Rochester’s prominent citizens, Mr. Arthur S. Hamilton, took up the ideas advanced and persuaded others to interest themselves in the subject, and so the association was formed, and being composed of business men it looked around for business and found it. Certainly the formation of local associations which can apply themselves to such definable tasks as that of the caterpillar crusade is to be encouraged as one of the most hopeful agencies in all matters relating to forests and to trees, both in city and country.”

The officers of the Genesee Valley Forestry Association are:

President.

A. S. Hamilton.

Vice-Presidents.

W. C. Barry, Herbert Wadsworth.

Secretary.

Dr. Porter Farley

Treasurer.

Henry C. Maine.

Corresponding Secretary.

C. C. Laney.

Executive Committee.

Dr. C. A. Dewey.	J. S. Andrews.
J. E. Durand.	F. S. Amsden.
Milton A. Noyes.	

THE TREE PLANTING AND FOUNTAIN SOCIETY OF BROOKLYN.

This society is engaged in work somewhat similar to that of the local forestry associations just mentioned. Article II of its constitution states that "The objects of this society shall be to promote the planting and protection of trees, the erection of drinking fountains, and otherwise to render the city of Brooklyn attractive."

The officers of the association are:

President.

A. A. Low.

Vice President.

John W. Hunter.

Secretary.

Lewis Collins.

Treasurer.

Paul Leicester Ford

Counsel.

Hermanus B. Hubbard.

Trustees.

John W. Hunter.	H. B. Hubbard,	Geo. V. Brower-
E. J. Rustin.	Henry Hentz.	A. A. Low.
E. L. Graef.	L. Collins	Wm. T. Lane.
A. Matthewson.	Jas. R. Cowing.	Paul L. Ford.
*H. W. Slocum-	J- O. Carpenter.	A. M. Hatch.

In connection with its work this society, through its secretary, Mr. Lewis Collins, has issued some interesting and valuable publications in which the subject of tree planting is discussed at

length. These pamphlets, or bulletins as they are termed by their author, are somewhat voluminous and contain a large amount of information relative to tree planting, the species best adapted to city streets, and the best methods for setting out trees so as to secure success. Bulletin No. 2 contains some useful hints on tree pruning, and aims to correct the ruinous, unskilful methods which have destroyed the beauty of so many shade trees in our cities and villages.

These publications should be welcomed by all who are interested in village improvement societies or the work of tree planting in cities. It is to be hoped that many such associations will be organized in the towns and cities of our State.

The Adirondack Spruce.

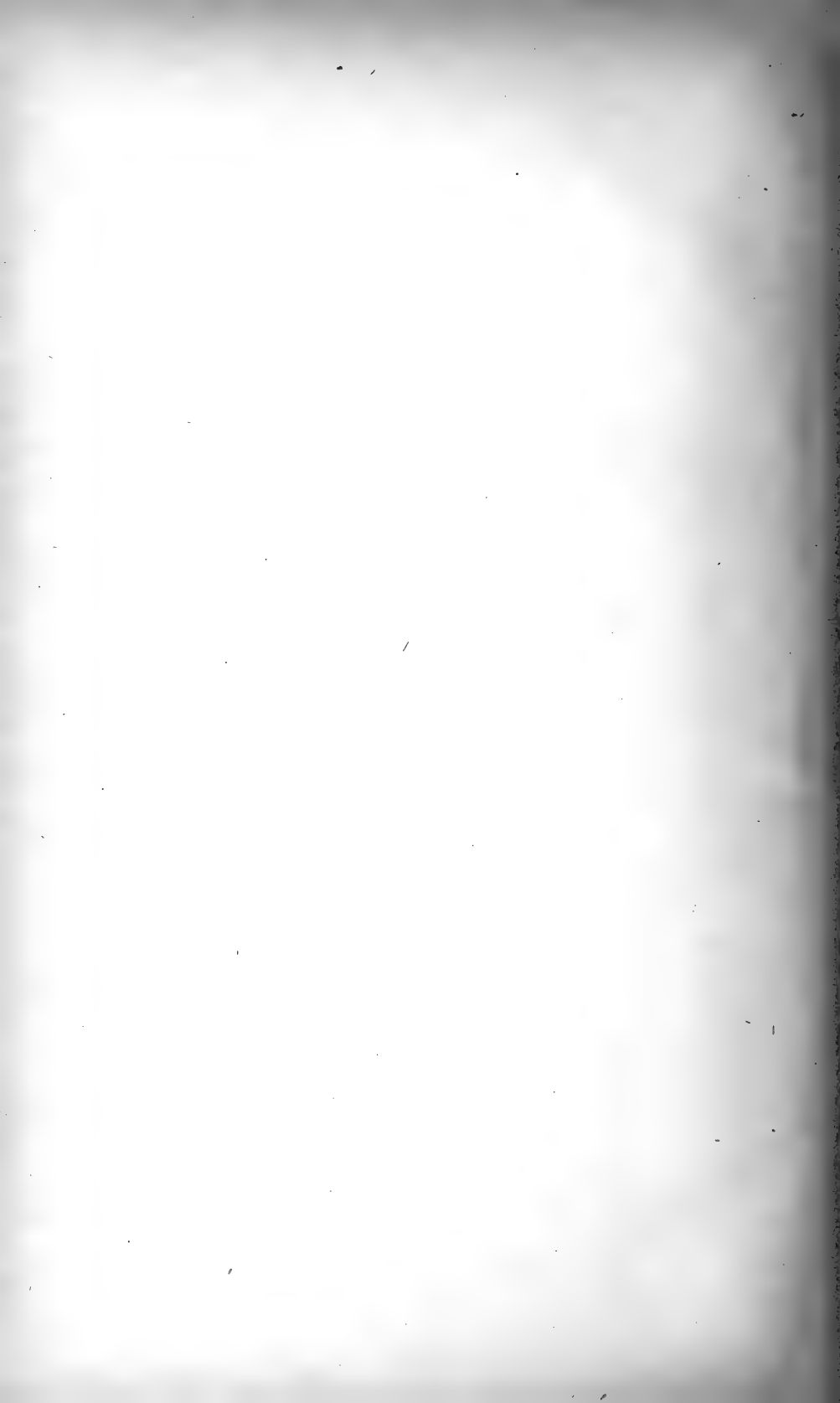
The forestry law of this State makes it mandatory upon the Forest Commission to "Take measures for awakening an interest in behalf of forestry and of imparting elementary instruction on such subject, and prepare and distribute tracts and circulars of information for the care of private woodlands, and for the growth of new forests upon lands that have been denuded, exhausted by cultivation, eroded by torrents or injured by fire, or that are sandy, marshy, broken, sterile or waste and unfit for use. These publications shall be furnished without cost to any citizen of the State on application, and proper measures may be taken for bringing them to the notice of persons who would be benefited thereby."

Tracts and circulars containing the information indicated in this clause of the law are being prepared and in time will be ready for distribution to those who may be interested in such matters. In accordance with the general requirements of this clause, an article on the Adirondack black spruce, the leading merchantable species of our northern woods, has been prepared by Col. W. F. Fox, Superintendent of State Forests, and is submitted here as an appendix to this report. One-third of the entire Adirondack forest is owned or controlled by private clubs whose aims and intentions are to so manage their forest property that they may obtain a fixed and perpetual revenue without injury to existing conditions, and at the same time improve the composition and productivity of their woods. While the following article does not pretend to go into the details of forest management it furnishes a mass of interesting information regarding the characteristics of the most valuable species in our forest, which we trust will prove interesting, not only to those connected with the management of the State forests but to all owners of timber land, owners of private preserves, and lumbermen in the Adirondack region.

We have embodied this paper in our report as it will thereby receive the circulation contemplated in the law referred to, this department being allowed 5,000 printed copies of its report for distribution throughout the State.

THE ADIRONDACK BLACK SPRUCE.

By WILLIAM F. FOX,
SUPERINTENDENT STATE FORESTS, ALBANY, N. Y.



The Adirondack Black Spruce.

PICEA NIGRA, LINK.

BLACK, DOUBLE, OR RED SPRUCE.

Fr., *Epinette noire*;* Ger., *Schwartztanne*; Sp., *Abeto negro*.

Leaves dark green, needle-shaped, four-sided, about one-half inch in length, and set thickly on all sides of the branches; flowers in May, the cells of the anthers opening lengthwise. Nodding cones, persistent for several years, from one to one and one-half inches long, ovate in shape, recurved, with thin, rigid scales having a characteristic broken or slightly jagged edge, the cones hanging on the end of short branches. Bark thin, of a dark-brown color somewhat tinged with gray, covered with roundish scales.

While the principal habitat of this species is to be found in New York, Vermont, New Hampshire, Maine and Canada, it extends northward to Hudson Bay, and southward as far as North Carolina, although it grows but sparsely in Pennsylvania. It is found also as far west as Wisconsin. Years ago it formed a large part of the forests which covered the Catskill mountains, but was rarely found in the western part of this State.

In New York it attains a common height of 80 feet (24.38 m.), with a common diameter of 18 inches (45.7 cm.); and a maximum height of 105 feet (32 m.), with a maximum diameter of 36 inches (91.4 cm.). It prefers a hilly and mountainous region with an altitude ranging from 1,200 to 1,800 feet, and while it is found at its best on mountain slopes it grows readily in low, swampy valleys.

It furnishes a light softwood of medium strength, with a straight close grain. The heartwood has a tinge of red; it is very often white. The sapwood, which is generally of a lighter shade, or a pure white, is about two inches deep in trees which have attained a diameter of 20 inches or more. The smaller trees have a thicker sap proportionately. It has a specific gravity of 0.584; percentage of ash, 0.27; average tensile strength,

* The French Canadians call it *Epinette a la bière*.

10,000 pounds to the square inch. It weighs about 28 pounds to the cubic foot, and when perfectly dry, 25 pounds. Spruce pulpwood cut on high land, partly seasoned, will weigh about 3,800 pounds per cord; that cut on low or swampy land about 4,200 pounds.

It is the leading merchantable species of the New York forests, the white pine having, substantially, been removed many years ago. In 1893 the total product of all the mills which obtained their stock of logs from the Adirondack forests was as follows:

	Feet.
Spruce.....	241,581,824
Hemlock.....	77,910,654
Pine.....	27,844,222
Hardwood.....	7,713,828
Total.....	<u>355,050,528</u>

The production was still greater in 1892, owing to the low water during the previous year; but the figures given here for 1893 will fairly represent the average annual product of this region. In addition to the 241,581,824 feet of spruce sawed in 1893, the pulp mills consumed in that year 92,135,707 feet, B. M., all of which was used in the manufacture of paper.

Spruce lumber is used for various purposes, but principally for house building, a large amount of it being made into flooring and ceiling, for which use it takes the place largely of white pine. A large share of the product is also sawed into joists, scantling, square timber and dimension stuff. In market value it is cheaper than white pine, but dearer than hemlock. The value of the logs in the tree, or "stumpage," is about 35 cents per market log, or \$1.75 per 1,000 feet, the price varying somewhat more or less in proportion as the timber is accessible or within hauling distance of streams which will permit the floating or "driving" of logs to the mills. The value of the logs when delivered on the banks of these streams is about \$1.30 per market, or \$6.50 per 1,000 feet. The bark has no commercial value. It is peeled from standing trees, occasionally by woodsmen, guides or sportsmen, who use it for covering the roof or sides of their shanties.

In the Albany lumber market the log run brings about \$14 per 1,000 feet. There is very little clear stuff to be sorted out; a small percentage of clear inch, however, is generally selected which sells for \$23 per 1,000 feet. For this market it is sawed largely into nine-inch boards, and into two-inch planks, nine inches wide; also into 2 by 10-inch planks. Shingles made from spruce are of inferior quality, and not durable; hence it is seldom used for this purpose. The wood decays rapidly when exposed to the weather, but when protected it will compare favorably with other softwoods in durability. The trees of this species growing in a dense forest furnish tall tapering trunks, free from branches, with an elastic, straight-grained timber, which makes it very desirable for spars and piles. One firm of lumbermen in the Adirondack region ships annually a large quantity of this timber "in the round," the full length of the tree, for this purpose. It is used in boat building, the base of the tree and principal roots furnishing knees, while the best quality of the straight-grained planks taken from the butt logs are manufactured into oars. In the southern part of the Adirondack forest the best trees are selected, from which the clear butt logs are taken for the manufacture of sounding boards for pianos. Only choice logs are used for this purpose, and these are "quarter sawed" into boards five-eighths of an inch thick. This class of lumber is worth \$35 per 1,000 feet at the mills. The logs cut for this purpose are known in the trade as "fiddle butts."

Mention should be made here, also, of the resinous gum which exudes from the tree trunks of this species, and which, after undergoing a slight preparation, is sold for chewing gum. A large number of men known as gum-pickers follow this industry during the winter months, obtaining a good livelihood from this peculiar work. Years ago a favorite drink known as spruce beer was made by boiling the young branches and evaporating the infusion, but its place as a beverage has been so largely taken by other drinks that now one seldom sees or hears of the old-fashioned "spruce beer." This decoction of the spruce twigs has valuable medicinal properties, and is a well-known antidote to the form of scurvy prevalent among seamen while on long voyages.

The wood furnishes an inferior quality of fuel, giving out little heat comparatively, and, owing to the air contained in it, causing

a continual snapping, which makes it dangerous when burned in open fire places.

Occasionally, this species grows thickly in masses, or what the lumbermen term "clumps," but, as a general thing, it is distributed quite evenly through the forests in which it is found. Throughout the Adirondack woods it forms on an average from 10 to 15 per cent. of the timber. The Adirondack forests, as a whole, are composed principally of hardwoods, the deciduous trees including about 70 per cent., among which the remaining 30 per cent. of conifers are, as a general thing, somewhat evenly distributed. The black spruce is here found in company with the maple, beech, and yellow birch, among which there is a further but small admixture of ash, cherry, elm, basswood, and ironwood. The conifers associated with the spruce are composed of hemlock, balsam (*abies balsamea*), tamarack and white cedar, the various species of pine having been nearly all removed by the lumbermen years ago. Michaux makes the statement that this species "often constitutes a third part of the forests by which they are uninterruptedly covered." One of our leading text-books on botany states that "dark-mountain forests are often wholly composed of it." While this statement may possibly be true of other localities, there is certainly no such composition in the Adirondack forests, aside from the occasional but small clumps of spruce previously referred to.

In some localities there are large areas along the mountain slopes covered with a heavy proportion of evergreens whose sombre hues might give rise to such an impression to a distant spectator, but a closer examination of such forests discloses a large admixture of other conifers, together with a good proportion of broad-leaved trees which are apparent only in summer, and which even then are liable to be overshadowed and hidden by the overtopping or dominant crowns of tall conifers.

In its habit the black spruce has very little of attraction or beauty in its appearance. When growing in masses, all its branches fall off, leaving groups of columnar, tapering shafts, each of which is surmounted by a small, sparsely-limbed and irregular crown; and this is also the case, to a considerable extent, where it is distributed among the hardwoods with plenty of surrounding space. When growing in openings, well removed



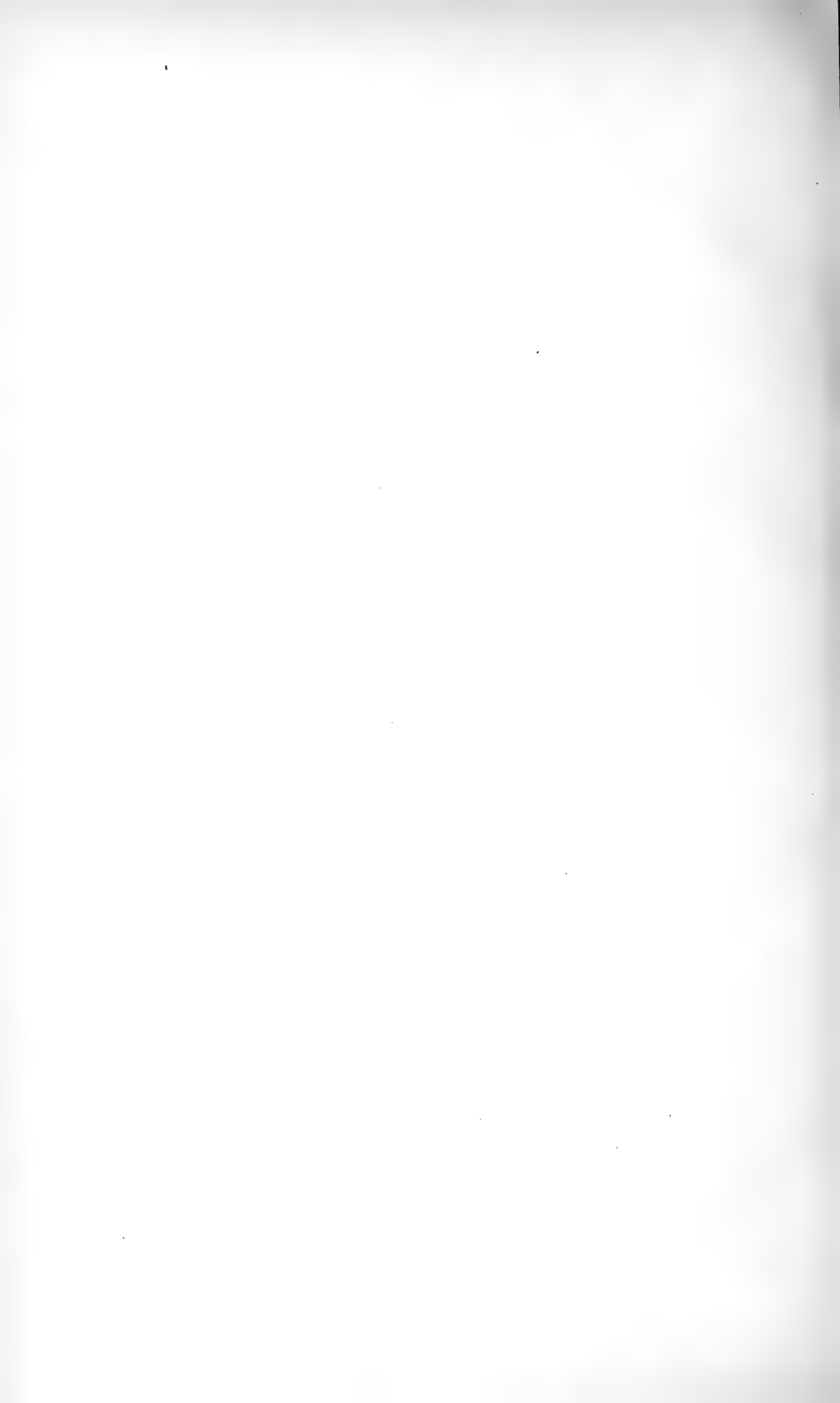
BLACK SPRUCE.
Habit when grown in the Forest.

G. H. Rison, Photo



BLACK SPRUCE.
Habit when grown in the open.

G. H. Rison, Photo.



from other trees, its branches are persistent and cover the trunk from the ground to the crown, forming a pyramidal-shaped tree with a conical head whose regular and symmetrical outlines elicit praise from some, while the primness and exactness of shape is objectionable to others.

In growing it attains height by the annual increase of one leading terminal shoot, which adds to its height 10 to 15 inches each year. From the base of this terminal shoot there is formed each year a whorl of branches which gradually shorten in passing from the lower to the upper ones, the lower ones having each one more year of growth than the one above it. The branches, which are in whorls of four or more, are horizontal with a slight tendency to an upward direction. As the trees increase in age the whorls become less distinct, owing to the decay and falling off of the branches.

The black spruce derives its name from the very dark hue of its foliage which, when massed on some mountain slope, is of such a sombre color that it appears to be black rather than green. The name is also used in distinction from the white spruce, whose leaves are of a pale or glaucous hue. In many of our manuals the black and white spruce are designated respectively as the double and single spruce, but the reason for this peculiar distinction is not readily apparent.

These two species bear such a resemblance that it is not always easy to identify them, the cones, which differ but slightly in size and shape, furnishing the principal distinctive feature when the flowering season has past. The white spruce is far less abundant throughout the Adirondacks, being rarely seen outside of Essex county. It is a much smaller tree, and its branches are more persistent, most of the trees being covered with limbs from the pyramidal apex down to the ground. The difference between these species is best described by Mr. Charles H. Peck, State Botanist, who in referring to their resemblance says:

“The resemblance between the white spruce and some forms of the black spruce is so close that it is not always easy for an unskilled person to separate them. The descriptions of these trees, as given in the manual, indicate but a part of their distinctive features, and the characters there ascribed to the edges of the cone scales do not in all cases hold good. Having compared

these trees at flowering time the following characters seem to me to be the most available ones for distinguishing them.

WHITE SPRUCE.

Young branchlets glabrous. Leaves six to eight lines long. Cones oblong or cylindrical, deciduous before next flowering time. Sterile aments pale, supported on slender whitish pedicels exerted from the basal cup of scales. Fertile aments eight to ten lines long. Young leaves visible at flowering time.

BLACK SPRUCE.

Young branchlets pubescent. Leaves four to seven lines long. Cones ovate or oblong, still on the tree at next flowering time. Sterile aments tinged with red, sessile in the basal cup of scales. Fertile aments five to six lines long. Young leaves not yet visible at flowering time.

“These trees are in flower at the same time in the same locality. They were in bloom the past season in the vicinity of Elizabethtown the last week in May.”

The white spruce of the Adirondacks seems to be an inferior type of its kind. Prof. Charles S. Sargent, in his “Report on the Forests of North America,” tenth United States census, in describing this species says:

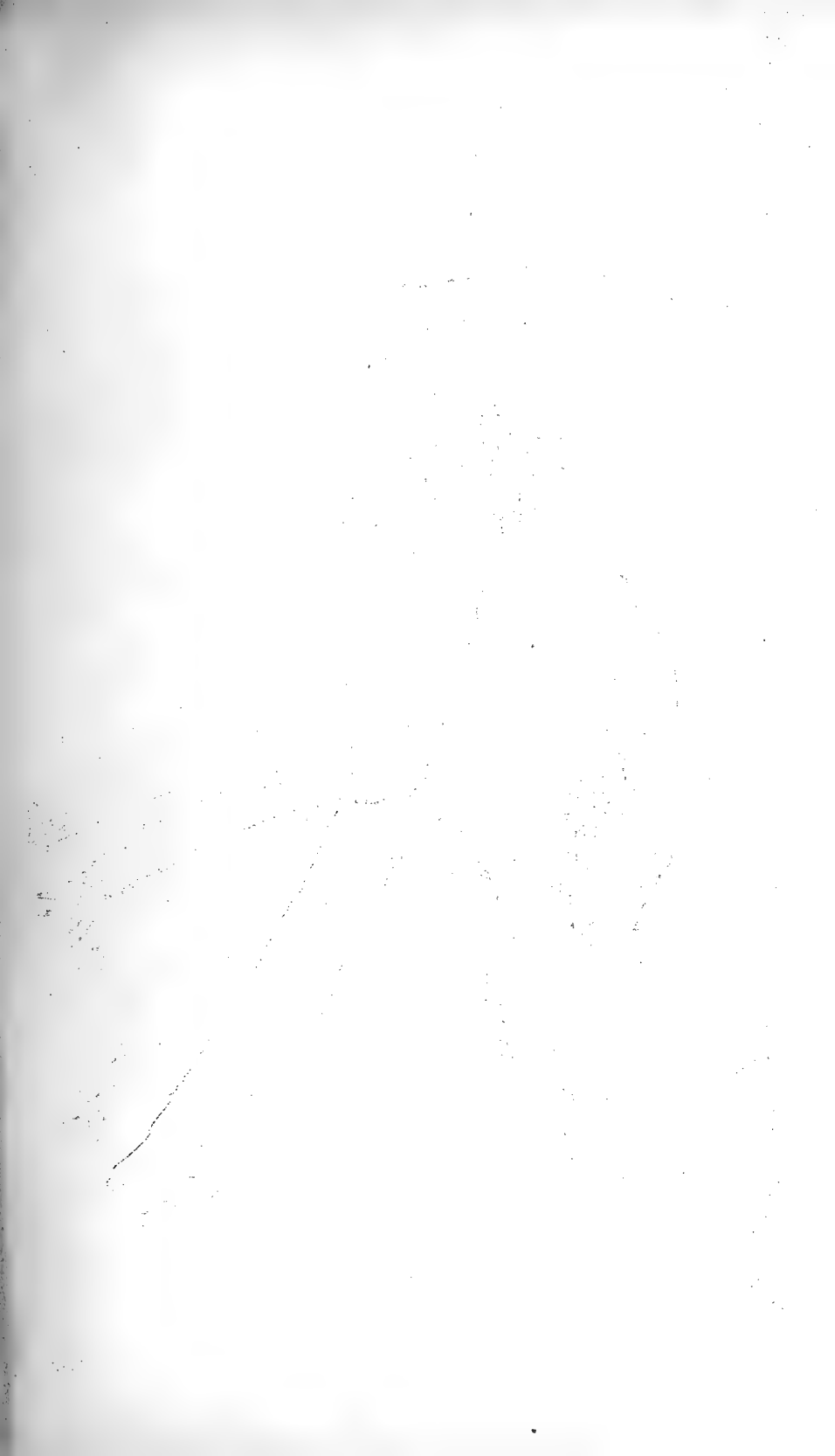
“A tree 15 to 50 meters in height, with a trunk 0.60 to 0.90 meter in diameter; low, rather wet soil, borders of ponds and swamps; most common north of the boundary of the United States, and reaching its greatest development along the streams and lakes of the Flathead region of northern Montana, at an elevation of 2,500 to 3,500 feet; the most important timber tree of the American subarctic forests north of the sixtieth degree of latitude, here more generally multiplied and of larger size than the allied *P. Nigra* with which it is associated.”

There is also a tree known as the red spruce which is occasionally found in the Adirondacks, but more plentifully in Canada. At one time this tree was described as a distinct species (*Abies rubra*), but latterly it is held to be a variety of the black spruce. It has larger cones, and a reddish, softer wood, the latter feature being attributed by Michaux to some influence of the soil.

Prof. N. L. Britton, of the Department of Botany, Columbia College, in an article on “New or Noteworthy North American Phanerogams”* says:

“I have lately been much interested in the spruces, and have observed them closely on the Blue Ridge in southwestern Virginia, where I became familiar with two species, one of which I supposed to be the white spruce, *Picea Canadensis*. The same two species occur on the slopes of Mounts Marcy and McIntyre, in the Adirondacks, but neither of them is *P. Canadensis*, which species I did not see. It is reported from northern New York, but I did not encounter it.

* Bulletin of the Torrey Botanical Club, Vol. 21, No. 1, Jan., 1894.



*Fig. 1, Cone and leaves natural size.
Fig. 2, A seed.*



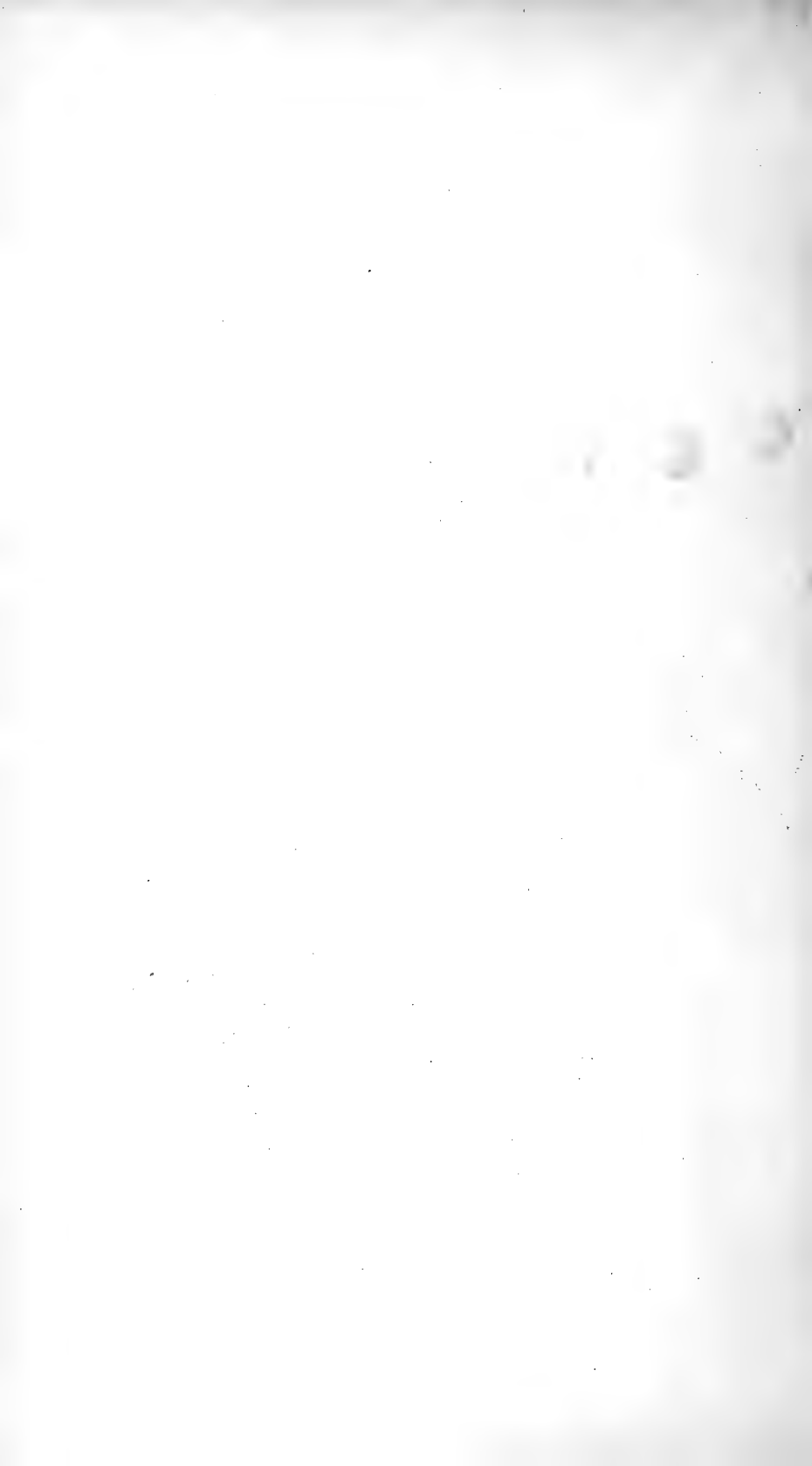
*Fig. 1, Cone and leaves, natural size.
Fig. 2, A seed.*



*From Michaux
N. American Sylva.*

White Spruce
Picea alba.

Albany Eng Co.



“The two species of the Blue Ridge and the Central Adirondacks are the black spruce, *P. Mariana*, and the red spruce, *P. rubra*. By most recent authors the latter has been regarded as a variety of the former, but this view has been ably attacked by Prof. George Lawson in a paper on ‘Remarks on the Distinctive Characters of the Canadian Spruces,’ published, I think, in 1888. He there maintains that the red spruce is distinct from the black, and I am in entire accord with this opinion. The white spruce is very different from either of the others by its elongated cones, entirely glabrous and glaucous twigs and sterigmata, and very light green leaves. *P. rubra* differs from *P. Mariana* by its very slender twigs, which are sparingly pubescent, the sterigmata nearly or quite glabrous, its very slender light-green, nearly straight, very acute leaves, and its oblong cones, which are deciduous at the end of the season, the scales lacerated or two-lobed. *P. Mariana* has stout, very pubescent twigs and sterigmata, stout and thick, merely mucronate, dark-green, incurved leaves, and ovate, larger cones, which are persistent for two or more years, their scales entirely or merely erose. *P. rubra*, according to my observations, reaches a much greater altitude on McIntyre than does *P. Mariana*, and this agrees with our collections in the Blue Ridge of Virginia. The very slender twigs of *P. rubra* and its light-green leaves give it a much more graceful aspect than is exhibited by *P. Mariana*”

A noticeable peculiarity of the Adirondack spruce is the large number of defective trees scattered through the forest, which are known as “seamy trees,” this defect or “seam” rendering them unfit for lumber. The seam appears to be a crack which extends up and down the trunk, varying in length and extending in some cases from the butt log to the lower branches of the crown. These openings vary in depth, but sometimes the crack reaches to the heart. The edges of the seam are thickly coated with the resinous substance known as spruce gum, which exudes and then hardens, the larger and cleaner masses being gathered by the “gum pickers” who earn a livelihood by this work. The seams are mostly perpendicular, but in trees where the grain of the wood is not straight, the seam winds upward obliquely as it follows the grain. The cause of this defect has never been satisfactorily explained, although various reasons have been suggested.

These seamy trees are not as observable now as before the great blight which, within the last 20 years, destroyed a large proportion of the spruce throughout the Adirondack forests. The seams were confined mostly to mature trees, as the

blight seldom attacked trees under 12 inches in diameter. The younger spruces which were spared, and which form a large part of the forest to-day, afford now comparatively few specimens of seamy timber.

About 25 years ago, the black spruce throughout the great forest of northern New York began to show signs of blight, the first appearance of which was noticed in 1868. During the next ten years this blight spread through most of the forest, only a few localities remaining untouched. Competent authorities who had made a study of the matter on the ground, estimated that at one time one-third to one-half of the matured spruce in the Adirondack region was dead. In some townships there was a recurrence of the evil after an interval of 25 years, the time of the first appearance being fixed by some observers at a date earlier than 1868.

When the trees were first attacked by this scourge, the leaves commenced falling while they were yet green. The foliage remaining on the tree soon turned to a reddish-brown, whose hues made the mountain slopes and forest areas of the valleys appear as if a scorching fire had swept over them. About 1884, there was a noticeable cessation in this destruction of timber, and since that time there has been no recurrence of the evil. The dead trees have mostly fallen, although here and there some tall "stubs" remain as reminders of the calamity. The young trees, which everywhere escaped, now display their green foliage where the brown dead leaves of the blasted spruces were seen, and but little evidence remains of the blight that wrought such a wide-spread destruction in this class of property.

The cause of this decay or death of the spruce has been the subject of much discussion, various reasons for it having been advanced. Some — among them, men who had been close observers of the blight from its beginning — attributed the death of the trees to drought ; but this reason was hardly satisfactory, because the disease killed the timber growing in damp, moist places and swamps, as well as in localities where drought might have affected them ; also, on northern as well as on southern slopes. Moreover the alleged drought did not affect in any way the other species, both deciduous and coniferous, which were growing in company with the diseased spruces.



G. H. Rison, Photo

BRANCH OF THE BLACK SPRUCE

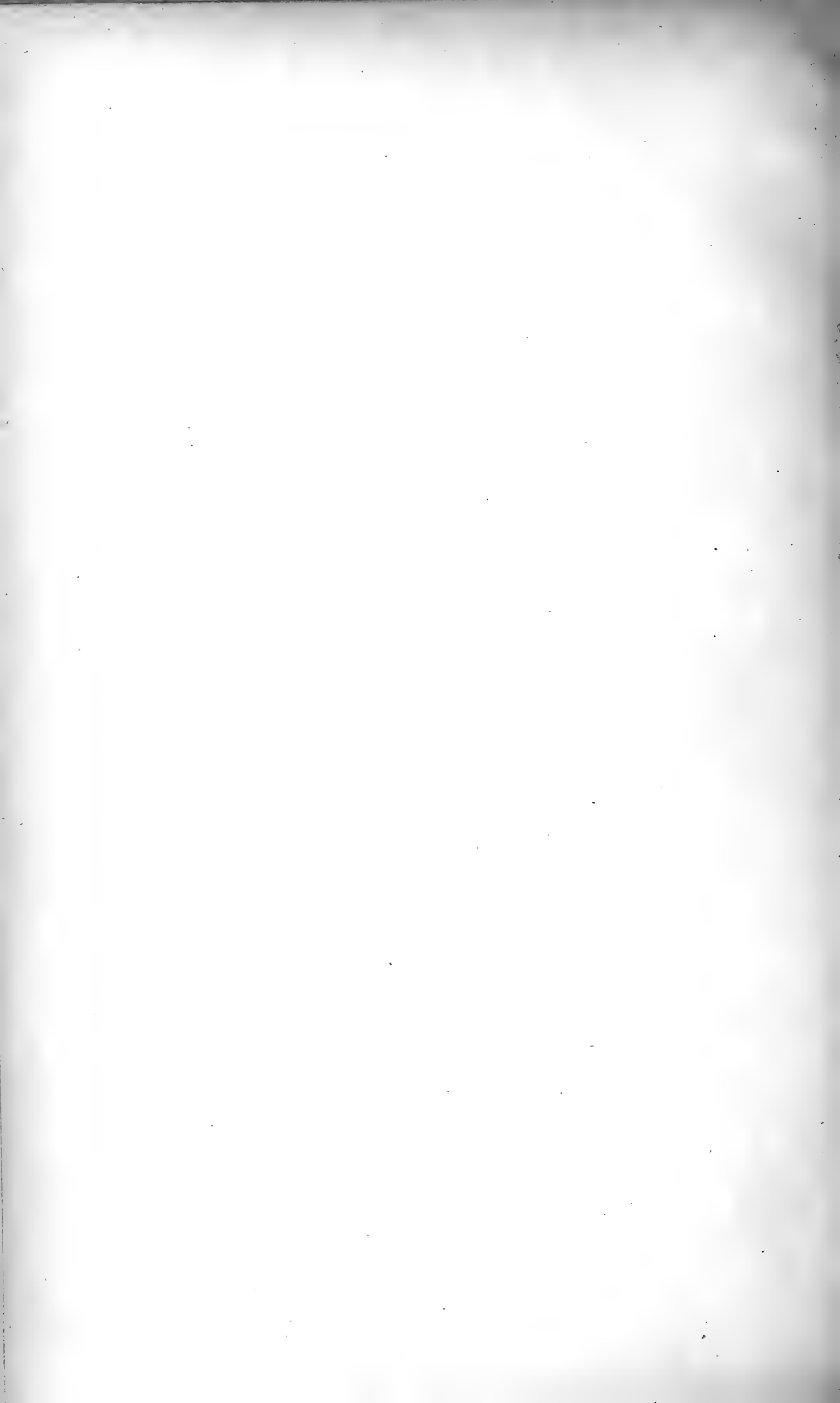
Not quite natural size.



G. H. Rison, Photo

BRANCH OF THE BLACK SPRUCE.

One-third natural size.



Some claimed that this premature decay was due to the agitation of the trees by high winds, but the blight attacked also the timber standing in sheltered and protected situations.

It was suggested that the evil might have been due to a hard winter, to some period of intense cold, or to some late and severe frost occurring after the sap had started in its vernal flow; but there is no record of any such unusual weather, and no reason why all the other species, some of them closely allied to the spruce, should not have been injured by the same cause.

Others, including dendrologists as well as woodsmen, held stoutly to the theory that the spruce was a short-lived species, and that the trees died of old age. There was some ground for this theory in the fact that the smaller trees—those under 12 inches in diameter or thereabouts—were uninjured. But, in reply, it has been shown that the spruce is not a short-lived tree; that it is a hardy species which resists the extremes of altitude and latitude; that, where it grows subject to natural forest conditions, it is the slowest in growth of all the native trees of our State, and that there are live spruces standing in the Adirondacks which are nearly four centuries old. Spruces of equal diameters often vary 100 years in age, owing to difference in environment. But these trees died in masses or clumps, the same as when scattered, irrespective of the fact that, though of equal size, they differed a century or more in age. If the trees which died had all been planted at the same time, were all of the same size, diameter and age, and, furthermore, the limit of maturity had been ascertained and determined, then the theory of death from old age might be entertained.

In view of the prevalence of insect blight elsewhere it seems strange that this cause should have been overlooked or summarily dismissed without consideration. Some investigators asserted that they had looked carefully for insects, both on the leaves and under the bark, and failed to find any. This proves nothing, however; the entomologists found them when they took up the investigation.

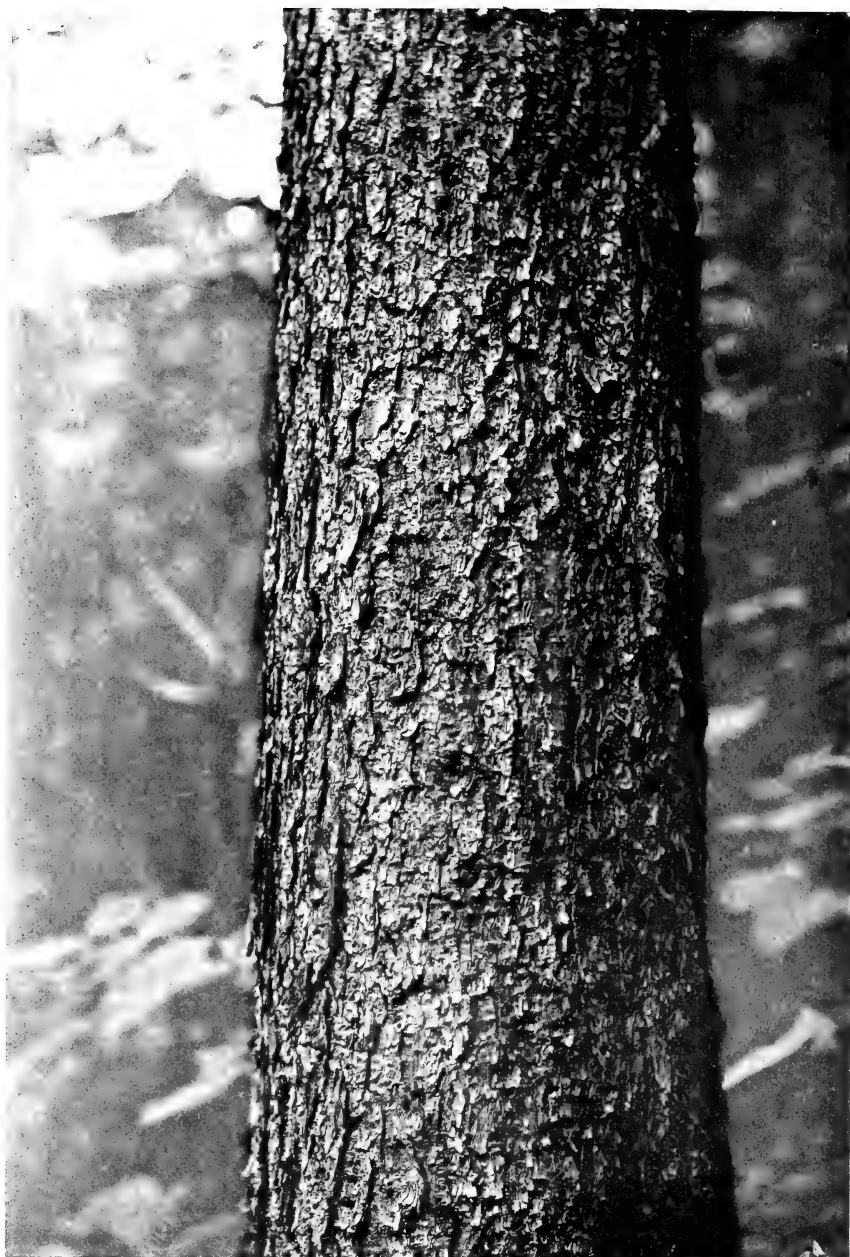
From statements made by Mr. Peck, the State Botanist, who first discovered the insect at work, and reports of entomologists whose observations justify his conclusions, there seems to be good ground for attributing the death of the Adirondack spruces

to the work of a small beetle known as the *Hylurgus rufipennis*, Kirby. Mr. Peck found both the mature insect and its larvæ in countless numbers under the bark of the diseased trees. These insects excavate a passage between the bark and the wood, eating away a part of both, and thus, practically, girdling the tree, their numerous galleries forming an intricate network of furrows which traverse the most vital part. Woodsmen are apt to claim that worms or insects are found only in dead or fallen timber, and entomologists have often expressed a doubt as to any borer attacking a live tree. But both Mr. Peck and Dr. Packard, in their investigations of the Adirondack spruce blight, found these beetles in live spruces, trees in which the wood was full of sap and on which the leaves were fresh and green.

Mr. Peck mentions having found dead beetles in a 10-inch tree. In this case the insects had commenced work, but the resin — which is so plentiful in the young spruces — oozed from the wounds, obstructing their passage, and the insects becoming embedded in gum were found dead, each in its furrow. The older and larger trees having less resinous matter, offered no such obstruction, which may account for the fact that only the mature trees perished — a much more plausible theory than the one of old age.

The reason for the sudden cessation of the blight has been a subject of discussion as well as the origin. The complete disappearance of these insects has been attributed, with good reason, to the woodpeckers, which were observed at work in many places, the dead trees having been pecked at by these birds in search of insect food until the bark had turned to a reddish hue.

It is not at all improbable that there may be a recurrence of this blight, and another wholesale destruction of merchantable timber from this cause. If so, the timber as fast as it is attacked should be cut and marketed instead of allowing it to be wasted and lost. Unfortunately the State law will not permit any such economic action. The sale of any timber in the Forest Preserve, not only the matured but the dead and fallen trees as well, is specifically prohibited. Neither can the law be repealed or amended, for the persons who are responsible for this remarkable legislation succeeded in having it incorporated in the Constitution itself.



G. H. Rison, Photo.

BARK ON BLACK SPRUCE.

Tree 12 inches in diameter.

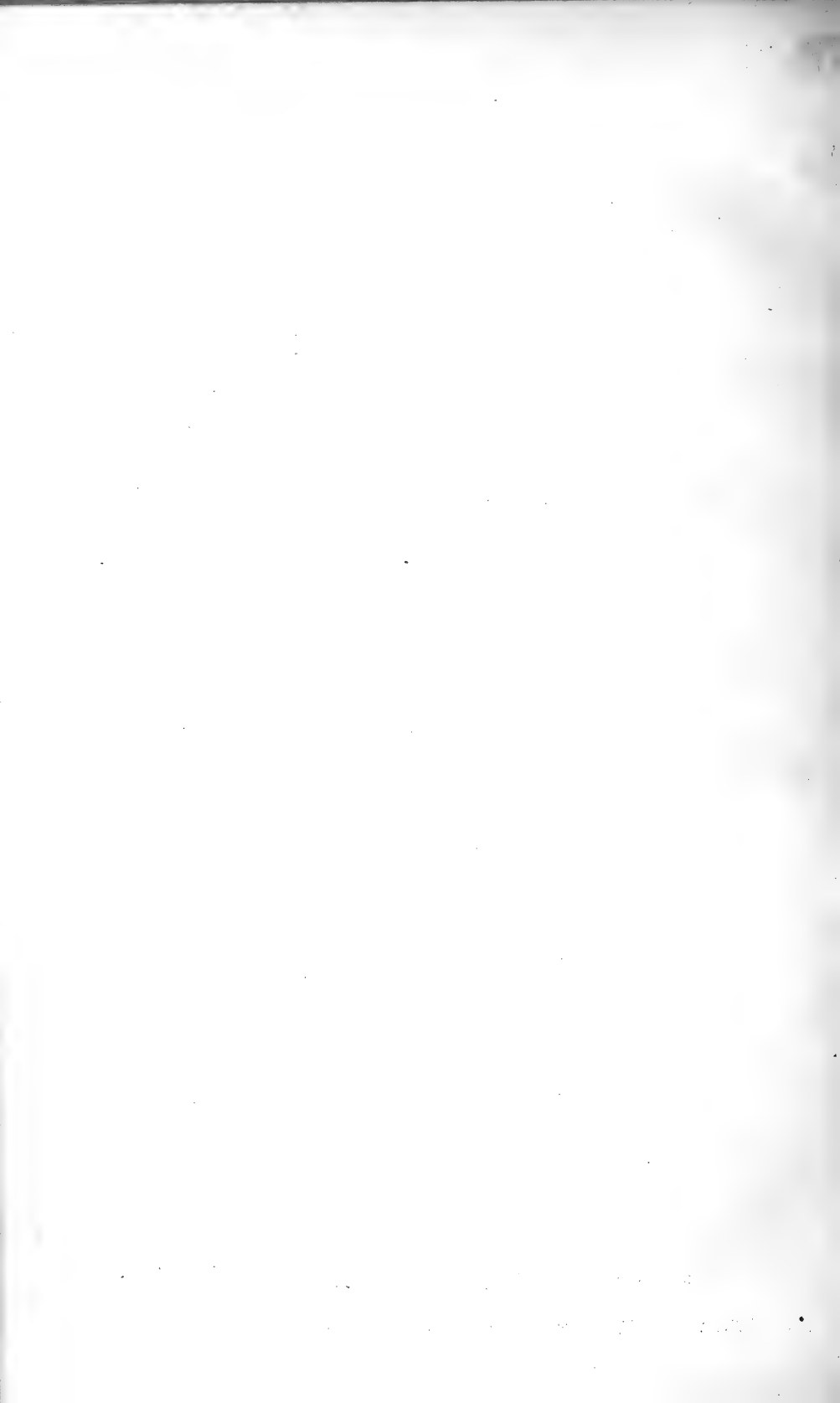


G. H. Rison, Photo

BARK ON BLACK SPRUCE.

Tree 23 inches in diameter.

NOTE.—Unlike many other species the bark on the large, old trees undergoes little change, and retains its characteristic appearance.



Since the organization of the Forest Commission, 10 years ago, not a tree has been cut on State land with the consent of the Commission, and, under the new Constitution, 20 years must elapse before any such permission can be given. But on the lands owned by the clubs or used as private preserves, which include one-third of the Adirondack forest, timber cutting for revenue and also for forest improvement will always be carried on. Where the cutting is done with reference primarily to forest improvement, the trees are taken irrespective of size or species; but where the thinning is done with reference to forest revenue rather than improvement, the cutting will probably be confined to one or two merchantable species, with some further restrictions to prevent the cutting of small trees or those which have not attained a mature size.

Except in a few localities the hardwood timber, which constitutes over 70 per cent. of the average forest, is not cut, while from the remaining evergreens only two* species are taken to any extent. There is little or no white pine left in northern New York. Hemlock is valuable only for its bark, owing to the low market price for that kind of lumber, and is not cut for bark except where there is a short haul or easy shipment to some tannery. Balsam, cedar, and tamarack have so small a place in the lumber market that these species are seldom removed. But the black spruce, which forms from 5 to 10 per cent. of our northern forests is a merchantable species in great demand, and forest owners desirous of obtaining a revenue from their property can take the matured trees of this species without any serious injury to existing conditions. In fact, so few spruce trees are cut to the acre on a well-managed job that their absence would be noticed only by those familiar with the business, there being no apparent diminution in the density of the forest or quantity of foliage. Of course, such a system, however closely restricted, would not fill the requirements for forest improvement; but it does not necessarily imply forest injury, much less forest destruction, as recently claimed by some very good but very stupid people.

Laying aside the question of cutting timber with reference to forest improvement, the cutting on the private preserves of

* Spruce and hemlock.

matured spruce for revenue only, still involves a discussion of certain points closely connected with forestry principles.

No matter how well our people may become educated in the tenets of scientific forestry, or how amply provided our land-owners may be with skillful, professional foresters, the system under which the Adirondack forest must be managed for years, well or poorly, will be the one known as that of "selection." This is indicated by various conditions. Our forests are already grown, and the market price of their product will not warrant anything in the line of planted forests other than some experimental work. Moreover, as only one merchantable species is accessible, the cutting will be limited for a long time to that one species, — the black spruce. In order to insure a future and permanent supply the selection will be further confined to the matured trees, so far as the problem of tree-growth and interest account will permit.

AGE OF THE SPRUCE.

Here arises the question, what constitutes a matured spruce in the Adirondack forests? How old must it be when it grows under natural conditions? How large, how tall, and what must its diameter be? Under any system, whether the thinning be done for improvement or revenue, this point is one of the first to be determined.

For the purpose of obtaining definite information on this subject the Forest Commission instituted some researches, the result of which is here submitted. Acting under definite instructions from the Superintendent some of the foresters, specially detailed for this work, went to different localities in the Adirondack forest, where, by counting the annual rings of tree-growth as revealed by the stumps and cross sections of the trunks, they accumulated a mass of data and statistics which furnish satisfactory information on this point. In counting the rings on the stumps the foresters used large magnifying glasses, which were necessary owing to the slow growth of the spruce and crowded condition of the annual rings. In many cases it would be impossible to count these rings, or "grains" as the woodsmen term them, with the naked eye. The rings were counted on the line of the greatest diameter, and from the center along the longest radiating line. Small pins were inserted at every inch, and the rings in each

inch counted and recorded separately. By the latter arrangement the amount of eccentricity in the growth is apparent in each case. In the black spruce the heart is seldom found in the exact center of the tree, this lack of concentricity in the rings of annual growth being a noticeable feature.

The statistics offered first are based on the work done by Forester Humes, in St. Lawrence county, who examined and counted the rings on 237 spruce trees with reference to establishing the facts as to age and maximum size only. The statistics showing number of years for each successive individual inch of diameter, together with amount of eccentricity, are given in other and subsequent tables.

TABLE I.

SPECIMEN NUMBER.	Diameter of stump, in inches.	Number of rings on stump.	*Length of shaft, in feet.	Diameter at top, in inches.	Number of rings at top.	Total height of tree, in feet.
1	30	325	72	11	98	93
2	30	289	68	9	105	87
3	30	315	54	12	123	82
4	30	275	54	11	104	91
5	30	291	58	12	116	92
6	29	333	58	13	112	81
7	29	298	54	10	100	79
8	29	321	54	9	97	75
9	29	287	58	12	103	87
10	29	312	54	14	138	91
11	29	310	54	13	106	83
12	29	273	54	11	94	80
13	28	278	58	10	100	70
14	28	295	58	13	118	76
15	28	273	54	10	84	70
16	28	247	58	8	99	68
17	28	301	60	7	93	72
18	28	300	54	12	68	70
19	28	271	54	10	123	70
20	27	281	58	12	103	68
21	27	302	54	11	98	76
22	27	298	58	10	99	69
23	27	258	54	9	107	80
24	27	259	54	13	156	78
25	27	316	54	10	121	71
26	27	273	58	11	99	81
27	27	301	54	12	136	69
28	27	298	54	14	134	86
29	27	294	58	12	123	80
30	27	284	58	10	118	71
31	27	294	54	14	119	64
32	27	274	54	11	100	80
33	27	278	58	11	87	67
34	27	304	54	11	101	70
35	27	293	58	11	112	71
36	27	278	54	10	97	68
37	27	301	58	10	80	68
38	26	301	54	13	155	84
39	26	302	58	12	102	74
40	26	293	54	12	138	69
41	26	284	54	13	138	80
42	26	354	65	9	102	94
43	26	291	54	12	129	81
44	26	274	54	13	154	83
45	26	271	54	10	98	80
46	26	285	58	13	128	69
47	26	290	54	10	102	78
48	26	258	54	9	100	80
49	26	291	58	12	91	63
50	26	231	54	10	62	70
51	26	261	54	8	92	80
52	26	293	58	12	102	88
53	25	219	44	10	61	71
54	25	291	58	11	100	81

* Not including crown or stump. The stumps average 32 inches in height.

TABLE I—(Continued).

SPECIMEN NUMBER.	Diameter of stump, in inches.	Number of rings on stump.	Length of shaft, in feet.	Diameter at top, in inches.	Number of rings at top.	Total height of tree, in feet.
55	25	281	54	11	81	62
56	25	271	54	10	94	80
57	25	219	48	12	99	62
58	25	283	58	10	73	61
59	25	261	54	9	51	73
60	25	300	58	11	91	71
61	25	300	54	11	98	61
62	25	281	57	12	162	71
63	25	300	58	14	152	67
64	25	300	54	11	92	61
65	25	291	54	13	100	62
66	25	195	48	11	76	57
67	25	208	54	8	80	64
68	25	302	58	10	103	71
69	25	271	54	12	94	67
70	25	284	58	13	151	71
71	25	293	54	10	102	71
72	25	273	54	13	103	72
73	25	284	54	9	132	71
74	25	274	58	12	93	61
75	25	281	54	14	152	75
76	25	258	54	11	124	91
77	25	274	58	10	119	82
78	25	271	54	14	120	92
79	25	198	54	10	104	81
80	25	291	56	12	161	91
81	25	267	48	15	126	65
82	24	269	54	14	130	82
83	24	264	54	11	101	71
84	24	274	58	13	121	73
85	24	261	54	11	104	80
86	24	291	58	12	100	69
87	24	272	54	11	93	71
88	24	281	58	12	126	80
89	24	300	62	11	158	86
90	24	271	54	14	132	71
91	24	299	54	13	121	70
92	24	301	58	10	141	80
93	24	291	54	14	132	65
94	24	254	54	11	91	71
95	24	239	54	13	106	61
96	24	267	56	14	123	74
97	24	281	58	12	85	80
98	24	178	54	15	74	68
99	24	267	54	11	124	71
100	24	271	58	13	100	69
101	23	256	54	12	92	67
102	23	300	48	12	120	70
103	23	278	54	11	100	78
104	23	283	55	12	98	71
105	23	291	54	14	141	70
106	23	283	48	11	104	80
107	23	283	58	11	106	73
108	23	300	52	15	151	80

TABLE I—(Continued).

SPECIMEN NUMBER.	Diameter of stump, in inches.	Number of rings on stump.	Length of shaft, in feet.	Diameter at top, in inches.	Number of rings at top.	Total height of tree, in feet.
109	23	291	54	12	103	69
110	23	281	58	11	127	70
111	23	271	54	11	97	69
112	23	217	54	14	85	70
113	23	253	54	13	132	71
114	23	219	54	12	116	62
115	23	271	58	11	121	73
116	23	189	48	10	79	62
117	22	314	54	12	155	73
118	22	263	54	12	152	73
119	22	281	54	13	121	80
120	22	283	54	11	82	76
121	22	261	54	10	99	71
122	22	345	58	9	152	69
123	22	204	54	10	91	70
124	22	215	58	8	100	67
125	22	253	54	11	89	70
126	22	251	54	9	93	71
127	22	261	58	7	80	75
128	22	201	48	9	78	60
129	22	281	54	12	121	64
130	22	107	54	9	91	65
131	22	271	54	8	89	71
132	22	201	54	12	101	67
133	22	265	54	7	97	69
134	22	261	58	11	99	72
135	22	198	54	13	75	64
136	21	256	48	9	100	63
137	21	201	54	8	76	61
138	21	251	48	11	103	73
139	21	251	54	11	99	71
140	21	242	54	13	121	74
141	21	201	48	7	100	71
142	21	199	54	10	78	80
143	21	291	54	14	123	76
144	21	271	56	10	99	70
145	21	236	54	12	100	69
146	21	281	54	10	104	76
147	21	261	54	12	123	80
148	21	271	54	8	100	76
149	21	199	54	11	103	71
150	21	283	58	14	99	81
151	20	200	54	11	101	68
152	20	201	48	9	99	67
153	20	261	54	12	89	70
154	20	206	54	10	99	71
155	20	213	48	11	100	69
156	20	204	54	8	87	72
157	20	208	54	7	82	69
158	20	199	48	9	100	70
159	20	189	54	8	100	70
160	20	201	54	11	102	71
161	20	194	52	9	99	70
162	20	204	48	12	132	68

TABLE I—(Continued).

SPECIMEN NUMBER.	Diameter of stump, in inches.	Number of rings on stump.	Length of shaft, in feet.	Diameter at top, in inches.	Number of rings at top.	Total height of tree, in feet.
163	20	203	54	10	99	68
164	20	207	54	8	124	71
165	20	239	54	10	124	74
166	19	230	46	11	130	78
167	19	193	54	9	105	70
168	19	208	54	8	99	68
169	19	233	62	7	136	82
170	19	194	54	13	100	70
171	19	209	54	10	100	72
172	19	209	48	8	100	67
173	19	238	54	14	96	72
174	19	189	54	12	121	69
175	19	218	48	9	129	74
176	19	201	54	11	99	67
177	19	231	54	6	76	65
178	19	273	58	10	141	76
179	19	194	54	9	100	70
180	19	201	54	10	99	80
181	19	194	56	12	101	71
182	19	204	54	8	78	67
183	19	207	54	11	121	71
184	19	201	48	12	103	69
185	19	184	54	6	78	67
186	19	200	48	5	100	65
187	19	201	54	9	89	70
188	19	199	54	8	89	71
189	18	183	54	7	101	72
190	18	173	46	9	90	70
191	18	200	54	10	100	71
192	18	179	44	8	92	69
193	17	182	46	6	78	65
194	17	200	54	10	89	65
195	17	156	46	8	100	70
196	17	200	48	7	89	67
197	17	192	50	10	102	71
198	17	172	44	6	78	68
199	16	171	50	5	79	66
200	16	200	54	9	121	73
201	16	178	54	8	79	69
202	16	201	50	11	99	70
203	16	167	44	9	100	62
204	15	178	46	10	97	68
205	15	203	42	9	87	71
206	15	174	48	6	78	63
207	15	183	50	5	100	70
208	14	275	27	11	155	74
209	14	182	48	11	108	68
210	14	156	44	7	89	65
211	14	157	44	7	99	69
212	14	200	54	5	78	64
213	14	145	40	8	88	60
214	14	175	50	9	98	70
215	14	161	48	11	103	67
216	14	182	42	12	99	59

TABLE I—(Concluded).

SPECIMEN NUMBER.	Diameter of stump, in inches.	Number of rings on stump.	Length of shaft, in feet.	Diameter at top, in inches	Number of rings at top.	Total height of tree, in feet.
217	13	176	48	4	35	59
218	13	180	36	6	50	61
219	13	157	42	7	60	57
220	13	150	28	8	76	57
221	13	200	44	10	102	66
222	13	138	40	4	59	58
223	13	162	34	6	87	60
224	13	172	27	8	103	61
225	13	192	38	7	96	70
226	13	200	44	9	136	72

Mr. Humes subsequently forwarded some additional notes which are intended to show the maximum size and age of the spruce. Thus far our foresters have been unable to find any black spruce over 36 inches in diameter on the stump. The stumps average about 30 inches in height, and in measuring standing timber the girth is taken at about the same height. The maximum size of the Adirondack black spruce is indicated in the following figures :

TABLE II.

SPECIMEN NUMBER.	Diameter of stump, in inches	Number of rings on stump.	Length of shaft, in feet.	Diameter at top, in inches.	Number of rings at top.	Total height of tree, in feet.
1	36	350	90	12	102	110
2	36	326	84	8	87	90
3	34	302	86	10	100	93
4	34	374	91	5	67	99
5	34	315	72	11	124	87
6	33	285	68	13	165	89
7	32	290	70	5	80	81
8	31	293	60	14	125	80
9	31	231	73	7	80	82
10	31	276	68	10	100	67
11	31	290	71	9	98	70

Statistics showing the age, size or other characteristics of any particular species should be accompanied by some further information regarding the various kinds of trees which are growing on the same ground To this end Forester Humes, in

Mr. Fremont Fuller, of Duane, Franklin county, N. Y., reports a black spruce, 10 feet 3 inches in circumference, or about 41 inches in diameter, outside the bark, breast high above the ground. This tree, which is sound and healthy, is standing in a clump of spruces with six other large ones near it, and overtops the surrounding forest. It stands on the N. W. $\frac{1}{4}$ of Township 15, on Lot 3, about two miles from the hotel at Meacham Lake.

accordance with instructions from the Superintendent, measured off a tract of four acres, situated in the forest in which he made the measurements and other memoranda embodied in Tables I and II, and noted all the other trees growing there in company with the spruce. These notes are embodied in Table III. This forest is located in the south part of Township 14 ("Bloomfield"), Town of Fine, St. Lawrence county. It stands on the north slope of a hill, the spruce being thickly interspersed with hardwoods—maple, beech, and yellow birch (*Betula lutea*). The land on which the timber stands has an elevation of about 1,800 feet above the sea.

The four acres which furnish the statistics in the following table represent the maximum yield of spruce per acre, the timber being far above the average in size, height and quantity. The spruce on this piece of four acres—not including trees less than twelve inches in diameter—will yield 60,000 feet of logs, or 15,000 feet to the acre. This is a remarkable exhibit; and, in addition to the spruce, the figures indicate 18,000 feet of hemlock on these four acres, or 4,500 feet per acre. The average quantity of spruce per acre throughout the Adirondack forests, on large tracts, is estimated at 3,000 feet per acre, and some townships have yielded as low as 2,500.

TABLE III.

COMPOSITION OF FOREST ON FOUR ACRES.

S. W. $\frac{1}{4}$, Township 14, Town of Fine, St. Lawrence County.

DIAMETER—INCHES.	Spruce.	Hemlock.	Maple.	Birch.	Beech.	Total.
9.....	14	7	6	4	12	43
10.....	15	.....	14	11	8	48
11.....	5	3	.....	3	7	18
12.....	15	8	12	11	16	62
13.....	12	5	8	5	17	47
14.....	14	1	4	6	13	38
15.....	18	2	5	5	13	43
16.....	14	7	8	5	11	45
17.....	14	4	5	10	12	45
18.....	13	5	3	9	6	36
19.....	4	3	.....	3	9	19
20.....	4	.....	5	6	7	22
21.....	12	2	5	6	1	26
22.....	7	.....	.....	1	.....	8
23.....	10	1	3	6	.....	20

TABLE III — (Continued).

DIAMETER — INCHES.	Spruce.	Hemlock.	Maple.	Birch.	Beech.	Total.
24.....	5	2	1	3	.....	11
25.....	4	.....	2	..	.....	6
26.....	6	1	.....	2	.....	9
27.....	4	.....	.....	.....	.....	4
28.....	6	2	.....	.....	.....	8
29.....	2	.....	.....	3	.....	5
30.....	2	.....	.....	1	.....	3
31.....	.....	1	.....	.....	.....	1
32.....	1	2	.....	.....	.....	3
33.....	.....	.....	.....	1	.....	1
34.....	.....	.....	.....	.....	.....	.....
35.....	.....	1	.....	.....	.....	1
36.....	1	1	.....	.....	.....	2
	202	58	81	101	132	574

The average diameters are: Spruce, $17\frac{1}{8}$ inches; hemlock, 17 inches; maple, $14\frac{5}{8}$ inches; yellow birch, $16\frac{3}{8}$ inches, and beech, $14\frac{1}{4}$ inches. This average does not include trees of less than nine inches in diameter. Number of trees to the acre (nine inches or more in diameter), 144, or less than one to each square rod.*

The statistics in the next following table are based on measurements and counts made by Foresters Olmsted and Sanford, who were instructed to measure and count the rings of tree growth on 1,000 trees. Of this number the first 700 were examined on Lots 33 and 34, Township 20, Town of Santa Clara, Franklin county. This piece of forest is situated about four miles west of the Upper Saranac lake and lies between Floodwood and Long Ponds.

The 203 specimens next following were examined in St. Lawrence county on Lots 34 and 35, Township 3, Town of Hopkinton.

The remaining 97, embracing specimens 903-1,000, were measured and counted on Lots 50 and 63, Township 3, Town of Hopkinton, St. Lawrence county.

Each locality was covered by a virgin forest, the trees examined being the first that had been cut in that vicinity. The

* Not including the young trees under nine inches in diameter, of which there was the usual number intermixed with the undergrowth.





BLACK SPRUCE FOREST.
Side-hill growth.

G. H. Rison, Photo.

foresters were directed to confine their examinations to trees which were 12 inches or more in diameter on the stump, although the lumbermen were cutting the spruce there as low as 10 inches and occasionally smaller. With the exception of the trees under 12 inches in diameter, the foresters examined every spruce stump and top within the area selected until the required number had been measured.

In counting the rings of growth in these trees note was made of the number at each inch of the radius with a view to determining the annual increase in diameter.

In the following tabulation, Table IV, the first column contains the specimen number, the next the diameter inside the bark of the tree on the stump; then follows the number of rings per inch on the stump, counting from the heart outward, and along the line of what might be termed the longest radius; the last or right-hand column on the left-hand page shows the total number of rings, or age of the tree, as indicated at the height of the stump.

On the right-hand page the statistics for each tree are continued, following the same specimen number, which, as before, is found in the first column; the next column shows the diameter of the shaft at the top, or at the small end of the top log; then come the number of rings per inch at the top, counting outward from the heart; the next column shows the height of the stump; the next the combined length of the logs into which the trunk was cut, each log being as a rule 13 feet 4 inches long; the next shows the length of the tree top or "leader" left by the lumbermen, and the last column the total height of the tree as indicated by the combined figures of the three preceding columns.

The short dash or hyphen-mark, which appears occasionally in connection with the last figure in a line, indicates that the radius terminated in a fractional inch and, consequently, a smaller number of rings.

TABLE IV.

SPECIMEN NUMBER. <i>Continued.</i>	Diameter of top in inches.	TOP MEASUREMENTS.										Height of stump.	Combined length of logs.	Length of top.	Total height.
		Number of rings per inch at top, counting from the heart outward.													
1	8 1/8	16	15	11	14	10	10	10	10	10	10	2	53	31	87
2	11	12	13	15	18	21	21	21	21	21	21	2	42	42	72
3	10	10	10	10	10	10	10	10	10	10	10	2	35	35	67
4	9	16	16	19	15	15	15	15	15	15	15	2	35	35	59
5	9	12	11	15	16	14	14	14	14	14	14	2	40	30	54
6	9	9	9	9	9	9	9	9	9	9	9	2	28	30	59
7	9	9	8	7	7	7	7	7	7	7	7	2	25	30	54
8	11	21	15	8	10	18	11	11	11	11	11	2	26	30	55
9	11	11	13	13	16	12	12	12	12	12	12	2	40	32	55
10	11	14	11	15	13	10	10	10	10	10	10	2	36	34	75
11	13	13	14	15	26	6	6	6	6	6	6	2	26	34	59
12	10	10	13	12	11	5	5	5	5	5	5	2	26	30	65
13	7	18	23	26	30	8	8	8	8	8	8	2	40	30	60
14	15	15	16	23	21	21	21	21	21	21	21	2	26	26	55
15	10	12	11	12	12	12	12	12	12	12	12	2	26	31	60
16	10	12	15	16	19	18	7	7	7	7	7	2	26	37	66
17	9	14	11	12	12	13	8	8	8	8	8	2	26	33	62
18	9	10	13	12	12	13	8	8	8	8	8	2	26	32	62
19	9	10	7	13	14	14	14	14	14	14	14	2	26	27	62
20	9	12	11	12	14	7	7	7	7	7	7	2	44	30	71
21	9	13	15	9	11	12	11	11	11	11	11	2	40	29	72
22	9	14	11	13	13	4	4	4	4	4	4	2	26	31	61
23	9	11	13	13	14	7	7	7	7	7	7	2	26	31	63
24	9	13	14	12	12	12	8	8	8	8	8	2	26	27	57
25	9	9	13	15	13	8	8	8	8	8	8	2	26	30	65
26	8	13	12	12	11	8	8	8	8	8	8	2	26	34	47
27	8	14	12	11	11	11	11	11	11	11	11	2	51	24	86
28	10	15	12	13	13	14	11	11	11	11	11	2	40	24	67
29	9	13	15	12	13	13	11	11	11	11	11	2	40	21	64
30	9	13	14	14	12	12	11	11	11	11	11	2	40	27	70
31	9	12	13	14	12	12	7	7	7	7	7	2	40	24	67
32	8	13	14	14	13	12	12	12	12	12	12	2	26	30	74
33	9	13	12	14	10	12	11	11	11	11	11	2	40	30	69
34	9	13	16	11	13	12	11	11	11	11	11	2	26	26	63
35	9	16	14	14	12	11	11	11	11	11	11	2	26	34	63
36	8	14	12	13	10	11	11	11	11	11	11	2	26	33	59
37	8	17	14	11	9	13	11	11	11	11	11	2	26	30	61
38	10	13	13	12	14	11	11	11	11	11	11	2	26	30	76
39	8	14	14	10	13	11	11	11	11	11	11	2	40	33	61
40	8	14	16	11	12	11	11	11	11	11	11	2	26	31	61
41	8	11	13	15	18	13	13	13	13	13	13	2	26	30	59
42	8	12	10	14	10	11	11	11	11	11	11	2	26	24	53
43	8	12	15	14	13	11	11	11	11	11	11	2	26	25	54
44	9	13	12	14	14	6	6	6	6	6	6	2	40	30	73
45	9	11	13	15	14	8	8	8	8	8	8	2	40	34	77
46	8	12	13	14	18	11	11	11	11	11	11	2	40	34	82
47	8	13	12	12	16	11	11	11	11	11	11	2	26	39	65
48	8	13	13	14	17	11	11	11	11	11	11	2	26	30	58
49	10	14	14	15	10	11	12	12	12	12	12	2	40	27	70
50	8	12	14	15	12	11	12	12	12	12	12	2	26	38	67
51	8	14	14	15	15	11	11	11	11	11	11	2	40	33	70
52	8	11	14	14	12	10	10	10	10	10	10	2	26	27	70
53	8	16	11	13	15	13	13	13	13	13	13	2	26	24	54
54	8	13	14	15	13	13	13	13	13	13	13	2	40	23	66
55	9	14	14	13	14	15	15	15	15	15	15	2	26	33	76
56	7	12	14	12	12	12	12	12	12	12	12	2	26	30	66
57	8	15	18	16	17	17	17	17	17	17	17	2	26	27	56
58	8	12	12	13	13	13	13	13	13	13	13	2	26	25	55
59	10	15	10	10	14	12	15	18	18	18	18	2	21	21	64
60	8	15	12	11	12	10	14	13	13	13	13	2	53	30	87
61	8	13	12	13	13	12	12	12	12	12	12	2	53	34	91
62	8	15	14	14	12	12	12	12	12	12	12	2	26	24	53
63	9	16	13	12	14	12	12	12	12	12	12	2	40	35	78
64	10	20	15	16	18	12	7	7	7	7	7	2	40	33	76
65	8	15	14	14	12	12	12	12	12	12	12	2	40	35	72
66	8	16	12	14	8	11	11	11	11	11	11	2	53	4	77
67	8	19	16	15	10	10	10	10	10	10	10	2	53	13	69
68	8	16	16	12	13	13	13	13	13	13	13	2	26	36	78
69	10	18	16	13	15	15	15	15	15	15	15	2	40	40	58
70	9	15	12	17	19	13	13	13	13	13	13	2	26	32	76
71	10	17	18	16	16	12	12	12	12	12	12	2	40	40	69
												2	26	32	61

TABLE IV — (Continued).

SPECIMEN NUMBER <i>Continued.</i>	Diameter of top in inches.	TOP MEASUREMENTS.										Height of stump.	Combined length of logs.	Length of top.	Total height.				
		Number of rings per inch at top, counting from the heart outward.																	
72	11	16	17	19	23	12	9	.....	.....	.....	.....	2	8	40	0	36	0	76	8
73	8	14	12	16	19	.....	.....	.....	.....	.....	.....	2	6	40	0	41	6	84	0
74	10	17	18	18	12	14	.....	.....	.....	.....	.....	3	0	40	0	23	6	65	6
75	8	12	14	14	12	7	.....	.....	.....	.....	.....	2	4	26	8	33	8	62	8
76	9	14	16	16	12	14	.....	.....	.....	.....	.....	2	3	26	8	34	0	62	11
77	11	13	17	15	15	15	.....	.....	.....	.....	.....	3	0	26	8	43	6	73	2
78	8	16	13	17	9	.....	.....	.....	.....	.....	.....	3	1	53	4	23	0	79	5
79	8	19	15	11	12	.....	.....	.....	.....	.....	.....	2	4	40	0	26	4	68	8
80	10	18	13	12	12	14	.....	.....	.....	.....	.....	3	0	66	8	24	8	94	4
81	8	15	14	15	16	.....	.....	.....	.....	.....	.....	2	8	53	4	25	6	81	6
82	10	16	16	15	12	13	.....	.....	.....	.....	.....	2	10	53	4	29	7	85	9
83	8	18	19	10	16	.....	.....	.....	.....	.....	.....	2	8	66	8	15	5	84	9
84	9	16	17	11	10	11	.....	.....	.....	.....	.....	2	4	40	0	34	7	76	11
85	8	13	16	12	14	.....	.....	.....	.....	.....	.....	3	0	53	4	21	5	77	9
86	9	17	19	11	18	12	.....	.....	.....	.....	.....	3	1	53	4	28	4	84	9
87	12	14	16	16	19	20	24	.....	.....	.....	.....	3	2	66	8	23	9	93	7
88	8	13	14	12	9	7	.....	.....	.....	.....	.....	3	0	26	8	30	0	59	8
89	11	17	19	13	13	12	14	8	.....	.....	.....	2	10	26	8	33	8	63	2
90	9	18	12	17	17	18	.....	.....	.....	.....	.....	2	9	26	8	37	7	67	0
91	8	16	14	12	16	.....	.....	.....	.....	.....	.....	2	6	40	0	28	4	70	10
92	8	17	14	13	15	10	.....	.....	.....	.....	.....	3	1	26	8	24	0	53	9
93	8	16	10	14	15	.....	.....	.....	.....	.....	.....	3	4	40	0	27	11	71	3
94	9	19	11	12	18	11	.....	.....	.....	.....	.....	3	1	40	0	31	8	74	9
95	10	17	18	12	13	16	.....	.....	.....	.....	.....	3	0	28	8	34	6	64	2
96	8	19	17	14	19	.....	.....	.....	.....	.....	.....	2	8	40	0	26	8	69	4
97	10	19	19	11	17	12	.....	.....	.....	.....	.....	2	9	26	8	31	5	60	10
98	8	17	19	15	10	17	.....	.....	.....	.....	.....	2	11	53	4	24	10	81	1
99	8	14	17	14	18	.....	.....	.....	.....	.....	.....	3	0	25	8	23	6	53	2
100	7	18	16	10	12	.....	.....	.....	.....	.....	.....	3	10	66	8	16	10	87	4
101	8	18	18	12	15	12	.....	.....	.....	.....	.....	3	2	26	8	36	0	65	10
102	7	19	12	14	10	.....	.....	.....	.....	.....	.....	2	6	40	0	24	7	87	1
103	9	16	21	13	13	16	.....	.....	.....	.....	.....	3	1	26	8	26	9	56	6
104	10	19	19	12	12	12	16	.....	.....	.....	.....	2	8	30	0	37	0	69	8
105	11	21	9	13	16	16	19	23	.....	.....	.....	3	3	26	8	38	4	88	3
106	8	16	10	14	17	.....	.....	.....	.....	.....	.....	2	10	26	8	27	9	57	3
107	8	19	12	13	14	.....	.....	.....	.....	.....	.....	3	0	40	0	21	7	64	7
108	8	21	16	9	11	.....	.....	.....	.....	.....	.....	2	4	40	0	28	4	70	8
109	8	14	13	17	12	.....	.....	.....	.....	.....	.....	2	8	40	0	20	10	63	6
110	8	15	16	19	10	.....	.....	.....	.....	.....	.....	3	0	53	4	21	8	78	0
111	7	9	14	17	13	.....	.....	.....	.....	.....	.....	2	2	40	0	27	6	69	8
112	7	16	17	12	12	.....	.....	.....	.....	.....	.....	3	2	40	0	24	6	67	10
113	9	21	16	13	12	12	.....	.....	.....	.....	.....	2	0	23	8	39	7	63	3
114	6	19	18	10	12	.....	.....	.....	.....	.....	.....	3	0	53	4	21	0	77	4
115	8	13	11	15	21	.....	.....	.....	.....	.....	.....	2	4	40	0	27	3	69	7
116	8	14	15	17	12	.....	.....	.....	.....	.....	.....	2	2	40	0	27	8	69	10
117	9	16	12	12	10	15	.....	.....	.....	.....	.....	3	4	40	0	25	0	68	4
118	7	19	12	16	10	.....	.....	.....	.....	.....	.....	2	7	53	4	19	0	74	11
119	11	10	9	15	15	10	17	16	.....	.....	.....	2	8	26	8	41	6	70	10
120	7	16	20	15	9	.....	.....	.....	.....	.....	.....	2	4	53	4	17	10	73	6
121	5	12	11	16	.....	.....	.....	.....	.....	.....	.....	3	3	53	4	29	0	85	7
122	8	16	19	12	8	13	.....	.....	.....	.....	.....	3	0	53	4	18	10	75	2
123	9	17	13	14	9	15	.....	.....	.....	.....	.....	2	6	40	0	26	8	69	2
124	9	16	12	14	10	13	.....	.....	.....	.....	.....	3	4	26	8	31	0	61	0
125	9	19	16	12	16	8	.....	.....	.....	.....	.....	3	3	23	8	37	5	67	4
126	11	16	14	10	12	18	16	.....	.....	.....	.....	4	0	40	0	31	8	75	8
127	8	14	17	11	13	7	.....	.....	.....	.....	.....	3	2	26	8	27	6	57	4
128	8	13	9	19	14	8	.....	.....	.....	.....	.....	2	10	40	0	26	6	69	4
129	9	16	12	14	18	12	.....	.....	.....	.....	.....	3	0	26	8	36	4	66	0
130	11	15	17	14	16	10	9	.....	.....	.....	.....	3	2	40	0	37	6	80	8
131	9	12	12	17	14	11	.....	.....	.....	.....	.....	3	0	26	8	33	0	57	8
132	8	16	14	15	10	.....	.....	.....	.....	.....	.....	2	10	26	8	27	6	57	0
133	8	13	16	12	14	9	.....	.....	.....	.....	.....	3	1	26	8	25	10	55	7
134	10	14	12	16	14	14	.....	.....	.....	.....	.....	3	4	40	0	19	0	62	4
135	6	17	10	12	7	.....	.....	.....	.....	.....	.....	3	1	40	0	18	0	61	1
136	8	19	16	18	10	12	.....	.....	.....	.....	.....	3	0	40	0	29	6	72	6
137	7	16	17	15	12	.....	.....	.....	.....	.....	.....	3	4	40	0	23	8	67	0
138	8	15	12	15	21	.....	.....	.....	.....	.....	.....	2	10	40	0	26	7	69	5
139	9	17	14	13	11	9	.....	.....	.....	.....	.....	3	0	40	0	22	4	65	4
140	8	12	14	16	13	7	.....	.....	.....	.....	.....	2	8	40	0	26	8	69	4
141	9	16	14	14	11	16	.....	.....	.....	.....	.....	2	10	40	0	29	6	72	4
142	8	16	19	14	12	7	.....	.....	.....	.....	.....	2	10	40	0	30	0	72	10

TABLE IV — (Continued).

SPECIMEN NUMBER. <i>Continued.</i>	Diameter of top in inches	TOP MEASUREMENTS.										Height of stump.	Combined length of logs.	Length of top	Total height.				
		Number of rings per inch at top, counting from the heart outward.																	
143	8	14	11	14	16	6	.....	.....	.....	.....	.....	3'	0"	40'	0"	23'	8"	71'	8"
144	8	16	16	12	10	15	.....	.....	.....	.....	.....	2	4	26	8	33	4	62	4
145	9	17	11	14	9	15	11	.....	.....	.....	.....	3	0	26	8	21	4	51	0
146	8	16	12	12	11	10	.....	.....	.....	.....	.....	3	0	26	8	31	4	61	2
147	6	14	17	12	9	.....	.....	.....	.....	.....	.....	3	6	40	0	8	8	52	2
148	6	18	16	13	14	7	.....	.....	.....	.....	.....	2	8	26	8	26	8	58	4
149	6	16	19	14	14	.....	.....	.....	.....	.....	.....	2	10	26	8	26	8	56	6
150	6	19	14	17	12	8	.....	.....	.....	.....	.....	2	10	40	0	27	8	70	6
151	6	16	16	16	11	8	.....	.....	.....	.....	.....	2	8	26	8	25	0	54	4
152	10	27	24	18	15	18	10	.....	.....	.....	.....	2	8	13	4	26	0	42	0
153	8	19	18	14	10	13	.....	.....	.....	.....	.....	2	10	26	8	31	8	61	2
154	8	14	14	17	21	.....	.....	.....	.....	.....	.....	2	6	40	0	33	8	76	2
155	8	15	16	16	11	13	.....	.....	.....	.....	.....	2	10	26	8	37	10	67	4
156	8	16	16	12	12	13	.....	.....	.....	.....	.....	3	1	40	0	24	10	67	11
157	9	17	19	12	10	13	.....	.....	.....	.....	.....	3	3	26	8	40	6	70	5
158	9	13	19	12	12	16	.....	.....	.....	.....	.....	2	10	26	8	24	8	64	2
159	8	16	16	13	11	.....	.....	.....	.....	.....	.....	2	6	26	8	31	0	60	2
160	8	16	12	17	12	8	.....	.....	.....	.....	.....	3	4	26	8	31	8	61	8
161	7	17	16	10	18	.....	.....	.....	.....	.....	.....	3	1	50	0	20	6	63	7
162	7	19	12	16	16	.....	.....	.....	.....	.....	.....	3	6	56	8	15	0	75	2
163	9	16	16	12	12	12	.....	.....	.....	.....	.....	3	0	40	0	24	6	67	6
164	9	16	19	12	13	8	.....	.....	.....	.....	.....	2	8	26	8	38	8	68	0
165	7	7	13	16	16	.....	.....	.....	.....	.....	.....	2	6	40	0	25	0	67	6
166	7	13	12	15	15	.....	.....	.....	.....	.....	.....	3	0	53	4	24	6	80	10
167	6	16	15	17	14	11	.....	.....	.....	.....	.....	2	6	40	0	27	8	70	2
168	9	13	16	16	19	15	.....	.....	.....	.....	.....	2	6	26	8	33	0	62	2
169	9	21	17	17	11	13	.....	.....	.....	.....	.....	2	8	40	0	31	6	74	2
170	9	16	16	13	13	13	.....	.....	.....	.....	.....	2	4	26	8	35	7	64	7
171	8	18	17	11	11	9	.....	.....	.....	.....	.....	2	6	26	8	27	10	57	1
172	8	19	19	15	16	8	.....	.....	.....	.....	.....	3	0	40	0	29	4	72	4
173	8	16	18	18	12	11	.....	.....	.....	.....	.....	3	5	40	0	26	9	70	2
174	14	11	14	10	13	12	15	12	12	.....	.....	2	11	26	8	42	8	72	3
175	7	17	11	11	18	.....	.....	.....	.....	.....	.....	1	8	66	8	25	0	94	4
176	7	16	17	18	13	12	.....	.....	.....	.....	.....	2	2	26	8	31	4	60	7
177	10	18	18	18	10	15	.....	.....	.....	.....	.....	2	8	26	8	39	0	68	4
178	7	16	11	14	14	.....	.....	.....	.....	.....	.....	2	9	40	0	21	6	64	3
179	7	15	15	10	17	12	.....	.....	.....	.....	.....	2	8	26	8	27	3	56	7
180	8	15	14	16	16	.....	.....	.....	.....	.....	.....	2	9	40	0	21	6	64	3
181	8	16	12	11	12	.....	.....	.....	.....	.....	.....	2	11	40	0	12	2	55	1
182	8	19	16	12	14	13	.....	.....	.....	.....	.....	2	2	26	8	30	0	59	3
183	8	11	11	21	14	12	.....	.....	.....	.....	.....	2	10	26	8	32	8	62	2
184	6	16	12	15	11	11	.....	.....	.....	.....	.....	2	7	13	4	35	10	52	9
185	6	12	10	17	14	.....	.....	.....	.....	.....	.....	3	0	26	8	31	4	61	0
186	8	8	13	11	15	10	.....	.....	.....	.....	.....	2	2	26	8	30	8	59	11
187	8	16	14	13	12	.....	.....	.....	.....	.....	.....	3	0	26	8	30	0	59	8
188	8	11	12	16	17	.....	.....	.....	.....	.....	.....	2	6	26	8	26	5	55	7
189	9	12	16	13	14	11	11	.....	.....	.....	.....	2	7	26	8	34	0	63	3
190	9	13	15	12	11	12	.....	.....	.....	.....	.....	2	8	26	8	36	0	65	4
191	9	17	19	8	14	13	.....	.....	.....	.....	.....	3	4	53	4	26	9	83	5
192	9	12	16	13	11	14	.....	.....	.....	.....	.....	3	0	53	4	23	10	80	2
193	9	10	14	16	12	12	.....	.....	.....	.....	.....	3	1	40	0	32	10	75	11
194	8	14	14	13	10	9	.....	.....	.....	.....	.....	2	2	26	8	29	0	58	2
195	6	16	17	11	9	8	.....	.....	.....	.....	.....	2	2	40	0	31	0	73	8
196	6	18	13	15	9	.....	.....	.....	.....	.....	.....	3	1	40	0	22	0	65	1
197	9	20	18	16	11	.....	.....	.....	.....	.....	.....	2	6	26	8	34	0	63	2
198	8	19	19	12	15	7	.....	.....	.....	.....	.....	2	2	26	8	27	6	66	10
199	8	12	15	15	8	.....	.....	.....	.....	.....	.....	2	8	26	8	27	6	66	10
200	8	21	16	13	8	.....	.....	.....	.....	.....	.....	2	10	53	4	19	0	75	2
201	8	20	19	16	13	.....	.....	.....	.....	.....	.....	3	1	40	0	27	4	70	5
202	6	15	14	14	13	.....	.....	.....	.....	.....	.....	2	11	40	0	23	10	66	9
203	7	17	15	9	17	.....	.....	.....	.....	.....	.....	3	0	53	4	19	8	76	0
204	7	21	20	17	12	16	.....	.....	.....	.....	.....	2	2	26	8	25	0	53	10
205	9	19	16	12	12	.....	.....	.....	.....	.....	.....	3	3	53	4	27	0	83	7
206	9	19	18	20	12	.....	.....	.....	.....	.....	.....	2	11	40	0	22	4	65	3
207	9	17	18	21	15	16	.....	.....	.....	.....	.....	2	8	26	8	39	0	68	4
208	6	17	14	15	16	.....	.....	.....	.....	.....	.....	2	6	26	8	43	2	72	4
209	9	19	17	21	12	.....	.....	.....	.....	.....	.....	2	10	40	0	19	6	62	4
210	10	20	11	8	7	23	24	.....	.....	.....	.....	2	11	40	0	24	8	87	7
211	9	19	17	16	13	.....	.....	.....	.....	.....	.....	3	2	53	4	23	10	80	4
212	9	21	17	12	13	16	.....	.....	.....	.....	.....	3	0	53	4	23	8	80	0
213	9	21	17	12	13	16	.....	.....	.....	.....	.....	3	6	40	0	31	7	75	1
214	9	20	20	12	15	17	.....	.....	.....	.....	.....	3	0	40	0	29	10	72	10

TABLE IV — (Continued).

SPECIMEN NUMBER <i>Continued.</i>	Diameter of top in inches.	TOP MEASUREMENTS.										Height of stump.	Combined length of logs	Length of top.	Total height.
		Number of rings per inch at top, counting from the heart outward.													
214	9	22	17	16	12	.....	.....	.....	.....	.....	.....	2' 6"	40' 6"	30' 6"	75' 0"
215	9	21	21	16	15	.....	.....	.....	.....	.....	.....	3' 0	40 0	33 10	78 10
216	8	19	20	17	13	9	.....	.....	.....	.....	.....	3' 8	26 8	37 0	66 4
217	9	19	17	19	16	.....	.....	.....	.....	.....	.....	3' 0	40 0	22 4	65 4
218	9	19	19	16	16	10	.....	.....	.....	.....	.....	3' 8	40 0	27 0	63 8
219	9	18	16	12	13	.....	.....	.....	.....	.....	.....	3' 1	53 4	22 2	78 5
220	9	19	19	17	15	6	.....	.....	.....	.....	.....	3' 0	40 0	26 10	69 10
221	8	18	19	16	16	10	.....	.....	.....	.....	.....	11	40 0	25 0	67 11
222	8	14	21	19	17	.....	.....	.....	.....	.....	.....	3' 10	26 8	19 4	69 10
223	12	24	24	19	19	12	16	.....	.....	.....	.....	3' 2	16 8	40 6	70 4
224	6	16	15	16	14	.....	.....	.....	.....	.....	.....	3' 8	40 0	19 7	62 3
225	9	20	19	18	17	17	.....	.....	.....	.....	.....	3' 1	40 0	22 5	65 6
226	10	21	2	17	12	13	.....	.....	.....	.....	.....	3' 0	40 0	24 0	67 0
227	10	23	20	20	16	16	.....	.....	.....	.....	.....	3' 6	53 4	25 7	82 5
228	9	20	20	17	18	12	.....	.....	.....	.....	.....	3' 0	40 0	10	83 0
229	9	19	19	19	17	14	.....	.....	.....	.....	.....	2' 10	40 0	36 10	79 8
230	10	2	20	17	17	19	8	.....	.....	.....	.....	3' 3	53 4	32 8	89 3
231	9	19	20	18	17	17	.....	.....	.....	.....	.....	3' 4	53 4	26 9	83 5
232	9	21	20	20	18	16	.....	.....	.....	.....	.....	3' 2	40 0	28 4	71 6
233	7	15	18	10	16	.....	.....	.....	.....	.....	.....	4	13 4	27 4	84 8
234	8	18	18	16	14	8	.....	.....	.....	.....	.....	3' 6	53 4	19 3	76 1
235	8	20	19	19	22	.....	.....	.....	.....	.....	.....	3' 4	53 4	22 7	79 3
236	10	18	19	17	18	16	.....	.....	.....	.....	.....	3' 8	40 0	36 8	80 4
237	8	16	17	19	12	.....	.....	.....	.....	.....	.....	3' 2	66 8	19 6	89 4
238	7	16	16	12	17	.....	.....	.....	.....	.....	.....	2' 10	13 4	23 7	79 9
239	8	19	20	12	14	16	.....	.....	.....	.....	.....	3' 4	25 8	34 8	64 8
240	7	18	17	17	12	.....	.....	.....	.....	.....	.....	3' 0	40 0	13 7	66 7
241	7	16	17	19	18	.....	.....	.....	.....	.....	.....	3' 1	53 4	21 10	78 3
242	8	18	17	16	14	.....	.....	.....	.....	.....	.....	2' 10	40 0	26 6	69 4
243	8	21	19	12	12	10	.....	.....	.....	.....	.....	2' 8	40 0	13 7	66 3
244	8	19	20	20	16	8	.....	.....	.....	.....	.....	2' 10	33 8	37 0	73 6
245	8	22	13	16	18	12	.....	.....	.....	.....	.....	2' 10	40 0	30 2	73 0
246	7	18	19	15	16	.....	.....	.....	.....	.....	.....	2' 6	40 0	21 0	63 6
247	7	16	12	23	15	10	.....	.....	.....	.....	.....	2' 6	40 0	27 0	69 6
248	8	18	18	10	14	6	.....	.....	.....	.....	.....	3' 0	23 8	24 9	51 5
249	8	16	19	19	12	8	.....	.....	.....	.....	.....	2' 11	53 4	25 8	81 11
250	9	12	19	16	19	12	.....	.....	.....	.....	.....	2' 10	40 0	30 6	73 4
251	8	19	12	13	16	7	.....	.....	.....	.....	.....	2' 6	26 8	19 4	58 6
252	7	19	16	15	10	.....	.....	.....	.....	.....	.....	2' 10	40 0	24 7	67 5
253	2	21	20	17	17	12	.....	.....	.....	.....	.....	3' 0	66 8	26 10	96 6
254	10	22	16	12	19	17	.....	.....	.....	.....	.....	2' 10	40 0	34 8	77 6
255	10	19	12	22	18	12	.....	.....	.....	.....	.....	2' 11	53 4	21 9	78 0
256	8	21	16	19	16	9	.....	.....	.....	.....	.....	2' 8	40 0	29 6	72 2
257	7	19	18	14	15	.....	.....	.....	.....	.....	.....	3' 0	53 4	18 4	74 8
258	10	18	23	17	12	16	.....	.....	.....	.....	.....	3' 0	40 0	26 10	69 10
259	10	21	21	14	11	12	.....	.....	.....	.....	.....	3' 2	40 0	27 4	70 6
260	7	16	19	15	12	.....	.....	.....	.....	.....	.....	3' 3	53 4	23 0	79 7
261	8	19	20	17	12	.....	.....	.....	.....	.....	.....	3' 0	26 8	30 2	59 10
262	8 1/2	17	19	16	16	8	.....	.....	.....	.....	.....	3' 1	26 8	31 0	60 9
263	9	21	20	16	14	12	.....	.....	.....	.....	.....	2' 11	26 8	29 6	59 1
264	10	16	15	19	23	17	.....	.....	.....	.....	.....	3' 5	26 8	28 4	58 5
265	9	17	14	11	21	21	.....	.....	.....	.....	.....	2' 8	40 0	29 7	72 3
266	8	19	19	13	18	11	.....	.....	.....	.....	.....	2' 6	26 8	31 4	60 6
267	7	18	10	16	21	.....	.....	.....	.....	.....	.....	2' 8	40 0	21 0	63 8
268	10	21	21	19	11	11	6	.....	.....	.....	.....	3' 0	26 8	29 8	59 4
269	8	16	19	19	17	7	.....	.....	.....	.....	.....	3' 0	53 4	27 6	83 10
270	10	17	22	17	2	10	.....	.....	.....	.....	.....	3' 3	40 0	23 0	66 3
271	8	19	19	12	19	.....	.....	.....	.....	.....	.....	3' 0	53 4	19 8	76 0
272	8	19	14	16	17	8	.....	.....	.....	.....	.....	3' 4	53 4	20 6	77 2
273	8	16	14	16	19	.....	.....	.....	.....	.....	.....	2' 8	53 4	21 6	77 6
274	7	18	17	16	12	.....	.....	.....	.....	.....	.....	3' 6	53 4	24 4	81 2
275	7	16	17	19	16	.....	.....	.....	.....	.....	.....	2' 10	26 8	19 6	49 0
276	8	19	19	12	17	.....	.....	.....	.....	.....	.....	2' 8	26 8	22 7	51 11
277	8	21	19	11	16	7	.....	.....	.....	.....	.....	3' 2	40 0	24 8	67 10
278	8	16	21	21	12	8	.....	.....	.....	.....	.....	3' 0	40 0	21 8	64 8
279	8	12	21	13	19	7	.....	.....	.....	.....	.....	3' 2	40 0	22 0	65 2
280	10	18	22	17	12	19	.....	.....	.....	.....	.....	3' 0	53 4	19 6	75 8
281	10	19	19	21	16	13	.....	.....	.....	.....	.....	2' 10	40 0	27 4	70 4
282	9	16	17	21	13	13	.....	.....	.....	.....	.....	2' 6	13 4	22 7	78 5
283	9	21	19	19	12	13	16	.....	.....	.....	.....	2' 8	40 0	21 6	64 2
284	8	16	19	19	15	6	.....	.....	.....	.....	.....	2' 4	26 8	24 2	53 2

TABLE IV — (Continued).

SPECIMEN NUMBER <i>Continued.</i>	Diameter of top in inches.	TOP MEASUREMENTS.										Height of stump.	Combined length of logs.	Length of top	Total height.				
		Number of rings per inch at top, counting from the heart outward.																	
285.....	8	18	21	17	14	5	.....	.....	.....	.....	.....	2	0'	40'	0'	28'	0"	65'	10"
286.....	11	19	20	20	17	18	.....	.....	.....	.....	.....	3	0	49	0	42	3	85	3
287.....	8	14	16	19	19	7	.....	.....	.....	.....	.....	2	10	26	8	31	2	60	8
288.....	11	21	21	18	14	17	.....	.....	.....	.....	.....	3	1	40	0	29	8	72	9
289.....	10	23	17	15	19	15	.....	.....	.....	.....	.....	2	6	40	0	28	6	71	0
290.....	7	12	19	16	16	.....	.....	.....	.....	.....	.....	3	0	26	8	22	5	52	1
291.....	10	17	21	19	17	18	.....	.....	.....	.....	.....	2	4	40	0	32	7	74	11
292.....	8	16	16	20	19	7	.....	.....	.....	.....	.....	3	0	53	4	32	0	78	4
293.....	7	19	18	17	13	.....	.....	.....	.....	.....	.....	2	8	40	0	15	4	68	0
294.....	6	16	14	11	9	.....	.....	.....	.....	.....	.....	3	0	40	0	20	0	63	0
295.....	7	21	21	16	11	.....	.....	.....	.....	.....	.....	3	0	26	8	28	5	53	1
296.....	8	19	16	16	20	7	.....	.....	.....	.....	.....	2	10	26	8	31	7	61	1
297.....	9	19	19	16	13	15	.....	.....	.....	.....	.....	3	1	40	0	27	6	70	7
298.....	8	20	19	12	12	8	.....	.....	.....	.....	.....	2	0	40	0	21	6	63	6
299.....	5	16	17	12	.....	.....	.....	.....	.....	.....	.....	3	2	40	0	21	7	64	9
300.....	6	17	11	16	9	.....	.....	.....	.....	.....	.....	2	8	40	0	19	10	62	6
301.....	7	16	16	17	19	.....	.....	.....	.....	.....	.....	2	6	26	8	21	4	50	6
302.....	8	18	18	19	12	7	.....	.....	.....	.....	.....	3	2	40	0	22	0	65	2
303.....	8	19	17	18	4	.....	.....	.....	.....	.....	.....	3	0	40	0	26	3	69	3
304.....	7	16	19	17	15	.....	.....	.....	.....	.....	.....	3	0	53	4	18	7	74	11
305.....	8	17	17	20	16	.....	.....	.....	.....	.....	.....	2	10	40	0	27	5	70	3
306.....	8	18	18	14	19	.....	.....	.....	.....	.....	.....	3	1	26	8	32	0	61	9
307.....	7	17	23	15	16	.....	.....	.....	.....	.....	.....	2	8	40	0	22	9	85	5
308.....	8	19	21	13	17	.....	.....	.....	.....	.....	.....	2	8	40	0	24	2	66	10
309.....	8	18	20	16	16	.....	.....	.....	.....	.....	.....	3	0	26	8	26	5	56	1
310.....	7	10	20	17	14	.....	.....	.....	.....	.....	.....	2	8	40	0	21	6	64	2
311.....	8	22	16	18	17	.....	.....	.....	.....	.....	.....	2	8	40	0	25	3	67	11
312.....	8	19	19	20	16	5	.....	.....	.....	.....	.....	2	4	16	8	23	0	52	0
313.....	9	16	19	20	16	12	.....	.....	.....	.....	.....	2	10	13	4	44	10	61	0
314.....	9	19	17	12	21	8	.....	.....	.....	.....	.....	3	10	13	4	29	8	45	10
315.....	10	16	20	12	14	9	.....	.....	.....	.....	.....	3	4	26	8	22	6	52	6
316.....	11	23	19	20	13	.....	.....	.....	.....	.....	.....	3	1	53	4	18	0	74	5
317.....	10	16	19	12	21	17	.....	.....	.....	.....	.....	2	10	40	0	28	8	71	6
318.....	8	18	12	17	17	.....	.....	.....	.....	.....	.....	3	1	53	4	21	10	78	3
319.....	10	19	16	13	20	12	.....	.....	.....	.....	.....	3	0	40	0	24	10	67	10
320.....	9	17	16	21	11	13	.....	.....	.....	.....	.....	0	26	8	28	4	57	0	
321.....	10	20	16	17	12	7	.....	.....	.....	.....	.....	2	4	13	4	39	0	54	8
322.....	8	16	19	10	17	.....	.....	.....	.....	.....	.....	2	4	26	8	29	7	58	7
323.....	8	16	21	19	14	10	.....	.....	.....	.....	.....	2	1	13	4	26	0	51	5
324.....	10	19	20	21	17	12	15	.....	.....	.....	.....	2	8	40	0	14	8	57	4
325.....	8	16	19	10	16	.....	.....	.....	.....	.....	.....	2	4	26	8	19	9	48	9
326.....	9	19	20	18	16	12	.....	.....	.....	.....	.....	2	1	13	4	38	4	53	9
327.....	7	19	18	18	18	.....	.....	.....	.....	.....	.....	3	0	40	0	27	0	70	0
328.....	7	16	12	15	13	.....	.....	.....	.....	.....	.....	3	4	16	8	12	0	32	0
329.....	8	16	14	14	16	.....	.....	.....	.....	.....	.....	2	4	26	8	33	8	62	8
330.....	9	19	18	20	17	14	.....	.....	.....	.....	.....	2	8	26	8	36	4	65	8
331.....	8	16	18	15	12	7	.....	.....	.....	.....	.....	2	4	40	0	28	0	70	4
332.....	11	19	18	13	17	16	12	.....	.....	.....	.....	3	1	40	0	30	6	73	7
333.....	7	17	16	15	12	.....	.....	.....	.....	.....	.....	2	11	66	8	15	3	84	10
334.....	9	19	19	16	11	14	.....	.....	.....	.....	.....	3	0	40	0	24	8	67	8
335.....	10	19	16	17	14	15	.....	.....	.....	.....	.....	3	2	66	8	25	6	95	4
336.....	8	17	16	15	15	.....	.....	.....	.....	.....	.....	2	10	26	8	31	4	60	10
337.....	9	20	18	16	15	12	.....	.....	.....	.....	.....	2	4	40	0	34	7	76	11
338.....	7	17	19	12	13	.....	.....	.....	.....	.....	.....	2	4	53	4	25	9	81	5
339.....	8	17	16	19	13	7	.....	.....	.....	.....	.....	2	1	40	0	21	0	63	1
340.....	10	16	19	15	12	12	.....	.....	.....	.....	.....	0	26	8	42	8	71	4	
341.....	9	18	18	17	15	15	.....	.....	.....	.....	.....	2	8	40	0	33	0	75	8
342.....	8	20	19	16	12	7	.....	.....	.....	.....	.....	3	4	53	4	18	6	75	2
343.....	10	18	19	12	11	8	6	.....	.....	.....	.....	3	0	23	4	23	4	84	8
344.....	8	16	19	11	12	8	.....	.....	.....	.....	.....	2	10	48	0	22	0	72	10
345.....	9	19	18	17	11	12	.....	.....	.....	.....	.....	3	1	40	0	21	9	74	10
346.....	7	18	19	21	11	.....	.....	.....	.....	.....	.....	3	4	40	0	30	0	73	4
347.....	8	17	17	10	19	6	.....	.....	.....	.....	.....	3	3	66	8	18	6	88	5
348.....	11	7	15	16	21	24	12	.....	.....	.....	.....	3	2	23	4	26	7	88	1
349.....	11	16	14	14	19	11	8	.....	.....	.....	.....	4	0	53	4	25	4	82	8
350.....	10	11	13	16	18	26	.....	.....	.....	.....	.....	3	10	66	8	22	0	92	6
351.....	8	19	18	15	12	8	.....	.....	.....	.....	.....	2	4	40	0	27	6	69	10
352.....	9	12	19	16	9	15	.....	.....	.....	.....	.....	1	8	53	4	22	8	77	8
353.....	9	16	17	21	12	12	.....	.....	.....	.....	.....	3	0	26	8	30	7	60	3
354.....	8	18	19	20	13	8	.....	.....	.....	.....	.....	2	0	26	8	24	0	52	8
355.....	8	18	20	18	14	6	.....	.....	.....	.....	.....	2	1	40	0	27	6	69	7

TABLE IV — (Continued).

SPECIMEN NUMBER <i>Continued.</i>	Diameter of top in inches.	TOP MEASUREMENTS.										Height of stump.	Combined length of logs.	Length of top.	Total height.	
		Number of rings per inch at top, counting from the heart outward.														
356	8	12	22	21	17	10	.....	.....	.....	.....	.....	2 5'	40' 0"	24' 8"	66' 11"
357	8	16	19	20	20	.....	.....	.....	.....	.....	.....	2 0	53 4	26 8	83 0
358	8	17	20	14	15	7	.....	.....	.....	.....	.....	1 8	53 4	19 4	74 4
359	8	19	19	12	16	6	.....	.....	.....	.....	.....	2 0	53 4	24 0	79 4
360	10	8	18	20	23	19	.....	.....	.....	.....	.....	2 3	66 8	18 6	87 0
361	8	16	12	9	14	.....	.....	.....	.....	.....	.....	2 0	26 8	27 4	56 0
362	7	17	21	23	11	.....	.....	.....	.....	.....	.....	3 0	16 8	25 7	55 3
363	8	21	16	12	12	7	.....	.....	.....	.....	.....	2 8	40 0	35 10	73 6
364	11	21	22	17	11	13	2	.....	.....	.....	.....	2 8	40 0	39 9	82 9
365	8	16	9	22	13	7	.....	.....	.....	.....	.....	2 6	40 0	23 6	66 8
366	8	10	16	23	15	12	.....	.....	.....	.....	.....	2 4	53 4	21 0	76 4
367	8	12	19	19	16	6	.....	.....	.....	.....	.....	2 3	53 4	24 8	80 3
368	8	17	21	11	18	9	.....	.....	.....	.....	.....	3 0	53 4	25 6	81 10
369	8	19	16	21	1	12	.....	.....	.....	.....	.....	2 8	26 8	26 0	57 4
370	8	20	11	20	15	10	.....	.....	.....	.....	.....	2 6	26 8	22 10	52 0
371	8	6	12	20	27	11	.....	.....	.....	.....	.....	3 10	66 8	18 6	85 0
372	11	19	22	24	18	12	11	.....	.....	.....	.....	2 4	26 8	36 0	69 0
373	10	16	20	21	19	11	.....	.....	.....	.....	.....	2 0	40 0	33 10	76 10
374	9	23	17	12	16	.....	.....	.....	.....	.....	.....	3 10	40 0	25 6	65 4
375	8	2	12	19	15	.....	.....	.....	.....	.....	.....	2 8	53 4	22 0	78 0
376	8	16	19	21	12	8	.....	.....	.....	.....	.....	2 4	13 4	31 6	47 2
377	8	17	22	10	12	8	.....	.....	.....	.....	.....	2 5	21 8	27 5	56 6
378	10	23	23	27	14	23	.....	.....	.....	.....	.....	2 0	26 8	17 4	68 0
379	8	21	19	12	7	.....	.....	.....	.....	.....	.....	2 8	40 0	22 7	63 3
380	8	12	19	26	15	.....	.....	.....	.....	.....	.....	2 10	28 8	20 10	60 4
381	8	20	16	19	13	.....	.....	.....	.....	.....	.....	3 0	40 0	18 0	61 0
382	9	20	22	15	17	16	.....	.....	.....	.....	.....	3 1	40 0	25 4	68 5
383	11	8	12	8	12	16	18	19	20	.....	.....	2 8	40 0	42 6	85 2
384	9	16	20	21	8	13	.....	.....	.....	.....	.....	2 4	53 4	28 4	84 0
385	7	8	17	22	11	.....	.....	.....	.....	.....	.....	2 8	53 4	21 4	76 4
386	8	17	18	20	19	8	.....	.....	.....	.....	.....	2 3	40 0	33 0	75 3
387	8	10	17	13	19	6	.....	.....	.....	.....	.....	2 6	40 0	15 8	58 2
388	9	9	16	24	13	12	.....	.....	.....	.....	.....	2 2	26 8	30 0	58 10
389	7	15	23	21	16	.....	.....	.....	.....	.....	.....	3 6	52 4	12 0	63 10
390	10	22	19	12	15	12	.....	.....	.....	.....	.....	3 0	40 0	34 4	77 4
391	9	18	21	23	15	9	.....	.....	.....	.....	.....	2 4	26 8	39 0	66 0
392	8	13	19	24	12	.....	.....	.....	.....	.....	.....	2 3	26 8	37 6	68 5
393	22	21	18	12	14	13	15	13	16	16	22	23	3 2	13 4	75 0	91 6
394	9	12	17	23	21	13	.....	.....	.....	.....	.....	2 4	40 0	33 0	75 4
395	8	14	16	19	19	10	.....	.....	.....	.....	.....	2 8	26 8	32 4	61 6
396	8	10	21	22	12	16	.....	.....	.....	.....	.....	2 6	53 4	16 6	72 6
397	10	15	11	23	19	12	.....	.....	.....	.....	.....	2 9	55 4	24 8	82 9
398	9	11	.....	21	17	12	9	.....	.....	.....	.....	2 4	26 8	22 6	61 6
399	7	16	14	19	17	.....	.....	.....	.....	.....	.....	2 8	40 0	30 0	72 8
400	14	14	9	10	12	17	12	13	23	.....	.....	2 10	53 4	19 10	96 0
401	9	16	21	23	12	12	.....	.....	.....	.....	.....	2 8	40 0	31 0	73 8
402	8	18	17	19	20	.....	.....	.....	.....	.....	.....	3 0	23 8	27 6	57 2
403	8	12	19	19	21	9	.....	.....	.....	.....	.....	3 3	40 0	22 8	65 11
404	8	17	19	22	13	.....	.....	.....	.....	.....	.....	2 8	40 0	25 0	67 8
405	10	9	16	21	23	19	7	.....	.....	.....	.....	3 2	40 0	38 4	81 6
406	10	8	12	16	22	23	27	.....	.....	.....	.....	2 10	53 4	25 7	81 9
407	9	21	18	12	20	23	.....	.....	.....	.....	.....	2 5	53 4	31 3	87 0
408	9	11	20	21	17	17	.....	.....	.....	.....	.....	2 6	53 4	24 4	80 2
409	9	12	17	23	24	9	.....	.....	.....	.....	.....	2 8	53 4	25 8	81 8
410	11	11	20	25	19	12	13	.....	.....	.....	.....	3 0	40 0	40 6	83 6
411	9	16	18	21	18	23	.....	.....	.....	.....	.....	2 10	53 4	26 7	82 9
412	10	12	20	22	18	16	.....	.....	.....	.....	.....	2 8	40 0	23 4	66 0
413	8	16	19	17	22	.....	.....	.....	.....	.....	.....	2 7	53 4	27 0	82 11
414	7	10	13	19	14	.....	.....	.....	.....	.....	.....	2 2	40 0	23 7	65 9
415	9	18	12	23	19	12	.....	.....	.....	.....	.....	2 2	40 0	32 8	74 10
416	7	18	21	13	17	.....	.....	.....	.....	.....	.....	2 6	40 0	28 6	71 0
417	8	16	14	19	14	.....	.....	.....	.....	.....	.....	2 5	40 0	26 10	69 3
418	9	13	21	23	16	9	.....	.....	.....	.....	.....	2 4	40 0	26 10	69 2
419	8	16	17	26	17	12	.....	.....	.....	.....	.....	2 6	40 0	32 4	74 10
420	9	11	23	26	17	12	.....	.....	.....	.....	.....	2 3	40 0	31 0	73 3
421	8	13	19	12	24	.....	.....	.....	.....	.....	.....	2 2	26 8	30 3	59 1
422	8	16	9	17	19	6	.....	.....	.....	.....	.....	2 6	40 0	32 10	75 4
423	8	12	21	19	21	.....	.....	.....	.....	.....	.....	3 1	26 8	29 8	59 5
424	12	16	28	20	22	24	21	.....	.....	.....	.....	3 10	13 4	52 8	69 10
425	8	12	16	18	20	.....	.....	.....	.....	.....	.....	2 10	40 0	22 6	65 4
426	8	17	17	22	14	9	.....	.....	.....	.....	.....	2 11	26 8	29 6	59 1

TABLE IV — (Continued).

SPECIMEN NUMBER. <i>Continued.</i>	Diameter of top in inches.	TOP MEASUREMENTS.										Height of stump.	Combined length of logs.	Length of top.	Total height.					
		Number of rings per inch at top, counting from the heart outward.																		
427.....	8	16	19	10	24	.....	.....	.....	.....	.....	.....	2'	0'	26'	8"	21'	10"	50'	6"
428.....	10-	21	23	10	17	12	19	.....	.....	.....	.....	3	2	26	8	36	8	66	6
429.....	8	12	16	23	16	.....	.....	.....	.....	.....	.....	3	0	26	8	24	4	53	6
430.....	8	19	11	17	12	9	.....	.....	.....	.....	.....	3	0	26	8	23	7	53	3
431.....	8-	12	20	19	10	15	.....	.....	.....	.....	.....	3	10	40	0	30	0	73	10
432.....	10	17	22	20	11	18	.....	.....	.....	.....	.....	4	0	40	0	38	8	82	8
433.....	9	20	20	12	14	18	.....	.....	.....	.....	.....	2	6	26	8	37	4	66	6
434.....	10-	16	24	17	11	16	10	.....	.....	.....	.....	2	10	26	8	34	10	64	4
435.....	8	10	17	21	15	12	2	2	3	26	8	35	7	58	6
436.....	8	12	19	20	17	.....	.....	.....	.....	.....	.....	2	8	40	0	29	0	77	8
437.....	8	18	12	19	10	.....	.....	.....	.....	.....	.....	2	6	26	8	31	4	60	6
438.....	9	16	21	11	23	10	.....	.....	.....	.....	.....	3	0	26	8	22	6	52	2
439.....	10-	20	19	12	16	16	12	.....	.....	.....	.....	3	4	40	0	37	9	81	1
440.....	9	17	17	14	12	17	.....	.....	.....	.....	.....	2	10	26	8	32	6	62	0
441.....	8-	19	12	21	17	12	.....	.....	.....	.....	.....	3	0	40	0	25	7	68	7
442.....	8	13	16	19	19	8	.....	.....	.....	.....	.....	3	0	53	4	21	6	77	10
443.....	8-	17	22	20	11	16	.....	.....	.....	.....	.....	2	3	26	8	26	3	55	2
444.....	11	11	24	19	20	17	10	.....	.....	.....	.....	4	4	40	0	34	7	78	11
445.....	12	10	14	14	16	16	14	.....	.....	.....	.....	3	6	53	4	34	6	91	4
446.....	8	12	16	12	16	.....	.....	.....	.....	.....	.....	4	2	40	0	26	8	70	10
447.....	8-	14	20	17	11	10	.....	.....	.....	.....	.....	3	6	40	0	21	4	64	10
448.....	8	13	19	17	12	7	.....	.....	.....	.....	.....	3	2	26	8	26	10	56	8
449.....	8	9	17	22	15	.....	.....	.....	.....	.....	.....	3	0	53	4	27	9	84	1
450.....	8	13	16	16	20	8	.....	.....	.....	.....	.....	4	0	40	0	23	9	67	9
451.....	9	16	20	23	19	12	.....	.....	.....	.....	.....	4	8	66	8	26	4	97	8
452.....	8	10	14	19	19	.....	.....	.....	.....	.....	.....	2	2	26	8	24	6	53	4
453.....	9	12	16	21	17	11	.....	.....	.....	.....	.....	3	0	26	8	27	4	57	0
454.....	8	11	13	26	12	5	.....	.....	.....	.....	.....	3	10	26	8	24	0	54	6
455.....	12	12	16	9	17	8	15	.....	.....	.....	.....	4	2	40	0	37	6	81	8
456.....	11	13	10	14	18	21	8	.....	.....	.....	.....	8	4	40	0	40	4	83	8
457.....	8	18	18	19	12	7	.....	.....	.....	.....	.....	4	8	53	4	22	8	80	8
458.....	7	13	20	12	15	.....	.....	.....	.....	.....	.....	3	2	26	8	20	10	50	8
459.....	8	8	19	19	16	.....	.....	.....	.....	.....	.....	3	2	26	8	27	4	57	2
460.....	10	8	21	20	12	19	.....	.....	.....	.....	.....	2	4	40	0	34	4	76	8
461.....	10	16	22	18	19	17	.....	.....	.....	.....	.....	3	1	40	0	30	6	73	7
462.....	11-	14	19	21	21	11	14	.....	.....	.....	.....	4	0	40	0	31	10	75	10
463.....	10	11	20	17	19	19	.....	.....	.....	.....	.....	3	4	40	0	29	8	73	0
464.....	8	10	17	19	23	.....	.....	.....	.....	.....	.....	2	8	40	0	21	9	64	5
465.....	9	16	12	14	20	10	.....	.....	.....	.....	.....	3	0	26	8	24	8	54	4
466.....	9	12	19	21	15	14	.....	.....	.....	.....	.....	3	0	40	0	26	4	69	4
467.....	10	15	21	12	17	18	.....	.....	.....	.....	.....	3	4	40	0	28	6	71	10
468.....	11	14	18	20	12	19	11	.....	.....	.....	.....	2	4	40	0	33	3	75	7
469.....	10	16	20	19	17	12	.....	.....	.....	.....	.....	3	0	26	8	36	0	65	8
470.....	10	11	18	22	12	18	.....	.....	.....	.....	.....	3	1	40	0	29	6	72	7
471.....	8	12	19	20	16	9	.....	.....	.....	.....	.....	3	8	53	4	23	5	80	5
472.....	8	11	16	19	22	.....	.....	.....	.....	.....	.....	3	0	40	0	24	8	67	8
473.....	7-	8	18	18	20	.....	.....	.....	.....	.....	.....	2	2	26	8	21	6	50	4
474.....	8	12	19	22	21	.....	.....	.....	.....	.....	.....	4	3	53	4	22	4	79	11
475.....	8	18	16	14	21	.....	.....	.....	.....	.....	.....	3	1	53	4	26	8	83	1
476.....	7	11	13	19	23	.....	.....	.....	.....	.....	.....	2	10	40	0	21	6	64	4
477.....	8	10	16	21	17	.....	.....	.....	.....	.....	.....	3	0	26	8	32	10	62	6
478.....	8-	12	19	19	10	13	.....	.....	.....	.....	.....	3	6	40	0	21	8	65	2
479.....	9	14	14	20	11	13	.....	.....	.....	.....	.....	3	0	26	8	33	0	62	8
480.....	9	13	19	9	18	2	.....	.....	.....	.....	.....	3	1	40	0	34	6	77	7
481.....	8	12	21	17	16	20	.....	.....	.....	.....	.....	4	4	40	0	30	8	75	0
482.....	8	10	17	12	20	.....	.....	.....	.....	.....	.....	2	2	26	8	20	10	49	8
483.....	8-	13	16	21	12	14	.....	.....	.....	.....	.....	2	4	26	8	22	6	51	6
484.....	10	14	19	22	17	11	.....	.....	.....	.....	.....	2	8	40	0	27	4	70	0
485.....	9	11	17	20	14	12	.....	.....	.....	.....	.....	2	8	26	8	39	8	69	0
486.....	10	16	21	12	18	10	.....	.....	.....	.....	.....	2	10	26	8	34	7	64	1
487.....	10	16	20	10	13	11	.....	.....	.....	.....	.....	2	8	26	8	37	10	67	2
488.....	9	17	19	15	21	8	.....	.....	.....	.....	.....	2	7	26	8	30	7	59	10
489.....	9	14	21	17	16	10	.....	.....	.....	.....	.....	3	2	26	8	34	7	64	5
490.....	9	16	17	20	12	13	.....	.....	.....	.....	.....	2	6	26	8	31	4	60	6
491.....	8	18	10	19	70	.....	.....	.....	.....	.....	.....	3	0	40	0	26	7	69	7
492.....	8	14	16	16	17	.....	.....	.....	.....	.....	.....	2	4	26	8	29	0	58	0
493.....	9	16	15	19	11	12	.....	.....	.....	.....	.....	3	2	40	0	34	5	77	7
494.....	10	14	18	20	14	9	.....	.....	.....	.....	.....	3	8	40	0	31	6	75	2
495.....	10	16	16	19	12	15	.....	.....	.....	.....	.....	2	8	40	0	36	0	78	8
496.....	8	16	19	17	13	.....	.....	.....	.....	.....	.....	2	8	49	0	26	6	69	2
497.....	10	16	18	18	17	15	.....	.....	.....	.....	.....	3	1	26	8	37	4	67	1

TABLE IV — (Continued).

SPECIMEN NUMBER	Diameter of top in inches.	TOP MEASUREMENTS.										Height of stump.	Combined length of logs.	Length of top.	Total height.	
		Number of rings per inch at top, counting from the heart outward.														
569.....	11	7	12	16	16	21	18	.....	.....	.....	.....	2	5	46	36	80
570.....	10	10	12	12	21	22	.....	.....	.....	.....	.....	2	4	40	28	71
571.....	10	11	14	22	17	19	.....	.....	.....	.....	.....	4	1	40	48	71
572.....	9	12	17	19	21	23	.....	.....	.....	.....	.....	4	1	40	36	73
573.....	9	12	14	17	19	19	.....	.....	.....	.....	.....	4	2	53	27	80
574.....	9	8	13	16	22	.....	.....	.....	.....	.....	.....	2	10	40	21	85
575.....	9	16	10	21	14	.....	.....	.....	.....	.....	.....	2	6	40	32	64
576.....	9	11	12	17	21	11	.....	.....	.....	.....	.....	2	6	40	21	63
577.....	10	12	10	19	10	.....	.....	.....	.....	.....	.....	2	6	40	25	64
578.....	10	16	11	9	9	.....	.....	.....	.....	.....	.....	3	10	40	24	68
579.....	10	12	16	20	13	.....	.....	.....	.....	.....	.....	3	8	40	27	70
580.....	10	13	15	19	16	.....	.....	.....	.....	.....	.....	2	7	40	23	70
581.....	7	14	12	17	17	.....	.....	.....	.....	.....	.....	2	1	40	16	11
582.....	8	8	11	14	19	.....	.....	.....	.....	.....	.....	2	6	53	22	58
583.....	9	10	12	16	10	8	.....	.....	.....	.....	.....	2	6	40	28	71
584.....	10	14	12	17	11	.....	.....	.....	.....	.....	.....	2	9	26	24	54
585.....	10	16	16	19	19	9	.....	.....	.....	.....	.....	3	3	26	26	52
586.....	10	10	12	17	12	.....	.....	.....	.....	.....	.....	4	0	53	40	56
587.....	7	14	11	13	9	.....	.....	.....	.....	.....	.....	3	1	26	22	11
588.....	9	16	20	14	14	12	.....	.....	.....	.....	.....	2	2	26	20	5
589.....	9	17	19	17	16	.....	.....	.....	.....	.....	.....	3	4	40	21	8
590.....	7	16	12	18	13	.....	.....	.....	.....	.....	.....	2	8	40	23	0
591.....	7	12	9	21	17	.....	.....	.....	.....	.....	.....	2	3	40	27	9
592.....	8	12	17	16	12	.....	.....	.....	.....	.....	.....	2	10	40	28	2
593.....	8	8	11	19	12	.....	.....	.....	.....	.....	.....	2	6	53	18	6
594.....	8	12	13	21	11	.....	.....	.....	.....	.....	.....	3	0	53	21	8
595.....	8	12	14	14	19	.....	.....	.....	.....	.....	.....	2	8	56	24	11
596.....	8	14	14	21	20	.....	.....	.....	.....	.....	.....	3	2	40	21	8
597.....	8	14	10	17	14	.....	.....	.....	.....	.....	.....	2	3	40	19	8
598.....	8	12	9	21	12	.....	.....	.....	.....	.....	.....	2	8	26	23	7
599.....	9	11	13	19	16	10	.....	.....	.....	.....	.....	3	1	53	27	3
600.....	8	10	4	22	17	16	.....	.....	.....	.....	.....	4	0	53	4	1
601.....	11	17	16	21	18	12	.....	.....	.....	.....	.....	3	6	13	28	0
602.....	8	8	11	17	12	.....	.....	.....	.....	.....	.....	3	2	40	21	8
603.....	8	10	10	14	14	.....	.....	.....	.....	.....	.....	2	6	26	27	0
604.....	8	12	12	12	9	.....	.....	.....	.....	.....	.....	3	0	40	28	6
605.....	8	16	13	10	8	.....	.....	.....	.....	.....	.....	3	1	26	30	1
606.....	8	10	10	16	13	9	.....	.....	.....	.....	.....	2	11	40	59	5
607.....	9	10	13	14	13	13	.....	.....	.....	.....	.....	3	3	40	30	7
608.....	9	11	13	16	13	15	.....	.....	.....	.....	.....	2	4	26	27	6
609.....	8	11	12	14	16	.....	.....	.....	.....	.....	.....	3	6	40	21	10
610.....	9	12	12	17	17	19	.....	.....	.....	.....	.....	3	2	40	26	8
611.....	10	12	14	16	16	10	.....	.....	.....	.....	.....	2	10	26	30	10
612.....	8	12	9	14	17	.....	.....	.....	.....	.....	.....	3	1	40	23	6
613.....	8	8	11	16	12	.....	.....	.....	.....	.....	.....	2	11	56	21	4
614.....	8	9	9	22	11	.....	.....	.....	.....	.....	.....	2	7	40	19	8
615.....	8	8	14	16	16	.....	.....	.....	.....	.....	.....	3	4	40	25	2
616.....	9	12	14	16	21	12	.....	.....	.....	.....	.....	2	8	53	22	3
617.....	11	15	15	11	14	16	.....	.....	.....	.....	.....	3	0	26	38	6
618.....	10	16	17	14	14	12	.....	.....	.....	.....	.....	3	2	40	34	1
619.....	10	16	18	11	10	14	.....	.....	.....	.....	.....	2	8	40	28	8
620.....	8	14	14	16	15	.....	.....	.....	.....	.....	.....	2	10	53	25	0
621.....	8	9	11	17	16	.....	.....	.....	.....	.....	.....	2	9	26	30	5
622.....	8	10	13	16	12	.....	.....	.....	.....	.....	.....	3	0	26	32	3
623.....	8	10	11	20	19	.....	.....	.....	.....	.....	.....	2	10	26	31	11
624.....	8	11	11	17	17	.....	.....	.....	.....	.....	.....	2	10	26	30	0
625.....	8	10	17	19	16	.....	.....	.....	.....	.....	.....	2	9	26	30	6
626.....	10	11	10	16	15	.....	.....	.....	.....	.....	.....	3	2	26	27	6
627.....	8	11	12	12	14	17	.....	.....	.....	.....	.....	3	0	40	32	0
628.....	8	13	11	16	15	.....	.....	.....	.....	.....	.....	2	8	40	32	2
629.....	8	14	12	12	14	.....	.....	.....	.....	.....	.....	3	0	26	34	4
630.....	8	9	11	17	12	.....	.....	.....	.....	.....	.....	2	4	26	23	6
631.....	10	8	8	10	11	16	.....	.....	.....	.....	.....	3	10	26	36	10
632.....	8	11	14	13	11	17	.....	.....	.....	.....	.....	3	2	40	31	3
633.....	8	11	11	15	15	7	.....	.....	.....	.....	.....	2	10	40	27	4
634.....	10	10	12	16	19	10	.....	.....	.....	.....	.....	2	8	40	34	0
635.....	8	10	12	14	17	.....	.....	.....	.....	.....	.....	2	10	40	26	8
636.....	8	10	10	16	16	.....	.....	.....	.....	.....	.....	3	0	53	21	6
637.....	8	13	16	19	12	.....	.....	.....	.....	.....	.....	2	6	40	24	6
638.....	10	12	17	17	14	12	.....	.....	.....	.....	.....	2	8	40	36	3
639.....	10	16	19	12	16	8	.....	.....	.....	.....	.....	4	0	53	33	4

TABLE IV — (Continued).

SPECIMEN NUMBER <i>Continued.</i>	Diameter of top in inches.	TOP MEASUREMENTS.										Height of stump.	Combined length of logs.	Length of top.	Total height.
		Number of rings per inch at top, counting from the heart outward.													
640.....	10	15	12	14	19	9	.....	.....	.....	.....	.....	3'	40'	24'	78'
641.....	9	14	14	16	18	12	.....	.....	.....	.....	.....	10	0	39	81
642.....	11	14	15	16	17	17	.....	.....	.....	.....	.....	6	0	0	10
643.....	11	15	15	16	17	16	.....	.....	.....	.....	.....	6	0	6	86
644.....	8	10	13	15	17	19	.....	.....	.....	.....	.....	3	3	3	93
645.....	8	12	16	17	19	.....	.....	.....	.....	.....	.....	3	4	3	88
646.....	8	16	12	12	14	.....	.....	.....	.....	.....	.....	3	4	7	11
647.....	8	11	12	12	14	.....	.....	.....	.....	.....	.....	3	0	6	82
648.....	8	11	12	12	14	.....	.....	.....	.....	.....	.....	4	0	3	78
649.....	10	11	12	12	15	15	.....	.....	.....	.....	.....	4	4	6	84
650.....	9	13	13	12	17	.....	.....	.....	.....	.....	.....	4	4	0	66
651.....	8	8	10	14	14	.....	.....	.....	.....	.....	.....	10	0	0	10
652.....	7	8	16	16	12	.....	.....	.....	.....	.....	.....	2	1	28	76
653.....	7	8	12	14	12	.....	.....	.....	.....	.....	.....	3	0	28	71
654.....	8	8	11	20	16	.....	.....	.....	.....	.....	.....	4	0	21	84
655.....	8	8	12	14	17	.....	.....	.....	.....	.....	.....	2	8	6	69
656.....	8	8	12	14	17	.....	.....	.....	.....	.....	.....	4	8	8	79
657.....	8	11	13	16	16	.....	.....	.....	.....	.....	.....	0	8	8	85
658.....	8	10	14	12	13	6	.....	.....	.....	.....	.....	0	0	27	66
659.....	12 1/2	16	17	16	18	11	14	11	.....	.....	.....	3	0	0	55
660.....	8	11	11	11	14	10	.....	.....	.....	.....	.....	10	0	7	76
661.....	8	11	16	20	15	8	.....	.....	.....	.....	.....	4	0	6	75
662.....	8	12	14	17	13	.....	.....	.....	.....	.....	.....	0	0	31	73
663.....	8	11	16	16	13	.....	.....	.....	.....	.....	.....	10	0	4	6
664.....	8	12	14	15	11	.....	.....	.....	.....	.....	.....	0	0	18	72
665.....	7	10	15	12	11	.....	.....	.....	.....	.....	.....	4	0	23	54
666.....	7	10	16	14	13	.....	.....	.....	.....	.....	.....	4	0	26	70
667.....	8	12	14	14	12	.....	.....	.....	.....	.....	.....	1	0	30	88
668.....	8	10	16	14	15	.....	.....	.....	.....	.....	.....	10	0	26	10
669.....	8	12	14	14	12	.....	.....	.....	.....	.....	.....	0	0	40	6
670.....	10	11	16	13	17	.....	.....	.....	.....	.....	.....	2	8	28	65
671.....	8	12	13	13	16	16	.....	.....	.....	.....	.....	10	0	4	71
672.....	8	10	14	14	16	.....	.....	.....	.....	.....	.....	10	0	4	64
673.....	8	11	13	13	16	.....	.....	.....	.....	.....	.....	2	8	6	76
674.....	8	14	15	15	16	.....	.....	.....	.....	.....	.....	4	4	18	77
675.....	9	10	16	15	8	.....	.....	.....	.....	.....	.....	5	4	21	70
676.....	9	11	14	17	11	.....	.....	.....	.....	.....	.....	8	0	27	7
677.....	10	10	16	13	12	.....	.....	.....	.....	.....	.....	10	0	11	9
678.....	10	11	13	12	16	.....	.....	.....	.....	.....	.....	2	0	27	4
679.....	10	16	10	16	11	.....	.....	.....	.....	.....	.....	6	0	35	65
680.....	10	15	13	13	13	.....	.....	.....	.....	.....	.....	2	0	39	74
681.....	8	12	13	13	11	.....	.....	.....	.....	.....	.....	8	0	27	0
682.....	8	12	16	10	10	.....	.....	.....	.....	.....	.....	2	0	27	68
683.....	8	12	10	14	8	.....	.....	.....	.....	.....	.....	2	0	27	69
684.....	9	12	10	16	8	.....	.....	.....	.....	.....	.....	2	8	27	57
685.....	11	12	16	16	8	.....	.....	.....	.....	.....	.....	10	0	10	4
686.....	11	12	16	16	8	.....	.....	.....	.....	.....	.....	2	8	23	53
687.....	8	14	11	17	9	.....	.....	.....	.....	.....	.....	0	4	23	72
688.....	9	15	16	12	11	.....	.....	.....	.....	.....	.....	3	4	27	71
689.....	9	13	14	14	8	.....	.....	.....	.....	.....	.....	4	0	32	75
690.....	10	14	12	13	12	.....	.....	.....	.....	.....	.....	10	0	21	0
691.....	10	11	17	10	11	.....	.....	.....	.....	.....	.....	2	0	27	6
692.....	10	10	12	13	15	.....	.....	.....	.....	.....	.....	4	0	27	57
693.....	11	10	12	13	15	.....	.....	.....	.....	.....	.....	2	8	26	68
694.....	9	10	12	13	16	.....	.....	.....	.....	.....	.....	4	0	30	56
695.....	9	12	13	14	16	.....	.....	.....	.....	.....	.....	4	0	30	81
696.....	9	9	13	16	.....	.....	.....	.....	.....	.....	.....	3	6	26	73
697.....	8	12	10	10	8	.....	.....	.....	.....	.....	.....	2	0	27	69
698.....	11	12	16	16	8	.....	.....	.....	.....	.....	.....	2	8	27	57
699.....	11	12	16	16	8	.....	.....	.....	.....	.....	.....	2	0	27	4
700.....	8	13	12	10	.....	.....	.....	.....	.....	.....	.....	10	0	28	8
701.....	8	13	12	10	.....	.....	.....	.....	.....	.....	.....	2	0	28	6
702.....	8	10	14	15	.....	.....	.....	.....	.....	.....	.....	4	0	28	4
703.....	11	10	10	15	.....	.....	.....	.....	.....	.....	.....	4	0	28	6
704.....	7	10	10	15	.....	.....	.....	.....	.....	.....	.....	2	0	28	4
705.....	8	13	12	10	.....	.....	.....	.....	.....	.....	.....	6	0	31	0
706.....	12	10	14	12	.....	.....	.....	.....	.....	.....	.....	4	0	31	4
707.....	9	10	13	10	.....	.....	.....	.....	.....	.....	.....	2	0	31	4
708.....	7	10	13	10	.....	.....	.....	.....	.....	.....	.....	4	0	28	4
709.....	8	13	12	10	.....	.....	.....	.....	.....	.....	.....	4	0	28	4
710.....	8	13	13	18	.....	.....	.....	.....	.....	.....	.....	2	4	53	4

TABLE IV — (Continued).

SPECIMEN NUMBER.	Diameter of top in inches.	TOP MEASUREMENTS.										Height of stump.	Combined length of logs.	Length of top.	Total height.			
		Number of rings per inch at top, counting from the heart outward.																
711	8	16	13	15	16	7						22	26'	8	35'	4"	67'	2"
712	8	11	14	15	16							22	31	8	22	6	56	3
713	9	10	8	15	13	12						1	1	8	26	6	70	10
714	9	13	16	22	20	16						1	1	10	13	4	61	0
715	9	15	16	19	21	10						1	13	4	13	4	61	2
716	9	14	18	18	17	12						2	13	4	46	4	74	9
717	11	8	14	23	21	20	19					6	0	0	27	7	82	10
718	9	8	9	17	24	23	11					6	53	4	26	0	81	10
719	10	10	9	16	20	24						6	53	4	27	0	91	0
720	9	11	12	14	17	17						0	66	8	23	4	93	2
721	8	12	12	12	16	19						4	16	8	21	8	91	8
722	10	13	12	16	18	9						8	53	4	24	0	80	0
723	8	13	12	12	16							0	26	8	30	0	58	8
724	8	14	10	13	13							1	26	8	30	8	58	10
725	8	14	16	13	12							6	26	8	33	9	62	5
726	8	11	14	14	14							1	26	8	31	4	59	10
727	10	11	11	16	17	14						1	10	0	26	8	68	6
728	8 1/2	11	10	15	18	7						0	26	8	40	0	69	4
729	8	13	11	12	16							6	26	8	37	8	66	10
730	8	11	14	14	15							4	40	0	27	6	69	10
731	10	10	10	16	12							1	26	8	29	4	57	8
732	9	13	12	14	16	9						8	40	0	34	10	77	6
733	7	12	16	14	14							1	40	0	22	6	74	10
734	8	16	17	16	12							4	53	4	24	0	79	10
735	9	11	13	17	11	9						6	26	8	36	10	66	0
736	8	12	12	14	15							1	13	4	48	6	63	8
737	8	12	14	15	16							3	26	8	34	9	63	8
738	8	14	13	10	19							2	26	8	28	4	58	2
739	8 1/2	13	17	16	12	8						0	26	8	29	0	57	8
740	8 1/2	14	16	16	12							4	53	4	26	0	82	2
741	8	10	11	17	13							0	26	8	28	0	56	8
742	10	11	13	16	13	12						1	40	0	31	10	73	11
743	10	13	16	14	16	13						3	53	4	30	2	86	9
744	10	16	15	12	13	13						1	53	4	36	8	93	1
745	8	10	14	11	16							4	53	4	33	0	88	8
746	8	12	16	16	15							8	26	8	27	6	57	10
747	10	14	18	12	15	13						0	47	0	34	8	84	2
748	10	12	14	16	12	8						8	26	8	39	0	68	4
749	10	13	16	14	16	16						4	26	8	36	7	65	7
750	9	14	14	16	16	12						1	40	0	34	4	76	2
751	9	10	17	15	8	11						1	26	8	33	8	62	2
752	9	17	21	11	12	9						1	66	8	23	4	93	1
753	8	12	13	16	15							0	40	0	24	10	66	10
754	8	13	16	10	14							4	40	0	30	0	72	4
755	8	8	11	17	16							1	26	8	28	9	57	6
756	10	16	21	17	16	12						6	53	4	26	6	82	4
757	9	13	16	19	11	8						8	13	4	21	3	77	3
758	9	16	11	11	15	12						0	53	4	23	10	80	2
759	8	10	14	18	12							0	53	4	25	6	80	10
760	8	13	14	15	13	8						6	40	0	28	4	70	10
761	8	13	15	19	16	13						2	40	0	25	6	67	8
762	8	19	17	12	11							8	40	0	24	4	67	0
763	8	18	12	14	14							10	40	0	26	8	69	6
764	9	21	12	16	16	14						10	53	4	22	8	78	10
765	8	17	16	18	14							0	53	4	27	4	83	8
766	12	19	12	16	16	19	8					2	16	8	34	10	64	8
767	8	11	15	16	12							2	66	8	19	10	90	8
768	9	6	12	14	12	8						2	26	8	81	8	61	6
769	10	14	16	15	15	10						1	45	0	28	6	76	7
770	9	16	16	12	14	14						4	53	4	30	6	87	2
771	8	12	12	10	16							3	26	8	28	4	57	3
772	8	14	12	15	15							4	40	0	26	10	69	2
773	11	17	19	15	17	12						3	26	8	45	7	75	6
774	8	16	8	16	16	12	15					3	26	8	41	6	70	10
775	8	18	14	15	15							2	53	4	27	6	84	0
776	9	16	19	12	16	10						1	26	8	39	0	68	9
777	8	19	22	16	12							10	53	4	26	8	82	10
778	8	16	12	18	14							6	26	8	36	10	66	0
779	9	14	19	16	12	16						4	26	8	38	4	67	4
780	10	16	16	11	18	13						6	26	8	34	3	63	5
781	9	18	14	12	10							1	26	8	30	0	59	9
782	8	18	20	11	13	5						2	26	8	33	7	62	5

TABLE IV — (Continued).

SPECIMEN NUMBER. <i>Continued.</i>	Diameter of top in inches.	TOP MEASUREMENTS.										Height of stump.	Combined length of logs.	Length of top.	Total height.		
		Number of rings per inch at top, counting from the heart outward.															
783.....	8	12	17	14	15	.....	.....	.....	.....	.....	.....	2'	2'	56'	8'	61'	2'
784.....	8	12	17	14	15	.....	.....	.....	.....	.....	.....	3	2	40	0	26	6
785.....	9	16	16	19	17	12	7	.....	.....	.....	.....	2	4	26	8	34	8
786.....	9	16	18	17	17	12	7	.....	.....	.....	.....	2	8	26	8	31	4
787.....	8	18	12	10	19	6	.....	.....	.....	.....	.....	2	11	40	0	24	8
788.....	14	18	16	21	20	17	16	8	6	.....	.....	3	2	40	0	40	4
789.....	9	10	14	19	11	10	.....	.....	.....	.....	.....	4	0	53	4	34	3
790.....	8	12	14	14	15	.....	.....	.....	.....	.....	.....	2	0	36	8	31	10
791.....	8	16	15	15	17	.....	.....	.....	.....	.....	.....	2	6	40	0	24	0
792.....	14	18	17	15	14	12	16	8	.....	.....	.....	3	8	40	0	35	4
793.....	9	16	17	12	14	7	.....	.....	.....	.....	.....	4	2	26	8	34	8
794.....	9	12	18	14	16	10	.....	.....	.....	.....	.....	3	2	26	8	33	6
795.....	8	14	16	16	17	.....	.....	.....	.....	.....	.....	3	0	40	0	24	6
796.....	8	16	12	20	8	6	.....	.....	.....	.....	.....	3	6	40	0	27	4
797.....	10	18	19	14	10	8	.....	.....	.....	.....	.....	2	8	26	8	34	7
798.....	10	14	17	10	12	14	.....	.....	.....	.....	.....	3	0	53	4	26	5
799.....	12	16	18	14	10	16	9	.....	.....	.....	.....	3	1	53	4	33	0
800.....	8	14	12	17	15	10	.....	.....	.....	.....	.....	3	3	53	4	27	6
801.....	10	16	16	14	15	12	7	.....	.....	.....	.....	4	0	53	4	26	10
802.....	10	14	11	16	14	10	.....	.....	.....	.....	.....	3	8	40	0	36	0
803.....	9	16	9	13	12	7	.....	.....	.....	.....	.....	3	8	53	4	26	2
804.....	9	11	13	14	18	10	.....	.....	.....	.....	.....	2	8	40	0	31	4
805.....	9	12	16	11	14	15	.....	.....	.....	.....	.....	2	11	53	4	31	0
806.....	8	14	12	17	10	10	.....	.....	.....	.....	.....	3	0	53	4	19	10
807.....	8	13	16	15	12	.....	.....	.....	.....	.....	.....	4	6	40	0	24	6
808.....	8	16	15	12	17	.....	.....	.....	.....	.....	.....	2	6	40	0	26	4
809.....	9	14	18	12	13	14	.....	.....	.....	.....	.....	3	0	13	4	38	8
810.....	8	16	17	11	14	.....	.....	.....	.....	.....	.....	3	0	53	4	21	4
811.....	8	15	14	11	10	12	.....	.....	.....	.....	.....	3	4	53	4	24	4
812.....	8	16	17	12	9	6	.....	.....	.....	.....	.....	3	2	40	0	27	0
813.....	8	14	16	12	12	.....	.....	.....	.....	.....	.....	2	8	40	0	23	6
814.....	8	16	15	12	11	.....	.....	.....	.....	.....	.....	3	2	53	4	24	6
815.....	8	19	12	14	10	.....	.....	.....	.....	.....	.....	3	2	53	4	27	4
816.....	10	14	16	19	14	10	.....	.....	.....	.....	.....	3	4	40	0	29	10
817.....	9	16	18	12	15	10	.....	.....	.....	.....	.....	3	0	53	4	24	4
818.....	10	11	12	14	14	11	.....	.....	.....	.....	.....	2	8	40	0	30	0
819.....	8	16	16	14	12	.....	.....	.....	.....	.....	.....	2	10	40	0	26	10
820.....	8	14	15	12	17	5	.....	.....	.....	.....	.....	2	10	40	0	24	4
821.....	8	18	20	12	14	.....	.....	.....	.....	.....	.....	2	6	26	8	31	6
822.....	14	13	13	15	14	13	15	17	14	.....	.....	3	0	40	0	42	7
823.....	9	13	14	16	12	12	.....	.....	.....	.....	.....	2	10	53	4	27	4
824.....	8	13	16	16	10	8	.....	.....	.....	.....	.....	2	10	26	8	32	6
825.....	8	14	13	15	15	6	.....	.....	.....	.....	.....	3	2	53	4	33	9
826.....	10	16	14	13	12	12	.....	.....	.....	.....	.....	3	6	26	8	42	10
827.....	8	18	13	15	12	.....	.....	.....	.....	.....	.....	2	6	40	0	23	7
828.....	9	16	14	11	13	12	.....	.....	.....	.....	.....	3	2	26	8	38	4
829.....	9	17	15	12	13	12	.....	.....	.....	.....	.....	3	3	40	0	28	6
830.....	9	14	12	16	13	13	.....	.....	.....	.....	.....	2	0	26	8	34	4
831.....	9	16	14	14	13	14	.....	.....	.....	.....	.....	2	10	53	4	27	11
832.....	13	13	14	12	13	14	12	12	.....	.....	.....	4	0	53	4	30	4
833.....	11	14	12	14	11	13	11	.....	.....	.....	.....	3	4	53	4	32	8
834.....	8	16	12	11	15	.....	.....	.....	.....	.....	.....	3	0	40	0	28	4
835.....	8	14	12	11	14	10	.....	.....	.....	.....	.....	2	5	26	8	30	0
836.....	8	15	12	14	13	.....	.....	.....	.....	.....	.....	2	8	26	8	31	4
837.....	11	14	15	11	13	13	.....	.....	.....	.....	.....	3	0	40	0	38	7
838.....	10	13	12	16	14	10	.....	.....	.....	.....	.....	3	2	40	0	37	4
839.....	8	13	14	12	14	.....	.....	.....	.....	.....	.....	4	0	66	8	27	10
840.....	10	14	13	14	12	12	.....	.....	.....	.....	.....	3	8	53	4	31	8
841.....	10	16	14	14	12	15	.....	.....	.....	.....	.....	2	10	40	0	36	4
842.....	8	16	12	12	17	.....	.....	.....	.....	.....	.....	2	8	40	0	26	6
843.....	9	14	13	15	16	12	.....	.....	.....	.....	.....	3	4	53	4	28	10
844.....	9	16	14	12	13	12	.....	.....	.....	.....	.....	3	1	66	8	21	3
845.....	8	16	13	12	14	.....	.....	.....	.....	.....	.....	2	8	26	8	31	5
846.....	10	14	15	11	16	12	.....	.....	.....	.....	.....	2	10	40	0	33	7
847.....	8	14	15	12	16	.....	.....	.....	.....	.....	.....	2	8	26	8	34	3
848.....	9	16	15	12	13	8	.....	.....	.....	.....	.....	3	0	40	0	31	6
849.....	8	12	14	17	10	6	.....	.....	.....	.....	.....	2	10	53	4	27	6
850.....	8	12	16	14	11	.....	.....	.....	.....	.....	.....	2	8	40	0	26	10
851.....	10	14	18	12	12	10	.....	.....	.....	.....	.....	3	2	26	8	43	4
852.....	8	16	14	15	12	6	.....	.....	.....	.....	.....	3	1	40	0	26	7
853.....	8	14	14	16	19	.....	.....	.....	.....	.....	.....	2	10	53	4	36	8
854.....	10	13	17	15	12	14	.....	.....	.....	.....	.....	2	8	26	8	42	4
855.....	10	14	16	15	11	11	.....	.....	.....	.....	.....	2	4	13	4	44	10

TABLE IV — (Continued).

SPECIMEN NUMBER	Diameter of top in inches.	TOP MEASUREMENTS.										Height of stump.	Combined length of logs.	Length of top.	Total height.				
		Number of rings per inch at top, counting from the heart outward.																	
856	9	14	15	12	12	16						3'	4"	53'	4"	28'	3"	84'	11"
857	7	14	10	11	12							3'	6"	66'	6"	22'	7"	92'	9"
858	9	14	16	13	10	11						3'	4"	40'	0"	27'	6"	70'	10"
859	8	16	15	12	13							3'	6"	53'	4"	26'	5"	83'	3"
860	9	12	13	17	14	10						3'	2"	26'	6"	33'	8"	63'	6"
861	8	14	13	12	14							3'	2"	53'	4"	22'	4"	78'	4"
862	8	16	12	15	11							3'	0"	26'	6"	36'	0"	65'	6"
863	8	14	16	10	13							2'	0"	26'	8"	32'	6"	61'	2"
864	8	10	16	16	12	6						2'	8"	40'	0"	36'	11"	79'	7"
865	9	9	11	17	12	14						2'	6"	40'	0"	34'	9"	77'	3"
866	10	12	11	12	16	19						2'	8"	26'	8"	45'	4"	74'	6"
867	9	12	16	17	10	10						3'	0"	53'	4"	32'	10"	89'	2"
868	8	16	11	14	10	5						2'	2"	26'	6"	34'	7"	63'	5"
869	12	10	16	11								3'	4"	26'	6"	33'	0"	63'	0"
870	10	14	17	18	11	11						3'	2"	53'	4"	11'	4"	87'	10"
871	9	16	14	12	12	10						3'	0"	66'	6"	26'	10"	96'	6"
872	9	11	15	10	17	12						2'	10"	40'	0"	34'	3"	77'	1"
873	8	16	12	11	14	7						2'	7"	26'	6"	42'	8"	71'	11"
874	10	12	13	10	17	15						2'	5"	26'	8"	34'	11"	64'	0"
875	8	14	14	14	9							2'	6"	26'	8"	37'	3"	66'	5"
876	8	16	12	11	8							2'	8"	26'	8"	34'	8"	64'	0"
877	8	14	17	13	10	7						3'	4"	26'	8"	32'	5"	62'	5"
878	10	16	12	12	17	11						2'	11"	49'	0"	26'	10"	69'	9"
879	9	14	19	12	15	10						2'	2"	56'	8"	31'	6"	60'	4"
880	8	10	16	10	18							2'	10"	40'	0"	20'	8"	73'	6"
881	8	14	12	12	11	9						2'	8"	26'	8"	27'	4"	56'	8"
882	8	16	14	10	9							2'	4"	26'	8"	26'	0"	55'	0"
883	8	6	12	11	11	10						3'	1"	26'	8"	27'	6"	57'	3"
884	10	16	16	12	13	9						2'	10"	40'	0"	24'	7"	67'	5"
885	9	4	11	15	10	12						2'	3"	40'	0"	26'	0"	63'	3"
886	7	12	14	9	11							2'	1"	26'	8"	27'	0"	55'	9"
887	9	16	16	10	12	17						2'	3"	40'	0"	29'	3"	71'	6"
888	8	11	12	18	10							1'	11"	23'	8"	39'	6"	68'	1"
889	9	17	11	10	14	12						4'	0"	53'	4"	25'	8"	83'	0"
890	10	14	16	10	10	17						3'	10"	53'	4"	27'	6"	84'	8"
891	8	14	11	15	16	10						2'	4"	13'	4"	45'	10"	61'	6"
892	9	12	19	11	14	10						2'	4"	40'	0"	23'	6"	70'	10"
893	8	16	12	13	14							2'	2"	26'	8"	27'	4"	56'	2"
894	8	14	14	17	13	7						2'	4"	23'	8"	29'	3"	58'	3"
895	8	18	12	14	10							2'	6"	26'	8"	21'	8"	50'	10"
896	9	16	14	15	10	11						2'	2"	13'	4"	42'	10"	58'	4"
897	8	14	17	17	14							2'	2"	26'	8"	31'	4"	60'	2"
898	12	16	16	18	12	14						3'	0"	26'	8"	43'	8"	73'	4"
899	8	19	12	12	14							2'	8"	53'	4"	24'	3"	80'	3"
900	10	19	10	17	12	10						3'	1"	66'	8"	21'	10"	91'	7"
901	8	14	14	13	9							3'	4"	56'	8"	41'	2"	70'	2"
902	7	16	11	14	16							2'	4"	26'	8"	34'	10"	63'	10"
903	9	12	14	14	17	10						2'	6"	40'	0"	33'	0"	75'	6"
904	9	12	14	14	12	16						2'	8"	53'	4"	27'	0"	83'	0"
905	10	11	12	10	9	15						3'	0"	40'	0"	33'	7"	76'	7"
906	8	14	16	12	14							1'	10"	26'	8"	31'	2"	59'	8"
907	9	12	14	15	12	12						2'	0"	26'	8"	36'	0"	64'	8"
908	9	13	13	12	14	12						2'	4"	40'	0"	23'	6"	68'	10"
909	8	12	14	9	10	6						3'	0"	66'	8"	19'	10"	89'	6"
910	10	16	15	8	9	11						2'	8"	23'	8"	30'	0"	59'	4"
911	9	16	12	12	10	9						3'	0"	53'	4"	22'	6"	78'	10"
912	9	14	11	13	13	10						3'	2"	53'	4"	21'	4"	77'	10"
913	10	12	13	14	14	9						3'	0"	53'	4"	30'	8"	87'	0"
914	9	13	16	12	16	10						4'	2"	40'	0"	34'	11"	79'	1"
915	8	14	16	12	13							3'	0"	40'	0"	29'	7"	72'	7"
916	9	16	11	13	13	10						3'	2"	34'	8"	29'	0"	66'	10"
917	8	14	12	14	14							4'	4"	53'	4"	22'	10"	80'	6"
918	13	14	12	13	11	13	10	6				4'	1"	40'	0"	42'	4"	86'	5"
919	9	14	12	13	12	11						3'	10"	53'	4"	21'	8"	88'	10"
920	10	13	16	12	12	13						4'	2"	53'	4"	29'	8"	87'	2"
921	10	16	13	14	12	12						4'	0"	26'	8"	41'	6"	72'	2"
922	9	12	14	14	13	10						4'	2"	40'	0"	31'	10"	79'	0"
923	10	14	11	11	6	15	6					4'	4"	49'	0"	43'	0"	87'	4"
924	9	12	13	13	16	16						4'	0"	26'	8"	43'	6"	74'	2"
925	9	13	12	14	15	12						3'	10"	26'	8"	40'	8"	71'	2"
926	8	12	13	14	10							2'	8"	40'	0"	32'	7"	75'	3"
927	10	14	14	11	10	9						2'	6"	26'	8"	42'	6"	71'	8"
928	8	15	13	11	14							2'	10"	40'	0"	29'	8"	72'	6"

TABLE IV — (Concluded).

SPECIMEN NUMBER <i>Continued.</i>	Diameter of top in inches.	TOP MEASUREMENTS.										Height of stump.	Combined length of logs.	Length of top.	Total height.
		Number of rings per inch at top, counting from the heart outward.													
929....	9	13	14	10	10	9	.....	.....	.....	.....	.....	2' 8"	40' 0"	28' 10"	71' 6"
930....	11	12	12	14	9	8	.....	.....	.....	.....	.....	3' 0"	53 4	29 11	86 3
931....	8	12	11	10	10	.....	.....	.....	.....	.....	.....	3' 1	40 0	26 4	69 5
932....	8	14	13	13	11	.....	.....	.....	.....	.....	.....	3' 4	53 4	22 6	79 2
933....	8	11	13	12	12	.....	.....	.....	.....	.....	.....	3' 0	26 8	32 7	62 3
934....	9	10	11	13	11	10	.....	.....	.....	.....	.....	4' 4	26 8	44 7	75 7
935....	10	14	11	10	14	.....	.....	.....	.....	.....	.....	3' 2	40 0	33 8	76 10
935....	8	12	14	14	9	.....	.....	.....	.....	.....	.....	2' 10	40 0	31 2	74 0
937....	8	13	13	16	14	.....	.....	.....	.....	.....	.....	2' 2	26 8	36 7	65 5
938....	8	13	14	15	14	.....	.....	.....	.....	.....	.....	2' 4	40 0	26 10	69 2
939....	8	14	16	16	12	.....	.....	.....	.....	.....	.....	3' 2	66 8	31 7	91 5
940....	11	12	13	16	14	11	.....	.....	.....	.....	.....	3' 1	40 0	29 10	72 11
941....	8	12	14	14	12	.....	.....	.....	.....	.....	.....	2' 10	53 4	22 4	78 6
942....	11	12	12	13	14	16	8	.....	.....	.....	.....	3' 4	40 0	33 6	76 10
943....	9	14	14	14	12	10	.....	.....	.....	.....	.....	3' 0	40 0	31 4	74 4
944....	9	14	10	13	13	11	.....	.....	.....	.....	.....	3' 0	40 0	31 0	74 0
945....	11	14	16	14	15	10	10	.....	.....	.....	.....	2' 6	40 0	30 4	72 10
946....	12	14	16	14	13	12	12	14	.....	.....	.....	2' 10	26 8	49 10	79 4
947....	8	16	12	10	11	12	.....	.....	.....	.....	.....	2' 10	26 8	31 4	60 10
948....	9	14	14	11	13	16	.....	.....	.....	.....	.....	3' 6	40 0	28 4	71 10
949....	9	18	12	13	13	10	.....	.....	.....	.....	.....	3' 2	40 0	26 10	70 0
950....	10	14	12	12	15	11	.....	.....	.....	.....	.....	3' 2	53 4	27 9	84 3
951....	13	16	4	14	16	10	11	8	.....	.....	.....	2' 10	13 4	50 4	66 6
952....	9	12	16	11	12	9	.....	.....	.....	.....	.....	4' 0	26 8	28 6	59 2
953....	10	12	16	12	13	11	.....	.....	.....	.....	.....	4' 0	53 4	26 4	83 8
954....	10	14	12	14	13	10	.....	.....	.....	.....	.....	3' 6	53 4	19 6	86 4
955....	8	14	16	12	10	.....	.....	.....	.....	.....	.....	3' 10	26 8	33 2	63 8
956....	8	16	17	9	11	.....	.....	.....	.....	.....	.....	3' 4	26 8	30 10	60 10
957....	10	17	19	11	10	9	.....	.....	.....	.....	.....	3' 6	26 8	38 3	68 5
958....	8	12	12	14	14	.....	.....	.....	.....	.....	.....	3' 2	26 8	33 4	63 2
959....	9	18	11	13	12	.....	.....	.....	.....	.....	.....	2' 7	40 0	26 8	69 3
960....	8 1/2	11	14	14	12	12	.....	.....	.....	.....	.....	2' 8	40 0	24 10	67 6
961....	8 1/2	14	15	15	10	12	.....	.....	.....	.....	.....	2' 10	40 0	29 3	72 1
962....	11	6	9	14	16	15	18	.....	.....	.....	.....	2' 6	26 8	42 7	71 9
963....	9	13	11	11	17	14	.....	.....	.....	.....	.....	2' 8	40 0	30 3	72 11
964....	12	7	8	10	16	17	19	.....	.....	.....	.....	3' 0	40 0	28 11	71 11
965....	10	14	16	12	19	11	.....	.....	.....	.....	.....	3' 0	53 4	28 7	84 11
966....	8	12	12	17	11	.....	.....	.....	.....	.....	.....	2' 4	40 0	19 10	62 2
967....	8	14	16	11	9	6	.....	.....	.....	.....	.....	2' 10	40 0	26 4	69 2
968....	8	19	14	10	8	.....	.....	.....	.....	.....	.....	2' 8	26 8	25 0	54 4
969....	10	9	21	17	12	8	.....	.....	.....	.....	.....	3' 0	53 4	21 10	78 2
970....	9 1/2	16	19	11	18	7	.....	.....	.....	.....	.....	3' 0	40 0	32 6	75 6
971....	8	10	18	17	11	11	.....	.....	.....	.....	.....	3' 1	26 8	35 7	65 4
972....	8	9	17	12	15	.....	.....	.....	.....	.....	.....	2' 4	26 8	30 0	59 0
973....	8 1/2	12	16	16	11	8	.....	.....	.....	.....	.....	2' 6	26 8	26 9	55 11
974....	9	17	20	13	14	8	.....	.....	.....	.....	.....	2' 0	13 4	42 3	57 7
975....	9 1/2	12	19	16	10	10	.....	.....	.....	.....	.....	2' 2	26 8	36 10	65 8
976....	9	16	11	15	16	8	.....	.....	.....	.....	.....	2' 4	26 8	39 0	68 0
977....	8	14	13	17	11	.....	.....	.....	.....	.....	.....	1' 10	40 0	31 2	73 0
978....	8 1/2	14	11	18	15	6	.....	.....	.....	.....	.....	2' 4	26 8	36 10	65 10
979....	8	16	11	15	12	.....	.....	.....	.....	.....	.....	2' 0	26 8	38 6	67 2
980....	8	16	11	13	14	.....	.....	.....	.....	.....	.....	1' 11	26 8	24 9	63 4
981....	8	14	12	18	10	.....	.....	.....	.....	.....	.....	2' 2	26 8	33 6	62 4
982....	9	16	12	19	18	11	.....	.....	.....	.....	.....	2' 8	40 0	29 4	72 0
983....	12	21	17	12	14	18	8	.....	.....	.....	.....	2' 9	40 0	40 2	82 11
984....	9	19	18	11	16	12	.....	.....	.....	.....	.....	2' 4	26 8	30 0	59 0
985....	10	20	14	19	11	10	.....	.....	.....	.....	.....	2' 3	40 0	28 6	70 9
986....	12	19	19	12	14	14	10	.....	.....	.....	.....	2' 10	40 0	38 3	81 1
987....	8 1/2	16	16	10	15	12	.....	.....	.....	.....	.....	2' 6	40 0	34 4	76 10
988....	8	11	19	12	14	.....	.....	.....	.....	.....	.....	1' 4	26 8	31 6	59 6
989....	8	14	16	15	12	.....	.....	.....	.....	.....	.....	3' 0	26 8	40 4	70 0
990....	8	12	19	13	13	.....	.....	.....	.....	.....	.....	2' 10	26 8	23 0	52 6
991....	10	14	16	12	12	14	.....	.....	.....	.....	.....	2' 8	26 8	26 10	56 2
992....	8	14	14	19	10	.....	.....	.....	.....	.....	.....	2' 9	40 0	27 6	70 3
993....	8	16	12	17	11	.....	.....	.....	.....	.....	.....	1' 11	26 8	31 8	60 3
994....	8	14	13	19	8	.....	.....	.....	.....	.....	.....	2' 2	13 4	36 0	51 6
995....	9	19	18	14	10	.....	.....	.....	.....	.....	.....	2' 4	26 8	34 10	63 10
996....	10	19	21	20	11	11	.....	.....	.....	.....	.....	2' 6	40 0	28 6	71 0
997....	9	23	19	17	8	.....	.....	.....	.....	.....	.....	2' 0	13 4	52 2	67 6
998....	8	11	17	16	12	.....	.....	.....	.....	.....	.....	2' 3	40 0	24 6	66 9
999....	8	12	19	17	14	.....	.....	.....	.....	.....	.....	2' 1	26 8	31 4	80 1
1000....	9	16	12	19	20	16	.....	.....	.....	.....	.....	2' 0	26 8	38 2	86 10

In connection with the preceding tables it may be stated that all of the 700 trees first examined were found on Township 20, Franklin county, between two large ponds, Floodwood and Long Pond. The two main slopes on this land run north and south, with little or no difference in the timber on either slope. This township has an average elevation of about 1,600 feet above the sea. The spruce was above the average in quantity per acre, and in quality it was first class. The trees were thrifty, but few being found that were rotten at the stump. Not a tree had died within the past ten years, the absence of any dead spruce having been noted by the foresters. In size the trees were above the average diameter for Adirondack black spruce.

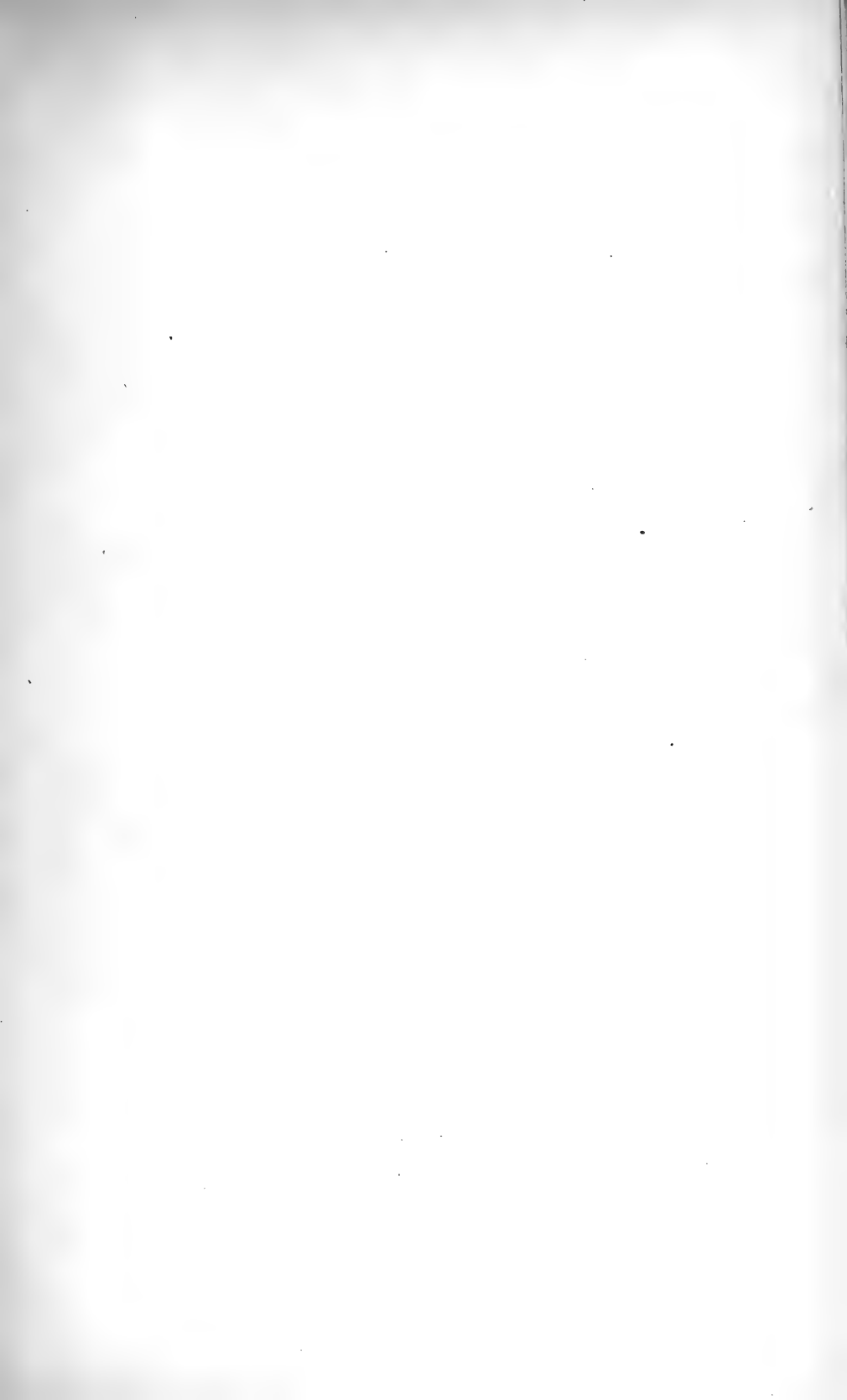
On Township 20, in a few places where the spruce was standing in "clumps," there was a yield of 40 standard logs (8,000 feet, B. M.) per acre; where it was scattered through the other timber, 15 standards (3,000 feet) would be a fair average.

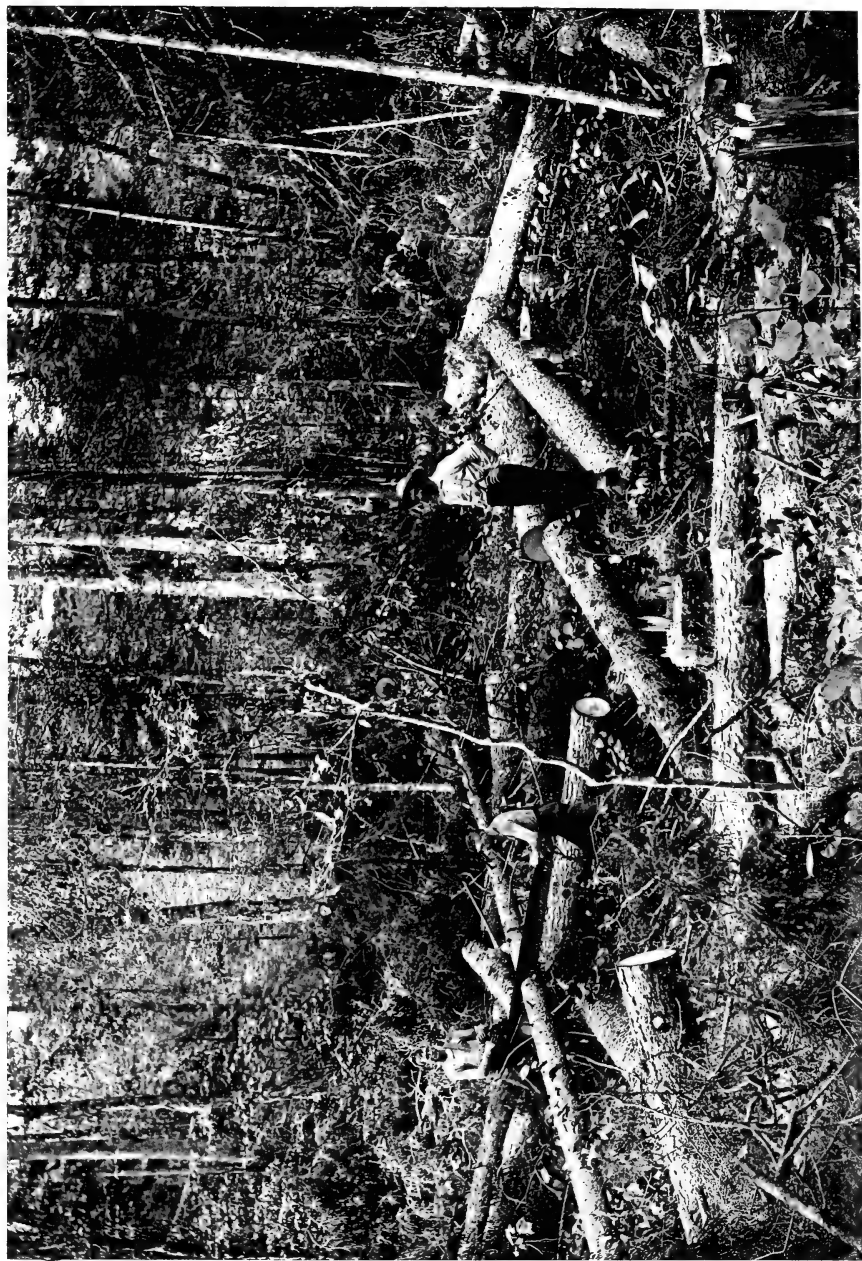
On Lots 34 and 35, Township 3, St. Lawrence county, the spruce growing in clumps measured, in two different places, 35 standard logs (7,000 feet) to the acre. Where it was scattered among other species, it measured 12 standards per acre on an average.

On Lots 50 and 63, Township 3, St. Lawrence county, the spruce did not grow in clumps at all, but averaged 15 standard logs to the acre.

The spruce in each case was growing either in small clumps or was scattered among hardwoods composed of beech, hard maple, and yellow birch, the beech predominating in number of trees, although of inferior diameter and height. The black spruce overtops the hardwoods where its diameter exceeds 14 inches; when standing in clumps it is taller than the scattered spruces of the same diameter growing among the hardwoods. Where it grows in clumps the spruce has a small crown, the limbs being small and short; but in a scattering growth the spruces, as soon as they overtop surrounding hardwoods, put out their limbs thickly and large.

A spruce 20 inches in diameter growing in a clump of spruces will yield five logs, 13 feet 4 inches in length, while one of the same diameter in a scattered growth mixed with hardwoods will yield but four logs. In the one growing among hardwoods, after four logs





G. H. Risson, Photo.

SAWING FALLEN TREES INTO LOGS.

have been cut from its trunk, the diameter of the last or top log at its small end will be from 10 to 12 inches, but the limbs above this point will be so thick and large that the fifth log would not be over five or six inches at the top, and would not be accepted by the lumbermen. A tree of the same species and size growing in a clump will yield five logs, because the shaft does not diminish in size so fast owing to the lighter growth of limbs that form its top. While the largest spruces are found scattered among the hardwoods, the tallest ones of like diameters are found growing in the spruce clumps.

A coarse, gravelly soil, with a southern or western slope, seems most favorable for the best development of this species. Before the axemen came into this locality there was an ample growth of young spruces or nurslings thickly scattered throughout the timber; but where the spruce grew thickly, the felling of trees scarred and broke down most of the nurslings. Where the spruce was scattered through the hardwoods the young trees did not suffer so much from the careless felling of the axemen.

The spruce blight of twenty years ago did not make its appearance in Township 20, on which the first 700 trees examined were growing. In fact, this locality is remarkable for its exemption from injury in that respect.

There are but few balsams (*Abies balsamea*) growing among the spruces which furnished the specimens examined by the foresters, although many trees of this species are growing along the edges or shores of neighboring swamps and ponds. The balsam in this vicinity is small, ranging from three to seven inches in diameter near the ground. It is very scarce, however, in the vicinity of this spruce growth, there being many acres on which no balsam is found; neither was there any cedar. There are a few tamaracks (*Larix Americana*) on these lots, but they are all dead, having succumbed to the attacks of the sawfly (*Nematus Erichsonii*) which within a few years has destroyed all the tamarack in the Adirondacks. But little white pine was found among the spruce where these measurements were taken. On the north shore of East Pine Pond, there was a piece of timber composed almost wholly of that species,—nice, thrifty, sound timber of large size. The owner, Mr. Snell, said

that he cut 1,000 standards (200,000 feet, B. M.) of white pine logs on less than ten acres of land near the west end of East Pine Pond. There were a few black ash trees scattered throughout the timber where the spruce was growing, but no cherry.

In Township 3, St. Lawrence county, a few elms were growing among the spruces and hardwoods, a species rarely seen in the Adirondack forest.

A noticeable feature in the growth of the black spruce is that the annual accretion of wood in the trunk is not concentric, the total growth being considerably greater on one side of the heart than on the opposite side. The extent of this eccentricity is apparent in some of the figures given in Table IV, in which the diameter of each tree is not only given, but the number of inches and growth per inch of the longest radius. For instance, Specimen No. 1 had a diameter of 18 inches on the stump, but the figures showing the number of annual rings for each inch in growth indicate that instead of nine inches, which would have been one half the diameter, there were eleven inches between the heart and the bark. Specimen No. 77 is fourteen inches in diameter, but the heart is nine inches from the bark. Specimen No. 135, with a diameter of thirteen inches, shows that there were nine inches between the bark and the heart. In Specimen 237 it will be seen that the heart was two inches nearer one side of the tree than the other. In No. 383 the radius is 17 instead of 12 inches. This lack of concentricity, as measured by the abnormal length of the longest radius, varies from one to five inches.

A remarkable feature of this one-sided growth is that it is mostly in one direction. The foresters who examined the trees in Township 20 were instructed to note carefully the compass point to which in each case the longest radius of tree growth pointed. Of 700 trees examined in Township 20, Franklin county, (the first 700 specimens in Table IV,) this abnormal or one-sided growth was directed as follows:

Direction.	Trees.
North	471
Northeast	81
East	106
South	1
West	27
Southwest	6
Northwest	8
	<hr/>
	700
	<hr/> <hr/>

There seems to be no satisfactory explanation of this tendency of the black spruce to a one-sided growth. After careful observations in search of some reason, no regular conditions of slope, exposure or environment were found upon which to base any theory. It has been asserted frequently, however, that this uneven growth on either side of the heart was due to an uneven distribution of the roots; and that the greater accretion in the tree trunk would be found on the side of the tree on which lay the largest roots.

In the preceding tables the indicated age of the tree is based upon the number of rings revealed by the stump; but in each case if the tree had been cut close to the ground a greater number of rings would have been found and consequently a greater age indicated. This should be borne in mind in connection with the statistics referred to. The stumps varied in height from one to four feet, the height of the stump depending in each case upon the convenience of the axeman and the position in which he stood while at work.

One column of figures in Table IV indicates the length of the section taken by the lumbermen for their logs, and represents one, two, or three logs of 13 feet 4 inches each, that being the length cut by the log-choppers in the Adirondack forests. For instance; in Specimen No. 6 (right-hand page), 26 feet and 8 inches of trunk were taken, showing that two logs were obtained from that tree. Specimen 19 shows that a section of the trunk 40 feet long was removed, from which it appears that this tree furnished three logs; and specimen 60, that 53 feet and 4 inches of

the tree trunk, making four logs, were taken. Specimen 83 shows that five logs aggregating 66 feet and 8 inches were taken, the top log being only eight inches in diameter at the top or small end. In this tree it appears, from the next column of figures, that only 15 feet and 5 inches of top remained, indicating that this tree, which was 84 feet 9 inches high, was not only tall, but cylindrical and free from limbs nearly to its crown. Specimen 87 was 93 feet and 7 inches high, and although taller than the one just mentioned, furnished the same number of logs, the top log, however, being 12 inches in diameter at its small end.

The tallest tree mentioned in Table IV is Specimen 839, which was 98 feet 6 inches high, and 22 inches in diameter on the stump. Specimen 832 was 26 inches in diameter, but only 87 feet 8 inches high, and furnished four logs instead of five. It will be noticed that many of the trees furnished only two logs and some only one, although they were of a fair height. The small number of logs obtained from a tree was due in some instances to rotten butts, or to the fact that there was too great a limb development at the top of the tree, the top measurements indicating in many cases that the trunk diminished in diameter, or "tapered" too rapidly.

In Table IV the figures showing the number of rings per inch indicate that the Adirondack black spruce when growing under natural conditions, where the trees are overcrowded and deprived of light, requires on an average over 24 years for an increase of two inches in diameter; but an examination of the figures shows that many of the trees, which had attained a height enabling them to dominate the surrounding ones, required from six to eight years only to gain two inches. Thus the tree represented by Specimen 43 was 30 years in gaining the third inch of radius while it was only seven years in growing an inch after its crown had reached to where it could gain proper nourishment. Specimen 456 evidently had the advantage of light and air from the time that it was a nursling, as is indicated by the comparatively small number of years required in adding each inch to its diameter.

From the measurements and notes made by Forester Humes — in Township 14, Town of Fine, St. Lawrence county — the following deductions as to the average age of the spruce are made:

TABLE V.

DIAMETER IN INCHES.	Number of trees.*	Maximum and minimum ages.	Average age.
13	10	138—200	173
14	9	145—275	181
15	4	174—203	184
16	5	167—201	183
17	6	156—200	183
18	4	173—200	184
19	23	184—283	211
20	15	189—289	212
21	15	199—291	246
22	19	107—345	248
23	16	189—300	266
24	19	178—301	270
25	29	195—302	270
26	15	231—354	285
27	18	258—316	288
28	7	271—301	281
29	7	273—333	304
30	5	275—325	299
31	4	231—293	272
32	1	290—...	290
33	1	285—...	285
34	3	302—374	330
36	2	326—351	338
	237		

* These trees do not represent any definite area or yield per acre, but were selected with reference to securing specimens of each diameter.

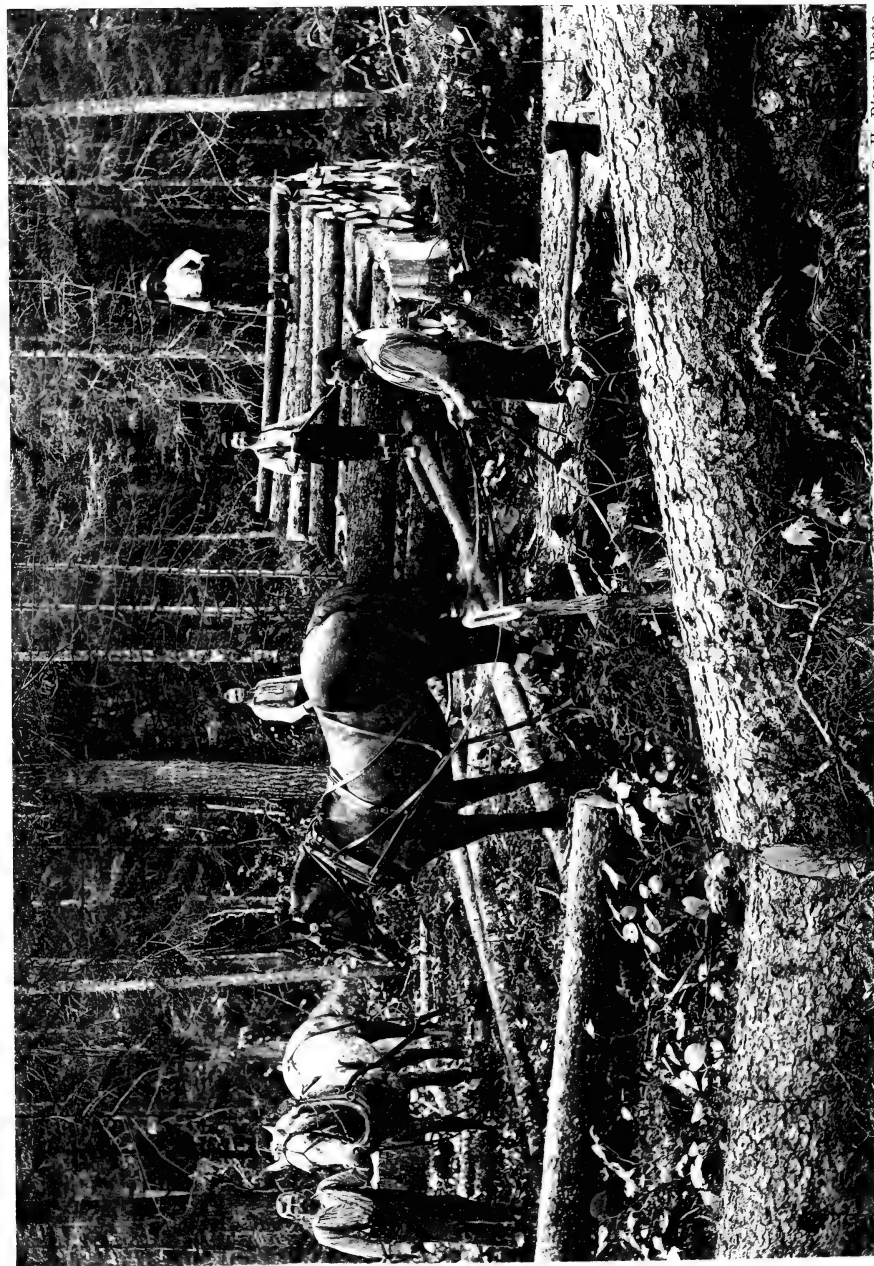
And from the measurements and notes made by Foresters Olmstead and Sanford in Township 20, Franklin county, and Township 3 ("Atherton"), St. Lawrence county, the following deductions as to the average age of the Adirondack spruce are made:

TABLE VI.

DIAMETER IN INCHES.	Number of spruce trees.	Minimum and maximum ages.	Average age.
12	217	96—185	128
13	177	102—210	139
14	187	104—214	143
15	71	114—217	151
16	113	116—212	154
17	53	121—236	161
18	77	130—209	154
19	17	95—200	174
20	53	133—235	184
21	4	156—227	185
22	12	162—224	189
23	4	149—234	186
24	10	160—226	195
25	1	213—...	213
26	1	197—...	197
27	3	217—226	222
	1,000		

We are unable to account satisfactorily for the difference in average age as indicated in the two preceding tables. It may be that if the figures in the first had included as large a number of trees and as wide a scope of territory as are embraced in the second table, that the two results would agree better. The average age as indicated in Table V corresponds substantially with that of the black spruce in Maine, as based upon measurements made by Mr. Austin Cary, whose report shows that the average age of the 12-inch spruce is 171 years; the 13-inch, 174 years; the 14-inch, 189 years, and the 15-inch, 185 years.

A remarkable feature in connection with the biology of the spruce is the exceedingly wide range of ages in trees of the same diameter. Thus, in Table VI it will be noted that of 187 trees all 14 inches in diameter on the stump, there is a difference of 110 years in some of the ages. Some will readily explain this



G. H. Risson, Photo.

SKIDDING LOGS.

wide divergence by claiming that in many cases there were two or more rings formed in single years owing to climatic effects, which is discussed later on.

But, in view of the short season in the Adirondacks during which the flow of sap is not checked, as might occur in trees which feel the influence of an early spring, only one ring could reasonably be expected for each year's growth. It is more reasonable to account for the rapid growth of some of the trees by the fact that these trees stood where they received more light and air; and for the slow growth of the others by the deprivation of the same.

Although the black spruce is the slowest in growth of all our forest trees, it does not require the number of years to attain maturity that are indicated by the preceding statistics. It must be borne in mind that these tables indicate the age of the spruce when growing under natural conditions, where it is deprived of a proper amount of light and air during the greater period of its growth. Starting as a seedling, the young tree struggles for many years in the cold and gloom of the underbrush, the first decade of its existence being merely a struggle for survival. This is evident from the figures in Table IV, in which so many trees show that over 30 years were passed in attaining their first inch of radius or two inches of diameter. Only through the survival of the fittest do these nurslings struggle upward until by overtopping the surrounding growth they gain light and air, after which their increase in rapidity of growth is plainly noticeable.

Now the black spruce of the Adirondacks does not require any such number of years to attain a merchantable size. On Lot 94, Township 21, in the Town of Long Lake, Hamilton county, there is at the present time a thick growth of spruce on a piece of land where the Rev. Robert Shaw, a local clergyman, according to his statement, mowed grass 26 years ago. Many of the trees in this clump of spruce are over 30 feet high and nine inches in diameter. Emerson* mentions seven spruce trees of 31 years' growth, in the Botanic garden, which averaged 30 inches in diameter, or one-third of an inch annual growth in diameter.

* Trees and shrubs of Massachusetts, by George B. Emerson.

In the office of the Forest Commission there are some carbon paper impressions showing growth rings taken from the stumps of spruce trees recently cut by lumbermen — trees which were growing in a spruce forest that had been lumbered 24 years ago, at which time all the larger spruce was taken out. The accelerated growth of the young spruces which were left, due to the admission of light and air through the removal of the large trees, is plainly seen in the wider rings shown by the carbon impressions taken from the stumps. Up to and just preceding the time when the lumbermen first went into this forest these spruces were growing at a rate of 26 rings to the inch. Immediately after this thinning and interlucation there was an increased growth, as shown by the impression paper, at the rate of 11 rings to two inches.

We regret exceedingly that we are unable to reproduce in print these impression papers of tree rings so as to furnish them with this publication, for they argue plainly and incontestably as to the increased product and revenue which can be derived from our spruce forests where the cutting is done under an intelligent system.

That the number of rings disclosed by the cross-section of a tree-trunk indicates the years of age is a generally accepted fact. It is so taught in all text-books pertaining to the subject. Asa Gray states that "the trunk of an exogenous tree, when cut off at the base, exhibits as many concentric rings of wood as it is years old."

Emerson* says of these tree rings that "a single circle attains maturity, in temperate regions, every year."

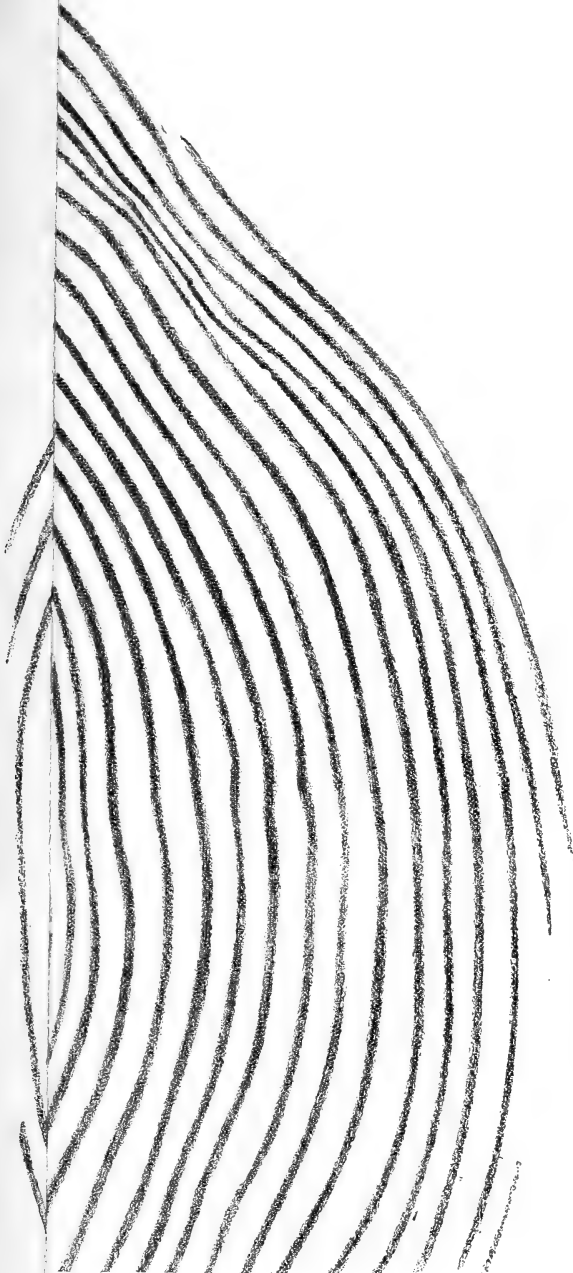
Goodale† states that this "development of the film of growth is usually continuous in a given season, but it may be interrupted, in which case it is possible to have two rings added to the wood in a single year, whereas, *as everyone knows, there is usually only one new ring for each year's growth.*"

The "interrupted" growth just referred to is the result of a period of cold weather acting upon trees which in the same season have felt previously the influence of an early spring. But in

* Trees and shrubs of Massachusetts, by George B. Emerson.

† Garden and Forest, Vol. II, March 20, 1889: Principles of Physiological Botany, as applied to Forestry; by George Lincoln Goodale.

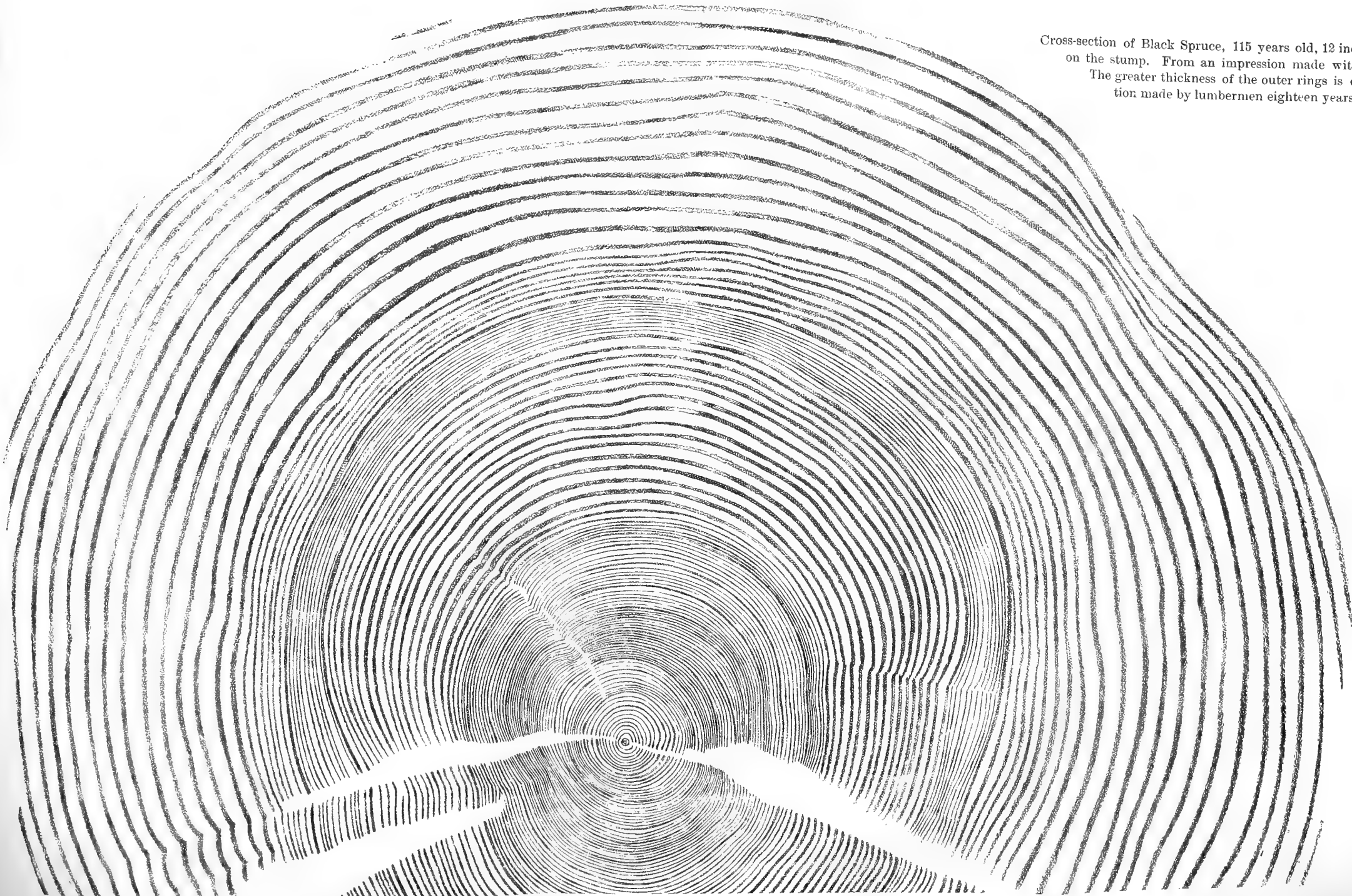
cross-section of Black Spruce, 115 years old, 12 inches in diameter
on the stump. From an impression made with carbon paper.
The greater thickness of the outer rings is due to interluca-
tion made by lumbermen eighteen years ago.



Direction of longest radius. N

NATURAL SIZE.

Cross-section of Black Spruce, 115 years old, 12 inches in diameter on the stump. From an impression made with carbon paper. The greater thickness of the outer rings is due to interlucation made by lumbermen eighteen years ago.



N
Direction of longest radius.

THE LIFE HISTORY OF A TREE.

Albany Eng. Co.



the cold, backward climate which prevails in the habitat of the Adirondack spruce there is no early spring, and no premature starting of the sap or liability to such interruptions. In that region spring is late in coming, and barely ushers in the summer.

Hough * says: "The record of the seasons for a long period may be determined, at least in effect, by the width of the rings of annual growth. We sometimes find, at recurring intervals, a narrow ring, perhaps every third year, that may have been caused by the loss of leaves from worms that appear at that interval, and that have thus left their record when every other proof of their presence has perished. We have seen sections of trees in the museums of Schools of Forestry, in which these proofs were recorded through a century or more of time, and the years could be definitely fixed by counting inward from the year when the tree was felled.

"When the bark and wood of a tree are cut or wounded by accident, as by the marking hammer of the forester, or the axe of a surveyor, the growth from the side will gradually close over the injury, and fill in the inequalities, so that, when afterward split off, it will often show in relief any depressions or cuts on the original trunk. Many Forest Academies in Europe have in their museums specimens of timbermarks thus cut or stamped into wood, with the cast taken by nature from the mold. The landmarks of surveyors have thus been found more than a hundred years afterward. Some scar, or, in coniferous trees, perhaps a gum spot, would be noticed upon the outside, and by cutting down through as many rings of growth as there had been years since the former survey, the marks of the ax would be found."

It is no new idea. Over 400 years ago, Leonardo da Vinci†, who was an observant botanist as well as a great painter, wrote: "The rings of the branches of trees show how many years they have lived, and their greater or smaller size whether they were damper or drier. They also show the direction in which they were turned, because they are larger on the north side than on the south, and for this reason the center of the tree is nearer the bark on the south than on the north side."

But these statements need not rest upon any botanical theory. In the course of our work we have often found it necessary to

* Elements of Forestry, by Franklin B. Hough, Ph. D.

† *Il Nuovo Giornale Botanico Italiano*: Vol. I, No. 1, 1869.

re-establish the old boundary lines of various townships in the Adirondack forest. The surveyors have repeatedly cut blocks out of line trees in which the old original "blaze" was grown over with wood and hidden from sight; but the number of tree rings outside the original but concealed scar of the blaze mark corresponded exactly with the number of years which had elapsed since the time when the surveyors first ran the line. This curious and interesting phenomenon has been observed so often in the course of our work that it has ceased to attract attention as a novelty. Many suits involving the title to or possession of land have been decided in courts on the evidence of some surveyor who proved the date of an old survey by introducing as evidence a block of wood cut from a line tree.

In view of the general belief that the annular grains of tree growth are coincident in number with the years of age, it is interesting to note that this idea is strongly combated by some careful observers. While we do not agree with the conclusions in the following article, it is reproduced here as an interesting contribution to the literature pertaining to this subject. The article is reprinted from the *Saw-Mill Gazette* :

GROWTH RINGS ON TREES.

Age said not to be indicated by them.

"There is an old landmark on the DeLarm farm that is of considerable interest. The farm is located on what is known as the 'high road' to DuBois from Reynoldsville. The landmark, which is a notch in a tree, locates a corner of the DeLarm farm, which is in Jefferson county. The landmark also locates the boundary line between Jefferson and Clearfield counties. When the notch was cut Clearfield and Jefferson counties had not been organized, and the line ran between two other counties. The line still remains, though it does not now mark the boundary of either of the original counties. The notch was cut into the tree in 1785, just 108 years ago. This fact is proven by the rings in the tree that are visible and which number 108. Sometimes parts of a tree containing a notch similar to this one, establishing a corner, are taken into court and are accepted as evidence. The date, designated by the number of rings, is also accepted."—*Reynoldsville Volunteer*, Pa.

"The above item is from a recent copy of a Pennsylvania journal, and serves to show how tenaciously man clings to old fallacies. Of all silly notions this idea of rings being an indicator of the age of trees seems to be most senseless, and yet, according to the above authority, the rings of a tree are accepted as evidence in courts.

If the determining of the age of a tree by the rings was one of those things that was difficult to controvert, then there might be some excuse for depending upon them, but when there are so many opportunities at hand to disprove the theory, to adhere to the fallacy is worse than ignorance—it becomes a species of bigotry.

Just how the notch proves what is asserted is not made clear, as any cut into the side of a healthy tree is sure to fill up by the outer growths after a series of years, but somewhere the authority for the statement found 108 rings, and forsooth the notch was cut 108 years ago; logic, and as a matter of course, "a horse chestnut must be a chestnut horse."

Had a section from an opposite side of the tree been cut there would have been found, without doubt, another number of rings, either less or more, or had the count been several feet above the notch the number would have been less, or below it a short distance there would have been found a greater number.

If the believers in the rings are to tell us the age of a tree thereby, they must settle just at what point the count is to be made for beginning at the ground and going upwards, it is found that the number of rings grows less as you ascend. This must be so from the natural course of things, as new shoots put out from the top and continue the upward growth of the tree every year. We can see no way out unless we make our count at the ground, but here even we encounter another difficulty, and one that is serious, if the tree should be one that has grown where one side is fully exposed to the sun and the other shaded. In that case, counting from the heart, it will be found that on the exposed side of the tree the number of rings is greatly in excess of the number on the shaded side.

A notable case is called to mind of a second-growth white ash that grew in a hedge on the south side of a fence. This tree showed forty clearly defined rings upon the south side of the heart, and, by a liberal allowance, after examining with a magnifying glass, thirty was the most that could be defined on the north side, so that it was just as easy to prove the tree thirty as it was to prove it forty years old. The same butt was cut off eight feet above the cutting kerf, and the number of rings had been reduced to twenty and sixteen. Curiosity led to a further examination and the stump was cut close to the ground, where no difficulty was experienced in counting sixty and forty-five rings, respectively.

A further proof was furnished by the recorded facts of the fence having been erected on that line thirty-five years before, as a boundary line between the estates of two brothers, being a part of a plot that was divided up between heirs, and the tree grew after the fence was built. Of course, such a case would not count against the prejudice of ages, but it becomes a stubborn fact, nevertheless.

Let anyone plant a number of seed—apple, peach or plum, something that grows quickly—care for the sprouts, and after three or four years cut them and count the growth-rings and thus satisfy himself. It is doubtful if two out of a dozen will contain the same number of rings, or if anyone will show a number corresponding with the age. The thriftier the shoot the greater the number of rings, and the more stunted and weak the specimen the less the number, and yet all may be of the same age and grown under similar conditions.

All roots, those used for food as well as those that are not, are of a woody nature, and where the circumstances are unfavorable the least thrifty of the edible show a fibrous, woody composition, and at times some are found that can not be cooked to make them fit for food. In all the growth rings are defined, but in none so clearly as in the beet. Not only does it show the rings, but it shows the porous state and medullary rays as well. These rings neither indicate days, months, moons or other time divisions. On a tender, thrifty root there may be a dozen or more rings, while a less thrifty one grown at its side may not show half that number. What will our seer tell us regarding the ages of these beets?

Leaving all other tests aside, there is a law of nature that upsets all this annular ring growth theory. Everything has its growing, ripening and decaying season. The tree, like the straw of wheat, grows to its full, ripens and then dies. A tree may be vigorous and put on wood, or, in other words, grow for one hundred years, but that hundred years does not mark its life; for fifty or even a hundred more years the life sap may be sufficient to nourish and maintain the growth already made, but not enough to put on new wood, and another fifty or hundred years may pass, during which no new growth is made, and during which the vital fluid is sufficient to maintain the tree in full vigor, during which it slowly but surely dies. Here may be three hundred years of life, and yet, during two hundred years, not an ounce of new wood has been added, and yet, in face of all, men will assert that they can determine the age of a tree by its rings.

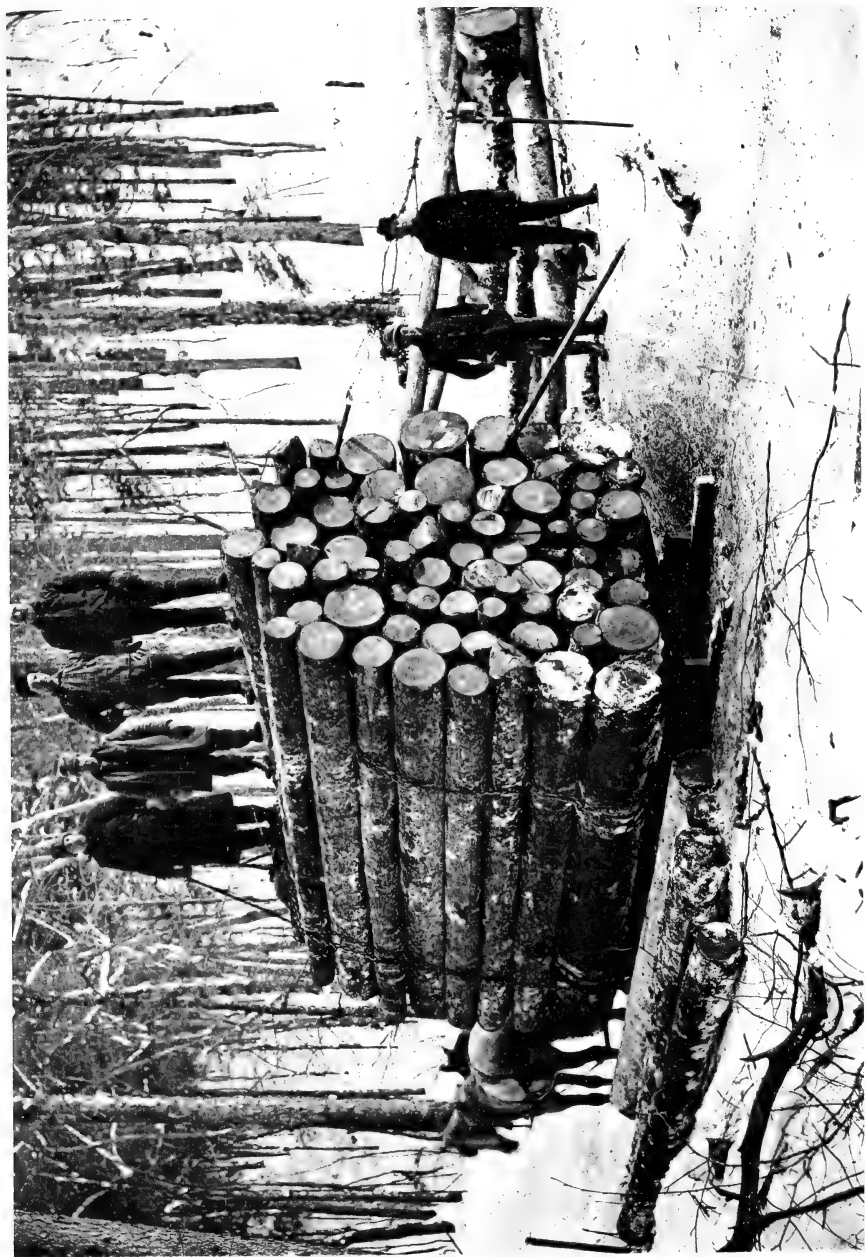
What, then, are these rings and what do they determine? The common-sense answer is, they are growth rings—nothing more. One may be the result of a year, a month or a week or any other division of time; all depends upon circumstances. If an entire summer has been moist

and vegetation has suffered no drawback from drouth or cold, it is barely possible that the entire growth of that season will be represented by a single ring, but even this is doubtful, as it is the thin sap which flows nearest the bark that nourishes the growth, and if an extra large growth is formed the sugar and glutinous matter in the sap may thicken and impede the flow of the more watery portion, and by forcing it into the new inner bark cause a new growth; but if, after a growing period, there comes a drouth sufficient to rob the roots of the necessary moisture, the sap in the wood thickens and the more watery seeks the inner bark, through which it carries nourishment to the leaves. This is often insufficient, and many leaves fall and others wilt, but with a fall of rain the supply of vital fluid is increased, the leaves brighten up and the smaller ones grow. New life is imparted, and with this new life comes a new growth, another ring is formed, and so on through the entire season. Who living in the north has not seen the leaves nipped by a frost after they were full and fall to the ground? After a few warm days and a warm rain new leaves start and the tree is soon in full foliage, but there has been a check to growth and a new growth starts with the new leaf. Thus, one cause another checks one growth and invites another, making a ring each time entirely independent of years."—*Saw-Mill Gazette*.

Mr. Austin Cary, of Bangor, Me., who, acting under instructions from the National Forestry Bureau, has been engaged in the Maine forests in counting tree rings with a view to establishing the age of the black spruce in that State, calls attention in his report to certain facts which throw some light on this matter of variable or retarded tree growth:

"While carrying out the field work, which is behind all these statements, facts were found proving the influence of the weather on the growth of trees. In May, 1893, while at work on the Androscoggin river, word came from Mr. J. A. Pike, of Berlin, N. H., that record was to be seen in the spruces of a series of cold years which occurred in the early part of the century. This was richly worth examination, and I immediately set about investigating the matter. Beginning the count of rings with the bark, it was found on the first log examined that a number of rings, being in that case the seventy-ninth to the eighty-third from the bark, were very distinctly thinned. Continuing the search, every tree was found to have a belt of thin rings in substantially the same position, these being reduced in some cases almost to microscopic.

"As soon as access could be had to books the history of the matter was looked up, and it was found that the years 1812 to 1816 in Maine were very extraordinary years. The temperature was unusually low as an average, and in 1812, 1815 and 1816, at least, frosts or snows or both occurred in the summer. In 1815 and 1816 crops through the State were very seriously impaired, and many people despairing of the agricultural prospects of the



G. E. Rison, Photo.

LOG HAULING IN THE ADIRONDACKS.
(At the "double-header.")

country emigrated to the Ohio valley. This severe weather then was without doubt the cause of the thin rings so regularly found in the spruce trees.

“Since that time this zone of rings has been found in spruce trees in all parts of the State and in the northern portion of New Hampshire. Careful notes of its character and occurrence were taken, in the course of other study, and the facts observed and inferences drawn will be found in full in the publications of the United States Forestry Division.

“This belt of thin rings can be seen by anyone who will take the trouble to examine carefully any good sized spruce log. It demonstrates the effect of inclement seasons on the growth of trees, and it is further of value in that while there is some variation about it, the approximate regularity of its position, the close correspondence in number of the rings outside the thin belt with the seasons that have elapsed since the cold year, gives added confidence in the substantial regularity of ring deposit and consequently in the results of investigation which proceed on that assumption.

“An instance of the effect of exposure on the growth of trees I am able to present through the interest of Mr. William Monroe, of Bangor. In the winter of 1893-94 he scaled* a landing of spruce hauled into Silver lake in the Town of Katahdin Iron Works, from a piece of ground on the south slopes of Saddle Rock Mountain, which had never before been cut. The soil was a deep red loam, and the spruce was gathered along brook runs or scattered amongst the hardwood growth intervening. But the point is that the timber was divided between two separate slopes of the mountain, the upper one of which was some 200 feet above the lower, and considerably more exposed.

“The timber from each slope was yarded on the more level land at its base, and Mr. Monroe kept a separate scale of the two lots. A marked difference in the size of the trees is found. The logs cut on the upper and more exposed slope were 4,377 in number, and scaled 435,726 feet, B. M., or $99\frac{1}{2}$ feet to the piece. The lower lot numbered 2,598 sticks, and the total scale was 320,811 feet, or $123\frac{1}{2}$ feet to the piece. The difference is 24 per

* Measured.

cent. of the smaller piece. No other cause for it being apparent, the difference in the size of the trees seems to be due to their greater or less exposure."

FOREST COMPOSITION.

Throughout the entire forest, covering the Adirondack Plateau, where the altitude exceeds 1,300 feet, the hardwood growth accompanying the black spruce is in almost every locality made up of maple, beech and yellow birch. Here and there, but at widely separated intervals, are scattering specimens of the white and black ash, black cherry, elm, basswood, "hardhack"* (*Ostrya Virginica*), and white birch. On burned areas or reforested clearings the poplars and "pin" cherries (*Prunus Pennsylvanica*) grow in abundance, but are seldom seen growing with the spruce in the primeval woods.

In order to give some idea of the general composition of the Adirondack woods, the foresters were directed to measure off in different places an acre or more of ground and count each tree within the space, noting, also, its diameter and species. They were further instructed to take pains that the localities selected should be ones in which the growth had no unusual characteristics, and which would fairly represent the number and proportion of the various species per acre.

Foresters Olmstead and Sanford accordingly selected four acres on Lot 39, Township 20, Franklin county, in the immediate vicinity of the forest in which they examined the trees embraced in the first 700 specimens of Table IV. These four acres are situated about four miles west of the head of the Upper Saranac Lake, and near the line of the Adirondack division of the New York Central railroad. Their notes do not embrace the young trees of seven inches in diameter or less, of which there was the usual proportion standing among the others. The undergrowth, like that of all the Adirondack forests, was somewhat dense, being composed largely of "witch hopple" (*Viburnum lantanoides*) and striped maple (*Acer Pennsylvanicum*). The mountain maple (*Acer spicatum*) was not plentiful, this species apparently seeking the roadsides or openings.

* Local, for iron-wood.

TABLE VII.

ACRE No. 1.

Lot 39, Township 20, Franklin County.

DIAMETER.	Spruce.	Hemlock.	Balsam.	Birch.	Maple.	Beech.	Total.
8 inches	20	8	2	.....	1	22	53
9 "	6	5	1	.....	.....	7	19
10 "	8	2	2	1	4	13	30
11 "	4	1	.....	.....	1	5	11
12 "	4	4	1	1	8	11	29
13 "	7	.....	.....	.....	3	3	13
14 "	1	.....	.....	2	2	3	8
15 " .....	.....	.....	.....	2	.....	.....	2
16 " .....	.....	.....	.....	2	5	4	11
17 " .....	.....	.....	.....	.....	.....	.....	.....
18 " .....	.....	.....	.....	.....	2	2	4
19 " .....	.....	.....	.....	.....	.....	.....	.....
20 "	1	1	.....	3	4	.....	9
21 " .....	.....	.....	.....	.....	.....	.....	.....
22 " .....	.....	.....	.....	.....	1	.....	1
23 " .....	.....	.....	.....	.....	.....	.....	.....
24 " .....	.....	1	.....	1	.....	.....	2
25 " .....	.....	.....	.....	.....	.....	.....	.....
26 " .....	.....	.....	.....	.....	.....	.....	.....
27 " .....	.....	.....	.....	.....	.....	.....	.....
28 " .....	.....	.....	.....	1	.....	.....	1
	51	22	6	13	31	70	193

Average diameter, including eight inches and upwards:—
 Spruce, 10 inches; hemlock, $10\frac{1}{2}$ inches; balsam, $9\frac{1}{2}$ inches;
 yellow birch, $17\frac{1}{4}$ inches; maple, $14\frac{1}{5}$ inches; beech, $10\frac{1}{2}$ inches.

TABLE VIII.

ACRE No. 2.

Lot 39, Township 20, Franklin County.

DIAMETER.	Spruce.	Hemlock.	Balsam.	Birch.	Maple.	Beech.	Total.
8 inches	18	13	5	1	.....	16	53
9 "	3	3	2	.....	.....	2	10
10 "	7	4	.....	3	.....	8	22
11 "	6	2	.....	.....	2	2	12
12 "	5	11	1	3	1	10	31
13 "	5	2	.....	3	.....	.....	10
14 "	3	3	.....	2	3	1	12
15 "	1	.....	.....	.....	.....	.....	1
16 "	1	1	.....	.....	2	1	5
17 "	1	.....	.....	.....	1	.....	2
18 "	3	.....	.....	1	.....	.....	4
19 " . . . . .	.....	.....	.....	.....	.....	.....	.....
20 " . . . . .	.....	.....	.....	2	.....	.....	2
	53	39	8	15	9	40	164

Average diameter, including eight inches: Black spruce, $10\frac{1}{2}$ inches; hemlock, $10\frac{2}{3}$ inches; balsam, $8\frac{3}{4}$ inches; yellow birch, $13\frac{1}{4}$ inches; hard maple, $13\frac{3}{8}$ inches; beech, $9\frac{9}{10}$ inches.

TABLE IX.

ACRE No. 3.

Lot 39, Township 20, Franklin County.

DIAMETER.	Spruce.	Hemlock.	Balsam.	Birch.	Maple.	Beech.	Total.
8 inches	18	15	2	1	.....	25	61
9 " "	6	.....	.....	.....	.....	.....	6
10 " "	17	10	.....	2	1	10	40
11 " "	5	2	1	.....	.....	3	11
12 " "	14	6	.....	8	2	6	36
13 " "	6	.....	.....	1	.....	.....	7
14 " "	11	2	.....	3	1	3	20
15 " "	1	1	.....	2	.....	.....	4
16 " "	2	.....	.....	2	.....	3	7
17 " "	.....	.....	.....	1	.....	.....	1
18 " "	.....	1	.....	2	2	.....	5
19 " "	.....	.....	.....	.....	.....	.....	.....
20 " "	.....	.....	.....	.....	.....	.....	.....
21 " "	1	.....	.....	.....	.....	.....	1
22 " "	1	1	.....	.....	1	.....	3
23 " "	.....	.....	.....	.....	.....	.....	.....
24 " "	1	2	.....	.....	2	.....	5
29 " "	.....	1	.....	.....	.....	.....	1
33 " "	.....	1	.....	.....	.....	.....	1
	83	42	3	22	9	50	209

Average diameter, including eight inches: Black spruce, $11\frac{3}{4}$ inches; hemlock, $12\frac{1}{4}$ inches; balsam, 9 inches; yellow birch, $13\frac{1}{3}$ inches; hard maple, $17\frac{1}{3}$ inches; beech, $9\frac{1}{2}$ inches.

TABLE X.

ACRE No. 4.

Lot 39, Township 20, Franklin County.

DIAMETER.	Spruce.	Hemlock.	Baisam.	Birch.	Maple.	Beech.	Total.
8 inches	14	9	1	1		5	30
9 "							
10 "	9	4	1	1		5	20
11 "	5					2	7
12 "	11	4		4	1	5	25
13 "	4			1			5
14 "	6	2		1		4	13
15 "	3			1	2	2	8
16 "				3	1	4	8
17 "	2						2
18 "	4				1		5
19 "							
20 "				2	1		3
21 "	1				1		2
22 "	1						1
23 "							
24 "						1	1
28 "		1					1
33 "		1					1
	60	21	2	14	7	28	132

Average diameter, including eight inches: Black spruce, $11\frac{9}{10}$ inches; hemlock, $11\frac{6}{7}$ inches; balsam, 9 inches; yellow birch, 14 inches; hard maple, $16\frac{5}{7}$ inches; beech, $12\frac{1}{3}$ inches.

The trees noted in the next table were counted and measured by Foresters Olmstead and Sanford on an acre located on Lot 31, Township 19, Town of Altamont, Franklin county. On this acre all trees above four inches in diameter were included in the forester's notes. Although in a different township and several miles to the westward it will be noticed that the composition of this piece of forest is essentially the same as that shown in the four preceding tables.

TABLE XI.

ACRE No. 5.

Lot 31, Township 19, Franklin County.

DIAMETER.	Spruce.	Hemlock.	Balsam.	Birch.	Maple.	Beech.	Total.
5 inches	21	1	13		1	1	37
6 "	7	3	6	1		2	19
7 "	7	2	4			1	14
8 "	15	1	12		1	14	43
9 "							
10 "	13	2		3		5	23
11 "	2	1				2	5
12 "	9	4	2	1	2	15	33
13 "		1				4	5
14 "	3	4		1	1	3	12
15 "		1				1	2
16 "	11	4		4	2	2	23
17 "							
18 "	8	2				1	11
19 "				1			1
20 "				2			2
21 "		1					1
22 "	3				1		4
23 "							
24 "	2			1	1		4
	101	27	37	14	9	51	239

Average diameter, including five inches: Black spruce, $10\frac{4}{10}$ inches; hemlock, $12\frac{1}{2}$ inches; balsam, $6\frac{3}{4}$ inches; yellow birch, $14\frac{9}{10}$ inches; hard maple, $14\frac{1}{3}$ inches; beech, $10\frac{2}{3}$ inches.

The general composition of the Adirondack forest is fairly represented by the species shown in the five preceding tables. But in traveling through the wilderness exceptional forest tracts will be often noted. In some localities, as shown in Table XII, the hemlock predominates, and the spruce is of secondary importance. In others the white pine, which has nearly disappeared from the Adirondacks, is still to be found. Then, again, in some places only one of the three dominant hardwoods is growing.

In illustration of these exceptional types of timber land we furnish here some tables based on notes and measurements made by Forester Frank C. Parker, who was instructed to examine certain tracts in Essex county.

TABLE XII.

ACRE No. 1.

Lot No. 12, Roaring Brook Tract, Essex County, N. Y.

SPECIES.	Trees.	Diameters in inches.	Standards *	Feet, B. M.	Cords.
Black Spruce (<i>Picea nigra</i>)	11	12—16	6.90	1,262	2
Hemlock (<i>Tsuga Cana- densis</i>)	35	12—40	92.00	16,836	.....
Yellow Birch (<i>Betula lutea</i>)	6	8—30	.....	.....	.....
Hard Maple (<i>Acer sacchar- inum</i>)	5	19—28	.....	.....	.....
Beech (<i>Fagus ferruginea</i>)	36	10—24	.....	.....	.....
Basswood (<i>Tilia Ameri- cana</i>)	1	20—	.....	.....	.....
Totals	94	.....	98.90	18,098	2

NOTES.—This acre was selected in a virgin forest, situated on a gentle slope, well watered, with an easterly exposure. Ground slightly rolling. A fair type of forest in which the hemlock predominates. The altitude is about 1,700 feet. The land is owned by the State.

TABLE XIII.

ACRE No. 2.

Lot No. 12, Roaring Brook Tract, Essex County, N. Y.

SPECIES.	Trees.	Diameters in inches.	Standards.	Feet, B. M.
Black Spruce (<i>Picea nigra</i>)	11	8—17	4.55	832
Hemlock (<i>Tsuga Canadensis</i>)	7	16—28	12.08	2,210
Balsam (<i>Abies balsamea</i>)	10	7—16	2.96	541
White Cedar (<i>Thuja occidentalis</i>)	13	10—20	9.13	1,671
Yellow Birch (<i>Betula lutea</i>)	38	10—21	.....	.....
Beech (<i>Fagus ferruginea</i>)	7	12—20	.....	.....
Totals	86	.....	28.72	5,254

NOTES.—On high land with an easterly exposure. The surrounding forest has the appearance of having been burned over at some previous time, many years ago. The original field-notes pertaining to the survey of this lot call for a corner on a burned hill. This corner is only a short distance from the strip on which these measurements were made. The hardwood has the appearance of a second growth, and some of the larger ones show the effects of fire.

* A "standard" log is 13 feet long and 19 inches in diameter at the smallest end, inside the bark, and contains 183 feet of lumber, board measure. In the Adirondack forests the lumbermen cut all their logs 13 feet long.

TABLE XIV.

ACRE No. 3.

Lot No. 12, Roaring Brook Tract, Essex County, N. Y.

SPECIES.	Trees.	Diameters in inches.	Standards.	Feet, B. M.	Cords.
Black Spruce (<i>Picea nigra</i>).	28	8—21	21.54	3,942	6
Hard Maple (<i>Acer saccharinum</i>)	47	10—28	.....	.....	.....
Beech (<i>Fagus ferruginea</i>).	43	7—21	.....	.....	.....
Totals	118	.....	21.54	3,942	6

NOTES—This acre is a primitive forest in which the hardwoods predominate. It is on a piece of table land, well watered from slopes on either side. The maples and beeches are thrifty and tall, this acre being a good type of an Adirondack forest in which there is a good growth of spruce intermixed among the hardwoods. The undergrowth is composed largely of Mountain Maple (*Acer spicatum*) and small Yellow Birch.

TABLE XV.

ACRE No. 4.

Lot No. 12, Roaring Brook Tract, Essex County, N. Y.

SPECIES.	Trees.	Diameters in inches.	Standards.	Feet, B. M.	Cords.
Black Spruce (<i>Picea nigra</i>).	73	9—18	37.00	6,771	12
Hemlock (<i>Tsuga Canadensis</i>)	3	12—30	9.98	1,826	.....
White Cedar (<i>Thuja occidentalis</i>)	46	9—22	18.24	3,338	.....
White Pine (<i>Pinus strobus</i>).	12	24—37	101.55	18,583	.....
White Birch (<i>Betula papyracea</i>)	11	8—16	.....	.....	.....
Totals	145	.....	166.77	30,518	12

NOTES—This acre represents a portion of virgin forest situated on rising ground, well watered, a small brook running through a portion of it. The slope has a westerly exposure. It is a fair example of the ridges on which the spruce predominates, and where it grows in company with other conifers.

TABLE XVI.

ACRE No. 5.

Lot No. 12, Roaring Brook Tract, Essex County, N. Y.

SPECIES.	Trees.	Diameters in inches.	Standards.	Feet, B. M.	Cords.
Black Spruce (<i>Picea nigra</i>).	36	9—20	15.49	2,834	4
Hemlock (<i>Tsuga Canadensis</i>).....	40	8—26	17.37	3,178	.....
White Cedar (<i>Thuja occidentalis</i>).....	6	9—26	6.60	1,208	.....
Hard Maple (<i>Acer saccharinum</i>).....	12	11—28	.....	.....	.....
Beech (<i>Fagus ferruginea</i>).	43	6—19	.....	.....	.....
White Ash (<i>Fraxinus Americana</i>).....	1	20—	.....	.....	.....
Totals.....	138	.....	39.46	7,220	4

NOTES.—This acre was selected in a primitive forest, growing on a "bench" or natural terrace, well watered, with a northerly exposure. The undergrowth, in addition to the nurslings of the dominant species, was composed largely of Mountain Maple (*Acer spicatum*), with occasional specimens of Striped Maple (*Acer Pennsylvanicum*). The growth under and near the hemlocks was completely covered in places with the American Yew or Ground Hemlock (*Taxus Canadensis*).

TABLE XVII.

ACRE No. 1.

Lot No. 206, Township 11, O. M. Tract, Essex County, N. Y.

SPECIES.	Trees.	Diameters in inches.	Standards.	Feet, B. M.	Cords.
Black Spruce (<i>Picea nigra</i>).	52	5—16	14.49	2,651	4
Hemlock (<i>Tsuga Canadensis</i>).....	26	9—28	20.00	3,660	.....
Balsam (<i>Abies balsamea</i>)..	44	7—16	9.00	1,647	.....
Yellow Birch (<i>Betula lutea</i>)	37	6—20	.....	.....	.....
Hard Maple (<i>Acer saccharinum</i>).....	14	8—22	.....	.....	.....
Totals.....	173	.....	43.49	7,958	4

NOTES.—This lot (206, Township 11) was lumbered about 33 years ago by C. F. Norton, at which time the pine and spruce were cut; but the spruces under 10 inches in diameter were not taken. Since then—about 16 years ago—it was cut over again, at which time some white ash and yellow birch was taken, as well as the larger spruce.

This acre strip was measured off on level land, not low enough to be swampy, but a bench of table land. The crown covering is dense; and the timber, with the exception of the hemlock and some of the hardwoods, seems to be a second growth,—that is, it has been growing among first-growth trees, and has made a rapid progress after the interlucation made by cutting out the larger trees.

TABLE XVIII.

ACRE No. 2.

Lot No. 206, Township 11, O. M. Tract, Essex County, N. Y.

SPECIES.	Trees.	Diameters in inches.	Standards	Feet, B. M.	Cords.
Black Spruce (<i>Picea nigra</i>).	51	5—16	20.00	3,660	7
Hemlock (<i>Tsuga Cana-</i> <i>densis</i>).....	15	10—24	24.00	4,392	.....
Balsam (<i>Abies balsamea</i>)..	38	7—16	10.00	1,830	.....
Tamarack (<i>Larix Ameri-</i> <i>cana</i>).....	5	7—12	.....	.....	.....
Yellow Birch (<i>Betula</i> <i>lutea</i>).....	30	10—23	.....	.....	.....
Soft Maple (<i>Acer dasycar-</i> <i>pum</i>).....	14	8—20	.....	.....	.....
Totals	153	.....	54.00	9,882	7

NOTES.—This acre was measured off at the extreme end of a bench of table land extending toward a swamp The undergrowth is mostly small yellow birches and mountain maples, the latter appearing only where the cutting had been severe, evidently places where the ground was originally cleared for skidways.

TABLE XIX.

ACRE No. 3.

Lot 206, Township 11, O. M. Tract, Essex County, N. Y.

SPECIES.	Trees.	Diameters in inches.	Standards.	Feet, B. M.	Cords.
Black Spruce (<i>Picea nigra</i>)	15	8—22	9.00	1,647	3
Balsam (<i>Abies balsamea</i>)..	5	7—14	.....	.....	.....
Hard Maple (<i>Acer sacchari-</i> <i>num</i>).....	30	9—28	.....	.....	.....
Beech (<i>Fagus ferruginea</i>)	39	7—20	.....	.....	.....
Totals	89	.....	9 00	1,647	5

NOTES.—This acre was selected on a hardwood slope with a northerly exposure. Interspersed with the larger trees there was a large number of small yellow birches and maples, and in places, groups of small balsams, all under five inches in diameter. Only a few of the hardwood trees had been cut by the lumbermen.

The crown development was dense, and the forest in good condition.

TABLE XX.

ACRE No. 4.

Lot 206, Township 11, O. M. Tract, Essex County, N. Y.

SPECIES.	Trees.	Diameters in inches.	Standards.	Feet, B. M.	Cords.
Black Spruce (<i>Picea nigra</i>).	36	8-22	15	2,745	5
Hemlock (<i>Tsuga Canadensis</i>)	30	12-27	20	3,660	.....
Balsam (<i>Abies balsamea</i>) ..	10	6-12	.....	.....	.....
Yellow Birch (<i>Betula lutea</i>)	27	7-24	.....	.....	.....
Beech (<i>Fagus ferruginea</i>).	40	8-20	.....	.....	.....
Black Cherry (<i>Prunus serotina</i>)	3	6-20	.....	.....	.....
Totals	146	.....	35	6,405	5

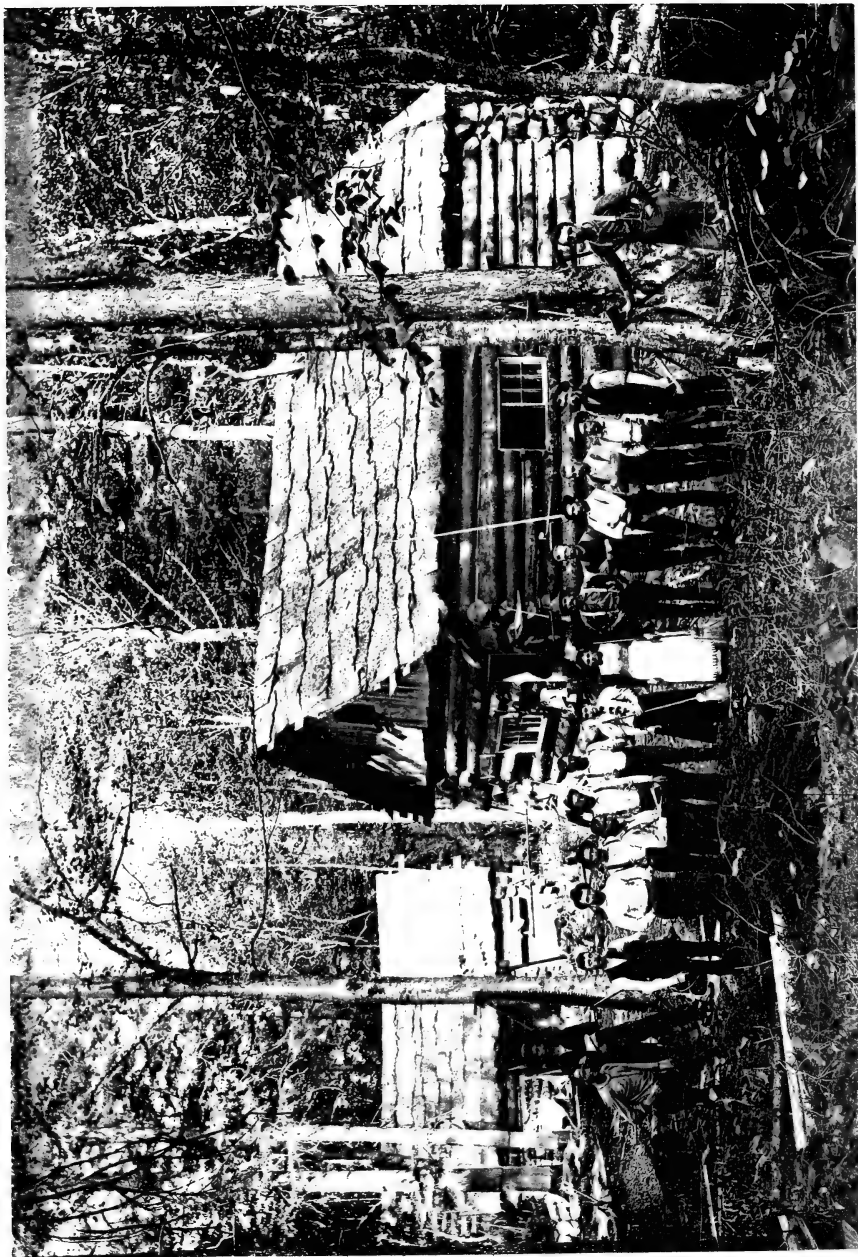
NOTES.—This acre is on land sloping toward the east. On this strip there is a cluster of spruces that have all the appearances of being a "first-growth," although the trees are not large. It is evident that at the time of the first cutting these trees were considered too small for saw logs.

In several instances the owners of spruce timber lands in northern New York have shown an encouraging and commendable tendency to manage their property with reference to sustained productivity. Instead of taking all the merchantable timber available for immediate profit, they have restricted their cutting materially with the intention of securing further growth and further revenues in future. The cutting of small spruces for pulpwood has been prohibited on many large tracts, although the revenue derivable from this source is large and available at any time. Furthermore, the cutting for lumber or saw-logs is restricted to trees 12 inches in diameter on the stump.

Although this is a step in the right direction, and something of an improvement on previous methods, there is little in it worthy of the name of forestry. As an approach to scientific or even intelligent forestry methods it is a very slight advance indeed.

It is true that spruce lands in our State have been cut over a second and even a third time, at intervals of 25 years or thereabout, and that such cuttings have proved remunerative. But this was not rendered possible altogether by any increase in the





G. H. Rison, Photo.

LUMBER CAMP.
(Roof covered with spruce bark.)

rate of growth due to the interlucation resulting from a previous thinning of the trees; nor in any great degree to the natural increase in size during the intervals.

These successive crops of spruce were due for the most part to other reasons. In the first cutting only the larger and easily accessible trees were taken. Large trees were often left because it did not pay to cut roads to them, the roads being confined to the areas on which the timber grew thickly. In the second cutting roads were extended into these areas of scattered spruces, some slight increase in market price warranting this additional expense. The large trees left at the first cutting were then taken out, together with many others which had become large enough through this additional period of growth. The third cutting becomes feasible 25 years later by reason of increased market values, improved means of access, and the demand for pulpwood — the latter demand alone making it profitable in many instances to cut over an old tract where the sawing timber by itself would not yield enough to pay the expense of “lumbering” it. Of course, the younger spruces increase in size during the intervals between operations, and at each return the axeman finds some trees large enough for saw-logs which previously were too small. But too much stress has been laid on this factor in the question, while too many other and important points have been ignored.

Assuming that our spruce forests are to be managed, for a period at least, under the well-recognized and accepted forestry method known as that of “selection,” we will waive the all-important question of cutting for improvement, and turn to that of cutting for revenue — for future and continuous revenue as some of our well-intentioned forest owners are pleased to term it.

This method, which for convenience may be termed cutting for revenue, can not secure the desired result — that of the perpetual maintenance of a merchantable species — unless the cutting is confined to mature trees only. Nothing short of this will answer. Now, it would be difficult to say just what diameter should be assumed in defining a matured spruce. This is evident from the figures in the preceding tables. Moreover, this diameter must vary in different localities. Such diameter can not be ascertained, if at all, until working plans covering a century of improvement cutting, seeding or planting have been exploited. It would be idle to discuss it here.

But if there is to be no improvement cutting, if our forest owners prefer to start with a fixed diameter as a basis for restriction in revenue cutting — “a rule of thumb,” as Dr. Fernow calls it — such diameter can be fixed approximately in each locality; and when thus determined, if it approximates closely the average diameter of the matured spruce, it may answer as a first step in a right direction. Such diameter need not be fixed at the maximum. On the contrary, something should be subtracted to offset what is termed in forestry the interest account. A perfectly managed forest is one that will produce the greatest possible revenue and maintain it. It is evident that as a tree approaches maturity there comes a time in its slowly waning growth after which the increment will not equal in value the interest on the money obtainable if cut at that time. Before felling a tree it is not necessary to wait for the signs of decay that announce the cessation of growth. The tree may be turned into money before that, and, in view of the interest account, thus yield a greater profit than to wait for its maximum development.

It would be impossible to name any diameters here which should govern such cutting. But any owner of spruce lands can arrive approximately at the proper size if the question is approached intelligently and honestly. Certainly, the twelve inch limit now in use falls far below such requirements. A tree sixteen inches in diameter yields twice as much lumber as one of twelve inches; and one twenty inches yields four times as much.

By harvesting matured trees only, the land owner receives the legitimate income from his property, and makes it a perpetual, interest-bearing investment; by harvesting the timber before it attains its growth, he decreases the future productivity of his land, and, for the sake of immediate returns, makes a heavy draft upon the principal. Moreover, if he confines his cutting for revenue to mature trees he not only preserves his principal intact, but by adding to his work some judicious improvement cutting he can increase the value of the principal and its corresponding productivity.

Many owners of spruce lands have been encouraged by the repeated crops attainable from cutting on a basis of ten or twelve inches in diameter on the stump to assume that such returns may be obtained perpetually. Even if this could be done the yield





G. H. Rison, Photo.

DRIVING LOGS.
(On Big Marsh Stream, W. of Piseco Lake.)

thus obtained must be inferior in quantity and value, like any crop that is gathered before it is ripe or has attained its full growth.

It is maintained by experienced foresters, and with good reason, that the persistent cutting of any one species, especially where it is done before the trees have attained their full size, tends to the deterioration and, ultimately, to the extinction of such species. This ought to be evident without going into the technical reasons.

It is not intended in this report to criticise unfavorably the land owners who are willing to accept pay for twelve-inch spruce. It is their property, and if they prefer the cash in hand to future payment they have the right to accept it without comment. In fact, many who advocate other methods would probably do the same if they were fortunate enough to own spruce timber lands. But the owners of woodlands who are able to hold them, and who may wish to manage their forest so that it will yield the greatest revenue, and are willing to waive immediate returns in favor of a permanent, revenue producing investment will do well to study this question carefully.

The felling of immature spruce merely for revenue should be discontinued. Mature trees, however, should be converted into money. Part of this money could be set aside with advantage as a fund from which to pay the expense of improvement cuttings, through which the growth of desirable species would be fostered and inferior ones eliminated. The work of the axeman should not be limited to the mature trees which are cut for revenue, but should include the removal of all diseased trees and inferior species, large and small, even though such timber does not yield one cent to pay for the work. Then, again, it might be necessary often to allow sound, mature trees to remain, because their removal might influence surrounding conditions so unfavorably as to inflict a loss greater than their value. But to go further into this subject would involve the recital of technical details of management which are foreign to the scope of this article.

Some mention should be made here of the natural tendency of the Adirondack spruce to reproduce itself, a fortunate characteristic that, under the guidance of skillful foresters, could be utilized with great advantage in the work of forest improvement. But

land owners who persist in cutting down to a small diameter on the stump should not rely on this natural seeding of the spruce to correct their faulty system. In the dissemination of spruce seeds and starting of natural plantations, nature has proved whimsical; and while the young spruces generally succeed the poplars and bird cherries on the burned lands, they often fail to restock the lands of their own habitat which have been rendered bare by injudicious cutting.

The thrifty landowner who would manage his spruce lands rightly should not only confine his cutting to sound methods, but should employ a skillful forester whose judicious, fostering care of the seedlings, together with some provision for the dissemination of seed, will insure that future stability of income which is the main object and aim of intelligent, scientific forestry.

The foregoing paragraphs have dealt solely with the question of the black spruce, because the other merchantable species in the Adirondack forests growing in company with it are seldom accessible. The white pine, except in few localities, was removed years ago. The hemlock is valuable mainly on account of its bark, and in many townships is not cut at all. The hardwoods, though merchantable near the borders of the forest, owing to their accessibility, are not marketable for the most part, as the logs can not be floated down the streams.

Still, the roads and railways which are penetrating the forest in increased numbers are fast rendering the hardwoods accessible. The time is near when most of the broad-leaved trees in the Adirondacks, as well as the conifers, will become merchantable species. The same provisions which should regulate the cutting of the spruce will apply to them also. The value and productivity of these timber lands will be correspondingly increased and with the proper management of our woodlands American forestry will occupy its rightful place as a beneficent factor in our political economy.

In concluding I desire to acknowledge the cordial and liberal support which your honorable board has given me in pursuing the investigations necessary to a study of this subject.

WILLIAM F. FOX,
Superintendent.

Rules for Log Measurements.

In their forestry operations the lumbermen of northern New York cut all their logs 13 feet long; or, to be exact, 13 feet 4 inches long, the extra four inches being added for good measure and to permit the boards being trimmed at the ends to just 13 feet. All logs are bought and sold by what is known as the standard rule, which provides that a log 13 feet long and 19 inches in diameter at the top or small end shall constitute a standard or "market" log, by which measure all the logs shall be estimated, counted, or measured. If the logs are less than 19 inches in diameter it requires a greater number proportionately to make one standard; if larger, it takes less. The logs are bought and sold at a fixed price per market without reference to their contents or other measurements.

This rule is based on the squares of the diameters, which are divided in each case by the square of the standard log — 19 inches — the quotient showing, in decimals, the number of standards or fraction of a standard, which the log contains. In using this rule the log measurer or "scaler" measures the diameter of the logs on the skidway, tallies them in his book opposite the figures for the diameter, and then computes them at his leisure.

Thus, to arrive at the contents of a 24-inch log, standard measure, the square of 24, which is 576, is divided by 361, the square of the 19-inch standard, giving a quotient of 1.59, showing that a 24-inch log contains 1.59 standards.

To arrive at the contents of a 16-inch log, the square of 16, which is 256, is divided by 361, giving a quotient of .709 and hence a 16-inch log contains .709 of a standard.

In short, the standard rule is merely a table of decimals for each inch in diameter, showing the quotient obtained in each case by dividing the square of the diameter by 361, the square of the standard. The log scaler computes his logs by multiplying the decimal figures for each diameter by the number of logs of that diameter recorded in his tally book. By pointing off the decimals he has the number of standards as the result.

This rule is in general use in the Adirondack forests, where it seems to give perfect satisfaction to both buyer and seller, lumberman and log jobber. But the 19 inch, or Glens Falls standard, is not the only one in use there. On the Saranac river the lumbermen use a 22-inch standard. The principle of computation, however, is the same, a higher price per standard being paid in such a case for the logs.

But in the great lumber regions of the Northern States, in Pennsylvania, and in other localities, logs are bought and sold by the thousand feet, log measure. The rules used there are based on the number of feet, board measure, which the log will yield when it is sawed into inch boards. In such a rule, deduction is made for slabs and saw-kerf, and this deduction is much greater in small logs than in medium sized or large ones, the increase in deduction exceeding proportionately the decrease in diameter.

The scale most in use where logs are bought by log measure is the one tabulated by Edward Doyle, and known as "Doyle's Rule." Another scale computed by J. M. Scribner, known as the Scribner Rule, was also in use until lately. It was generally claimed that Doyle did not allow enough for the contents of small logs, while Scribner allowed too much; that the product of the saw-mills would overrun the log measurement if the logs were bought by the Doyle rule, and that it would not "hold out" if bought by the Scribner rule. It was further asserted that the Doyle rule, while it did not allow enough for the contents of small logs, gave too much for the large ones; and that the Scribner rule was just the reverse. The two rules coincide at 24 inches.

But in late years the Doyle rule has come into general use, to the exclusion of the other. Scribner's log book* has adopted the Doyle rule, a book whose popularity is indicated by the publisher's statement that over 1,000,000 copies have been sold. For this reason the Doyle rule has been used in the following tables showing the difference between standard measure and log measure.

This "standard" rule is peculiar to northern New York, and persons accustomed to the log measure used so generally elsewhere are unable to form any definite idea of quantities where the piece or standard measure is used. When an Adirondack lumberman

* Published by George W. Fisher, Rochester, N. Y., 1839.



MEASURING SPRUCE LOGS.

G. H. RISON, PHOTO.

Stamping them with the owner's log mark. Note the log mark "X" on the face of the stamping-hammer held by the man at the lower right-hand corner of the log pile.



tells a Pennsylvania or Michigan dealer that his year's stock of logs amounts to 100,000 markets, his statement conveys no idea of the quantity; and in our own State the lumbermen and dealers outside of the Adirondack region have difficulty in forming any estimate based on standard or "market" logs.

We have, therefore, for convenient reference, inserted here a table showing the two methods of computing logs and their relation to each other.

COMPARATIVE LOG TABLES.

STANDARD LOGS WITH THEIR EQUIVALENT IN FEET, LOG MEASURE.

DIAMETER IN INCHES.*	Standard measure.	Number of logs to a standard.	Number of feet, log measure †	Number of logs per 1,000 feet.	Number of standards to 1,000 feet.
8.....	.177	5.6	13	76.9	13.6
9.....	.224	4.5	20	50.0	11.1
10.....	.277	3.6	29	34.5	9.6
11.....	.335	3.0	40	25.0	8.3
12.....	.399	2.5	52	19.2	7.7
13.....	.468	2.1	66	15.1	7.2
14.....	.543	1.8	81	12.3	6.8
15.....	.623	1.6	98	10.2	6.4
16.....	.709	1.4	117	8.5	6.1
17.....	.800	1.2	137	7.3	5.8
18.....	.897	1.1	159	6.3	5.7
19.....	1.000	1.0	183	5.5	5.5
20.....	1.108	.9	208	4.8	5.3
21.....	1.221	.8	235	4.2	5.2
22.....	1.341	.7	263	3.8	5.1
23.....	1.465	.7	293	3.4	5.0
24.....	1.595	.6	325	3.1	4.9
25.....	1.731	.6	358	2.8	4.8
26.....	1.872	.5	393	2.5	4.7
27.....	2.020	.5	430	2.3	4.6
28.....	2.172	.5	468	2.1	4.6
29.....	2.330	.4	508	2.0	4.6
30.....	2.493	.4	549	1.8	4.5
31.....	2.662	.4	592	1.7	4.5
32.....	2.836	.3	637	1.6	4.4
33.....	3.017	.3	683	1.5	4.4
34.....	3.202	.3	731	1.4	4.3
35.....	3.393	.3	781	1.3	4.3
36.....	3.590	.3	832	1.2	4.3

* At top end of log, inside the bark.

† Doyle's rule.

From the foregoing table it will be seen that it takes five and a half markets to make 1,000 feet of logs. But in the Adirondack woods five markets are, for convenience, always estimated as a thousand feet, and this is approximately correct, for a 19-inch log will yield 200 feet of sawed lumber. The Doyle rule gives 183 feet only for a 19 inch log, 13 feet long; but the log, unless very crooked or defective, will yield more than that. Hence, when a lumberman says he is getting in a stock of 100,000 markets he estimates it as equivalent—five markets to the 1,000 feet—to 20,000,000 feet of logs or sawed lumber.

If the logs averaged 19 inches in diameter, such an estimate would be fairly correct. But the usual run of Adirondack logs will not average that, and so it requires more than five markets to equal a thousand feet, Doyle's rule.

On the other hand it is claimed that Doyle's rule makes too great an allowance for slabs and saw kerf on small logs, and, consequently, that an estimate of five markets to the 1,000 feet is correct. Some lumbermen assert that, although their logs will not average 19 inches, an estimate of five markets to the 1,000 will hold good as proved by the saw-bill or measurements of the lumber produced from these logs; or, as they term it, the lumber will hold out on that basis.

That it takes more than five markets of the smaller logs to make 1,000 feet, Doyle's rule, is due to the fact that in this rule the figures for the contents decrease in a greater progression than the decrease in the squares of the diameters.

In order that five standards should equal 1,000 feet we must assume that the standard 19-inch log contains 200 feet, log measure; and that the logs of all other diameters contain a number of feet proportionate to the squares of their diameters.

If five standards of any diameter are to be accepted as equivalent to 1,000 feet it will be necessary to find some table of log measure other than those given by the Doyle or old Scribner rules.

For this purpose the following table has been prepared from computations based on the squares of the diameters as used in the standard rule, and the series of figures thus obtained will warrant the ratio of five standards to 1,000 feet.

TABLE OF LOG MEASURES BASED ON FIVE STANDARDS TO 1,000 FEET.*

DIAMETER IN INCHES.	Standard rule.	Number of feet, standard rule †	Number of feet, Doyle's rule.
8	.177	35	13
9	.224	45	20
10	.277	55	29
11	.335	67	40
12	.399	80	52
13	.468	94	66
14	.543	107	81
15	.623	125	98
16	.709	142	117
17	.800	160	137
18	.897	179	159
19	1.000	* 200	183
20	1.108	222	208
21	1.221	244	235
22	1.341	268	263
23	1.465	293	293
24	1.595	319	325
25	1.731	346	* 358
26	1.872	374	393
27	2.020	404	430
28	2.172	434	468
29	2.330	466	508
30	2.493	499	549
31	2.662	532	592
32	2.836	567	637
33	3.017	603	683
34	3.202	640	731
35	3.393	679	781
36	3.590	718	832

This table was not computed with any idea that it could be available for business purposes in measuring logs, for it would allow too much for the contents of the small logs. It merely shows the equivalent of the oft heard statement that five standards are equal to one thousand feet.

* In this rule it is assumed that the 19-inch standard log contains 200 feet, log measure.

† From computations made by William F. Fox.

Forest Commissions in Other States.

Following the lead of New York, other States have evinced an active interest in the forestry movement, by the establishment of State bureaus for the protection and preservation of their woodlands. The various State Commissions now in existence have all been established within ten years, their inception being largely, if not wholly, due to the active, earnest work of the propaganda known as the American Forestry Association.* This organization has a membership in every State in the Union. For thirteen years it has held annual meetings in various States and in Canada — at Cincinnati, Montreal, St. Paul, Washington, Quebec, Saratoga Springs, Philadelphia, Boston, Atlanta, Chicago, Albany, Brooklyn, White Mountains and Springfield, Mass.

A little pamphlet stating the objects of the association says :

“This association endeavors to promote :

“1. A more rational and conservative treatment of the forest resources of this continent.

“2. The extension of forest growth, wherever for climatic or other reasons such seems desirable.

“The association does *not* desire to prevent the legitimate use of the forest growth, but recognizes the same as a crop to be utilized, and judiciously managed.

“The association does *not*, therefore, antagonize the lumberman's or timberland owner's interests, but on the contrary endeavors to perpetuate, improve and increase the productiveness of his property, discountenancing only wasteful practices, which decrease its value and are injurious to his own and public interests.

“The association invites *owners of timber and wood lands especially* to join its ranks for their own benefit.”

* Originally the American Forestry Congress.

The officers for 1895 are :

J. Sterling Morton, Washington, D. C.	<i>President.</i>
H. G. Joly, Quebec, Canada,	<i>1st Vice-President.</i>
Edwin Willits,	<i>Vice-President for the District of Columbia.</i>
Frederick H. Newell, Washington, D. C.,	<i>Corresponding Secretary.</i>
N. H. Egleston, Washington, D. C.,	<i>Recording Secretary.</i>
Henry M. Fisher, M. D., Philadelphia, Pa.,	<i>Treasurer.</i>

Executive Committee.

The executive committee consists of the president, vice-president for the District of Columbia, the secretaries, the treasurer and the following members:

B. E. Fernow, <i>chairman.</i>	Edw. A. Bowers.	C. A. Keffer,
Cleveland Abbe.	Robert B. Warder,	Charles C. Binney.

Vice-Presidents.

H. G. Joly, Pointe Platon, Quebec.	Wm. E. Chandler, Concord, N. H.
Charles Mohr, Mobile, Ala.	W. A. Stiles, Deckertown, N. J.
D. M. Riordan, Flagstaff, Ariz.	Warren Higley, New York, N. Y.
Abbot Kinney, Lamanda Park, Cal.	W. W. Barrett, Church's Ferry,
George H. Parsons, Colorado	N. D.
Springs, Col.	W. R. Lazenby, Columbus, O.
B. G. Northrop, Clinton, Conn.	E. W. Hammond, Wimer, Ore.
A. V. Clubbs, Pensacola, Fla.	J. T. Rothrock, Westchester, Pa.
C. R. Pringle, Sandersville, Ga.	H. G. Russell, East Greenwich,
George W. Minier, Minier, Ill.	R. I.
James Troop, Lafayette, Ind.	H. A. Green, Chester, S. C.
C. L. Watrous, Des Moines, Iowa.	L. McLouth, Brookings, S. D.
E. A. Popenoe, Manhattan, Kan.	Albert Roberts, Nashville, Tenn.
A. M. Brown, Elizabethtown, Ky.	W. Goodrich Jones, Temple,
John E. Hobbs, North Berwick, Me.	Texas.
F. H. Appleton, Boston, Mass.	Redfield Proctor, Proctor, Vt.
W. J. Beal, Lansing, Mich.	H. C. Putnam, Eau Claire, Wis.
J. O. Barrett, Minneapolis, Minn.	Edwin Willits, Washington, D. C.
William Trelease, St. Louis, Mo.	G. W. Allen, Toronto, Ont.
Robt. W. Furnas, Brownville, Neb.	William Little, Montreal, Quebec.

The following report of the executive committee made December 28, 1894, will show the present status of the society and give some idea of the character of its work :

The past year has seen a considerable increase of activity and progress in forestry matters within the Association and without.

MEMBERSHIP AND FINANCES.

By systematic canvass the membership of the Association has been increased so that it is now nearing the 500 mark, and the character of the membership shows a wider reach of influence. With this increase in membership the income of the Association, and, in consequence, its opportunities for usefulness, are increased. According to the treasurer's report, a considerable sum stands to the credit of the Association in the two funds, which are intended to accumulate for special uses, namely, the fund from life memberships and for a permanent secretary, the annual membership dues being now sufficient to cover the current expenditures of meetings, publications, etc.

MEETINGS.

During the year three special meetings have been held, all with gratifying success as to numbers participating and character of proceedings.

The first, held in March, at the invitation and under the auspices of the New York State Forest Commission, at Albany, was a notable gathering, with the interests of the Adirondack forests as the central subject for discussion, the Governor of the State and the eloquent Bishop of the Episcopal church taking prominent part. The position of the Association with reference to the Adirondack problem, as evidenced in the discussion, was, naturally, that the State should acquire the bulk of the Adirondack forest, but that timber-cutting should be deferred until well-considered plans of management and a competent organization of control were matured.

The second meeting was held, upon the invitation of the citizens of Brooklyn, at that city, in August, in conjunction with the American Association for the Advancement of Science, and was well attended by members of the latter. The more intimate relation thus established with that association of men, interested in the rational and scientific treatment of economic questions, should be kept warm in the future, and such joint meetings, when practicable, should become a rule, as they enable the association to secure thereby the active interest of influential educators in all parts of the country.

The third meeting, closely following the second, was held at the invitation and under the auspices of the New Hampshire State Forest Commission. It was unique in its conception, being of a peripatetic nature, the days given up to an inspection of the forest conditions of the famous White Mountain region, and the evenings to discussion of matters of interest affecting that region. It was found that, although



FLOWED LANDS ON BEAVER RIVER.

Timber killed by a State dam.

J. M. Schuler, Photo.



badly damaged and made unsightly by fire, the mountain forest was capable of recovering lost ground readily. A plan for the acquisition of these mountain forests by corporate bodies of visitors to the region was warmly discussed, while ownership by the State of at least the alpine region was favored by others.

PUBLICATIONS.

The proceedings of these three meetings, which were briefly published as usual in the organ of the association, *Forest Leaves*, will form the subject-matter of the 11th volume of proceedings.

The 10th volume, long delayed, but going now through the press, published in parts, two of which have been issued, will contain all the accumulated material from the last three annual meetings and the World's Fair congress.

It is expected that in future the proceedings will be published regularly, and with this policy in view it was decided to number the volumes of previous publications, although this was not done at the time of their publication.

With the exception of a few copies of volumes VII and VIII, containing the proceedings of the meetings at Atlanta and Quebec and annual meetings in 1889 and 1890, the issues of former volumes are exhausted by free distribution to applicants. It is proposed in the future to charge a uniform price of \$1 per volume, restricting the free list to institutions of a public character and to exchanges.

LEGISLATION.

The most important advance which the association may note as a direct outcome of its own efforts is the passage of H. R. 119, known as the McRae bill. It was passed by the House of Representatives on Monday, December 17, with a vote of 159 to 53.

The special thanks of the association for this result are due to our fellow member, the Hon. Thomas C. McRae, through whose skillful, persistent and energetic parliamentary management the passage of the bill was secured. To be sure, this passage could be effected only by concessions to the wishes of representatives from the western States in the way of amendments. These amendments consist in confining the effect of the bill to forest reservations alone, striking out provisions which had in view a rational administration of the rest of public timber lands; also restricting on the one hand the Secretary of the Interior in the sale of timber to dead and such mature trees as must be removed for the sake of maintaining proper forest conditions — an ambiguous

provision — and, on the other hand, extending to the reservations the free permit system by which settlers and miners may supply their needs free of charge — a most objectionable provision.

Nevertheless, the passage of the bill is of highest importance, as it recognizes by legislative enactment the status of forest reservations, and places them under special protection (with the aid of the army) and control of the Secretary of the Interior. It will now devolve upon the association to make strenuous efforts for the passage of this bill by the Senate during the present session of Congress, and then to secure by executive proclamation the further reservation of public timber lands from sale and entry.

It may be proper in this report once more to refute the imputations made on the floor of the House of Representatives, that the bill was inspired or its passage in any way influenced by the lumberman's interests of the west. These interests have been naturally against the bill, and the restrictive amendments may be traced to that influence.

The objections to the bill proceed either from ignorance as to the conditions which it seeks to remedy, or from distrust in the capacity of the executive to carry out its provisions with due care, or else from the personal interests of timber-land owners, who, according to their condition, either desire to make unpopular the reservation policy and avoid further withdrawals from the market of accessible timber of merchantable quality, or else fear the competition if the Government should sell stumpage.

It may also be proper to state that the association does not consider the present bill as its ideal, but only a first step towards a more rational treatment of the public timber lands. For its ideal, it still adheres to the bill, Senate 3235, Fifty-second Congress, which became known as the Paddock bill. This provides for a fully organized forestry management of the public timber lands, and has been abandoned only temporarily on account of the difficulty of having such a comprehensive measure discussed or enacted at the present time.

It should be noted with satisfaction that the president in his message to Congress fully and strongly indorses the policy for which this association stands in the following language:

“I fully indorse the recommendation that adequate protection be provided for our forest reserves, and that a comprehensive forestry system be inaugurated. Such keepers and superintendents as are necessary to protect the forests already reserved should be provided. I am of the opinion that there should be an abandonment of the policy sanctioned by present laws under which the Government, for a very

small consideration, is rapidly losing title to immense tracts of land covered with timber, which should be properly reserved as permanent sources of timber supply."

MOVEMENT IN THE STATES.

Since the various phases of the forestry movement in all parts of the country may be claimed to be due, however indirectly or remotely, to the present influence or to former labors of this association, a brief statement of the progress of the movement in the States may be here in place.

The forest commissioner of Maine continues to prepare the way for an extension of his usefulness on the basis of the fire law which has been so successfully applied.

The New Hampshire Forest Commission continues to popularize the idea of State interest in forest protection on the White Mountains.

In Massachusetts the most notable step is the one taken by the city of Boston in the establishment of a series of extensive forest parks, which, although reserved for park rather than forestry purposes, may, in time, be managed for both purposes. The excellent institution of the "Board of Trustees of Public Reservations," a few years ago inaugurated in Massachusetts, may also in time prove of great use in the establishment of public forest reservations throughout the State.

An extended course of special forestry lectures given at Amherst College may be noted as a progressive movement in the educational direction.

The State of New York voted for the incorporation into its constitution of a clause forbidding the cutting of any timber on its State lands. This association expressed its disapproval of such a provision by a resolution passed at the White Mountain meeting, believing that forest conservation and utilization of the timber crop should go hand in hand, and that while a temporary cessation of lumbering operations until proper forestry methods could be developed might be expedient, it was undesirable and inimical to the development of rational forest management to prevent for a term of twenty years (the time when such a constitutional provision could be changed) the development of such management in the State which had the best opportunity for doing so.

In Pennsylvania, Dr. J. T. Rothrock, a member of the State Forest Commission, has made a most successful propaganda among the people throughout the State, which, it is expected, will result in the establishment of State forest reserves under a permanent commission. The Pennsylvania Forestry Association, in most flourishing condition, is,

of course, backing this movement, and with *Forest Leaves* constantly improving in character and regularity of issue does much to popularize its aims.

In New Jersey, the State Forestry Association and the South Jersey Woodmen's Association have been organized, and a law passed charging the State Geological Survey to investigate the forest conditions of the State and to make recommendations for legislative action. The more local Southern Association, organized by our fellow-member, Mr. J. Gifford, proposes to unite the woodland owners and those interested in protection of the woodlands of that section of the State generally for the practical purposes of securing such protection. The association will also publish a monthly journal.

In the West the terrible forest fires, which raged more fiercely this summer and have cost more lives than for many years past, have roused public attention to the necessity of measures to prevent recurrences of this scourge; the Wisconsin and the Minnesota State Forestry Associations, in conjunction with the Chamber of Commerce of St. Paul and others interested, are trying to pass forest-fire legislation in the respective States.

It is hoped that the interests of the lumbermen will presently appear to them to lie in a more conservative policy than they have hitherto practiced.

A movement to establish a forestry school, as provided by the constitution of North Dakota, is reported from that State.

The forest commission of Colorado is still in abeyance, but with the change to Republican rule it is expected a revival may be effected.

A forestry association was organized in Utah early in the year.

In California, the management of the forestry stations, established by the first State Forest Commission, has fallen into the competent hands of the University of California, and the signs are hopeful of a successful revival in the organization of the forestry interests of that State.

Finally, it may be of interest to state that plans for an extension of educational facilities are in progress. It is proposed to introduce presently into Congress legislative measures providing for obligatory forestry courses at the agricultural colleges, as well as courses of lectures at West Point, a post-graduate course at the Department of Agriculture, and scholarships for forestry students to be sent abroad.

It is hoped that this brief synopsis of the activity everywhere on behalf of forestry interests will stimulate the members of the association to further efforts and to such active support of its executive com-

mittee as will enable us to secure the objects in general for which we are associated, and especially the legislation which is to provide for a rational management of the public timber lands. This secured, the example will be most powerful in influencing States and private woodland owners to follow. The most pressing need of the association is a permanent secretary, who can be in part at least compensated for his work, and for this purpose we need an increase of membership, which, with increased financial support, brings influence among the people.

B. E. FERNOW,

Chairman Executive Committee.

It is gratifying to note that so many States have established forestry commissions. It is hoped that the time is not far distant when the remaining States, and the general government as well, will each have a department devoted to this work, under the management of competent and enthusiastic officials, supported by liberal appropriations of money.

We insert here the forestry laws of some of the other States.* As some of them contain important features which might well be incorporated in the forest law of our own State, a careful perusal of these various acts may prove advantageous before attempting any further legislation.

MAINE.

FORESTRY LAW OF 1891.

Chapter 100.

AN ACT to create a forest commission and for the protection of forests.

SECTION 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.

§ 2. It shall be the duty of the forest commissioner to make a collection and classification of statistics relating to the forests and connected

* Kansas has a forestry commission also, but no copy of its law is on file in our office.

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 watersheds 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.

§ 3. The selectmen of towns shall be, *ex-officio*, forest firewardens 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 firewardens therein. A description of each district and the name of the firewarden thereof shall be recorded with the town clerk. The services of such selectmen acting as said firewardens, shall be paid for at the same rate as is paid for their other official services. It shall be the duty of the firewarden 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 centum upon its valuation for purposes of taxation. If any person so ordered to assist, and not excused from said service by said forest firewarden 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.

§ 4. County commissioners of each county in which there are unorganized places shall annually appoint, when they deem it necessary, such number of firewardens 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 firewardens 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 firewardens have to call out citizens of the town. The compensation of such firewardens 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.

§ 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 can not spread into forest wood or cultivated lands or meadows, shall not be construed as prohibited by this act.

§ 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 conspicuous 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, notices 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.

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

§ 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 woodlands; 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.

§ 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,

specifying 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.

§ 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.

§ 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.

§ 12. No railroad company shall permit its employes to deposit fire, live coals or ashes, upon their track in the immediate vicinity of woodlands or land liable to be overrun by fires, and where engineers, conductors or trainmen discover that fences along the right of way of woodlands 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.

§ 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 woodland, there shall be kept posted in conspicuous places on each line of the roadways 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 or 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.

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

§ 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.

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

§ 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 schoolhouses, sawmills, 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.

§ 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.]

NEW HAMPSHIRE.

(SESSION OF 1893.)

Be it enacted by the Senate and House of Representatives in General Court convened:

SECTION 1. There is hereby established a forestry commission, to consist of the Governor, *ex officio*, and four other members, two Republicans and two Democrats, who shall be appointed by the governor, with the advice of the council, for their special fitness for service on this commission, and be classified in such manner that the office of one shall become vacant each year. One of said commissioners shall be

elected by his associates secretary of the commission, and receive a salary of one thousand dollars per annum. The other members shall receive no compensation for their services, but shall be paid their necessary expenses incurred in the discharge of their duties, as audited and allowed by the governor and council.

§ 2. It shall be the duty of the forestry commission to investigate the extent and character of the original and secondary forests of the state, together with the amounts and varieties of the wood and timber growing therein; to ascertain, as near as the means at their command will allow, the annual removals of wood and timber therefrom, and the disposition made of the same by home consumption and manufacture, as well as by exportation in the log; the different methods of lumbering pursued and the effects thereof upon the timber-supply, water power, scenery, and climate of the state; the approximate amount of revenue annually derived from the forests of the state; the damages done to them from time to time by forest fires; and any other important facts relating to forest interests which may come to their knowledge. They shall also hold meetings from time to time in different parts of the state for the discussion of forestry subjects and make an annual report to the governor and council, embracing such suggestions as to the commission seem important, fifteen hundred copies of which shall be printed by the state.

§ 3. The selectmen of towns in this state are hereby constituted fire wardens of their several towns, whose duty it shall be to watch the forests, and whenever a fire is observed therein to immediately summon such assistance as they may deem necessary, go at once to the scene of it, and, if possible, extinguish it. In regions where no town organizations exist, the county commissioners are empowered to appoint such firewardens. Firewardens and such persons as they may employ shall be paid for their services by the towns in which such fires occur, and in the absence of town organizations, by the county.

§ 4. Whenever any person or persons shall supply the necessary funds therefor, so that no cost or expense shall accrue to the state, the forestry commission is hereby authorized to buy any tract of land and devote the same to the purposes of a public park. If they cannot agree with the owners thereof as to the price, they may condemn the same under the powers of eminent domain, and the value shall be determined as in the case of lands taken for highways, with the same rights of appeal and jury trial. On the payment of the value as finally determined, the land so taken shall be vested in the state, and forever held for the purposes of a public park. The persons furnishing the

money to buy such land shall be at liberty to lay out such roads and paths on the land, and otherwise improve the same under the direction of the forestry commission, and the tract shall at all times be open to the use of the public.

§ 5. This act shall take effect upon its passage.

[Approved March 29, 1893.]

PROVISIONS OF THE PUBLIC STATUTES RELATING TO FOREST FIRES.

If any person shall kindle a fire by the use of firearms, or by any other means, on land not his own, he shall be fined not exceeding ten dollars; and if such fire spreads and does any damage to the property of others, he shall be fined not exceeding one thousand dollars.—Chapter 277, section 4.

If any person, for a lawful purpose, shall kindle a fire upon his own land, or upon land which he occupies, or upon which he is laboring, at an unsuitable time, or in a careless and imprudent manner, and shall thereby injure or destroy the property of others, he shall be fined not exceeding one thousand dollars.—Chapter 277, section 5.

Whoever shall inform the prosecuting officers of the state of evidence which secures the conviction of any person who wilfully, maliciously, or through criminal carelessness has caused any damage by fire in any forest, woodlot, pasture, or field, shall receive from the state a reward of one hundred dollars. The state treasurer shall pay the same to the informer upon presentation of a certificate of the attorney-general or solicitor that he is entitled thereto.—Chapter 277, section 7.

NEW JERSEY.

Chapter 120.

A Further Supplement to an act entitled "An act to complete the geological survey of the state," approved March thirtieth, one thousand eight hundred and sixty-four.

1. Be it enacted *by the Senate and General Assembly of the State of New Jersey*, That the state geologist, under the direction of the board of managers of the geological survey, and with the assistance of a competent botanist, to be selected by said board for his expert knowledge of forestry and of the forest trees of this state, and such other expert assistance as may be required for the purpose, shall make

an investigation to ascertain the extent, character and location of the wild lands in this state which are suited for permanent occupation by forests rather than by agriculture, and shall report the results of such investigation to the legislature, together with a statement of what part or parts of such lands would be suitable for a state forest reserve, and the advantages as regards the timber supply, water supply, scenery and climate of the state, which would accrue from the conservation of existing forests by the establishment of such reserve or otherwise; the investigation so to be made shall determine the extent to which forests of timber of commercial value now exist in the state, and include a study of the localities and areas which are specially adapted to the growth of designated kinds of timber of commercial value; it shall also include an examination as to the presence or absence of forest cover upon the slopes and summits of the more important watersheds of the state, and a study of the effect of such conditions as now exists upon the maintenance of the streams therein and the regulation of the freshet-flow thereof; the report to the legislature shall state the arguments touching the beneficial effect upon climate and rainfall attributable to the presence of forests, and shall likewise present an outline of the policy and legislation of other states and countries for the preservation of forests and their regulation for public ends, so far as the same may be applicable to this state.

2. *And be it enacted*, That the expense of making such investigation and report, shall, when duly audited by the board of managers and approved by the governor and comptroller, be paid out of any funds in the treasury not otherwise appropriated, and shall be limited to five thousand dollars.

3. *And be it enacted*, That this act shall take effect immediately.
[Approved May 1, 1894.]

PENNSYLVANIA.

In 1887 an act was passed for encouragement of forest culture, and provided penalties for the injury and destruction of forests. This was amended in session of 1891, and now stands thus on the statute book :

AN ACT for the encouragement of forest culture, and provided penalties for the injury and destruction of forests.

SECTION 1. *Be it enacted, etc.*, That in consideration of the public benefit to be derived from the planting and cultivation of forest or tim-

ber trees, the owner or owners of any land in this commonwealth planted with forest or timber trees in number not less than twelve hundred to the acre, shall, on making due proof thereof, be entitled to receive annually from the commissioners of their respective counties, during the period that the said trees are maintained in sound condition upon the said land, the following sums of money:

For a period of ten years after the land has been so planted, a sum equal to ninety per centum of all the taxes annually assessed and paid upon the said land, or so much of the said ninety per centum as shall not exceed the sum of forty-five cents per acre;

For a second period of ten years, a sum equal to eighty per centum of the said taxes, or so much of the said eighty per centum as shall not exceed the sum of forty cents per acre;

For a third and final period of ten years a sum equal to fifty per centum of the said taxes, or so much of the said fifty per centum as shall not exceed the sum of twenty-five cents per acre:

Provided, That it shall be lawful for the owner or owners of the said land, after the same has been so planted for at least ten years, to thin out and reduce the number of trees growing thereon to not less than six hundred to the acre, so long as no portion of the said lands shall be absolutely cleared of the said trees:

And provided also, That the benefits of this act shall not be extended to nurserymen or others growing trees for sale for future planting.

§ 2. The owner or owners of forest or timber land in this commonwealth, which has been so cleared of merchantable timber, who shall, within one year after the said land has been so cleared, have given notice to the commissioners of their respective counties that the said land is to be maintained in timber, and who shall maintain upon the said land young forest or timber trees in sound condition, in number at least twelve hundred to the acre, shall, on making due proof thereof, be entitled to receive annually from the commissioners of their respective counties the sums of money mentioned in the first section of this act: *Provided*, That the first period of ten years shall be counted from the time that the said land has been cleared of merchantable timber, and that after the said first period of ten years the number of trees upon the said land may be reduced as in the said first section is provided.

§ 3. Any person or persons who shall willfully or carelessly cut bark from or otherwise cut, burn or injure any tree, plant, shrub or sprout planted, growing or being on any land in this commonwealth without the consent of the owner or owners thereof first had and obtained, or

who, without such consent, shall kindle, or cause to be kindled, a fire on any forest or timber land in this commonwealth, or who shall carry into or over any forest or timber land any lighted candle, lamp or torch or other fire, without having the same secured in a lantern or other closed vessel, or who shall discharge or set off fireworks of any kind on said land or among the trees thereon, or who shall willfully or carelessly burn or fire upon his or their own land or that of others, any tree, brush, stubble or other combustible material, whereby fire shall be communicated to the leaves, brush or timber upon any forest or timber lands belonging to other parties, shall be subject to a penalty not exceeding one hundred dollars for each offense committed, with costs of suit: *Provided*, That if the defendant or defendants neglect or refuse to pay at once the penalty imposed and costs, or shall not enter sufficient bail for the payment of the same within ten days, he or they shall be committed to the common jail of said county for a period of not less than one day for each dollar of the penalty imposed: *And provided*, When the penalty imposed is above five dollars, the defendant or defendants may enter into a recognizance, with good security, to answer said complaint on a charge of misdemeanor before the court of quarter sessions of the peace of the county in which the offense is committed, which court, on conviction of the defendant or defendants of the offense so charged, and failure to pay the penalty imposed by this act, with costs, shall commit said defendant or defendants to the common jail of the county for a period of not less than one day for each dollar of penalty imposed.

§ 4. Any justice of the peace or alderman, upon information or complaint made before him by the affidavit of one or more persons of the violation of this act by any person or persons, shall issue his warrant to any constable or police officer to cause such person or persons to be arrested and brought before the said justice of the peace or alderman, who shall hear and determine the guilt or innocence of the person or persons so charged, who, if convicted of the said offense, shall be sentenced to pay the penalty aforesaid.

§ 5. The commissioners of each county shall, within one month after the passage of this act, cause the same to be published one or more times in one newspaper of general circulation in their respective counties.

In January, 1893, the Hon. D. Smith Talbot, of Chester county, introduced a measure for the Pennsylvania Forestry Association into the Legislature. It was entitled "An act relative to a forestry commission and providing for the expenses thereof."

SECTION 1. *Be it enacted, etc.*, That the governor be authorized to appoint two persons as a commission, one of whom is to be a competent engineer, one a botanist practically acquainted with the forest trees of the commonwealth, whose duty it shall be to examine and report upon the conditions of the slopes and summits of the important watersheds of the state for the purpose of determining how far the presence or absence of the forest cover may be influential in producing high and low water stages in the various river basins; and to report how much timber remains standing of such kinds as have special commercial value, how much there is of each kind, as well, also, as to indicate the part or parts of the state where each grows naturally, and what measures, if any, are being taken to secure a supply of timber for the future. It shall further be the duty of said commission to suggest such measures in this connection as have been found of practical service elsewhere in maintaining a proper timber supply, and to ascertain, as nearly as is practicable, what proportion of the state not now recognized as mineral land is unfit for remunerative agriculture and could with advantage be devoted to the growth of trees.

§ 2. The said commission shall also ascertain what wild lands, if any, now belong to the commonwealth; their extent, character and location, and report the same, together with a statement of what part or parts of such lands would be suitable for a state forest reserve; and, further, should the lands belonging to the commonwealth be insufficient for such purpose, then to ascertain and report what other suitable lands there may be within the state, their extent, character and value. The final report of the said commission shall be presented to the legislature not later than March 15, 1895.

§ 3. The said commission shall have power to appoint one competent person to act as statistician, whose duties shall be to compile the statistics collected by said commission, under their direction and supervision, whose salary shall be one thousand dollars per annum, with necessary expenses, to be paid in the same manner as is hereinafter provided for the payment of the forestry commission.

§ 4. The commissioners appointed hereunder shall be entitled to receive by quarterly payments a compensation as follows: The engineer, twenty-five hundred dollars (\$2,500) per annum; the botanist, twenty-five hundred dollars (\$2,500) per annum, with necessary expenses for each; and the sum of twenty thousand dollars (\$20,000), or so much as may be necessary, is hereby appropriated out of any money in the treasury, not otherwise appropriated, to be paid by warrant drawn by the auditor-general.

Law of 1895. (*Pennsylvania.*)

AN ACT to establish a department of agriculture, and to define its duties.

SECTION 1. That there be and hereby is established a department of agriculture, to be organized and administered by an officer who shall be known as the secretary of agriculture, who shall be appointed by the governor, by and with the advice and consent of the senate, for a term of four years, at an annual salary of three thousand five hundred dollars. * * *

§ 2. That it shall be the duty of the secretary of agriculture in such ways as he may deem fit and proper to encourage and promote the development of agriculture, horticulture, *forestry* and kindred industries. * * * In the performance of the duties prescribed by this act the secretary of agriculture shall, as far as practicable, make use of the facilities provided by the state agricultural experiment station, the state board of agriculture and the various state and county societies and organizations maintained by agriculturists and horticulturists, whether with or without the aid of the state, and shall, as far as practicable, enlist the aid of the state geological survey for the purpose of obtaining and publishing useful information respecting the economic relations of geology to agriculture, *forestry* and kindred industries. * * *

§ 3. That it shall be the duty of the secretary to obtain and publish information respecting the extent and condition of forest lands in this state, to make and carry out rules and regulations for the enforcement of all laws designed to protect forests from fires and from all illegal depredations and destruction, and report the same annually to the governor, and, as far as practicable, to give information and advice respecting the best methods of preserving woodlands and starting new plantations. He shall also, as far as practicable, procure statistics of the amount of timber cut during each year, the purpose for which it is used, and the amount of timber land thus cleared as compared with the amount of land newly brought under timber cultivation, and shall, in general, adopt all such measures as in his judgment may be desirable and effective for the preservation and increase of the timber lands of this state, and shall have direct charge and control of the management of all forest lands belonging to the commonwealth, subject to the provisions of law relative thereto. * * *

§ 4. There shall be one deputy secretary who shall be appointed by the governor for the term of four years, at a salary of three thousand

dollars a year, who shall also be director of farmers' institutes. The other officers of the department shall be appointed by the governor for the term of four years, and shall be an economic zoologist, a *commissioner of forestry*, a dairy and food commissioner, who shall have practical experience in the manufacture of dairy products, and a state veterinarian, who shall be a graduate of some reputable veterinary college, who shall receive an annual salary of twenty-five hundred dollars each. The governor is hereby authorized to appoint one chief clerk of the department at an annual salary of sixteen hundred dollars, one stenographer at a salary of eight hundred dollars a year, and one messenger at a salary of six hundred dollars a year, and the dairy and food commissioner, the *commissioner of forestry* and the economic zoologist shall each have a clerk, who shall be appointed by the governor, and who shall serve under the direction of the respective commissioners aforesaid, and receive a salary of fifteen hundred dollars a year each.

§ 7. That the secretary of agriculture shall have an office at the State Capitol, and it is hereby made the duty of the Commissioners of Public Buildings and Grounds to provide the necessary rooms, furniture and apparatus for the use of the department.

§ 8. That all acts or parts of acts inconsistent herewith be, and the same are hereby, repealed.

[Approved March 13, 1895.]

* AN ACT for the preservation of the forests of the commonwealth, and to this end enlarging the powers and duties of the forestry commission; designating firewardens and prescribing their duties; regulating the prevention and extinguishment of forest fires, and providing for the punishment of persons who set fire to or endanger forests.

SECTION 1. *Be it enacted, etc.*, That the Forestry Commission shall have authority, and it shall be the duty of said Forestry Commission under this act

(a) To make a report to the General Assembly, through the State Board of Agriculture, at each regular session, giving an account of forest fires, their causes, extent, values destroyed, methods recommended for preventing them, and such information and suggestions concerning their charge as the said commission shall judge to be important to the welfare of the commonwealth.

* This bill after passing the lower house of the Pennsylvania Legislature, February 1, 1895, failed to become a law in the senate, owing to a disagreement regarding the provision authorizing firewardens to "arrest without warrant." The bill will be introduced again at the next session.

(b) To prepare at the public charge and freely distribute to the firewardens and to citizens interested in protecting the forests who shall apply for them, warning placards containing brief summaries from the provisions of this act for the information of lumbermen, railroad employes, hunters, fishermen, tourists and others who might violate the law unwittingly.

(c) To prepare at the public charge and to distribute copies of this act, that it may be known throughout the commonwealth by whomsoever it may concern.

(d) To take measures at the public charge for the free diffusion of knowledge concerning forestry, in the form of lectures and essays, commending the subject to public attention.

(e) To prepare at the public charge for the guidance of firewardens a code of rules and regulations having reference to this act, utilizing the experience of other States and embodying from time to time the results of our own experience.

(f) To appoint special firewardens, with the approval of the Governor of the commonwealth, in remote and thinly peopled forest districts where prompt action is necessary to prevent destructive conflagrations, providing that such special firewardens shall be resident citizens of the said districts, respectively, and shall be removable for cause by the Forestry Commission. They shall have the same powers, duties and emoluments as the district firewardens. The compensation of special firewardens and of the persons employed by them under the provisions of this act shall be paid by the commonwealth in accordance with such rules as shall be prescribed by the Forestry Commission, with the approval and concurrence of the Auditor-General of the commonwealth.

§ 2. That the supervisors of roads of the respective townships shall, by virtue of their office, be district firewardens within the limits of their district, and in cases of emergency shall serve as such beyond the said limits. They shall have authority and it shall be their duty as firewardens

(a) To go to the ground at once, in case of a forest fire within the limits of their respective districts, and take all the necessary measures for its control and extinguishment.

(b) To call upon any person within their township or the vicinity thereof to assist them in that service.

(c) To co-operate with the firewardens of any adjoining district, and in the absence of such firewardens to direct the work of control and extinguishment of forest fires in any such district.

(d) To attend on the ground when notified by any person proposing to fire brush or any combustible matter on or near forest land, and to supervise or, if necessary, to postpone such firing in order to prevent forest fires.

(e) To arrest, without warrant, every person found violating any provision of the law relating to forest fires, and to forthwith take the offender before a magistrate and make complaint against such person.

(f) To inquire into the cause of every forest fire within their several districts, and if any such fire be traceable to the negligence or willfulness of any person, company, society or corporation, to make complaint before a magistrate against such person, company, society or corporation.

(g) To post and keep posted warning placards, prepared by the Forestry Commission, in localities where fires are likely to occur, and to carry into effect such rules and regulations as may be prescribed, with the approval of the Governor of the commonwealth by the said Forestry Commission conformably to the provisions and in furtherance of the object of this act.

(h) To open and to keep open fire lanes not less than two rods wide, and where authorized by the Forestry Commission, as barriers against fire, provided that the said lanes need not be graded as public highways, nor shall they be open in any case without the previous consent in writing of the land owners granting free right of way and releasing all claim for compensation therefor.

(i) To make two reports annually in duplicate, at dates to be fixed by the Forestry Commission, giving the statistics of forest fires, including the actual cost of suppressing them and other items on the forms prescribed and furnished by the said commission, one of the said duplicates to be sent to the district attorney of the proper county and the other to the Forestry Commission at Harrisburg.

(j) To wear exposed to view while on duty as firewardens a distinctive badge, which shall be furnished by the forestry commission and shall be delivered by the respective firewardens to their successors in office.

§ 3. It shall be the duty of the justice of peace residing nearest the place of the origin of the forest fire to make prompt and strict inquiry into the origin of such fire, and whenever such fire is found to have been started willfully or negligently by any person, company, society or corporation, in violation of the law, to issue a warrant for the apprehension of the offender or offenders, and after a hearing, if sufficient cause be shown, bind him or them over to appear at the next court of

quarter sessions for the proper county, or, in default of bail, commit him or them to answer as in other cases of misdemeanor, or he shall fine the offender or offenders, if the fire was caused by his or her negligence.

§ 4. Any justice of the peace residing in any township where there shall be a forest fire shall, in the absence or in the case of disability of the district firewarden, act as a substitute or appoint a substitute temporarily for him.

§ 5. Every person who shall neglect or refuse to assist in suppressing a forest fire when called on for such service by a firewarden, shall be subject to a fine of five dollars for each offense, unless excused for good cause by the said firewarden, or declared to be justly exempt after a hearing before a magistrate.

§ 6. Every person, before firing brush or other combustible matter on or near forest land, at hazard of injury to the property of others, shall notify the district firewarden of his intention, and shall not proceed with such firing except by the written authority or under the personal direction of said district firewarden, or of his duly authorized substitute. Violation of this section shall be punished by a fine not exceeding five hundred dollars.

§ 7. Every person and every company, society or corporation shall be responsible for all injury to the property of others resulting from forest fires originated willfully or negligently by themselves or their agents, and shall be liable in an action of trespass for the actual damages, direct and consequential, caused by such fire, and in case such fire originated negligently, shall also be subject to a fine not exceeding one hundred dollars.

§ 8. Every person who shall kindle a fire on or dangerously near to forest land and leave it unquenched, or who shall be a party thereto, and every person who shall use other than incombustible wads for firearms or who shall carry a naked torch, firebrand or other exposed light in or dangerously near to forest land at hazard of accidental fire, shall be liable to a fine not exceeding fifty dollars for each offense.

§ 9. Every person who shall willfully or heedlessly deface, destroy or remove any warning placard posted under the requirements of this act, shall be liable to a fine not exceeding twenty-five dollars for each offense. Every person wearing a firewarden's badge without lawful warrant shall be liable to a fine of not more than fifty dollars.

§ 10. All fines imposed by this act shall be sued for before a justice of the peace in the commonwealth as debts of a like amount are sued

for, and the accused may be proceeded against by complaint and warrant of arrest or by summons as in civil actions, and in default of payment of any fine and costs imposed by a justice of the peace under this act, the defendant shall be committed to the county jail for one day for every dollar of fine and costs so imposed and unpaid. No fine imposed under this act shall be less than five dollars. One-half of all the fines imposed and collected under the provision of this act shall be paid to the informer in each case and the other half to the supervisors of the township in which the offense was committed, for the use of such township.

§ 11. Supervisors acting as firewardens shall be paid two dollars for each day of actual service in extinguishing forest fires or in supervising the brush fires or others which are in dangerous proximity to other woodlands. The compensation of such firewardens and of the persons employed by them under the provisions of this act shall be paid by the townships in which the forest fires shall occur, and such townships shall be reimbursed by the commonwealth, one-half of the amount so paid under such rules as shall be prescribed by the forestry commission, with the approval and concurrence of the auditor general.

§ 12. The term forest in this act shall include not only woods in the ordinary sense, but also scrub brush, sprouts, briars and the like woody growths apt to feed or spread on wild land. The word district in this act shall mean such township subdivisions as are ordinarily made for convenience by the supervisors of roads.

§ 13. The prothonotary of every county within this commonwealth shall, within fifteen days after the township elections in each year are returned into his office, make out, certify and deliver under his hand and seal of office to the Forestry Commission a list of the names of the persons elected to the office of supervisor of roads, together with their postoffice addresses and the names of the townships within their respective counties for which they were respectively elected, and shall be allowed therefor the usual fees for equal or similar services, to be paid out of the county treasury.

OHIO.

AN ACT to establish a state forestry bureau.

SECTION 1. *Be it enacted by the General Assembly of the State of Ohio, That there be and hereby is established at the state university,*

at Columbus, Ohio, a central office for the promotion of forestry, to be entitled the state forestry bureau, which shall consist of three members, to be appointed by the governor, as a board of directors. The members of the board of directors shall be commissioned by the governor, and be duly qualified as like officers of the state; one of three directors shall serve for six years, the second for four years and the third for two years, and on the expiration of terms of service, appointments shall be made for the term of six years.

§ 2. It shall be the duty of said state forestry bureau to thoroughly inquire into the character and extent of forests of the state; to investigate the causes which are in operation to produce their waste or decay; to suggest what legislation, if any, may be necessary for the development of a rational system of forestry, adapted to the wants and conditions of this state, and with the consent of the trustees of the Ohio state university, the said directors may establish a forestry station on the grounds of said university. The directors shall select one of their number, or appoint a qualified person as secretary, to carry out the plans of the board, who shall receive such compensation for his services as shall be agreed upon by the board. *Provided*, that all expenses incurred under this act shall not exceed the amount hereinafter provided. Said directors shall serve without compensation, but shall be allowed their necessary expenses incurred in discharge of the duties of their office.

§ 3. This bureau shall annually make a report to the governor, which shall contain the results of the investigation, together with such other information as the board may deem necessary for the promotion of forestry in this state. Five thousand (5,000) copies of this report are to be printed by the state, two thousand (2,000) of which shall be distributed by this bureau of forestry and the remainder by the general assembly.

§ 4. There is hereby appropriated for the ensuing year, for the maintenance of said bureau, the sum of one thousand dollars, or so much thereof as may be necessary, for the purpose of meeting the actual expenses of carrying out the provisions of this act.

§ 5. No money shall be expended except on order of the president direct, or by and with the approval of the board.

§ 6. This act shall take effect and be in force from and after its passage.

MICHIGAN.

Public Acts of Michigan, 1887 — Act No. 259.

AN ACT to provide for an independent forestry commission of the state of Michigan and to define its duties and powers and to provide for the expense thereof.

SECTION 1. *The People of the State of Michigan enact*, That the members of the State Board of Agriculture are hereby constituted a commission to be known as an independent forestry commission.

§ 2. It shall be the duty of said forestry commission to institute an inquiry into the extent to which the forests of Michigan are being destroyed by fires, used by wasteful cutting for consumption or for the purpose of clearing lands for tillage or pasturage; also as to the effect of the diminution of the wooded surface of the land upon ponds, rivers and water power of the State, and in disturbing and deteriorating the natural conditions of the climate. Also as to the protection of denuded regions, stump and swamp lands.

§ 3. Said commission shall make report of the results of their inquiries to the Governor of the State, together with such legislation as seems to them expedient to propose to preserve and restore the forest wealth of the State, sixty days before the assembling of the legislature for the year eighteen hundred and eighty-nine, and the State printer, under the direction of said commission, shall cause to be printed as many copies of said report for distribution as they may deem expedient.

§ 4. It shall be the duty of the supervisor of each township, on or before the first Monday of June, eighteen hundred and eighty-eight, to make a careful estimate of the area and condition as to the stage of growth, density and character of forest land in their several towns; also the area and waste of barren land on which valuable forest trees might be grown, and report the same to the forestry commission. A consolidated summary of these returns by counties, and of the information as to the same matter otherwise gathered by said commission, shall be included in the annual report.

§ 5. The supervisor of every township as aforesaid and in which a forest fire of more than one acre in extent has occurred within a year shall report to the forestry commission the extent of area burned over, to the best of his information, together with the probable amount of property destroyed, specifying the value of timber, as near as may be, and amount of cord-wood, logs, bark or other forest product; also fencing, bridges and buildings that have been burned. They shall also

make inquiries and report as the cause of these fires, if they can be ascertained, and as to the measures employed and found most effective in checking their progress. A summary of these returns by counties, and of the information otherwise gathered by said commission, shall be included in their annual report. Blanks for the reports required in this act shall be furnished by the forestry commission to the several townships at the expense of the State.

§ 6. The said commission shall serve without compensation, but a sum not exceeding one thousand dollars is hereby appropriated to pay the necessary expenses incurred in collecting the information required by this act to be ascertained by said commission, to be paid for by the State treasurer, upon the warrant of the auditor-general, out of any funds not otherwise appropriated.

[Approved June 27, 1887.]

MINNESOTA.

C. C. ANDREWS, *Chief Fire Warden.*

R. C. DUNN, *Forest Commissioner.*

STATE OF MINNESOTA.

[CIRCULAR No. 1.]

OFFICE OF CHIEF FIRE WARDEN, }
ST. PAUL, MINN., May 1, 1895. }

The following is published for the information and guidance of all parties concerned:

AN ACT to provide for the preservation of forests of this State and for the prevention and suppression of forest and prairie fires.

Be it enacted by the Legislature of the State of Minnesota:

SECTION 1. The State auditor shall be forest commissioner of this State, and his orders shall be supreme in all matters relating to the preservation of the forests of this State and to the prevention and suppression of forest and prairie fires as hereinafter provided. The supervisors of towns, mayors of cities and presidents of village councils are hereby constituted firewardens of their respective towns, cities and villages in the State, and the chief fire warden may appoint as firewardens such other persons as he may deem necessary living in or near to unorganized territory in this State, whose districts, to be known as fire districts, he may determine.

§ 2. The aforesaid forest commissioner shall appoint a competent deputy, to be known as chief firewarden, who, from personal experi-

ence, is familiar with the conditions of the forest and methods by which fires may be controlled. Said chief firewarden shall receive a salary of twelve hundred (\$1,200) dollars per year, and shall hold his office during the pleasure of the forest commissioner. He shall represent the authority of the forest commissioner and it shall be his duty to enforce the provisions of this act throughout the State.

§ 3. The chief firewarden shall have general charge of the firewarden force of the State and shall have authority to mass such firewarden force as may be available at any special point to suppress fires. In case the firewarden force of any locality is deemed by said chief firewarden inadequate to prevent or suppress forest or prairie fires, he may appoint, temporarily, needed firewardens whose duties and authority shall be the same as herein given to town supervisors acting as firewardens. He shall properly divide into fire districts all unorganized territory in this state and appoint competent firewardens therein; he shall co-operate with any police or military force of the United States Government which may be detailed to guard the national domain from fire; he shall investigate the extent of the forests in the State, together with the amounts and varieties of the wood and timber growing therein, the damages done to them from time to time by forest fires and the causes of such fires, the method used, if any, to promote the regrowth of timber, and any other important facts relating to forest interests, which may be required by the forest commissioner. The information so gathered, with his suggestions relative thereto, shall be included in a report to be made by him annually to the forest commissioner.

§ 4. The forest commissioner shall provide and officially sign an abstract of the penal laws of this act, with such rules and regulations in accord therewith as he may deem necessary, and on or before the first day of April of each year he shall forward as many copies as he considers needful to the chairman of each town board of supervisors and presidents of villages, to the forest firewardens that he has appointed and to all railroad companies and to the chairman of each board of county commissioners in this State, and it shall be the duty of said firewardens to post up such abstract as warning placards in conspicuous places in their respective districts, and it shall be the duty of the county commissioners of each county to cause the said abstract to be published in at least three issues of the official paper in their respective counties during the fire-dangerous season of each year, which shall be reckoned from the fifteenth of April to the first of November.

§ 5. During a dry and dangerous season, when forest and prairie fires are prevailing or are liable to break out, the chief firewarden shall use such means under his command as he may deem necessary to prevent or suppress such fires, and his expenses shall be paid by the State, which expenditures in one year shall not exceed five thousand dollars, to be paid for out of the general revenue fund, upon the order of the forest commissioner.

§ 6. It shall be the duty of each fire warden to take precautions to prevent the setting of forest or prairie fires, and when his district is suffering or threatened with fire, to go to the place of danger to control such fires, and each forest firewarden shall have authority to call to his assistance in emergencies any able-bodied male person over eighteen years of age, and if such person refuses, without reasonable justification or excuse, to assist, or if any firewarden refuses or neglects to perform the duties assigned him in this act, such officer or person shall be deemed guilty of a misdemeanor, and shall, upon conviction thereof, be punished by a fine of not more than one hundred (\$100) dollars or imprisonment in the county jail not to exceed three (3) months.

§ 7. The chief firewarden and the several firewardens created by this act shall have authority to enforce the provisions of this act, and it shall be their duty to co-operate with the firewarden of any adjoining district, and in the absence of such firewardens to direct the work of control and extinguishment of forest or prairie fires in such district, and to arrest, without warrant, every person found violating any provisions of this act, and to forthwith take the offender before a magistrate and make complaint against such person. The chairman of boards of township supervisors, presidents of villages and firewardens appointed by the chief firewarden shall inquire into the cause of each forest or prairie fire within their districts, and shall report the same to the chief firewarden and the methods used to control or extinguish such fires and the amount of property destroyed and the number of lives lost, if any, and report such other facts in regard to said fires as said chief firewarden may require. During the more dangerous season of the year the chief firewarden may require frequent reports from the chairman of township boards, or in unorganized towns from firewardens appointed by the said chief firewarden as to condition of forest and prairie fires and as to what is being done to control the same.

§ 8. Each firewarden shall receive for his actual services rendered under this act two (\$2) dollars per day, two-thirds of which shall be

paid by the county where such service is performed, and one-third by the state; and any employe engaged in like service shall receive at the rate of one and fifty one-hundredths (\$1.50) dollars per day, and said expense shall also be paid, two-thirds by the county where such service is rendered, and one-third by the state, as hereinafter provided, but no payment shall be made to any claimant under this act until he shall have presented an itemized account and made oath or affirmation that said account is just and correct, which account shall be approved by the board of township supervisors, and shall be audited by the county commissioners, when satisfied of the justice of the claim and left on file with the county auditor; in case of unorganized townships, the board of county commissioners alone shall approve and audit such accounts. The county auditor shall thereupon issue to each claimant his warrant upon the county treasurer for the entire sum to which such claimant is entitled, and the treasurer shall pay the same. Such county auditor shall transmit the original oath and copy of the warrant to the state auditor, who shall audit such claim, and one-third thereof shall be paid out of the state treasury from the general revenue fund by warrant issued by the state auditor upon the state treasurer in favor of the county thereof paying the same, and forward the same to the auditor of said county. *Provided*, that no firewarden shall be paid, in any one year, for more than ten (10) days' service in extinguishment and preventing forest or prairie fires, nor for more than five (5) days' service in each year in posting notices and making the reports required by this act; nor, in the aggregate, for more than fifteen (15) days' service, of whatever character, in any one year; nor shall any one person, employed by firewardens to assist in extinguishing or preventing forest or prairie fires be paid for more than five (5) days of such service in any one year. No county shall expend more than five hundred (\$500) dollars of public money in any one year under this act.

§ 9. Any person who willfully, negligently or carelessly sets on fire, or causes to be set on fire, any woods, prairies or other combustible material, whether or not on his own lands, by means whereof the property of another is injured or endangered, or any person who willfully, negligently or carelessly suffers any fire set by himself to damage the property of another, is guilty of a misdemeanor and shall be punished by a fine not exceeding one hundred (\$100) dollars, or by imprisonment in the county jail not exceeding three months. Any person who maliciously sets on fire, or causes to be set on fire, any woods, prairies or other combustible material whereby the property of another is

destroyed and life is sacrificed, shall be punished with a fine of not over five hundred (\$500) dollars, or be imprisoned in the state prison for a term of not over ten (10) years, or both such fine and imprisonment.

§ 10. Any person who shall kindle a fire on or dangerously near to forest or prairie land and leave it unquenched, or shall be a party thereto, and every person who shall use other than incombustible wads for firearms, or who shall carry a naked torch, fire brand or other exposed light in or dangerously near to forest land, causing risk of accidental fire, shall be punished by a fine not exceeding one hundred (\$100) dollars or imprisonment in the county jail not exceeding three (3) months.

§ 11. Every person who shall willfully or heedlessly deface, destroy or remove any warning placard posted under the requirements of this act shall be liable to a fine not exceeding one hundred (\$100) dollars for each such offense, or imprisonment in the county jail not exceeding three (3) months.

§ 12. It shall be the duty of all railroad companies operating any railroad within this state to use efficient spark arresters on all their engines and to keep their right of way to the width of fifty (50) feet on each side of the center of the main track cleared of all combustible materials and safely dispose of the same within said limits of their right of way between the fifteenth day of April and the first day of December. No railroad company shall permit its employes to leave a deposit of fire or live coals, or hot ashes, in the immediate vicinity of woodland, or lands liable to be overrun by fires, and where engineers, conductors or trainmen discover that fences or other materials along the right of way or woodland adjacent to the railroad are burning or in danger from fire, they shall report the same promptly at the next telegraph station that they may pass. In seasons of drouth railroad companies shall give particular instructions to their employes for the prevention and prompt extinguishment of fires and they shall cause warning placards furnished by the forest commissioner to be posted at their stations in the vicinity of forest and prairie grass lands, and where a fire occurs along the line of their road they shall concentrate such help and adopt such measures as shall be available to effectively extinguish it. Any railroad company willfully violating the requirements of this act shall be deemed guilty of a misdemeanor and be punished by a fine not exceeding one hundred (100) dollars for each such offense, and railroad employes willfully violating the requirements of this section shall be guilty of a misdemeanor and be punished by a

fine of not less than five (\$5) dollars nor more than fifty (\$50) dollars. But this section shall not be construed to prohibit or prevent any railroad company from piling or keeping upon the right of way cross ties or other material necessary in the operation or maintenance of such railroad.

§ 13. It shall be the duty of each and every owner of threshing or other portable steam engines to have efficient spark arresters on their engines at all times when in use, and no person in charge of any threshing engine shall deposit live coals or hot ashes from his engine in any place without putting them out or covering them with at least three inches of earth before leaving them. All persons violating the provisions of this section shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine not less than five (\$5) dollars nor more than fifty (\$50) dollars.

§ 14. Nothing in this act shall be construed as affecting any right of action for damages.

§ 15. Woodland territory within the terms of this act shall be construed to mean bodies of forest and brush land.

§ 16. All moneys received as penalties for violating the provisions of this act shall be paid into the county treasury of the county wherein the offense occurred, to be known as the county fire fund, and used under the direction of the county board in defraying the expenses of enforcing the provisions of this act within such county.

§ 17. The forest commissioner shall annually on or before the first day of December make a written report to the governor of his doings in respect to the duties herein assigned him, together with an itemized account of the expenses incurred in carrying out the provisions of this act, which report shall include such statistics and facts as he has obtained from the chief firewarden and from the several firewardens of the state and from other sources, together with his suggestions relative to the preservation of the forests of the state and to the prevention and extinguishment of forest and prairie fires.

§ 18. All acts and parts of acts inconsistent with this act are hereby repealed.

§ 19. This act shall take effect and be in force from and after its passage.

[Approved April 18, 1895.]

COLORADO.

ACT CREATING A FOREST COMMISSION.

[As originally enacted April 4, 1885, and amended March 3, 1887.]

AN ACT relating to woodlands and forestry in Colorado, and to create a forest commission for said state.

Be it enacted by the General Assembly of the State of Colorado :

SECTION 1. All lands now owned or controlled, or which may be hereafter owned or controlled by the state of Colorado, and which are now, or shall hereafter be, covered with forest growth, or devoted to forest uses, are, for the purposes of this act, declared to be woodlands.

§ 2. By and with the advice and consent of the senate, the governor shall appoint one forest commissioner, a suitable person, skilled in matters relating to forestry, who shall be a resident and citizen of this state, and who shall be known as the forest commissioner of the state of Colorado; the said commissioner shall hold his office for the term of two years, or until his successor shall be duly appointed and confirmed, unless sooner removed by the governor for cause.

§ 3. The forest commissioner shall, at the expense of the state, be provided with an office at the capital, where his official records shall be kept. He shall be paid a salary of fifteen hundred dollars (\$1,500) per annum, and his reasonable and necessary traveling expenses, not to exceed five hundred (500) dollars in any one year. Such salary and traveling expenses shall be payable in monthly installments, by the state treasurer, on warrants drawn by the state auditor. Before entering upon the duties of his office, he shall take and subscribe the oath required by the constitution, and give a bond to the state of Colorado in the sum of two thousand dollars, conditioned for the faithful discharge of the duties of his office. Said bond shall be approved by the governor and attorney-general, and be deposited in the office of the secretary of state.

§ 4. Said forest commissioner shall have the care of all woodlands now owned, or controlled, or which may be hereafter owned or controlled by the state. He shall cause all such lands to be located and duly recorded, and shall make and publish reasonable rules and regulations for the prevention of trespass upon said lands, for the prevention and extinguishment of fires thereon, and for the conservation of forest growth. He shall also, as far as possible, promote the gradual extension of the forest area, encourage the planting

of trees, and preserve the sources of water supply; but nothing in this act shall be so construed as to permit any forest officer, hereby constituted, to interfere with the use of timber for domestic, mining, or agricultural uses. On or before the fifteenth day of December, in each year, he shall report to the governor his official action during the preceding year, and such information as may be useful in preserving the forests of the State, and maintaining the supply of water.

§ 5. In addition to the powers and duties attaching to the offices of county commissioners and road overseers in the counties of this state, such commissioners and overseers shall act as conservators of woodlands in their respective localities, and shall enforce the laws and regulations made for the protection and preservation of such woodlands. Said county commissioners shall, also, to the extent of their power, encourage the planting of trees along water courses and irrigating ditches, and in other proper places. Except in cases of emergency, no expenses under this act shall be incurred by the said county commissioners, or road overseers, unless by direction of the state forest commissioner.

§ 6. It is made the special duty of all forest officers of the state to exercise the utmost care and vigilance in the prevention and extinguishment of fires within the state likely to endanger or destroy forest growth, and to apprehend any person who may be guilty of causing such fires; and in the performance of their duties such officers may call to their aid such person or persons, within the state, as they may deem necessary. Any person who, without good cause, shall fail or refuse to give aid as aforesaid, when requested so to do by any duly authorized forest officer, shall be deemed guilty of a misdemeanor, and upon conviction thereof, shall be fined in a sum not less than twenty-five dollars, nor more than one hundred dollars. All forest officers and all peace officers within the state are empowered and required to arrest any and all persons found trespassing upon the woodlands of the state, or unlawfully cutting or destroying timber thereon, or setting fire in a manner to endanger such woodlands, and shall cause actions to be instituted in courts of proper jurisdiction to punish violators of the forestry laws of the state. In all matters pertaining to woodlands and forests the district officers shall be subject to the county forest officers of their respective counties; and all shall be subordinate to the forest commissioner of the state. The county and district forest officers shall make reports of their official action to the state forest commissioner, and furnish that officer with such information relative to their respective counties and districts as he may, from time to time require.

§ 7. For the time actually occupied in the performance of duties imposed by this act, the said county commissioners shall receive additional pay at the same rate per diem as is allowed them by existing laws. The said road overseers, for services rendered under this act, shall be paid at the rate of three dollars per day. All bills for such services shall be approved by the state forest commissioner, and shall be paid by the county wherein such services were rendered: *Provided*, That the entire sum which may be paid under the provisions of this act in any county shall not exceed the sum of one hundred dollars (\$100) in any one year.

§ 8. No person who is directly, or indirectly, engaged in the manufacture of lumber, or railroad ties, or telegraph poles, or any business which requires a large consumption of growing timber or wood, shall be qualified to serve as a forest commissioner under this act.

§ 9. All acts and parts of acts inconsistent with the provisions of this act are hereby repealed.

§ 10. It is the opinion of the general assembly that an emergency exists; therefore, this act shall take effect and be in force from and after its passage.

FOREST FIRES.

AN ACT to prevent the spreading of fires in this state, and providing for the punishment of willful or negligent use thereof.

Be it enacted by the General Assembly of the State of Colorado :

SECTION 1. If any person shall willfully and maliciously set on fire, or cause to be set on fire, any woods or prairie, or grounds of any description other than his own, or shall intentionally, or by gross neglect, permit a fire, set or caused to be set by him, to pass from his own grounds to the injury of any other person or persons, such person shall be deemed guilty of a misdemeanor, and, upon conviction thereof, shall be punished by fine not exceeding three hundred dollars, or by imprisonment in the county jail not exceeding six months, or by both such fine and imprisonment.

§ 2. Any person who shall build a camp fire in any woods or prairie, or on other grounds in this state, shall, before or at the time of breaking or leaving such camp, totally extinguish such camp fire; and, upon a 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.

[Approved March 27, 1885.]

Further enactments upon this subject may also be found in the General Statutes of Colorado, sections 905, 906, 1036 and 1037.

Penalties, for injuries to trees, are prescribed in sections 2468, 2469, 3427 and 3428 of the General Statutes of Colorado.

POSTING OF FIRE NOTICES.

AN ACT directing the erection of notices to extinguish camp fires.

Be it enacted by the General Assembly of the State of Colorado :

SECTION 1. It shall be the duty of the board of county commissioners of each county in this state, within thirty days after this act shall take effect, to cause to be erected in a conspicuous place, at the side of each and every traveled highway, and at such places as they may deem proper, at suitable distances alongside the main traveled highways of their respective counties, a notice in large letters, substantially in the following form, to wit:

“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.”

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.....
.....

County Commissioners.

The erection and maintenance of such notices shall be at the expense of the respective counties, and at least 10 in number of such notices shall be posted in each and every county in this state.

§ 2. Whoever shall willfully destroy, remove, injure or deface any such notice, erected on any highway as aforesaid, or shall willfully injure or deface any inscription or device comprising such notice, shall be deemed guilty of a misdemeanor, and on conviction thereof, before any justice of the peace or court of competent jurisdiction, shall be fined not exceeding one hundred dollars, or imprisonment in the county jail not exceeding three months, or both, in the discretion of the court.

[Approved March 27, 1885.]

CALIFORNIA.

AN ACT to create a state board of forestry, and to provide for the expenses thereof.

[Approved March 3, 1885.]

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. There shall be established a state board of forestry, consisting of three persons, appointed by the governor of the state.

§ 2 Each member shall hold office for the term of four years, and until his successor shall be qualified.

§ 3. The board may appoint and prescribe the duties of its secretary, and elect one of its own members treasurer, both to hold office at the pleasure of the board.

§ 4. The duty of the board shall be to collect statistics and other information with regard to forestry, tree culture, and tree preservation, throughout the state; to correspond with various forestry societies and individuals, for the purpose of obtaining such information; to learn by investigation and experiments the adaptability of various trees to the different sections of the state; to disseminate such information throughout the state in such a manner as to aid and encourage the purpose for which this board is formed; to assist in enforcing and carrying out all national and state forestry laws, as far as practicable; to act with a special view to the continuance of water sources that may be affected in any measure by the destruction of forests near such sources; to do any and all things within their power to encourage the preservation and planting of forests, and the consequent maintenance of the water sources of the state.

§ 5. The board shall report biennially to the governor a detailed statement of the work, which shall include all disbursements that may have been made. All printing required to be done by the board for their official use shall be done by the superintendent of state printing.

§ 6. There is hereby appropriated for the use of this board, out of any moneys in the state treasury not otherwise appropriated, the sum of five thousand (\$5,000) dollars for the two years beginning the first of April, eighteen hundred and eighty-five, said sum to be used for the payment of the salary of the secretary, not to exceed the sum of one hundred and twenty-five dollars per month, the necessary traveling expenses of the members of this board, the employment of assistants, and such other needful expenditures as this board may incur, and the state controller will draw his warrants on the state treasurer in favor of the treasurer of the board for the same.

§ 7. The members of this board shall receive no compensation.

8. All acts or parts of acts in conflict with this act are hereby repealed.

AN ACT to enlarge the powers of the state board of forestry, and to provide for the expenses of said board.

[Approved March 7, 1887.]

The People of the State of California, represented in Senate and Assembly, do enact as follows :

SECTION 1. All the members of the state board of forestry of this state, and all assistants now employed or hereafter to be employed by said board, are hereby endowed with all the powers of peace officers, for the purpose of making arrests for any violation of any law applying to forest or brush lands within this state, or prohibiting the destruction thereof.

§ 2. There is hereby appropriated for the use of this board, out of the moneys in the state treasury not otherwise appropriated, the sum of twenty-nine thousand five hundred dollars for the two years beginning the first of April, eighteen hundred and eighty-seven, said sum to be used for the payment of the salaries of the assistants of said board, the necessary traveling expenses of the members of said board, and such other needful expenditures as said board may find necessary, and the state controller shall draw his warrant on the state treasurer in favor of the treasurer of the board for the same.

§ 3. This act shall take effect and be in force from and after its passage.

NEW YORK.

Law of 1885 as amended by the law of 1893.

AN ACT in relation to the forest preserve and Adirondack park, constituting articles six and seven of chapter forty-three of the general laws.

The People of the State of New York, represented in Senate and Assembly, do enact as follows :

ARTICLE VI.

FOREST PRESERVE.

SECTION 100. Forest preserve.

101. Forest commission.

102. Powers and duties.

- SECTION 103. Sale of timber in forest preserve.
104. Accounts and annual report of forest commission.
 105. Partition of lands.
 106. Taxation of forest preserve.
 107. Duties of railroad companies.
 108. Powers and duties of certain officers in case of fire.
 109. Supervisors to be town protectors of land.
 110. Supervisors *ex officio* firewardens.
 111. Supervisors to report fires.
 112. Actions for trespasses upon forest preserve.
 113. Penalty for setting fire to forest lands.
 114. Arrest of offenders without warrant.
 115. Deer parks in the Catskill region,
 116. Powers and duties of commissioner of agriculture as to forest preserve.

§ 100. Forest preserve.—The forest preserve* shall include the lands now owned, or hereafter acquired, by the state within the counties of Clinton, except the towns of Alton and Dannemora, Delaware, Essex, Franklin, Fulton, Hamilton, Herkimer, Lewis, Oneida, Saratoga, St. Lawrence, Warren, Washington, Greene, Ulster, and Sullivan, except

1. Lands within the limits of any village or city, and
2. Lands, not wild lands, acquired by the state on foreclosure of mortgages made to the commissioners for loaning certain moneys of the United States, usually called the United States deposit fund.

§ 101. Forest commission.—There shall be a forest commission consisting of five persons to be known as the forest commissioners, appointed by the governor by and with the advice and consent of the senate, and holding office for the term of five years. The commissioners shall serve without compensation, but shall be paid for the reasonable expenses incurred in the performance of their official duties, not to exceed the sum of five hundred dollars in any year to any commissioner. The superintendent, assistant superintendent, the two inspectors of forests, and the secretary and clerks now employed by the forest commission, shall continue on the same terms and conditions until such employment shall be terminated or modified by the forest commission.

§ 102. Powers and duties.—The forest commission shall :

1. Have the care, custody, control and superintendence of the forest preserve.

* N. B.—The Forest Preserve and the Adirondack Park are not the same. The different territory embraced by each is clearly defined by this law. The frequent failure to note this difference has resulted in confused ideas, misuse of terms, and, in one instance, an inoperative law.

2. Maintain and protect the forests in the forest preserve, and promote as far as practicable the further growth of the forest therein.

3. Have charge of the public interests of the state with regard to forestry and tree planting, and especially with reference to forest fires in every part of the state.

4. Possess all the powers relating to the forest preserve which were vested in the commissioners of the land office and in the comptroller on May fifteenth, eighteen hundred and eighty-five.

5. Prescribe rules and regulations affecting the whole or any part of the forest preserve and for its use, care, and administration, and alter or amend the same; but neither such rules or regulations, nor anything contained in this article, shall prevent or operate to prevent the free use of any road, stream or water as the same may have been heretofore used, or as may be reasonably required in the prosecution of any lawful business.

6. Employ a superintendent, assistant superintendent, two forest inspectors, twelve foresters, and such clerical force and agents as they may deem necessary, and fix their compensation; but the expenses and salaries of such employees shall not exceed in the aggregate, with the other expenses of the commission, the sum appropriated therefor by the legislature; and the amount allowed to each forester for salary shall not exceed the sum of seventy-five dollars a month.

7. Take such measures as in the judgment of the commissioners may be proper, and the state superintendent of public instruction and the regents of the university may approve, for awakening an interest in behalf of forestry in the common schools, academies, and colleges of the state, and of imparting elementary instruction on such subject therein; and prepare and distribute the tracts and circulars of information, giving plain and concise instructions for the care of private woodlands and for the growth of new forests upon lands that have been denuded, exhausted by cultivation, eroded by torrents, or injured by fire, or that are sandy, marshy, broken, sterile or waste, and unfit for other use. These publications shall be furnished without cost to any citizen of the state on application, and proper measures may be taken for bringing them to the notice of persons who would be benefited thereby.

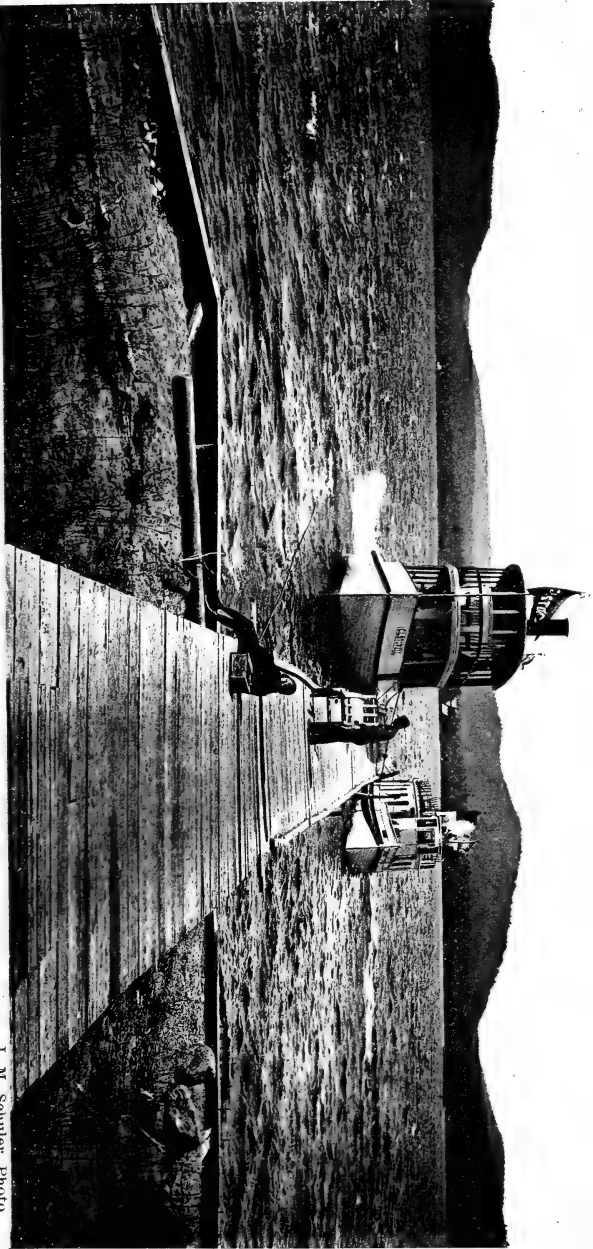
8. Cause rules for the prevention and suppression of forest fires to be printed for posting in schoolhouses, inns, sawmills and other wood-working establishments, lumber camps, and other places in such portions of the state as they may deem necessary. Forest inspectors, foresters, firewardens, supervisors, and school trustees shall cause these rules, when received by them, to be properly posted and replaced when lost or destroyed. Any person maliciously or wantonly defacing or

destroying any such notice shall forfeit to the people of the state the sum of five dollars for every such offense.

§ 103. **Sale of timber on forest preserve.** The forest commissioners may sell any spruce and tamarack timber which is not less than twelve inches in diameter at a height of three feet above the ground, standing in any part of the forest preserve, and poplar timber of such size as the forest commission may determine, and the proceeds of such sales shall be turned over to the state treasurer, by whom they shall be placed to the credit of the special fund established for the purchase of lands within the Adirondack park.

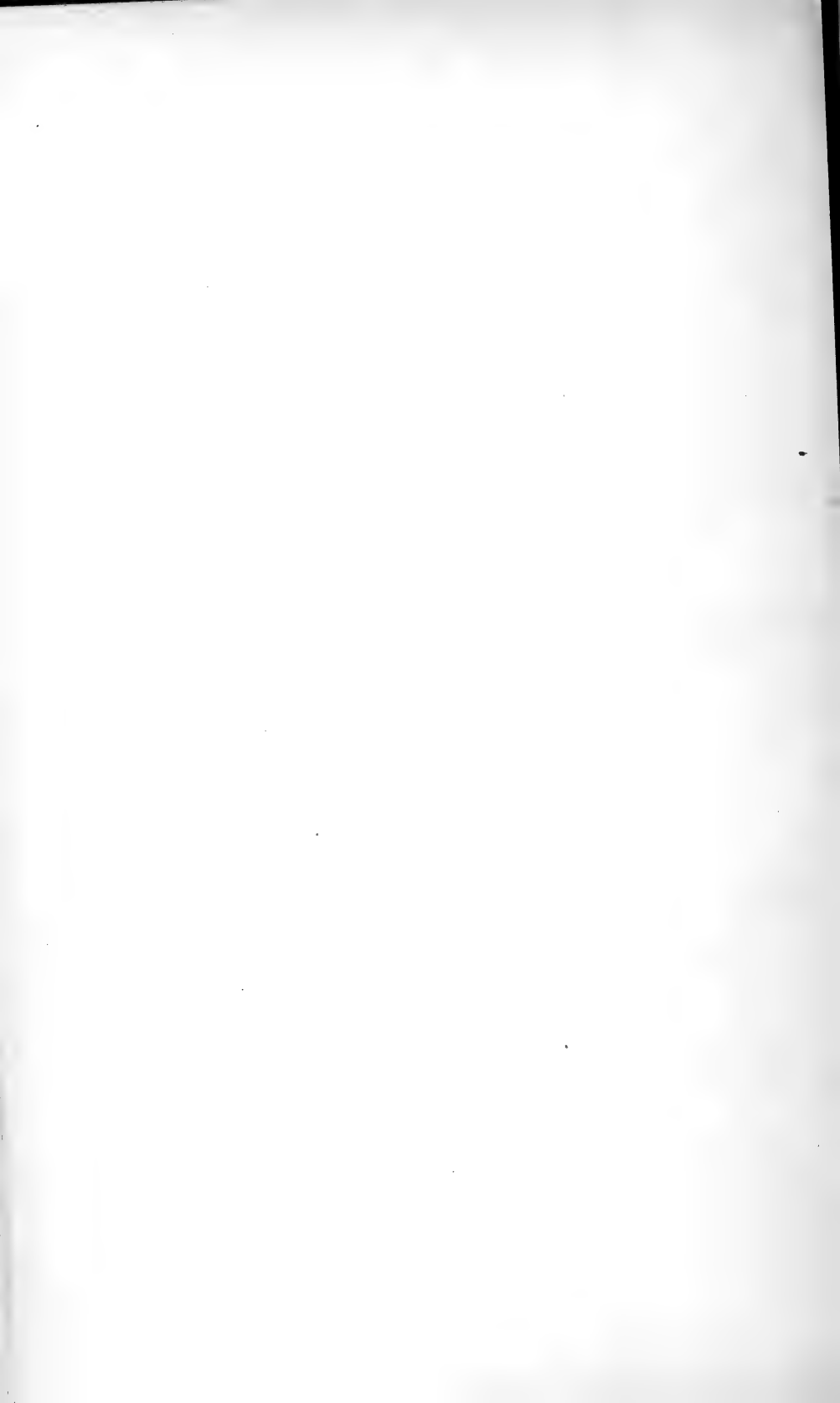
§ 104. **Accounts and annual report of forest commission.** All income derived from state forest lands shall be paid over by the forest commission to the treasury of the state, and a strict account shall be kept of all receipts and expenses of the commission, which account shall be audited by the comptroller. The commission shall annually, in the month of January, make a written report to the legislature of their receipts and expenses, and of all their proceedings, with such recommendations of further legislative or official action as they may deem proper.

§ 105. **Partition of lands.** Whenever the state owns an undivided interest with any person in lands of the forest preserve, or holds and is in possession of such lands as joint tenant or tenant in common with any person who has a freehold estate therein, the attorney-general shall, on the request of the forest commission, bring an action in the name of the people of the state for the actual partition of such land; and on the written consent of the forest commission any such person may maintain an action for the actual partition of such land in the same manner as if the state were not entitled to exemption from legal proceedings, and service of process in such action upon the attorney general shall be deemed service upon the state. Such actions, the proceedings and judgment therein, and the proceedings under the judgment, shall be according to the practice at the time prevailing in action of partition, and shall have the same force and effect as in other actions, except that no costs against the state shall be allowed in such actions, and no sale of such lands shall be adjudged therein. The forest commission may without action, but with the consent of the comptroller, agree with any person or persons owning lands within the forest preserve jointly or as tenants in common with the state, for the partition of such lands; and on such agreement and consent, the comptroller shall make, on behalf of the people of the state, any con-



FOURTH LAKE, FULTON CHAIN.

J. M. Schuler, Photo.



veyance necessary or proper in such partition, and such conveyance shall be forthwith recorded as now provided by law as to conveyances made by the commissioners of the land office.

§ 106. **Taxation of forest preserve.**—All wild or forest land within the forest preserve shall be assessed and taxed at a like valuation and rate as similar lands of individuals within the counties where situated. On or before August first in every year the assessors of the town, within which the lands so belonging to the state are situated, shall file in the office of the comptroller and of the forest commission, a copy of the assessment roll of the town which, in addition to the other matter now required by law, shall state and specify which and how much, if any, of the lands assessed are forest lands, and which and how much, if any, are lands belonging to the state; such statements and specifications to be verified by the oaths of a majority of the assessors. The comptroller shall thereupon, and before the first day of September following, and after hearing the assessors and forest commission if they or any of them so desire, correct or reduce any assessment of state land which may be in his judgment an unfair proportion to the remaining assessment of land within the town, and shall in other respects approve the assessment and communicate such approval to the assessors. No such assessment of state lands shall be valid for any purpose until the amount of assessment is approved by the comptroller, and such approval attached to and deposited with the assessment-roll of the town and therewith delivered by the assessors of the town to the supervisor thereof or other officer authorized to receive the same from the assessors. No tax for the erection of a schoolhouse, or opening of a road shall be imposed on the state lands unless such erection or opening shall have been first approved in writing by the forest commission. Payment of the lawful and just amount of the taxes imposed under this section on lands so belonging to the state shall in every year be made by the treasurer of the state, on the certificate of the comptroller, by allowing to the treasurer of the county in which such lands are situated a credit of the amount of such taxes due on such lands payable by such county treasurer in such year to the state for state taxes; but no fee shall be allowed by the comptroller to the county treasurer in adjusting their accounts for such portion of the state tax so paid.

§ 107. **Duties of railroad companies.** Every railroad company whose road passes through waste or forest lands, or lands liable to be overrun by fires within the state, shall twice in each year cut and remove from its right of way all grass, brush or other inflammable

materials, but under proper care, and at proper times when fire, if set can be kept under control. All locomotives which run through forest lands shall be provided with approved and sufficient arrangements for preventing the escape of fire from their furnaces or ashpans, and with netting of steel or iron wire upon their smoke stacks to prevent the escape of sparks of fire; and every engineer and fireman employed upon a locomotive shall see that the appliances to prevent the escape of fire are in use, and applied as far as it can be reasonably and practically done. No railroad company shall permit its employes to deposit fire coals or ashes upon their track in the immediate vicinity of woodlands, or lands liable to be overrun by fires; and where any engineers, conductors or trainmen discover that fences or other material, or substances along the right of way upon woodlands adjacent to the railroad are burning, or in danger from fire, they shall report the same at their next stopping place, and the person in charge of such station shall take prompt measures to extinguish such fires and shall immediately notify the nearest firewarden or forester. In seasons of drought, and especially during the first dry time in the spring after the snows have gone and before vegetation has revived, railroad companies shall employ a sufficient number of trackmen for the prompt extinguishment of fires; and where a forest fire is raging near the line of their road, they shall concentrate such help and adopt such measures as shall most effectually arrest its progress. If any railroad company or any of its employes violate any provision of this section the company shall forfeit to the people of the state the sum of one hundred dollars for every such violation.

§ 108. Powers and duties of certain officers in case of fire. The forest commission, forest superintendent, forest inspector, foresters, and other persons employed by or under the authority of the forest commission, and who may be authorized by the commission to assume such duty, shall in a town within or a part of the forest preserve, whenever the woods in any such town shall be on fire, perform the duty imposed on them, and in such case shall have the powers granted to justices of the peace, the supervisors and commissioners of highways, with reference to the ordering of persons to assist in extinguishing fires or stopping their progress. The firewarden, or the supervisor, where acting in general charge, may cause fences to be destroyed or furrows to be ploughed, to check the running of fire; or, in case of great danger, back fires may be set along a road or stream, or other line of defence, to clear off the combustible material before an advancing fire. No action for

trespass shall be brought by any owner of land for entry made upon his premises by persons going to assist in extinguishing a forest fire, although such fire may not be upon his land. The compensation for services of persons who may assist in extinguishing forest fires shall be a town charge, and shall not exceed the sum of two dollars per day for each person employed; but all bills for such services must be approved by the firewarden of the town in which the fire occurred before payment shall be made.

§ 109. **Supervisors to be town protectors of lands.** The supervisor of every town in the state not within or a part of the forest preserve, in which wild or forest lands belonging to the state are located, shall be, by virtue of his office, the protector of such lands, subject to the instructions he may receive from the forest commission. He shall report to the district attorney for prosecution any acts of spoliation or injury that may be done, and such district attorney shall institute proceedings for the prevention of further trespass and for the recovery of all damages committed, with costs of prosecution. The supervisors shall report their proceedings therein to the forest commission. In towns where the forest commission deem it necessary, they may serve a notice upon the supervisor, requiring him to appoint one or more forest guards; and if more than one in a town, the district of each shall be properly defined. The guards so appointed shall have such powers, perform such duties, and receive such pay as the forest commission may determine.

§ 110. **Supervisors ex-officio firewardens.**—Every supervisor of a town in this state, in which there are no wild or forest lands of the forest preserve, and in which no firewarden is appointed by the forest commission, shall be ex-officio firewarden therein; but the supervisor may divide towns particularly exposed to damages from forest fires into two or more districts, bounded as far as may be by roads, streams of water, or dividing ridges of land or lot lines, and appoint in writing one resident citizen in each district as district firewarden therein. A description of these districts, and the names of the district firewardens thus appointed, shall be recorded in the office of the town clerk. The supervisor may also cause a map of the fire districts of his town to be posted in some public place with the names of the district firewardens appointed. The cost of such map, not exceeding five dollars, shall be a town charge, and the services of the firewarden shall also be deemed a town charge, and shall not exceed the sum of two dollars per day for

the time actually employed. Within a town in which there are wild or forest lands of the forest preserve, and in such other towns in the counties mentioned in section one hundred of this chapter as the forest commission may designate, such persons shall be firewardens as may, from time to time, be appointed by the forest commission, and shall act during the pleasure of such commission, and all the provisions of this article with reference to supervisors and district town wardens shall be applicable to them. On the discovery of a forest fire, or a fire in any woods, the firewarden of the district, town, or county in which it shall be, shall take such measures as shall be necessary for its extinction, and for this purpose he may call on any person in the territory in which he acts, or in its vicinity, for assistance, and any person refusing to act when so called on shall forfeit to the people of the state the sum of ten dollars. Any justice of the peace, or commissioner of highways of the town in which any such fire shall be, shall act as firewarden with respect to any such fire, if the firewardens of the district, town, or county are not taking such measures for its extinguishment.

§ 111. **Supervisors to report fires.** The firewarden of every town in which a forest fire of more than one acre in extent has occurred within a year shall report to the forest commission the extent of area burned over to the best of his information, together with the probable amount of property destroyed, specifying the value of timber, as near as may be, and amount of cordwood, logs, bark, or other forest products, and of fences, bridges and buildings that have been burned. He shall make inquiries, and report as to the causes of such fires, if ascertainable, and as to the measures employed and found most effectual in checking their progress. A consolidated summary of these returns by counties, and of the information as to the same matter otherwise gathered by the forest commission, shall be included in their annual report.

§ 112. **Actions for trespasses upon forest preserve.** The forest commission may bring in the name of the people of the state any action to prevent trespass upon or injury to the forest preserve, and recover damages therefor, or to recover lands properly forming part of the forest preserve, but occupied or held by persons not entitled thereto, or for the maintenance and protection of the forest preserve, which any owner of lands would be entitled to bring; or for cutting or carrying away, or causing to be cut, or assisting to cut, any tree or timber within the forest preserve or any bark thereupon, or removing any tree, timber or bark, or any portion thereof, from such forest pre-

serve. Every person violating the provisions of this section relating to the cutting or carrying away any timber, trees or bark, shall forfeit to the state the sum of twenty-five dollars for every tree cut or carried away by him or under his direction. The forest commission may, with the consent of the attorney-general and the comptroller, employ attorneys and counsel to prosecute any such action, or to defend any action brought against the commission or any of its members or subordinates arising out of their or his official conduct with relation to the forest preserve. Any attorney or counsel so employed shall act under the direction of and in the name of the attorney-general. Where such attorney or counsel is not so employed, the attorney-general shall prosecute and defend such actions. A preliminary or final injunction shall, on application in an action brought by or at the instance of the forest commission, be granted restraining any act of trespass, waste or destruction upon the forest preserve. All such actions for the prosecution shall be brought in the county where the trespass is alleged to have been committed.

§ 113. **Penalty for setting fire to forest lands.** Any person who shall willfully or negligently set fire to, or assist another to set fire to, any waste or forest lands belonging to the state or to another person, whereby such forests are injured or endangered; or who suffers any fire upon his own lands to escape or extend beyond the limits thereof to the injury of the woodlands of another or of the state, shall forfeit to the state for every such offense not less than fifty dollars nor more than five hundred dollars, and be liable to the person injured for all damages that may be caused by such fires.

§ 114. **Arrest of offenders without warrant.** The forest superintendent, inspectors, foresters, and other persons acting upon the forest preserve under the written employment of the superintendent or of the forest commission, may, without warrant, arrest any person found upon the forest preserve violating any of the provisions of this article, and forthwith take the person so arrested before a magistrate having jurisdiction to issue warrants in such cases, and there make or procure to be made a complaint in writing, on which complaint the magistrate shall act as the case may require.

§ 115. **Deer parks in the Catskill region.** The forest commission shall set apart tracts of land not exceeding three, of such size as they

may deem proper, belonging to the state in the Catskill region, now constituting a part of the forest preserve, for the purpose of breeding deer and wild game. The commission shall purchase and turn out upon such lands such deer or other game as they may think proper, and establish all proper rules for the protection of such land and the game thereupon. No game shall be killed, pursued, trapped or in any way destroyed within the limits of such land so set apart for the period of five years from the time that such lands shall have been so set apart. The forest commission may receive private subscriptions of money, and expend the same for the purposes specified in this section.

§ 116. Powers and duties of commissioner of agriculture as to forest preserve. On the expiration of the terms of office of the forest commissioners appointed pursuant to this chapter, the forest commission shall cease and determine, and all its powers and duties shall devolve on the commissioner of agriculture.

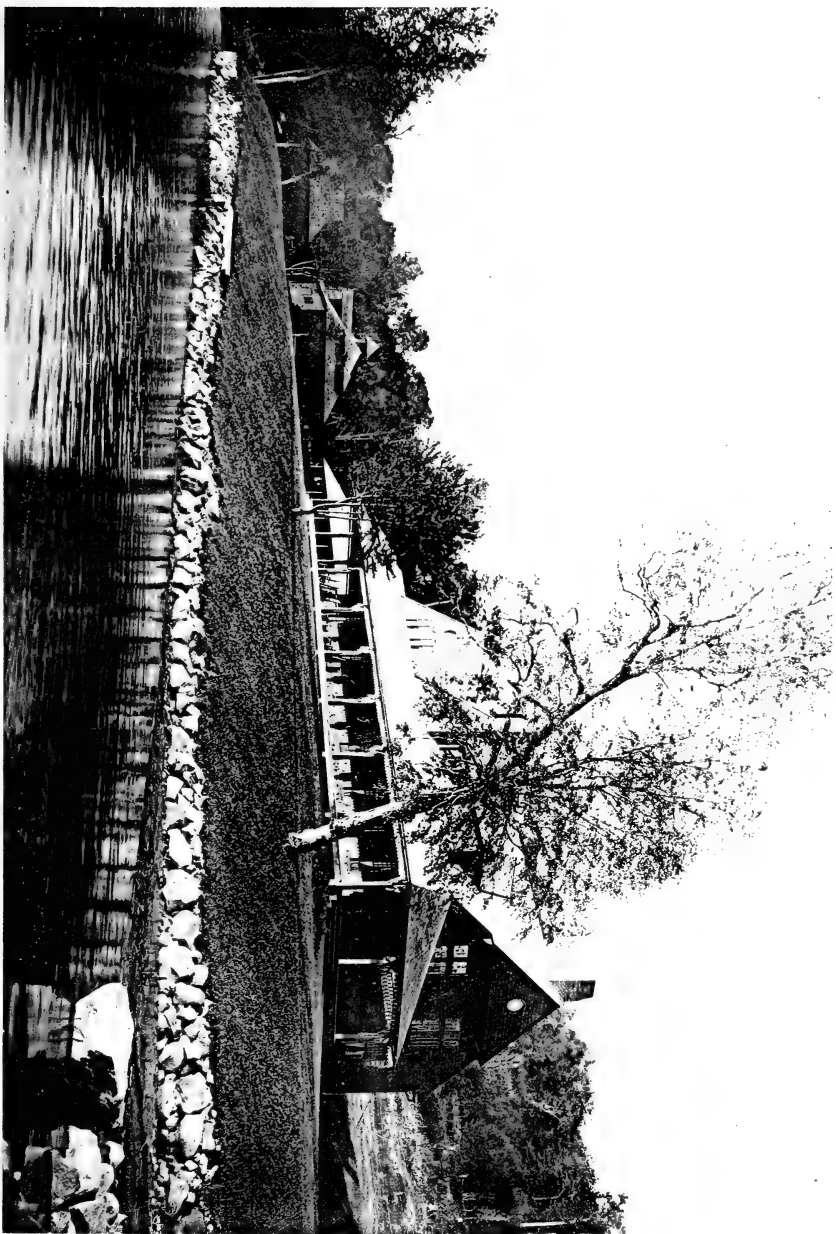
ARTICLE VIII

ADIRONDACK PARK.

Section 120. Adirondack park.

- 121. Powers and duties of forest commission.
- 122. Contracts and conveyances.
- 123. Proceeds of lands sold and payment for lands purchased.
- 124. Foresters and employes to act as game protectors.
- 125. Annual report.
- 126. Laws repealed.
- 127. When to take effect.

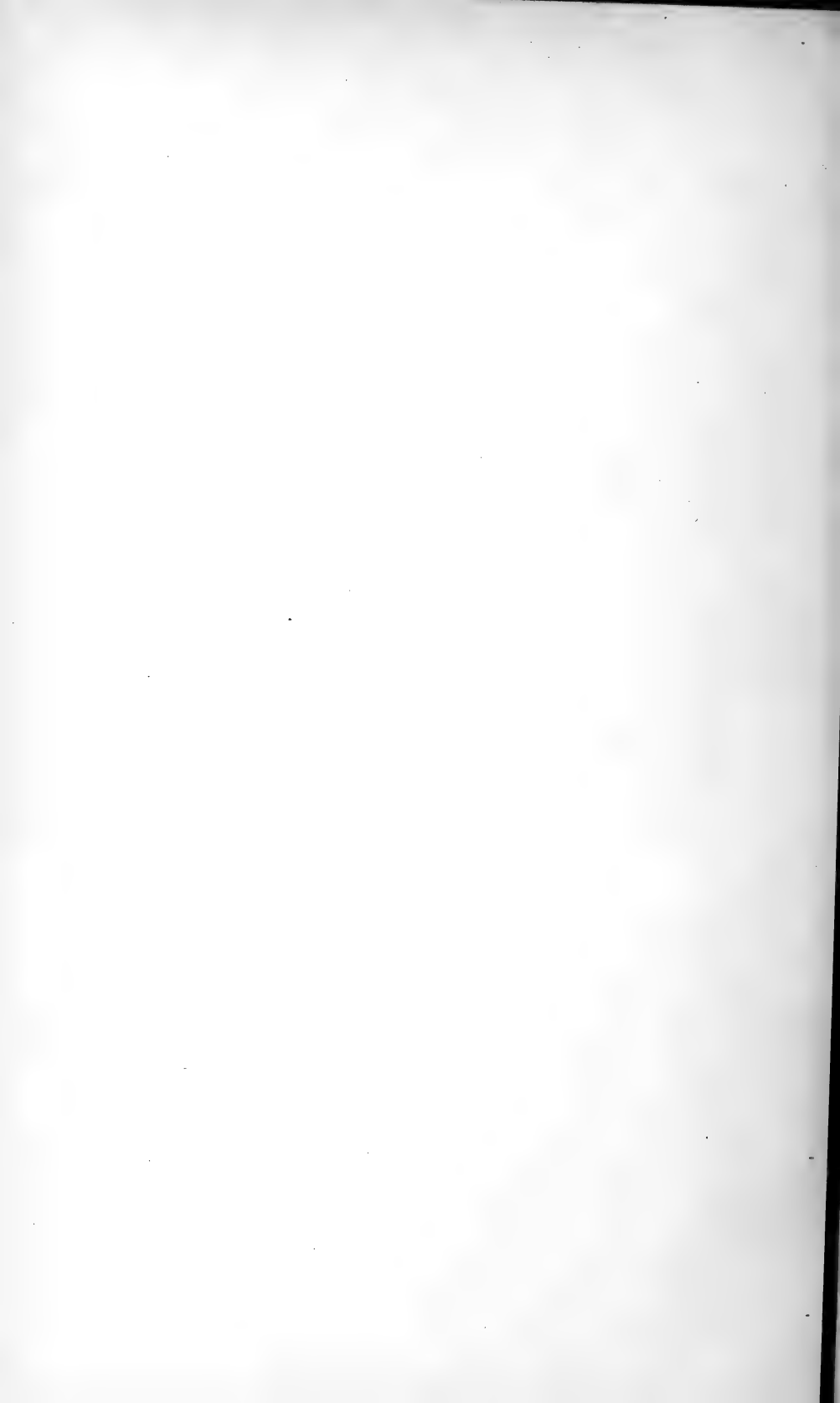
§ 120. **Adirondack park.** All lands now owned or hereafter acquired by the state within the county of Hamilton; the towns of Newcomb, Minerva, Schroon, North Hudson, Keene, North Elba, Saint Armand, and Wilmington, in the county of Essex; the towns of Harrietstown, Santa Clara, Altamont, Waverly, and Brighton, in the county of Franklin; the town of Wilmurt, in the county of Herkimer; the towns of Hopkinton, Colton, Clifton, and Fine, in the county of Saint Lawrence; and in the towns of Johnsburgh, Stony Creek, and Thurman, and the islands in Lake George, in the county of Warren, except such lands as may be sold as provided in this article, shall constitute the Adirondack park. Such park shall be forever reserved, maintained, and cared for as ground open for the free use of all the people for their



AT LAKE LILA,

Hamilton County.

J. M. Schuler, Photo.



health and pleasure, and as forest lands necessary to the preservation of the headwaters of the chief rivers of the state, and a future timber supply, and shall remain part of the forest preserve.

§ 121. **Powers and duties of forest commission.** The forest commission shall have the care, custody, control, and superintendence of the Adirondack park, and within the same and with reference thereto and to acts committed therein and to persons committing the same, all the control, powers, duties, rights of action and remedies belonging to such commission or the commissioners of the land office within and with reference to the forest preserve as to acts committed therein and persons committing the same. The forest commission shall have power:

1. To contract as herein provided for the purchase of land situated within the bounds of the park as defined in the preceding section; if any such lands can not be purchased on advantageous terms unless subject to leases or restrictions, or the right to remove soft wood timber, the contract may provide accordingly; but not for any such right, lease or restriction after ten years from the date of the contract, nor for the right to remove any such trees with a diameter of less than twelve inches at the height of three feet from the ground.

2. To contract as herein provided, on giving notice by publication for at least thirty days in at least two newspapers published in the county where the lands are situated, to sell and convey any part of the forest preserve within the counties of Clinton, Fulton, Lewis, Oneida, Saratoga, Washington, Saint Lawrence, Franklin (except the town of Harrietstown), Herkimer (except the town of Wilmurt), Essex (except the towns of Newcomb and North Elba) and Warren (except the islands in Lake George and land upon the shore thereof), the ownership of which is not in the opinion of the commission needed to promote the purposes of this or the preceding article. All such sales shall be made on sealed bids and to the highest bidder; but the commissioners must reserve the right to reject all bids.

3. To contract with owners of land situated within the bounds of the park that such lands may become part of the park and subject to the provisions of this article, in consideration of the exemption of such lands from taxation for state and county purposes, which contract shall contain a provision that the owners of such land and their grantees shall refrain forever from removing any of the timber thereupon, except spruce, tamarack, or poplar timber, twelve inches in diameter at a height of three feet above the ground; or fallen, burned, or blighted timber, and such other and further conditions as to the right of occupancy of

such lands by such owners or their grantees as may be equitable. Such contract may also reserve to the owners of such forest lands and their grantees the privilege of clearing portions of such lands for agricultural or domestic purposes under regulations to be prescribed by the forest commissioners; but no such privilege shall give to the owners or grantees of said lands the right to clear more than one acre within the boundary of each one hundred acres covered by said contract.

4. To lease from time to time for a term not longer than five years, land within the forest preserve, not more than five acres in one parcel to any person, for the erection of camps or cottages for the use and accommodation of campers. Such leases shall contain strict conditions as to the cutting and protection of timber and the prevention of fires, a reservation for travelers of the right of passage over the land leased at all proper and reasonable times, and a covenant on the part of the lessee to observe all conditions or regulations of the forest commission theretofore or thereafter to be prescribed; and no exclusive privilege of fishing or hunting shall be granted to any person. All revenues received from such leases shall be paid into the state treasury, and shall be placed to the credit of the special fund established for the purchase of lands within the Adirondack park.

5. To prescribe and enforce ordinances and regulations for the government and care of the park, and for the licensing or regulation of guides or other persons engaged in business therein.

6. To lay out paths and roads in the park.

7. To sell the standing spruce, tamarack, and poplar timber, the fallen timber, and the timber injured by blight or fire, on any of the state forest lands, under such regulations and restrictions as the forest commission may prescribe, provided, however, that no such standing timber, except poplar, shall be sold which shall measure twelve inches or less in diameter at least three feet from the ground. All proceeds from such sales shall be turned over to the state treasurer, by whom they shall be placed to the credit of the special fund established for the purchase of land within the Adirondack park.

§ 122. **Contracts and conveyances.** A contract mentioned in this article shall not take effect until approved by the commissioners of the land office, a certificate of which approval, certified by the clerk of said commissioners, shall be attached to the copy of the resolution of the forest commission authorizing such contract. Every conveyance mentioned in this article shall be certified by the attorney-general to be in conformity with the contract, and approved by him as to

form before the acceptance or delivery thereof; those to be received by the commission shall be made to the people of the state, recorded in the proper county, and after record delivered to the commissioners of the land office as a part of their archives; those for land sold by the state shall be executed by the comptroller, and may contain any restrictions, reservations, or covenants which the commission deem proper to promote the purposes of this or the preceding article.

§ 123. **Proceeds of lands sold and payment for lands purchased.** The proceeds of lands sold under this article shall be paid to the state treasurer, and held by him as a separate fund and special deposit, at all times available for the purchase of other lands under this article. Payment for such purchases and for expenses, necessarily incurred by the commission in the preliminary examinations of lands purchased or sold under authority of this article, or in the examination of titles of lands so purchased, or otherwise necessarily incidental to such purchases or conveyances, may be made from such fund or from any moneys appropriated therefor on the certificate of the commission and audit of the comptroller.

§ 124. **Foresters and employes to act as game protectors.** The foresters and other employes of the commission shall, when so directed by the commission, act as game protectors, and possess all powers within the park, conferred on such protectors by law; they shall make such reports to the commissioners of fisheries as that commission from time to time may require. The forest commission, with the approval of the commissioners of fisheries, shall provide for the enforcement of the game law within the park by such lawful means as such commissions deem wise, in addition to such other means as are provided by law.

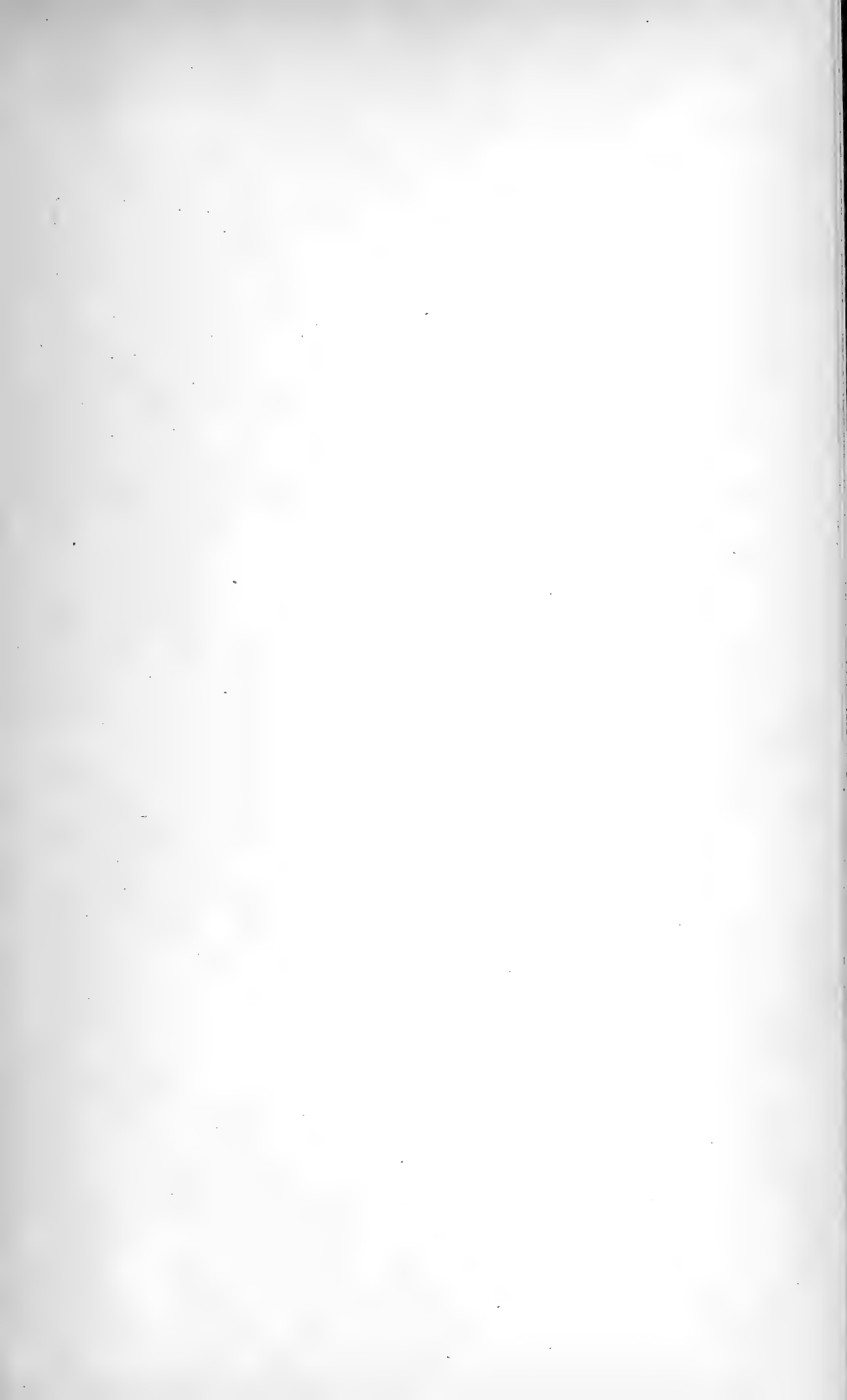
§ 125. **Annual report.** The forest commission shall include in its annual report an account of its proceedings with reference to the park, including a statement of the number of acres of land purchased or sold during the year, the locality thereof, the price paid or received, the amount of timber sold and the prices received therefor, the revenue from leases, and all other information of importance connected with such transfers and transactions; and shall state the amount of money required in the next fiscal year for the purchase of lands and expenses of the park, and make such recommendations with reference thereto as it deems wise.

§ 127. **When to take effect.** This chapter shall take effect immediately.

ARBOR DAY.

Arbor Day is now observed in forty of the States and Territories. It originated in Nebraska, in 1872, where its introduction was due to the efforts and able advocacy of Hon. J. Sterling Morton. It is also observed in the provinces of the Dominion of Canada. In some of the States, including New York, the date is designated by law; in others, by a proclamation of the Governor or Superintendent of Public Schools. The adoption of this holiday by the schools was accomplished by the American Forestry Association, which, in 1882, passed a resolution at the Cincinnati meeting favoring the recognition of Arbor Day by the schools, and appointed a committee to look after this particular work.

Dr. B. G. Northrop, a prominent advocate of Arbor Day and village improvement societies, states that, in a recent visit to Japan and the Hawaiian Islands, he was gratified to find the day set apart as a holiday in those countries also. In Japan, the Emperor's birthday has been designated as Arbor Day, memorial trees being then planted in his honor.





J. M. Schuler, Photo.

SARANAC CLUB-HOUSE.

On the Bartlett Carry.

SUPPLEMENTARY.

FINANCIAL STATEMENT.

The delay in printing this report enables us to add here a financial statement covering the period from October 1, 1894, to April 25, 1895. On the latter date the official existence of the Forest Commission terminated by act of Legislature, the department having been consolidated with the Fish and Game Commission, and a new department created under the title of the Fisheries, Game and Forest Commission.

The appropriation bill of 1894 placed to the credit of the Forest Commission the sum of \$30,000, which became available October 1, 1894. Of this sum \$18,500 was designated, in the bill, for salaries, and \$11,500 for expenses. In addition, there was on October 1, 1894, an unexpended balance of \$4,381.32 in the salary fund, and \$16.84 in the expense fund.

From these appropriations and unexpended balances this commission has expended, since the beginning of the fiscal year, \$15,025.32 for salaries, and \$10,295.18 for the traveling expenses of the commissioners, foresters and other officials, for legal expenses, and for office expenses. The balances remaining—\$7,856 in the salary fund and \$1,221.66 in the expense fund—were turned over by the Comptroller to the credit of the newly-appointed Fisheries, Game and Forest Commission.

Financial statement for the period, from October 1, 1894, to April 25, 1895:

RECEIPTS.

From appropriation for salaries	\$18,500 00
From appropriation for expenses	11,500 00
From unexpended balance, 1894, salaries	4,381 32
From unexpended balance, 1894, expenses	16 84
	<hr/>
	\$34,398 16
	<hr/> <hr/>

EXPENDITURES.

For salaries	\$15,025 32
For expenses	10,295 18
Balance on hand, salary fund.....	*7,856 00
Balance on hand, expense fund.....	*1,221 66
	\$34,398 16
	\$34,398 16

There remained, also, in the Deer Park Fund an unexpended sum of \$258.56, which was also placed to the credit of the new department.

Complete sets of duplicate vouchers, numbered seriatim for each year, neatly folded and indorsed, covering in detail every item of expenditure during the 10 years in which the Forest Commission has been in existence, were turned over also to our successors. The originals of these vouchers may be found on file in the Comptroller's office, where they are open to public inspection.

All of which is respectfully submitted.

FRANCIS G. BABCOCK,
 SAMUEL J. TILDEN,
 CLARKSON C. SCHUYLER,
 NATHAN STRAUS,
 WILLIAM R. WEED.

* Turned over to the Fisheries, Game and Forest Commission.

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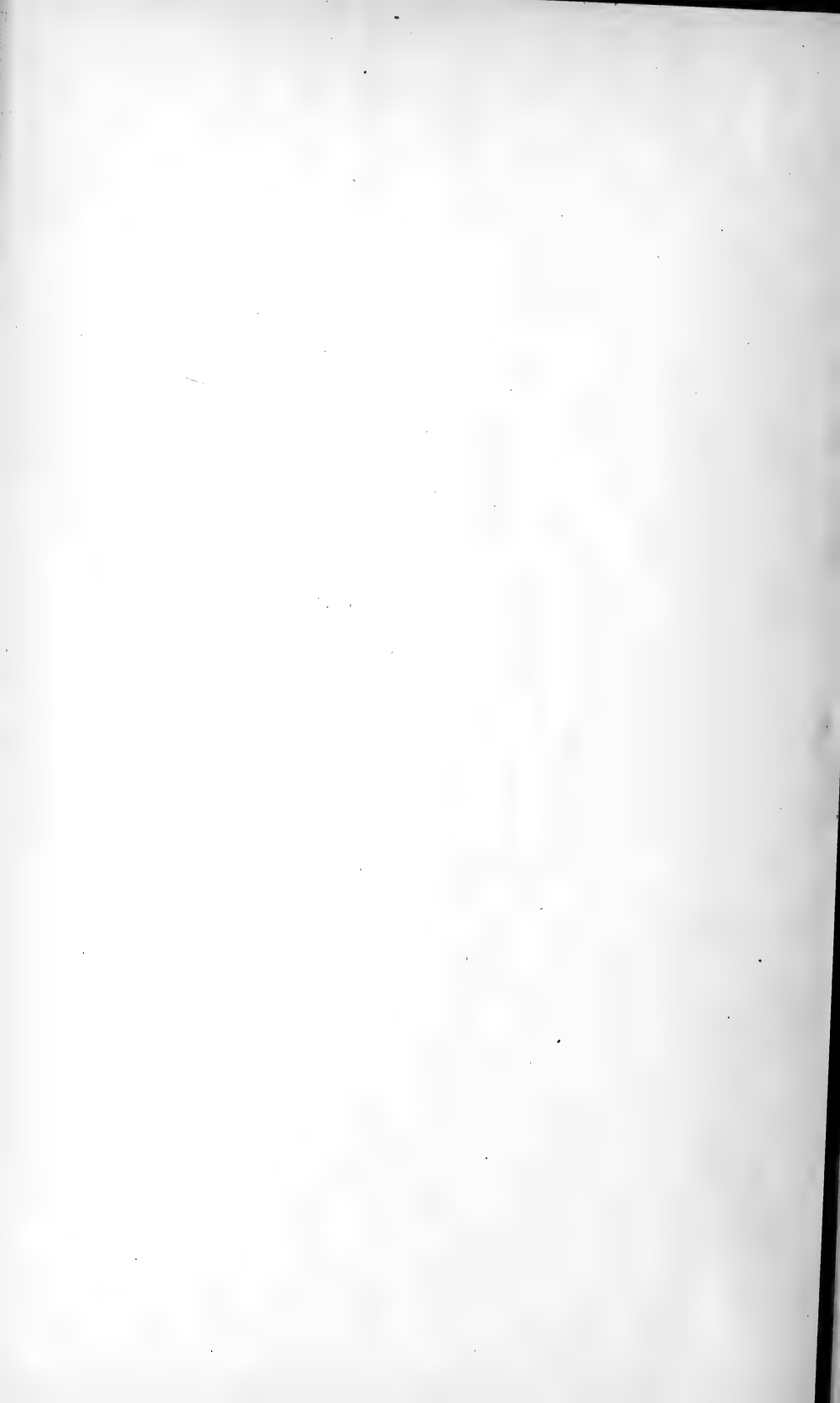
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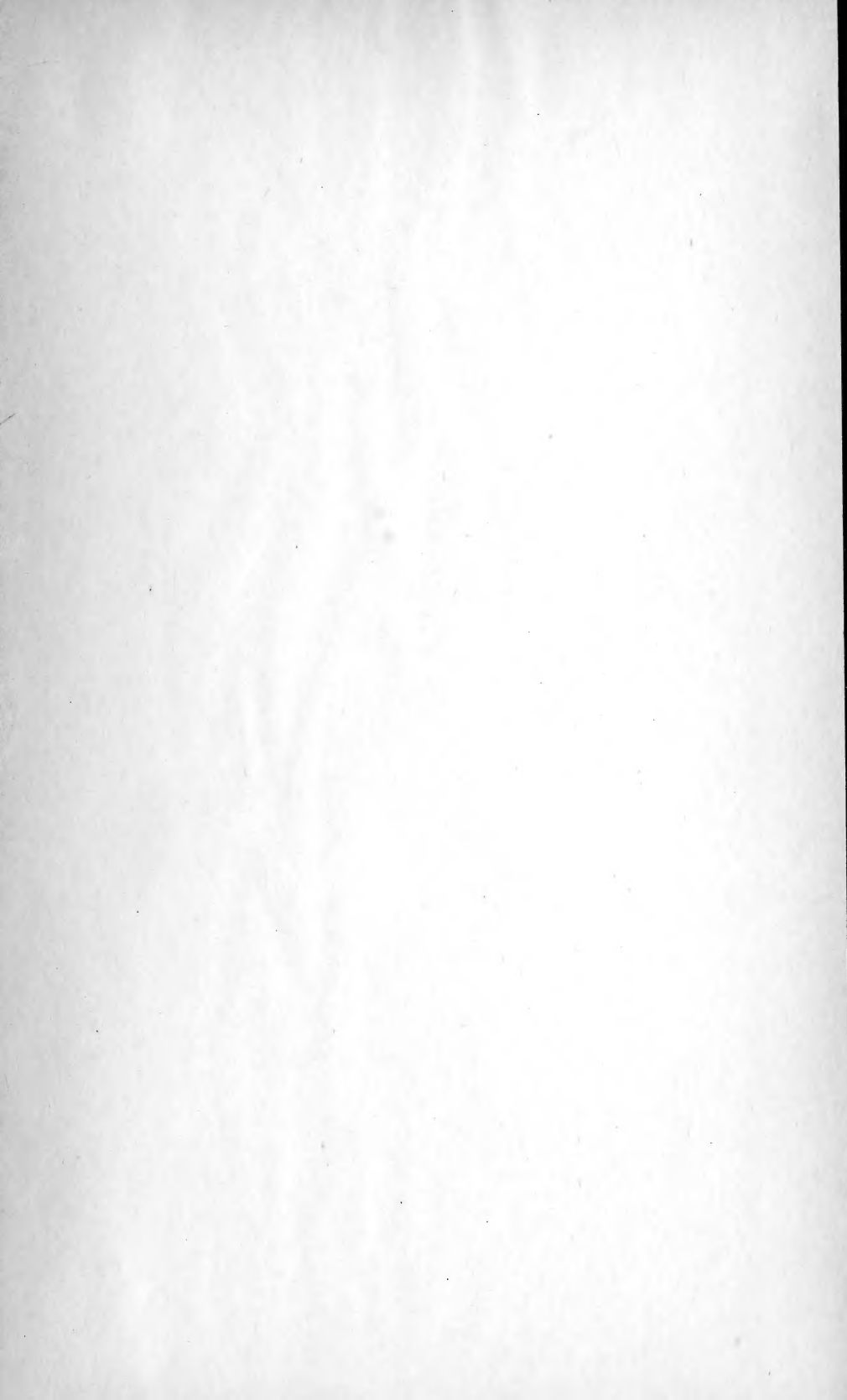
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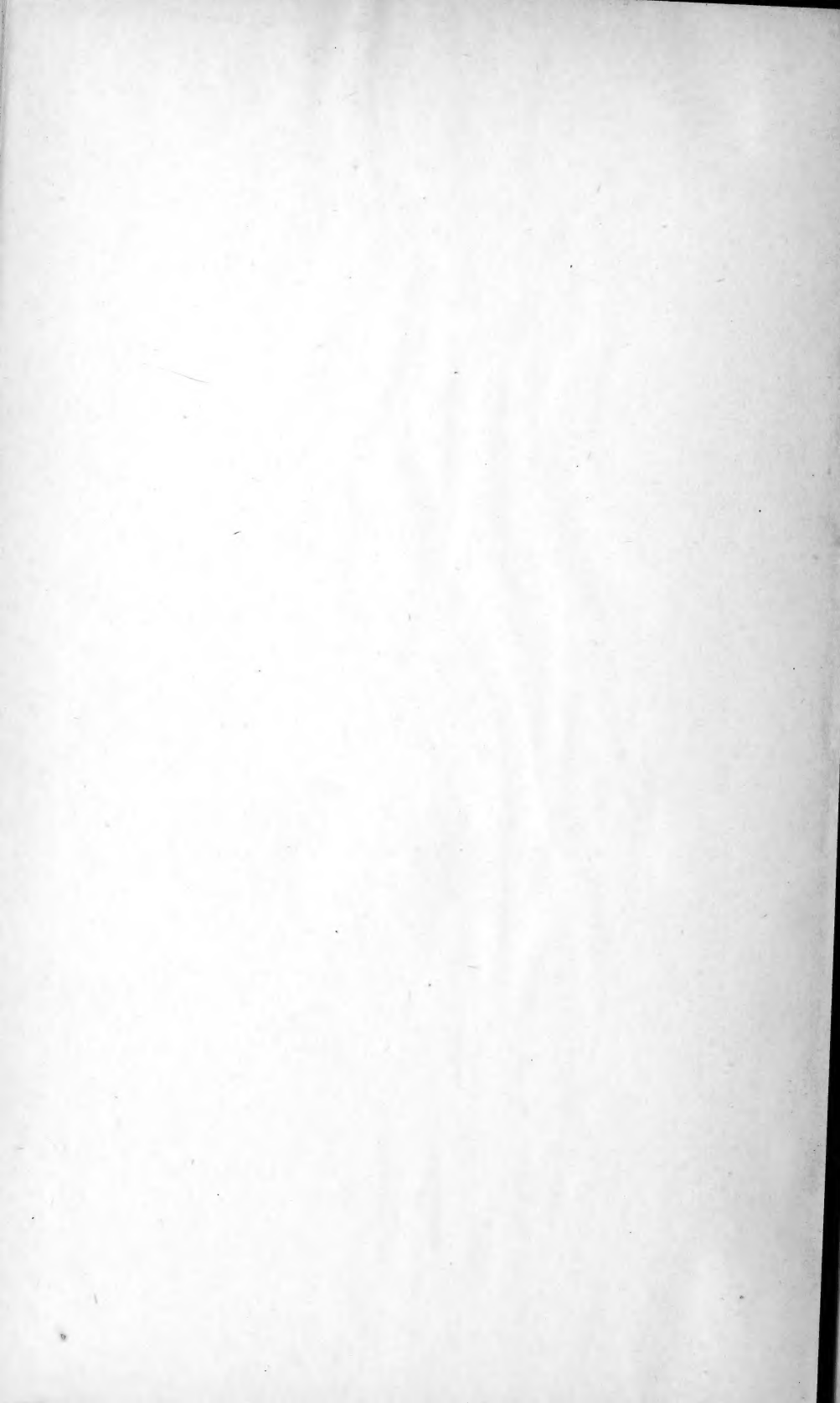
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