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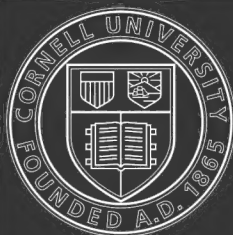
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Experiment Station.

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St. Anthony Park, Minn.

UNIVERSITY OF MINNESOTA.

Department of Agriculture.

WM. M. LIGGETT, Dean.

DIVISION OF HORTICULTURE.

CLASS BULLETIN NO. 9.

THE EXPENSE OF THE PROPOSED NATIONAL PARK FOR MINNESOTA.

BY SAMUEL B. GREEN,

Professor of Horticulture and Forestry.

It has been proposed that the National Government reserve for the purposes of a public park the land and water included in the Leech Lake Indian Reservation in Minnesota, except such land as has been allotted to the Indians in severalty. Allowing for the land taken by the Indians, which no

one proposes to interfere with, there would remain to be included in the proposed park 489,790 acres of land and 218,470 acres of water surface. Of the land 100,000 acres is classed as "timber land," that is contains much valuable timber. The surface is gently undulating and is mostly covered with trees although there are some natural meadows. The water surface comprises three of the largest lakes in the state besides many smaller lakes and many miles of river that are suitable for canoeing. The lake shores are broken and picturesque and the sandy beaches are good bathing places. There is also good hunting and fishing.

This reservation is crossed from east to west by the Great Northern Railway, and is reached from the south by a direct railway line from St. Paul. These lines of communication make this section easily accessible, which is an important point if it is to be set aside for the purposes of a public park.

There is no apparent good reason why this proposed national park should not be carried on as an example in good forestry and serve the purposes of a park at the same time. In Europe many of the woodland resorts are thus carried on, so that they not only afford good pleasure grounds, but a fair return on the money invested in them. It seems to me that this is the only practical way of managing such a large park as is proposed. The carrying out of such a plan means practically the establishment of a business which at the outset will result in the employment of several hundred men for several years, cutting two-thirds of the present stand of pine, which business will thereafter be continued indefinitely, paying out each year probably at least \$40,000 for wages and supplies. The data for the estimates of the yield per acre are obtained from Bulletin No. 49 of the experiment station of the University of Minnesota, published in 1896, together with subsequent data which I have collected at various times and from several visits made to this reservation. I am very sure that the

estimates given are conservative, and that the balance between outlay and income has not been made to appear more favorable than can be realized in practice. Each item is numbered, and following the financial statement will be found notes on each according to number wherever explanation seems necessary.

IMMEDIATE OUTLAY.

(1)	100,000 acres timber land containing pine estimated at 625,000,000 feet, at \$4 per M.....	\$2,500,000.00
(2)	389,790 acres at \$1.25 per acre.....	487,237.50
		<hr/>
		\$2,987,237.50
(3)	Houses and barns.....	15,000.00
(4)	Horses, implements, etc.....	3,000.00
		<hr/>
	Total immediate outlay.....	\$3,005,237.50

IMMEDIATE INCOME.

5)	By sale of trees now overripe and beginning to deteriorate, and which should be cut at once to save loss, estimated at two-thirds present stand.....	\$1,666,666.67
	Balance of purchase price unpaid..	\$1,338,570.83

ANNUAL INCOME.

(6)	185 feet, board measure, per acre annual growth on 100,000 acres would be 18,500,000 feet, board measure, which can be cut each year without intruding upon the normal growing stock, <i>i. e.</i> the principal, at \$4 per M.....	\$74,000.00
(7)	For fishing and hunting privileges, cranberries, rents and pasture.....	21,500.00
		<hr/>
	Total annual income.....	\$95,500.00

ANNUAL OUTLAY.

(8)	Interest at 5% on \$1,338,570.83.....	\$66,928.54
(9)	For administration and protection.....	12,500.00
(10)	For planting 3,000 acres with pine and spruce.....	15,000.00
(11)	For labor improving meadows, making roads, fire-lanes, etc.....	8,000.00
(12)	For implements, repairs, etc.....	5,000.00
	Total annual outlay.....	<u>\$107,428.54</u>
	If debt is funded at 3% instead of 5% the total annual outlay will be.....	\$80,657.12
	and the net annual income.....	14,842.88

ANNUAL INCOME, AFTER TWENTY YEARS.

(13)	Increase 185 feet, board measure, on 200,000 acres at \$4 per M.....	\$148,000.00
(14)	Income from hunting and fishing privileges, rent of house sites, agricultural land, etc.....	10,000 00
(14)	Hay and pasture, 10,000 acres at \$1... ..	10,000.00
	Total annual income after 20 years... ..	<u>\$168,000.00</u>

ANNUAL OUTLAY AFTER TWENTY YEARS.

(16)	Interest at 5 per cent on debt \$1,338,570.83.....	\$ 66,928.54
(17)	Administration and protection.....	20,500.00
(18)	For planting 5,000 acres per year at \$5 per acre.....	25,000.00
	Total annual outlay after twenty years..	<u>\$112,428.54</u>
	If debt is funded at 3 per cent instead of 5 per cent the total annual outlay will be \$	85,657.12
	and the annual net income.....	82,342.88

Item No. 1. This 100,000 acres of timber land I estimate to contain approximately 625,000,000 feet of timber which is somewhat higher than the government estimate, but it is considered a fair estimate by those who know the situation. This is here valued at \$4 per thousand, with the expectation of cutting two-thirds of it at once on the selection plan, which will be more expensive than if it were logged in the ordinary way, and perhaps will cost as much as 50 cents per thousand in excess of ordinary expenses; but I believe that even under such conditions \$4 per 1000 feet is a reasonable figure, since there is a railroad going through the reservation, and the timber is easily gotten out by this or by water, and there are two saw mills close by or on the reservation of very large capacity. I am inclined to think that this figure is under rather than above what can be obtained for the timber.

Item number 2. There are 389,790 acres termed "agricultural land" in this reservation. This is a misnomer, for but little of it is really agricultural land in the ordinary sense of the word. As understood here the term "agricultural land" means only land that has but little, if any, pine timber on it. But this land is so poor in quality that comparatively little of it has any value for agricultural purposes. And in view of the fact that there is such a large amount of good agricultural land in the timbered section of this state that is still unoccupied, it is ridiculous to claim it necessary to hold this land open for agricultural purposes. The agricultural land is figured at \$1.25 per acre, the regular homestead price, and which would be a reasonable sum for the government to pay the Indians for it.

Item number 3. It is estimated that at least twenty families must be permanently located at once upon this land were it taken for park purposes.

Item number 5. From many surveys made it seems fair to estimate that about two-thirds of the trees on this land are overripe, so to speak: in other words, are not improving,

and these, under good forest management, should be cut at once. This would mean the employment of fully two-thirds as much labor as would be employed were the whole timber cut at one time, and would give a large immediate income, which could be applied upon the principal, thus reducing it by two-thirds. After this was cut, it is estimated that the land would continue to render a certain annual income in timber, as shown by item No. 6.

Item number 6. The estimate of 185 feet board measure per acre increase per year may seem high at first thought, but it will be noticed that it is figured on only 100,000 acres, and it is well known that there is a large amount of timber on what is known as "agricultural land," on which no increase whatever is figured, and in my own experience I have found 185 board feet per acre increase per year to obtain in a number of localities in Minnesota on land apparently no better or better stocked than this, I have thought that it is no more than fair to use this as the factor for the sustained yield.

Item number 8. The interest on the balance of the principal not paid is here estimated at 5 per cent, although this money could be borrowed at a much lower figure, for the reason that the government is required to pay the Indians 5 per cent on money received from this purchase. If this principal were paid to the Indians at once, and the government were to borrow the money for this purpose, it would not cost over 3 per cent, which would result in the very material reduction of this interest by \$26,771.42 per year.

Item number 13. After twenty years I am sure it would be safe to expect double the returns from the land that would be possible soon after taking the reservation in hand, for the reason that a large amount of what is now classed as agricultural land will, under proper management, have developed into good timber land. This has been figured at \$4 per thousand, but it seems very probable that in the course of the next twenty years timber as centrally situated

as this, and so very accessible, will more likely be worth \$6. per thousand, besides which, the meadows and some agricultural land will have been opened up and rented out, and will afford an income much greater than that estimated in No. 7. The annual outlay, on the other hand, after twenty years, will not necessarily have increased much except for purposes of planting and perhaps a little closer supervision of the grounds.

It would seem quite probable that the estimate for patrolling this land for fire protection would be reduced very materially by the assistance of the war department, which, it is more than likely, would detail a company of cavalry for this purpose. The estimate given does not take into consideration any returns from the sale of firewood, and is figured on conditions now existing in our woods. It seems certain that after twenty years 40 per cent. of the material which is now left in the woods by our loggers will be readily salable for fuel, if easily accessible.

EFFECT ON THE SURROUNDING COUNTRY.

The immediate effect of putting this reservation into a park on this plan will be very apparent. Two-thirds of the standing timber, to the value of \$1,666,666.67, will be cut at once. This will mean the employment of a large number of men, and will start a period of great activity in the country near by. But when this has been done the source of wealth will not have ended, as in the ordinary cutting of timber. There will still be employment in the park for probably one hundred or more men continuously, in the harvesting of \$74,000 worth of annual increase, the building of roads, the making of fire lanes and other employment; and should the United States government decide to locate a company of cavalry here for fire protection, there will be in addition the supplies for this force. This will, with the families depend-

ent upon the employes, etc., probably mean the location at once, and permanently, of 500 persons on or near the reservation, many of whom would be in families, and this would make a large and permanent market for the farm products of the country near by. In addition to this, the natural attractions of the section are such that many tourists would come in, each of whom would leave some money behind, and this would assist in making a permanent demand for supplies by the hotels located here. It is probable that one or more sanitariums would be established here for the cure of pulmonary diseases, which would be open the year round. School houses would be opened in the park, and the better agricultural land would be used for agricultural purposes.

If the above figures are correct the proposed park, merely as a financial venture, will take care of itself, and as an example in good forestry and a place for recreation for our people it ought to be above almost any price. Besides, from the purely economical standpoint, the establishment of this park would have the effect on the surrounding country that the establishment of any great, permanent manufacturing concern has, and would undoubtedly result in much improvement over the ordinary way of cutting timber in this state which so often has left a trail of stagnation behind it. Why not try such a plan as this? Surely the government can well afford to do so, and it cannot possibly be any worse than the plan of selling all the timber to the highest bidder without any regard to the interests of posterity.



In Itasca Park. Photographed 1907 for the Annual Report of the Forestry Commissioner of Minnesota. Itasca Park includes the head-waters of the Mississippi river. It is a forest reserve and has recently come under charge of the Forestry Board. No sound standing timber, however, is to be cut in its limits. It is a health and recreation resort for the public.

FORESTRY

THIRTEENTH ANNUAL REPORT

OF THE

FORESTRY COMMISSIONER
[FORMERLY CHIEF FIRE WARDEN]

OF

MINNESOTA

AS REQUIRED BY CHAPTER 22 OF THE REVISED LAWS OF MINNESOTA, 1905.

FOR THE YEAR 1907.

ST. PAUL, MINN.,
PRINTED BY THE PIONEER PRESS COMPANY,
1908

STATE OF MINNESOTA
OFFICE OF FORESTRY COMMISSIONER, }
ST. PAUL, JUNE 1, 1908.

Hon. S. G. Iverson, State Auditor:

SIR: As required by Section 3 of Chapter 22, Revised Laws of Minnesota, 1905, I have the honor to submit, herewith, my annual report for the year 1907.

Very respectfully,

C. C. ANDREWS,

Forestry Commissioner.

THIRTEENTH ANNUAL REPORT
OF THE
FORESTRY COMMISSIONER
OF MINNESOTA.

The year 1907 was not an exceptional one in having continued dry weather for several weeks in different parts of Northern Minnesota in May-June and in October and November. The damage reported from forest fires was, however, only \$16,145. Eight were reported to have been caused by railroad locomotives, eight by hunters, three from clearing land and 29 from causes unknown; but probably the greater part of these last were from burning brush and clearing land.

The principal damage was from prairie fires, which were considerable in Clay, Polk and Wilkin counties. The number of acres reported burned over, usually reported in round numbers, and possibly exaggerated in some instances, were 172,760, damage \$23,942. As many as 17 of these fires were reported as caused by railroad locomotives; 11 were caused from burning brush and meadow. One of the worst of these fires was in Wilkin county, caused by a well-to-do farmer attempting to burn a fire break around his haystacks after having plowed a few furrows. I obtained evidence which

should be sufficient to convict him of carelessness in causing the fire, but refrained from instituting criminal prosecution, because it appeared that he was liable to suffer considerably in payment of damage in civil actions at law.

THIRTEEN YEARS' EXPERIENCE.

We have now had 13 years' experience with the law for the prevention of forest and prairie fires. Town supervisors, mayors of cities and presidents of village councils are constituted fire wardens under this law; they are every year instructed in their duties under the law, and cautioned to use their efforts for the prevention and control of fires; they are paid for investigating and reporting fires; they are liable to a penalty for failing to report forest and prairie fires in their districts; in unorganized territory wardens are appointed by the Forestry Commissioner, where there is a suitable person whose services can be obtained; and it can be safely assumed that about all the fires that are at all important have been reported. The returns show that the damage done by forest fires during these past 13 years has averaged only \$29,819 annually, and that the damage from prairie fires during the same period has averaged only \$16,397 annually.

When we consider the great area of country—20,000,000 acres and upwards—where such fires are liable to prevail, the great activity in the settlement of the country and in the various industries, the damage from fires has been exceedingly small. In neighboring states during the period mentioned forest fires have occurred doing damage in at least one instance to the amount of a million dollars. I believe the administration of this law in Minnesota has saved more than a million dollars worth of property.

There is, however, room for improvement. No one

can tell when a season like that preceding the Hinckley calamity, September 1, 1894, may occur, and too much care cannot be observed in regard to fires in dangerous localities in seasons of drought. A small fire, if left to smoulder and burn, might in a very dry period, with a terrific gale of wind, cause a great calamity. The only safe way in case of such fire is, if a warden in whose district it occurs cannot entirely extinguish it, to summon assistance and make such a break around it that it cannot spread. It must not be neglected. The law is explicit in making it the duty of a warden to "go to the place of danger," to CONTROL fires and to PREVENT fires.

Wardens have other public duties, but none of their duties is more respectable than that of saving their districts from a catastrophe that is liable from forest and prairie fires. If such catastrophe should occur through their neglect, it would be a lasting discredit to their memory; on the other hand, where their vigilance results in the preservation of life and property in their communities, they deserve public gratitude.

SUMMARY OF FOREST FIRES, 1907.

COUNTY AND TOWN.	Date.	Acres.	Damage.	Cause.
Aitkin County—				
Beaver.....	Oct. 21.	25	\$300	Hunters
Farm Island.....	Oct. 22.	70	Slight	School Children
Beltrami County—				
Battle.....	June 8.	30	Slight	Camper
Port Hope.....	Oct. 29.	200	100	Hunters
Summit.....	June 5.	200	50	Unknown
Summit.....	June 8.	120	500	Unknown
Carlton County—				
Wrenshall.....	June 10.	30	150	Unknown
Cass County—				
Bungo.....	Oct. 22.	640	Slight	Unknown
Moose Lake.....	Oct. 31.	700	2,500	Campers
Chisago County—				
Branch.....	April 21. ....	.....	25	Unknown
Sunrise.....	April 22.	500	300	Clearing Land
Clearwater County—				
Bear Creek.....	June 7.	120	375	Unknown
Cook County—				
Grand Marais.....	June 19.	160	50	Unknown
Grand Marais.....	June 28.	100	None	Lightning
Lutsen.....	June 10-19.	200	1,500	Unknown
Maple Hill.....	June 22.	5	None	Unknown
Crow Wing County—				
Ideal.....	April 21.	40	50	Unknown
Pelican.....	April 21.	30	10	Burning Meadow
Pelican.....	July 20.	40	200	Travellers
Watertown.....	May 20.	100	50	Unknown
Houston County—				
Hoka.....	April 19.	100	750	Unknown
Hubbard County—				
Farris.....	June 8.	200	500	R. R. Locomotive
Itasca County—				
Lake Jessie.....	June 17.	200	100	Smoker
Lake Jessie.....	June 29.	500	None	Unknown
Marcel.....	June 1.	300	None	Unknown
Wirt.....	Nov. 12.	30	200	Hunters
Twp. 54, R. 26.....	Oct. 23.	320	500	Unknown
Koochiching County—				
Pine Top.....	June 21.	10	Slight	Unknown
Twp. 153, R. 27.....	July 12.	110	600	Unknown
Mille Lacs County—				
Princeton.....	Aug. 12.	2	20	R. R. Locomotive

SUMMARY OF FOREST FIRES, 1907—Continued.

COUNTY AND TOWN.	Date.	Acres.	Damage.	Cause.
Morrison County—				
Cushing.....	May 12	80	\$50	Unknown
Green Prairie.....	April 23.....	150	275	Hunters
Lakin.....	July —.....	200	Slight	Clearing Land
Pike Creek.....	Oct. 22.....	15	Slight	Unknown
Rail Prairie.....	May 5.....	800	225	Unknown
Rosing.....	May 23.....	125	300	Unknown
Olmstead County—				
New Haven.....	May 12.....	80	150	Clearing Land
Ottertail County—				
Eastern.....	Oct. 21.....	350	50	Unknown
Maine.....	Oct. 24.....	300	200	Hunters
Parker's Prairie.....	Oct. 24.....	500	300	Unknown
Parker's Prairie.....	Oct. 28.....	10	None	R. R. Locomotive
Woodside.....	Oct. 18.....	5	350	Unknown
Pine County—				
Norman.....	May 9.....	60	600	Unknown
St. Louis County—				
Angora.....	June 14.....	1,100	500	Unknown
Duluth.....	June 1.....	200	2,000	Campers
Fern.....	June 6.....	40	500	Burning Brush
Kugler.....	June 7.....	100	50	Unknown
Mesaba.....	June 8.....	500	300	Burning Right-of-Way
White.....	June 14.....	220	100	Unknown
Twp. 55, R. 18.....	June 7.....	18	Slight	R. R. Locomotive
Todd County—				
Bruce.....	Oct. 16.....	80	Slight	Unknown
Wadena County—				
Aldrich.....	April 1.....	25	Slight	R. R. Locomotive
Leaf River.....	Oct. 16.....	200	300	R. R. Locomotive
Leaf River.....	Oct. 19.....	75	75	R. R. Locomotive
Rockwood.....	Oct. 19.....	320	100	R. R. Locomotive

Total acres burned over, 10,385.

Damage, \$16,145.

Classification of causes:

Burning brush or meadow, 3.

Clearing land, 3.

Hunters, 8.

Railroad locomotives, 8.

Other causes, 3.

Unknown, 29.

SUMMARY OF PRAIRIE FIRES, 1907.

COUNTY AND TOWN.	Date.	Acres.	Damage.	Cause.
Anoka County—				
Columbus.....	May 3.....	500	None	Unknown
Fridley.....	Oct. 22.....	80	\$350	R. R. Locomotive
Grow.....	Jan. 24, 1908..	350	475	R. R. Locomotive
Clay County—				
Cromwell.....	April 28.....	40	140	Burning Straw
Egton.....	May 1.....	100	150	Burning Grass
Elkton.....	June 4.....	600	60	Unknown
Elkton.....	Nov. 19.....	200	300	R. R. Locomotive
Flowing.....	May 18.....	3,000	1,500	R. R. Locomotive
Flowing.....	Oct. 8.....	600	700	R. R. Locomotive
Flowing.....	Oct. 22.....	1,800	4,435	R. R. Locomotive
Kragnes.....	May 17.....	40	300	Burning Grass
Moland.....	Oct. 29.....	160	1,404	R. R. Locomotive
Oakport.....	May 18.....	320	780	R. R. Locomotive
Spring Prairie.....	May 18.....	10,000	1,000	R. R. Locomotive
Spring Prairie.....	Oct. 22.....	3,000	5,000	R. R. Locomotive
Kittson County—				
Hill.....	Oct. 23.....	160	200	Unknown
Norway.....	Nov. 16.....	1,000	None	From Town of Pelan
Pelan.....	Nov. 12.....	500	50	Hunters
Lac qui Parle County—				
Mehurin.....	Oct. 21.....	250	1,000	From South Dakota
Lincoln County—				
Drammen.....	Oct. 23.....	1,000	150	Burning Straw
Marshall County—				
Bloomer.....	May 21.....	130	200	Clearing Land
Comstock.....	Oct. 21.....	1,200	300	Unknown
Comstock.....	Nov. 17.....	200	None	Unknown
Moose River.....	April 28.....	830	None	Hunters
Polk County—				
Belgium.....	Nov. 15.....	1,000	.....	From Town of Euclid
Belgium.....	Nov. 17.....	300	180	From Town of Brandt
Brandt.....	Nov. 17.....	3,000	175	Burning Fire Break
Brislet.....	Nov. 19.....	30	173	R. R. Locomotive
Euclid.....	Nov. 15.....	1,000	None	R. R. Locomotive
Gentilly.....	May 23.....	1,280	400	Burning Grass
Helgeland.....	May 14.....	11,000	200	Unknown
Helgeland.....	Oct. 22.....	1,000	None	From Tn. of Comstock
Helgeland.....	Oct. 27.....	600	250	From Town of Brandt
Helgeland.....	Nov. 17.....	6,000	300	From Tn. of Comstock
Parnell.....	Nov. 12.....	700	200	Unknown
Tilden.....	May 12.....	200	10	Burning Meadow
Tilden.....	Oct. 26.....	6,000	200	R. R. Locomotive
Red Lake County—				
Bray.....	Oct. 22.....	400	200	From Tn. of Numedal
Bray.....	Nov. 20.....	6,000	25	Hunters
Numedal.....	May 24.....	2,000	None	Burning Meadow
Numedal.....	Nov. 20.....	3,000	125	Fm. Tn. of Goose Lake

SUMMARY OF PRAIRIE FIRES, 1907—Continued.

COUNTY AND TOWN.	Date.	Acres.	Damage.	Cause.
Yellow Medicine Co.—				
Florida	March 28.....	60	\$55	Clearing Land
Florida	Oct. 28.	550	1,500	R. R. Locomotive
Fortier.....	April 21.....	20	120	Unknown
Roseau County—				
Soler	Oct. 19.....	1,000	75	Burning Meadow
Swift County—				
Maryland	Oct. 11.....	640	225	R. R. Locomotive
Maryland	Oct. 17.....	640	820	R. R. Locomotive
Wilkin County—				
Akron.....	Oct. 23.....	150	None	Burning stubble
Atherton.....	Oct. 19.....	640	480	Burning Fire Break
Campbell	Oct. 22.....	800	2,000	R. R. Locomotive
Manston	Oct. 19.....	6,000	5,000	From Tn. of Atherton
Manston	Oct. 23.....	1,600	500	From Tn. of Mitchell
Meadows.....	Oct. 23.....	3,000	75	From Town of Nilsen
Nilsen.....	Oct. 23.....	4,000	1,000	Burning Fire Break

Total acres burned over, 172,760.

Damage, \$23,942.

Classification of causes:

Burning brush or meadow, 11.

Clearing land, 2.

Hunters, 2.

Railroad locomotives, 17.

Other causes, 12.

Unknown, 8.

FIRE REPORTS.

The following is a copy of the fire report blank furnished to fire wardens from the office of the Forestry Commissioner, with prepaid return envelope:

STATE OF MINNESOTA.
FIRE WARDEN'S REPORT OF FIRE.

To the Forestry Commissioner, St, Paul, Minn.:

A [state whether forest, prairie or field fire].....
fire occurred in the [state what part of town].....
part of the town of.....being Township No.....
Range.....in the County of.....on the
.....day of.....[state about what time of
day]..... It burnt over.....acres of [state
kind of land, whether field, prairie, brush, meadow, heavy or light
timber]..... destroyed.....
.....and did damage to the amount of
\$..... Said fire originated on Section No.....
being land occupied by.....[if vacant,
so state].....and was caused by [explain
how it originated. It is the chairman's duty "**to inquire into the
cause**" of the fire. He should report the **facts and circumstances
showing who caused the fire**].

The fire was extinguished in.....hours after it started. There
were.....persons called to help extinguish it. [If
none were called, so state.] The number of persons assisting in
extinguishing the fire was..... The fire was
extinguished in the following manner ..

The weather was [state whether dry and windy and how long it had
been dry].

[Give the **name of any Fire Warden** who was present and assisted
in controlling or extinguishing the fire, and the name and address
of any **witness** as to who set the fire and state **what he will
swear to**.

P. O..... Signature.....
Date..... Name of Organized Township.....

CIRCULARS OF INSTRUCTIONS.

The following are among the instructions sent out each spring from the office of the Forestry Commissioner:

DUTIES OF FIRE WARDENS.

Circular No. 31. } STATE OF MINNESOTA,
OFFICE OF FORESTRY COMMISSIONER,
St. Paul, Minn., April 11, 1908.

By Section 1782, Revised Laws, Minnesota, 1905, Supervisors of Towns, Mayors of Cities, Presidents of Village Councils are Fire Wardens. They shall go to the place of danger to Prevent Fires and to Control Fires. They shall in emergencies Compel Assistance.

No one can tell when a season like that preceding the Hinckley calamity, September 1, 1894, may occur, and too much care cannot be observed in regard to fires in dangerous localities in seasons of drought. A small fire, if left to smoulder and burn, might in a very dry period, with a sudden and terrific gale of wind, cause a great calamity. The only safe way in case of such fire is, if a warden in whose district it occurs cannot entirely extinguish the fire, to summon assistance and make such a break around it that it cannot spread. The law is explicit in making it the duty of a warden to "go to the place of danger" to CONTROL fires and PREVENT fires. They shall promptly INVESTIGATE and REPORT fires and make COMPLAINT before a magistrate for violation of the law.

Wardens have other public duties, but none of their duties is more respectable than that of saving their districts from a catastrophe that is liable from forest and prairie fires. If such catastrophe should occur through their neglect it would be a lasting discredit to their memory. On the other hand, where their vigilance results in the preservation of life and property in their communities, they deserve public gratitude.

The only safety is to insist that people shall **be careful about fire. Wardens must be watchful, energetic, strict.**

C. C. ANDREWS,
Forestry Commissioner.

DUTIES OF RAILROAD COMPANIES AND THEIR EMPLOYEES IN THE PREVENTION AND EXTINGUISHMENT OF FOREST AND PRAIRIE FIRES.

Circular No. 30 } STATE OF MINNESOTA,
OFFICE OF FORESTRY COMMISSIONER,
St. Paul, Minn., April 9, 1908.

The following section (2037) of the Revised Laws of Minnesota, 1905, relating to the duties of railroad companies and their employes in preventing and extinguishing forest and prairie fires, is herewith quoted for the information and guidance of all parties concerned:

“Every company operating a railroad shall use upon each locomotive engine a good and **efficient spark arrester**, and shall keep the ground for fifty feet on each side of the center of the main track **clear of combustible materials**, except ties and other material necessary for the maintenance and operation of the road, from April 15 to December 1. No company shall permit any of its employes to leave a deposit of fire, live coals or ashes in the immediate vicinity of woodland or lands liable to be overrun by fire, and every **engineer, conductor or trainman discovering fire adjacent to the track shall report the same promptly** at the first telegraph station reached by him. In seasons of drought, every such company shall **give its employes particular instructions** for the prevention and extinguishment of fires, and shall cause warning placards furnished by the Forestry Commissioner to be **conspicuously posted at every station** in the vicinity of forests and grass lands, and, **when a fire occurs near the line of its road**, shall concentrate such help and adopt such measures as shall be available for its extinguishment. Any company violating any provision of this section shall forfeit to the state not more than one hundred dollars for each offence, and any railroad **employee** violating the same shall be **guilty of a misdemeanor**, and shall be punished by a fine of not less than five dollars nor more than fifty dollars.”

The placards should be posted, one on the **front** part of the outside, and one in the principal waiting room of the principal

station building. To post them on small out-buildings or telegraph poles, as is sometimes done, is **not a compliance with the law.**

Frequently when a station building is newly painted and a placard is removed it is not again put up, which shows gross neglect of duty. Conductors and trainmen are often neglectful in noticing and reporting fires that occur along the line of their road. The public looks to railroad companies and their employes for the exercise of more than ordinary care. Let us see if improvement in this matter of forest and prairie fires cannot be made without having to resort to harsh measures.

C. C. ANDREWS,
Forestry Commissioner.

FIRE WARDEN ACCOUNTS.

Circular No. 28 { STATE OF MINNESOTA,
OFFICE OF FORESTRY COMMISSIONER,
St. Paul, Minn., Jan. 2, 1907.

TO FIRE WARDENS:

Accounts for patrolling will not be approved unless the warden reported to the Forestry Commissioner the facts showing the need of such service and received permission to patrol.

The law requires that forest and prairie fires be promptly investigated and reported. Unless that be done, an account for fighting the fire will not be approved.

Wardens sometimes include in their accounts the service of other persons. In all such cases a receipt from such person for the amount of his service, as a sub-voucher, must be attached to the warden's voucher. It is better, however, that each person who is to be paid any amount should make a separate account. Wardens frequently overlook signing the receipt for their pay in advance.

It sometimes appears that a warden has neglected to post the warning notices until late in the season. Such notices ought to be posted very soon after they are received, and unless this is done pay for the posting will not be allowed.

Very respectfully,
C. C. ANDREWS,
Forestry Commissioner.

FORM OF CRIMINAL COMPLAINT, JUSTICE'S COURT, UNDER FIRE WARDEN LAW.

Circular No. 24 } STATE OF MINNESOTA, OFFICE OF FORESTRY COMMISSIONER, St. Paul, Minn., March 16, 1906.

The following form, with explanations, may assist fire wardens and justices of the peace in criminal prosecutions:

STATE OF MINNESOTA, } ss.

County of..... being first duly sworn, makes complaint and says that did, on the..... day of..... A. D. 190.., at the town of..... in said County and State, kindle a fire near to forest (or prairie, if such was the fact) land and left it unquenched (if the kindling the fire was by some one acting under his direction, allege "caused to be kindled a fire") contrary to the form of the statute in such case made and provided, and against the peace and dignity of the State of Minnesota; and prays that the said may be arrested and dealt with according to law.

Subscribed and sworn to before } me this....day of....A. D. 190.. }

Justice of the Peace.

STATE OF MINNESOTA, OFFICE OF ATTORNEY GENERAL, St. Paul, March 16, 1906. } Approved: C. S. JELLEY, Asst. Att'y General.

NOTE.—The above form of complaint is under Section 1787, Revised Laws of Minnesota, 1905. The evidence must show that the defendant set the fire or caused it to be set. The testimony of a credible witness that he saw the defendant set the fire is the best kind of evidence; but it is sufficient to convict if circumstances are proved which show beyond a reasonable doubt that the fire was set by him.

It is best to avoid any allegations in a complaint that are unnecessary; such, for example, as that the fire was set on a particular section of land. It is unnecessary to allege or prove intent to

do injury. If a person sets a fire in dry weather without the means for its control, it is no excuse for him that the wind rose unexpectedly. Everyone may expect the wind to rise or change at any time. These are things the prudent man will look out for. Fire wardens should investigate fires without a day's delay, and if there is evidence to convict they should promptly make complaint before a justice of the peace or other court of competent jurisdiction.

Section 4997, Revised Laws of Minnesota, 1905, is as follows:

“Every person who shall negligently or carelessly set on fire, or cause to be set on fire, any woods, prairie or other combustible material, whether on his own land or not, by means whereof the property of another shall be endangered, or who shall negligently suffer any fire upon his own lands to extend beyond the limits thereof, shall be guilty of a misdemeanor.” The facts may sometimes make it advisable to have a complaint made under this clause.

A rigorous, rather than mild, enforcement of the law against forest fires is the truest kindness.

Respectfully,

C. C. ANDREWS,

Forestry Commissioner.

RED LAKE COUNTRY.

In the early part of July I made a trip to the Red Lake country, and mainly to see the pine forest on the east side of Red Lake, comprising about 36 square miles, and which appears on the map as a wedge-shaped peninsula, 12 miles in length, between Lower and Upper Red Lakes. The level portion of the land is covered principally with hardwood timber of different varieties and of large growth, which shows the fertility of the soil; most of the pine, both white and Norway, is on a ridge which runs along the center. There is considerable undergrowth of large-leaved trees amidst the pine. While many of the pines are about a hundred feet high and have reached their growth, there are some which would yet earn good interest by their growth fifty years longer. The symmetrical

and stately forms of the trees, clear of limbs to a height of 60 feet, the fresh, reddish color of the Norway and the dark, handsome slate color of the white pine, and standing so close that an acre would seem in many places to contain about 200 trees, one at first sight of this forest can only exclaim upon its beauty. There are probably 200,000,000 feet of pine in this particular forest, of the value of \$10 per thousand at the present prices, and which belongs exclusively to the Red Lake Indian band, now numbering 1,300 persons. In other parts of their reserve are probably 50,000,000 feet more. The present area of the Red Lake Indian reserve is 340,000 acres, the most of which is fairly good agricultural land.

I think that most of our people would be surprised at the progress being made in civilization by the Red Lake Indians. They have two large and well-equipped school buildings and schools, the principal one being at the village of Red Lake and the other at Ponemah on the peninsula above mentioned, and situated on a cleared and cultivated plateau on the north shore of Lower Red Lake. This band of Chippewas is under the charge of an agent in the Civil Service and whose title is Superintendent of Schools.

I went from Bemedji to Red Lake on one logging railroad and returned most of the way on another logging railroad, both passing through fine bodies of forest. The high price of forest products in recent years has led to the construction of hundreds of miles of logging railroads in Northern Minnesota, which will always remain in use for transportation and which are contributing much to the development of the country.

It is not uncommon now for lumbermen to cut as many as 14 kinds of marketable timber in the same forest. On

this trip I saw, for the first time, a train load of basswood logs standing on the railroad tracks.

VISIT TO LAKE COUNTY.

Early in August I visited Lake County; went forty-four miles by railroad from Knife River in a northeasterly direction, through mostly cut-over country, and was impressed by some of the advantages there for settlers. Lake County contains 1,300,000 acres of land, much of which is good for agriculture, though comparatively little is under cultivation. Much of the land that I saw will produce, among other crops, wheat, oats, potatoes and good hay. There are numerous streams of soft water which contain trout. The surface is undulating, and the more valuable timber having been removed it will require much labor to subdue the soil. It struck me that large owners of land might well afford to give each settler twenty acres of land with the privilege of buying sixty more under certain conditions for cultivation. Lumber companies, however, are absorbed in their own affairs and cannot go into the immigration business; but commercial or immigration clubs of the various cities interested might be able to carry such a scheme into effect. I talked with Jacob Schaf, a German farmer who has been cultivating a farm about seven miles north of Beaver Bay for twenty-six years. He has wheat four feet high and is enthusiastic about the agricultural advantages of the country. The occupation of agricultural lands by a good class of settlers would lessen the dangers of forest fires.

The law of Minnesota requires railroad companies to keep their right of way clear of combustible material a distance of fifty feet from the center of the track on each side. It makes a country look very much better where this is attended to and where the adjoining standing

timber looks fresh and thrifty and is free from the scars of fire. It also adds greatly to the value of railroad property where this regulation is carefully adhered to.

I saw a very handsome and large body of white pine yet remaining in the vicinity of Gooseberry River, and was told that it had lately been sold at \$13 per 1,000 feet standing.

TRIPS INTO PINE COUNTY.

It was thirteen years the 1st of last September since the forest fire in which 418 persons perished in the vicinity of Hinckley. In the latter part of August I visited the country swept over by that fire to examine especially any pine that has grown since the fire. Three miles east of Hinckley I saw a tract of several hundred acres of close standing jack pine, about ten feet high, intermixed with some Norway pine and with poplar, which has grown since 1894. The tract borders the Grindstone River and is a little too rocky for field crops. It is the kind of land that should be kept for forest. I was informed of several other bodies of young pine forest that has grown since the Hinckley fire.

Most of the land in that region is suitable for agriculture, and I saw quite a number of well-cultivated and prosperous-looking farms and with buildings that would be a credit to any farming community.

Owing to the quality of the soil, some of the pine which I have mentioned will be large enough to cut in twenty-five years, and it shows how important it is to keep out fires.

As the removal of the old pine stumps has much to do with the successful opening of farms on cut-over land, I made a particular inquiry about the business of producing turpentine from such stumps. There is a plant for this manufacture, under a Russian invention, a dozen miles or

so east of Hinckley. Only Norway pine stumps are used, and they must be old enough to have had the sap wood, which is the part nearest the bark, decayed. The company pays \$4 for 3,000 pounds, reckoned a cord, of stump and roots; and the product from such quantity is 40 bushels of charcoal, 25 gallons of turpentine, 20 gallons of tar and some citric acid.

UPPER ST. CROIX VALLEY.

About the middle of September I made a more extended trip in Pine County and visited the upper St. Croix valley of Minnesota, about 70 miles above Taylor's Falls, being that part about east from Hinckley, and was impressed by the large size of the river so far up. The country was originally pine forest which was cut many years ago, and most of the land was burned over in the dry season of 1894. It is now grown up to what might be called brush forest, of which the greater part is poplar; but there are occasional bunches of valuable hardwood trees, including ash, that escaped fire. I was noticing particularly the regrowth of pine, and I would say that not more than a twentieth part of the area that I saw in a drive of about 25 miles in Pine County is well stocked with pine. The pine that I saw was almost wholly jack pine. The country is generally level or moderately undulating, but with depressions along the river courses. Lakes are not common, but streams are frequent and are said to contain trout. The land is generally free from rocks and appears to be considerably in demand for farming purposes.

OUTPUT FROM MINNESOTA FORESTS 1907-1908.

There is no system of statistics showing the amount of timber that is cut in the Minnesota forests in any one year or season. It has been the general understanding

that during the recent prosperous years the cut of pine timber has amounted to about one billion and a half each year. On account of the unexpected business depression beginning in the latter part of 1907, it was assumed that the output for the winter of 1907-8 would be only about half the usual amount.

With a view to ascertaining as far as practicable the output for that season, I in December last, sent out printed blanks to about 300 firms and individuals supposed to be engaged in cutting timber of various kinds in Northern Minnesota, calling for a statement of the number of feet and kinds of timber being cut for the market, on what subdivisions, the number of logging camps, number of men employed and average wages. Replies were received quite generally and promptly and in a frank and cordial spirit. I received in all 260 returns and communications, showing that the aggregate output of various kinds of timber and wood from the Minnesota forests this past winter was as follows:

Pine, 800,000,000 feet; mixed timber, including ash, balsam, basswood, birch, cedar, poplar, pine, spruce and tamarac, 79,000,000 feet. Included in this last list should be noted Balm of Gilead, a species of poplar not before reported as being cut for timber. Number of poles, 213,028; number of ties, 3,565,750; number of posts, 1,754,500; number cords of pulp wood, 151,890; number cords of wood, 77,580; number of feet of mining timber, 500,000; number logging camps, 529; number of men employed, 19,575; average wages, \$26 a month and board.

These returns are probably 25 per cent below the actual output. In respect to cordwood, pulpwood, posts, ties and poles, I believe they are much more than 25 per cent below the actual output. Naturally I could not get

the address of all the camps, and as before stated the figures do not include what was cut by farmers and settlers for their own use. This is the first attempt that I know of being made to collect statistics of this kind, and another trial at some future season ought to result in more accurate returns. These figures, however, show how important the forests are as an industrial resource, employing as they do many thousand men in the winter season, when there would be no other occupation for them. The original value of the forest products, even in a season like the past, amounts to many million dollars.

Plan of Reforestation.

The pine forests of Minnesota have been logged sixty years and most of the timber has been shipped out of the State. In a few more years the original pine will be gone. Already thirty thousand car loads of forest products are brought into Minnesota annually from the Pacific coast.

The population of the United States since its first settlement has increased at the average rate of 18 per cent every ten years, and in eighty years will reach the amazing number of 320,000,000! Forest products will be in much greater demand then than now. If we neglect suitable measures of reforestation our posterity will be ashamed of us.

Forestry is not an expenditure. It is a savings bank investment. The great thing in forestry is that it utilizes third and fourth rate—sandy, hilly and rocky—land that is unfit for agriculture. The yield tables of Germany show that an acre of such land planted as part of a forest, with pine, on forestry principles—seedling trees two or three years old, planted at an average distance apart of four or five feet, it being necessary to have forest crowded when young to promote height growth—will in eighty

years produce 18,000 feet board measure. The surviving trees—for the greater number would have died out—would be from 12 to 15 inches in diameter breast high. They would continue, if left standing, to grow many years after they had reached the age of eighty years, but not at a rate to earn good interest.

If the State this year planted 37,500 acres of forestry land in the same way, and continued to do as much every year for eighty years, it would then have a normal forest of 3,000,000 acres—not in one body but in scattered localities—of the value of probably \$200,000,000, yielding a net revenue of 3 per cent per annum. From the 37,500 acres planted this year there could then be cut 675,000,000 feet board measure of logs and the same amount every year thereafter perpetually. Under forestry management a larger percentage of the cut-over area would become reforested by natural seeding than is the case under present methods of logging (now only about 5 per cent of cut-over land becomes well stocked with pine from natural seeding), the blank spaces would be promptly replanted and a sustained yield secured.

If the State had 37,500 acres of third or fourth rate land to plant with forest we would find that on an average 5 per cent of it was already well stocked with pine or some other valuable timber, and that another 5 per cent of the area was rock or water, which we would call blank spaces; deducting this 10 per cent from 37,500 would leave 33,750 acres to be actually planted. In other words, for every 1,000 acres of third or fourth rate land only 900 acres on an average would have to be planted.

In planting about 200 acres substantially in the way above mentioned the State has found that two men can plant one acre a day, the whole cost, exclusive of land, being about \$6.00 per acre. To plant 37,500 acres each

spring would require 2,500 employes thirty days. Although some thousands of men will for a few years be coming out of the logging camps every spring, some of whom could be employed in planting, and although the planting would be done in half a dozen or more counties, still it is not likely the State could for a number of years plant 37,500 acres annually. The State should not undertake to do any more than it can do economically and well. It should, however, engage in the work with energy.

Prussia plants and sows 45,000 acres of state forest annually. The other German states in the aggregate plant more.

I believe the State will be able to purchase forestry land at an average price of not exceeding \$2.50 per acre, but as the State has some school land that is only fit for forestry, but which according to the constitution must be offered for sale at not less than \$5.00 per acre, authority should be granted for paying \$5.00 per acre when necessary.

The ordinary revenue is not sufficient to permit the legislature to appropriate money enough to carry into effect a plan of reforestation as extensive as the above. To accomplish this there should be an additional tax of three-tenths of one mill on all taxable property in the State, being only thirty cents on each thousand dollars. This would raise about \$300,000 annually and be sufficient to carry the plan into effect. That the plan may be permanent it should be authorized by a constitutional amendment such as herewith proposed. That it may not seem extravagant let me mention that for forestry Pennsylvania appropriates annually \$400,000 and New York \$550,000.

If the next legislature were to submit the amendment it could not be voted on until the general election in 1911,

and if adopted no money would be available under it sooner than 1913.

Few states have the natural resources to undertake such a system of reforestation. Minnesota's natural advantages admit of her doing it. If she has the public spirit to undertake it she would at once be in the front rank, if not the leader, of all the American States in reforestation.



Original white pine forest in township 50, range 18, on the Fond du Lac Indian Reservation, Minnesota. Photographed 1907 for the Annual Report of the Forestry Commissioner of Minnesota.

Proposed Constitutional Amendment.

To secure a sustained yield of timber for the use of the people of this State the proper officers shall annually levy and collect a tax of three-tenths of one mill on each dollar of the taxable property within this State, the proceeds of which shall be used for the purchase of land for the State adapted for forest at not over \$5.00 per acre, and for the production and maintenance thereon of forest according to forestry principles. Unexpended balances shall not lapse but constitute a fund for forestry purposes. The timber produced thereon shall be sold at a fair valuation and the revenue therefrom be paid into the State treasury, except that one quarter of the net revenue shall be paid to the towns in which the land is situated, in aid of public schools and roads. Should any tract acquired be found better adapted for any other purpose than the production of timber, it may be sold or leased and the proceeds used for acquiring or developing forestry land. Until otherwise directed by the legislature, which may supplement these provisions with necessary enactments, the State Forestry Board shall draw and disburse the money hereby provided and purchase, manage and control the lands and forests. No money shall be paid for any tract until the attorney general shall certify to the validity of the title. It shall be competent for two successive regular legislatures, by a two-thirds vote of each house, to alter or repeal any of these provisions.

LETTERS FROM VARIOUS CITIZENS OF MINNESOTA APPROVING
THE FOREGOING PLAN OF REFORESTATION, IN THE
ORDER OF THEIR DATE.

(From Mr. J. M. Underwood, experienced nurseryman and
formerly President of the State Horticultural Society.)

LAKE CITY, MINN., Jan. 22, 1908.

Gen. C. C. Andrews,
St. Paul, Minn.

Dear Sir:

I have just read over the plan you recommend for reforestation. You certainly have put the subject in a logical and conclusive manner, and I heartily endorse the proposed constitutional amendment. There is nothing of greater importance to our State and country than of promoting moisture in our climate and retaining it, and in no way can it be done except by reforesting our cut-over forests and adding to them. Commending you for your efficient service in this work, I am,

Very truly yours,

J. M. UNDERWOOD.

(From Hon. S. G. Comstock, ex-Member of Congress.)

MOORHEAD, MINN., Jan. 22, 1908.

Hon. C. C. Andrews,
Forestry Commissioner,
St. Paul, Minn.

Dear General:

I have read with much interest your plan of reforestation. The need for some energetic action in that line is apparent to all familiar with the facts. I have heard no plan so feasible and practical as the one you outline. In my judgment the State will do well to adopt and put in early execution your recommendations.

Very sincerely yours,

S. G. COMSTOCK.

(From Mr. J. H. Beek, Secretary St. Paul Jobbers' and Manufacturers' Association.)

ST. PAUL, MINN., Jan. 22, 1908.

Gen. C. C. Andrews,
Forestry Commissioner,
State Capitol, City.

Dear Sir:

I have very carefully thought over your plan of reforestation as outlined in your letter of January 14th, and I am heartily in favor of it. Unless the State of Minnesota enters upon some comprehensive plan of reforestation and pursues it continuously the time is not far distant when the people will realize how costly has been the indifference and shortsightedness of our lawmakers.

Yours truly,

J. H. BEEK.

(From General C. McC. Reeve.)

MINNEAPOLIS, MINN., Jan. 22, 1908.

General C. C. Andrews,
St. Paul, Minn.

My Dear General:

I have examined carefully your plan of reforestation and I certainly approve most heartily of it. To my mind no one question is deserving of more prompt and intelligent action on the part of the proper authorities than the question of providing an adequate timber supply for future generations.

Yours very truly,

C. McC. REEVE.

(From Mr. Daniel R. Noyes.)

ST. PAUL, MINN., Jan. 23, 1908.

Hon. C. C. Andrews,
Forestry Commissioner,
St. Paul, Minn.

Dear Sir:

Your favor of Jan. 20 received. I am heartily in favor of the plan proposed to "secure a sustained yield of timber" in this State. The matter of "reforestation" is one of great importance to Minnesota, and some practical plan of reforestation is of the utmost importance to our State, and cannot be entered upon too soon.

Yours truly,

DANIEL R. NOYES.

(From Ex-Lieut. Governor A. E. Rice.)

WILLMAR, MINN., Jan. 23, 1908.

Hon. C. C. Andrews,
St. Paul, Minn.

My Dear General:

The necessity of reforestation under such a plan as you propose, or something similar, ought to be given serious consideration by every thinking person who has at heart the needs of the State and the welfare of its future generations.

Sincerely yours,

A. E. RICE.

(From Mr. Robert A. Kirk.)

ST. PAUL, MINN., Jan. 24, 1908.

Gen. C. C. Andrews,
St. Paul, Minn.

Dear Sir:

I have your valued favor of the 21st, enclosing statement of your plan of reforestation.

I am sure that most thoughtful men are disposed to regard this subject as one of the most important subjects before our people. Already valuable time has been lost in getting to work on it, and it is to be hoped that our next legislature will take favorable action on it. I do not attempt to recommend any particular plan for this purpose. I have not given the matter careful attention, and am not qualified to express an opinion of the value of any plan under consideration.

I feel deeply, however, that this work should be undertaken at the earliest day possible, and that it should be put into operation as soon as the large body of intelligent men who have been giving this subject careful consideration can unitedly work together in carrying out this object.

It is a great work and deserves the most thoughtful consideration of all public spirited citizens.

Yours truly,

R. A. KIRK.

(From Hon. W. P. Allen, former Senator from Cloquet District, and for many years Vice Pres. C. N. Nelson Lumber Company.)

Gen. C. C. Andrews,
Forestry Commissioner,
St. Paul, Minn.

Dear Sir:

I have carefully read your circular offering a plan of reforestation, to be submitted to the people of Minnesota through a constitutional amendment.

With the general purpose of the proposed plan I am, as you know, heartily in sympathy, and I do not know of any one in the State better fitted by temperament and experience to work out the details than yourself. The adoption of some permanent system of scientific forestry by the State of Minnesota is, in my opinion, the only way to avert a disastrous famine in forest products in the near future, and, what is worse, a steady decrease in rainfall and the consequent lessening of agricultural production. No dependence can be put on private initiative and enterprise, even when encouraged by tax exemption or other subsidy.

It is a work to be undertaken by the whole State, since its ultimate benefits accrue to the treeless portions of the State even more than to the regions included in the forested limits.

Very truly yours,

W. P. ALLEN.

(From Mr. James J. Hill, Great Northern Railroad Company.)

ST. PAUL, MINN., Jan 25, 1908.

Mr. C. C. Andrews,
Forestry Commissioner,
St. Paul, Minnesota.

Dear Sir:

Acknowledging receipt of your favor of the 24th instant, I beg to say that I have read your plan for reforestation of cut-over pine lands in this State, and find it well worthy of the best efforts of all the people in the State. Our forest, once a rich heritage, is rapidly disappearing. Except for the areas on the Pacific coast, the forests of the whole country will in twenty years be practically exhausted, and then we will be compelled to begin in earnest what you recommend now.

Yours truly,
JAS. J. HILL.

(From Hon. Wm. B. Dean, Ex-Senator from Ramsey County.)
 REDLANDS, CALIF., Jan. 26, 1908.

My Dear General Andrews:

Yours of the 20th instant, forwarded from St. Paul, is at hand.

I know of nothing relating to the material interests of Minnesota that should command the hearty support of our people more than the subject of reforestation.

The plan proposed in the amendment to the Constitution seems practical and common sense. If it should ever be put into operation, future generations will bless the wise men who devised it. I hope you will be successful in your efforts.

Yours truly,

WM. B. DEAN.

(From Mr. Thos. Owens, Gen. Sup't. Duluth & Iron Range R. R.)
 TWO HARBORS, MINN., Jan. 27th, 1908.

Mr. C. C. Andrews,
 Forestry Commissioner,
 St. Paul, Minn.

Dear Sir:

I am in receipt of your letter of the 24th inst., with your plan of reforestation; and I assure you that I heartily concur in same. In fact, I am a strong believer in the fact that we should plant trees for the coming generation.

Yours truly,

THOS. OWENS.

(From President Northrop, State University.)

MINNEAPOLIS, MINN., Jan. 28, 1908.

Hon. C. C. Andrews,
 St. Paul, Minn.

Dear Sir:

I have read with interest the plan of reforestation recommended by the Forestry Commissioner of Minnesota, and while I cannot go into a minute examination of the plan, I may say unhesitatingly that the plan seems to me to be feasible and desirable. It is of the utmost importance that the land in Minnesota that is not adapted to agriculture should be restored to forests, if possible; and I have faith in your knowledge of the subject and your wisdom that justifies me in approving your plan.

Very truly yours

CYRUS NORTHROP.

(From Mr. Geo. Rupley of Duluth.)

DULUTH, MINN., Jan. 20th, 1908.

Hon. C. C. Andrews,
St. Paul, Minn.

Dear Sir:

I have your favor of the 28th instant enclosing copy of proposed constitutional amendment.

I certainly approve of the plan of State forestry outlined therein and trust there will be no unnecessary delay in its adoption.

Very truly yours,

GEORGE RUPLEY.

(From Mr. J. W. Cooper, of Griggs, Cooper & Co., St. Paul.)

ST. PAUL, MINN., Jan. 30, 1908.

Mr. C. C. Andrews,
Forestry Commissioner,
State Capitol, City.

Dear Sir:

I have read with a good deal of interest the printed communication sent me in your favor of Jan. 28th. I have long thought that the State could well afford to spend sufficient means to eventually cover lands that are unfit for agriculture with timber of various kinds. I believe there is no question of more importance than the question of reforestation, and I regret so few people give the matter any thought. If it was possible to place before the people of Minnesota what reforestation means to future generations, I have no doubt a large majority of the people would favor liberal use of public moneys for such a scheme. I assure you it will be my pleasure to do anything in my power to assist you in the matter.

Yours very truly,

J. W. COOPER.

(From Mr. T. G. Walther of St. Paul.)

ST. PAUL, MINN., Jan. 29, 1908.

Gen. C. C. Andrews,
St. Paul, Minn.

Dear Sir:

The subject of the restoration of our pine forests is very interesting to me.

I fully believe that the United States ought to take hold of this

subject and carry it out to its fullest possibility, but it would also be a grand idea for the State of Minnesota.

In this State we have many thousands of acres of land which is really waste and is only fit to raise pine trees,—in addition to that, the question of what the future generations will do if there is no pine is a very serious one. It is right that we who live at the present time should do all we can for the happiness and profit of the future, and I am very much in sympathy with your efforts to bring about the restoration of the forests.

Of course, you know much more about the detail than I do, but I assure you that if my assistance can be of benefit to you at any time I will be very glad indeed to give you my help to the fullest extent.

If a system of taxation is necessary, I will be very glad to put in my share,—in fact, anything that is done to restore our forests to the greatest possible extent will meet with my hearty approval.

Yours truly, T. G. WALTHER.

(From Hon. C. D. O'Brien.)

Mr. C. C. Andrews, ST. PAUL, MINN., Jan. 30, 1908.

Forestry Commissioner,
St. Paul, Minn.

Dear Sir:

I am in receipt to-day of your favor of the 30th inst., enclosing your plan for the reforestation of this State. The matter cannot be commended too highly, and is one of lasting importance. I sincerely trust that your plan will be carried out.

Sincerely yours, C. D. O'BRIEN.

(From President C. H. Cooper, State Normal School, Mankato.)

MANKATO, MINN., January 30, 1908.

General C. C. Andrews,
Forestry Commissioner,
St. Paul, Minn.

Dear Sir:

I am greatly interested in the effort that is being made for an amendment to our State Constitution, and the plan of reforestation contained in the amendment submitted to me meets my approval. I believe that the State should in fairness to the coming generations do what it can to restore the forests that have been destroyed; no investment could yield greater returns.

Very truly yours, C. H. COOPER.

(From Mr. Joseph McKibbin of St. Paul.)

ST. PAUL, MINN., Feb. 1st, 1908.

Gen. C. C. Andrews,
Forestry Commissioner,
St. Paul, Minn.

My Dear Sir:

I have read your plan of reforestation with great interest, and while lacking the information to discuss it fully in all its details, the plan as a whole has my hearty endorsement.

Forestry is one of our greatest economic problems. It should especially command the attention of our more thoughtful citizens and legislators. When we are so resolved, we can extricate ourselves in a comparatively short time from most of our economic difficulties—but no amount of penitence and energetic reform can grow a pine forest in much less than a hundred years.

Individuals will not engage to any extent in enterprises from which they must wait a century for returns. Reforestation is peculiarly the work of the State and the nation, and a vigorous and broadspread start should at once be made in Minnesota.

Very truly yours,

JOSEPH MCKIBBIN.

(From Professor Thomas Shaw, of St. Anthony Park, Minn.
WILLISTON, N. D., Feb. 1st, 1908.

Gen. C. C. Andrews,
St. Paul, Minn.

Dear Sir:

Your letter of the 28th ult. and the circular inclosed have reached me here. I take the first spare moment to reply. I have read what you say in the circular headed "Plan of Reforestation Recommended by the Forestry Commissioner of Minnesota," and am in hearty accord with the same. Minnesota will not be true to herself nor to her future citizens unless steps are taken at the earliest possible moment looking to reforestation under government supervision.

I am also in hearty accord with the proposition to ask for a Constitutional amendment on the general lines suggested by the Commissioner, but have not yet been able to give that study to this phase of the question which its importance demands

Truly yours,

THOMAS SHAW.

(From Hon. Daniel W. Lawler.)

ST. PAUL, MINN., Feb. 3, 1908.

Gen. C. C. Andrews,
Forestry Commissioner,
St. Paul, Minn.

Dear General:

I have carefully studied your plan of reforestation and your draft of the proposed Constitutional amendment to put it into effect.

I believe that your plan is feasible and that the commencement of the work should be no longer delayed. During the past several years I have carefully read in the newspapers the accounts of your efforts for the preservation and renewal of our forests, and I believe that the people of the State are under great obligations to you for the intelligent and efficient work which you have done.

Respectfully,

D. W. LAWLER.

(From J. W. Strong, President Emeritus, Carlton College, of
of Northfield, Minn.)

LOS ANGELES, CALIF., Feb. 4, 1908.

Hon. C. C. Andrews,
Forestry Commissioner,
St. Paul, Minn.

My Dear Sir:

For many years I have been deeply interested in your earnest efforts to preserve the forests of Minnesota from needless waste—a waste far greater than most of our citizens appreciate. The importance of reforestation cannot be overestimated. The adoption of the Constitutional amendment suggested would, in time, accomplish what President Roosevelt so wisely calls “an imperative business necessity.” I sincerely hope your plan may be carried out at the earliest possible date.

With personal regards,

Very cordially yours

JAS. W. STRONG.

(From Mr. L. W. Ayer, Experienced Woodsman and Timber Estimator.)

BELLE PRAIRIE, MINN., Feb. 3, 1908.

Gen. C. C. Andrews,
Forestry Commissioner,
St. Paul, Minnesota.

Dear Sir:

Your favor of the 1st inst., enclosing "Plan of Reforestation," is before me. That this "Plan," or something equivalent thereto, is absolutely necessary to prevent the destruction of our entire timber resources in the near future, is evident to any one fully conversant with the facts; and I am glad to give it my unqualified endorsement.

Born and raised in the timber region of Minnesota and having followed the occupation of surveyor, cruiser and timber estimator for thirty-five years or more, my opportunities for observation have been perhaps as great as those of any person in the State.

Truly yours,

L. W. AYER.

(From Ex-Governor Lucius F. Hubbard.)

ST. PAUL, MINN., Feb. 6, 1908.

General C. C. Andrews,
St. Paul, Minn.

My Dear Sir:

The proposition that Minnesota should adopt a definite policy for the protection and perpetuation of her forest products, such as would be provided by the Constitutional amendment you have suggested, is one of the important questions that ought to be pressed upon the attention of the people of the State.

This is one of the vital questions of the moment, and much farther postponement of its serious consideration and practical action thereon, would be a neglect of duty that would be severely judged by generations to follow us. I believe that our people are now educated upon this subject to a point where a decided opinion in favor of substantial State aid for the reforestation of our denuded timber tracts would be secured if an opportunity was given for its expression.

Very truly yours,

L. F. HUBBARD.

(From Mr. Frank J. Waterous.)

Gen. C. C. Andrews, ST. PAUL, MINN., Feb. 13, 1908.
Forestry Commissioner,
St. Paul, Minn.

My Dear Sir:

The proposed Constitutional amendment as recommended by you appears to me to be thoroughly practical and feasible, and I am satisfied that if the people of our State understood the situation that the amendment would carry by an overwhelming majority.

Is there not some way that a campaign of education can be inaugurated calling the people's attention to the importance of this matter?

Yours sincerely,

FRANK J. WATEROUS.

(From Hon. J. R. Morley, Chairman House Committee on
Forestry, Legislature, 1905.)

Gen. C. C. Andrews, OWATONNA, MINN., March 3, 1908.
St. Paul, Minn.

Dear Sir:

I have read with much interest the Constitutional amendment proposed by you for presentation to the next Legislature. And I can assure you that I am very much pleased to see these steps taken toward reforesting the cut-over lands not fit for agriculture.

And I think the State should take the necessary steps at once to reforest these cut-over lands. It is common knowledge that our forests are fast becoming depleted and the average citizen is indifferent about it. But if the State does not interest itself in the matter of reforestation it will never be done.

Such a system of reforestation as you propose would put Minnesota in the front rank in this particular enterprise, as she has been in everything she undertakes. Let the people become once interested in this matter and realize the benefit that will accrue to posterity, and your measure will become instantly popular. No time should be wasted, and I hope you will use every effort to get this matter before the people, to the end that public sentiment may crystallize and results may be got at the hands of the next legislature.

Yours truly,

J. R. MORLEY.



Natural Resources. Curtain Falls, outlet of Crooked Lake into Lake La Croix, northern boundary of Minnesota (Township 66, Range 12).
Photographed July, 1905

(From Mr. James E. McGee, of Hibbing, St. Louis County,
Timber Cruiser and Surveyor for Thirty Years.)

HIBBING, MINN., April 13, 1908.

Mr. C. C. Andrews,
Forestry Commissioner,
St. Paul, Minn.

My Dear Sir:

In answer to your letter of February 1st, 1908, will say that your plan of reforestation meets my approval; and also your proposed Constitutional amendment meets my approval. I have had thirty years' experience as timber cruiser, surveyor and logging superintendent in the forests of Northern Wisconsin and Minnesota.

Yours truly,

JAS. E. MCGEE.

TAX EXEMPTION TO PROMOTE FORESTRY.

It is the opinion of some people that it would be good policy to encourage the production of timber by private parties by reducing the tax on land so used. In Minnesota it would require an amendment to the Constitution to authorize a lower rate of tax for forest than for other land. If any such measure were adopted there would have to be conditions that on land receiving the benefit of low tax, forest should be maintained according to forestry principles. It would not do to leave the land in a wild state to take its chances for natural forest growth, because in such a condition it might be very many years before the whole of it would become well stocked with valuable timber. There would have to be conditions that all of the land not well stocked naturally should be planted with valuable trees at proper distance apart—say not more than about five feet apart when two or three years old; also that the assessor should in person annually visit the land and report in detail as to the manner in which forest was maintained. Besides, the State forestry authority

would have to keep informed as to the way in which forest was maintained on private land receiving the benefit of tax exemption or reduction.

I believe the opinion which favors any such encouragement of private parties in forest production goes no further than to recommend that the land be taxed simply for its value as land, and that no tax be levied upon the timber until it is cut, and that the tax shall then be collected according to a fair value of the timber.

I do not believe that public opinion would favor treating large tracts of private land nor land of large corporations in this way; but only about 40, possibly 80, acres owned by any one individual.

If it should be found expedient, I would not object to the submission of an additional amendment to the Constitution of a clause in substance like the following, to form a part of and follow the amendment I have recommended for a tax levy of three-tenths of one mill on every dollar of taxable property, namely:

To encourage the production of timber by private parties, the Legislature may provide that not exceeding 80 acres of land belonging to any separate owner and used for the production of timber in a manner which the Legislature shall prescribe, shall be taxed only for its value as land; the timber to be exempt from tax until cut.

DISSEMINATE INFORMATION.

The law makes it one of the duties of the Forestry Commissioner to "disseminate information concerning forestry." He is frequently called upon to give talks on forestry. As it may interest the reader to see a sample of these talks, the following report of an address made by him before the Men's Club of the Park Avenue Congregational Church, Minneapolis, the evening of January 28, 1908, is here given:

The Hinckley forest fire, in which 418 persons perished, occurred September 1st, 1894. There was at that time a law against setting forest fires, but there was no one particularly required to have it enforced. If the present law had been in force the Hinckley fire would not have occurred. The law of 1895 made town supervisors fire wardens. It provided for a chief, since changed to Forestry Commissioner, whose duty was to instruct the local wardens and keep them on the alert, provide them with blanks on which to report fires and warning notices to post against setting fires. He was also required to investigate the forests, the means of regrowth and to make an annual report containing information on forestry. Thus he was and is more than a mere police officer. The State pays the wardens for their actual services and collects half from the counties in which the service was rendered. The appropriation is extremely inadequate, being only \$5,000 for an ordinary season and \$5,000 for a season of unusual drought. Nevertheless, according to the reports of wardens, the average damage done by forest fires the past twelve years was only \$30,000 a year.

Many people think that a forest is a dense wilderness. As a forest should only occupy third and fourth rate land that is unsuited for cultivation, it naturally must be in detached bodies. Take, for example, the so-called Black Forest, lying partly in Baden and partly in Wurtemberg. That forest extends over country 90 miles in length, with an average breadth of 30 miles, yet within it are cultivated farms, villages and even cities, and a population of 1,000,000, it abounds with fine roads and is practically a fine park.

A year or two ago I stood on a hill in my native town, Hillsboro, N. H., from which I could see most of the sur-

face, and it seemed to me that two-thirds of it was forest, and yet it has four villages and a larger population than average towns.

According to forestry a tree has reached its fiscal age and ought to be cut when it ceases to earn good interest by its growth. On third and fourth rate—hilly, rocky and sandy land, which only should be used for forest, the pine will on an average reach its fiscal age in 80 years.

The original pine of Minnesota will last only about ten years longer. The State should begin reforestation on an extensive scale and the friends of forestry would accomplish a good work if they would secure the election to the Legislature of **even one** able man who would **make forestry a specialty**.

EDITORIAL ASSOCIATION.

Address of Gen. C. C. Andrews, Forestry Commissioner of Minnesota, at the annual meeting of the State Editorial Association in the reception room of the Mayor of Minneapolis, February 20, 1908:

After something over twelve years' experience in the forestry service of the State I have ventured to recommend a plan of reforestation. I bring it before you, because I believe that, as educators of public opinion, you can, if you try, secure its adoption. It is that a constitutional amendment be adopted providing for an annual tax of three-tenths of a mill on each dollar of taxable property, the proceeds to be used by the Forestry Board in the purchase of forestry land at not exceeding \$5.00 per acre, and maintaining forest thereon according to forestry principles. This tax would be only thirty cents on a thousand dollars. The revenue from the forest to be paid into the State treasury, except that one-quarter part of the net revenue to go to the town in which the forest is situated in aid of schools and roads.

Third and fourth rate land can be bought for \$1.50 per acre, but as the State holds some land only fit for forest the minimum price of which is \$5.00 per acre, there should be authority to pay that when necessary.

The German yield tables show that an acre of third or fourth rate land planted as part of a forest with pine on forestry principles—two or three year old seedlings five feet apart—will in eighty years produce 18,000 feet of timber, board measure. I say eighty years, because on an average pine does its fastest growing in that period. It grows after that, but not at a rate to earn good interest on the capital it represents. Forestry always looks to getting good revenue.

Experience shows that the State can plant forest at about \$6.00 per acre, exclusive of cost of land. If the State had 37,500 acres of third or fourth rate land to plant with forest we would find that 5 per cent of it was already well stocked with pine or some other valuable timber, and that another 5 per cent of the area was rock or water, which we would call blank spaces; deducting this 10 per cent from 37,500 would leave 33,750 acres to be actually planted.

The three-tenths of a mill levy will yield about \$300,000 annually, but if adopted it will be five years before any money will be available. In the course of ten years the State would be able to annually acquire and plant 37,500 acres, not in one body but in scattered localities. Then in eighty years the state would own three million acres of normal forest from which 675,000,000 feet board measure of timber could annually be cut perpetually. It would be worth \$200,000,000, yielding a net revenue of 3 per cent; giving steady employment to 50,000 workmen, besides those in mills and shops, and affording other benefits,

such as improvement of climate and soil, water supply in streams, beauty of scenery and covert for game.

No one feels poorer for that splendid fleet that has gone to the Pacific, and no one will feel poorer for the adoption of this plan of reforestation.

PROGRESS OF UNITED STATES GOVERNMENT FORESTRY.

The progress of forestry under the government of the United States in recent years has been remarkable.

Twenty years ago the appropriation made by Congress for the U. S. Bureau of Forestry in Washington—and which was then occupied simply in the diffusion of forestry information—was only \$10,000 a year. The appropriation made for forestry at the last session of Congress, 1907, was \$2,400,000!

Twenty years ago there was not an acre of United States forestry reserve (now called national forest). Today there are 167,000,000 acres of national forest!

If the United States government employed scientifically trained foresters for the management of its forests in the same proportion as they are employed by Prussia for the management of its state forests, and assuming that only half of the United States' national forests are productive (it is supposed that a portion are too mountainous to be productive), then even for that half it would require eight thousand scientifically educated foresters for their management!

At present there are not one hundred scientifically trained foresters available for such service.

What a vast field is open for scientifically educated young American foresters! And what a useful influence will the needed body of scientific men for the management of the forests have on the general welfare of the country.

The country that gave the world the sewing machine, the electric telegraph, the ocean cable and the telephone is not going to be very slow in scientific forestry after it gets once started; and I confidently predict that in thirty years from now the United States will be in the front rank of countries, if not indeed the leader, for splendid forestry achievement.

REPORT BY A COMMITTEE OF THE NATIONAL ACADEMY OF
SCIENCE ON A PLAN OF FOREST ADMINISTRATION.

It will be valuable here to place on record the first steps taken by the government of the United States in creating a forestry system.

The Act of Congress of March 3, 1891, section 24, authorized the President to set apart any part of the public lands, wholly or in part covered with timber or undergrowth, whether of commercial value or not, as public reservations, and by public proclamation declare the establishment and limits thereof. By the year 1896 sixteen forest reservations had been established under this law, aggregating an area of 17,500,000 acres, but no plan had been devised for their administration.

February 15, 1896, the Secretary of the Interior, Hon. Hoke Smith, addressed a communication to Professor Wolcott Gibbs, of Newport, Rhode Island, President of the National Academy of Sciences, requesting that an "investigation and report" be made by the National Academy "upon the inauguration of a rational forest policy for the forested lands of the United States." Congress, June 11, 1896, appropriated \$25,000 for such investigation and report, and Professor Gibbs appointed a commission consisting of Professor Charles S. Sargent, director of the Arnold Arboretum at Harvard University; Gen. Henry L. Abbott, United States Engineer Corps;

Professor William H. Brewer, of Yale University; Mr. Arnold Hague, of the United States Geological Survey; Mr. Alexander Agassiz, and Mr. Gifford Pinchot, forester, to perform the duty. The members of this commission began their work July 2, 1896, "visited most or all of the forest reservations and other public forests of the United States, devoting three months of hard travel and careful study, without compensation, to the work assigned them." Their report, dated May 1, 1897, was drawn up by the chairman, Professor Charles S. Sargent, and signed by all the members, and contains much valuable information and various recommendations; and is accompanied by several carefully drawn bills which, or portions of which, have been enacted by Congress. The appointment and labors of such a commission, of course, gave a great impulse to American forestry. The commission recommended the establishment of a permanent forest bureau, composed of trained officers, to administer, maintain and improve the reserved forested lands; that topographical surveys, under the supervision of the Director of the Geological Survey, be made of the reservations to determine what portions of them should be permanently reserved on account of their forest covering, and what portions should be reopened to entry and sale; that regulations should be issued for the protection, growth and improvement of the forests on the reservations, for the sale of timber, firewood and fencing to actual settlers and to owners of mines; for allowing the public to enter and cross the reservations, etc., etc.; that all public lands of the United States more valuable for the production of timber than for agriculture or mining shall be withdrawn from sale, settlement and other disposition, and held for the growth and sale of timber.

The following are a few extracts from this noteworthy report:

NEGLECT OF REPRODUCTIVE MEASURES.

“But a well regulated water supply is not the only thing dependent on the preservation of forests. In civilized nations the demand for lumber and other forest products is continuous, and requires systematic and intelligent forest reproduction. Numerous districts in our country have now no more timber than is needed for early use, and if forest reproduction is not encouraged local timber scarcity in the not distant future seems inevitable. The enormous waste from forest fires, incendiary and accidental, which prevail in nearly every part of the United States, the extravagant modes of lumbering, especially in the West, permitting valuable logs to rot in the brush on account of slight defects, and the universal neglect of all reproductive measures, threaten the prosperity of the country and should receive early attention from the Government.”

FOREST FIRES.

“No human agency can stop a Western forest fire when it has obtained real headway, and the only hope of averting the enormous losses which the country suffers every year from this cause is in PREVENTING FIRES FROM STARTING IN THE FORESTS OR IN EXTINGUISHING THEM PROMPTLY. They will always occur, but the experience gained in the Yellowstone National Park since it has been patrolled by detachments of the United States army and in Canada shows conclusively that with the aid of disciplined forest rangers intelligently directed the number of forest fires in any district can be greatly reduced, and that it is frequently possible to extinguish small fires if they are energetically attacked when first discovered.”

FOREST RESERVES FOR THE PEOPLE.

“A study of the forest reserves in their relations to the general development and welfare of the country shows that the segregations of these great bodies of reserved lands can not be withdrawn from all occupation and use, and that they must be made to perform their part in the economy of the nation. According to a strict interpretation of the ruling of the Department of the Interior, no one has a right to enter a forest reserve, to cut a single tree from its forests, or to examine its rocks in search of valuable minerals. Forty million acres of land are thus theoretically shut out from all human occupation or enjoyment. Such a condition of things should not continue, for unless the reserved lands of the public domain are made to contribute to the welfare and prosperity of the country they should be thrown open to settlement and the whole system of reserved forests abandoned. Land more valuable for its mineral deposit or for the production of agricultural crops than for its timber should be taken from the reservations and sold to miners and farmers, the mature timber should be cut and sold, settlers within or adjacent to the boundaries, unable to procure it in other ways, should be authorized to take such material from reserved forests as is necessary for their needs, and prospectors should be allowed to search them for minerals.

“But it must not be forgotten that the public domain of which these reserves form a part belongs to the people of the whole country and not to those of any one section. It is right, therefore, that the forest reserves should be managed for the benefit of the people of the whole country and not for any particular class or section. Steep and elevated mountain slopes should not be cleared of their forests for the sole benefit of the prospector or the miner, because this, by its influence on water flow, might

mean permanent injury to persons living hundreds of miles away. A few foreign sheep owners should not be allowed to exterminate great forests at the expense of the whole country; and prospectors and miners should not be permitted to burn, wilfully or carelessly, forests in which all classes of the community are equally interested.

“Our examination of the Western forests shows that the existing methods and forces at the disposal of the Interior Department are entirely inadequate to protect the forests of the public domain. Civil employes, often selected for political reasons and retained in office by political favor, insufficiently paid and without security in their tenure of office, have proved unable to cope with the difficulties of forest protection, and the reserves are practically unguarded.”

FOREST ADMINISTRATION.

“It has been shown that the preservation and judicious management of the forests on those portions of the public domain which are unsuited for agriculture are of great importance for the flow of rivers needed for the irrigation of arid districts, and to furnish forest products for settlers on adjacent arable lands and for mining operations. The cheapness of forest products in the United States, and the length of time required to produce crops of timber in the West, will make the investment of the capital of individuals in silvicultural operations, for the present at least, a doubtful enterprise in those States and Territories where the public domain is now principally situated; and silviculture in western North America will only be really successful under sustained government control and administration; for, dealing with crops which often do not reach maturity until the end of one or two centuries, it can only be made profitable by carrying out, without interruption

and under thoroughly trained officers, plans which must often be followed during the lives of several generations of men. This stability and continuity of management can only be secured by a permanent government administration composed of officers of the highest character, entirely devoted to duty."

"Ultimate self-support of a government forest administration is possible in the United States, and it may be expected to yield a permanent income if the national forests are managed with the intelligence, thrift and honesty which characterize the forest administration in Germany, France and other European countries. At first, however, the cost of administration will exceed the receipts, as is almost invariably the case in important economic reforms, but outlays may be expected to diminish in proportion as the administration is faithful, intelligent and honest."

"The fundamental principle of any government system of forest management should be the retention of the fee of forest lands, and the sale of forest products from them at reasonable prices, under regulations looking to the perpetual reproduction of the forest. While it is not desirable, perhaps, that the Government in the immediate future should enter into competition with the private owners of forest lands, it is evident that ultimately the sale of forest supplies from the government timber lands should not only cover all expenses of government forest management, but produce a steadily increasing income.

"Upon officers charged with the administration of the government forests will devolve the care of immensely valuable public property, its improvement under the best established scientific methods, police responsibility of exceptional delicacy, surveys, the construction of roads and engineering works for the protection of mountain slopes,

and the control of numerous agents, widely separated and not easily trained to habits of discipline. Many of these duties are essentially military in character and should be regulated for the present on military principles. Wise forest management calls for technical knowledge which must be based on a liberal scientific education. The forest officers must be men of the highest personal character, who can be trusted to avoid participation in any private business connected, however remotely, with forest products. To secure the service of men qualified to meet these several requirements will call for liberal remuneration and permanent tenure of office."

PAY OF FORESTRY OFFICIALS.

'The following are the rates of annual compensation suggested for forest officers, with an increase of 10 per cent for each period of five years' service: For the director, \$4,500; for the assistant director, \$4,000; for an inspector, \$3,500; for a head forester \$2,500; for a forester, \$2,000.

For the subordinate grades a monthly pay of \$45 for rangers and of \$35 for assistant rangers is proposed, with a gradual increase for length of service. Rations in kind, or a commutation, should also be furnished.

All officers of the service, on reaching the age of 64 years, should be entitled to receive 50 per cent of their pay at the time of their retirement, and a like inducement to faithful service should be extended to rangers after a service of thirty years.

"This organization will require for salaries, including those of rangers, for each of the first five years, an annual appropriation of \$250,000. While the number of officers proposed is much smaller in proportion to the area of the territory to be protected, now about 40,000,000 acres, than has been found necessary in other countries, it is

believed to be sufficient for the immediate wants of the service. It is probable, however, that it will have to be enlarged in the future, when increase of population in the Western States and Territories and a greater demand for forest supplies than now exists will make the protection of the reserved forest lands more difficult and will justify more elaborate methods of forest management than now appear necessary, or when now unreserved forest lands of the public domain are controlled by the officers of the forest bureau.

“When it is remembered that several million dollars’ worth of timber are taken every year from the public domain without the Government being able to obtain any payment for it, it would appear a wise and economical policy to spend annually a few hundred thousand dollars on an organization which would prevent such unnecessary drains on the wealth of the nation. It must be remembered also that an efficient forest administration would be able to prevent many forest fires on the public domain, and that it is not an unusual occurrence for a single fire to destroy material in a few days worth more in actual money than this forest administration would cost in years, while the loss to the country in impaired water flow through forest fires, which might be easily prevented, is incalculable. The expenditure, therefore, of \$250,000 a year in furnishing means for protecting the forests on the public domain would appear to be justified by every consideration of common sense and economy.

“The example, moreover, of wisely directed national forests may be expected to be a substantial benefit to the private interests of the citizens of the United States, both as object lessons and in the opportunity they would offer for the special training of foresters. Such examples would gradually change the wasteful methods now practiced by indi-



Burntside Lake in St. Louis County. Popular resort for trout fishing. A part of the State's Burntside Forest, being land granted to Minnesota by Congress in 1904, for forestry purposes, borders on this lake. Alexander Winchell, Geologist of Michigan, pronounced this lake more beautiful than the Thousand Islands of the St. Lawrence River.

vidual owners of forest property, and in this way increase national wealth and prosperity. Your committee fully realizes that the organization of such an administrative bureau of civil officers would be a radical departure from the recognized customs of the United States. The nature and extent of the interests at stake, however, and the difficulty, delicacy and permanency of the duties demand an exceptionally stable service. The experience of all other countries shows that this service can be successfully performed only by highly trained and conscientious officers."

MINNESOTA NATIONAL FOREST.

The following is the Act of Congress approved May 23, 1908, changing the boundary and somewhat reducing the area of the Minnesota National Forest:

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That there is hereby created in the State of Minnesota a national forest consisting of lands and territory described as follows, to-wit:

Beginning at a point where the north line of section thirty-one in township one hundred and forty-eight north, range twenty-eight west, fifth principal meridian, intersects the low water mark of the lake formed by the waters of Third River; thence easterly along the north line of sections thirty-one, thirty-two, thirty-three, thirty-four, thirty-five, and thirty-six in township one hundred and forty-eight north, ranges twenty-eight and twenty-seven west, continuing easterly along the north line of section thirty-one in township one hundred and forty-eight north, range twenty-six west, to a point where said line intersects the low water mark of Bow String Lake on the west shore; thence southerly along the west side of said lake at low water mark to a point where it crosses the section line between sections sixteen and seventeen in township one hundred and forty-seven north, range twenty-six west; thence southerly along the section line on the east side of sections seventeen, twenty, twenty-nine, and thirty-two in township one hundred and forty-seven north, range twenty-six west, and continuing southerly along the east side of sections five, eight, seventeen, twenty, twenty-nine, and thirty-two, township one hundred and forty-six north, range twenty-six west, continuing southerly along the east line of sections five, eight, seventeen, twenty, and twenty-nine, township one hundred and forty-five north, range twenty-six west, to a point at the low water mark on the right bank of the Mississippi River on the section line between sections twenty-eight and twenty-nine in said township; thence southeasterly along the right bank of the Mississippi River at low

water mark to its confluence with Leech Lake River in section twelve in township one hundred and forty-four north, range twenty-six west; thence southwesterly along the right bank of Leech Lake River along the low water mark to Mud Lake; thence along the line of low water mark of Mud Lake on its northern and western shores to the point where Leech Lake River empties into the same on fractional section thirty-two, township one hundred and forty-four north, range twenty-six west; thence up said river along the low water mark on the right bank thereof to a point in fractional section twenty-nine where the line intersects the low water mark of Leech Lake; thence in a northwesterly and southwesterly direction following the contours of said lake at low water mark to the point at low water mark on the shore of said lake on the northeast boundary of the ceded Leech Lake Indian Reservation on section line between sections five and eight, township one hundred and forty-three north, range twenty-nine west; thence in a southwesterly direction following the contours of said lake at low water mark to the point on said lake at the southwestern extremity of Ottetail Point; thence southwesterly in a direct line to the southern extremity of section twenty-five in township one hundred and forty-three north, range thirty-one west; thence in a westerly direction along the contour of said lake to the southwestern extremity of section twenty-six in said township; thence in a northerly and westerly direction along the contour of said lake at low water mark to a point where the center line through section two, running in a north and south direction in township one hundred and forty-three north, range thirty-one west, intersects the low water mark of Leech Lake; thence northerly through the middle of said section two to the shore of a small lake at low water mark; thence along the east shore of said lake at low water line to a point where the section line between sections thirty-five and thirty-six, township one hundred and forty-four north, range thirty-one west, intersects low water mark of said lake on north shore; thence northerly on section line between sections thirty-five, thirty-six, twenty-five, and twenty-six, to the low water mark at the shore of a small lake; thence northerly along the east side of said lake to a point where the section line between sections twenty-five and twenty-six intersects the low water mark of said lake in said township; thence northerly along the east line of sections twenty-six, twenty-three, and fourteen, to a point on the east line of section fourteen, twenty chains north of the southeast corner of section fourteen; thence west twenty chains; thence north twenty chains; thence west twenty chains; thence northerly along the east side of a small lake to a point where the center line running in a north and south direction through section fourteen intersects the north side of said lake at low water mark; thence northerly along the center line of said section through section eleven to the quarter corner between sections two and eleven of said township; thence westerly to a point twenty chains west of the northwest corner of section eleven; thence north forty chains; thence west twenty chains; thence north to a point where the center line running in a north and south direction in section three intersects the township line between townships one hundred and forty-four and one hundred and forty-five north, range thirty-one west; thence westerly to the quarter quarter corner on the township line in the southeast quarter of section thirty-four in township one hundred and forty-five north range thirty-one west; thence north twenty chains; thence west forty chains; thence north twenty chains; thence west twenty chains to the quarter corner

between sections thirty-three and thirty-four in said township and range; thence northerly along the east line of sections thirty-three, twenty-eight, twenty-one and sixteen in said township to a point where it intersects the right-of-way of the Great Northern Railway as at present located; thence easterly along said right-of-way to a point where it intersects the shore of Cass Lake at low water mark in section fifteen, township one hundred and forty-five north, range thirty-one west; thence northerly along the west shore of Cass Lake and the south, west and north shore of Allen's Bay and the northwest shore of Cass Lake to a point along the contour of said lake at low water mark at the head of the Mississippi River, approximately in section twenty-one, township one hundred and forty-six north, range thirty west; thence easterly along the right bank of said river to a point where the range line between ranges twenty-nine and thirty west intersects said river; thence northerly along the range line to the northwest corner of section nineteen in township one hundred and forty-seven north, range twenty-nine west; thence easterly along the north line of sections nineteen, twenty, twenty-one, twenty-two, twenty-three and twenty-four in said township and along the north side of sections nineteen and twenty in township one hundred and forty-seven north, range twenty-eight west, to a point where said line intersects the left bank of Third River at low water mark; thence northerly along the right bank of Third River to the contour line at low water mark of the lake formed by the waters of Third River; thence southeasterly and northerly along the contour line of said lake to the point of beginning; and it is the intent of this Act to include in said national forest and make a part thereof all that certain territory and land which has heretofore been selected by the Forester of the Department of Agriculture as the ten sections situated in townships one hundred and forty-four, one hundred and forty-five, and one hundred and forty-six north, ranges thirty and thirty-one west of the fifth principal meridian in Minnesota and designated as being the ten sections referred to and authorized to be selected by section two of the Act approved June twenty-seventh, nineteen hundred and two, being chapter eleven hundred and fifty-seven, United States Statutes at Large, volume thirty-two, entitled, "An Act to amend an Act entitled, 'An Act for the relief and civilization of the Chippewa Indians in the State of Minnesota,'" approved January fourteenth, eighteen hundred and eighty-nine; and also all the islands in Cass Lake in the State of Minnesota.

And in addition to the lands and territory above described, the lands described by section two of said Act of June twenty-seventh, nineteen hundred and two, as follows: "One hundred and sixty acres at the extremity of Sugar Point, on Leech Lake, and the peninsula known as Pine Point, on which the new Leech Lake Agency is now located" shall be included in and are hereby made a part of said national forest: *Provided*, That this Act shall not in any manner abridge the right of citizens to the use of the west and northwesterly shores of Cass Lake.

SEC. 2. The Secretary of the Interior is hereby authorized to proceed with the sale of the merchantable pine timber upon the above-described land outside of said ten sections and said islands and points, in conformity with the provisions of said Act above entitled, and reserving ten per centum of such timber from sale, said ten per centum to be designated by the Forester of the United States Department of Agriculture; and as to the timber upon said ten sections and said

islands and points, the said Forester is authorized, under such rules and regulations as he may prescribe from time to time, to sell and dispose of so much of the standing timber thereon as he may deem wise and advisable in the conduct of a National Forest: *Provided*, That a commission of three persons shall at once be appointed, consisting of one person to be designated by the President, one by the Secretary of the Interior, and one by a general council of the Indians of the Winnibigoshish, Cass Lake, Chippewas of the Mississippi Reservation, and Leech Lake Reservation, to be held under the direction of the agent at Leech Lake Indian Agency; and said commissioners shall proceed forthwith to appraise the value of the five per centum of timber heretofore reserved from sale by the provisions of said Act entitled "An Act to amend an Act entitled 'An Act for the relief and civilization of the Chippewa Indians in the State of Minnesota,'" approved January fourteenth, eighteen hundred and eighty-nine, and the ten per centum hereafter reserved under the provisions of this Act, and the timber upon said ten sections and upon the unappropriated lands on said islands and points, and shall ascertain the acreage of actual land included under the provisions of this Act and to the estimated value of said five per centum of timber reserved under the said Act entitled "An Act to amend an Act entitled 'An Act for the relief and civilization of the Chippewa Indians in the State of Minnesota,'" approved January fourteenth, eighteen hundred and eighty-nine, and the ten per centum reserved under this Act and the estimated value of timber upon said ten sections and upon the unappropriated lands on said islands and points, to the sum of the values of the timber so estimated shall add an amount equal to one dollar and twenty-five cents for each and every acre of land not otherwise appropriated which they find covered by the provisions of this Act, and shall certify the same to the Secretary of the Interior. The Indians designated in this section, acting through a representative who shall serve without compensation, to be named by them at the time of their appointment of the commissioner herein, shall have sixty days in which to appeal to the President of the United States from the findings of said commissioners, as certified to the Secretary of the Interior. At the end of said sixty days, if no appeal has been taken or if an appeal has been taken, then, upon the determination thereof by the President, the Secretary of the Interior shall certify the amount found by said commissioners, or if modified by the President, the amount determined by him, to the Secretary of the Treasury, who shall thereupon place such amount to the credit of all the Chippewa Indians in the State of Minnesota as a part of the permanent fund of said "All of the Chippewa Indians in the State of Minnesota" provided for in an Act of Congress entitled "An Act for the relief and civilization of the Chippewa Indians in the State of Minnesota," approved January fourteenth, eighteen hundred and eighty-nine, and the Acts supplementary thereto, and the amounts so certified to the Secretary of the Treasury shall draw interest at the rate of five per centum per annum, pursuant to the terms of said Acts.

SEC. 3. That any Indian having an allotment within the limits of the National Forest created by this Act is hereby authorized to relinquish such allotment and permitted to take another allotment in lieu thereof outside such National Forest, under the direction of the Secretary of the Interior; and the allotments of any deceased Indians located within the boundaries of said National Forest shall not hereafter be disposed of under section seven of the Act of June

twenty-seventh, nineteen hundred and two (volume thirty-second Statutes at Large, page two hundred and forty-five); but the heirs of said deceased Indians shall have the right, with the consent of the Secretary of the Interior and under such rules as he may prescribe, to relinquish to the United States the lands covered by such allotments and to select surveyed, unappropriated, unreserved land within the limits of any of the ceded Indian lands in the State of Minnesota and outside of the National Forest hereby created in lieu of the land covered by such allotments; and the lands so relinquished by the Indians or their heirs shall thereupon become part of the said National Forest. And the Secretary of the Interior is hereby authorized on request of the Forester of the Department of Agriculture to purchase such relinquishments from said Indians or their heirs and to pay for the same from any moneys received, after the appraisal of timber herein provided for, on account of the sale of timber from the National Forest hereby created, or from the sale of any other products or the use of any lands or resources thereof.

SEC. 4. That all land in any of said reservations, the Winnibigoshish Indian Reservation, Cass Lake Indian Reservation, Chippewas of the Mississippi Reservation, or Leech Lake Indian Reservation, not included in the National Forest hereby created as above described, heretofore classified or designated as agricultural lands, is hereby declared to be open to homestead settlement; and any of said land which has been classified as timber land shall be open to homestead settlement as soon and as fast as the timber is removed therefrom, in conformity with the homestead law, except that none of said lands shall be disposed of except on payment of one dollar and twenty-five cents per acre.

SEC. 5. That all moneys received from the sale of timber from any of the lands set aside by this Act for a National Forest, prior to the appraisal herein provided for, including all moneys received for timber under sales made by the Secretary of the Interior as authorized by existing laws and section two of this Act, shall be placed to the credit of the Chippewa Indians in the State of Minnesota, as provided for in an Act of Congress entitled "An Act for the relief and civilization of the Chippewa Indians in the State of Minnesota," approved January fourteenth, eighteen hundred and eighty-nine; and the Acts supplementary thereto, and shall draw interest at the rate of five per centum per annum, pursuant to the terms of said Acts; and after said appraisal the National Forest hereby created, as above described, shall be subject to all general laws and regulations from time to time governing national forests, so far as said laws and regulations may be applicable thereto.

SEC. 6. That the commissioners provided for herein shall receive a compensation of ten dollars per day each for each and every day actually spent upon the work herein provided for, which shall be paid out of any money in the Treasury of the United States not otherwise appropriated, and no commissioner shall be paid for more than ten days' service.

SEC. 7. None of the Indian graves now upon any of the islands or points referred to in this Act shall be disturbed, and the Indians shall continue to have the right to bury their dead at such places as they have heretofore used for that purpose, under the rules and regulations to be prescribed by the Forest Service.

SEC. 8. That nothing in this Act contained shall in any manner bind the United States to purchase any of the land in said reservations excluded from the

reserve created by this Act, or to dispose of said land, except as provided by the Act of January fourteenth, eighteen hundred and eighty-nine, entitled "An Act for the relief and civilization of the Chippewa Indians in the State of Minnesota," and an Act of June twenty-seventh, nineteen hundred and two, entitled "An Act to amend an Act for the relief and civilization of the Chippewa Indians in the State of Minnesota," or the provisions of this Act; or to guarantee to find purchasers for said lands or any portion thereof, it being the intention of this Act that the United States shall act as trustee for said Indians to dispose of the said lands and the timber thereon, and to dispose of the proceeds thereof, as provided in said Acts, only when received from the sale of the timber and the lands, as therein provided.

LETTER FROM MR. GIFFORD PINCHOT, U. S. FORESTER, IN
REGARD TO THE FOREGOING ACT OF CONGRESS.

The following letter from Mr. Pinchot, explains the effect of the foregoing Act of Congress :

WASHINGTON, April 22, 1908.

HON. MOSES E. CLAPP,
United States Senate.

My dear Senator:

The joint letter from you and Senator Nelson of April 10 is received. The boundary as embodied in your bill (S. 4186), as it was amended and passed the Senate on April 15, is satisfactory to this service because the advantages to the Minnesota National Forest carried by your bill are worth more to it than the land it loses. Apparently the bill eliminates 69,380.88 acres. This, however, is offset by the following additions:

The Ten Sections,	-	-	6,400	acres
Sugar Point,	-	-	160	"
Pine Point,	-	-	7,000	"
Cooper and other islands in Cass Lake,	-	-	1,119.20	"

In all, - - - 14,679.20 acres

In addition to this, the Indian allotments within the boundary established by your bill approximate 50,000 acres, which under the terms of the bill may be relinquished to the Government for other allotments or for a money consideration. It is possible, therefore, that 64,679.20 acres may be added to the forest, as against 69,380.88 eliminated from it, leaving the forest positively reduced in area by 4,701.68.

It seems to me that the essential things in the bill are that the National Forest is created immediately instead of awaiting the cutting of the merchantable timber, as was necessary under the existing law; the Ten Sections, the islands in Cass Lake, Pine Point and Sugar Point are included within the forest, with the merchantable timber thereon uncut; the Indians are paid such amounts as are due them for their lands and for the timber left standing; the percentage of seed trees reserved is increased from five to ten per cent; the forest is consolidated by making possible the relinquishment or purchase of Indian allotments; and the logging on all Indian allotments not relinquished shall be done in such a manner as not to endanger the rest of the forest. I am very glad that Section 7 was added to protect the Indian graves.

I am hoping that some solution of the State swamp land question will be found which will remove the last difficulty in the way of the successful administration of this National Forest.

Very sincerely yours,

GIFFORD PINCHOT,

Forester.

THE STATE'S POWER TO REGULATE CUTTING OF TREES ON PRIVATE LAND.

Although the question in its application to forestry has not been agitated in Minnesota, it is nevertheless a well established principle of law that the State has the constitutional power—known as its “police” power—to regulate the use of private property so as to promote the public welfare. Under this power the State can prohibit the cutting of small trees by a private owner, where such cutting would injuriously affect the maintenance of natural water supply, or otherwise be prejudicial to the public welfare. This principle of law has lately received fresh support by an opinion of the Supreme Judicial Court of Maine, rendered at the request of the Senate of Maine, and as it will prove instructive to all interested in forestry, I quote it in full.

The request, dated March 27, 1907, of the Senate of Maine for the opinion was as follows:

ORDERED, The Justices of the Supreme Judicial Court are hereby requested to give to the senate, according to the provisions of the constitution in this behalf, their opinion on the following questions, to-wit:

In order to promote the common welfare of the people of Maine by preventing or diminishing injurious droughts and freshets, and by protecting, preserving and maintaining the natural water supply of the springs, streams, ponds and lakes and of the lands, and by preventing or diminishing injurious erosion of the land and the filling up of the rivers, ponds, and lakes, and as an efficient means necessary to this end, has the legislature power under the constitution.

1. By public general law to regulate or restrict the cutting or destruction of small trees growing on wild or uncultivated land by the owner thereof without compensation therefor to such owner;

2. To prohibit, restrict or regulate the wanton, wasteful or unnecessary cutting or destruction of small trees growing on any wild or uncultivated land by the owner thereof, without compensation therefor to such owner, in case such small trees are of equal or greater actual value standing and remaining for their future growth than for immediate cutting, and such trees are not intended or sought to be cut for the purpose of clearing and improving such land for use or occupation in agriculture, mining, quarrying, manufacturing or business or for pleasure purposes or for a building site; or

3. In such manner to regulate or restrict the cutting or destruction of trees growing on wild or uncultivated lands by the owners thereof as to preserve or enhance the value of such lands and trees thereon and protect and promote the interests of such owners and the common welfare of the people;

4. Is such regulation of the control, management or use of private property a taking thereof for public uses for which compensation must be made?

OPINION OF THE COURT.

To the President of the Senate:

The undersigned justices, in obedience to the requirement of the constitution, severally give the following as their advisory opinion upon the questions of law submitted to the justices of the Supreme Judicial Court by the senate order of March 27, 1907:

We find that the legislature has by the constitution "full power to make and establish all reasonable laws and regulations for the defense and benefit of the people of this state, not repugnant to this constitution nor that of the United States." Constitution of Maine, Article IV, Part III, Section 1. It is for the legislature to determine from time to time the occasion and what laws and regulations are necessary or expedient for the defense and benefit of the people; and however inconvenienced, restricted or even damaged particular persons and corporations may be, such general laws and regulations are to be held valid unless there can be pointed out some provision in the state or United States Constitution which clearly prohibits them. Those we understand to be universally accepted principles of constitutional law.

As to the proposed laws and regulations named in the senate order, the only provision of the United States Constitution having any possible application to

such legislation by a state would seem to be that in XIV amendment. As to that provision, we think it sufficient to quote the language of the United States Supreme Court in *Barbier versus Connolly*, 113 United States 27, where, speaking of the XIV amendment, the Court said: "But neither the amendment, broad and comprehensive as it is, nor any other amendment was designed to interfere with the power of a state, sometimes termed its 'police power,' to prescribe regulations to promote the health, peace, morals, education and good order of its people, and to legislate so as to increase the industries of the state, develop its resources and add to its wealth and prosperity." It may be added that the proposed laws and regulations would not discriminate between persons or corporations but only between things and situations, with a classification not merely arbitrary but based on real differences in the nature, situation and condition of things.

We think the only provisions in the state constitution that could be reasonably invoked against the proposed laws and regulations are the guaranteed right of "acquiring, possessing and defending property," and the provision that "private property shall not be taken for public uses without just compensation." Dec. of Rights, Section 1 and 21). If, however, the proposed legislation would not conflict with the latter provision, it evidently would not with the former; hence, only the latter one need be considered.

The question of what constitutes a "taking" of private property in the constitutional sense of the term has been much considered and variously decided. In the earlier cases and in the older states the provision has been construed strictly. In some states, in later cases, it has been construed more widely to include legislation formerly not considered within the provision. Still more recently, however, the tendency seems to go back to the principles enunciated in the earlier cases. In Massachusetts, one of the earliest states to adopt the constitutional provision, and in Maine, adopting the same provision in succession, the courts have uniformly considered that it was to be construed strictly as against the police power of the legislature.

Commonwealth versus Tewkesbury, 11 Met. 55, decided in 1846, was a case where the legislature prohibited the owners from removing "any stones, gravel or sand" from their beaches in Chelsea as necessary for the protection of Boston harbor. The court held that the statute did not operate to "take" property within the meaning of the constitution, but was "a just and legitimate exercise of the power of legislature to regulate and restrain such particular use of property as would be inconsistent with or injurious to the rights of the public." *Commonwealth versus Alger*, 7 Cush. 53, decided in 1851, was a case where the defendant was prohibited by statute from erecting and maintaining a wharf on his own land (flats) beyond certain fixed lines. The court held that the defendant's title to the land (flats) was a fee simple, and that but for statute he would have had full right to erect and maintain wharves upon any part where they would not obstruct navigation. It was not claimed that the proposed wharf would obstruct navigation, but rather admitted that it would not. The court further held, however, that the statute was within the legislative power and not forbidden by any clause in the constitution. The question was considered at length in an opinion by Chief Justice Shaw, and the principle stated as follows:

"We think it a settled principle, growing out of the nature of well ordered civil society, that every holder of property, however absolute and unqualified

may be his title, holds it under the implied liability that his use of it shall be so regulated that it shall not be injurious to the equal enjoyment of others having an equal right to the enjoyment of their property, nor injurious to the rights of the community. All property in this commonwealth, as well as that in the interior as that bordering on tide waters, is derived directly or indirectly from the government and held subject to those general regulations which are necessary for the common good and general welfare. Rights of property, like all other social and conventional rights, are subject to such reasonable limitations in their enjoyment as shall prevent them from being injurious, and to such reasonable restraints and regulations established by law as the legislature, under the governing and controlling power vested in them by the constitution, may think necessary and expedient. This is very different from right of eminent domain," etc.

In the case of *Wadleigh versus Gilman*, 12 Maine 403, decided in 1835, only 15 years after the adoption of our constitution, there was upon the plaintiff's land a wooden building. A city ordinance was passed by legislative authority prohibiting the erection of wooden buildings within certain limits, which included the plaintiff's building. After the passage of the ordinance the plaintiff moved his building to another place within the same inhabited limits. The defendant, as city marshal, acting under the ordinance, entered upon the plaintiff's land, took the building down. The court held the ordinance valid and the defendant protected, and declared as follows: P. 405: "Police regulations may forbid such a use and such modifications of private property as would prove injurious to the citizens generally. This is one of the benefits which men derive from associating in communities. It may sometimes occasion inconvenience to an individual, but he has compensation in participating in the general advantage. Laws of this character are unquestionably within the scope of the legislative power without impairing any constitutional provision. It does not appropriate private property to public uses, but merely regulates its enjoyment."

In *Cushman versus Smith*, 34 Maine 247, decided 15 years later, in an elaborate opinion by Chief Justice Shepley, the court said of the constitutional provision in question (page 258): "The design appears to have been simply to declare that private property shall not be changed to public property, nor transferred from the owners to others for public use without just compensation." In *Jordan versus Woodward*, 40 Maine 317, it was said by the court at page 324: "Strictly speaking, private property can only be said to have been taken for public uses when it has been so appropriated that the public have certain and well defined rights to that use secured, as the right to use the public highway, the turnpike, the ferry, the railroad and the like." The same doctrine was recognized in *Preston versus Drew*, 33 Maine 558; *State versus Gurney*, 37 Maine 156; *Boston & Maine Railroad Company versus County Commissioners*, 79 Maine 386; and as late as 1905 in *State versus Robb*, 100 Maine 180.

There are two reasons of great weight for applying this strict construction of the constitutional provision to property in land: First, such property is not the result of productive labor, but is derived solely from the state itself, the original owner; second, the amount of land being incapable of increase, if the owners of large tracts can waste them at will without state restriction, the state and its people may be helplessly impoverished and one great purpose of government defeated.

Regarding the question submitted, in the light of the doctrine above stated (being that of Maine and Massachusetts at least) we do not think the proposed legislation would operate to "take" private property within the inhibition of the constitution. While it might restrict the owner of wild and uncultivated lands in his use of them, might delay his taking some of the product, might delay his anticipated profits, and even thereby might cause him some loss of profit, it would nevertheless leave him his lands, their product and increase, untouched, and without diminution of title, estate or quantity. He would still have large measure of control and large opportunity to realize values. He might suffer delay, but not deprivation. While the use might be restricted, it would not be appropriated or "taken."

The foregoing considerations lead us to the opinion at present that the proposed legislation for the purposes and with the limitations named in the senate order, would be within the legislative power and would not operate as a taking of private property for which compensation must be made.

Respectfully submitted,

LUCILIUS A. EMERY,
WM. P. WHITEHOUSE,
S. C. STROUT,
HENRY C. PEABODY,
ALBERT M. SPEAR,
LESLIE C. CORNISH.

March 10, 1908.

FORESTRY IN BULGARIA.

Bulgaria, bordering the west coast of the Black Sea and the south bank of the Danube, was in antiquity a part of Thrace. That, in the drama of "The Gladiator," was the native land of Spartacus. Now a slave and gladiator, he had, he says, in boyhood looked from the "cloud-piercing Hoemus" upon a fertile country sloping to the mighty Danube, where "peace was tinkling on the shepherd's bell and singing with the reapers."

Bulgaria, with a population now of over four million, was for five centuries a province of Turkey, but gained its political independence thirty years ago. It has made rapid progress in recent years, and naturally forestry is one of the things that has received favorable attention from its enlightened government.

The total area of the forest in Bulgaria comprises 7,512,000 acres, being 30 per cent of the whole area of the country. Of these, 2,231,000 acres belong to the State, 3,866,000 acres to parishes, 132,000 acres to schools

and 1,283,500 acres to private individuals. Scotch pine and other conifers, including fir (*picea pectinata*) and spruce, are the prevailing kinds of trees.

ADMINISTRATION.

The administration of the forests is by a bureau in the Ministry of Commerce and Agriculture, and consists of a chief, an inspector general of forests and two assistant chiefs. The budget for forests and forestry for the year 1905 was \$150,000. There are six district inspectors, who have received scientific forestry training, 40 foresters who have received forestry training. There is a district inspector for each 1,250,000 acres and a forester for every 190,000 acres. There is a keeper to patrol the forest to every 3,500 acres. There are also many other employes. For the parish forests there is a forester for every 125,000 acres.

These facts are taken from an unusually able and fine volume entitled "Bulgaria of To-day," issued in 1907 by the Bulgarian Ministry of Commerce and Agriculture, and a copy of which was kindly sent to the Commissioner of Forestry of Minnesota by the British Diplomatic Agent and Consul General at Sofia, Sir G. W. Buchanan. The following are the concluding words of the chapter on forests in said volume:

"The improvement of our forests demands enormous sacrifices, but on the other hand a time will come when the revenue from the forests will play an important part in the State budget. The Bulgarian Government, fully aware of its duties and its interests, concentrates its efforts to this end; to make our forests, by the simplest means, in the near future a source of riches, which are so sorely needed by the young State for the completion of its organization."

It is an interesting fact that Bulgaria, in territorial extent, is only half as large as Minnesota.



Showing a part of nursery containing Norway spruce seedlings, from seed sown and covered with brush screens, made under direction of the Minnesota State Forestry Board on the Pillsbury Reserve in Cass County. Evergreen seedlings must be protected from the sun for a few weeks after they come up.



Virgin forest of Norway (red) pine on the U. S. Forest Reserve (Chippewa Reservation). Photographed for the Annual Report of the Chief Fire Warden of Minnesota, July, 1902. (NOTE—The first suggestion that any part of the Chippewa Reservation be held as a public park or forest reserve was by the Chief Fire Warden of Minnesota in August, 1898. See his Fourth Annual Report pages 54 and 55).

FORESTRY

EIGHTH ANNUAL REPORT

OF THE

CHIEF FIRE WARDEN

OF

MINNESOTA.

UNDER THE ACT OF THE LEGISLATURE ENTITLED
"AN ACT TO PROVIDE FOR THE PRESERVATION OF FORESTS OF THIS STATE AND FOR
THE PREVENTION AND SUPPRESSION OF FOREST AND PRAIRIE FIRES,"
APPROVED APRIL 18, 1895, AND AS AMENDED BY
THE ACT OF APRIL 21, 1903.

FOR THE YEAR 1902.

ST. PAUL, MINN.:
PRINTED BY THE PIONEER PRESS COMPANY
1903.

STATE OF MINNESOTA,
OFFICE OF CHIEF FIRE WARDEN, }
ST. PAUL, MAY 1, 1903.

Hon. S. G. Iverson, State Auditor and Forest Commissioner:

SIR: As required by section 3 of the Act for the Preservation of Forests, etc., approved April 18, 1895, amended by the Act of April 21, 1903, I have the honor to submit, herewith, my annual report for the year 1902.

Very respectfully,

C. C. ANDREWS,

Chief Fire Warden.

EIGHTH ANNUAL REPORT
OF THE
CHIEF FIRE WARDEN
OF MINNESOTA.

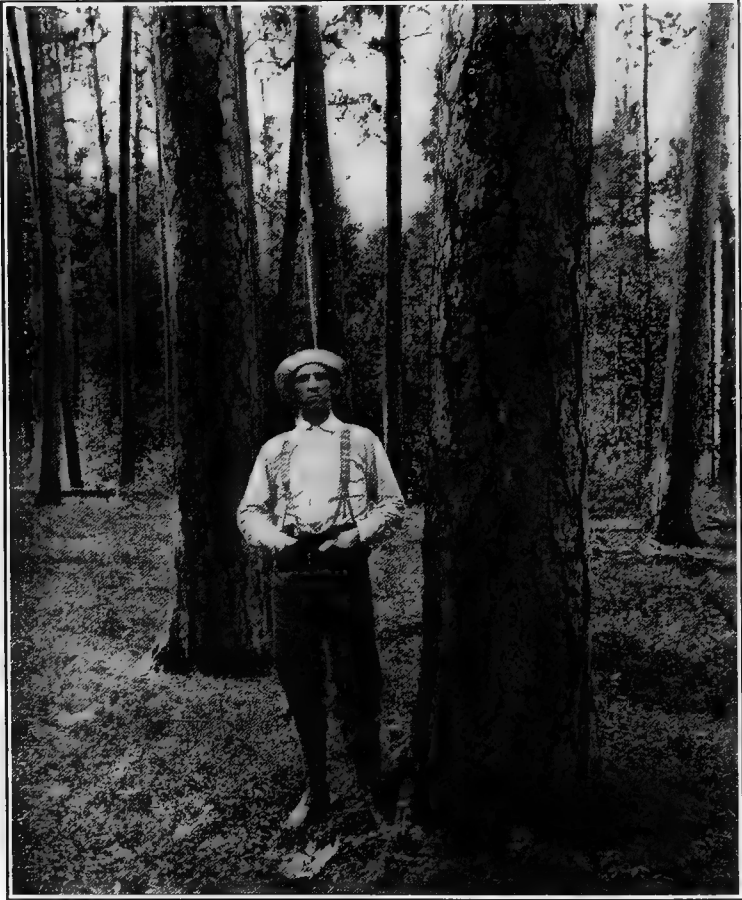
Wet weather in the summer and autumn of 1902 was favorable for the prevention of forest fires, and but few occurred. Dry and dangerous weather, however, prevailed in the northern part of the state in April and May, and most of the fires which were reported occurred in those months. The number of forest fires reported—and mostly on brush and cut-over land—was 34; estimated number of acres burned over, 18,285; damage, \$3,820.

Number of prairie (and field) fires reported, 46; estimated number of acres burned over, 31,928; damage, \$12,318.

Extracts from the reports of fire wardens, printed below, show that in a number of cases serious damage was prevented by the prompt service of fire wardens and their helpers. I believe it can be truly said that each year shows increased attention on the part of fire wardens to their duties. These officers are town supervisors, elected the second Tuesday of March, and many of them each year are new to the work.

SUMMARY OF FOREST AND BRUSH FIRES, 1902.

COUNTY AND TOWN.	Date.	Acres.	Damage.	Cause.
Anoka County— Bethel.....	April 4.....	600	\$50	Unknown.
Becker County— Grand Park.....	Oct. 19.....	200	.....	From White Earth Res.
Holmesville.....	Oct. 9.....	10	15	Unknown.
Beltrami County— Bear Creek.....	Oct. 18.....	640	250	Unknown.
Benton County— Glendorado.....	April 7.....	400	200	Clearing land.
Glendorado.....	April 25.....	40	20	Clearing land.
St. George.....	Oct. 7.....	70	200	Hunters.
Sauk Rapids.....	Oct. 19.....	200	600	R. R. locomotive.
Carlton County— Barnum.....	April 9.....	40	Brush	Unknown.
Cass County— Becker.....	April 18.....	5,000	{ Brush & Weeds.	Unknown.
Chisago County— Branch.....	Mar. 27.....	30	40	R. R. locomotive.
Wyoming.....	Mar. 27.....	20	195	R. R. locomotive.
Crow Wing County— Hubbard County— Nevis.....	April 19.....	1,500	100	Fishermen.
Nevis.....	Oct. 20.....	5	5	Unknown.
Isanti County— North Branch.....	May 5.....	60	10	Tramp.
Oxford.....	Mar. 28.....	400	Slight.	Unknown.
Stanchfield.....	April 18.....	800	Slight.	Clearing land.
Kanabec County— South Fork.....	Mar. 27.....	2,400	500	Clearing land.
Marshall County— Excel.....	Oct. 4.....	800	150	Hunters.
Mille Lacs County— Onamia.....	April 20.....	2,000	None	Unknown.
Morrison County— Pike Creek.....	April 14.....	15	79.60	Burning meadow.
Pine County— Eastern.....	April 19.....	5	None	Clearing land.
Hinckley.....	April 14.....	200	150	Clearing land.
Kettle River.....	April 15.....	160	200	Clearing land.
St. Louis County— Mesaba.....	April 4.....	80	200	Unknown.
Town. 54-20.....	May 18.....	600	15	Unknown.



Mature Norway pine 20 inches in diameter breast high, Big Fork River, 1902.
(By Mr. T. S. Woolsey, Jr.)

SUMMARY OF FOREST AND BRUSH FIRES, 1902—*Continued.*

COUNTY AND TOWN.	Date.	Acres.	Damage.	Cause.
Stearns County—				
Melrose.....	Mar. 15.....	300	100	Burning meadow.
Todd County—				
Birch Lake.....	Mar. 20.....	200	150	Unknown.
Fawn Lake.....	April 7.....	1,200	75	Unknown.
Iona.....	April 18.....	800	200	Unknown.
Little Sauk.....	April 27.....	20	100	Unknown.
Wadena County—				
Rockwood.....	April 8.....	70	15	Unknown.
Wright County—				
Clearwater.....	April 19.....	300	200	Unknown.

Total acres burned over, 18,285. Damage, \$3,820.

Classification of causes:

Clearing land, 8.

Railroad locomotives, 3.

Burning meadows, 2.

Other causes, 5.

Unknown, 16.

REPORT OF FIRE WARDENS AND OTHERS OF FOREST FIRES FOR 1902.

ANOKA COUNTY.

P. W. Jaspersen, chairman, town of Bethel, April 12:

On the 4th instant, about 12 o'clock, a fire started on land occupied by Joseph Cogger; burned over 600 acres of brush and meadow, and destroyed 20 tons of hay. The fire was stopped by a back-fire. Weather dry and windy; had been for about a week.

BECKER COUNTY.

Peter O. Dahl, chairman, town of Grand Park, October 30:

On the 19th instant fire burned over 200 acres of light timber on section 3. It originated in a meadow

on the White Earth Indian Reservation on the 17th instant and was brought into this town by hard wind; was extinguished by three men digging and cutting a break through timber and brush. Weather was very dry and windy; had been so about two months.

BELTRAMI COUNTY.

H. C. Teigland, chairman, town of Bear Creek, October 20:

On the 18th instant a fire, supposed to have been caused by some railroad employe on section 28, burned over about 640 acres of partly timber and partly meadow land. Fire burned white pine logs to the amount of \$200 and hay to the amount of \$50. I do not figure damage on standing timber, as it will be cut this winter. The fire was extinguished by Emil Oleson, fire warden, assisted by five men. The weather had been dry for about six weeks, and the 19th was very windy.

BENTON COUNTY.

Jens P. Anderson, chairman, town of Glendorado, April 22:

On the 7th instant, fire which originated on section 22, burned over 400 acres of timber, brush and meadow land; did damage to the amount of \$200. It was extinguished by back-fires, by digging and using wet sacks. The weather was dry and windy; had been dry for about six weeks.

Same, May 1:

The latter part of April a fire in the northwestern part of the town burned over 40 acres of brush and meadow and destroyed about 11 cords of wood; damage \$20. Weather was dry and windy; had been so for a month.

W. J. Stewart, chairman, town of Granite Ledge, September 23:

About the 18th of September a fire on section 34 started, I suppose, from someone setting an old rotten log on fire. It caught in some other rotten logs and was burning a few places in the ground, and, if it had not been discovered, would after a while have spread and done some damage. It was extinguished by hauling water with teams.

John Wilson, chairman, town of St. George, October 8:

October 7th a fire on section 1 burned over 70 acres of light timber; destroyed 9 tons of hay, a shanty and contents, small stable and some timber. Damage \$200. It was extinguished by back-firing, carrying water and wetting grain sacks and slapping the fire out. It is the general opinion that it was caused by hunters, as the woods are full of them. Three hunters came and assisted in extinguishing the fire. Weather dry and windy; had been for two weeks.

G. S. Reeder, chairman, town of Sauk Rapids, October 21:

On the 19th instant a fire on section 4, which started from the railroad track, or near it, burned over 200 acres of brush and meadow. Damage \$600. The weather was windy; had been for two days.

CARLTON COUNTY.

Thomas Spencer, chairman, town of Barnum, April 25:

April 9th fire on section 11 burned over about 40 acres of brush and field. It was extinguished by nine persons beating it out. There had been no rain this spring previous to the fire.

CASS COUNTY.

George Lewis, chairman, town of Becker, April 28:

A swamp and brush fire burned over a quarter part of the town, destroying old weeds and brush. Controlled by back-firing, plowing and on roads. Everybody assisted. Rain April 22nd stopped the fire. Very dry and windy some of the time; had no rain until now. People here have been clearing land since the middle of March. Have not known anyone to let fire get from their control. A number of fires started on vacant land, but have been stopped without damage, as far as I know.

CHISAGO COUNTY.

Robert Striker, chairman, town of Branch, April 3:

March 27th a fire set by a railroad train on land occupied by C. E. Elmgren, destroyed about 20 cords of cord wood. Damage \$40. It was extinguished in six hours with the help of eight persons throwing sand and water. Weather very dry and windy.

George Kappler, chairman, town of Wyoming, April 3:

On the 27th of March, the weather being dry, with a heavy wind, fire was set in three different places in one mile by the ten o'clock railway train running north. Damage \$195. Fire was extinguished in five hours with the help of thirty-one persons using water and wet sacks.

CROW WING COUNTY.

H. G. Butterfield, Cross Lake, May 12:

On the 25th of April fire, which originated on land occupied by Nels Garden, on section 24, town of Eagle Lake, burned over 120 acres of light timber; destroyed nothing but underbrush. Fire was not hot enough to damage the pines. It was whipped out with branches of green brush. Weather was partially dry, with light winds.

HUBBARD COUNTY.

James K. Deyo, chairman, town of Nevis, May 10:

On the 19th, 20th and 21st of April, a fire which burned over sections 31, 32 and 33, in the town of Nevis, being township 140, range 33, did damage to the amount of \$100. It originated on section 33, being land occupied by Fred White. It started near the bridge on the Crow Wing river at the head of 4th lake. It was extinguished with the help of eight persons by plowing, back-firing and whisking same out; weather very dry and windy. It is supposed to have been started by fishermen. For about three weeks in April, while fish are running in between 4th and 5th lakes in Crow Wing river, hundreds of barrels of fish are taken out, salted and taken home by settlers who come from fifty miles around and camp about the river and fish. Wagon loads of fish are taken by net at one haul. Fire was traced to one of the camps, but no one has been able to locate parties who left the fire burning. Now that the fish have stopped running, there will be no more danger until next spring.

M. Mikel, Fire Warden, town of Nevis, November 10:

On the 20th of October a fire burned over about 5 acres of Jack pine on section 7. Damage \$5. It was extinguished by myself. Weather was dry and windy for four weeks.

ISANTI COUNTY.

A. P. Ledin, chairman, town of North Branch, May 9:

On the 5th instant a fire caused by a tramp, as near as can be found out, burned over 60 acres of brush and meadow; destroyed some hay. Damage \$10. It was extinguished by back-firing and ditching.

C. J. Olson, chairman, town of Oxford, April 3:

March 28th a fire originating on section 16 burned over 400 acres of meadow and light timber and

destroyed open oak, mostly dead and down. Very little damage done. It was extinguished by eight persons by starting cross-fires and using old sacks wet. Weather was dry and windy; had been so about two weeks.

Leonard Groth, chairman, town of Stanchfield, April 23:

On the 18th of April, about 11 A. M., a fire burned over 800 acres of brush and light timber and destroyed a little fencing; damage amounted to very little. Fire was set by a party burning weeds and other combustible material. A strong wind blowing at the time brought the fire into a tamarack swamp overgrown with long grass and it quickly spread to the brush and timber. Weather was very dry and windy, as there has been no rain of note this spring. The fire was extinguished with the help of forty persons by plowing, using wet sacks and back-firing. It had to be watched for three days. The party who caused fire was arrested, plead guilty and paid a fine of \$50.

ITASCA COUNTY.

R. M. Dering, Fire Warden, town of Rippel, on the Big Fork, near Grand Falls, October 19:

There have been no fires in this section of the country this season; none anywhere along the northern part of the state. The swamps are wet and there is no danger of fires doing any damage this fall.

KANABEC COUNTY.

Henry T. Olson, chairman, town of South Fork, April 15:

March 27th a fire burned over 2,400 acres of partly meadow, partly brush and partly heavy timber; mostly hard maple. Did damage to the amount of \$500. As near as I can find out, it was caused by a settler clearing land. It was extinguished by the work of ten



Part of the Forest Reserve, Chippewa Reservation. Photographed by Mr. Herrell for the Annual Report of the Chief Forest Fire Warden of Minnesota, July, 1902.

persons by back-firing around new settlers' houses and along roads with wet sacks. The weather had been dry for twenty days and a heavy gale was blowing from the southwest.

MARSHALL COUNTY.

James Roach, chairman, town of Excel, November 12:

October 4th a fire, which originated on section 11, being vacant land, and supposed to have been started by some boys or hunters, burned over 800 acres of brush and prairie and destroyed 60 tons of hay; damage \$150. Ten persons helped extinguish the fire by plowing, using wet sacks and brooms. Weather was dry for about six weeks before the fire, and windy also.

MILLE LACS COUNTY.

E. W. Cundy, chairman, town of Onamia, April 25:

On the 20th day of April a fire which originated on vacant land on section 33, from cause unknown, burned over about 2,000 acres. No damage. Weather dry and windy. The fire was extinguished in forty-eight hours by rain.

MORRISON COUNTY.

Anton Webber, chairman, town of Pike Creek, April 21:

April 14th a fire, caused by burning meadow, burned over 15 acres of meadow and timber on section 7. Damage \$79.60. It was extinguished in four hours with the help of nine persons with water and brush. Weather dry and windy. Party admitted setting the fire and was prosecuted.

OTTER TAIL COUNTY.

Andrew Johnson, chairman, town of Eastern, April 24:

On the 19th of April a fire on section 12 burned over 4 or 5 acres of brush and stubble. It was extinguished in an hour by two men before any damage was done. Weather dry and windy. Party causing the fire was prosecuted.

ST. LOUIS COUNTY.

Frank Rimmell, chairman, town of Mesaba, April 7:

On the 4th instant a fire caused by unknown parties, possibly by some iron ore prospectors, who are very numerous in this locality at present, burned over 80 acres of light timber and destroyed a small quantity of standing dead timber. Damage \$200. It was extinguished by rain and snow storm on the night of the 5th instant. On Saturday evening I cut down several dry pine trees that were burning, which, together with rain and snow, extinguished the fire.

John Hillman, Fire Warden, unorganized town, 54-20,
July 2:

May 18th a fire on section 19 burned over 600 acres of brush and meadow; destroyed about 40 rods of fence. Damage \$15.

TODD COUNTY.

Paul Oldenburg, chairman, town of Fawn Lake, April 25:

April 7th a fire, which originated on section 5 in the town of Turtle Creek, burned over 1,200 acres in the southwest part of Fawn Lake and, destroyed brush, meadow, light timber, 18 tons of hay and 3 cords of wood. Damage \$75. It was extinguished by plowing, back-firing and using wet sacks. Weather dry and windy; had been dry for two weeks.

On the same day there was a fire on section 17, which destroyed hay to the value of \$25. This fire was extinguished in six hours.

Edward Paulson, chairman, town of Iona, April 23:

April 19th and 20th a fire, which originated on section 26, burned over 800 acres of timber and meadow; destroyed about 15 tons of hay and some cord wood. Damage \$200. Fire was extinguished by plowing and using wet sacks. Weather has been dry all spring, and windy.

WADENA COUNTY.

J. A. Collins, chairman, town of Rockwood, April 19:

April 8th a fire burned over 70 acres of meadow and small timber; destroyed small undergrowth. Damage \$15. The cause of the fire is unknown. It was quite a fire. There was a school house and number of hay stacks in great danger, but by the good services of Chris P. Aarnes, fire warden, and his men, they saved \$500. They did some very good work back-firing and whipping out fire with wet sacks. Weather very windy and dry.

WRIGHT COUNTY.

Peter Nelson, chairman, town of Clearwater, May 1:

On the 19th of April, in the afternoon, a fire, which originated on vacant land on section 25, from cause unknown, burned over 300 acres or more of meadow, heavy and light timber; destroyed hay, wood and standing timber. Damage \$200. It was extinguished with the help of six men. The weather was dry; had been dry for weeks—in fact, months.

SUMMARY OF PRAIRIE, FIELD AND MEADOW FIRES, 1902.

COUNTY AND TOWN.	Date.	Acres.	Damage.	Cause.
Aitkin County— Hazelton.....	Sept. 6.....	40	\$200	Burning brush.
Anoka County— Columbus.....	Mar. 26.....	600	75	Unknown.
Ham Lake.....	Mar. 20.....	1,000	55	Burning meadow.
Ham Lake.....	Mar. 29.....	3,000	150	Burning meadow.
Benton County— Langola.....	Nov 3.....	170	50	R. R. locomotive.
Mayhew.....	April 12.....	40	60	Unknown.
Watab.....	April 2.....	300	None	Burning grass.
Carlton County— Barnum.....	April 2.....	60	80	Burning stubble.
Clay County— Barnesville.....	Sept. 12.....	160	300	Unknown.
Barnesville.....	Sept. 13.....	1,600	1,000	R. R. locomotive.
Barnesville.....	Sept. 28.....	130	300	Unknown.
Felton.....	Sept. 23.....	200	105	R. R. locomotive.

SUMMARY OF PRAIRIE, FIELD AND MEADOW FIRES, 1902—*Cont.*

COUNTY AND TOWN.	Date.	Acres.	Damage.	Cause.
Clay County— <i>Cont.</i>				
Highland Grove.....	Oct. 14.....	240	760	R. R. locomotive.
Riverton.....	Sept. 18.....	100	120	Burning hay stack.
Viding.....	Nov. 23.....	40	50	Lighting cigar.
Chippewa County—				
Woods.....	Oct. 14.....	800	1,500	Burning stubble.
Kittson County—				
Hill.....	Oct. 19.....	2,000	1,200	Unknown.
Lac qui Parle County—				
Manfred.....	April 17.....	1,380	266	Unknown.
Marshall County—				
Agda.....	Oct. 17.....	1,000	11	Unknown.
Comstock.....	Oct. 18.....	2,000	300	Burning grass.
Foldahl.....	Oct. 4.....	250	150	Hunters.
Grand Plain.....	Oct. 22.....	400	300	Hunters.
Grand Plain.....	Nov. 1.....	10	125	Burning hay stack.
Moylan.....	Oct. 21.....	2,500	30	Hunter.
Sennott.....	Sept. 25.....	160	225	Burning straw.
Morrison County—				
Pike Creek.....	Oct. 15.....	200	96	Unknown.
Ottertail County—				
Bluffton.....	Aug. 26.....	6	60	Boys.
Compton.....	April 27.....	350	150	Unknown.
Pine County—				
Rock Creek.....	April 20.....	40	35	Unknown.
Polk County—				
Helgeland.....	Oct. 4.....	400	100	Burning straw.
Kersonville.....	Sept. 24.....	1,200	2,000	R. R. locomotive.
Parnell.....				
Swift County—				
Clontarf.....	April 18.....	3,000	600	Unknown.
Clontarf.....	Oct. 12.....	200	100	R. R. locomotive.
Clontarf.....	Oct.....	400	70	R. R. locomotive.
Wadena County—				
Meadow.....	April 4.....	4,000	100	Unknown.
Wilkin County—				
Akron.....	Sept... ..	80	90	Burning stubble.
Andrea.....	Oct. 21.....	10	25	Unknown.
Andrea.....	Nov. 9.....	800	300	Burning old hay.
Kent.....	Oct. 20.....	2	60	Unknown.
Manston.....	April 17.....	600	75	Unknown.
Meadows.....	Oct. 19.....	1,200	50	Tramps.
Mitchell.....	Sept. 27.....	80	250	Unknown.
Roberts.....	Oct. 6.....	300	50	Burning straw.
Yellow Medicine Co.—				
Florida.....	April 18.....	640	135	R. R. locomotive.
Fortier.....	Sept. 28.....	120	500	Burning straw.
Norman.....	Nov. 21.....	170	50	Travelers.

Total acres burned over, 31,928. Damage, \$12,318.

Classification of causes:

- Burning brush, 1.
- Burning grass or meadow, 4.
- Burning haystacks, 3.
- Burning straw, 4.
- Burning stubble, 3.
- Hunters, 3.
- R. R. locomotives, 8.
- Other causes, 4.
- Unknown, 16.

REPORTS OF FIRE WARDENS OF PRAIRIE, FIELD AND
MEADOW FIRES, 1902.

AITKIN COUNTY.

F. R. Nichols, chairman, town of Hazelton, September 16:

On the 6th of September, 3 P. M., a fire, caused by burning brush on land occupied by Peter Reither, burned over 40 acres of meadow; did damage to the amount of \$200. It is not out yet, but was put under control with the help of seven persons plowing, ditching and hauling water. Weather very dry and windy.

ANOKA COUNTY.

Frank Hoffman, chairman, town of Columbus, April 15:

March 26th, a fire originating on section 16, burned over 600 acres of field, brush and meadow. Damage \$75. It was extinguished in six hours with the help of 15 people, and by plowing. Weather was dry and windy; had been dry for a few weeks.

Charles J. Lundberg, chairman, town of Ham Lake, April 22:

March 20th, a fire burned over sections 22, 23, 24 and part of 26; destroyed 23 tons of hay, and did damage to the amount of \$57. The American Grass Twine Company clears a lot of land and burns the old

grass, and perhaps the fire originated in that way. We set back-fire along a public road and ditch. Weather has been dry all spring.

BENTON COUNTY.

Peter Stodvlka, Fire Warden, town of Langola, November 7:

On the 3rd instant, a fire set on section 1 by the N. P. train, burned over 170 acres. Damage \$50. It was extinguished in four hours by myself, wife and children, by plowing, raking and using wet sacks. The wind was blowing 60 miles an hour, and if the fire had not been extinguished it would have done damage over \$6,000.

G. Golenbeck, chairman, town of Mayhew Lake, May 21:

April 12th, a fire originating on section 22, occupied by Mr. Reimer, burned over 40 acres of meadow and destroyed 20 tons of hay. It went out after reaching the plowed land. Weather had been dry and windy for about three weeks.

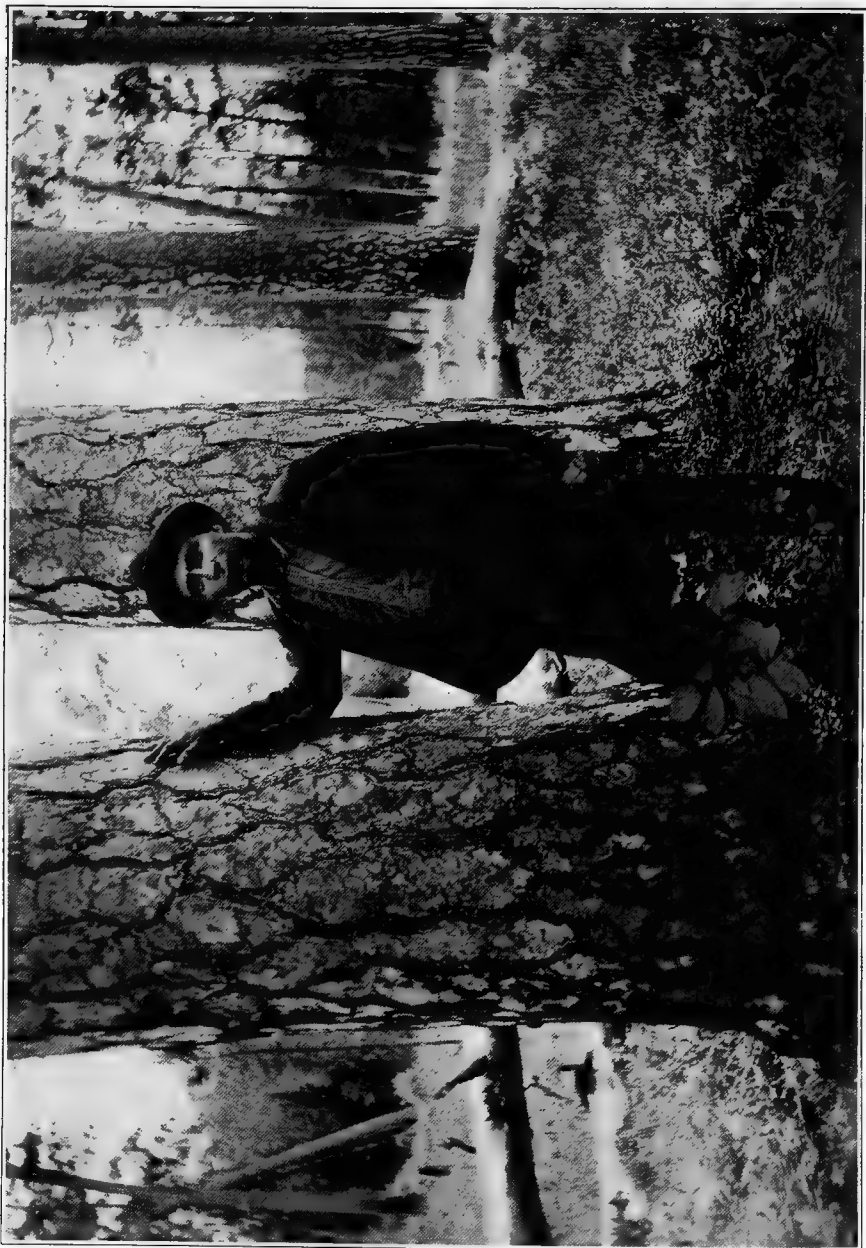
Nels Campbell, chairman, town of Watab, May 1:

April 2d, a fire on section 22, unoccupied, burned over 300 acres of brush and meadow. It burned to the road and plowed fields, and could go no further. It might have burned about 30 tons of hay. Weather had been dry for some time, and very windy.

CARLTON COUNTY.

Thomas Spencer, chairman, town of Barnum, April 15:

On the 4th instant a field fire, caused by burning stubble, burned over several acres and destroyed 16 tons of hay. Damage \$80. The weather had been dry since the snow disappeared.



Sections of Norway pine 30 inches in diameter and 200 years old on the Winnibigoshish reservation. A mixed blood of the Chippewas. Photographed for the Chief Forest Fire Warden of Minnesota, July, 1902.

CHIPPEWA COUNTY.

J. D. Beninga, chairman, town of Woods, October 15:

On the 14th instant a fire, caused by burning stubble with a fire-break of only two furrows and, a strong wind blowing from the southwest, burned over 800 acres of field and prairie; destroyed hay, grain and one building. Damage \$1,500. About 20 persons helped control the fire by plowing fire-breaks in fields.

CLAY COUNTY.

R. Sieber, chairman, town of Barnesville, September 17:

On the 13th of September, a fire set on vacant land on section 9, by locomotive of Great Northern Railway Company, burned over 1,600 acres of prairie land, and destroyed a large amount of hay. Damage \$1,000. It was extinguished by plowing ahead of fire. Weather dry and windy.

Same, October 2:

September 12, a fire burned over 160 acres on sections 15 and 16, and destroyed hay stacks. Damage about \$300. It was extinguished by using wet sacks. Weather dry and windy.

Same, October 2:

September 28th, a fire burned over 200 acres on section 19. Damage \$300. Was controlled by plowing. The weather was dry and windy.

Thomas Barry, chairman, town of Felton, September 25:

September 23d, a fire, caused by a railroad locomotive, burned over 200 acres on section 4, and destroyed 35 tons of hay. Damage \$105. It was extinguished in six hours by plowing and using wet sacks. Weather had been windy for about four days.

C. J. Cederberg, chairman, town of Highland Grove,
October 18;

On the 14th of October, about noon, a fire, caused by sparks from an N. P. railroad locomotive, burned over

240 acres on sections 17 and 21; destroyed 190 tons of hay. Damage \$760. The same locomotive set fire four times through our town at the same time. It was extinguished in five hours with the help of forty persons by plowing, shoveling and whipping with wet sacks. Weather had been dry for three weeks.

Edward Weaver, chairman, town of Riverton, September 20:

September 18th, at 2 P. M., a fire, supposed to be set by a man unknown to me, by burning an old hay stack bottom, burned over 100 acres of meadow on section 17; destroyed seven stacks of hay. Damage \$120. It was extinguished in four hours by plowing. Weather dry for two weeks; wind south.

R. O. Stevenson, chairman, town of Viding, November 28:

On the 23d of November, a fire, supposed to have been caused by persons lighting cigars, burned over 40 acres of prairie land; destroyed about 10 tons of hay, stacked. Damage \$50. Was whipped out with wet sacks by seven persons.

KITTSOON COUNTY.

J. J. Bienek, chairman, town of Hill, October 26:

October 19th, in the morning, a fire that came from St. Vincent township, burned over 2,000 acres in the northeastern part of this town; destroyed hay and buildings. Damage \$120. There was quite a crowd fighting the fire, but on account of illness I was not there. Weather has been both dry and windy the whole season.

LAC QUI PARLE COUNTY.

Charles Roske, chairman, town of Manfred, April 20:

On the 17th of April, about 2 P. M., a fire, which originated on section 21, being land occupied by Anton Smith, burned over about 1,380 acres of prairie land; destroyed two stacks of hay, three bridges and one barn.

Damage \$266. Three persons assisted in controlling the fire by plowing and whipping it out. Weather was dry and windy and has been nearly all spring.

MARSHALL COUNTY.

G. Gunderson, chairman, town of Agder, December 13:

October 17th a fire, which originated on section 9, vacant land, burned over 1,000 acres of meadow. Damage \$11. The fire was pounded out with wet rags, eleven persons helping.

J. M. Laeslie, chairman, town of Comstock, October 24:

October 18th a fire burned over sections 4, 5, 8, 9 and 10. Did damage to the amount of \$480. The parties causing fire were prosecuted. The fire was extinguished mostly by plowing. Weather had been dry for four weeks.

Otto S. Haug, fire warden, town of Foldahl, October 10:

October 4th a fire, supposed to have been caused by chicken hunters, burned over 250 acres in the southwest part of the town; destroyed 6 stacks of hay. Damage \$150. It was extinguished by plowing and using brush brooms and water. Weather very dry and windy.

Henry Roller, fire warden, town of Grand Plain, November 2:

October 22nd a fire caused by hunters burned over 400 acres of prairie; destroyed 40 tons of hay and one house with 40 bushels of grain. Damage \$300. It was extinguished by rain. The weather was dry and windy most of summer.

Same, November 2:

On the 1st instant a fire, caused by burning old hay, spread over 10 acres of field; destroyed one barn and 30 tons of hay. Damage \$125. It was extinguished by plowing.

A. D. Brown, fire warden, town of Moylan, October 23:

October 21st a fire, supposed to have been caused by a boy hunting, burned over 2,500 acres of meadow, prairie and light timber; destroyed 3 or 4 tons of hay and part of corduroy on county road. Damage \$30. It was extinguished with the help of thirty persons plowing fire breaks, back-firing and whipping out with brush and wet sacks. Weather dry and windy; had been dry for two months.

August Lundin, chairman, town of Sinnott, Sept. 27:

On the 25th of September, a fire, caused by burning straw on land occupied by E. Johnson, burned over 100 acres; destroyed a house and barn. Damage \$225. It was controlled by plowing. The weather had been dry for three weeks and windy.

MORRISON COUNTY.

Anton Webber, chairman, town of Pike Creek, Oct. 21:

On the 15th instant, a fire which originated on vacant land in section 27, from cause unknown, burned over 200 acres of timber and meadow; destroyed 4 cords of hard wood and 24 tons of hay; damage \$96. Extinguished by hauling water and using wet sacks. Weather dry and windy; had been dry for two or three weeks.

OTTER TAIL COUNTY.

J. C. Johnson, chairman, town of Bluffton, September 4:

August 6th, a fire on section 27, land occupied by Mr. Noehle, burned over 6 acres of field and destroyed 200 bushels of oats; damage \$60. Controlled in one hour by plowing around it. It looks as if some boys had set the fire. I have inquired, but do not think I can get evidence enough to convict. Weather was very dry but not windy; have not had any rain for two months.

Addison Petrie, chairman, town of Compton, May 8:

April 27th, a fire which started on section 5, being land occupied by Mr. Newell, burned over 300 to 400 acres of meadow, brush and light timber; destroyed 4 tons of hay. It also burned the grove around J. R. Dennison's house—he was away. Hired one man to watch house at night. Weather dry and windy although it had rained two days before.

PINE COUNTY.

F. P. Dey, chairman, town of Rock Creek, April 26:

April 20th, a fire on section 30 burned over 40 acres of meadow and destroyed 50 tons of hay; damage \$35. Think it was started by some boys. It was extinguished in twelve hours by the work of fifteen persons plowing, back-firing and with water. Weather dry and windy; had been dry thirty days.

POLK COUNTY.

Christian Anderson, chairman, town of Helgeland, October 13:

October 4th, a fire in the northwestern part of the town burned over 500 acres, and destroyed 25 tons of hay in the stack. Damage \$100. It was extinguished by fighting with wet rags, and by plowing. Weather dry and windy; had been dry for a week or more.

Pierre La Rochelle, chairman, town of Kersonville, Oct. 20:

On the 24th of September a fire, which started on section 31, by an N. P. railroad locomotive, burned over 1,200 acres of prairie and field; destroyed hay and grain. Did damage to the amount of \$2,000. It was extinguished with the help of six persons, by plowing furrows in front of it. Weather dry and windy.

John W. Ralston, clerk, town of Parnell, October 24.

On the 6th instant, a fire swept the country for several miles around, many farmers losing their hay and grain. Myself and family labored hard in fighting the fire. I

suffered loss of about \$300. Fire is supposed to have been set by the section men employed by the Great Northern Railway Company.

SWIFT COUNTY.

M. F. Wagner, chairman, town of Clontarf, April 28:

On the 18th of April a fire, which originated on section 11, burned over 3,000 acres of wild meadow, and destroyed 200 tons of wild hay; damage \$600. Cause unknown. It was extinguished in five hours by the work of 13 men and two teams. Weather very dry, with strong wind from north.

Bert Anderson, chairman, town of Clontarf, February 23, 1903:

On the 12th of October a fire, originating on section 26, caused by sparks from a railroad locomotive, burned over about 200 acres; destroyed hay and straw stacks. Did damage to the amount of \$100. Weather very dry and windy; had been dry for some time. Fire was extinguished by the work of 15 persons—some with teams and plows, others with sacks and shovels, to pound it out. Same, March 5, 1903:

In the latter part of October a fire, which started from the east side of the railroad track, just as the train passed by, burned over 400 acres, and destroyed hay and straw stacks to the value of \$70.

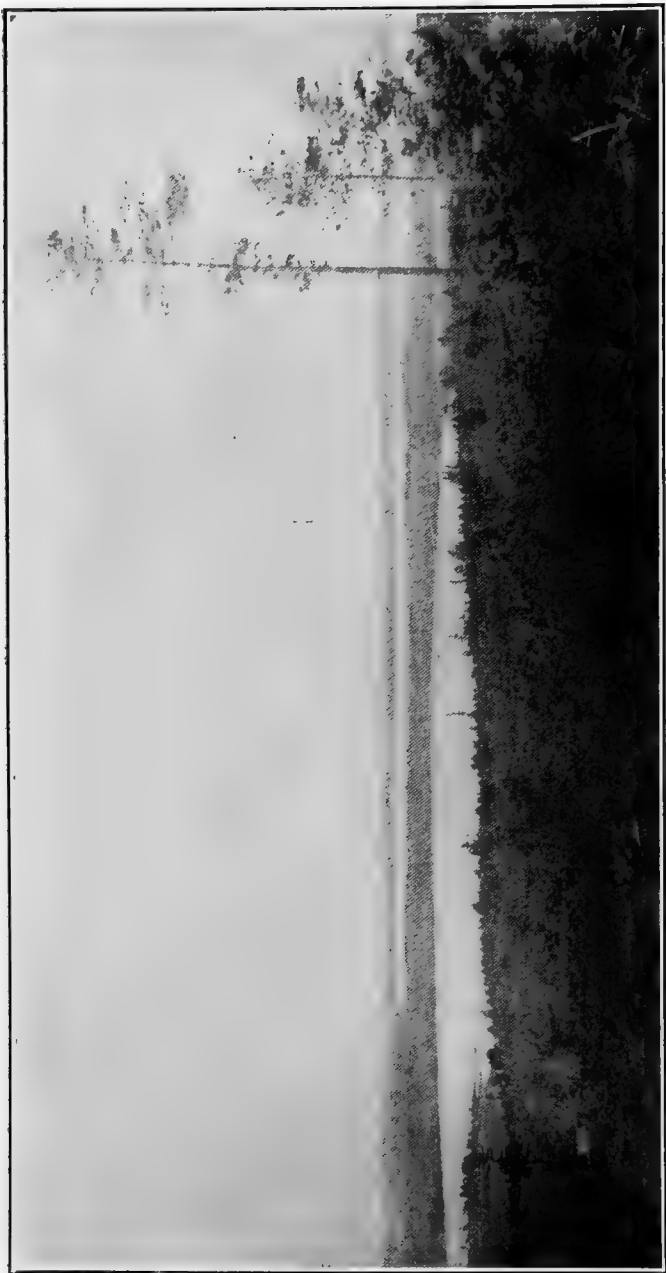
WADENA COUNTY.

J. B. Kelly, chairman, town of Aldrich, November 3:

On the 30th of October a fire, caused by a railroad train, burned over 12 acres of meadow and brush, but did no damage. Seven persons extinguished it with plows and shovels.

Charles Harmes, chairman, town of Meadow, April 12:

April 4th, a fire, which started at night and ran the next day, burned over south half of town; destroyed 30



View from high point showing Agate and Gull Lakes on land in Cass county donated by the late ex-Gov. John S. Pillsbury to the state of Minnesota for forestry purposes.

tons of hay. It was set by parties unknown; supposed to be set by someone passing along the town line road. The owners of the hay burned would not help put out the fire; said the hay was not worth it, and as the rest of us had all we wanted to do guarding our own, we had to let it burn itself out. It went out after it struck high ground. Weather dry and windy.

WILKIN COUNTY.

Emil E. Brown, chairman, town of Akron, November 3:

Sometime in September, a fire caused by burning stubble on land occupied by Anton Kyone, burned over about 80 acres and did damage to the amount of \$50. Weather had been dry about a month. The fire was extinguished by plowing and with wet sacks.

Ralph Murphy, chairman, town of Andrea, October 31:

October 31st, a fire on section 11 burned over 10 acres of meadow; destroyed one threshing machine belt and damaged separator. The machine was left on said ground at twelve o'clock previous to the fire. It is supposed fire was in separator when left. It was extinguished with the help of three persons by plowing and whipping with wet sacks. Weather was dry but very little wind at the time.

Same, November 14:

On the 9th of November, a fire, originating on section 1 by burning old hay, burned over 800 acres of meadow and destroyed about 15 tons of hay; damage \$300. The party was prosecuted for causing the fire and settled for damage.

C. Longevin, chairman, town of Kent, October 24:

October 20th a fire on section 11 burned over 2 acres of field and did damage to the amount of from \$50 to \$75. It was whipped out with wet sacks by three persons.

L. Lomsdalen, chairman, town of Manston, April 17:

April 8th a fire in the evening burned over about a section of land and destroyed a bridge; damage \$75.

Frank Sorenson, chairman, town of Meadows, October 31:

October 19th about four o'clock P. M. a fire, originating on section 33, being land occupied by Geo. Demoret, burned over 1,200 acres wild prairie and destroyed 50 tons of old hay that had been standing in water all summer; damage \$50. As near as I can find out it was caused by two tramps who were traveling across the prairie smoking. Two threshing crews helped extinguish the fire by plowing furrows and setting back-fires. There was only a little breeze; it had been dry for two days.

G. J. Czichotzki, chairman, town of Mitchell, October 20:

On the 27th of September between twelve and one (I cannot find out how the fire was caused) a fire burned over 80 acres and destroyed 200 bushels of wheat and about 600 bushels of oats. The fire was extinguished with plows and shovels. Weather still and dry.

M. Waybel, chairman, town of Roberts, October 22:

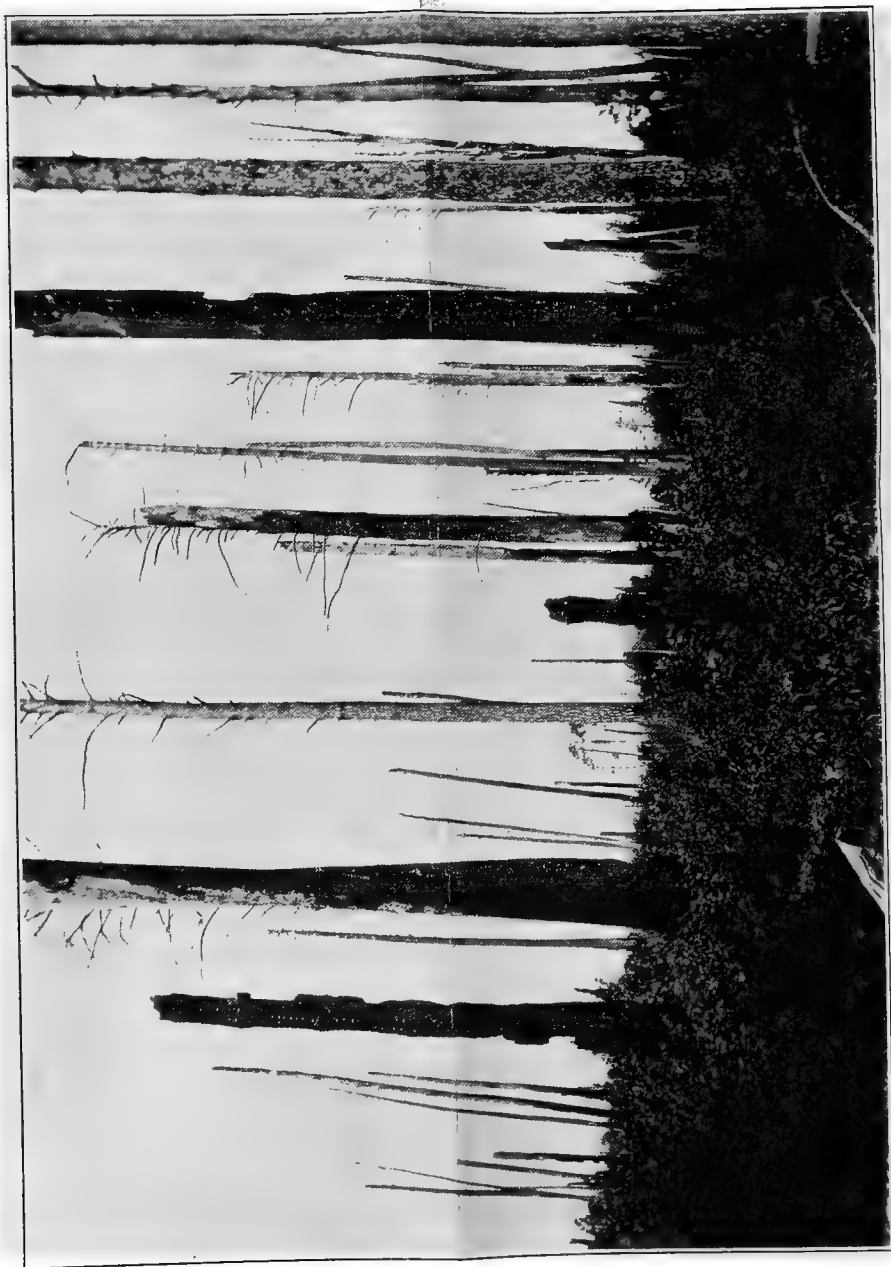
October 6th at two P. M. a fire, originating from burning straw stacks on section 1, burned over about 300 acres and destroyed some flax; damage \$50. It was extinguished in three hours by eight persons with wet rags and shovels and two men with four horses each on two gang plows. Weather very dry and windy for the last six weeks.

YELLOW MEDICINE COUNTY.

Chresten Olsen, chairman, town of Florida, April 21:

April 18th a fire, caused by sparks from a railroad locomotive, burned over 640 acres of field and prairie land and did damage to the amount of \$135. Weather was dry and windy; had been dry for two months.

B. H. Melby, chairman, town of Fortier, September 29:



Ruin wrought by fire in a once splendid pine forest on the Winnibigoshish Indian Reservation. Photographed for the Annual Report of the Chief Forest Fire Warden, July, 1902.

September 28th at one P. M. a fire, originating on section 33, occupied by M. Victor, and caused by burning a straw stack the previous day, spread over 120 acres of stubble and prairie; destroyed 15 stacks of grain. Damage \$500. The fire was extinguished in two hours by plowing and pounding with sacks. Weather dry for one day. Party who set the fire is willing and able to settle for the whole loss.

E. O. Helgemo, chairman, town of Norman, Nov. 24:

On the 21st instant a fire on section 7, caused by some party driving in lumber wagon (we have been tracing the track but have not found the party yet) burned over 170 acres of prairie and meadow and destroyed 50 tons of hay; damage \$50. It was extinguished in four hours by fifteen persons; by using breaking plow and furrow, where we could, and wet rags.

THE BARBARISM OF FOREST FIRES.

The forest fires that have occurred in this state in the last eight years have generally done more damage by burning hay, and wood that would be valuable for fuel, than in the destruction of timber. Such fires often run for many miles, following meadows, and there have been many cases where all forage of the poor settler has been destroyed, making it necessary for such settler to dispose of his only cow, the means of sustenance for his children through winter. Not unfrequently all the members of the family have to turn out and work with all their might to save their humble home from the flames. The prevalence of fires, at night especially, are a source of great terror to families in scattered settlements thus exposed. To see a mother flying with her children from such a danger is pathetic. The most dangerous fires are caused by the inexcusably negligent habit of setting fire to clear land in dry and dangerous weather and let-

ting the fire run. Every respectable citizen, or man of good conscience, would refrain from setting fire in extremely dry weather; or if he set fire, he would first pile his brush and dig or carefully make a break around it to absolutely prevent the fire from spreading. To set fire and let it run wild and do, nobody knows how much, injury to other people, is a lazy and half-civilized practice.

Great forest fires in the Northwest have been caused by just such negligence.

In October, 1871, such a fire devastated 400 square miles of territory in Wisconsin by wiping out several villages, including Peshtigo, causing the loss of a thousand lives, the destitution of 3,000 people and damage of \$3,000,000.

Another such fire as that was in the southeastern part of Michigan, September, 1881, which ran over 48 townships, and in which 138 people perished and over \$2,000,000 worth of property was destroyed.

The Hinckley fire in Minnesota originated about three miles southwest of Brook Park, Pine county, Minnesota, and was burning slowly for several days before September 1st, the day of the great calamity, when 418 people perished. The material loss, but not including timber, which the people sustained, amounted to \$750,000. The relief furnished to the sufferers, nearly all from private contributions, amounted to \$184,744.

It is a striking fact that the present penalty against negligence in causing fires, which is now in force, formed a part of the law at the time of the Hinckley fire, but there were no officers specially designated at that time to have it enforced. I believe that if the present fire warden system had been in operation in 1894 the Hinckley fire would not have occurred.

Strange as it may seem, there are some people who appear to think that the state should take no precautions for preventing forest fires. Why, the state itself owns

neatly 3,000,000 acres of school and state institution lands, scattered principally in the forest regions, on which is much valuable timber, and for the protection of its own property could afford to spend ten times as much as it now spends for the prevention of forest fires. It is the duty of the state to prevent forest fires, if only to preserve its scenery and landscape. These are things which belong to the public.

The cities and villages in Minnesota spend in the aggregate \$2,000,000 a year to prevent and control fires.

The prevalence of forest fires in the state is an indication of disregard of law, of negligence, of poor administration and of a low state of morals. They cast a blemish on the state's reputation for good government and civilization. They tend to lower its standing before the rest of the country. The taking of precautions to prevent fires, such as the posting of warning notices, the warning of the careless and the prompt prosecution of those who violate the law, also the diffusion of information of the principles of forestry and the value of the forests, will gradually tend to do away with the evil of forest fires and make them of as rare occurrence in this state as they are in the civilized countries of Europe.

NEW YORK'S SYSTEM.

The State of New York in 1885 made town supervisors fire wardens, and that system was in use for twelve years, when the practice was adopted which is still in force of appointing a fire warden for each town in the sixteen counties containing land belonging to the "Forest Preserve." The charge for fire warden service is paid by the town in which the service is rendered. The state then pays one-half. New York has a Chief Fire Warden, also a State Superintendent of Forests. During the dry season of 1899 the number of acres burned over in that state was 79,000, damage \$86,893; and the amount paid to fire wardens and their helpers was \$41,659.

PENNSYLVANIA'S SYSTEM.

In Pennsylvania the constables are made fire wardens. The towns there first pay the expense and the state pays one-half. There is a Forestry Commissioner and a Forestry Reservation Commission, of which the Forestry Commissioner is President, that is authorized to purchase any suitable land for forest preservation at not exceeding \$5 per acre.

Some other states have constituted town supervisors fire wardens, but, not having an official to supervise the work, the systems have been practically in abeyance.

MINNESOTA'S SYSTEM.

Our Minnesota system makes town supervisors fire wardens. Such officers are generally men of some influence in their town. They travel through the town on town business, and, although by the annual elections they are frequently changed, yet the system is better than we could expect unless the state paid for fire warden service much more than it now does.

Under the present law our fire wardens must post warning notices, take precautions to prevent fires, which naturally includes the warning of people likely to be careless; when a fire occurs to call help—every able-bodied male eighteen years of age and upward is liable to be called—and extinguish it. Fire wardens are paid \$2 a day for services when rendered but for not exceeding fifteen days in the year.

The county commissioners have to audit fire warden accounts. The county pays for the service and the state, by the law as now amended, repays the county two-thirds of the amount. Some counties have heretofore been backward in paying fire wardens for their services, but it is believed it will lead to more certainty of pay for the state to pay two-thirds of the expense. Efficient service cannot be expected where there is no pay.

People will turn out without pay to protect their near neighbors' property, but they will not go off some miles distant to put out a fire which does not threaten present danger.

A MORE EFFICIENT SYSTEM.

Let anyone assume for a moment that he is going to undertake the work of preventing and controlling forest and prairie fires. What would be his plan? What the most effective and at the same time the most economical system? Would he not think that the best plan would be to find in each town a good, energetic man who would attend to the work in his town? What would he have to pay such a man? Such a man would have to make it for the interest of two or three other good men in distant parts of the town to watch and report to him in dangerous seasons, and he would have to pay them a little. In case citizens were called to help extinguish a fire, they would be paid as is the case at present. Now, assume that the best plan would be to employ one good, energetic man for the service in each town, how much would we have to pay him a year to secure his faithful service? Would we expect to get him for less than \$50 a year? Well, there are six hundred townships in this state requiring and receiving fire warden service. The annual expense therefore of employing a good, efficient man in each town at \$50 a year would amount to \$30,000 annually, without counting the pay of citizens who turn out and help extinguish fires. There is the cost of what one might call an efficient system.

Under the present system of making supervisors fire wardens, and which was adopted on grounds of economy, the present cost of fire warden service does not average \$10 in each town annually. And here is the point which deserves attention—the present fire wardens receive so little pay that it throws so much the more work upon the

chief fire warden to inspire them with interest and zeal and keep them on the alert.

DIFFICULTIES THAT ARE MET WITH.

Remember the great extent of territory—about 30,000,000 acres—that our fire warden system has to protect; a country containing hundreds of logging camps, thousands of new settlers clearing land, land and timber seekers, mineral prospectors, campers, hunters and tourists, all in large numbers; a country full of activity and attended with great danger in respect to fires. These are facts to be considered when judging of the efficiency of the fire warden system.

Remember, too, how many there are in this region who are naturally hostile to any such system, and who themselves, and by their mouthpieces, slur and belittle it. This class of people embraces those professional hunters who are mean enough, in a dry and dangerous season, to set fires in the woods in order to make pasture for deer; also men who make a living by stealing timber. Such men naturally do not want any agents of the law around.

Also, there are multitudes of well-meaning settlers, who, not thinking of the future and of their own best interests, wish an indiscriminate removal of all the woods in their locality.

DUTIES OF THE CHIEF FIRE WARDEN.

What are the duties of the supervising officer, who, under our system, is entitled the Chief Fire Warden? In the first place, he is practically a Forest Commissioner. He is required by law to investigate the extent of forests in the state, the amounts and variety of timber growing therein, the methods used to promote regrowth of timber, and other important facts relating to forest interests. Such information and his suggestions are to be included in his annual report. He must be a man well informed in the science of forestry.



On the U. S. Forest Reserve. Pure and ideally close stand of young Norway pine on the Winnibigoshish Chippewa reservation. Photographed July, 1902, for the Annual Report of the Chief Fire Warden of Minnesota.

He has authority to mass the whole fire warden force of the state at any necessary point of danger. He is intrusted with the expenditure of the emergency fund of \$5,000 in a dangerous season. An officer with this authority should not be a cheap man.

This officer appoints fire wardens in unorganized territory. He instructs the local fire wardens as to their duties. He must inspire them with interest to perform their duties faithfully. The principal object of the law is *prevention*—to have precautions taken against fires; and the local fire wardens, during the dangerous seasons, must be kept on the alert to guard against fires; otherwise the system would have very little value. The supervising officer is just as responsible for the efficiency of the fire warden service as a colonel is responsible for the behavior of his regiment in action.

RESULTS.

Since the Minnesota fire warden system went into effect there have been forest fires in each of our neighboring states, Michigan, Wisconsin and South Dakota, that have done damage exceeding a million dollars. Of course there have been some fires in this state, but there have been no such fires as occurred in the above mentioned states. There is a hundred million dollars worth of forest still standing in Minnesota which has not been injured by fire, and besides, many thousand acres of young and growing forest which have not been injured by fire. These facts speak for themselves. Still, the service is not as effective as it ought to be made, for it is a work of educating the public living in the vicinity of woods to the exercise of proper care.

FIRE WARDEN SYSTEM STRENGTHENED BY THE LAST LEGISLATURE.

The legislature which has just closed strengthened the fire warden law of 1895 by the following twelve

amendments, in the act approved April 21, 1903. By these amendments—

It is made the duty of each fire warden to patrol his district in a dry season, or, under the direction of the Chief Fire Warden, to employ one or more patrols.

To warn against careless use of fire any person he thinks is likely to be negligent therein.

Any fire warden who knows or has information of facts and circumstances which he believes can be established, and which if so proven would show beyond reasonable doubt that any person has caused a fire in violation of this act, shall immediately go before a justice of the peace and make complaint thereof.

Chairmen of town boards, without delay, to inquire into cause of forest or prairie fires and immediately report same to Chief Fire Warden.

Fire wardens shall promptly comply with the instructions of the Chief Fire Warden.

Where local authorities neglect to duly prosecute violations of this act, the Chief Fire Warden shall be authorized to ferret out and prosecute such violations, and his expenses therefor, not exceeding one thousand (\$1,000) dollars in any one year, shall be paid out of the general revenue on approval of the State Auditor and Attorney General.

Use of a team when required in making a break to control or extinguish a fire, may be paid for.

Two-thirds of expense by counties for fire protection services to be paid by the state and one-third by the county.

Verification of accounts can be made before any officer qualified to administer oaths, or before any fire warden or town clerk.

Any account of services under this act which the county commissioners shall fail to audit within ninety days succeeding the second meeting of the board after the same

shall have been presented shall be deemed to have been rejected, and the claimant may then appeal to the district court or to the Chief Fire Warden, and the decision of either shall be final.

Helpers to be paid for not exceeding ten days' service in any one year.

The limitations "five" days posting notices and "ten" days preventing and extinguishing fires are stricken out; and fire wardens may be paid for fifteen days' service if rendered. The bill, as introduced, did not change the Chief Fire Warden's salary, but the committees recommended an increase from \$1,200 to \$1,600, which was agreed to by the House. It was, however, stricken out by the Senate.

APPROPRIATION.

For each of the first two years that the fire warden law was in operation, the legislature, under the head "For Forest Preservation," appropriated \$6,000, which was to cover the one-third of expense the state paid to counties, and the salary, printing and other expenses of the Chief Fire Warden. Since then the appropriation for each year for those purposes has been only \$5,000. The legislature appropriated no more for each of the two ensuing fiscal years, although the state will have to pay an additional third of county expenses. It will be necessary, therefore, to keep expenses as low as possible.

FOREST SOUTHEAST OF RED LAKE.

Three hundred miles northwest of the Twin Cities and in a region covering twenty townships east and southeast of Red Lake is one of the largest and richest forests of original white pine remaining in Minnesota. Starting in the latter part of September last from the village of Black Duck and going east to within about ten miles of the Big Fork river, thence north, I made a circuit of sixty miles through this forest, passing through eight townships and the settlements of Island Lake, Phena, Mizpah and

Bridgie. The surface of the country is moderately undulating. The pine is mixed with spruce, balsam, white and yellow birch, poplar and maple, with intervening swamps of cedar and tamarack. There are occasional pure stands of white and of Norway (or red) pine, but generally the pine is mixed with large leaved trees. The soil is a black sandy loam with a subsoil of yellow clay and gravel, and will all be good for agriculture and sustain a large population.

As indicating the richness of this forest, some quarter sections (160 acres) are known to contain 2,000,000 feet board measure of pine, and worth \$12,000. Generally the white pine trees are of medium size, but there are some which singly will yield 5,000 feet of lumber. The United States has parted with its title to practically all of this splendid forest, mostly under the homestead law, partly by sale, under the stone and timber act, at \$2.50 per acre, and by the location of scrip. (I have elsewhere discussed these ways in which Congress allows the United States pine lands to be disposed of.) The pine is mostly in the possession of lumber companies and will be cut and removed, if times continue prosperous, within the next eight years. It is safe to say that the value of this pine as it stands is \$12,000,000. Some of it will be floated down streams into Red Lake, thence into the Red River valley and the Dakotas; but the most of it will reach a market over the Minnesota & International Railway, the rails of which are laid ten miles beyond Black Duck, and which is heading for the Big Falls of the Big Fork river. Branch logging railroads are being built from this road through the forest.

Considering the newness of the settlements, it is perhaps surprising that the roads are as good as they are. They can be traveled except in an unusually wet spell, but the stumps and roots left in the roadway make it impossible for a team to go faster than a walk, and there

is need of almost constant winding out and around to avoid bad places. Itasca county has lately appropriated \$1,500 to be divided equally among five new towns for road building, namely Bartlett, Bridgie, Cormorant, Fairview and Island Lake.

ALONG THE IRON RANGE.

In October last I went from Virginia north sixteen miles through hilly forest of principally pine and cedar on the new Duluth, Virginia & Rainy Lake Railroad and within eight miles of the Little Fork river whose valley, like those of the Big Fork and Rat rivers, contains a great deal of public agricultural land that is being rapidly settled, and which still affords golden opportunities for actual homestead settlers.

This new railroad, which is reaching out about one hundred miles to Rainy Lake at Koochiching, and being built by experienced railroad men, will tap eight million dollars worth of standing pine, a good agricultural area beyond, and make a new and important route for wheat from the Winnipeg region to Duluth. It will also increase the value of much land owned by the State of Minnesota.

During eight years I have annually or oftener visited some of the mining cities and villages on the Iron Range, of which there are about a dozen, and apparently they never were more prosperous than to-day. I stopped at four of these on this trip, and was impressed by the steadiness of their growth, their clean streets and the neatness and comfort of the workingmen's homes. To see these thriving young towns—with their mile or two distant border of autumn colored woods—connected with a network of busy railroads, in some instances with good carriage roads, with fine school houses and swarms of well behaved and handsome children, where but a few years ago was a dense wilderness, impresses one with the greatness of his state.

PLATFORM OF THE FRIENDS OF FORESTRY IN MINNESOTA.

Beginning about a century ago the Indians in Minnesota parted with their possessory title to the pine lands to the United States at a low figure. The United States took no pains to ascertain the location, quantity and value of the timber, but from time to time offered it at public sale, with the regulation that after the public sale had continued for so many days the lands unsold could then be purchased at "private entry" at \$1.25 per acre. This looked well on paper, but as a rule purchasers waited till the public sale was over, and then, at \$1.25 per acre, bought lands worth anywhere from \$10 to \$75 or even more per acre.

This system was discontinued about forty years ago, since which time pine lands have been obtained of the United States through the location of scrip; soldiers' additional homesteads (devised not for the benefit of the soldier, but for the benefit of the timber grabber), the homestead law, and the stone and timber act—all and each of which have been but a system of plunder.

The value of the standing pine timber in Minnesota which in the past fifty years has passed from the United States into the possession of private parties has probably not been less than \$200,000,000. Of this a few million dollars worth, originally granted to the state, was given to railroad companies to aid in the construction of their roads.

The records of the U. S. General Land Office, Washington, show that beginning with the year 1849 and up to October, 1897, all that the United States had received for public lands in Minnesota, timber, agricultural or of whatever character, amounted exactly to \$7,286,599.40.

If there are any people who have profited or who in the future hope to profit from plundering the United States of pine lands, or who are the mouthpieces of



Proposed Lake Superior Forest Reserve. Cook and Lake counties together have 2,228,000 acres of land exclusive of water. The forest reserve will occupy only about one-fifth of this area; and consisting of natural forest and mostly third and fourth rate soil. Drawn and engraved for the Annual Report of the Chief Fire Warden of Minnesota.

such people, their influence as opponents of forestry should not have much weight.

At the highest figure, there remains standing in the forests of Minnesota, thirty billion feet of merchantable pine timber, and of the value of \$120,000,000. The most of it is in the hands of private parties, is mature, and will and should be cut as fast as a good market for it can be found; and which will be accomplished in about fifteen years. The most of it will be shipped out of the state. Mature timber is that which has reached its fiscal age—the age when it has ceased to earn good interest by its growth. On average pine soil a pine tree does its fastest growing the first eighty years of its life, and at the end of that period it should be cut.

What is implied then by “forest preservation,” in Minnesota, is the protection from fire of the remaining forests, including the young pine, now all the way from two inches to thirty feet in height, and some of which will be merchantable when the original growth shall have disappeared; the reservation and treatment on forestry principles, either by the United States or by the state of Minnesota, of the few pine lands yet belonging to the United States and which are better adapted to forestry than to agriculture; and, finally, the acquisition by the state by purchase of any land that is too sandy, too hilly or too rocky for agriculture, and holding and using the same for forestry. These three propositions constitute the platform of the friends of forestry in Minnesota.

LAKE SUPERIOR FOREST RESERVE.

An area of about 500,000 acres in Lake and Cook counties that is believed to be better adapted for forest than for any other purpose has been temporarily withdrawn from market with a view of being created as a United States forest reserve, if further examination shall show that it is suitable for that purpose. By the

law of the United States any mature timber in a United States forest reserve may be sold at its appraised value, but not for shipment out of the state in which it is situated. Any person, under the regulations of the Interior department, can enter a forest reserve for all lawful purposes, including that of prospecting, locating and developing the mineral resources thereof; and more than that, can have free use of timber and stone for carrying on his work. Besides, the Interior department may restore to the public domain any public lands in a forest reserve, which, after due personal examination by a competent person, shall be found better for mining or for agricultural purposes than for forest use. The setting apart of lands that are suitable for the purpose as a forest reserve is, therefore, beneficial to the public, though it may not be beneficial to the speculator in timber. Having become satisfied that it would be for the best interest of the public that the above mentioned area be set apart as a forest reserve, I, on the 10th of May last, addressed the following recommendation to the U. S. Commissioner of the General Land Office:

ST. PAUL, MINN., May 10, 1902.

HON. BINGER HERMANN, Commissioner General Land Office,
Washington, D. C.

DEAR SIR: I have the honor hereby to recommend that the following townships, all public land, situated in Cook and Lake counties, in Minnesota, and comprising (after deducting water surface) an area in round numbers of five hundred thousand acres, be set apart by the President as a forest reserve, namely:

Township 59, ranges 5, 8 and 9 west.

Township 60, ranges 4 to 9 west.

Township 61, ranges 5 to 11 west, both inclusive.

Township 62, ranges 5 to 10 west, both inclusive.

Township 63, ranges 5 to 7 west, both inclusive, and south half of township 63, range 8.

Ten of these townships are surveyed and all of the lands are practically vacant, with these exceptions: that only half of township 59, range 9 west, and township 60, range 8 west, are vacant,



From Bruie Mountain, looking north, in central part of Cook County. Photographed, by A. B. Herrell September, 1901, for the Annual Report of the Chief Forest Fire Warden of Minnesota.

and that two-thirds of township 60, range 9 west, and township 61, range 5 west, are vacant.

I inclose a map of these lands, with notes showing their character, compiled from the field notes in the United States Surveyor General's office of this state.

I make this recommendation for the following reasons:

1. The land has a general elevation of about 1,200 feet above Lake Superior, is generally hilly and rocky and more valuable for the production of timber than for agriculture. It is natural timber land, but much of the original timber was killed by fires many years ago. Its soil is only third or fourth rate, and the fact that, although fairly accessible, none of it has been taken by settlers, is of itself evidence that it is undesirable for agricultural purposes.
2. The benefit that will accrue to Minnesota by having this waste and vacant land utilized for forestry purposes. Everyone knows that the supply of pine timber in Minnesota is fast diminishing. Already several kinds of lumber from the Pacific coast are competing here with our home products; and, as our home supply decreases, the price of lumber from the coast will be advanced. Dearthness of lumber will tend to retard the development of agricultural lands, farmers being among the principal consumers of lumber. On this land proposed to be created a forest reserve, it will require about eighty years for pine timber to grow to merchantable size. The population of the United States in eighty years from now, according to the estimate of the most competent judges, based on our past history, will be 320,000,000. Everyone can see that the demand for lumber will then be very much greater than at present.
3. The land in question contains many fine lakes and streams, and will, if administered as a forest reserve, prove valuable also as a fish and game preserve.
4. The educational effect of such a reserve would be useful in promoting forest economy in this state.
5. I have been reflecting upon this matter for over a year. I have also seen occasional expressions in the public press favoring a forest reserve to include some of the highlands north of Lake Superior. I have examined the Government plats of all the surveyed lands in Minnesota north of Lake Superior, and those herein contained are about the only lands that are available from being vacant. This is the only opportunity (outside of Indian reservations) of securing a number of townships in a body in this state for a forest reserve. Of course it is understood that the

state of Minnesota is entitled to sections 16 and 36 in each township as school lands; also that the state will have a right to any swamp lands there may be in either township. Also, should any of the reserve be found to be good agricultural land, I, for one, would expect that the law would be made to permit, if it does not now permit, the use of such lands for agricultural purposes. I do not expect the reserve to be a wilderness, nor to shut out any necessary means of communication.

Very truly yours,

C. C. ANDREWS,

Chief (Forest) Fire Warden.

THE COMMISSIONER'S REPLY.

Under date of June 30, 1902, the Commissioner of the General Land Office sent me the following favorable reply, informing me of the temporary withdrawal of lands substantially in accordance with my recommendation for a reserve, which he has designated as the "Lake Superior Forest Reserve, Minnesota."

DEPARTMENT OF THE INTERIOR, General Land Office, }
Washington, D. C., June 30, 1902. }

PROPOSED LAKE SUPERIOR FOREST RESERVE, MINNESOTA.

MR. C. C. ANDREWS, Chief Fire Warden, St. Paul, Minnesota.

SIR: Referring to your letter of May 10, 1902, recommending the establishment of a forest reserve, to include certain lands in Lake and Cook counties, Minnesota, I have to advise you that the matter has been favorably reported to the Honorable Secretary of the Interior by me, and also by the Director of the United States Geological Survey, and the Honorable Secretary has directed me to make temporary withdrawal of lands substantially in accordance with your recommendation.

On account of the extensive adverse holdings thereon, certain portions of the lands mentioned by you may not well be included within the reserve.

Very respectfully,

BINGER HERMANN,

Commissioner.

As soon as practicable, the lands in the proposed reserve will be examined by the United States Geological Survey.

FOREST RECONNAISSANCE OF WISCONSIN.

Wisconsin's Forest Commission, six years ago, employed Mr. Filibert Roth, an able and experienced forest expert, to make a reconnaissance of the northern part of that state, with a view to inaugurating a forest policy. In 27 counties, having an aggregate area of 18,500,000 acres, he found 6,800,000 acres, being 37.2 per cent, of poor land which, he states in his report (published by the Geological and Natural History Survey of Wisconsin), "is either not at all suited to farming, or only doubtfully so, and should by all means be left to forest." He says that his classification, when submitted to revision by the best informants, was generally considered a fair estimate. He found that the original stand of pine had comprised about 130 billion feet, of which 86 billion feet had been cut since 1840; that 26 billion feet had probably been wasted, chiefly destroyed by fire, and that 17.4 billion feet remained standing, and which was being cut at the rate of 3 billion feet per year. He found many thickets of young pine, in the aggregate 200,000 acres, which had sprung up in the previous 25 years, and which he estimated would within fifty years, yield 5,000 feet per acre of merchantable timber. He reports that Wisconsin's home consumption of lumber is 600 million feet a year; that the industries exploiting her forest resources paid yearly to over 55,000 men the sum of over 15 million dollars in wages; and he states in conclusion, that the failure to protect or restock the denuded waste lands "causes a continuous and ever growing loss to the commonwealth, which at present amounts to about 800 million feet per year of useful and much needed material."

"To remedy this matter," he says, "and stop the great loss, it will be necessary to adopt active measures both to protect and restock."

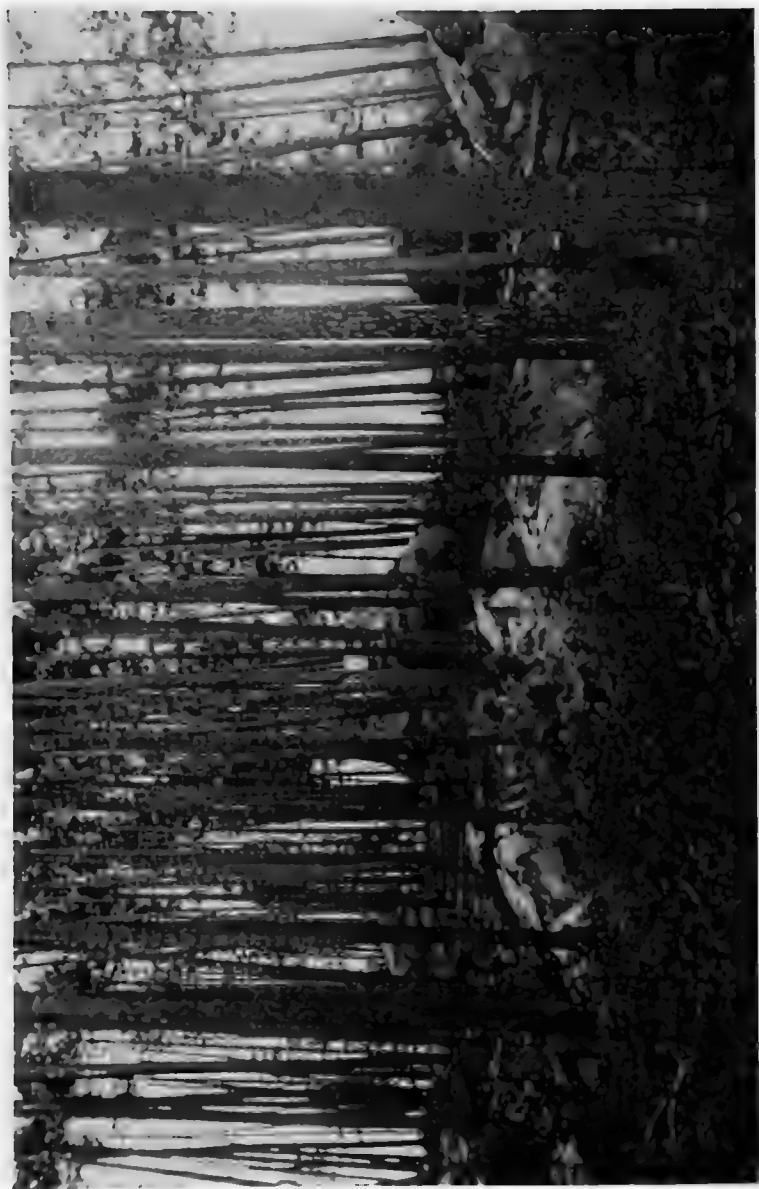
MINNESOTA SHOULD TAKE THE LESSON HOME.

As the forest conditions of Minnesota are similar to those of Wisconsin, except that there are in our state probably 25 billion feet of pine still standing, Mr. Roth's testimony ought to have great value for the people of Minnesota. It is a striking fact that the area originally covered with pine in Minnesota—with, of course, intervening stretches of mixed timber, swamps and bare tracts—was just about the same as that of Wisconsin, eighteen million acres.

The fact that we have in this state 15,000,000 acres of good agricultural land that is not yet under cultivation and that cheap lumber will promote its development; that our population increases 18 per cent each decade; that the demand for lumber will increase; that its value has risen 25 per cent in the last twenty years; that our home supply of original pine timber will, in a few years, be exhausted; that much lumber is already being brought into this state from the Pacific coast at the rate of 130 car loads per day, and the cost of transportation for which averages \$13.50 per 1000 feet, board measure; that centuries of experience of European states instruct and warn us—it is clear beyond any doubt that the sooner we begin in a systematic way to reforest our waste lands the better it will be for the welfare of the state.

It requires 80 years for pine to grow to merchantable size on poor, sandy land. Individuals cannot wait so long for a crop. The state must undertake the work.

The United States still holds 3,000,000 acres of vacant land in Minnesota, of which probably 1,000,000 acres are refuse land only fit for bearing forest; and as soon as our state shows by actual example its willingness and ability to carry on the work of reforesting such land, very likely our delegation in Congress would be able to procure a grant to our state of all such refuse land, for forestry purposes.



Norway pine forest, on rocky non-agricultural land north of Vermillion Lake, on road leading to Rainy Lake. Photographed by A. E. Herrell September, 1901, for the Annual Report of the Chief Forest Fire Warden of Minnesota.

WOMEN'S CLUBS AND FORESTRY.

Forestry made great strides in Pennsylvania because the women in that state interested themselves in the subject. Women ought to do the same in Minnesota. It is relatively a greater subject in Minnesota than it is in Pennsylvania, because Minnesota has more extensive natural forest resources. Women's clubs should not be content to study history; they should make history. Forestry in Minnesota is on its hands and knees, and it is a patriotic duty of the women of the state to place it on its feet.

FORESTRY EXPLAINED.

But before people can intelligently work for a cause they must take the trouble to inform themselves of its principles.

While forestry itself is the science of obtaining revenue by raising trees on refuse land, there are a number of things about the forest in which the people as a whole have a sort of ownership and a decided interest. For example, if sandy hills are well wooded, they make the landscape attractive; but if they become denuded and are left a bare waste, as is the practice in the absence of forestry methods, the scenery loses all its beauty. On such land forestry would have a young growth of timber started before removing all the mature trees. So, when fire is allowed to devastate a forest, especially along routes of travel, the public is robbed of beautiful scenery. Where forestry has its rights, fire is prevented from working such evil. The public has an ownership in water-courses, for they not only beautify scenery, but they fertilize the soil, furnish water for sanitary purposes, and afford means of water-power and navigation. The forest, holding back, as it does, in its porous soil, much of the rainfall, is a natural reservoir of moisture, feeding numberless little springs and rivulets and maintaining water supply in rivers. Forestry forbids the total clearing of

land at the head waters of streams; and the state, though it has not exercised the power, possesses the constitutional authority, as a police regulation, to prohibit a private owner from cutting trees less than eight inches in diameter, breast high, at the sources of our principal streams.

Scenery and water! Just for these two things alone the public has reason to concern itself with forestry.

Climate is an additional ground for public interest in forestry. Air in the forest is a little warmer in winter and a little cooler in summer than the air of open country. Forest air, like that of the sea, is richer in ozone, and therefore healthier, than the air of open country, and especially than the air of cities. The forest is a barrier to the hot wind from the south and to the cold wind from the north.

The public has rights in the forest for means of recreation. Mrs. Browning, the greatest of woman poets in the English language, wrote in a letter from Italy: "In the deep of the pine forests, which have such a strange dialect in the silence they speak with." It was not for the value of the timber that the state of New York paid a million dollars for 250,000 acres in the Adirondacks, but because tired people love to visit the woods for recreation and rest. When woods are managed according to forestry they are provided with good roads, and are delightful resorts.

The forest, properly managed, is a covert for useful game.

It is largely on account of these collateral benefits from forests that the public is interested and should, wherever possible, demand that they be administered on forestry principles. At present, however, most of the timber lands in this state are the property of private individuals and corporations who will, and for their financial safety must, cut and remove the timber therefrom as rapidly as they can find a good market for it, and without taking any

steps for the reproduction of timber on the cleared tracts. The present owners would not be alive when a new crop of pine forest had matured on the tracts now being cleared. Thus it is that the original pine forests in Minnesota are being cut without regard to forestry principles.

There are many extensive areas in northern Minnesota where pine timber is found growing in the midst of large leaved or hardwood forest. In all such cases the soil will be found sufficiently fertile to be useful for agriculture after the timber is removed. Such land ought to be used for agriculture, for the reason that it will yield a larger revenue in that way than it would in forest. But a large part of the pine lands in the state consist of soil that is too light for profitable use in agriculture, and such lands ought to be purchased by the state and administered on forestry principles.

LEADING PRINCIPLES.

The leading principles of forestry are these: Forest should occupy only non-agricultural land—land that is too hilly, or too rocky, or too sandy for profitable cultivation in field crops. The significance of forestry is that such refuse land used for coniferous forest will yield an average annual net revenue, on the capital it represents, of about three per cent. And when one sees, as he surely will in his travels, an abundance of such land lying waste, and even deteriorating year by year, let him call to mind the revenue it would yield if devoted to forest, and how much handsomer the country would be if all such land were so used.

Another principle of forestry is that the forest, when young, should be crowded to promote height growth. The elements in the air supply the principal food of the pine. The trees must have air and light. In a crowded state they strive upwards for air and light. They shed their limbs naturally when crowded. The weaker trees die out, and the survivors develop, in course of eighty

years, or more, the clear boles for a great height, which yield the best lumber. A pine on open ground produces too many limbs. It may be picturesque, but is not good for timber.

Another principle is that the forest must be administered so as to furnish a sustained yield. It must be perpetual. The cutting of mature trees must be done in a way to promote natural regeneration by seed.

Last, but not least, forest fires must be prevented; for without this there can be no such thing as forestry.

EXAMPLES FROM ABROAD.

The principles of forestry are the same everywhere, but the revenue from forests is naturally greater in Europe than it would be in this country, by reason of denser population, cheaper labor and higher value of forest products.

For example, Bavaria has 2,150,000 acres of state forest, 77 per cent of which is coniferous, yielding a net annual revenue of \$3,222,145, or \$1.50 per acre.

France (exclusive of the colonies) has 23,000,000 acres of forest, of which only 2,700,000 acres are state forest. Of the latter, 600,000 acres are "protective" forests—situated on mountains to prevent land slides, and on the sand dunes of the ocean to prevent the sand from drifting into the interior and submerging good land. The net annual revenue from the 2,100,000 acres of productive state forest is \$1.91 per acre.

France expends \$600,000 a year for scientific forestry in her province of Algeria. It is such things that make a country truly great.

There are in the whole kingdom of Prussia 21,000,000 acres of forest, of which 6,000,000 acres are state forests yielding a net annual revenue of \$9,000,000, being at the rate of \$1.50 per acre, and more than the average American farmer clears from his field crops.

Alsace-Lorraine, with an area of only one-fifteenth that of Minnesota, has 338,500 acres of state forest yielding an annual average net profit of \$2.50 per acre.

The Duchy of Baden, not as large as Pine county in this state, from its 240,000 acres of state forest, derives a net annual revenue of \$667,000, or \$2.50 per acre.

The Kingdom of Wurtemberg, only a very little larger than our county of St. Louis, derives a net annual revenue of \$1,700,000 from its 418,000 acres of state forest, or \$4.00 per acre.

The Kingdom of Saxony, from its 432,000 acres of state forest, mostly on poor mountainous land, derives a net annual revenue of \$1,946,000, being at the rate of \$4.50 per acre.

The forest profits in all these countries, and especially in Saxony, are owing to the density of population, cheapness of labor, high price of lumber and facilities of getting it to market. The forests are not only profitable in a money sense, but they furnish many indirect benefits, including water supply. They are provided with good roads, are well guarded, are delightful resorts, and are no impediment to the cultivation of neighboring agricultural lands.

PROGRESS IN FORESTRY.

In the past ten years the United States government has established sixty million acres of forest reserves, on mostly mountainous land, under a partially equipped force of rangers and guards. A division of forestry, under a forest expert, to administer these reserves, has been created in the Department of the Interior. The bureau of forestry, in the Department of Agriculture, now expends about \$50,000 annually in useful work, and last year made forestry investigations, not only in the national reserves, but in as many as twenty different states, at the request of the respective state governments; also made forest working plans for over a million acres. In this

work many trained and partly trained young American foresters, including some from this state, who are making a good record, took part.

The college of forestry at Cornell University and the school of forestry at Yale University are recent, well endowed and notable institutions.

A new school of forestry has been provided in the University of Michigan, and will commence work next September. Its principal professor will be Mr. Filibert Roth, a well known forester, who has served several years in the United States forestry bureau, also as chief of the division of forestry in the Department of the Interior. His duties as professor will be to foster forestry in Michigan by advice and addresses as well as by actual help in the woods; assist in the care of state forest lands; manage the university forest lands; and educate men in forest work. He will be assisted by Mr. Charles A. Davis, who has served as professor of sciences, in Alma College, Alma, Mich., and who has had extensive experience as a woodsman.

Of other schools where forestry training is given, that at St. Anthony Park, Minn., and that at Biltmore, N. C., are not the least.

Of the different states, two or three have already adopted, and a dozen or more are trying to work out, plans of forest restoration and administration. The State of New York has expended about \$2,000,000 in purchasing land, in the Adirondack mountains, for forestry purposes. She has contributed much to forestry literature. Her constitution, however, prohibits the cutting of any timber in the state forests, and requires them to remain in their natural state. This, the friends of forestry wish abrogated, and, when done, New York will be in the lead, if she is not now, of all the states in forestry. Pennsylvania has lately authorized its forest commission to buy any land suitable for forest at not exceeding \$5 per acre, and her commissioner states that during the term of the



Food for forest fires. Sample of country on the White Earth Chippewa Indian Reservation where the United States Government lumbered for the Indians a few years ago in a splendid forest of Norway pine. Shows a lack of forestry methods. Photographed, April, 1901, for the annual Report of the Chief Fire Warden of Minnesota.



Private forest of spruce and fir in Germany. Light cutting just made of largest trees. A "Selection forest," in which the large trees are cut and the smaller ones left to grow. Engraved for the Annual Report of the Chief Fire Warden of Minnesota.

present governor, who is much interested in the question, half a million acres will have been acquired for such purpose. In Michigan about 200,000 acres of land have been set apart for forestry purposes.

The legislature of Minnesota enacted the following law, which was approved April 8, 1903:

The Minnesota state forestry board is hereby authorized to acquire by purchase for the state at not exceeding two dollars and fifty cents (\$2.50) per acre, and preferably at the sources of rivers, any land in this state that is adapted for forestry, but not to exceed in any one congressional township, one-eighth part of the area of such township, and to take such steps as are necessary to maintain forest thereon according to forestry principles. One-quarter part of the net forest revenue from such lands shall always be paid to the respective towns in which the lands are situated. No money shall be paid by the state for any such land until the attorney general shall certify that the deed thereof conveys a clear title in the state.

No appropriation was made to carry this law into effect, and for the reason probably that \$20,000 was appropriated for the purchase of additional land in the original limits of the Itasca state park. The state now has a thousand acres of cut-over pine land in Cass county, donated by the late ex-governor John S. Pillsbury, and for which a preliminary working plan, after survey, was made last summer. A bulletin on the same was issued by the Forestry Board. Notice of expiration of redemption period has been served in respect of about a thousand acres in Cook county, which the board also expects to obtain for forestry purposes, under chapter 335 of the laws of 1901. If these are but crumbs, they foreshadow better things.

One of the results of forestry agitation in Minnesota was the recent act of Congress for opening the Chippewa reservation, creating a forest reserve of 200,000 acres, and which secures to the Indian, for the first time in his history, the true value of his timber.

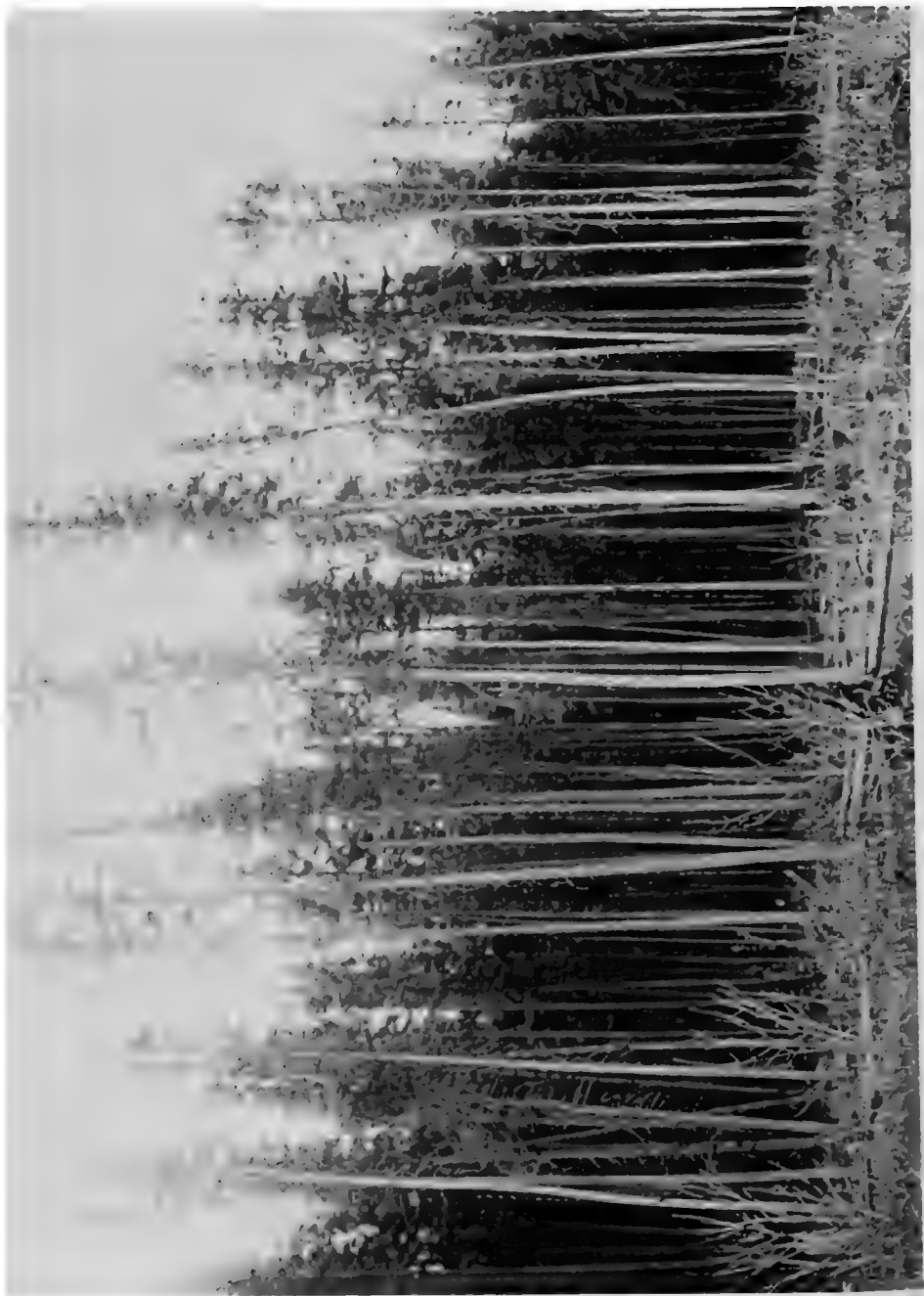
EUROPEAN FORESTRY.

No intelligent friend of forestry supposes that the science of forestry will, for a long time, produce in this country the results which are seen in many of the densely peopled states of Europe, but a knowledge of these splendid results is very instructive and stimulating, and for that reason I have taken pains to diffuse such information. The science of forestry is the same everywhere, but its application depends upon the conditions which are found in different countries. Let us assume that there is a natural coniferous forest on non-agricultural land in Germany in which 75 per cent of the trees are mature and 25 per cent have not reached merchantable size. According to scientific forestry the 75 per cent of mature trees will be cut just as soon as the market would justify and the 25 per cent of trees of unmerchantable size would be left to grow till they should be fit to cut. A similar natural forest in this country would be treated in the same way, if treated according to forestry principles; and some lumbermen, such as those, for example, who hold pine lands in the valley of the St. Croix river or on its tributaries in this state, and who have gone back every fifteen or twenty years to make a second, third or fourth cutting on the same land, are managing their forests in this way. In cases where pine lands are remote from streams of capacity for floating and where the pine is reached by temporary logging railroads, clean cutting is made of both large and small trees; but lumbering of this latter description is in violation of forestry principles. If a trained forester were to commence cutting a mature forest he would not begin on that side of it which is exposed to the prevailing wind, because if

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Norway pine, on non-agricultural land in Lake County. Photographed, 1900, for the Annual Report of the Chief Fire Warden
Minnesota.



A tamarack swamp in Lake County. The timber is used for railroad ties. Photographed, 1900, for the Annual Report of the Chief Fire Warden of Minnesota.



South shore of Lake Itasca. Place where first sermon was preached in the park, May, 1881. Photographed August, 1898, for the Annual Report of the Chief Fire Warden of Minnesota.



Lake Dewey. White pine logs and men working. Photographed May, 1899, for the Annual Report of the Chief Fire Warden of Minnesota.



Young Norway pine, one mile south of Lake Dewey. Photographed May, 1899, for the Annual Report of the Chief Fire Warden of Minnesota.



Residence of Mr. Oakes, seventeen miles north of Lake Itasca. Photographed August, 1898.



Norway pine forest in Beltrami County, burned recently to secure the benefits of the Dead and Down Timber Act. All young growth destroyed. Photographed September, 1899, by Dr. C. A. Schenck.



Jack pine (about 30 years old) between Solway and Red Lake. Photographed September, 1899, by Dr. Schenck.



Planted pine forest, 28 years old (Qvistså in Central Sweden).



Natural coniferous forest in the parish of Orsa, province of Dalarna, Sweden, 1801.



Ravages of forest fires near Lake Dewey, St. Louis county, Minnesota. Photographed May 9, 1899, for the Annual Report of the Chief Fire Warden of Minnesota.



Campbell Creek, five miles southwest of Buena Vista. Photographed August, 1898, for the Annual Report of the Chief Fire Warden of Minnesota.



Loading pine logs on railway cars at Lake Dewey, to take to the Mississippi river via Hibbing and Swan rivers. Photographed May, 1899, for the Annual Report of the Chief Fire Warden of Minnesota.



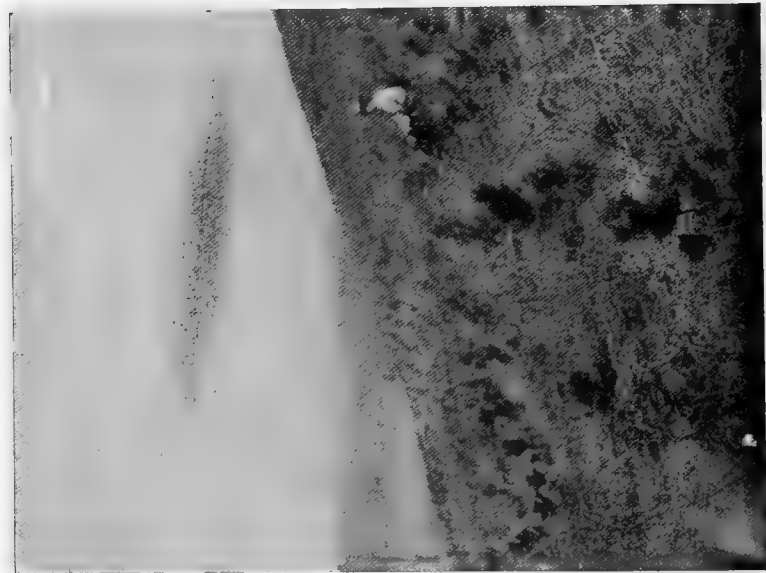
A splendid stand of primeval white pine on rocky non-agricultural land near Hibbing illustrates a leading principle of forestry. The logs in the foreground were cut from the forest in the winter of 1904. The land was cleared after being burned over in 1894. Photographed by the Chief Fire Warden of Minnesota, and reprinted from his fourth report.



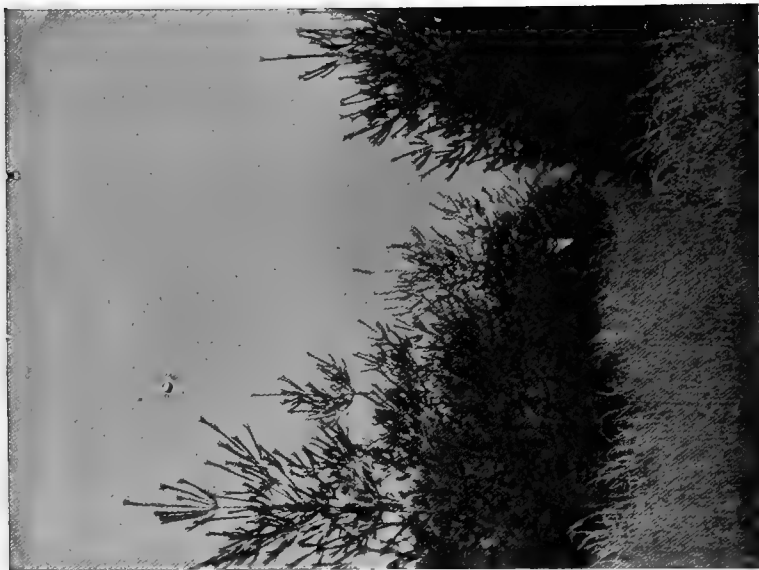
A year after lumbering, near Hibbing, Minn. Photographed September, 1899, by Dr. C. A. Schenck.



Primeval white pine forest near Hibbing, St. Louis County. Photographed September, 1899, by Dr. C. A. Schenck.



Plantation made on abandoned pasture in 1899, with white pine, four years old, on the Biltmore estate of Mr. Geo. W. Vanderbilt, in North Carolina.



Plantation made on abandoned fields in 1889, with white pine, four years old, on the Biltmore estate of Mr. Geo. W. Vanderbilt, in North Carolina.



On the Big Fork River. Photographed (from boat) June, 1900, for the Annual Report of the Chief Fire Warden of Minnesota.



At the Confluence of the Big Fork and Rainy Rivers. Photographed (from the Ontario side) June 6, 1900, for the Annual Report of the Chief Fire Warden of Minnesota.



Young and mature Norway pine on a school section, given to the State of Minnesota by the United States in Beltrami County. Illustrates what many uninformed people deny, that pine will succeed pine by natural seeding. If circumstances are favorable. Gradual clearing and gradual admission of sun are generally followed by the springing up of young pines if fires are kept out. Photographed, 1898, for the Annual Report of the Chief Fire Warden of Minnesota, and reprinted from his fourth report.



White pine forest on a school section (sec. 10, township 58, range 19), belonging to the State of Minnesota. Congress gave to Minnesota two sections of land, a mile square each, in each township, for school purposes. The permanent school fund derived from these lands now amounts to \$12,354,000. Photographed, 1900, for the Annual Report of the Chief F1



German working men at dinner in a German forest. The German forests give steady employment to over a million laborers.



Road in a German forest. There must be an economical way of getting out forest products, and good roads are essential in a permanent forest administered so as to secure a sustained yield.



Open country like what is often seen in the forest regions of Minnesota. This sketch is taken on the road bordering Turtle Lake near Buena Vista, Beltrami County. In many instances nature unaided does not completely stock a forest, but leaves frequent blank spaces. It requires forestry science to utilize all the surface with valuable trees.



What forestry science does. This is a German forest of spruce planted and managed according to forestry science; trees about 80 and 100 years old. Observe how closely the trees stand. Where forestry is applied all the land devoted to forest becomes as well stocked with trees.



Using the "Krempe" to work a log down to a road in a German forest.



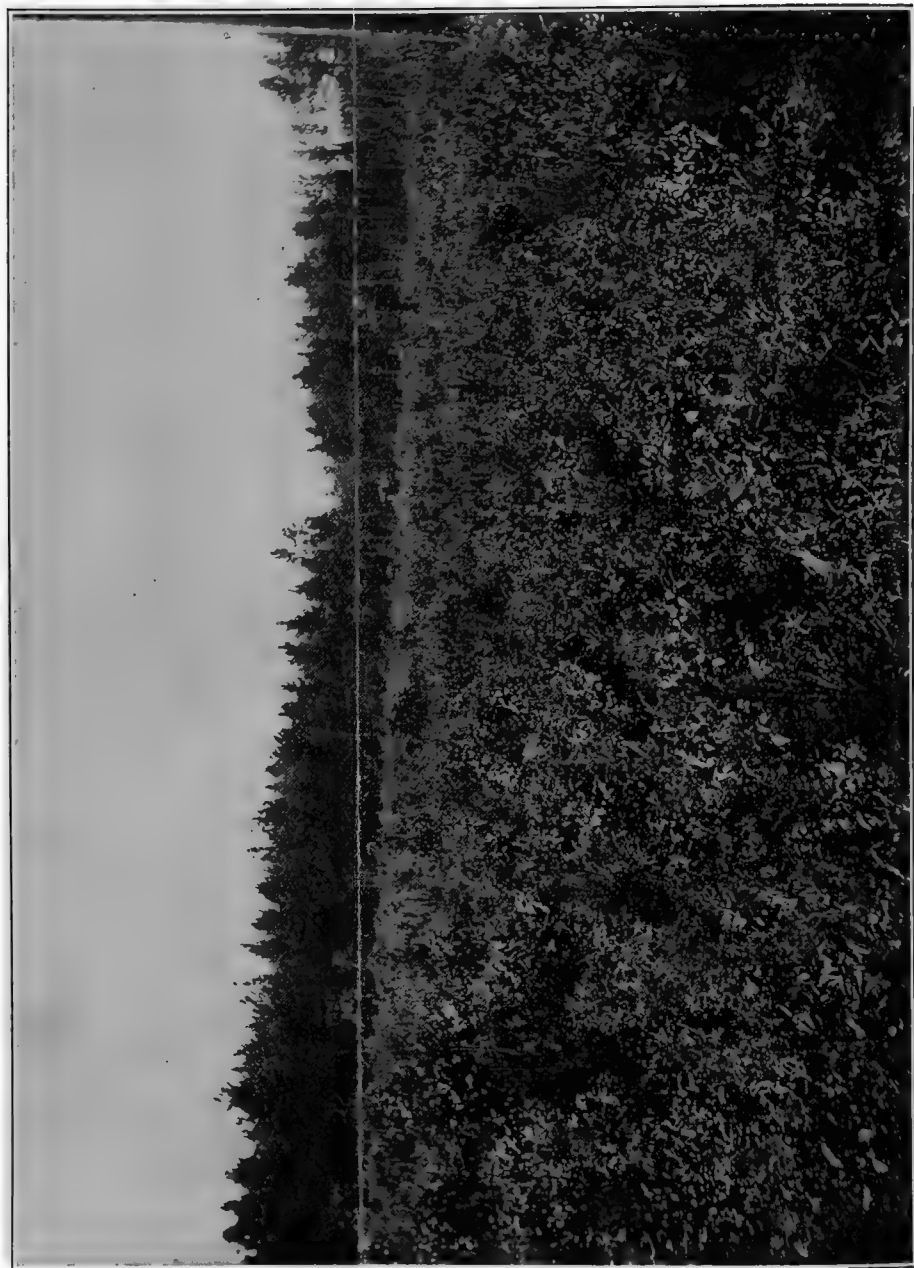
Upper St. Croix River at point due east from Hinckley, Minnesota, looking down the river. Photographed 1907.



Food for Forest Fires. Sample of country on the White Earth-Chippewa Indian Reservation, where the United States Government lumbered for the Indians a few years ago, in a splendid forest of Norway pine. Shows a lack of forestry methods. Photographed for the annual report of the Forestry Commissioner of Minnesota.



Spruce and fir forest near Freudenstadt, Wurttemberg, Germany: age about 130 years. Shows how closely land becomes stocked with trees under scientific forestry management. Also shows undergrowth about six inches high. Minnesota's natural resources are so great that if she would now begin to spend annually \$300,000 in forestry, she would in eighty years have 3,000,000 acres of as good forest on land not suited for agriculture, and of the value of \$200,000,000 and upwards.



Young Norway (red) pine in the foreground planted four feet apart on cut over pine land on the State Experiment Farm at Grand Rapids, Itasca County. Photographed July, 1902, for the Annual Report of the Chief Fire Warden of Minnesota.

ings, paying a rent equal to one-half of the additional pay above mentioned.

PRIVATE FORESTS.

At the close of 1895 the entire forest area of Austria was 23,993,442 acres. Deducting from this figure the area of the state and fund forests, aggregating 3,782,369 acres (out of which 862,236 were unproductive area), there remain 20,211,072 acres, which are composed of communal forests to the extent of 3,456,782 acres, and private forests to the extent of 16,754,290 acres.

There are treated according to forestry principles proper: In the case of communal forests, 14.5 per cent, equal to 500,818 acres; in the case of private forests, 38.4 per cent, equal to 6,434,070 acres. In these forests all work is done according to working plans, periodically made by officers of a training equal to that of the government forestry officers. In 85.6 per cent of the communal forests (2,955,964 acres) and in 61.6 per cent of the private forests (10,320,220 acres) no working plans exist. The work is done without reference to scientific forestry, more or less at haphazard after empirical rules.

The price of private forests depends on the quality of the soil, the age of the forest, and on the locality, viz., on the market conditions and on the industrial development of the section in which the forest is situated. Thus it is impossible to give even an approximately correct figure representing the value of private forests. Forest land has been sold actually at prices ranging between \$5 and \$340.

The annual net revenue drawn from forestry varies just as much as the value of the forest itself. It is impossible to give any exact figure showing the annual net revenue from private or communal forests. A net revenue of equal to two or three per cent of the capital invested in forestry may represent a fair average.

The annual production of timber and fuel in the Austrian forests has somewhat declined of late. Savings are made everywhere to make good former over-cutting. Besides, the regulations of the forest laws are now being enforced, and under these enforced laws the utilization of forest produce had to be diminished. In the year 1890 the total harvest of timber and fuel from 24,173,333 acres of forest aggregated 29,341,590 cubic meters, or 1,035,758,127 cubic feet. In the year 1895, on the other hand, there were cut from 23,993,442 acres only 27,523,241 cubic meters, or 971,570,407.3 cubic feet.

It may be stated that the smaller figures, representing the area of the forest in 1895, are explained by the fact that the political authorities, whenever they think it fit, after consulting the foresters in charge, approve of a change of forest land into agricultural or pasture land. Besides, the diminished area is partly explained by mistakes made formerly in the survey of the forests.

DUCHY OF BADEN.

STATE FORESTS.

The aggregate extent of the state forests of Baden is 240,304 acres, located in the Black Forest and the upper valley of the Rhine. The prevailing kind of trees is coniferous. The beech, however, covers the largest surface; next follows the fir, then the silver fir and the Scotch fir. The average estimated value per acre, taking the average of the ten years, 1886-1895, is \$98.55. The annual aggregate expense of administration is \$568,078. The annual aggregate revenue amounts to \$1,235,332, and the net revenue is \$667,244. Number of acres annually sown to forest is 222, and the number of acres planted is 823. Reforesting is effected by seed from standing trees; also by planting trees; in some rare cases



Along the first sixteen miles of the Duluth, Virginia & Rainy Lake R. R., taken Sept. 24, 1902. Non-agricultural land, but will produce timber. Land better adapted for forest than for agriculture.



Pine forest on Duluth, Virginia & Rainy Lake R. R., ten miles north of Virginia. Snap shot Sept. 24, 1902.



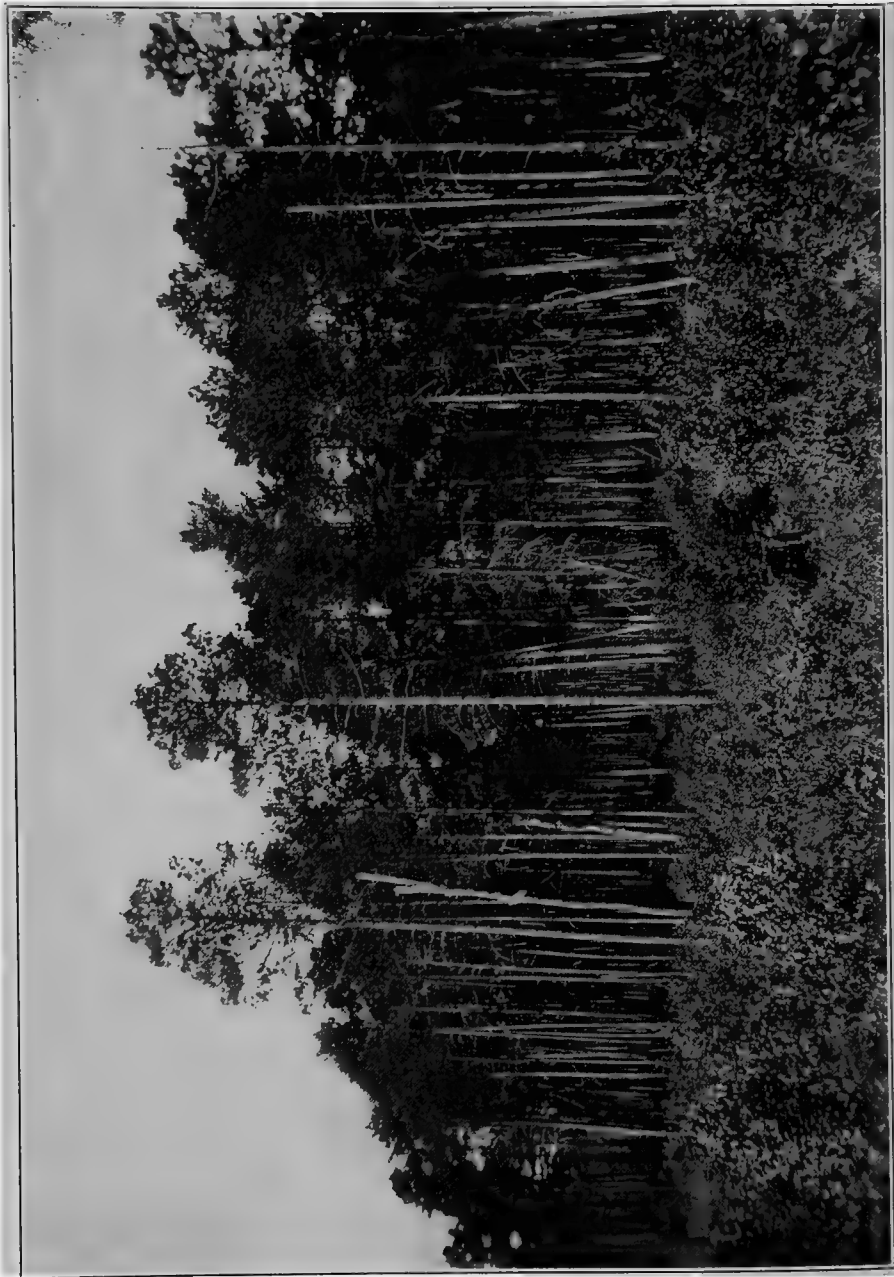
Young and mature red (Norway) pine four miles from Cutfoot, on the Winnibigoshish Reservation. Photographed for the Chief Forest Fire Warden of Minnesota, July, 1902.



Sample of Cleared and open country on the Winitigoshish Reservation. Photographed July, 1902, for the Annual Report of the Chief Forest Fire Warden of Minnesota.



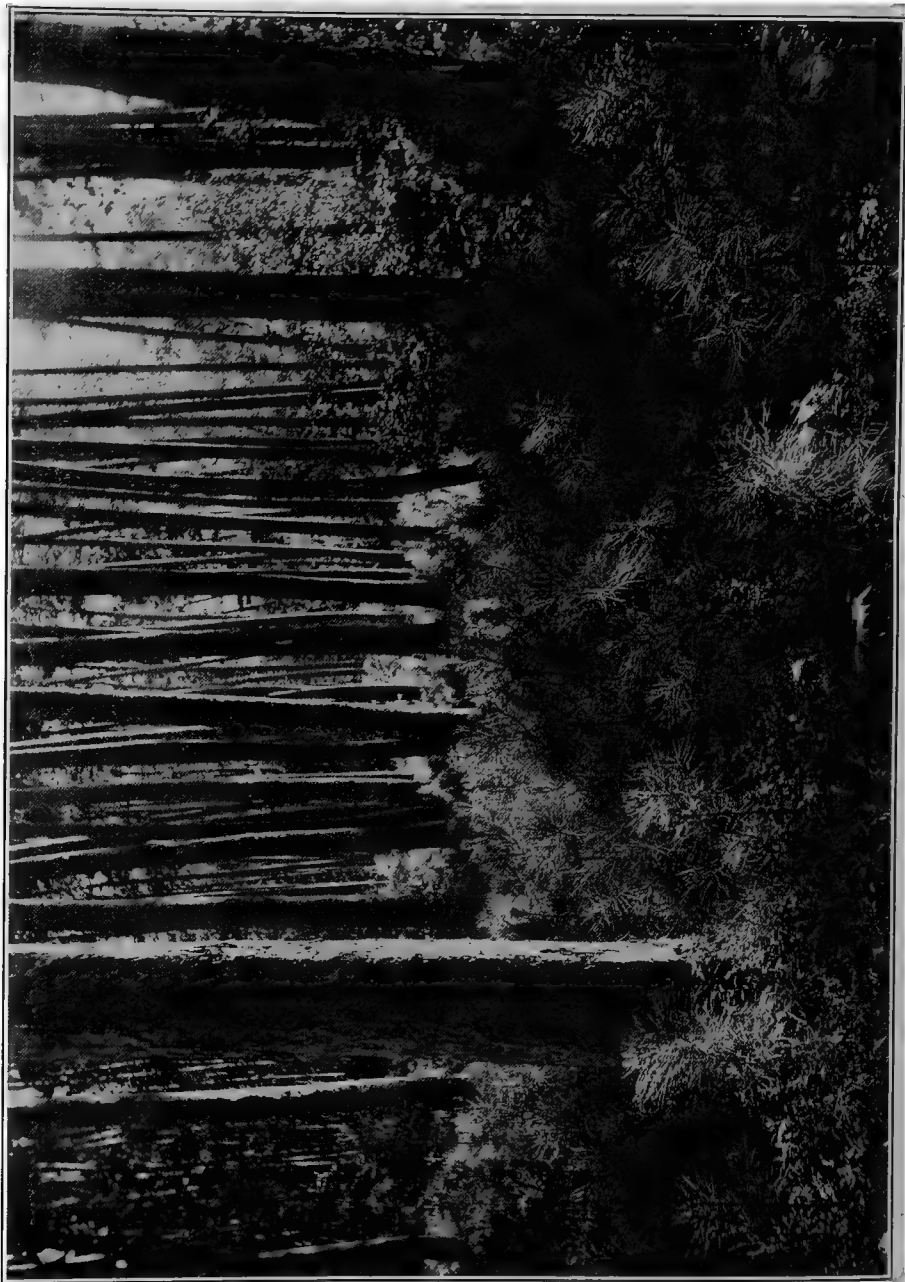
Mature and young Norway pine 3 miles northwest of Cutfoot Sioux on the Winnibigoshish Reservation. Photographed July, 1892, for the Annual Report of the Chief Fire Warden of Minnesota.



Young white pine on the U. S. Forest Reserve, southeast shore of Pike Bay. Photographed July, 1902, for the Annual Report of the Chief Forest Fire Warden of Minnesota.



Norway and young Jack Pine on Chippewa Forest Reserve. Photographed for the Annual Report of the Chief Forest Fire Warden of Minnesota
July, 1902.



Young and mature Norway (red) pine on island in Cass Lake. Photographed by Mr. A. B. Herrell for the Annual Report of the Chief Forest Fire Warden of Minnesota July, 1902.



Norway (red) pine reproduction in windfall, Big Fork River, 1902.
(By T. S. Woolsey, Jr.)



Oliver Iron Mine, Mountain Iron Photographed, 1890, for the Annual Report of the Chief Fire Warden of Minnesota.



White pine on a school section belonging to the State, in St. Louis County. Photographed, 1900, for the Annual Report of the Chief Fire Warden of Minnesota.

FORESTRY

FIFTH ANNUAL REPORT

OF THE

CHIEF FIRE WARDEN

OF

MINNESOTA

UNDER THE ACT OF THE LEGISLATURE ENTITLED
"AN ACT TO PROVIDE FOR THE PRESERVATION OF FORESTS OF THIS STATE
AND FOR THE PREVENTION AND SUPPRESSION OF FOREST AND
PRAIRIE FIRES," APPROVED APRIL 18, 1895.

FOR THE YEAR 1899.

ST. PAUL, MINN.:
PRINTED BY THE PIONEER PRESS COMPANY.
1900.

STATE OF MINNESOTA,
OFFICE OF CHIEF FIRE WARDEN, }
ST. PAUL, APRIL 9, 1900.

Hon. R. C. Dunn, State Auditor and Forest Commissioner:

SIR: As required by section 3 of the Act for the Preservation of Forests, etc., approved April 18, 1895, I have the honor to submit, herewith, my annual report for the year 1899.

Very respectfully,
C. C. ANDREWS,
Chief Fire Warden.

FIFTH ANNUAL REPORT
OF THE
CHIEF FIRE WARDEN
OF MINNESOTA

Reports by postal card received from 233 Fire Wardens under date of September 1, showed that up to that time the season of 1899 had generally been wet and favorable for the prevention of forest and prairie fires. In several localities in the western and northwestern parts of the state, however, there had been dangerous dry weather in May and in the latter part of August. The number of forest fires reported was only ten. Number of acres burned over, 3,635; damage, \$1,541.

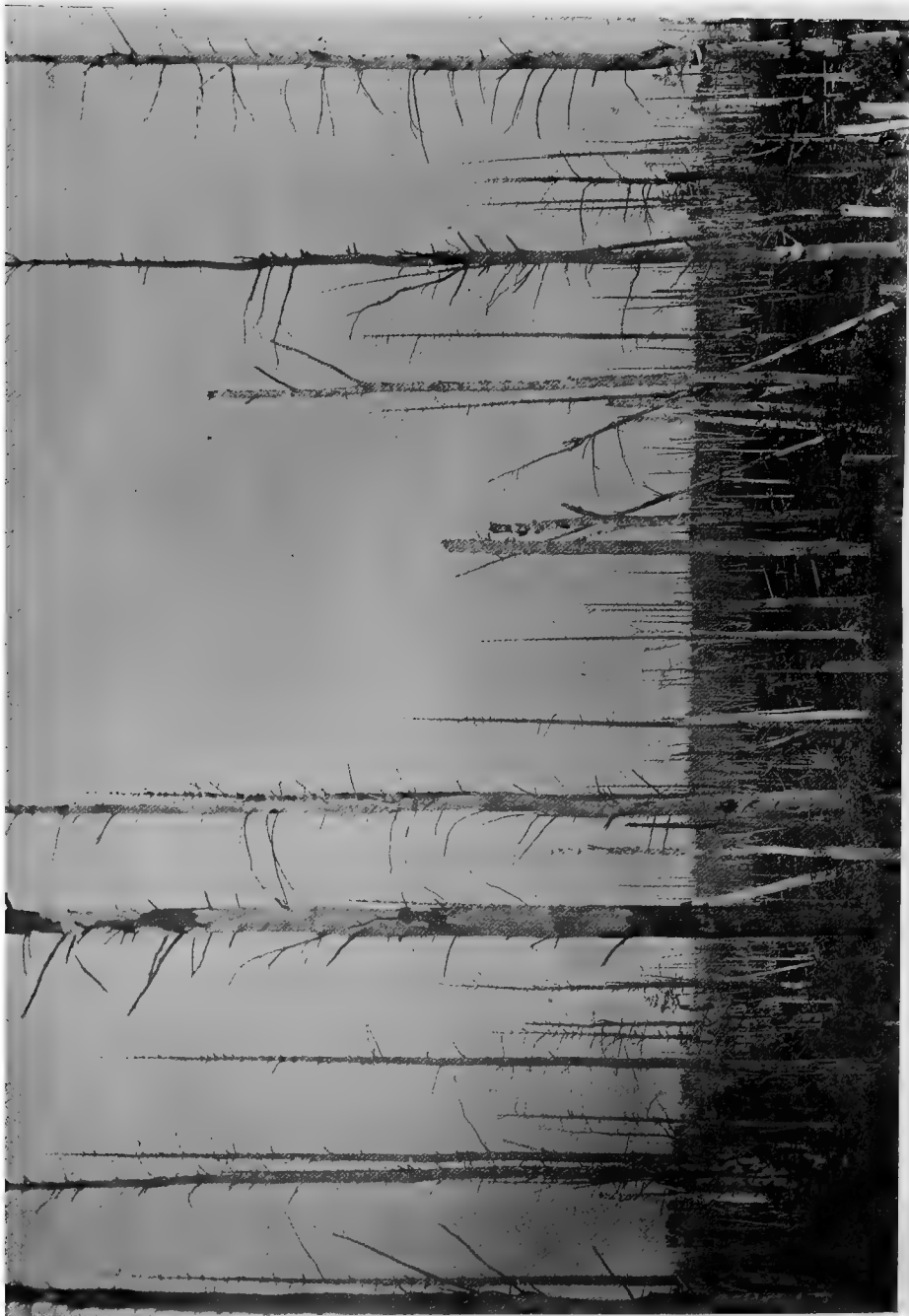
Number of prairie fires reported, thirty-four; acres burned over, 24,616; damage, \$4,856.

The chairmen of town boards and fire wardens in unorganized territory were all supplied with blanks on which to report fires and with stamped return envelopes; were urged to be particular and report every fire; and the law allows them a fee for reporting a fire; it is made their duty under a penalty to report all forest and prairie fires. But there is always a percentage of town officers who are neglectful of duty, and it may be assumed that some

fires occur which are never reported; still, there can be no question that during the five years that the fire warden law has been in operation there has been a growing exercise of care against forest and prairie fires.

PUNISHMENT FOR CARELESSLY CAUSING FIRES.

A few persons have been convicted the past year for carelessly causing fires. Fire wardens, however, are reluctant to institute criminal proceedings; and it is natural that they should be unwilling to make criminal complaint against a man who, perhaps, will be their neighbor or townsman through life. Still, men who accept official trusts should have courage to discharge them faithfully. Communities often feel that a man is being wronged if he is prosecuted; they do not stop to think that the principal object of punishment is to deter others from committing similar offenses. Very good people are liable to be careless, and when we punish a man who, in a heedless and careless spirit, sets a fire in very dry and windy weather, which he ought to know he cannot control and which destroys or endangers the property of others, he should be made an example of; not for revenge or because we wish to injure him, but as a warning to many others to refrain from doing the same. Take the case of William Daw who, in the town of Rusheba, Chisago County, in the early part of January last, when the ground was bare, the weather dry and very windy, set brush fire with only himself to control it and which spread and destroyed nearly two thousand dollars worth of hay and other property belonging to his neighbors. Daw owned a farm of eighty acres, which, with buildings, implements, live stock (not exceeding thirty-six head) and forage for the same, are all (and it is not too much) exempt from execution. Not a dollar of his property could be taken in payment of any of the damage which he had caused. He could fold his arms with indifference. The chairman of



Forest scenery along St. Paul & Duluth Railroad, near Carlton, Minnesota, destroyed by forest fires in 1894, or previously. Photographed, 1899, for the Annual Report of the Chief Fire Warden of Minnesota.

the town board would not make a complaint and I had to go and make the complaint myself, but was not present at the hearing. Daw plead guilty to carelessly causing the fire, was fined only \$15, together with \$3.05 costs, and yet the community did not sympathize with the prosecution. It is not an encouragement to men of capital to establish valuable farming plants if their property is liable to be endangered by any careless fellow who may choose to set a fire in dangerous weather without the means for its control. It seems to me it should be made the duty of county attorneys themselves to make the necessary complaints in such cases, when requested by the Chief Fire Warden. Of course they should not be required to make complaints except in cases where there are probable grounds for conviction.

LOGGING RAILROADS.

A bad example of forest fires came under my personal observation on the afternoon of the 15th of September last, while going on the logging railway train of the Red Lake Transportation Company from Red Lake to Nebish, a distance of fifteen miles. This logging railway extends nearly all of the way through forest of mostly Norway pine. I naturally gave particular attention to any effects of forest fires along the line of the road, and while I expected that there might have been a few fires I was surprised to see that there had been so many. There were then as many as six small fires actually burning along the right hand side of the right of way without anyone in sight to take care of them. There were traces of more than a dozen forest fires having extended into the woods on each side of the road, some of them having apparently killed the timber as far as could be seen. Indeed, the forest generally along the road had been ravaged by fire, and as the road will probably at some not remote future time be used as a part of an extended passenger route

the blackened trees will remain for a long period to shock the traveling public. The damage to property has been considerable, but it scarcely amounts to the weight of a pin compared to the damage to scenery and the injury to the public by spoiling the appearance of the country. It was evident that the fires, or the most of them, had been set by sparks from the railway engine, which from its diminutive appearance would strike any one as being inadequate to the work it had to do. This logging railway passes through a country entirely uninhabited. All the people at the terminus of the road are employes, either of the transportation company or of the company who are doing the logging, and it seemed to be useless to attempt a criminal prosecution for these fires. Similar injury has been done along other logging railways in previous years and is liable to be repeated in other places unless means are afforded for better watching. Such outrageous injuries make one wish that the time may soon come when lumbering will be done under forestry methods.

GUARANTEES BY RAILROAD COMPANIES AGAINST FIRES.

The Act of Congress of March 3, 1875, grants railroad companies right of way through the public lands of the United States, and the Act of Congress of March 2, 1899, grants general right of way for railroads through Indian reservations; and the laws of Minnesota give railroad companies power to acquire rights of way by purchase or condemnation of land. None of these laws provide guarantees against causing forest fires by companies operating railroads, and it would seem that they should be amended so as to secure proper guarantees against such evils. It is true that it has been held by the Secretary of the Interior (in the case of the Union River Logging Railroad Co., 12 Land Decisions, 574) that a railroad operated chiefly in the interest or for the benefit of private parties or corporations has not the right of way through the public

lands. The law, however, as it now stands, can too easily be evaded, and I repeat that guarantees against causing forest fires should be exacted of railroad companies before they are permitted to build roads.

FIRES ON INDIAN RESERVATIONS.

While the fire warden law applies to white people on Indian reservations it does not apply to Indians on their reservations; with the view, therefore, to having some regulations adopted that would help to prevent forest fires on Indian reservations I visited Washington in the early part of December last and had satisfactory interviews with the Secretary of the Interior, the Commissioner of the General Land Office and with the Commissioner of Indian Affairs, with the result that the latter issued the following regulations and instructions, in form of a letter to the United States Chippewa Indian Agent at White Earth, under date of December 23, 1899. After setting forth provisions of the laws of the United States and of Minnesota for preventing forest fires, the Commissioner's instructions proceed as follows:

“It is the desire of this office that you use your best endeavors to prevent the Indians, so far as possible, from causing forest or prairie fires on any of the reservations under your charge. To this end you should take such action (by calling the Indians in council at some convenient time, or otherwise) as may be necessary, carefully to explain to them and all other persons who may be residing upon the reservations or there temporarily, the laws that have been enacted by the State of Minnesota for the protection of its forests—which laws the whites have to obey—and also inform them of the said Act of June 4, 1888, which provides that every person who wantonly destroys any timber upon any Indian reservation or lands of any tribe of Indians shall be punished by a fine of not more than \$500, or be imprisoned not more than twelve months, or both, in the discretion of the court. Further, they should be informed that

this office desires them to comply strictly with the following rules in the matter:

“ ‘1. It is forbidden for any Indian wilfully or maliciously to set on fire any timber, underbrush or grass, or any other combustible material upon Indian reservations, or carelessly or negligently to leave or suffer fire to burn unattended near any timber or other inflammable material.

“ ‘2. Any Indian who shall build a camp fire, or other fire, in or near any forest, timber or other inflammable material upon any reservation, or shall be a party thereto, shall, before breaking camp or leaving said fire, totally extinguish the same.’

“You should instruct your Indian police that when a forest or prairie fire occurs on the reservation, it is their duty to go to, and use all means in their power to extinguish, the same, and when such fire occurs which is beyond their control, they must as soon as possible report the fact to you or other officer of the government in charge, in order that the Chief Fire Warden of the State of Minnesota, whose address is St. Paul, Minnesota, may immediately be notified by wire or other speedy means.

“In case persons, other than Indians, who may be living upon the reservation, or railroad companies operating roads within the same, cause forest or prairie fires within the limits of the reservation, or violate any of the laws (heretofore referred to) enacted by the legislature of Minnesota April 18, 1895, for the protection of forests within the state, you should report the facts at once to the Chief Fire Warden of Minnesota, and take such other action in the matter as may be necessary to have the offender turned over to the proper officials of the state for trial and punishment under its laws, which extend to misdemeanors and crimes committed by whites upon any reservation in Minnesota.

“It is also desired that you co-operate heartily with the said Chief Fire Warden in this matter; and that whenever any forest or prairie fire occurs on any reservation, causing material damage or injury, the facts in the case be reported to this office within a reasonable time thereafter.

“Very respectfully,

“W. A. JONES, Commissioner.”



Forest scenery along the St. Paul & Duluth Railroad, ruined by forest fires in 1894, or previously. Photographed in 1899 for the Annual Report of the Chief Fire Warden of Minnesota.

SUMMARY OF FOREST FIRES, 1899.

COUNTY AND TOWN.	Date.	Acres.	Damage	Cause.	Controlled by Fire Warden or Helper.
Anoka County— Ham Lake	Dec. 24..	1,000	\$190	Unknown.....	Yes.
Beltrami County— Itasca	May 12..	450	15	Unknown.....	No.
Township 150-32.....	June 20..	200	100	Unknown.....	No.
Township 150-32.....	June 27..	100	Slight	Burning brush.....	Yes.
Township 150-33.....	April	400	Slight	Burning brush.....	No.
Township 150-33.....	May 20..	40	150	Spite.....	Yes.
Crow Wing County— Oak Lawn.....	April 16..	400	500	Unknown.....	Yes.
Otter Tail County— Girard.....	May 20..	400	75	Smoker.....	Yes.
St. Louis County— Township 53-21.....	May 3 ...	640	500	Fishermen.....	Yes.
Todd County— Bertha	April 25..	5	11	Burning grass.....	Yes.

Total acres burned over, 3,635. Damage, \$1,541.

Classification of causes:

From burning brush and meadow, 3.

From fishermen, 1.

From smoker, 1.

From other causes, 5.

REPORTS OF FIRE WARDENS OF FOREST FIRES IN 1899.

ANOKA COUNTY.

G. Soderberg, chairman of the town of Ham Lake, February 26, 1900.

On the 24th of December a fire burned over about 1,000 acres of brush, meadow and light timber and destroyed about ten tons of hay and 20,000 feet of lumber. Damage, \$190. I have investigated, but have not been able to learn the cause of said fire. It was extinguished in 12 hours after it started by hauling water in barrels and beating the fire with wet sacks. The weather was somewhat cold; wind from the northwest.

BELTRAMI COUNTY.

A. Lindgren, chairman of the town of Itasca, May 30th:

A fire which originated on section 16, May 12th, burned over 450 acres of light

timber and some green pine; damage, \$15. Cannot tell how it was caused. It was put out in five hours after it started by a heavy rain.

John Clear, of Langor, January 26, 1900:

On the 20th of June a fire in the southeast part of the unorganized township 150, range 32, burned over 200 acres of pine timber, killed most of the timber, and they are logging it now. Damage very little. The fire originated near a saw mill; the parties had finished sawing and were likely burning the slashings around the mill before leaving it for the summer. The fire was extinguished by rain. I, living five miles from there, did not know of the fire at the time,

On the 27th of June, 10 a. m., a fire on section 2 burned over 100 acres of timber, which is now being logged. No damage. It was caused by clearing land that had been logged over the previous winter and was extinguished in 10 hours after it started.

T. J. Costello, of Nebish, January 21, 1900:

In April, a fire originating on section 28 burned over 400 acres of cut-over lands. Did no damage. Was set by the owners to burn tops and stuff.

Michael Kelly, of Nebish, January 16, 1900:

Late in the evening of May 20th a fire originating on section 21, township 150, range 33, burned over 40 acres of cut land and destroyed two hovels and 20 tons of hay; damage, \$150. It was probably set for spite by some man discharged from camp. The weather was dry, but the ground was wet at the time; ran over some of the old cutting, but did no damage to timber. It was put out in twenty-four hours after it started by two men, who kept it between the track and Mud river. It got no headway except around the hovels. We set fire along the track about that time, which is the only way to avoid big fires along a logging railroad. It burned back from the track on an average about 20 rods. Of course there were a great many small fires set by the (railroad) engine along the track through the summer, but did no damage to standing timber. There was no fire last year in towns 150-34, 150-35, 150-36, nor in 149-34, 149-35 and 149-36. Those are the most dangerous towns for fire in the county, but escaped last year with no fires to speak of.

CROW WING COUNTY.

George Keough, chairman of the town of Oak Lawn, May 18th:

On the 16th of April a fire on section 9, township 45, range 30, burned over 400 acres of mostly light pine timber; damage, \$500. It was vacant land and must have been set by hunters or others. I have been unable to learn by whom. It was extinguished in five hours after it started by five persons and mostly by back-setting.

OTTER TAIL COUNTY.

H. B. Olson, chairman of the town of Girard, May 24th:

May 20th, 10 a. m., a fire caused by party unknown burned over 400 acres of hardwood and brush; damage, \$75. It was vacant land. It was extinguished in six hours after it started by the use of horses and plow and by back-firing. The wind blew hard from the southeast.

ST. LOUIS COUNTY.

John Hillman, of Floodwood, June 15th:

From May 3d to 12th three fires occurred in townships 53-21 and 53-22. The first was caused by night fishermen, who were unknown. It burned over 640 acres and destroyed about 2,000 cords of hard wood, mostly birch; damage, \$500. It was extinguished by back-firing. The weather was windy. The other two fires were caused by farmers burning brush and did not do much damage.

TODD COUNTY.

L. P. Leech, president of the village of Bertha, June 14th:

A fire on the 25th of April burned over 5 acres and destroyed wood of the value of \$11. It was caused by setting fire to old grass. Had it not been for the fire being extinguished by railroad section men, 1,000 cords of wood, the depot, two dwellings and a stable would have been liable to be burned.

SUMMARY OF PRAIRIE FIRES, 1900.

COUNTY AND TOWNS.	Date.	Acres.	Damage.	Cause.
Becker County— Township 141-41-42.	Nov. 1-10.....	2,000	\$300	Unknown.
Benton County— Longola.....	April 13.....	200	10	Unknown.
Chisago County— Rusheba.....	Jan. 8 (1900).	600	2,000	Burning brush.
Clay County— Flowing.....	April 16.....	800	Slight	Unknown.
Glyndon.....	Aug. 13.....	1	12	R. R. locomotive.
Hawley.....	Nov. 4.....	100	150	R. R. locomotive.
Highland Grove.....	Oct. 1.....	25	225	R. R. locomotive.
Riverton.....	Sept. 12.....	5	71	R. R. locomotive.
Riverton.....	Oct. 12.....	10	81	R. R. locomotive.
Kittson County— Spring Brook.....	Oct. 9.....	600	Slight	Unknown.
Lac qui Parle County— Augusta.....	Oct. 31.....	300	500	Threshing engine.
Augusta.....	Jan. 8 (1900).	40	60	R. R. locomotive.
Mehurin.....	May 6.....	500	None	Unknown.
Mehurin.....	Sept. 30.....	450	None	Unknown.
Manfred.....	May 6.....	500	None	Unknown.
Lincoln County— Drammen.....	April 16.....	600	None	Unknown.
Drammen.....	Nov. 21.....	100	10	Traveler.
Royal.....	Oct. 30.....	80	300	Unknown.
Marshall County— Comstock.....	Oct. 5.....	800	Slight	Burning straw.
Foldahl.....	Nov. 6.....	400	132	Boys.
Spruce Valley.....	Nov. 10.....	600	None	Unknown.
Spruce Valley.....	Nov. 12.....	100	10	Unknown.
West Valley.....	Oct. 5.....	500	None	Unknown.

SUMMARY OF PRAIRIE FIRES—*Continued.*

COUNTY AND TOWNS.	Date.	Acres.	Damage.	Cause.
Murray County— Dovray	Dec. 21.....	60	300	Unknown.
Norman County— Good Hope.....	Jan. 23 (1900).	1,220	50	Unknown.
Polk County— Chester	May 2.....	1,600	None	Burning meadow.
Eden	May 13.....	200	50	Unknown.
Parnell.....	Oct. 7.....	3,000	200	Burning grass.
Vineland.....	Nov. 3.....	300	None	Burning brush.
Red Lake County— Black River.....	Nov. 5.....	500	150	Unknown.
Lambert.....	May 4.....	300	None	Burning break.
Redwood County— Vaile	Sept. 27.....	100	135	Unknown.
Roseau County— Dewey.....	Nov. 1.....	8,000	50	Unknown.
Yellow Medicine Co.— Minnesota Falls	Nov. 8.....	25	60	Burning stubble.

Total acres burned over, 24,616. Damage, \$4,856.

Per cent extinguished or controlled by fire wardens, 44.

Classification of causes:

Burning grass, straw or stubble, 6.

Railroad locomotives, 6.

Other causes, 4.

Unknown, 18.

REPORTS OF FIRE WARDENS OF PRAIRIE FIRES IN 1899.

BECKER COUNTY.

[From the Pioneer Press of November 10th.]

[SPECIAL.] WHITE EARTH, NOV. 9th.—Prairie and timber fires have been raging in the vicinity of the agency during the past week. A great deal of damage has been done to hard wood timber.

George W. Taylor, of Detroit, November 20th:

I visited the section of country on the White Earth reservation where the recent fire occurred. It was difficult to ascertain where it originated, owing to the sparsely settled condition of most of the territory over which the fire ran. It was mostly confined to prairie lands lying west and north of the agency a few miles and extended to some extent through some timber, mostly poplar, and over which



Cut over, non-agricultural pine land, now useless, near Ely. If planted with pine would earn a good revenue. There are probably a million acres of rocky, non-agricultural land in Northeastern Minnesota. That would yield good pine forest. Photographed, 1909, for the Annual Report of the Chief Forester of Minnesota.

fires have spread more or less for several years, and going off the reservation west-erly. This fire occurred between the 1st and 10th of November, continuing three or four days and nights, during which time the weather was dry, until frosty nights seemed to extinguish it. As to the area of land burned over, it is difficult to judge—perhaps 2,000 acres or more. As to damage, it is difficult to estimate, but the damage was nominal, as it was mostly prairie grass. No means of ascertaining how or by whom the fire started. No particular precautions seem to have been taken, as much of this territory is not inhabited. I went to the locality personally. Nobody seemed to know much about it, regarding it of not much note. Even the agent did not seem to be acquainted with the fact that there had been a fire, from the fact, perhaps, that he was away from home about that time. The country between Detroit and the agency is for about twelve miles—to the edge of the reservation—timber land, somewhat rolling; from there to agency, twelve miles farther, prairie, interspersed with hazel bushes and light timber groves. Northwest of agency six to twelve miles farther, where the fire ran, mostly prairie and more level. What timber there is between here and there is a mixture of hard and soft, no pine or spruce.

BENTON COUNTY.

John B. Schuoler, chairman of the Town of Langola, October 7th:

On the 13th of April, the weather being windy, a fire on section 27 burned over 200 acres of prairie and light timber; damage, \$10. It was extinguished in eleven hours after it started by hauling water and plowing fire breaks. If it had not been checked in time it would have done damage to the amount of \$900 on buildings.

CHISAGO COUNTY.

[NOTE.—The following fire, though actually occurring in the year 1900, nevertheless took place during an unusual spell of dry weather and when the ground was bare; the offender was prosecuted and paid a fine of \$15, together with \$3.05 costs.]

Fred Marty, chairman of the Town of Rusheba, Jan. 12, 1900:

On the 8th of January (1900) between 2 and 3 o'clock p. m., a meadow fire which originated on section 32, being land occupied by William Daw, burned upon eighteen forties of meadow and brush and destroyed 300 tons of hay and one hay press; damage, \$2,000. It was caused by fire getting away while burning brush and clearing land. It was extinguished in five hours after it started by the work of twelve persons by beating it out with wet sacks, by the Cambridge wagon road, and by a light shower in the evening. The weather was very windy; had been dry all the fall. Light snow fell three weeks ago, but this melted about two weeks ago. The day the fire occurred everything was very dry and the fire ran on the short aftermath like fury.

CLAY COUNTY.

H. C. Jarr, chairman of the Town of Flowing, May 31st:

April 16th, 8 p. m., a prairie fire originating on vacant land in section 25 burned over 800 acres. It was extinguished in twelve hours by two persons by pounding with wet sacks. The weather was still and dry in the evening, but damp from frost towards morning. I am unable to get a clue as to who caused the fire; there is no doubt but it was carelessly or wilfully set by someone, either a passer-by or a

resident; but the nearest resident came out to fight the fire without being called on. No particular damage.

There were two smaller fires on the 21st of April and May 26th, in the east part of our town, that were extinguished by myself and natural barriers in about half a day each place.

H. J. McCarty, chairman of the Town of Glyndon, August 19th and September 11th:

On the 13th of August at 3 p. m. a fire on section 10, caused by freight train going west on the N. P. R. R., burned over half an acre and destroyed twelve shocks of wheat; damage, \$12. The fire was extinguished by the shocking crew of twenty-five persons, in two hours after it started, by moving shocks, fighting the fire, etc. If the fire had been left alone great damage would have been done to the entire field, as well as to adjoining fields. The weather was very dry—not very windy.

F. H. Burrill, chairman of the town of Hawley, December 5th:

On the 4th of November fire originated on vacant land in section 7 and caused from locomotive of the N. P. R. R. train going east; burned over 100 acres, destroyed 11 tons of hay; damage, \$150. It was extinguished in seven hours after it started by five persons, mostly by back-firing. The weather was fairly windy; wind southwest. It was with difficulty that some of the railroad property was saved.

C. J. Cederberg, chairman of the town of Highland Grove, December 29th:

October 1st a fire on section 17, caused by a locomotive of the N. P. R. R. Co., burned over 25 acres and destroyed 45 tons of hay; damage, \$225. It was extinguished in three hours after it started by twenty persons by plowing and using wet sacks, or the damage would have been much greater.

L. L. Crawford, chairman of the town of Riverton, October 27th:

The following fires have occurred on sections 11 and 12, caused by trains on the N. P. Railroad: September 9th, a fire which burned over 5 acres of prairie occupied by R. T. Evans; one September 12th, which burned 71 shocks of wheat; one October 12th, which burned 81 shocks of wheat, and one October 13th which burned a few acres of prairie; damage, \$150. The weather was dry. The railroad company did not burn or in any way clear their right of way until very recently, October 25th, I believe, and not until several fires had been set.

KITTSON COUNTY.

John Seeger, chairman of the town of Spring Brook, January 1, 1900:

On the 9th of October a prairie fire, which originated on vacant land in section 35 from cause unknown, burned over 600 acres. Wind was in the northwest and there was no damage done.

LAC QUI PARLE COUNTY.

John M. Pfister, chairman of the town of Augusta, October 31st:

At 2 p. m. of this date a fire which originated on section 11, vacant land, from sparks from a traction engine while moving across meadow, burned over 300 acres

of meadow and destroyed 18 hay stacks; damage, \$500. The weather was clear with heavy wind from the northwest. About forty persons assisted in extinguishing the fire, which was done in two and one-half hours after it started.

Same, January 8, 1900:

On this date a fire, which originated on vacant land in section 25 at 10 o'clock a. m. from freight locomotive going east on M. & St. L. R. R., destroyed 20 tons of hay; damage, \$60. It was extinguished in two hours after it started by twelve persons with shovels, brooms and sacks. Weather dry and a strong southwest wind blowing.

J. J. McLeod, chairman of the town of Mehurin, May 26th:

On the 6th of May a fire burned over 550 or 600 acres; no damage. It was extinguished in six or eight hours by four persons by back-firing and making breaks, our only mode of stopping prairie fires. The weather was dry and rather windy. The fire started on section 7 in the town of Manfred and burned over sections 7 and 5 in that town. We have made every inquiry into the matter, but cannot ascertain how the fire started.

Same, October 4th:

On the 3d of September a fire burned over 450 acres in the southeast part of the town; no material damage done. The fire was extinguished in three hours after it started, by the work of six persons. The weather was very windy.

Ed. E. Thompson, chairman of the town of Manfred, June 6th:

On the 6th of May a fire, which originated on section 7, burned over 500 acres and destroyed only the grass growing on the land. Am unable to ascertain the cause. The weather was clear with little wind.

LINCOLN COUNTY.

Ole Johnson, chairman of the town of Drammen, May 25th:

April 16th a fire, from cause which I cannot ascertain, started early in the morning along the road and burned over 600 acres on sections 24 and 25; no damage. The weather was warm and windy.

Same, December 30th:

On the 21st of November a fire on section 25 burned over 100 acres, destroying a stack of hay of the value of \$10. It was vacant land, and the fire was caused by a person traveling on the road, but I have never been able to find out who it was. The fire was whipped out in nine hours after it started.

John Matz, chairman of the town of Royal, December 12th:

Between 1 and 2 o'clock in the afternoon, October 30th, weather being windy, a fire, originating from cause unknown, burned over 80 acres of vacant prairie and brush land in section 28 and destroyed 20 tons of hay of the value of \$60. Total damage, \$300. The weather was windy, and the fire was extinguished in four hours after it started by thirteen persons using team and plow, water and wet rags and sacks.

MARSHALL COUNTY.

O. L. Skonovd, chairman of the Town of Comstock, October 14th:

On the 5th of this month a fire, caused by burning straw, burned over 800 acres, but did not do much damage. It originated on land occupied by P. Gersk on section 20. It was extinguished in four hours after it started by plows and wet sacks.

Amund Johnson, chairman of the town of Foldahl, November 11th:

On the 11th instant, between 11 and 12 a. m., a fire which started on vacant railroad land in section 21 burned over 400 acres of meadow and brush and destroyed forty-four tons of hay; damage, \$132. The weather was dry and windy. The fire was extinguished in ten hours after it started by eight persons. It was caused by two boys under 12 years of age, and I am advised by the county attorney that no prosecution can be sustained against either them or their father.

C. A. Anderson, chairman of the town of Spruce Valley, November 18th:

On the 10th of this month a fire burned over six acres of meadow, but did no damage.

On the 12th instant, a fire on section 22 burned over about 100 acres and destroyed five tons of hay of the value of \$10. It was extinguished in five hours after it started by seven persons by plowing and with wet sacks. The weather was warm and windy.

Andrew Houde, chairman of the town of West Valley, December 9th:

On the 5th of October a fire, which originated in the town of Lincoln, burned over 500 acres of brush meadow. It was put out by six persons before it did any damage. The weather was dry, with strong wind from the north.

MURRAY COUNTY.

William Connick, chairman of the town of Dovray, December 25th:

On the 21st instant a fire, which was purposely set, burned over 60 acres of prairie, field and timber and destroyed 25 tons of hay and 4 acres of cottonwood grove; damage, \$300. It originated on section 23, being land partly occupied by William Schultz. It was extinguished in three hours after it started by three persons, and by pounding it out with wet sacks.

NORMAN COUNTY.

John Liback, chairman of the town of Good Hope (January 25, 1900):

On the 23d instant, a fire originating on sections 29, 30 and 32, being land occupied by L. Olson, Ole Olson and J. S. Tucker, caused, I believe, by clearing off old grass for hay land, burned over 1,220 acres of prairie and brush and destroyed a stack of 20 tons of hay; damage, \$50. It was extinguished in ten hours after it started by five persons by back-firing, by using wet sacks and by graded roads, There was light wind from the southeast.



Non-agricultural sand near Ellj mine covered with pine forest. Photographed, 1900. (For the Annual Report of the Chief Fore Warden of Minnesota)

POLK COUNTY.

L. J. O'Neill, chairman of the town of Chester, June 1st:

On the 2d of May a fire, set on section 30 to burn off old grass on meadow land, burned over 1,600 acres of prairie and meadow; did no damage. It burned out in about nine hours of its own accord. Weather warm and dry, with southwest wind.

Severt Larson, chairman of the town of Eden, June 20th:

On the 13th of May a fire on section 10, being land occupied by F. Gilbert, who was fifty or sixty miles from home, working in the pineries, burned over about 200 acres of brush. It was extinguished in three hours after it started by three persons with water and by fighting with wet rags. Weather dry and windy.

C. Casavan, chairman of the town of Parnell, October 18th:

On the 7th instant a fire in the northwest part of the town (151-46) burned over 3,000 acres, destroyed 5 stacks of hay; damage, \$200. Ten persons assisted in putting it out. [John Fee was convicted of causing the above fire and fined \$30, which he paid. The evidence showed that the weather was dry; that the fire was started some days before and remained smoldering until the wind rose and then the damage was done.]

A. P. Moen, chairman of the town of Vineland, November 21st:

On the 3d of November, a fire, caused by parties burning around their hay stacks on section 24, burned over 300 acres of meadow; destroyed nothing. It was put out by back-firing and using wet sacks.

RED LAKE COUNTY.

John Power, chairman of the town of Black River, November 28th:

On the 5th instant at 10 a. m. a fire originating from cause unknown on vacant land in section 5 burned over 500 acres of prairie and meadow and destroyed 5 stacks of hay; damage, \$150. It was put out in seven hours after it started by seven persons with team and plow and men with wet sacks. The weather was windy.

Adolphe Plante, chairman of the town of Lambert, May 21st:

May 4th a fire on section 27 on land occupied by Abraham Lacoursiere, caused by burning rubbish, burned over 300 acres, but did no damage. Weather dry and windy. The fire was extinguished in four hours after it started. Damage was prevented by plowing around buildings.

REDWOOD COUNTY.

Theodor Daub, chairman of the town of Vail (February 27, 1900).

On the 27th of September a fire which originated on section 20 burned over 100 acres and destroyed grain in stacks of the value of \$135. It was extinguished by four persons by plowing. The weather was dry, with northwest wind.

ROSEAU COUNTY.

Ellert Hanson, chairman of the town of Dewey (January 23, 1900).

November 1st a fire, which came into our town from the north and east, burned over half the town, being prairie land with poplar groves, and destroyed 25 tons of hay of the value of \$50. Cause unknown. Four persons were called to help control the fire. We could not extinguish it, but it burned against a sand ridge and extinguished itself in the morning. We saved a lot of hay and shanties by setting back-fire. The weather was dry and windy in the evening, but became damp in the morning.

YELLOW MEDICINE COUNTY.

A. H. Frase, chairman of the town of Minnesota Falls, November 9th:

The 8th instant a fire set to a straw stack on section 33, on land that was occupied by H. Fairbanks, burned over 25 acres of meadow and destroyed about 25 tons of hay of the value of \$60. The weather was dry, with a light south wind. The fire was extinguished in two hours after it started by plowing and back-firing. The hay burned was owned by W. H. Cook, and if the fire had not been extinguished it would have destroyed another 10 tons of hay, worth about \$25.

DUTIES OF THE CHIEF FIRE WARDEN.

The Fire Warden Law of Minnesota makes township supervisors (many of whom are newly elected each year and require instructions), mayors of cities and presidents of village councils fire wardens by virtue of office. In unorganized territory fire wardens are appointed by the Chief Fire Warden. The Chief Fire Warden is the deputy of the Forest Commissioner, and his duties and authority are to:

Enforce the fire warden law;

Divide into fire districts unorganized territory;

Appoint fire wardens in or near unorganized territory;

Have general charge of fire warden force in the state;

To mass the fire warden force at any point;

Appoint temporarily fire wardens;

Coöperate with police or military force of the United States;

Furnish warning notices to fire wardens and railroad companies;

Instruct fire wardens as to their duties;

Require reports from fire wardens;

Investigate, and include in ANNUAL REPORT, information as to

Extent of the forests in the state;

Amounts and varieties of wood and timber growing therein;

• Damages done by forest fires, and causes of such fires;

Method used to promote regrowth of timber;

And any other important facts relating to forest interests. •

WHAT FORESTRY SCIENCE IS.

Forestry is the science of growing trees for profit and should interest us in this state, because our climate and much of the soil is peculiarly adapted for growing pine. The white pine loves good soil and is never more beautiful and healthy than when surrounded by such hardwood neighbors as the yellow birch, the maple and the elm, and with a profusion of shrubbery at its feet; but it is not an exacting tree, and will thrive on poor soil. True economy demands, and it is a fundamental principle of forestry, that good soil be reserved for field crops. It takes eighty years on an average to raise a crop of pine trees on sandy soil. This is too long for individuals to wait for a crop and, if the business is to be undertaken extensively, it must be by the state. Forestry is therefore a question which concerns the public. The one great truth to be impressed on the public mind is, that we have in Minnesota about three million acres of idle land which is fit only for bearing pine and which, if planted with pine and administered on forestry principles, would earn a net revenue of three per cent per annum, compound interest on the capital expended in the work. The income would be available with the principal at the maturity of the crop. At the end of eighty years a regular net revenue of over one million dollars would be derived yearly, for all time, and

the forest would be increasing in value. The science of forestry as practised for a century in various German and other states of Europe shows this to be absolutely certain.

The secret of forestry is that coniferous trees, such as the pine, take from the soil only a twelfth part of mineral substances that are required for field crops. Pine forests will yield a steady net revenue of three per cent on land that is not fit for agriculture. Minnesota has taken but one step in scientific forestry—the endeavor to protect the forest from fire. There are four leading principles of forestry. Forests should occupy only non-agricultural land. When young it should be crowded to promote height growth. It should be treated as an inviolable capital and no more be cut in a series of years than equals the general increment for the same period. The cutting should be done so as to promote natural seeding. These principles apply to normal forests.

In a primeval forest of mostly trees that have ceased growing, and therefore have ceased to earn revenue, the cutting may be as rapid as the market will justify. Forestry makes no objection to the lumberman cutting ripe trees, but it objects to his terrible neglect in leaving so much material for fire. It is certain that forestry would make our state richer, healthier and handsomer. The state should acquire possession of the non-agricultural land and put it in forest.

WHAT IS FOREST PRESERVATION?

Forest preservation is a term liable to be misunderstood. It does not mean that full grown trees in a forest shall be spared from the axe. It means preserving the forest from fire, from ruthless waste, and that a chance be given for natural forest regeneration. A forest that is mature has ceased to grow. It is no longer an interest yielding capital and should be cut as fast as the market will justify.



Cut over, non-agricultural land, near Mountain Lake. Photographed, 1906, by the Annual Report of the Chief Forester, Bureau of Forestry, U.S. Department of Agriculture.

PROFITS FROM GROWING PINE.

A bulletin on the white pine lately published by the Division of Forestry, Washington, shows that in Plymouth and Bristol counties, Massachusetts, pine thirty-five years old measured nearly a foot in diameter, and that the land, which without the pine would be worth only \$3 to \$10 per acre, was worth with the standing pine \$50 to \$75 or more per acre, according to location.

I know of a farm of 300 acres on the Connecticut river, in Vermont, which was offered for sale a year ago for \$15,000; yet, recently, just the standing pine on it was sold for \$14,000. The owner had not before understood its value. This pine had grown in a man's life time. If the Minnesota farmers, even in the prairie regions, would plant a few acres of white pine on their poorest dry soil, it would add value to their property and beautify their landscape. On our poorest sandy soil it will take, as before stated, on an average, probably eighty years for a crop of pine to grow to merchantable size; but it will not make as good lumber as the virgin pine now being cut in Minnesota that has been growing from 100 to 300 years and which, when removed, we shall never see its like again.

At Greenfield, N. H., last summer I saw a twenty-acre tract of standing white pine that had just been sold for \$1,800, \$90 an acre. It was not agricultural land, but a rocky hillside. Very few of the pines exceeded a foot and a half in diameter. They had all come up from natural seeding and their average age probably did not exceed fifty years. The trees were being cut and sawed by a portable steam mill into boards, which were shipped by railroad to the city of Lowell, forty miles distant. The amount of timber in the tract was sold at an estimate of 600,000 feet, so that the price per 1,000 feet was only \$3, which, considering that the railroad station is only two miles distant by good road, seems very cheap. The ends

of some of the logs which were being sawed were only four inches in diameter.

The land itself, when cleared, would bring scarcely a dollar an acre, so here was a revenue of \$90 an acre in fifty years, from a piece of non-agricultural land, by raising white pine, which is more than most farmers get from agricultural land after deducting the cost of labor and other expenses. I doubt if white pine will grow as rapidly in Northern Minnesota as it does in Southern New Hampshire, still it is clear that our non-agricultural land would yield a fair net profit if planted with pine.

An acre of white pine on abandoned land in Farmington, N. H., yielded in fifty-one years 48,000 feet, board measure, worth there probably \$8 a thousand, or \$384 gross earnings of an acre. What forestry science needs first in this state is, that public opinion be aroused and instructed so that the legislature will give the subject the attention it deserves. It is the tendency of people to waste their sympathy or indignation on what is happening ten thousand miles away, to the neglect of affairs at home. If forestry science is to be popularized its principles must often be repeated. They are, that forest is to occupy only non-agricultural land; that it must be crowded when young so as to promote height growth; that the forest is to be permanent, and, after it reaches its normal condition, no more is to be cut in a year or series of years than equals the increment, or growth, of the entire forest for the same period, the cutting to be done so as to promote natural reproduction. The forest is to be treated as an inviolable capital, and only so much taken from it per year, or series of years, as will yield a fair revenue.

AN IDEAL FOREST.

Let us suppose that, eighty years ago, a man owned 80 acres of land that was too hilly, or too sandy, or too rocky for successful agriculture, and that he then began

to plant it with white pine, an acre each year. The work was continued by his son, and the last one of the 80 acres was planted this year. You have then, on a small scale, an ideal forest. You can begin this year to harvest the crop by cutting the acre that was first planted, the timber on which is eighty years old. On this acre a new crop of pine will soon start up from seeds which have fallen from neighboring trees. If all the surface is not reseeded naturally, then the bare spots must be planted. Next year you can cut another acre, and so on. In eighty years more the acre that was planted this year will be ready to cut. When the trees first came up, or were first planted, they stood very thick, four thousand or more on an acre; they competed for air and light, which promoted height growth; the weak ones died out, and at the end of eighty years the acre first planted contained, perhaps, 150 sound trees. But these trees will probably average each 500 feet, making for the whole 75,000 feet, the product of one acre. If the pine should be standing near good roads or populous communities it might be worth, as it stands, \$5 per 1,000 feet, or \$375.00. This may be too high an estimate for the yield on merely sandy soil, but it is not an excessive estimate for a moist and loamy soil, sheltered from strong winds.

SHOULD LAY THE FOUNDATIONS OF SUSTAINED FOREST YIELD.

Today we are cutting fifteen hundred million feet of pine in our Minnesota forests each year, but in twenty years the demand on our forest resources will be far greater than now. We should begin to lay the foundations of sustained forest products because nature will work with us. It was Frederick the Great who started forestry in Prussia, and the people of Minnesota can do as much for their state, if they will but give the matter attention. Fortunately we have not the incentive that he had, when,

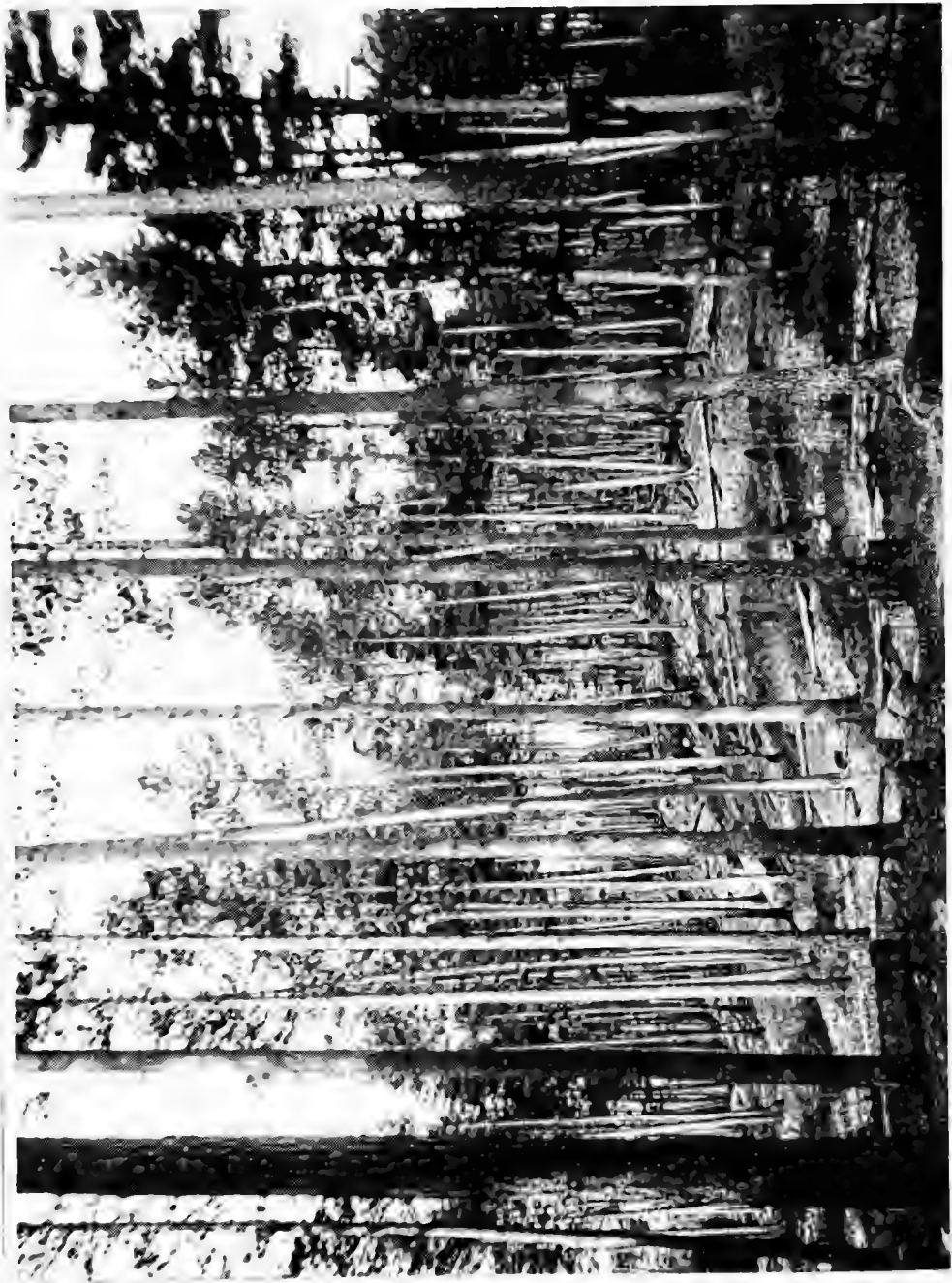
after six years' absence in a foreign war, he returned to a country reduced, as Carlyle says, "to skin and bones."

The value of the 10,000,000 acres of state forests in Germany, being on land unfit for agriculture, is \$700,000,000, an amount equal to the total assessed valuation of property in Minnesota. The average net revenue therefrom is \$23,000,000. And the forests are more in the nature of a park than of a wilderness. From the city of Freudenstadt, of 6,000 inhabitants, in the Black Forest, one can, in five minutes, step into the deepest woods. The principles of forestry are the same here as in Germany, but owing to the denser population, cheaper labor and higher value of products the profits of forestry there are much greater than could be expected here for a time. However, they would be fair here, and prove from the start the mother of wages. The sun, air and rain—all great factors in forest growth—are ready to go into partnership with our state in the forestry business, the state to furnish its sandy soil as capital, and receive all the dividends.

Our state received as a gift from Congress school lands which will finally yield a permanent fund of \$25,000,000. Minnesota owes a debt of gratitude to the Union for this, which she cannot better pay than by putting her best foot forward on the forestry question.

THE SENTIMENTAL SIDE.

The science of forestry has to do only with the dollars and cents that can be got out of the forest. It is purely economic. But there is a sentimental side of the forest which appeals to people generally, and which should be a powerful ally to forestry. The forest is nature's loveliest work. The ocean, lofty mountains and great rivers are sublime, but there is also something in them that is dreadful. We can go into the forest; we can handle it; we feel invigorated by its air, solaced by its tranquillity,



Norway pine forest on non-agricultural land in Lake County. Photographed 1900, for the Annual Report of the Chief Fire Warden of Minnesota.

inspired by its majesty. Hence it is that the greatest poets of all ages have made the forest a favorite theme and source of illustration. The forest is landscape and in some sense belongs to the public.

INDIRECT BENEFITS OF THE FOREST.

The forest improves climate. The air of the forest is a little warmer in winter and a little cooler in summer than the air of open country. The forest is a barrier to the cold north wind and to the hot south wind. Forest air, like that of the sea, is richer in ozone, and therefore healthier than the air of open country. The forest holds moisture, and therefore helps to maintain and equalize water flow. The forest enriches the soil.

LUMBER MANUFACTURERS AND FORESTRY.

“The intelligent efforts of forestry commissions,” said Mr. William Irvine, president of the Mississippi Valley Lumbermen’s Association at its annual meeting, in 1899, “should receive your support, to the end that waste shall be avoided, and the danger of forest fires reduced to the minimum. The interests of all lumbermen lie in the direction of efforts being made by the fire wardens of the northwestern states, and from united efforts will follow good results.”

PINE ON DIMINISHED INDIAN RESERVATIONS.

There are some valuable tracts of white and Norway pine on the diminished Red Lake and White Earth Indian reservations which remain under the control of the Interior Department, and which should be administered according to forestry principles. In this way the ripe pine would be cut as fast as it could be sold to advantage, and the young growth would be thus protected. The Indians would thus have a perpetual forest. This clearly would be much better for the Indians than to permit the pine to be cut in the ordinary destructive way of lumbering, which is to

clear the land entirely, and with no reference to future re-growth. By "diminished reservations" is meant the land which the Indians did not cede by the existing treaty. Here is a most excellent opportunity for the government to put in practice good forestry methods. And if the Interior Department and our Minnesota delegations in Congress are truly friendly to forestry, they will see that this policy is adopted. The friends of forestry strongly object to having the pine on the diminished Indian reservations consumed under the ordinary destructive methods of lumbering without regard to forest regeneration. A bill, however (H. R. 998), has been favorably reported by the Committee on Indian Affairs in the United States House of Representatives which authorizes the cutting annually of 10,000,000 feet on each of the Red Lake and White Earth "diminished" reservations, under the supervision of the United States Indian Agent. The report of the committee estimates that there are 800,000,000 feet of pine on the two reservations. As soon as I heard of this bill and report I sent a recommendation to the introducer of the bill, also to the Interior Department, that the bill be amended so as to have the cutting of the pine done under the supervision of the United States Division of Forestry, but, finding that the Interior Department was averse to such an amendment, I then recommended that the bill be amended by striking out the clause authorizing the cutting to be done under the supervision of the Indian Agent and by inserting the following at the end of the second section:

Provided, however, that the cutting, banking and handling of said timber shall be done under the supervision of a competent forester, or foresters, to be employed by the Secretary of the Interior solely with reference to their fitness and without regard to party affiliation.

The disposal of the pine forests in Minnesota has for fifty years been lavish and without regard to reproduction.

The government is still selling its choicest pine at \$2.50 an acre to whoever is enterprising enough to find it; also gives it away under the homestead law—a law which properly applies only to land taken in good faith for cultivation. Whatever pine remains the property of the government, or of the Indians, should be placed under forestry management. For twelve years there has been a United States forestry bureau which has been kept free from party politics. We have in this country a number of young Americans educated in forestry and habituated to the woods, who have a pride in their profession as foresters and who could be depended on to do their work with ability and fidelity. If the remaining public pine lands and Indian pine lands were placed under the charge of the United States division of forestry, these trained foresters would be employed to take care of this standing pine on forestry principles. The pine would be examined and estimated; the mature trees that ought to be cut would be counted, marked, sold and honestly paid for; the young timber would be left to grow; the forest would be watched, fires kept out and a foundation laid for a sustained yield. Of course, by far the greater part of the original pine forest in Minnesota has been consumed and of what remains standing the greater part has passed into the possession of private parties who will do with it as they please. The rest is under the control of congress and the general government, and to allow this remnant to be disposed of in the prodigal way that has hitherto prevailed, and especially to permit three million dollars worth of pine on the diminished Indian reservations to be cut under the supervision of an Indian agent, as a bill now in congress proposes, slaps forestry in the face. Our entire delegation in congress should be held responsible that there shall be no more Indian pine land scandals in Minnesota.

A STROLL IN THE BLACK FOREST.

An article in the *Outing Magazine*, last summer, by Mary E. Blake, under the above title, tends to show how a natural forest region can be used for forestry and park purposes without preventing the development of agricultural lands that are found in its limits. It shows that excellent carriage roads, railroads, towns, cities, wheat fields, and a happy population are a part of the "Black Forest," and if read by people in Northern Minnesota who are objecting to a national park would probably modify their views. I quote a few passages:

"The cost of the journey from Freiburg to Schaffhausen, including such luxuries as baths, the wild extravagance of our ten miles of charioteering, and the railway fare from Neuhausen, was \$23.28 for the party of four. This gave an average of \$5.82 for each person, from 2 o'clock on Sunday afternoon to 9 o'clock on Thursday morning. We were in very light marching order. The heavier bags had been sent two or three days ahead, by that parcel-post which is such a blessing in Europe. To mail your baggage as you would a letter or a newspaper, pay a small postage and call for it at the desired postoffice with the rest of your mail, is a comfort and convenience which we have not yet reached in America. We were to cross the forest diagonally to the Rhine falls, entirely away from the towns which usually attract the commercial and conventional traveler.

"The smooth white road wound through the broad fields, shaded by rows of thrifty trees, and followed always by the singing brook that told of the hills beyond. There was no dust. The softly rounded mountains stretched away to the horizon in picturesque vistas; orchards and wheat lands ran partly up the sides to meet the wooded slopes. Such luxuriant farming lands we had not seen before, with scattered flocks and herds browsing

in places, and sometimes a newly ploughed field waiting to be planted again after the early harvest. There is no hint in the landscape of any reason for the romantic name of the region. We stopped for the night at the fascinating small wayside inn of the Golden Lion.

“Four or five miles along we sent our remaining sacks by train to Titisee. Then, through the beautiful woods to the right, began the three hours' climb to the Feldberg, over a charming path deeply shadowed by forest trees, and with small rustic galleries built here and there for special views. A very beautiful, broad road, thickly shaded, led from this to Titisee, ten miles away, through woods that were a delight, with views of exquisite scenery opening constantly to the valleys below. The road continued full of delight in the way of unexpected beauty. Fleeting glimpses of the snowy Alps, the long curves of enchanting valleys, picturesque villages set in the midst of gardens so carefully tended that they appeared to be swept and garnished each morning, were always about us. The beauty of the scenery, the perfect condition of the roads, with a quaintness of dress and manner on the part of the inhabitants which is fast becoming lost in other parts of Germany, made these few days among the most interesting of our four months' walking tour.”

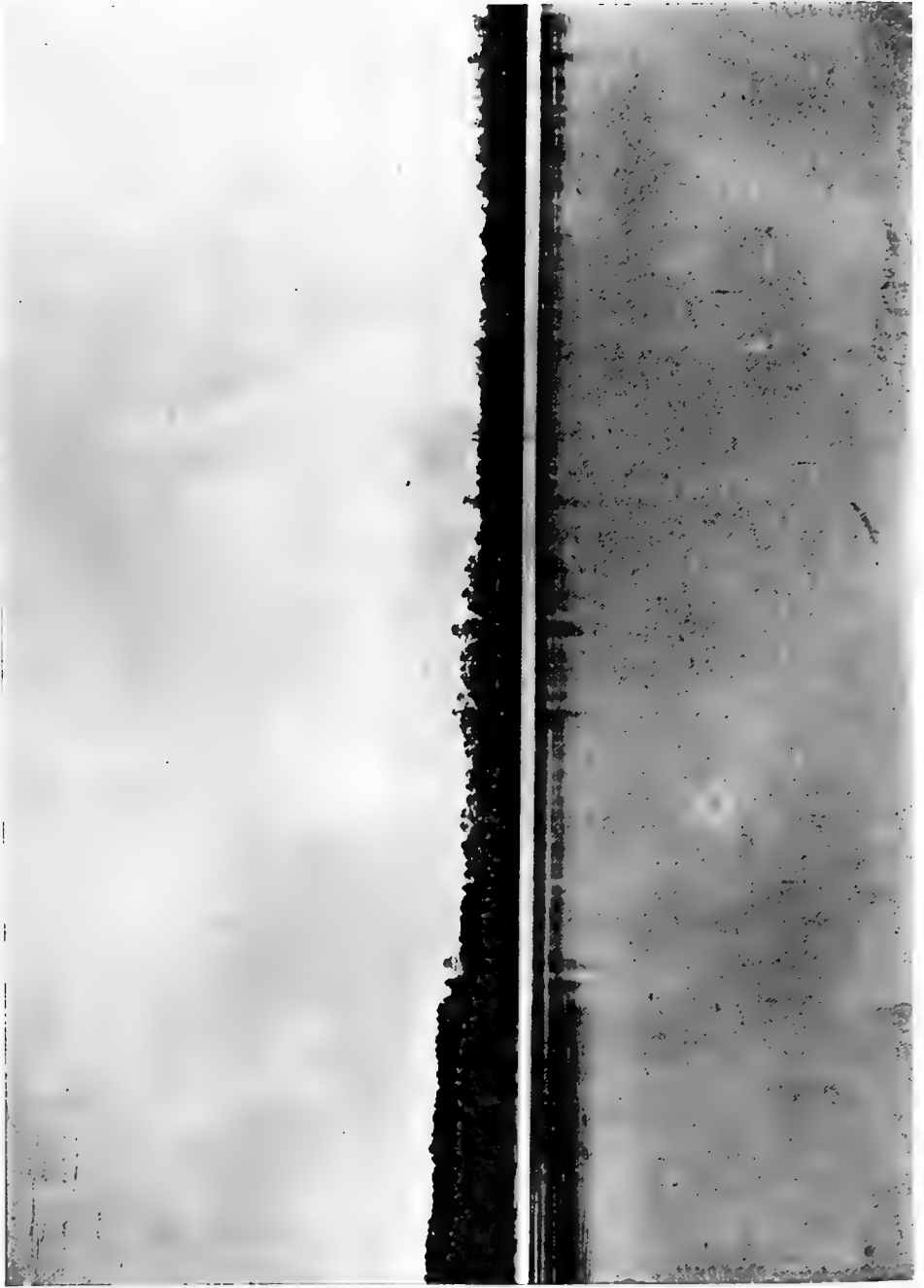
The net profits of the state forests of Baden and Wurttemberg, in which countries the Black Forest is situated, amount to \$2,500,000 a year, mostly from non-agricultural land. So far as I know, the friends of forestry in Minnesota only ask that a reasonable extent of territory in the forest region, and to include some of the best lake and forest scenery, be reserved for forestry and park purposes; and the more the subject is investigated the more clearly will it appear to everyone that its use for such purposes will promote rather than retard development of all good agricultural lands.

PROPOSED NATIONAL PARK—VANDALISM.

A year ago last August I visited Cass Lake and found, to my surprise and delight, on its south shore, such an ideal pine forest as, with the remarkably clean and attractive sandy beach, formed one of the most beautiful spots for a health and summer resort that could be imagined. I gave to the press some account of it at the time. Later a joint committee of the state medical societies made a visit there, and through the influence of a committee of woman's clubs the legislature memorialized the president to postpone for two years the sale of the land, so that the State of Minnesota might, if it should then deem it expedient, buy the same for a park.

Judge of my surprise and indignation then to find, as I did, on visiting the same spot again the early part of July last, that a dozen or more acres of this beautiful forest were lumbered and cut over the preceding winter, on the fraudulent pretense of its being "dead-and-down timber." The tops and branches of the trees—slashings as they are called—are now lying there endangering the rest of the forest in the event of dry weather. Notwithstanding this terrible injury and disfigurement, the forest is not ruined for a park. But last May fires were set on its eastern side, the traces of which cover quite an area, and were set for the purpose, as is generally believed, of making pretext for another contract the coming winter to lumber it as "dead-and-down timber."

This sad and wicked despoilment of one of the most beautiful pieces of scenery Minnesota possesses is understood to have been committed by a white man, living at Cass Lake, who is connected by marriage with the Chipewas. It was perpetrated under the fraudulent system of lumbering "dead-and-down timber," a system which offers a premium for firing the forest and which was cunningly devised to enable rascals to obtain standing pine at



Lake in island in Cass Lake. Photographed, 1899, for the Annual Report of the Chief Fire Warden of Minnesota.

a price far below its value. The government at Washington is directly responsible, and our people should hold their senators and representatives in congress accountable and responsible that nothing of the kind occurs again, for they are the officers elected to conduct the affairs of Minnesota with the executive departments at Washington and with congress.

THE ISLAND PARK.

The same day I visited for the first time the principal island in Cass Lake. It has an extent of two or three miles and contains within it a pretty lake, half a mile wide and about a mile in length. The surface of the island is gently undulating and richly and beautifully timbered, principally with Norway and white pine. The stand of Norway pine is pretty close, with but very little underbrush, and there are many acres thickly covered with a handsome growth of young pine; in some places almost wholly with Norway, in other places with white pine. The large growth of white pine is generally mixed with large-leaved timber. There is probably no more beautiful piece of woodland in Minnesota than is found on this island. As a natural island park it is a treasure to the state. But I would be no more surprised to hear of its being devastated under the "dead-and-down timber" system than I was to see the atrocious vandalism that has been committed on the south shore of Cass Lake.

The pine on the various reservations is so valuable that the interior department should employ watchmen to protect it from the danger that menaces it. Especially such a splendid body of pine as lies along the south shore of of Cass Lake, and near the railroad, and so uncommonly eligible for a permanent health resort, should be watched.

It may be asked, cannot the state fire warden protect this timber? It is not considered as being yet within the state's jurisdiction. Nevertheless, a year ago last

September I appointed Mr. Matthews, assistant chief timber examiner, a fire warden to watch that forest, and he served without charge until the examiners closed their work and left. In February, 1899, on the recommendation of the postmaster at Cass Lake, I appointed Nathan Brooks of that village a fire warden. In an ordinary year a fire warden, under the state law, can be paid for only fifteen day's service, at \$2 a day. It could hardly be expected that a fire warden living three miles away and with such small pay could watch against the stealthy acts of "dead-and-down timber" operators.

The interior department ought to prevent depredations on valuable pine forests. I am informed, however, that while the interior department can prosecute depredators, it is powerless for preventing depredations. A most singular lack indeed! Those who feel interest in preserving some of our most available primeval pine forest for a health resort should address their senators and representatives in congress on this subject. There should be an outcry that will be effective.

REASONS FOR THE PARK.

The establishment of national parks by the United States is not a new thing. In 1872 the Yellowstone National Park was set apart by congress "as a public park or pleasuring ground for the benefit and enjoyment of the people." It is under the charge of the interior department, but is policed by troops of the regular army. Congress has expended over \$500,000 in building roads in the park and mostly under the direction of a United States engineer. Though distant from centers of population, it has yet been visited by over 6,000 people in a year. For its scenery, natural phenomena, and as a fish and game preserve it is a wonderful success, and is truly one of the glories of our country.



Along the shore of island in Cass Lake. Photographed, 1898, for the Annual Report of the Chief Fire Warden of Minnesota.

Last year congress created another national park to include Mount Tacoma. In 1877 congress set apart 2,240 acres as a reserve or park at Hot Springs, Arkansas, on which has been established a fine army and navy hospital. It is practically a national park, and congress has expended considerable money for its maintenance. There has been good reason for all these as well as for the national military parks like Chickamauga and Gettysburgh. We also know that Ontario has established a national park of a million acres, and that the State of New York has a great park in the Adirondacks.

What good reason can we furnish congress for creating the proposed national park in Minnesota to include the Mississippi, Leech Lake, Lake Winnibigoshish and Cass Lake Indian reservations, in all 611,592 acres of land and 218,470 acres of water surface?

First—A strong reason for the park is, the good it will do to the science of forestry. In its limits are some fine bodies of primeval white as well as red pine, which have been growing for centuries, bordering beautiful lakes and easily accessible to the public by railroads. The white pine, on account of its rapid growth on ordinary soil in northern climes, and universal use, is the most valuable tree in the world. It has been growing on this site for successive centuries. Probably there is nothing in this country to match the wonderful and beautifully wooded island in Cass Lake, where, on the same area, different generations of pine are flourishing. Being on Indian reservations, these primeval forests have come down substantially intact to the present time; and there is no other so available opportunity in our country for obtaining a considerable tract of original white pine forest for scientific management as here. The forest would yield a revenue, but remain unimpaired. It is the last chance for so accessible a park.

One can see what forestry science is, from the fact that

the ten million acres of state forest on non-agricultural land in the states of Germany yield an aggregate annual net revenue of \$23,000,000, the forest remaining unimpaired. With the increase of population the value of American forest products will rise; but of course it will be a long time before a forest in this country, even under scientific management, will yield the revenue it does in the densely peopled states of Europe. This park is demanded for the science of forestry; and Minnesota having herself expended over half a million dollars the past twenty-six years in bounties for tree planting, is in a position to ask for it, especially as it will be in the nature of a wise investment by the general government.

Second—A second reason for establishing the park is, the sanitary benefits which its pine woods will afford. Forest air, like sea air, is much richer in ozone than the air of open country. "The sanitary value of our forests," says the report of the New York commission of 1885, headed by Prof. Charles S. Sargent, "cannot be overestimated. In addition to their furnishing a summer resort for the overcrowded population of our towns and cities, a place where rest, recuperation and vigor may be gained by our highly nervous and overworked people, the healthful and purifying influence of coniferous forests has been thoroughly established. The belief that the atmosphere of evergreen forests has a curative effect upon persons suffering from pulmonary phthisis is a very old one. Scientific evidence shows that 25 per cent of the patients sent to the Adirondacks suffering from incipient consumption come back cured." Committees of both the state medical societies of Minnesota have visited the proposed park and strongly recommend its acquisition for a public sanitarium. It would benefit the great mass of people who are unable to journey out of the state for health and recreation. Under national government management people could put up their temporary shelter in its limits



White pine on the south shore of Cass Lake. Some of Minnesota's most charming scenery. Photographed, 1899, for the Annual Report of the Chief Fire Warden of Minnesota.

and feel secure. It is true we now have the Itasca State Park, but it is only six miles square, and, being distant from a railroad, is not available as a popular resort. It should, however, be cherished and sometime connected with the proposed national park.

Third—It will benefit and please the Indians more to be paid for the land in bulk and have it held as a park than to have it sold in small tracks and lumbered, as was contemplated under their agreement with the United States in 1889. By agreement between the United States and the Chippewa Indians of Minnesota, made under the act of congress of January 14, 1889, entitled "An act for the relief and civilization of the Chippewa Indians in the State of Minnesota," said Indians ceded the said reservations to the United States with the understanding that the reservations would be surveyed, that the "pine lands" thereon would be estimated and offered for sale to the highest bidder in forty-acre tracts, and that all other lands except such as might be allotted to individual Indians should be regarded as agricultural lands and sold to actual settlers in tracts of not exceeding 160 acres at \$1.25 per acre, but on homestead law conditions, and that the proceeds of all sales, after deducting the expense of surveying, estimating, etc., should be paid into the treasury of the United States to the credit of the said Indians. To accomplish such new agreement with the Indians a bill substantially like the following will have to be enacted by congress:

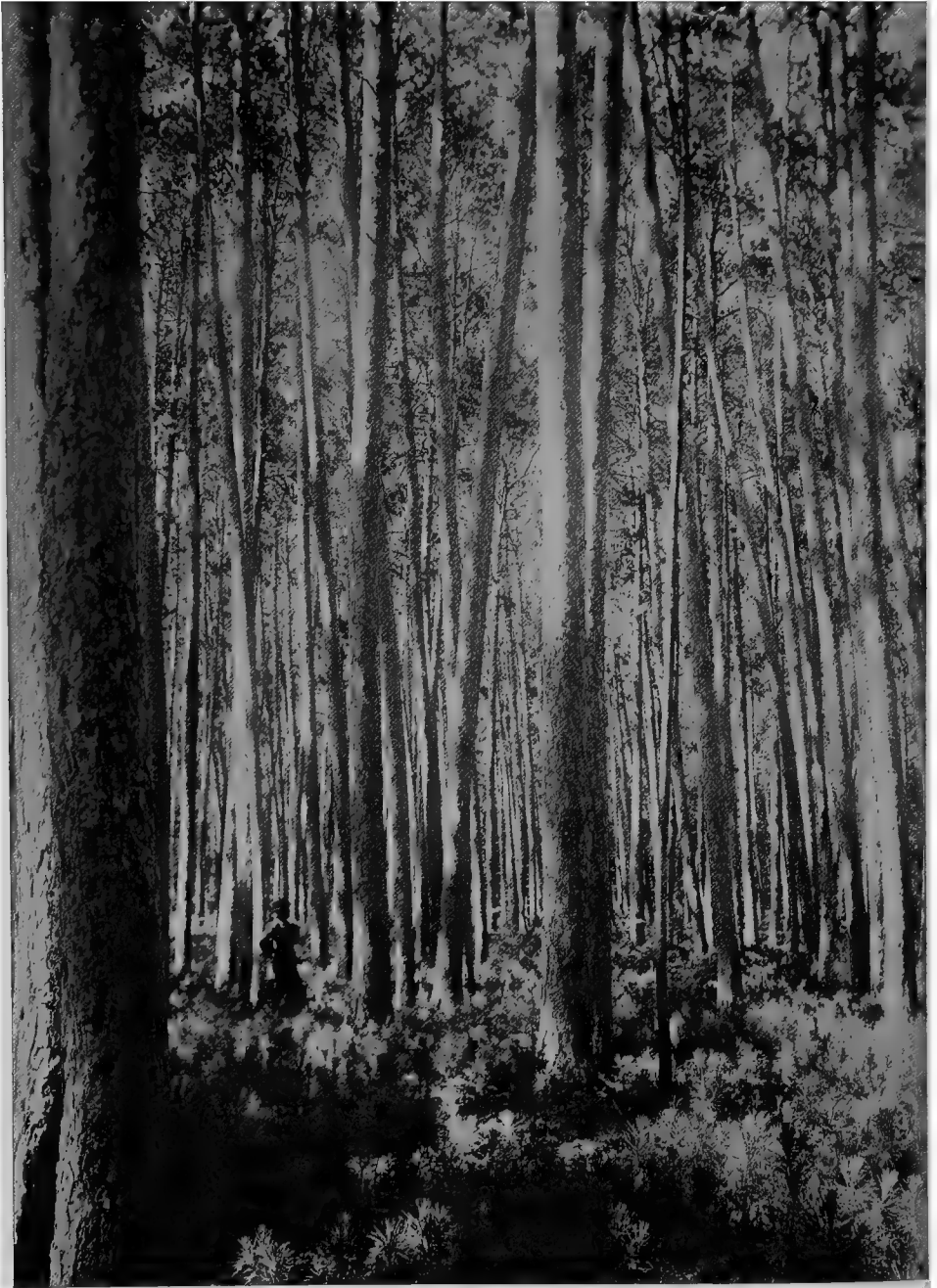
Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the President of the United States is hereby authorized and directed, within sixty days after the passage of this act, to designate and appoint three Commissioners, to be well known citizens of the United States, to negotiate with the bands of Chippewa Indians in Minnesota hereinafter mentioned and agree upon a sum that shall be paid by the United States for the Mississippi and Winnibigoshish, Leech and Cass Lake Chippewa Indian reservations, Minnesota, as a whole

in lieu of the manner of disposing of the lands in said reservations prescribed by section four of the said Act of Congress of January 14, 1889. And the agreement that may be entered into shall be deemed sufficient if made and assented to in writing by two-thirds of the male adults over eighteen years of age according to the latest census of the Mississippi, Leech Lake, Lake Winnibigoshish and Cass Lake bands of Chippewa Indians in Minnesota; and provided that the agreement that shall be made shall be approved by the President of the United States before taking effect. *Provided further,* That in any case where an allotment in severalty has heretofore been made to any Indian of land upon any of said reservations, he shall not be deprived thereof or disturbed therein except by his own individual consent separately and previously given, in such form and manner as may be prescribed by the Secretary of the Interior. And the sum of money that shall be agreed upon as the price of said reservations shall be placed in the Treasury of the United States to the credit of all the Chippewa Indians in the State of Minnesota as a permanent fund, which shall draw interest at the rate of five per cent per annum; and principal and interest shall be paid in the manner provided in section seven of the said Act of January 14, 1889.

Section 2. That the sum of twenty-five thousand dollars is hereby appropriated, or so much thereof as may be necessary, out of any money in the treasury not otherwise appropriated, to enable the President to carry this Act into effect, which money shall be expended under the direction of the Secretary of the Interior.

Section 3. That any lands which shall come into the possession of the United States under this Act shall be held and used as a National Park, and until further legislation the President shall prescribe all necessary regulations for the care and management of such lands.

Fourth—Another reason is the influence, even if it is but little, which its forests will have in maintaining water supply in the Mississippi river. Three large lakes and other of its sources and feeders are embraced within the park limits. The New York commission, above referred to, reported that owing to the removal of so much of the Adirondack forest the summer flow of the streams having their source there had decreased 30 to 50 per cent within the memory of men then living, and one of the principal



A remarkably beautiful forest of Norway Pine and of young white pine on the island in Cass Lake. Such scenery can scarcely be matched anywhere, and should be preserved. Photographed in 1899, for the Annual Report of the Chief Fire Warden of Minnesota.

reasons which the commission urged for the preservation of the Adirondack forests was their influence in maintaining water flow in rivers. This country has not produced a more all-round learned man than the late George P. Marsh, who, in his work, "Man and Nature," repeatedly emphasizes the value of forests as natural reservoirs of moisture.

Fifth—The park will be a valuable fish and game preserve.

Sixth—It is national in its locality because it embraces an important portion of the headwaters and sources of the Mississippi river.

Seventh—The greater part of the area being sandy is not well adapted for agriculture.

Eighth—There are some benefits which would accrue to the state in which the park is located because it would attract a great many visitors. The president of Dartmouth college, in an address before the legislature of New Hampshire, estimates that from 40,000 to 50,000 people visit that state through the attractions of its mountain and forest scenery, and leave in the state a large amount of money. The Adirondack park has a population of over 32,000. It has several prosperous villages. There are over 1,000 guides in the Adirondacks. It is certain that if the proposed Minnesota park be established it will cause the circulation of very much more money in its locality and create a more lasting prosperity than would occur if the forests should be denuded and the scenery destroyed, as will inevitably be the case under the agreement with the Indians as it now stands.

It is certain that the Chippewa Indians have occupied this region for two centuries, and that the Sioux Indians had occupied it an indefinite period previously. Men of science are confident, from discoveries which have been made in Minnesota, in territory eastward as well as in Idaho, that this romantic region of country was peopled

2,000 years ago. It is clear that it was once inhabited by the Mound Builders. Is it not worth while, then, that a portion of such territory be preserved in its natural condition, and as it has come down from centuries of aboriginal occupancy?

A vast majority of the people, if they could be heard, would answer yes. But they cannot well be reached. Meantime greed to cut the pine is active and influential, and the only possible way for getting the park is for all philanthropic persons, young and old, to take a hand in the matter and write to and petition their senators and representatives in congress to work for it.

PROBABLE COST OF THE PROPOSED NATIONAL PARK.

As before stated, the proposed park comprises 218,470 acres of water surface and 611,692 acres of land. Of the latter 121,802 acres, in scattered localities, have been allotted to Indians, leaving 489,790 acres to be paid for. Of this latter 100,000 acres in round numbers may be regarded as merchantable "pine lands." By "pine lands" is meant, according to the Interior Department's construction of Indian treaties and public land laws, lands that are valuable for the merchantable standing pine thereon; the balance, 389,790 acres, whether bearing jack or scrub pine or other sorts of timber or no timber, are considered, under the existing treaty with the Indians, as "agricultural lands," and when proclaimed as open to settlement were to be taken (a bill has lately passed the United States house of representatives for donating such lands to settlers) in 160-acre tracts at \$1.25 per acre by actual settlers under homestead law conditions as to residence and cultivation. Although the greater part of these lands technically designated "agricultural lands" are not desirable for farming and would not be taken up for cultivation for many years, if ever, yet in any new negotiations with the Chippewa Indians to obtain the land in bulk the government naturally would have to pay for it at the rate



Young pine on island in Cass Lake. Photographed, 1899, for the Annual Report of the Chief Fire Warden of Minnesota.

of \$1.25 an acre, as originally agreed to, which would amount to \$487,237. It will be conceded that this is a fair price when one remembers that there are millions of acres of land in Northern Minnesota which have been open to homestead settlers for thirty years and that are still vacant.

Under date of March 14th I submitted an estimate of the value of the pine lands in the proposed Minnesota national park based on official estimates of similar pine lands on the Red Lake Indian reservation reported as averaging 80,000 feet board measure to each forty-acre tract. This average number of feet per forty acres on the Red Lake reservation thus returned by the government estimators seemed to me small, and I was aware that their work had been criticised; yet inasmuch as a previous estimate had been set aside for unreliability and as this last one had been accepted, approved and promulgated—a portion by the Interior Department under the administration of President Cleveland and a portion by the Interior Department under the administration of President McKinley—I felt that it was reliable. Accordingly I used it as a basis for estimating the average number of feet of standing pine on the “pine lands” in the proposed park. But from information which I have since received and which I know to be absolutely reliable I am satisfied that “pine lands” in Minnesota will average 250,000 feet per forty-acre tract, and that consequently the estimates approved and promulgated by the Interior Department April 24, 1896, June 14, 1898, and those prepared for approval in 1899 (covering in all 291,348 acres, with 585,481,000 feet of standing pine of the value, at \$3 per 1 000 feet, of \$1,774,728), were in the aggregate much below the true value of the pine. The Department of the Interior was simply imposed upon by having thrust upon it, I do not undertake to say dishonest estimators, for there is sometimes a wide variance among honest

estimators, but incompetent estimators; which shows that political estimating of pine lands should cease at once and forever.

There are a number of qualifications to make a competent estimator. He should be an honest man. He should be a cruiser, also have the qualifications of a surveyor and of a lumberman. In short, he should be a forester. There are competent estimators in this state, but their services cannot be had for less than from \$5 to \$10 a day and their expenses paid.

I have visited the proposed national park four different times, and have traveled across it three times, and am of the opinion that it contains in round numbers 100,000 acres of strictly "pine lands;" there may be a few thousand acres more or less. And conceding that each forty-acre tract will average 250,000 feet of pine, the aggregate amount of stumpage would be 625,000,000 feet, which at \$4 per thousand feet, the present average value of standing pine in Minnesota, will amount to \$2,500,000, to which add \$487,237, the value of 389,790 acres technically designated "agricultural lands" at \$1.25 an acre, gives \$2,987,000, or, in round numbers, \$3,000,000 as the value which the government would have to pay the Indians for the proposed park. In all such dealings with the Indians the government does not pay the principal until the end of fifty years, but credits them with the amount and pays them interest at the rate of 5 per cent per annum. No matter how valuable the park is, the more valuable it is the better for all concerned. If a commission be appointed to treat with the Indians to buy this land in bulk for park purposes, means will undoubtedly be provided at the same time for a reliable estimate of its standing timber.

As I have said before, if the park be acquired it will be managed on forestry principles. The mature pine will be cut and honestly accounted for. Of course, some groves

of the handsomest pine on lake shores, and that are impressive for their antiquity, will be preserved. The younger growth of forest will be protected; bare spots will be planted; a sustained yield and revenue will be maintained; yet, in fifty years, the forest in the park will be more valuable and the park itself more beautiful than at present. If here and there are tracts of good agricultural land, they can be cultivated. The establishment of the park will give a wonderful impulse to forestry and prove a boon to the northwest that few now can realize. We have not, in Minnesota, the White Mountains nor the Catskills, but we have as beautiful pine forests, and as beautiful clear lakes in their midst, as can anywhere be found; and future generations will reproach us if we allow all of such scenery to be forever ruined.

Lumbering has been going on in the pineries of Minnesota for more than half a century. For a number of years back the pine that has been cut each year in Minnesota has averaged in value just as it stood in the woods, \$5,000,000. Fully \$100,000,000 worth of pine has been cut in this state and \$25,000,000 worth more has passed into the possession of private parties. For all this how much has the government of the United States received in money? It is true that some of the pine was granted to railway companies, but all that the United States has received for pine lands in Minnesota does not amount to \$7,000,000. Beginning with the year 1849, and up to October, 1897, all that the United States had received for public lands at its land offices at Stillwater, Sauk Rapids, St. Cloud, Taylor's Falls, Duluth, Alexandria, Fergus Falls and Crookston—offices whose districts included all of the pine lands and much agricultural land—amounted exactly to \$7,286,599.40! In view of these facts and figures it would seem strange, indeed, and most lamentable, if a little remnant of all the great pine forests of Minnesota could not be spared for forestry and for a health and pleasure resort for the people.

EUROPEAN FORESTRY.

No intelligent friend of forestry supposes that the science of forestry will, for a long time, produce in this country the results which are seen in many of the densely peopled states of Europe, but a knowledge of these splendid results is very instructive and stimulating, and for that reason I have taken pains to diffuse such information. The science of forestry is the same everywhere, but its application depends upon the conditions which are found in different countries. Let us assume that there is a natural coniferous forest on non-agricultural land in Germany in which 75 per cent of the trees are mature and 25 per cent have not reached merchantable size. According to scientific forestry the 75 per cent of mature trees will be cut just as soon as the market would justify and the 25 per cent of trees of unmerchantable size would be left to grow till they should be fit to cut. A similar natural forest in this country would be treated in the same way, if treated according to forestry principles; and some lumbermen, such as those, for example, who hold pine lands in the valley of the St. Croix river or on its tributaries in this state, and who have gone back every fifteen or twenty years to make a second, third or fourth cutting on the same land, are managing their forests in this way. In cases where pine lands are remote from streams of capacity for floating and where the pine is reached by temporary logging railroads, clean cutting is made of both large and small trees; but lumbering of this latter description is in violation of forestry principles. If a trained forester were to commence cutting a mature forest he would not begin on that side of it which is exposed to the prevailing wind, because if

THE
PROBLEM OF FORESTRY

IN
MINNESOTA.

REPORT TO THE
State Forestry Board
OF
Minnesota.

BY

BY C. A. SCHENCK, PH. D.,
FORESTER TO THE BILTMORE ESTATE, BILTMORE, N. C.,
FOREST ASSESSOR TO THE GRAND DUCHY OF HESSE-DARMSTADT, AND
PRINCIPAL, BILTMORE SCHOOL, OF FORESTRY.

ST. PAUL, MINN.
PRINTED BY THE PIONEER PRESS COMPANY,
1900.



A year after lumbering, near Hibbing, Minn. Photographed
September, 1899, by Dr. C. A. Schenck.



Primeval white pine forest near Hibbing, St. Louis County.
Photographed September, 1899, by Dr. C. A. Schenck.

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ORGANIZATION

OF THE

Minnesota State Forestry Board

JUDSON N. CROSS, President, Minneapolis, Minn.

GREENLEAF CLARK, Vice-President, St. Paul, Minn.

C. C. ANDREWS, Secretary, St. Paul, Minn.

MEMBERSHIP OF THE BOARD.

C. C. ANDREWS (ex-officio as Chief Fire Warden).....St. Paul, Minn.

SAMUEL B. GREEN, (ex-officio as Horticulturist,
State University).....St. Anthony Park, Minn.

The following three members recommended by the Regents of the State University,
and to hold for a term of four years:

JOHN COOPER.....St. Cloud, Minn.

FREDERICK WEYERHAEUSER.....St. Paul, Minn.

O. M. LORD.....Minnesota City, Minn.

JUDSON N. CROSS.....Minneapolis, Minn.
(Recommended by the State Forestry Association, and to hold for two years.)

GREENLEAF CLARK.....St. Paul, Minn.
(Recommended by the State Agricultural Society, and to hold for two years.)

WILLIAM MITCHELL.....Winona, Minn.
(Recommended by the Game and Fish Commission, and to hold for two years.)

A. L. COLE.....Motley, Minn.
(In place of Charles A. Duncan, of Duluth, who was recommended by the State Horticultural
Society, but declined.)

DR. SCHENCK'S REPORT.

At the invitation of the State Forestry Board of Minnesota, Dr. C. A. Schenck, Ph. D., trained in the science and practice of German forestry and for several years superintendent of the estate of Mr. Geo. W. Vanderbilt at Biltmore, North Carolina, visited the forest regions of Minnesota last September and afterwards submitted to the board the following report:

THE PROBLEM OF FORESTRY IN MINNESOTA.

ECONOMIC USE OF THE SOIL.

The possibilities for economic use of soil are threefold. Soil may be devoted to the production of field crops (agriculture), or to the production of animal matter (pasture), or finally to the production of wood crops (forestry). In America, only agriculture and pasture are considered as soil industries. Land unfit for either of the two is thrown away. Forestry as a remunerative use of national soil is entirely disregarded. In the case of private individuals, ignorance relative to the economic value of forestry can be easily excused. Government itself, be it of democratic, republican or populistic strain, sets the example in dealing carelessly with the forestry problem.

It has been and is the policy of state and federal government to leave the development of all sections of the country to private enterprise. Under this freedom of action, the agricultural districts have shown an unparalleled rate and steadiness of development. In sections, however, where there is a comparative scarcity of soil fit for such farming as can compete in the general market, it has been and will be impossible for private enterprise to undertake the development of the whole region. Proof of this statement lies, for instance, in the Adirondacks, in the Alleghanies, in the pineries of the Carolinas, and in certain sections of Michigan, Wisconsin and Minnesota. At the present density of population, the present wages of manual labor and the present prices of field crops, soil of poor quality can be used only for pasture or for silviculture. Pasture is not practicable, where the wintering of stock cannot be well effected, be it for climatic reasons, be it for lack of winter forage. Pasture is not permissible where it results in rapid deterioration

of the soil. Pasture is not advisable where tree growth will furnish a higher and safer revenue. Has it never occurred to the men framing this country's destiny, that on millions of acres embraced in this country, tree growing might possibly be the most remunerative industry? Is it not a function of government to see that every acre of national soil be devoted to the most remunerative production? Have our governments, or rather we, the people ruling this country, done our duty? Look at the millions of acres lying absolutely unproductive in almost every state of the Union. A few decades of years ago they bore a growth, a growth of trees. Now the barren appearance of the soil bears testimony of our economic thoughtlessness. Private enterprise, after having made a clean sweep of the primeval trees, did not find it practicable to use the soil for forestry or silviculture, the only use to which it is adapted. The bare land was neglected and cast aside. The governmental land policy, when turning absolute forest land over to private enterprise, ought to have foreseen the consequences. It was wrong—and it is wrong—as far as sections unfit for agriculture and for stock-raising are concerned. It is deaf to the main demand of political economy: "Do not allow a square foot of national soil to lie idle." The small farm holdings occupying the better ground in such artificial deserts, denuded from tree growth, look gloomy; the soil is worn out; miserable roads and inadequate schools characterize the region. Such unpleasant conditions are not the fruit of poor soil. They are the fruit of a preposterous use of poor soil.

In European countries, poor soil is used for forestry. The inhabitants of forest districts occupy small villages along the bottoms of creeks and rivers; the little patch of farm land does not feed the family. It is work in the forest on which the backwoodsman chiefly makes his living. Abroad we find a strong, energetic population in the forests, in spite of the poorness of the soil. In this country we find in sections productive of forest, though ~~not~~ destitute of it, a population thriftless and discontented.

There is nothing new in these observations. Every educated American is aware of the facts. Our legislatures, however, have not had time to consider the forestry question, which is perhaps not as urgent, but in my opinion more important, than the problems of trusts and expansion.

MINNESOTA'S INTEREST IN FORESTRY.

For merely agricultural states, like Iowa and Ohio, where all land is fit for farming, forestry is, of course, only a national matter.

For other states, and preëminently for Minnesota, it is a state problem of first importance. By far the larger portion of Minnesota, the prairies and the former hardwood belt, contain splendid farm land. Clearing of hardwood land is still in progress, and we can only hope that on every acre of fine soil the plow will soon follow the axe. On such ground agriculture yields higher net returns than timber growth, and a small wood lot on the farm is all the settler should desire to maintain. The character of the northeastern section (under northeastern section is understood the corner north of the 47th degree of latitude and east of the 95th degree of longitude) of Minnesota is entirely different. Farm land—I mean farm land about as good as prairie land—is scarce. Corn is an uncertain crop. Nature itself has designated the soil as poor by raising a crop of pines on the ground—pines making smaller demands on the fertility of the ground than hard woods.

Stock pasture is possible in many sections; still the length and severity of the winter, combined with the impossibility of raising sufficient winter forage, prevent stock farming on a large scale. Undoubtedly the most economic use to which the bulk of the northeastern section of Minnesota can be devoted, is forestry. There is, of course, many a spot on which potatoes and vegetables can be raised and which allows of farming on a small scale. However, unless the settler finds additional and remunerative work in the forest and a local market for his field products in the logging camp, the prospects for farming are gloomy. In the northeastern corner of Minnesota, as far as the best use of the soil is concerned, forestry must form the rule and farming the exception.

In the south and west of Minnesota, agriculture is the best possible soil industry, almost to the exclusion of the forest. Between the typical forest region of the northeast and the typical farm region of the west and south, lies a strip where forestry and agriculture should occupy equal shares of soil, always with a view of obtaining the best economic result for the commonwealth.

There is no doubt that gradually agriculture and forestry would adjust themselves to their respective precincts if the latter were given an equal chance in the hands of private individuals. Under the conditions prevailing in North America, however, forestry is an investment not sought for by private enterprise.

THE CAPITALIST AND FORESTRY.

The reasons for capital failing to engage in forestry lie in the danger from fire to which forests are exposed; in overtaxation

from the side of the county; further, in the unwieldiness of forestry as a business—a quality which does not allow of speculation, of unexpected gains and of ready sale—in the large size of the areas required for proper forest management, in the impossibility of entailing forest property, in the state laws preventing corporations from controlling over 5,000 acres of land, in the length of time required to develop a tree out of a seedling, in the uncertainty of future yields, due to an absolute lack of statistics, and many other particularities of forestry which it would lead me too far to enumerate.

Private individuals, I am confident, will not embark in forestry unless considerable inducements are offered. These inducements must do away with the main obstacles to conservative forestry—preëminently with the danger from fire. The forestry problem of Minnesota is almost identical with the forest fire problem. If there were no fires, a second growth would invariably follow the removal of the virgin growth, even against the wish of the land owner. As long as fires prevail, desolate barrenness takes possession of the land after lumbering. Hundreds of thousands of acres lying idle in every state of the wooded, east and west—in Minnesota over 2,000,000 acres—bear witness to the truth of the statement.

The American people commit a great economic mistake when considering land as unproductive which is unfit for agriculture. On an average, the annual production of timber on an acre of forest land is about 160 feet board measure, worth standing on the ground about 40 cents.

THE WAGE EARNER AND FORESTRY.

Even if protection from fire should cost all of these 40 cents, the people will make a gain: 160 feet of lumber, when manufactured into ceiling, siding, sheathing, flooring, doors, boxes, furniture, carriages, paper pulp, etc., are worth at least \$4.00, the difference of \$3.60 consisting almost entirely of wages earned by manual labor. We lose one of the best chances for remunerative employment of labor if we allow forest land to go to waste. In semi-agricultural districts, where work is scarce during winter, this fact weighs doubly, and similar considerations hold good for certain mining districts where operations are discontinued during the cold weather.

If 2,000,000 acres of forest land in Minnesota are lying unproductive, the state loses annually a chance for \$8,000,000 worth of

manual labor. Another 10,000,000 acres will have the same fate unless the people of Minnesota recognize the necessity of taking immediate action. The hygienic and æsthetic drawbacks of deforestation have been shown the people sufficiently; the influence of vanishing forests on water supply, navigation and local climate is generally known. But the fact that the practice of forestry is just as necessary on poor soil as the practice of agriculture on good soil, has not sufficiently impressed the public mind yet.

MINNESOTA'S LAW RELATIVE TO STATE FORESTS.

All land which the state of Minnesota now owns, land of agricultural quality as well as non-agricultural land, is not meant to be kept for state purposes; state land is to be disposed of, as soon as an opportunity for sale offers itself. While such a course, without a doubt, in the case of soil fit for farming, is highly commendable—in the case of nonagricultural soil fit for tree growth only, it is with no less doubt objectionable; nonagricultural land in Minnesota, in the hands of private individuals, is doomed to become and to lie barren, whilst it could produce, in the conservative hands of the people, a sustained yield and a rising annual revenue.

The explanation of the fact, that forestry practiced by the people is sure to be remunerative, whilst private individuals do not believe in it, lies in the following points:

1. Forestry is a clumsy investment, not allowing of quick-minded speculation, of sudden gains, of steady, even annual returns. The values created are, to a large extent, prospective values, which do not allow of ready sale.

2. The returns are not apt to be higher than 6 per cent on the capital. They cannot be much increased, owing to natural limitations, by the owner's ingenuity.

3. The investments are suffering from preposterous taxation, left at the mercy of short-sighted county officials.

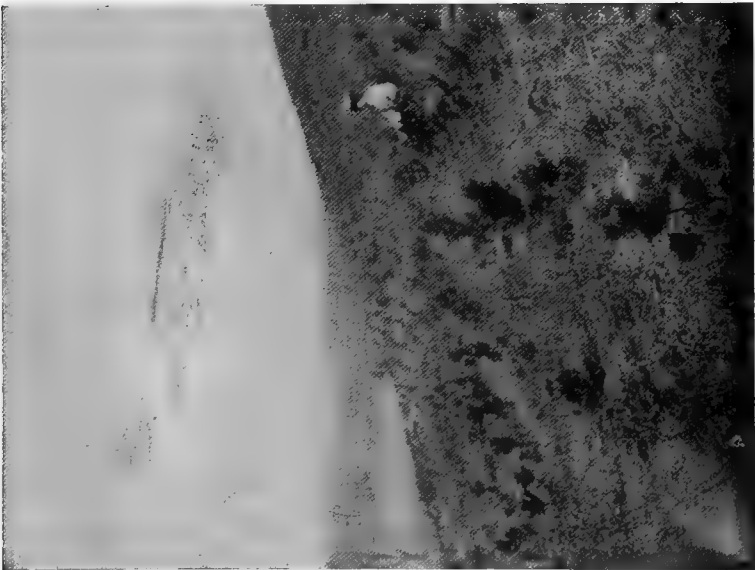
4. The forest is constantly endangered by fires; on small and scattering holdings this danger is particularly great. The more compact and the larger the area under forest, the easier is forest protection.

5. The beneficial effect of the forest upon water-regulation, climate, public health, public sport and recreation is a return from the forest, that does not flow into the pockets of an individual owner, whilst for the people these blessings offered by the forest are worth many a dollar.

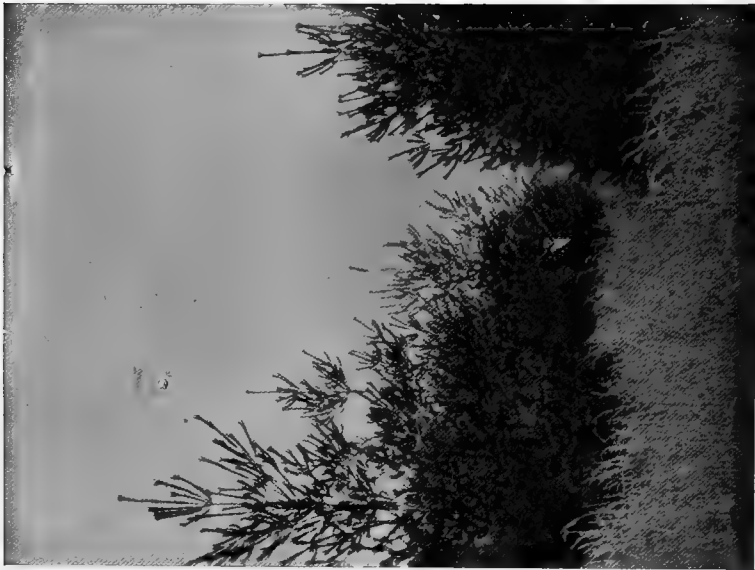
Recognizing the truth of these points, the legislature of the state of Minnesota has created a state board of forestry and has authorized it to accept gifts of land for forestry purposes. Although tentative only in its immediate bearing, the step was decisive in as far as it acknowledges the advisability of a state forestry system. If the gifts expected to be made by private generosity consist of small and scattering tracts only, the state board will find it difficult to make the undertaking yield immediate returns, especially so if the tracts are entirely denuded of timber. For in that case a considerable outlay is required in order to artificially replant the land, which, if mother-trees were left, would have been done by nature alone. The expense of reforestation, using 5,000 seedlings of white pine per acre, will be about \$11.25. The annual appropriation put at the disposition of the Minnesota State Forestry Board (\$1,000) will allow it to annually reforest about 90 acres of denuded land. The development of such plantations is shown by the enclosed photographs taken on the Biltmore estate, where about 300 acres of abandoned farmland were replanted with white pine. It is worth mentioning that no pine species, in my opinion, is more easily transplanted and raised than white pine. The success is more certain still, if only a few years have elapsed since the denudation of the land. Before planting, the debris left on the ground should be burned, so as to reduce the danger from fires.

If land cut over and not bare of timber should be deeded to the state for reserve purposes, a different course must be followed. Artificial planting can be dispensed with, unless the soil is covered exclusively with worthless brush. Protection from fire is the main task. The best specimens of valuable species, if dangerously suppressed by worthless poplars or birches, might be given slight assistance. An absolute freeing, however, is not advisable. Every case has its own requirements. There does not exist any general prescription fitting every case, in forestry no more than in medicine. Every case must be dealt with according to its peculiar necessities,—always with the best monetary result at stake. In forestry, it cannot be repeated often enough, there is no more room for sentiment than there is in agriculture.

Should private generosity put the state forestry board in charge of any virgin forests containing marketable timber, the board should at once proceed to sell the mature and hyper-mature trees to the highest bidder. Whilst these "idlers" are being removed, a young growth of seedlings will establish itself free of charge, provided that fires are kept out. If the cutting proceed gradually



Plantation made on abandoned pasture in 1899, with white pine, four years old, on the Biltmore estate of Mr. Geo. W. Vanderbilt, in North Carolina.



Plantation made on abandoned fields in 1889, with white pine, four years old, on the Biltmore estate of Mr. Geo. W. Vanderbilt, in North Carolina.

towards the prevailing wind direction, damage from wind-falls can be greatly restricted. Obviously the logging expenses under forestry are slightly higher than in destructive lumbering. The prospective value of the second growth started by forestry will, however, more than offset the excess of logging expenses, or, which is the same, the smaller stumpage prices obtained.

If an industry works at a loss, it should, of course, not be maintained artificially. Forestry, however, never works at a loss; I do not hesitate to say, it is the only industry which never knows financial failure. Proof of my testimony lies in 200 years of forest history abroad. A seedling, once well planted is sure to develop into a tree; and as sure as the value of a tree is higher than the value of a seedling, forestry pays interest on the capital invested and repays the capital. True, the interest is small, being counter-balanced by expenses for protection, administration and taxes, all of which accumulate at compound interest up to the year at which the trees reach maturity. If, however, protection and administration are done on a large scale, the annual charges per acre of forest are small; and if the assessment of forest land is not at the mercy of shortsighted county politicians, 2 to 4 per cent of annual interest on the investment will be left, even if stumpage prices do not rise in the future. Thus the forest will yield small but safe interest. High returns from forestry are impossible, because trees, generally speaking, do not grow at a 10-per-cent rate. They grow slowly, but they grow as regularly as the sun shines, the rain falls, the wind blows; for sunshine, rainfall and air are the components of wood.

The federal and state laws dealing with land problems are framed only to suit the character of agriculture. The acquisition of large tracts, so essential for forestry, is rendered almost impossible. The entailing of real estate so necessary where decades of years lie between time of planting and time of harvesting, as is the case in forestry, is unconstitutional. Corporations, which by an issue of shares, marketable on exchange, might facilitate the salableness of forest property; are not allowed to own over 5,000 acres of land. The land laws induce the settler to rather become a land speculator—but there is no room for land speculation in forestry.

The practice of selling absolute forest land in small lots must result in forest destruction and the people allowing it to continue are guilty of a criminal neglect. Settlers farming such land, when the soil is exhausted and when no work is available in the deserted

neighborhood, become a prey of disappointment and demoralization. Still, under existing laws, the government is not permitted to withdraw such land from private sale and to embark in forestry as a business on its own account, industrial functions of government not being considered democratic.

THE VIRGIN FOREST.

The primeval forest containing many thousand feet board measure per acre is not at all the forester's ideal. Such a forest is unproductive; the annual formation of wood is exactly offset by the annual deterioration and death of hyper-mature trees. This primeval forest is an idling capital, is economically objectionable.

I have said elsewhere that sunshine, air and rain are the chief factors of wood. The forester simply "bottles" those three ingredients into tree-boles. As the same causes must have the same effect, under otherwise equal conditions, a given amount of leafy surface and root system, whether it belongs to young saplings, middle-aged poles or old trees, must necessarily form an equal amount of wood. Hence the young forest, containing only 1,000 feet board measure grows at a high rate of interest; the old—although sound—forest grows at a rate of about $1\frac{1}{2}$ per cent. As soon as a forest ceases to grow at a sufficient rate, it must be cut and replaced by a new forest. Nature is ready to answer the task of regeneration. Since thousands of years it has replaced one generation of the forest by another. There is no reason why it should stop work at the threshold of the 20th century, if men do not change the natural conditions.

THE IDEAL FOREST.

The large majority of the trees in the ideal forest consist of small specimens; for only those grow at a high rate of interest. The oldest ones, towering over an abundant progeny of second growth, are removed when they reach the minimum rate of growth permissible, much for the benefit of the progeny, which after their parents' death enjoy the unrestricted blessings of sunshine, rain and air.

In the ideal forest, some trees are 10, others 20, 30, 40, 50, and so on, years old. Suppose the oldest ones, 100 years old, are now removed. They will be replaced quickly by young seedlings filling the gap. The forester returning to that neighborhood after 10 years, finds a composition of the forest identical with the one previously met with. Trees previously 90 years old are now 100

years old, and the forester again proceeds to remove the centenarians, the oldest age class.

The average stand of trees per acre in the ideal forest is little, say 2,000 feet to 4,000 feet board measure per acre. It must be the forester's aim to reduce the stumpage found in the primeval forest as quickly as possible to the ideal figure. Only that amount of capital is left in the forest which yields the highest interest in the safest manner.

There are, of course, many difficulties and drawbacks associated with a course as outlined. The lumbering expenses are increased; the storm is apt to play havoc in the new forest, at least to begin with; insect plagues are to be feared; the owner's capital is kept scattered over a large area, etc. Still, these inconveniences and dangers weigh little compared with the influence which reckless taxation has on the amount of revenue obtainable from the investment and which forest fires exercise on the safety of the capital engaged.

NECESSARY PREMISES FOR PRIVATE FORESTRY.

Give the wood-owning lumbermen protection against hypertaxation and protection against conflagration, and he will practice forestry on nonagricultural land, because it will pay him best to do so. In addition, cancel the law preventing companies from holding over 5,000 acres of land; gather statistical data relative to the rate of tree growth, through the St. Anthony Park station so well equipped for the task, so as to do away with the uncertainty enveloping the financial possibilities of tree growth. If you want to develop a desirable industry you will have to offer inducements allowing that industry to become remunerative.

As regards taxation, it is unwise to leave forest property at the mercy of mere local authority. All nonagricultural land, with the help of the geological survey, should be singled out and its taxation regulated by state authority. Young trees yielding a revenue only after decades of years cannot stand much taxation. The state deriving a direct benefit from the maintenance of forests, should be held to bear part of the tax burden.

As regards protection from fire, the state of Minnesota, through its fire-warden system, has made a timid step in the proper direction. That amount of safety however, which the owner of the forest requires for it, cannot be secured at the small appropriation set aside for forest protection. Unless the comparatively small

revenue derivable from forestry is absolutely safe, no one will care for forestry as an investment.

"Economy, is the highest virtue of a legislature." But is it economy to allow millions of acres to lie or to get barren, millions of dollars to escape the laboring classes of the future, because the state cannot afford \$50,000 annually for forest protection? Is it possible that the ~~provisional~~ functions of government are not sufficiently understood under the regime of democracy? If everything is done "by the people, for the people and through the people," why not forest protection?

I do not know whether constitutional restrictions prevent the rescue of forestry from its main adversaries, fires and taxes; but if they do, why not change the constitution? A constitution which does not allow of adaptation to changed economic conditions, is not for the good of the people. If for one reason or another, private forestry cannot be made a remunerative undertaking through state's authority and aid, then the state itself will have to embark in forestry.

The interdependence between the prosperity of the various forms of industry is nowhere better understood than in the United States. The industry of a country is a quadruped, with manufacture for the head and with the three soil industries (agriculture, mining, forestry) and transportation for the legs. Cutting off one of the legs, we cripple the entire animal.

The decision whether private forestry shall be made remunerative at the expense of the state, or whether state forestry shall be established, must be left to the legislature. To me, a combination of both methods seems most advisable. The state should practice forestry on all nonagricultural land owned by it, after clearing its title to land forfeited for nonpayment of taxes, and private individuals should be induced to practice forestry on their holdings of nonagricultural character. The advantage of the combined system is its greater elasticity. Finding that the one branch is cheaper and more effective than the other, we can gradually emphasize the one and abandon the other. To judge from a century's experience abroad, state forestry is the more advisable system. It is more stable, bears better regard to the people's interest in the forest and spends a comparatively small sum for administration and protection. Under the combined system, the governmental staff of foresters can at the same time protect the private forests from fires and assist in their proper assessment for tax purposes.

FEDERAL COÖPERATION.

The United States Government can be justly held to concur in paying the forestry expenses of states containing nonagricultural land, the people as a whole drawing advantage from a state forestry system. A division of forestry already exists at Washington, admirably managed by Mr. Gifford Pinchot. The coöperation of its officers can be had almost free of charge. If federal money is engaged in Minnesota's forestry, federal forest authorities must be allowed to watch its proper application. The American people pay for the administration of the United States forest reserves in the far West. Is it unjust to demand that the people as a whole bear a share of an expense which is incurred—to a large extent—for the benefit of the people as a whole, be it in the East or in the West, in the North or in the South?

In Minnesota, the federal government still owns several million acres of nonagricultural land. This land should be withdrawn from the market, as long as conservative use of its resources in the hands of private parties is impossible, private forestry being unremunerative. All mature timber, of course, should be sold as early as possible, and from the receipts the expense for forest administration and forest development should be covered. If an arrangement can be made by which the administration of federal and state forests, and the protection of private woodlands can be combined, being placed in charge of one and the same official staff, the expense for forestry in Minnesota will be a minimum and its efficiency a maximum.

Love of the forests alone will never bring about forestry. The people ruling this country must be made to see the intrinsic economic importance of forestry. Every leader of the public mind, every teacher, every preacher, every county and state officer, must consider it his duty to draw the people's attention to the necessity of a forest system. There is no room for selfishness in the forestry propaganda. The advocate of forestry can only be a man devoted more to his country than to his private interests. He will have to battle against the state's main enemy, the egotism of its various constituents, fearing loss of taxes for the county, or loss of a chance to obtain timber at a small price. He will have to brave the vociferations of those public leaders who offer to the people at random what the people like to hear, the war-cry against increased public expenses. As long as the people are taught to love the dollar kept in the pocket better than the dollar spent for the country, forestry will have a poor chance to develop.

I may be permitted to recapitulate the legal steps, which, in my opinion, the people of Minnesota ought to take towards forestry:

I. A law ordering a survey to be made, by which the nonagricultural townships and sections of townships shall be defined.

II. A law pertaining to clear—through the medium of courts, attorneys and surveyors—the state's title to land forfeited for non-payment of taxes.

III. A law creating an organized staff of forest guards, whose duty it shall be to efficiently protect all private forests, and to enforce the laws enacted relative to federal and state forests and forest lands. This staff might, at the same time, have the duties of fish and game wardens.

IV. A law regulating the assessment of nonagricultural land (compare No. I) for taxation purposes.

V. A law allowing companies to own tracts comprising over 5,000 acres for forestry purposes.

VI. A law providing means for investigating the financial possibilities of forestry.

C. A. SCHENCK.

PUBLICATIONS
OF
The Minnesota State Forestry Board.

BULLETIN NUMBER 2.

Issued from the office of the Secretary, St. Paul, Minn., November, 1903.

MEMBERS OF MINNESOTA STATE FORESTRY BOARD.

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(*Ex-officio as Chief Fire Warden.*)
John Cooper, St. Cloud.
Samuel B. Green, St. Anthony Park.
(*Ex-officio as Horticulturist State University.*)

O. M. Lord, Minnesota City.
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M. M. Williams, Little Falls.
A. C. Wedge, Albert Lea.

VOLUME TABLES FOR WHITE SPRUCE AND OTHER
TREES.

BY T. L. DUNCAN.

Settlers and others in Northern Minnesota have found considerable difficulty in securing accurate estimates of the standing timber on their lands. This is due mainly to the inexperience of most persons in making ocular estimates, and much to their lack of knowledge of simple mathematical methods of approximating the merchantable contents of standing trees. They have been compelled, to their disadvantage, to rely on the "guess" of professional estimators who are oftentimes influenced as buyer or locator to lend color to the estimates to their own benefit. Foresters, recognizing the volume table of mathematical construction as a necessary adjunct in the pursuit of their profession, have devised various forms of it for practical use and various ways for their preparation, and to the inexperienced person such tables should render some assistance.

Where great accuracy is desired special tables should be prepared for each species of tree and for each quality of locality, but general tables for each species of a district may be prepared that will readily, and more accurately, take the place of the eye of

the professional estimator. As preliminary to the construction of such tables the contents, in board measure (B. M.), of a great many felled trees should be determined by actual measurement, and classified according to some dimension of the tree. The volume of a tree varies with its diameter and height, and where extreme accuracy is desired, volume tables are made to show contents of trees of different heights, as well as of different diameters; but a classification on the basis of diameter at breast height from the ground will be found most convenient and quite practicable for ordinary purposes in estimating stands of timber. Breast height is uniformly taken to be four and one-half feet from the ground, and the diameter at that point is measured with a pair of tree calipers in inches outside the bark of the standing tree. Transactions for the sale of stumpage are made for the merchantable volume, and that varies with the diameter inside the bark and the length of the salable material in the tree. Scribner's Rule, the legal standard in Minnesota for the measurement of log contents, gives the volumes of logs in board measure according to the length in feet and the diameter in inches inside the bark at the small end. Now to get a working table we must have one that will give the contents of the standing tree in feet board measure for each diameter size taken outside the bark at breast height (Dbh), and as trees of the same diameter vary greatly in volume we must obtain measurements of as many as possible of each diameter and enter only the average size in the volume table.

To secure reliable results in the use of the volume tables all the trees in the stand which is to be estimated must be calipered, classified and volumes for each class computed by aid of the table. On account of the time required for the work objection is raised to this method, but experience has shown that the better results obtained will pay for the additional expense of the estimate. However, an estimator, after some practice with the calipers, will be able to classify the trees on his tally sheet in inch diameter sizes without the aid of the instrument sufficiently accurate for most occasions where time is an essential.

With the idea of preparing a practical working table for one species I selected the white spruce as being the most important commercial tree in this vicinity and on the particular tract of land for which I wanted an estimate, and proceeded to obtain all measurements possible under the circumstances attending my

work. In connection with the spruce, and on the same ground, I gathered data from a fewer number of trees for tables on white pine, balsam fir and tamarack.

The white spruce, *Picea canadensis*, is a very common tree in the northern part of Itasca county, and ranks third or fourth in abundance among the trees of this part of the state. It grows in mixture with all other species, and flourishes to the best advantage on slopes leading to lakes, streams and swamps, reaching 100 feet in height and 30 inches in diameter. The stem of the spruce is very straight with small branches, of which the dead ones on the lower part of the trunk are a very conspicuous feature of the tree on account of their persistent habit. The crown occupies from a third to a half of the length of the tree, and is of a dense, compact, and neatly conical form.

A straight, undivided stem renders the spruce capable of economical conversion to commercial purposes. The limbs contain no present value here, but the trunk may be utilized to a small size—the lower portion for saw timber and the upper length for pulp wood. In developing a volume table for spruce I have considered this utility and scaled the logs down to five inches at the top. One might go even farther and take them down to three inches inside the bark, but the top tapers off so rapidly that little length of value remains below five inches, and I have thought it better to underestimate the volume of a tree than to run short in the cut.

A volume table for any tree, as has been suggested, should embrace the measurement of as large a number of trees as it is practicable to get, and where the conditions of growth vary, a fair percentage of trees under each condition must be taken if the intention is to group them together for general application. This volume table for spruce was constructed from the measurements of 654 felled trees on the right of way of the Minnesota and International Railway, the Northome Townsite, and in the vicinity. The configuration of the country is rolling, but the conditions of growth vary only slightly from point to point, and the clearing of the Minnesota & International Railway in a direct line gave me opportunity to secure measurements of a sufficient number of trees in various situations, up and down hill, to insure reliable average results. This table, which was primarily prepared for use on a particular tract of forest land, and is properly applicable to this immediate vicinity only, and to stands of timber as now

found here, may still be used throughout Northern Minnesota in the mixed woods.

Each tree was measured as it lay on the ground where cut, the measurements taken being the diameter of the tree at breast height when standing, the length of each log and its diameter inside the bark at the small end; and the volume of all the logs in each tree was determined from Scribner's Rule. The trees were then classified according to the diameter breast high, and the volume of the average sized tree in each class obtained by dividing the total volume of that class by the number of trees. These average volumes were then plotted in curves for each species, and irregularities eliminated and deficiencies supplied in the following tables made from the curves. The tables are not perfect—a perfect one is an impossibility, for the accidents of life are more numerous and varied than the definite conditions of growth—but the practicability of even approximate tables is evident.

It was not convenient to measure the height of each tree, as often they were cut down by the workmen, trimmed, sawed into logs, and the slash and tops thrown into heaps for burning before I could get around to make the measurements. A table made to show merchantable contents in relation to both diameter and height of tree would have been valuable and interesting, but my figures will apply to average trees, and a few feet more or less in the length of the tree would not vary the top diameter an inch, nor move the five-inch limit up or down more than a foot or two.

The table for pine may be found suitable for the scattered timber growing in mixture with other trees here, but may not be applicable to the pine in groves of pure stand where the trees grow tall and straight with well-formed stems. For such pine a special table should be prepared.

VOLUME TABLES.

Diameter In inches.	White Spruce. (B. M. in Feet.)	White Pine. (B. M. in Feet.)	Balsam Fir. (B. M. in Feet.)	Tamarack. (B. M. in Feet.)
5	5	8	4	4
6	10	10	10	12
7	18	13	15	22
8	27	18	24	34
9	40	26	34	46
10	54	39	44	58
11	74	53	58	72
12	95	68	73	88
13	116	85	90	104
14	138	107	108	122
15	160	128	126	142
16	185	148	148	162
17	216	172	171	186
18	248	205	195	212
19	280	240	219	240
20	318	280	248	270
21	370	325	278	302
22	438	378		334
23	530	425		368
24	655	480		
25	790	540		
26	940	605		
27	1,080	672		
28		740		
29		813		
30		895		
31		960		
32		1,040		
33		1,140		
34		1,250		
35		1,370		
36		1,500		

To illustrate the use of volume tables we will take a specific case. The S. E. $\frac{1}{4}$ Sec. 13, Twp. 150, R. 29, is covered with a heavy stand of mixed woods, and to determine the volume of pine, spruce, fir and tamarack I calipered all the trees five inches and upwards in diameter. I had one assistant, Benjamin Tone of Bridgie, who tallied the sizes and species on paper as I called them to him. Part of the work was done in the early spring before the snow left the ground, and part during the summer. Where snow lies on the ground no trees need be marked, as the trail in the snow will indicate which trees have been measured, but during the summer when finishing the task we worked in narrow strips, and I blazed the outer trees of the strip as a

guide for the return trip across the tract. My tallyman held a course along the blazed line while I calipered over a fresh strip. The measurements were made and classified in inch diameter sizes for each species. The total number of trees of each diameter was then counted up and multiplied by the corresponding average volume obtained from the volume table, thus giving the number of feet, board measure, in each diameter class, and the sum of these volumes gives the total stand.

The computation is shown in the following table:

COMPUTATION OF GROWING STOCK.

Diameter Breast High.	WHITE SPRUCE.			WHITE PINE.			BALSAM FIR.			TAMARACK.		
	No. Trees.	Volume Av. Tree.	Total Volume B. M.	No. Trees.	Volume Av. Tree.	Total Volume B. M.	No. Trees.	Volume Av. Tree.	Total Volume B. M.	No. Trees.	Volume Av. Tree.	Total Volume B. M.
5	1,456	5	7,280	18	8	144	1,005	4	4,020	465	4	1,860
6	1,343	10	13,430	6	10	60	923	10	9,230	408	12	4,896
7	948	18	17,064	13	13	169	709	15	10,635	525	22	11,550
	3,747	..	37,774	37	....	373	2,637	....	23,885	1,398	....	18,306
8	1,033	27	27,891	22	18	396	679	24	16,296	517	34	17,578
9	862	40	34,480	20	26	520	665	34	22,610	457	46	21,022
10	685	54	36,990	20	39	780	474	44	20,836	348	58	20,184
11	533	74	39,442	25	53	1,325	388	58	22,504	190	72	13,680
12	466	95	44,270	17	68	1,156	284	73	20,732	210	88	18,480
13	352	116	40,832	13	85	1,105	278	90	25,020	118	104	12,272
14	253	138	34,914	22	107	2,354	203	108	21,924	80	122	9,760
15	173	160	27,680	16	128	2,048	126	126	15,876	36	142	5,112
16	138	185	25,530	29	148	4,292	67	148	9,916	20	162	3,240
17	64	216	13,824	22	172	3,784	43	171	7,353	10	186	1,860
18	47	248	10,656	21	205	4,305	17	195	3,315	11	212	2,332
19	27	280	7,560	16	240	3,840	6	219	1,314	4	240	960
20	11	318	3,498	28	280	7,840	7	248	1,736	2	270	540
21	11	370	4,070	26	325	8,450	5	278	1,390	1	302	302
22	6	438	2,628	21	378	7,938	.....	.....	.....	1	334	334
23	8	530	4,240	20	425	8,500	.....	.....	.....	1	368	368
24	1	655	655	14	480	6,720	.....	.....	.....	.....	.....	.....
25	.....	.....	.....	10	540	5,400	.....	.....	.....	.....	.....	.....
26	2	940	1,880	12	605	7,260	.....	.....	.....	.....	.....	.....
27	1	1,080	1,080	8	672	5,376	.....	.....	.....	.....	.....	.....
28	.....	.....	.....	6	740	4,440	.....	.....	.....	.....	.....	.....
29	.....	.....	.....	9	813	7,317	.....	.....	.....	.....	.....	.....
30	.....	.....	.....	2	895	1,790	.....	.....	.....	.....	.....	.....
31	.....	.....	.....	4	960	3,840	.....	.....	.....	.....	.....	.....
32	.....	.....	.....	1	1,040	1,040	.....	.....	.....	.....	.....	.....
36	.....	.....	.....	1	1,500	1,500	.....	.....	.....	.....	.....	.....
	.....	.....	362,120	.....	.....	103,316	.....	.....	190,822	.....	.....	128,024

In this table it will be noted that I have separated the volumes of 5, 6 and 7 inch trees from those 8 inches and upwards in diameter. The smaller trees were not considered merchantable, except in spruce, where they may be added in for pulp wood. In addition an estimate was made of 8,000 feet of red pine (Norway) and 100 feet of jack pine, which do not appear in this table.

The volumes obtained on section 13 and elsewhere were thrown together and the average-sized trees of merchantable timber 8 inches and up were determined for this locality as follows:

White pine, average diameter 19.3 inches, volume 252 feet, B. M.

Spruce, average diameter 11.3 inches, volume 80 feet, B. M.

Balsam fir, average diameter 10.5 inches, volume 51 feet, B. M.

Tamarack, average diameter 10.5 inches, volume 65 feet, B. M.

These figures may be used roughly to determine a stand of timber. Thus, count all the trees of merchantable size, keeping each species separate and multiply by these average volumes. This will give lower results than the more accurate method described, but will be a safe standard for rough work. If the cut takes trees down to 12 or 10 inches only, then the volume of the average tree would be greater.

In applying a volume table it is well to remember that it is only an approximation, and results accurate to the thousand, especially in these virgin woods that have grown up without care, are disputable, so all figures less than a thousand may be raised or lowered to the nearest thousand. Lumbermen are inclined to throw discredit on estimates giving unit thousands, but, nevertheless, even in an approximation where the unit thousands are expressed, we are the more certain to which ten thousand it approaches the nearest.

T. L. DUNCAN,
Northome, Itasca County, Minn.

October 14, 1903.

7

SHORT

SPECIAL REPORT

ON

Forest Fires in Minnesota

1908

STATE OF MINNESOTA,
OFFICE OF FORESTRY COMMISSIONER,
ST. PAUL, DEC. 28, 1908. }

Hon. S. G. Iverson, State Auditor:

SIR: I have the honor to submit, herewith, a short special report on forest fires in Minnesota the present year. Very respectfully,

C. C. ANDREWS,

Forestry Commissioner.

REPORT

OF THE

FORESTRY COMMISSIONER OF MINNESOTA

ON

FOREST FIRES, 1908.

Since the Hinckley forest fire of 1894, in which 418 persons perished, there have been several very dry seasons in Minnesota, but none so dangerous as during 1908. April and May of this year were very dry in the northwestern part of the state, and many forest fires occurred in the counties of Cass, Crow Wing, Becker, Beltrami, Hubbard, Morison, Ottertail, Todd and Wadena. A more protracted period of dry and windy weather, however, prevailed during August and September in the extensive territory of about 6,000,000 acres, comprising the counties of Cook, Lake, St. Louis, Itasca, Carlton and Pine. Practically all of the inhabitants of the north shore of Lake Superior were occupied for weeks in fighting forest fires. Their situation was one of distress and terror.

DAMAGE BY FOREST FIRES, 1908.

From all reports received, the damage done by forest fires in Minnesota in 1908, exclusive of the destruction of the village of Chisholm, was \$503,633. Including the loss at Chisholm, which according to popular rumor was \$1,500,000, the total loss by forest fires was \$2,003,633. The number of acres, mostly cut-over land, burned over or partly burned over, was 405,748.

The cause of many of the fires was as follows: Burning brush, 15; burning meadow, 9; campers, 11; clearing

land, 47; fishermen and hunters, 16; from adjoining town, 17; railroad locomotives, 29; other causes, 6; unknown, 180.

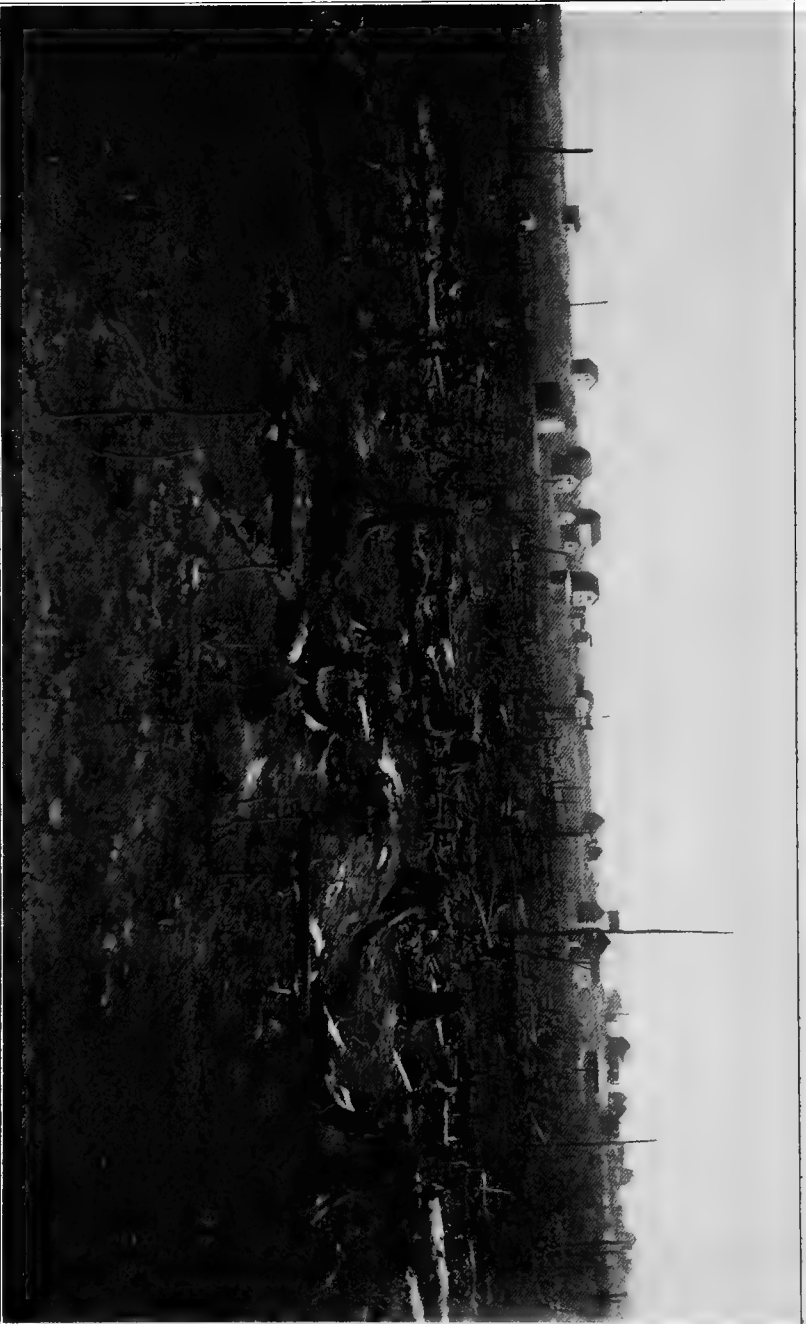
The number of persons who fought fire was 5,277.

NORTH SHORE.

An urgent appeal for help in fighting fires having been received by me from the village of Hovland, about thirty miles east of Grand Marais, Cook county, at my request Mr. J. T. Black, chief engineer of the fire department of Duluth, promptly organized a crew of forty men, who, with proper supplies and under the charge of Captain C. W. Wilson, left Duluth on a steamboat September 13th and were gone a full week. Finding they were not needed at Hovland, they stopped at Lutsen, a point about twenty miles west of Grand Marais, where they rendered effective service day and night. At the same time Adjutant General Wood, on the U. S. Steamer Gopher, with a detachment of Minnesota naval militia, was doing everything possible for the relief of the settlers. Grand Marais was one of the places most afflicted.

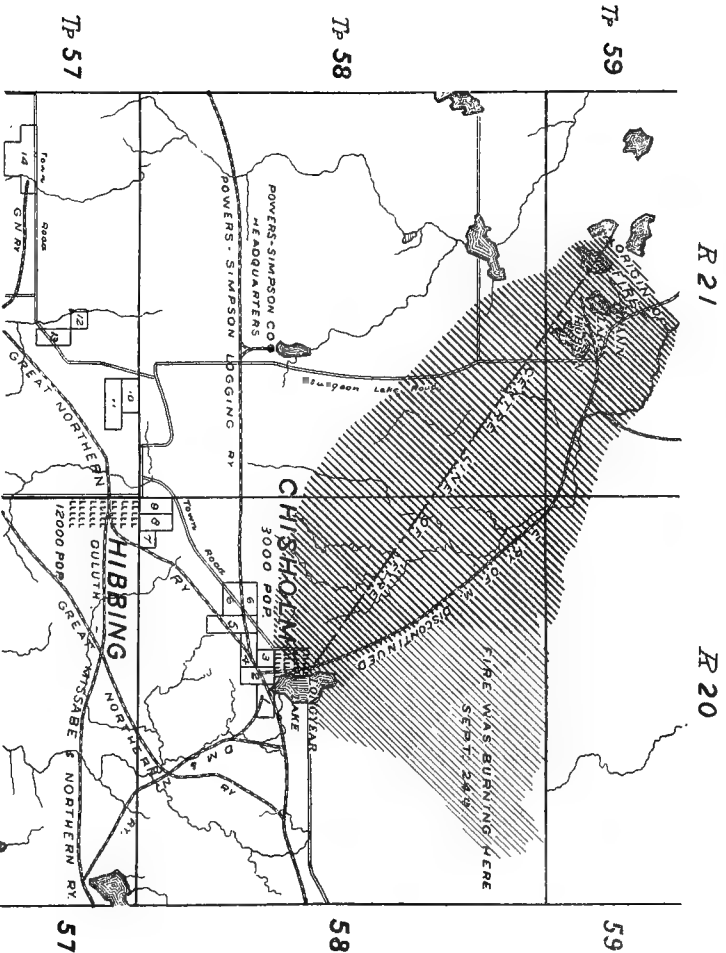
The principal damage to standing timber by all the fires was on the Pigeon River Indian reservation, comprising the eastern portion of Cook county, and which is separated from Ontario by the Pigeon river. Mr. L. W. Ayer, of Belle Prairie, an experienced and reliable cruiser, who was employed by this office to visit the burned regions and investigate the origin of the fires and amount of damage done, reports that the total timber loss by fire on the north shore, including the Indian reservation, was \$325,000.

Further west, hundreds of people were engaged successive days in fighting fire on the outskirts of Bovey, Nashwauk, Hibbing and Virginia, which places, on account of high wind, were considered in danger.



Part of the tract of about twenty acres in the village limits of Chisholm, which was covered with tops and refuse (slashings) September 4, 1908, and which made the destruction of the village by fire possible. The valuable timber throughout that locality was cut several years ago. Photographed for the Forestry Commissioner of Minnesota, October 2, 1908.

- Iron Mines.
1. Pillsbury.
 2. Glen.
 3. Clark.
 4. Pearce.
 5. Chisholm.
 6. Laura.
 7. Day.



Map made for the Forestry Commissioner of Minnesota, showing the starting point and track of the forest fire which, on September 4, 1908, destroyed most of the village of Chisholm, St. Louis County, Minnesota. The fourteen iron mines indicated on the map by numbers were in operation at the time of the fire.

CHISHOLM FIRE.

The only actual catastrophe, however, occurred at Chisholm, late on the afternoon of Saturday, the 4th of September. The mining village of Chisholm (which is being rapidly rebuilt) was credited with a population of 3,000; but its area extended over a mile, and included on the east three mining plants with their own little villages, and which escaped injury by fire. Also the new Central schoolhouse and many other buildings were uninjured.

The Chisholm fire originated at a lake about ten miles northwest, in the unorganized township 59, range 21, containing only a dozen settlers, and had been set by fishermen from Chisholm who had frequented the locality Saturdays and Sundays several weeks previously. They had been driven out of two of their camping places by fire caused by their negligence. Their fire had been burning and smouldering for a week or more until the 4th of September, when a gale from the northwest drove the spreading flames directly towards Chisholm, over undulating country covered with slashings and scattering young growth, and which a few years previously was a heavy forest of pine and hardwood.

SLASHINGS CAUSED CHISHOLM'S DESTRUCTION.

I visited Chisholm October 1st and saw that an area of twenty or more acres in the village limits and close to buildings on its west side had, up to the time of the fire, been covered with slashings left from logging a few years ago. Had these slashings been previously burned, the fire would have stopped before reaching any building in the village. Had this office been notified by the local authorities of the existence of these slashings, they

would have been burned in calm weather at the State's expense, just as was done a few years ago at Blackduck, and this catastrophe, I feel satisfied, would not have occurred.

Mr. J. P. Neal, of Duluth, representing this office and writing from Hibbing under date of September 8th, says:

"I went to Chisholm with Mayor Weirick, of Hibbing, this P. M., and we looked over the situation together. From many sources I learn that fires have been in progress back in the woods for at least six weeks. These were not looked after at all; the townspeople seem to have felt perfectly secure, because there were no woods near the town. Even at four o'clock on Saturday the Chisholm people considered that the town was not in danger and at that time, even, made no effort to check the fire. In an hour the town was doomed, fire leaping across acres of open clearing in clutch of the gale and set the wooden houses on fire. The water-works plant was among the first buildings to be destroyed, leaving the people helpless. It seems to me that the neglect of the small forest fires was, to say the least, imprudent, but it is true that such fires are most difficult to quench entirely. They keep springing up after they are seemingly put out."

It was Mr. L. W. Ayer who ascertained the origin of the Chisholm fire. Writing to this office under date of Duluth, September 30th, he says:

"I came into Duluth last evening from Chisholm and vicinity. Sent you a telegram this morning, 'Chisholm fire located,' etc. Thinking of it after sending, it occurred to me you might understand I had traced it to the *party* responsible therefor. This I did not accomplish. In fact, it is practically impossible to identify the guilty parties, but I have without question located the exact spot where the fire originated. Was caused by carelessness of fishing party from Chisholm. Referring to the map, you will find a chain of small lakes in the southwest corner of township 59, range 21. Fishing parties from Chisholm have been out to these lakes every Saturday and Sunday through the summer. Their principal rendezvous was on Hobson and Hahn lakes, as they were nearer

the road and thus more accessible. But at each of these places they burnt themselves out, and had to move to adjacent lakes to find camping ground. Their favorite camping place was on an island in Hahn lake. A week before the Chisholm fire started the island was burnt over. Then, the next, they went up to a small lake in secs. 32 and 33, township 59, range 21, and started the fire that destroyed Chisholm. This smouldered around the lake nearly a week, burning very slowly, as vegetation was comparatively green around the lake; but the high wind of the 4th and 5th, reaching a velocity of between 30 and 40 miles an hour, drove the flames straight for Chisholm. After crossing the Sturgeon Lake County road, it reached the doomed town, a distance of ten or eleven miles, in an hour and a half, and in less than an hour thereafter the village was in ashes."

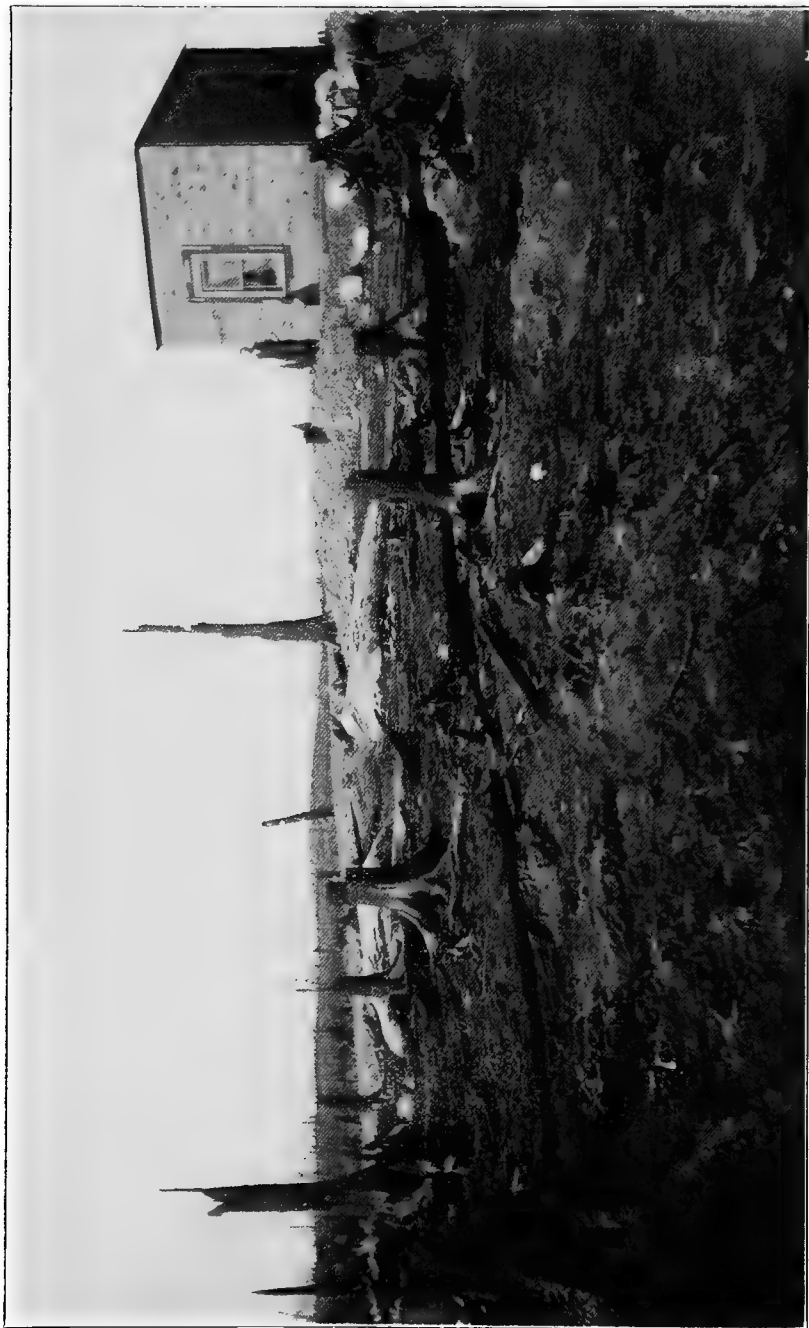
Mr. Dillon Tierney, of Farmington, graduate of the forestry school, and who had rendered field service a year or more for the Cloquet Lumber Company, was employed by this office to go to International Falls via Bemidji and return through the Ash Lake country. He reported that the important pine forests there had not been injured by fire.

DEFICIENCY APPROPRIATION.

The standing appropriation of \$5,000 a year provided by Section 1784, Revised Laws of Minnesota, 1905, to cover the expense of preventing and suppressing forest or prairie fires "in any season of unusual drought," was exhausted in October, and there are unpaid claims for fighting forest fires amounting to \$12,500, due for the most part to poor people, who in many instances worked day and night and who deserve their pay at the earliest possible moment. These accounts are on file in my office and I respectfully recommend that a deficiency appropriation be made by the legislature for their payment at an early day.

DUTIES OF FIRE WARDENS.

The law making supervisors of towns, mayors of cities, and presidents of village councils, fire wardens,



Ground in village limits of Chisholm that was covered with slashings at the time of the fire, September 4, 1908. Photographed for the Forestry Commissioner of Minnesota, October 2, 1908.

has been in operation fourteen years. Just as soon after the March elections as the address of these officers can be obtained, a printed copy of the law, with instructions, is each year sent them, and they know their duties. The law says: "They shall patrol their districts in dry seasons, and with the approval of the commissioner, *may employ patrols* to guard against carelessness in use of fire. It is true, a warden is paid only \$2.00 a day for actual service, and for not more than fifteen days in a year, unless with the approval of the commissioner. But this would not prevent a vigilant warden, where the situation is dangerous, from going or sending out ten or twenty miles, if need be, to seasonably prevent or suppress fires.

HOW OUR SYSTEM CAN BE STRENGTHENED.

Although there have been several very dry and dangerous seasons during the thirteen years previous to this that our fire warden system has been in operation, yet the average damage from forest fires per year during this period has been only \$30,000. The public takes little note of fires that are prevented or of property saved. The spring of 1900 was said by some people to have been as dry as the fall of 1894. June 22, 1900, the village of Moose Lake, Carlton county, was saved by the prompt suppression of a forest fire two and a half miles southwest of that place by the fire warden service. In April of the same year, the village of Cass Lake was saved from destruction by the fire warden service. The same can be said in respect to the villages of Blackduck and Tenstrike in May, 1904.

The majority of people are careful and law-abiding. But we must remember that the forest region of Minne-

sota is very extensive and contains the refuse of sixty years of logging. The activities of mining, logging, new settlements, new railroads, increase of population, and thousands of campers, tourists, hunters and prospectors, have increased the danger of fires since the present system went into effect. Fourteen years ago the country around Chisholm was a silent forest solitude. To-day, within a radius of ten miles of Chisholm, is an active population of 12,000.

In striving for improvement of our present system, PREVENTION is the thing to be mainly kept in view.

1. SLASHINGS. A law should be enacted requiring every one who cuts and fells timber or wood for commercial purposes to pile and burn the slashings—branches, tops and refuse—at the time of cutting. This is being done successfully by the United States forest service in the Minnesota national forest and with the cordial support of the lumbermen. Such a bill was agreed to by the forestry officials of Michigan, Wisconsin and Minnesota at a conference recently held at Madison, Wis. So far as I know, the Minnesota lumbermen will support such a measure. I endeavored to have such a bill enacted six years ago, and if it had passed, I feel sure the Chisholm calamity would not have occurred.

2. RANGERS. In dry and dangerous seasons there should be an energetic and reliable man to speedily visit localities where fires are liable to occur and inspect, assist or compel the activity of local wardens. Ontario has for many years employed rangers; and they are used successfully in the U. S. forest service and in the State of Washington. In a dry season forty or more rangers could be employed in Minnesota, and to secure the right kind of men their compensation for the comparatively short time they would be employed should be about \$5.00 a day and their expenses.

3. SEVERER PENALTY. In the Game Warden Law the minimum penalty a justice of the peace can impose is \$50.00, but there is no minimum penalty in the Fire Warden Law. In a dozen prosecutions under the Fire Warden Law the present year, the highest fine imposed was \$50.00, but in some cases the fine was as low as \$5.00 and \$1.00. The law should be amended so that the minimum penalty shall be \$50.00. A severer penalty than at present will arouse attention and make people more careful. A respectable citizen can be careless about fire, and it is very difficult to get a prosecution started against such men. Nevertheless, a rigorous enforcement of the law against forest fires is the truest kindness.

4. MORE PAY FOR LOCAL WARDENS AND HELPERS. At present the local warden is paid only \$2.00 a day for time actually employed, and for only fifteen days in a year. Can we expect a busy farmer to take his team and drive off ten miles about a fire at that pay? I think it would stimulate his interest in his duties to pay him twenty-five cents an hour for actual service and his necessary expenses, and repeal the limitation of fifteen days. At present those who are pressed into the service to fight fire are paid only \$1.50 per day. It was found necessary this year to pay \$2.00 a day for such service. I recommend they be paid twenty cents an hour.

5. MORE MONEY. The standing annual appropriation now, as an emergency fund to be used by the forestry commissioner in preventing and suppressing forest and prairie fires in a region of about 30,000,000 acres, is only \$5,000. The mere statement of this shows its absurdity. There is an additional \$1,000 for prosecutions. Then the general appropriation bill passed each session carries \$5,000 for each fiscal year for "Forest

Preservation" (erroneously headed in the last bill "Forestry Board"), out of which is paid the salary and office expenses of the forestry commissioner, the printing and free distribution of 4,000 copies of his annual report, and in *an ordinary year*, one-half of all the expense of local fire warden service—the counties in which such local service occurs paying the other half. This makes \$11,000, and not a dollar more, that the State of Minnesota appropriates for Forest Preservation and its service of preventing and suppressing forest and prairie fires. In place of the standing annual appropriation of \$6,000, I think \$30,000 is as little as can safely be appropriated; and the item in the general appropriation bill for "Forest Preservation" should be increased to \$10,000.

The State of Maine has a standing appropriation of \$20,000 a year for the prevention and suppression of forest fires in *unorganized* townships. The organized townships take care of themselves. In 1904 the State of New York appropriated \$93,000 for its share of the expense of fighting forest fires the spring of 1903. Ontario expends \$100,000 annually and the lumbermen \$60,000 in addition for preventing and suppressing forest fires.

The State of Minnesota itself owns 3,000,000 acres of school and swamp land, estimated to contain \$15,000,000 worth of timber, which increases by growth at least 2 per cent, or \$300,000 a year. Up to August 1st the State had received and turned into its permanent school fund \$6,506,952 for timber cut on its own land. The appropriations I recommend are a very small amount for the State to pay for protecting its own timber from fire.

The standing timber in the northern forests in Minnesota to-day is worth \$100,000,000. On an average \$8,000,000 worth of this as it stands is being cut every year.

SUMMARY OF FOREST FIRES, 1908,

COUNTY AND TOWN	Date	Acres	Damage	No. Fire Fight- ers	Cause
Aitkin County—					
Aitkin.....	April 20...	200	\$260	2	Unknown.
Balsam.....	April 18...	300	50	None	Unknown.
Balsam.....	April 19...	300	None	None	Unknown.
Beaver.....	Sept. 7....	3	100	5	Unknown.
Clark.....	Oct. 13....	80	None	3	Clearing land.
Idun.....	Oct. 16....	100	150	33	R. R. locomotive.
McGregor.....	April 15....	20	100	8	Clearing land.
McGregor.....	Oct. 13....	130	210	11	R. R. locomotive.
Millward.....	Sept. 19....	60	250	7	Unknown.
Township 44-22....	Oct. 12....	150	200	4	Burning brush.
Pliney.....	Sept. 19....	200	50	25	Clearing land.
Wagner.....	April 18....	40	500	6	Unknown.
Wagner.....	Sept. 25....	130	600	22	Unknown.
Wagner.....	Oct. 15....	1,200	4,000	71	Unknown.
Anoka County—					
Bethel.....	April 13....	200	200	7	Unknown.
Bethel.....	April 16....	200	150	7	Clearing land.
Becker County—					
Burlington.....	April 19....	4,000	20,000	21	Unknown.
Green Valley.....	April 19....	300	50	17	Unknown.
Height of Land.....	April 18....	75	600	15	Unknown.
Holmesville.....	April 21....	150	None	10	From town 139-40
Runeberg.....	April 18....	1,400	1,800	40	Clearing land.
Runeberg.....	April 23....	60	None	9	Unknown.
Toad Lake.....	April 19....	20	10	4	From adj. town.
Two Inlets.....	April 21....	1,200	700	35	From Indian res.
Two Inlets.....	April 24....	640	.....	13	From t'wn of Osage
Beltrami County—					
Buzzle.....	April 18....	80	.....	8	Burning brush.
Buzzle.....	April 23....	200	25	10	Unknown.
Buzzle.....	May 5....	2,000	200	20	Fishermen.
Buzzle.....	Sept. 21....	2,500	1,500	16	Fm. Clearwater Co.
Corment.....	April 19....	200	150	1	Unknown.
Corment.....	April 22....	400	500	.....	Unknown.
Corment.....	May 7....	20	.....	6	Camp fire.
Corment.....	May 10....	600	1,000	11	Unknown.
Corment.....	Sept. 11....	200	500	16	Unknown.
Durand.....	April 21....	5	.....	15	Clearing land.
Durand.....	April 21....	40	500	5	Unknown.
Eckles.....	April 21....	240	1,000	25	Clearing land.
Frohn.....	May 8....	200	1,000	14	Unknown.
Grant Valley.....	May 8....	120	200	31	R. R. locomotive.
Grant Valley.....	July 12....	50	100	21	R. R. locomotive.
Jones.....	April 21....	4,000	3,000	20	Campers.
Kelliher.....	May 15....	80	500	1	Unknown.
Lammers.....	April 20....	5,000	slight	30	Unknown.
Lammers.....	May 9....	1,000	800	11	Unknown.
Langor.....	April 21....	250	1,500	4	Clearing land.
Maple Ridge.....	July 8....	80	None	14	Unknown.

SUMMARY OF FOREST FIRES, 1908—Continued.

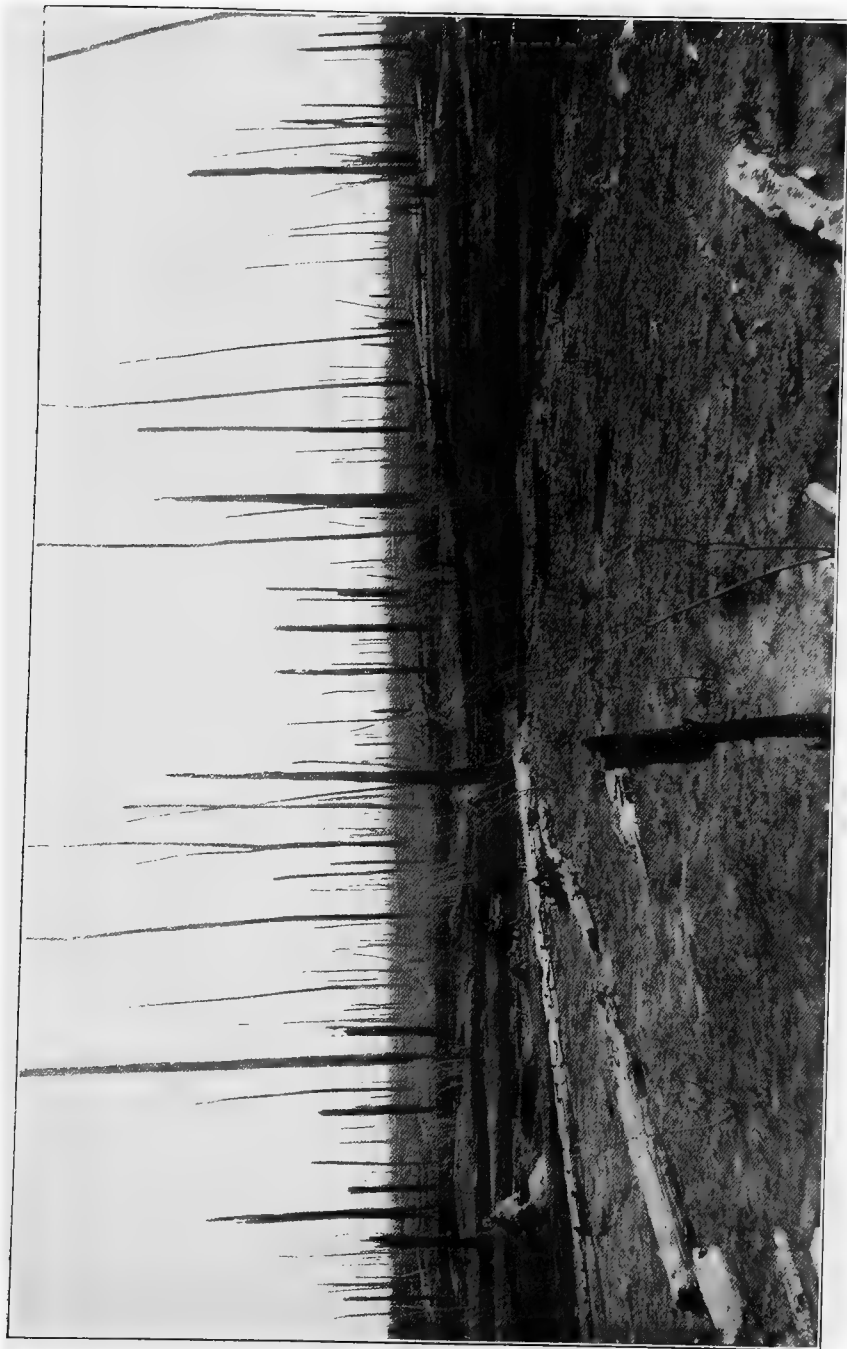
COUNTY AND TOWN	Date	Acres	Damage	No. Fire Fight- ers	Cause
Beltrami Cou'ty—Cont.					
Nebish.....	April 20...	3,160	6,000	18	Unknown.
Northern.....	April 22...	400	2,000	17	Unknown.
Port Hope.....	May 7.....	700	2,500	21	Unknown.
Port Hope.....	Sept. 11...	200	500	16	Unknown.
Port Hope.....	Sept. 21...	500	1,000	14	Clearing land.
Summit.....	April 21...	60	100	5	Camp fire.
Taylor.....	April 22...	400	400	22	Unknown.
Turtle Lake.....	April 19...	1,500	1,000	7	R. R. locomotive..
Turtle Lake.....	April 21...	600	300	2	Unknown.
Turtle Lake.....	May 8.....	500	200	7	Clearing land.
Benton County—					
Gilmanton.....	April 19...	240	75	...	Unknown.
Granite Ledge.....	April 12...	100	75	4	Unknown.
Carlton County—					
Atkinson.....	Sept. 3....	15	500	19	Unknown.
Atkinson.....	Sept. 5....	40	50	7	Clearing land.
Atkinson.....	Sept. 3....	60	250	9	Unknown.
Barnum.....	Sept. 8....	1,000	200	25	R. R. locomotive.
Barnum.....	Sept. 15...	300	slight	15	Clearing land.
Barnum.....	Sept. 16...	500	200	40	Unknown.
Barnum.....	Oct. 14....	600	120	8	Burning meadow.
Barnum.....	Oct. 15....	300	20	4	Clearing land.
Blackhoof.....	Sept. 4....	4,000	2,000	25	Unknown.
Eagle.....	April 20...	40	75	2	Clearing land.
Eagle.....	May 10....	120	300	4	Burning meadow.
Eagle.....	Sept. 8....	160	800	1	R. R. locomotive.
Holyoke.....	April 18...	500	100	...	Clearing land.
Holyoke.....	April 21...	100	slight	3	Clearing land.
Holyoke.....	April 22...	60	100	...	Clearing land.
Holyoke.....	Sept. 3....	600	300	13	Camp fire.
Holyoke.....	Sept. 7....	1,300	500	9	Unknown.
Holyoke.....	Oct. 15....	2,000	600	22	From Pine county.
Knife Falls.....	Sept. 11...	15	slight	65	Unknown.
Knife Falls.....	Sept. 11...	30	150	100	Clearing land.
Lake View.....	May 9.....	700	300	16	Burning meadow.
Lake View.....	Oct. 14....	30	600	3	R. R. locomotive.
Red Clover.....	Sept. 10...	200	slight	4	Clearing land.
Skelton.....	Sept. 5....	200	300	23	Unknown.
Skelton.....	Oct. 16....	400	200	19	Clearing land.
Split Rock.....	Oct. 13....	200	500	13	Unknown.
Twin Lakes.....	Sept. 20...	20	100	7	Unknown.
Wrenshall.....	Sept. 1....	6,000	9,000	150	Burning R. R. right of way.
Cass County—					
Ansel.....	April 12...	1,000	75	10	Unknown.
Birch Lake.....	April 19...	500	1,000	...	Unknown.
Deerfield.....	April 23...	1,500	None	19	Unknown.
Hiram.....	April 19...	2,000	500	11	Unknown.
May.....	April 11...	500	200	1	Unknown.
May.....	Oct. 12....	2	12	8	Traction engine.
May.....	Oct. 13....	160	160	2	R. R. locomotive.

SUMMARY OF FOREST FIRES, 1908—Continued.

COUNTY AND TOWN	Date	Acres	Damage	No. Fire Fight- ers	Cause
Cass County—Cont.					
Meadow Brook.....	April 10...	3,000	1,000	20	Burning brush.
Meadow Brook.....	April 12....	600	30	2	Unknown.
Meadow Brook.....	April 20....	400	280	.....	Unknown.
Moose Lake.....	April 20....	4,000	400	20	Unknown.
Pillager.....	April 17....	500	300	30	Unknown.
Pine River.....	April 18....	160	slight	2	Unknown.
Pine River.....	April 19....	900	1,000	14	Unknown.
Pine River.....	April 21....	300	100	6	Unknown.
Pine River.....	April 21....	2	80	25	Unknown.
Powers.....	April 19....	800	200	8	Fishermen.
Township 143-26...	April 12....	500	200	.....	Clearing land.
Township 134-30...	April 14....	4,000	500	10	Unknown.
Township 145-30...	April 10....	25	75	36	Burning brush.
Township 145-31...	May 10....	50	150	7	Unknown.
Township 145-31...	Sept. 21....	200	500	100	Unknown.
Walden.....	April 18....	300	100	25	R. R. locomotive.
Chisago County—					
Branch.....	Oct. 18....	5	None	.....	Clearing land.
Clearwater County—					
Bear Creek.....	April 21....	300	25	14	Unknown.
Bear Creek.....	May 9....	640	100	8	Burning meadow.
Copley.....	April 23....	6,000	600 (?)	30	Unknown.
Copley.....	Sept. 18....	80	100	5	Unknown.
Copley.....	Sept. 22....	250	500	40	R. R. locomotive.
Copley.....	Oct. 10....	160	125	7	R. R. locomotive.
Dudley.....	Sept. 22....	400	200	3	Hunters.
Dudley.....	Sept. 23....	1,500	500	14	Unknown.
Holst.....	April 22....	600	150	12	Clearing land.
Itasca.....	April 21....	500	800	20	Unknown.
Itasca.....	April 21....	640	200 (?)	13	From adj. town.
Itasca.....	May 10....	200	100	11	Unknown.
Township 143-36...	April 20....	4,000	10,000 (?)	14	Unknown.
Township 143-36...	April 20....	2,500	25,000 (?)	19	Unknown.
Leon.....	May 10....	500	150	10	Unknown.
Nora.....	Sept. 10....	640	500	5	Burning meadow.
Shevlin.....	April 19....	300	200	9	Unknown.
Shevlin.....	April 21....	200	300	8	Unknown.
Shevlin.....	April 21....	600	1,000	15	Unknown.
Shevlin.....	May 7....	300	50	4	Unknown.
Shevlin.....	Sept. 10....	120	500	7	Unknown.
Shevlin.....	Sept. 22....	700	1,000	20	Fm. town of Copley
Shevlin.....	Sept. 22....	500	1,000	8	Unknown.
Shevlin.....	Sept. 22....	120	slight	20	R. R. locomotive.
Cook County—					
Colville.....	Sept. 2....	5,000	10,000	22	Unknown.
Colville.....	Sept. 9....	700	300	.....	Unknown.
Grand Marais.....	Sept. 3....	3	None	8	Clearing land.
Grand Marais.....	Sept. 9....	30	None	1	Unknown.
Grand Marais vill'ge	Sept. 7....	500	3,000	120	Unknown.

SUMMARY OF FOREST FIRES, 1908—Continued.

COUNTY AND TOWN	Date	Acres	Damage	No. Fire Fight- ers	Cause
Cook County—Cont.					
Grand Marais.....	Sept. 6....	1,600	2,000	12	Clearing land.
Hovland.....	Aug. 28....	800	3,000	42	Clearing land.
Hovland.....	Sept. 4....	6,000	25,000	27	Unknown.
Hovland.....	Sept. 4....	4	100	19	Campers.
Hovland.....	Sept. 5....	400	4,000	.....	Clearing land.
Lutsen.....	Aug. 8....	640	slight	.....	Burning brush.
Lutsen.....	Aug. 10....	30	60	.....	Unknown.
Lutsen.....	Sept. 12....	2,000	10,000	30	Burning brush.
Maple Hill.....	Aug. 26....	2	25	8	Unknown.
Maple Hill.....	Sept. 3....	10	None	7	Camp fire.
Maple Hill.....	Sept. 7....	8,000	3,000	70	Fm. t'n of Rosebush
Rosebush.....	Aug. 23....	10,000	20,000	60	Unknown.
Tofte.....	July 13....	15	150	24	Clearing land.
Tofte.....	Sept. 3....	1,200	2,500	34	Unknown.
Crow Wing County—					
Allen.....	April 20....	12,400	30,000	20	Hunters.
Baxter.....	April 12....	1,200	1,000	2	Unknown.
Baxter.....	April 20....	100	150	2	R. R. locomotive.
Baxter.....	May 9....	1,000	750	6	Clearing land.
Deerwood.....	April 22....	300	100	18	R. R. locomotive.
Ideal.....	April 19....	320	320	8	Unknown.
Jenkins.....	April 12....	500	840	.....	Unknown.
Jenkins.....	April 18....	600	200	15	Unknown.
Jenkins.....	April 19....	3,000	200	25	Unknown.
Klondike.....	April 19....	2,000	1,500	.....	Campers.
Lake Edwards.....	April 20....	800	600	21	Unknown.
Lake Edwards.....	April 24....	500	100	6	Unknown.
Long Lake.....	April 12....	2,000	200	(?)	Unknown.
Pelican.....	April 18....	3,000	5,000	20	Clearing land.
Pelican.....	April 21....	300	slight	12	Unknown.
Roosevelt.....	April 10....	3,800	.....	3	From adj. town.
Sibley.....	April 19....	1,400	1,000	35	R. R. locomotive.
Hubbard County—					
Akeley.....	April 19....	5,000	7,000	150	From adj. town.
Arago.....	April 14....	200	10	None	Unknown.
Arago.....	April 21....	160	500	.....	Unknown.
Badoura.....	April 12....	30	25	7	From adj. town.
Badoura.....	May 7....	800	600	10	Clearing land.
Crow Wing.....	April 16....	600	600	5	Unknown.
Crow Wing.....	April 18....	60	None	8	Unknown.
Crow Wing.....	April 23....	80	50	12	Unknown.
Crow Wing.....	May 10....	300	200	17	Burning fire-break
Guthrie.....	April 20....	6,000	5,000	20	Clearing land.
Helga.....	May 13....	5	100	3	Unknown.
Helga.....	Sept. 10....	500	600	15	Unknown.
Hendrickson.....	April 22....	4,500	500	12	Unknown.
Hendrickson.....	Sept. 20....	30	150	7	Threshing engine.
Henrietta.....	April 11....	600	100	6	Unknown.
Henrietta.....	April 27....	300	300	5	R. R. locomotive.
Lake George.....	April 17....	25,000	1,200	15	Unknown.
Lake Hettie.....	April 21....	1,000	300	9	Unknown.



Path of Chisholm forest fire, at a locality six miles northwest of Chisholm, September 4, 1908. The valuable timber had been cut several years ago and the ground left covered with slavings. Photographed for the Forestry Commissioner of Minnesota, October 2, 1908.

SUMMARY OF FOREST FIRES, 1908—Continued.

COUNTY AND TOWN	Date	Acres	Damage	No. Fire Fight- ers	Cause
Hubbard County—Cont.					
Laport.....	April 21..	740	200	4	Unknown.
Laport.....	April 18..	800	1,200	10	R. R. locomotive.
Nevis.....	April 2....	600	1,000	13	Unknown.
Rockwood.....	April 19..	3,000	3,000	8	Unknown.
Schoolcraft.....	April 21..	4,500	5,000	21	Burning brush.
Straight River.....	April 23..	700	700	40	R. R. locomotive.
Straight River.....	May 9.....	600	600	8	Clearing R. R. right of way.
White Oak.....	April 19..	4,000	8,000	30	Unknown.
White Oak.....	April 22..	600	700	.....	.....
Isanti County—					
Dalbo.....	Oct. 12....	7	None	4	Unknown.
Itasca County—					
Balsam.....	Sept. 9....	50	200	.....	Unknown.
Balsam.....	Sept. 23....	2,000	.....	5	Unknown.
Township 57-26....	Sept. 23....	100	200	.....	Tobacco pipe.
Town. 59-22 & 23..	Sept. 15....	2,000	400	6	Unknown.
Bearville.....	May 10....	40	50	4	Unknown.
Bearville.....	June 5....	200	1,000	.....	Unknown.
Bearville.....	Sept. 10....	2,000	1,400	6	Unknown.
Deer River.....	Sept. 9....	70	50	13	Unknown.
Deer River.....	Oct. 12....	80	100	4	Hunters.
Feeley.....	May 8....	700	1,000	15	Unknown.
Grand Rapids.....	April 12....	15	None	3	Clearing land.
Grand Rapids.....	Sept. 11....	600	300	12	Unknown.
Grattan.....	July 8....	60	250	2	Campers.
Iron Range.....	Sept. 5....	1,600	1,000	200	R. R. locomotive.
Lake Jessie.....	July 11....	1,000	2,000	16	Unknown.
Lake Jessie.....	Sept. 12....	500	100	9	Unknown.
Marcell.....	April 18....	700	4,000	30	Burning brush.
Marcell.....	Oct. 11....	500	slight	.....	Unknown.
Nashwauk.....	Sept. 8....	3,000	1,000	25	Unknown.
Third River.....	May 9....	200	200	4	Unknown.
Township 53-22....	April 19....	300	None	.....	Unknown.
Township 53-22....	May 9....	1	94	9	R. R. locomotive.
Township 54-26....	April 18....	2,000	2,500	6	Unknown.
Township 56-26....	April 14....	700	300	7	Unknown.
Kanabec County—					
Brunswick.....	April 18....	900	4,550	9	Clearing land.
Peace.....	May 10....	40	125	4	Campers.
Koochiching County—					
Evergreen.....	July 13....	20	75	2	Unknown.
Koochiching.....	Aug. 10....	60	300	20	Unknown.
Koochiching.....	Sept. 12....	300	200	10	Unknown.
Sault.....	July 10....	600	1,000	35	Clearing land.
Township 151-29..	Sept. 20....	5	50	4	Unknown.
Township 151-29..	Sept. 29....	2	100	12	Hunters.

SUMMARY OF FOREST FIRES, 1908—Continued.

COUNTY AND TOWN	Date	Acres	Damage	No. Fire Fight- ers	Cause
Lake County—					
Beaver Bay.....	July 11....	600	100	4	Unknown.
Beaver Bay.....	Sept. 3....	1,800	.....	.....	R. R. locomotive.
Beaver Bay.....	Sept. 8....	4,000	15,000	25	R. R. locomotive.
Crystal Bay.....	Sept. — ..	20	100	6	Unknown.
Silver Creek.....	Sept. 8....	10,000	25,000	8	Unknown.
Silver Creek.....	Sept. 9....	500	500	9	Unknown.
Silver Creek.....	Sept. 9....	2,500	7,500	12	R. R. locomotive.
Two Harbors.....	Sept. 9....	80	150	5	Unknown.
Two Harbors.....	Sept. 9....	50	300	12	Clearing land.
Two Harbors.....	Sept. 17...	250	2,000	4	Unknown.
Two Harbors.....	Sept. 13...	20	150	9	Unknown.
Two Harbors.....	Sept. 23...	80	300	7	R. R. locomotive.
Two Harbors.....	Sept. 20...	120	slight	15	Unknown.
Two Harbors.....	Oct. 9....	35	200	10	.....
Two Harbors.....	Oct. 13....	10	slight	5	Clearing land.
Mille Lacs County—					
Borgholm.....	Oct. 5....	1	35	5	Hunters.
East Side.....	April 7 ...	300	500	.....	Campers.
East Side.....	Oct. 14....	400	200	45	Clearing land.
Isle Harbor.....	Sept. 22...	600	200	6	Unknown.
Kaitho.....	April 20...	700	400	5	Indian campers.
Morrison County—					
Clough.....	April 11...	500	200	.....	Unknown.
Caldrum.....	Oct. 16....	40	50	15	Clearing land.
Cushing.....	April 15...	800	200	5	Unknown.
Cushing.....	April 18...	300	150	25	R. R. locomotive.
Hellman.....	April 15...	200	300	.....	Unknown.
Parker.....	April 14...	640	200	8	Clearing land.
Parker.....	April 18...	5,000	1,000	25	From adj. town.
Parker.....	May 10....	300	40	2	Unknown.
Parker.....	Sept. 20...	15	60	7	Unknown.
Platte.....	April 13...	2,000	1,200	6	Unknown.
Richardson.....	April 18...	1,000	230	6	From adj. town.
Ripley.....	April 11...	3,000	3,000	20	Unknown.
Ripley.....	Sept. 21...	60	40	12	Unknown.
Rosing.....	April 19...	4,480	1,295	10	Unknown.
Scandia Valley.....	April 18...	5,000	1,000	20	Burning meadow.
Swan River.....	April 13...	200	300	15	Hunter.
Swan River.....	April 18...	100	250	10	Unknown.
Norman County—					
Fossum.....	May 8....	30	20	9	Unknown.
Fossum.....	May 8....	175	1,500	10	Unknown.
Ottertail County—					
Bluffton.....	April 13...	100	50	4	Unknown.
Eastern.....	Sept. 21...	1	3	7	Hunters.
Girard.....	April 18...	240	50	30	Burning meadow.
Gorman.....	April 18...	100	100	7	Unknown.
Maine.....	April 20...	300	100	6	Burning brush.

SUMMARY OF FOREST FIRES, 1908—Continued.

COUNTY AND TOWN	Date	Acres	Damage	No. Fire Fight- ers	Cause
Ottertail Cou'ty—Cont.					
Paddock.....	April 21...	1,600	65	21	Unknown.
Rush Lake.....	April 21...	500	300	11	Unknown.
Star Lake.....	April 18...	80	100	7	Burning brush.
Pine County—					
Birch Creek.....	Oct. 15....	300	200	37	Unknown.
Bremen.....	April 20...	60	200	3	Unknown.
Bremen.....	Oct. 9....	70	5	2	Unknown.
Bremen.....	Oct. 11....	560	700	36	Clearing land.
Bremen.....	Oct. 15....	9,000	1,500	66	From adj. town.
Bremen.....	Oct. 15....	40	None	4	Unknown.
Bruno.....	April 20...	3,000	500	3	Unknown.
Bruno.....	April 23...	500	200	4	Unknown.
Bruno.....	Oct. 15....	7,000	800	.....	Unknown.
Bruno.....	Oct. 15....	1,000	slight	50	Unknown.
Clover.....	Oct. 17....	1,600	300	4	Hunters.
Danforth.....	Oct. 12....	3,000	3,300	70	From town. 4I-18.
Dell Grove.....	May 8....	40	100	3	Clearing land.
Fleming.....	Oct. 12....	6,400	200	12	Unknown.
Kettle River.....	Sept. 7....	25	51	5	Unknown.
Nickerson.....	May 9....	4,000	300	35	R. R. locomotive.
Nickerson.....	Oct. 13....	500	200	28	Unknown.
Norman.....	May 20....	160	800	6	Unknown.
Partridge.....	Oct. 10....	600	200	20	R. R. locomotive.
Pine Lake.....	Sept. 21...	40	20	8	Burning brush.
Pine Lake.....	Oct. 9....	160	None	16	Burning brush.
Pine Lake.....	Oct. 14....	320	150	30	Unknown.
Sandstone.....	Sept. 9....	400	100	14	Unknown.
Sandstone.....	Sept. 16...	30	6	8	Unknown.
Sandstone.....	Oct. 12....	4,000	80	70	Unknown.
Sturgeon Lake.....	May 9....	65	300	6	R. R. locomotive.
Sturgeon Lake.....	Oct. 14....	800	200	37	Unknown.
Wagner.....	Sept. 23...	200	100	.....	Clearing land.
St. Louis County—					
Canosia.....	Sept. 6....	400	slight	12	Unknown.
Costine.....	Sept. 8....	300	.....	30	Unknown.
Colton.....	April 18...	60	125	3	Unknown.
Colton.....	July 15....	2	15	4	Unknown.
Colton.....	Oct. 13....	2	5	10	Burning brush.
Colton.....	April 20...	160	15	18	Unknown.
Culver.....	Oct. 21....	40	128	8	Unknown.
Duluth.....	Sept. 5....	4,000	20,000	30	Clearing land.
Duluth.....	Sept. 10....	500	500	.....	Hunters.
Fern.....	Sept. 9....	200	.....	.....	Unknown.
French.....	April 20...	4,000	(?)	3	Unknown.
French.....	Sept. 11....	1,290	None	13	Hunters.
Grand Lake.....	May 1....	300	(?)	26	Fishermen.
Great Scott.....	Sept. 4....	10,000	2,600	36	Unknown.
Great Scott (Virg'ia)	Sept. 9....	40	1,200	130	Unknown.
Meadowlands.....	Sept. 11....	60	50	21	Hunters.
Nichols.....	Sept. 5....	3,000	600	100	Unknown.
Pike.....	May 24....	4	50	6	Clearing land.

SUMMARY OF FOREST FIRES, 1908.—Continued.

COUNTY AND TOWN	Date	Acres	Damage	No. Fire Fight- ers	Cause
St. Louis Co.—Cont.					
Pike.....	Oct. 6.....	6	25	24	Unknown.
Prairie Lake.....	Sept. 6.....	2	75	11	Hunters.
Solway.....	May 11.....	350	slight	20	Fishermen.
Sturgeon.....	Sept. 11.....	300	100	3	Unknown.
Stuntz.....	Sept. 5.....	10,000	1,500,000	300	Fishermen.
Stuntz.....	Sept. 8.....	500	slight	200	Clearing land.
White.....	Sept. 8.....	6,000	1,500	63	Clearing land.
Township 50-18.....	Sept. 10.....	40	(?)	20	Unknown.
Township 50-19.....	May 1.....	2,000	500	2	Unknown.
Township 51-19.....	May 8.....	40	500	14	Unknown.
Township 61-16.....	May 9.....	80	75	5	Unknown.
Todd County—					
Birchdale.....	April 15.....	600	100	12	Unknown.
Burnhamville.....	April 13.....	80	15	1	R. R. locomotive.
Burnhamville.....	April 22.....	80	slight	.....	Clearing land.
Fawn Lake.....	April 15.....	500	500	4	Unknown.
Little Elk.....	April 18.....	1,400	200	20	Burning meadow.
Moran.....	April 14.....	800	200	7	Burning brush.
Turtle Creek.....	April 18.....	800	1,000	11	Unknown.
Wabasha County—					
Mazeppa.....	April 22.....	40	50	3	Unknown.
Wadena County—					
Bullard.....	April 14.....	3,600	75	17	Unknown.
Huntersville.....	April 21.....	12,000	4,000	37	From adj. town.
Leaf River.....	April 12.....	500	150	14	Unknown.
Leaf River.....	May 8.....	80	150	5	Clearing land.
Lyons.....	April 19.....	1,800	600	.....	From adj. town.
Rockwood.....	April 12.....	800	100	10	R. R. locomotive.
Rockwood.....	April 18.....	1,400	500	36	Burning meadow.
Shell River.....	April 20.....	1,000	slight	.....	Unknown.
Thomastown.....	April 12.....	200	200	5	Unknown.

Total acres burned over, 405,748. Damage, \$2,003,633.

Classification of causes:

Burning brush, 15.
 Burning meadow, 9.
 Campers, 11.
 Clearing land, 47.
 Fishermen and hunters, 16.
 From adjoining town, 17.
 Railroad locomotives, 29.
 Other causes, 6.
 Unknown, 180.



Site of the camp of fishermen whose negligence with fire caused the destruction of the village of Chisholm, September 4, 1908. Photographed for the Forestry Commissioner of Minnesota, October 2, 1908.

SUMMARY OF PRAIRIE FIRES, 1908.

COUNTY AND TOWN	Date	Acres	Damage	No. Fire Fight- ers	Cause
Aitkin County—					
Jevne (field fire)....	Oct. 12....	40	300	40	R. R. locomotive.
Benton County—					
Langola.....	April 12....	200	80	5	Fishermen.
Clay County—					
Elkton.....	April 16....	30	100	2	Unknown.
Elkton.....	April 18....	2,000	250	10	From adj. town.
Elkton.....	April 21....	200	160	10	R. R. locomotive.
Elkton.....	May 7....	200	500	3	R. R. locomotive.
Felton.....	May 4....	250	600	6	R. R. locomotive.
Flowing.....	April 16....	40	None	5	R. R. locomotive.
Flowing.....	April 19....	500	400	8	Burning meadow.
Flowing.....	April 23....	160	100	8	R. R. locomotive.
Flowing.....	May 5....	300	300	3	Unknown.
Flowing.....	Sept. 7....	300	200	50	R. R. locomotive.
Flowing.....	Sept. 21....	350	60	9	R. R. locomotive.
Hawley.....	April 18....	1,400	1,000	14	Unknown.
Hawley.....	Sept. 24....	40	50	2	Hunters.
Moland.....	May 5....	120	75	.....	Clearing land.
Moland.....	May 4....	350	None	20	R. R. locomotive.
Moland.....	Sept. 7....	200	1,200	19	R. R. locomotive.
Moland.....	Oct. 12....	100	700	9	Steam plow.
Morken.....	Oct. 12....	600	800	6	Steam plow.
Riverton.....	April 18....	5,000	1,000	22	Tobacco pipe.
Skree.....	April 20....	3,500	3,500	25	Fm. t'n of Riverton.
Clearwater County—					
Winsor.....	Nov. 3....	300	500	10	Burning grass.
Kittson County—					
Cannon.....	April 21....	200	150	6	Unknown.
Caribou.....	April 10....	2,000	400	5	Burning meadow.
Hazelton.....	April 21....	2,700	65	23	Unknown.
Hazelton.....	May 10....	200	None	8	Unknown.
Jupiter.....	April 21....	600	25	20	From adj. town.
Norway.....	April 23....	2,000	400	6	From adj. town.
Pelan.....	April 23....	800	150	.....	Unknown.
Skone.....	April 18....	90	20	.....	R. R. locomotive.
Skone.....	April 20....	80	None	.....	R. R. locomotive.
Skone.....	April 23....	80	35	.....	R. R. locomotive.
Skone.....	April 23....	10	100	.....	Burning stubble.
Marshall County—					
Comstock.....	April 21....	1,800	750	12	Unknown.
Comstock.....	Nov. 3....	1,000	None	.....	Unknown.
Excel.....	April 21....	200	800	.....	Unknown.
Norman County—					
Grand Meadow....	May 10....	900	None	13	Burning pasture.
Hegen.....	Nov. 18....	400	920	.....	From adj. town.
Mary.....	Nov. 18....	200	.....	.....	Burning pasture.

SUMMARY OF PRAIRIE FIRES, 1908—Continued.

COUNTY AND TOWN	Date	Acres	Damage	No. Fire Fight- ers	Cause
Polk County— Helgeland.....	Nov. 3....	1,300	100	3	Unknown.
Red Lake County— Black River.....	Aug. 16....	6	35	7	Unknown.
Bray.....	April 21....	1,800	None	.....	Unknown.
Mayfield.....	April 19....	500	250	.....	Burning grass.
Sanders.....	April 23....	2,500	550	8	Unknown.
Wyandott.....	April 20....	300	10	4	Unknown.
Roseau County— Pohlitz.....	May 10....	30	54	6	Burning fire-break.
Soler.....	Nov. 5....	2,000	65	23	Unknown.
Stevens County— Everglade.....	Nov. 17....	800	None	17	Unknown.
Swift County— Clontarf.....	April 13....	2,500	1,500	14	R. R. locomotive.
Wilkin County— Andrea.....	May 8....	4,000	1,000	.....	Travellers.
Prairie View.....	April 23....	600	.....	.....	10 R. R. locomotive.
Yellow Medicine Co.— Florida.....	April 4....	100	500	25	R. R. locomotive.
Florida.....	April 14....	350	1,500	23	Burning slough.
Fortier.....	April 22....	900	250	34	Unknown.

Total acres burned over, 44,276.

Damage, \$19,724.

Classification of causes:

Burning grass or meadow, 8.

Fishermen or hunters, 2.

From adjoining town, 5.

Railroad locomotives, 16.

Other causes, 7.

Unknown, 18.

REPORT

OF

THE MINNESOTA STATE FORESTRY BOARD.

TO THE LEGISLATURE OF MINNESOTA.

The law of 1899 creating the State Forestry Board requires that it shall report its doings and recommendations to the Legislature at each session.

The Forestry Board has been desirous of undertaking forestry work in a way commensurate with the needs of the forestry situation, but has been handicapped by lack of means, and we feel that the exigencies of the hour demand, and public sentiment will support, the coming Legislature in making sufficient appropriations to put the work of this Board upon an effective basis.

By act of the Legislature of 1907, Itasca Park was **Itasca Park.** made a forest reserve and placed under the care of the Forestry Board. This is a beautiful tract of 35 sections of land, located about Itasca Lake, the head of the Mississippi River, and should be carefully preserved, so that future generations may see in it a sample of the kind of forest vegetation that originally covered a large portion of the State. It should also be made a great demonstration forest and become an important game preserve.

The State's principal building in the park, known as Douglas Lodge, overlooking Lake Itasca and in the midst of beautiful pine forest, is built of logs in rustic style, contains a large sitting room with open fireplace, and in all respects is well adapted to the entertainment of visitors or guests.

Soon after Itasca Park was made a forest reserve, **Land Purchase.** the Forestry Board undertook to acquire by purchase certain private holdings, but being unable to agree with the owners, was compelled to resort to condemnation proceedings to secure 497 acres, with the timber thereon, for which it had to pay \$41,322.55. It also purchased at private sale 40 acres,

with 60,000 feet of timber growing thereon, for \$450, making a total of \$41,772.55 expended for land and timber. The land purchased is estimated to contain a total of over 4,000,000 feet of standing timber, mostly large, thrifty Norway pine, situated along the lake shores and drives, where it is conspicuous and especially desirable.

There still remain about 5,500 acres of private holdings within the Park limits which the State should acquire as soon as may be. Of this land the Pine Tree Lumber Company of Little Falls owns 3,300 acres, which it has offered to donate to the State, together with all hardwoods growing thereon, and all the cone bearing trees under eight inches in diameter, provided that the said Company can have ten years, free from taxes on the timber, in which to remove it. At the appraiser's price for land and timber in Itasca Park, it is estimated by experts that this is equivalent to a gift of at least \$33,000 to the State. The taxes exempted would probably be less than \$10,000 if held for ten years. As it is desirable to hold this forest cover on the land for a considerable time, in order to secure good seedage of the ground, we recommend that the Legislature provide for the acceptance of this offer of the Pine Tree Lumber Company. This Company will also permit the Forestry Board to buy such groves of trees skirting the lake shores as may seem most necessary for the best development of the Park. This is a very important concession, as it is extremely improbable that the State will purchase all of the standing timber within this area. The Board has already arranged to purchase about one million feet of standing timber in this way.

The following is a financial statement of the total cost and the present value of the State holdings within the Park:

	Dr.
Amount paid to commissioners to Nov. 1, 1908.....	\$8,058.30
For purchase of lands to Nov. 13, 1908.....	101,336.89
Buildings in 1895-6.....	1,000.00
House (Douglas Lodge) 1904-6.....	11,646.35
Improvements, including outlay, Douglas Lodge....	6,175.68
Platforms	280.00
Tree Planting	202.50
Fire Protection	432.31
Mary Creek	177.75
Firebreaks	1,980.18
	<hr/>
	\$131,289.96

Value of land acquired for Park purposes exclusive of School Sections:

	Cr.
13,220 acres at \$5.00	\$66,100.00
25,000,000 feet of standing timber valued at \$10 per M.	250,000.00
Donation from Pine Tree Lumber Company of 3,300 acres of land, together with all the hardwood timber and all other timber under 8 inches in diameter, valued at \$10 per acre.....	33,000.00
Received from sales of timber.....	7,639.09
	<hr/>
	\$356,739.09
Less cost of Park to State.....	131,289.96
	<hr/>
Showing approximate profit to State of.....	\$225,549.13

The Board regards fire protection for Itasca Park **Fire Protection.** as most important, for the safety of all of the trees and many of the improvements within the park. The present annual appropriation for maintenance of the Park is \$1,500, which has been carefully expended; but it has been inadequate to the pressing needs of the Park, though it has maintained in fairly good condition the stage route of about nine miles through the Park, and cut firebreaks, roads and trails to the extent of twenty miles, and now has a road completely around the Park, not what it should be, yet provides opportunity for fighting fires and to protect from trespass. The Board has co-operated with adjoining towns and with Clearwater County to secure public highways on the border line of Itasca Park for firebreaks.

The Forestry Board in coöperation with the State **Forest School.** University established a forest school in the Park, which has been very successful, and did much towards the forestry education of young men which the State must have to take care of its great forest wealth. The work done in the Park by these students was necessary for its preservation, was intelligently performed, without detracting from the wild natural beauty of the Park, and at much less expense than if ordinary unskilled labor had been employed. Means should be provided whereby these forestry students may be employed in improving the State forests at a small wage; for without such experience, the University

Forestry School cannot supply the trained men that the State needs, thus missing an opportunity of developing at a minimum expense the most important forestry school in America.

In the winter of 1907-8, the Forestry Board had **Sales of Timber** dead and down timber cut in Itasca Park to the amount of 800,960 feet, the net proceeds from which, amounting to \$4,112.53, were turned into the State treasury. It is probable that nearly as much timber can be sold from the Park each year.

Under the appropriation of \$2,500 made by the act **Tree Planting**, of April 23, 1907, the Board planted 600,000 ever-green seedlings of pine and spruce, but principally spruce, in 1907 and 1908, on the Pillsbury reserve (Cass County), and has planted in all 205 acres net on that reserve. There is a balance left of that appropriation amounting to \$292, and deducting amounts expended for setting iron stakes around the reserve and for making firelanes, the cost of planting has been only a little over \$6.00 per acre, less than one-half cent for each tree planted. The reserve is about twenty miles from the railroad.

In addition to Itasca Park and the 1,000 acres of **Burntside Forest**, the Pillsbury reserve, the State holds 20,000 acres known as the Burntside forest, situated about ten miles west of Ely, and which was granted to the State on the initiative of the Forestry Board, by Act of Congress, April 28, 1904. Not a dollar has been appropriated thus far for the care and development of that forest. It is accessible only by boat and trail. The nearest road to it is the Duluth and Iron Range Railroad, which, at Robinson Station, passes within about seven miles from its southern boundary.

The law of 1903, authorized the Forestry Board to purchase for forest reserves, at not exceeding \$2.50 per acre, land adapted for forestry, but no money has been appropriated to carry the law into effect. The Board recommends such appropriation as the Legislature deems expedient to make this law effective.

The prevention of forest fires will not only assist natural forest regeneration, but will promote that feeling of safety and security among new settlers which is essential for the development of the

vacant agricultural lands in the forest regions. It is therefore for the interest of all our people that ample means be provided for the prevention and suppression of forest fires.

Minnesota has great natural advantages for reforestation. Its future prosperity depends much upon the prompt adoption of suitable measures in that regard.

To carry on forestry work by this Board, even in a moderate way, we would recommend that the following items be included in the General Appropriation Bill for each fiscal year:

For land purchase in Itasca Park.....	\$10,000
For construction of necessary roads and trails in Burnt-side forest and for care and improvement of said forest.	10,000
For continuing tree planting on Pillsbury reserve.....	2,500
For improvements in Itasca Park.....	5,000
For repairs on Douglas Lodge.....	500
For contingent expenses of Forestry Board.....	2,000

S. M. OWEN, Pres., Minneapolis.

C. C. ANDREWS, Sec., St. Paul.

(Ex-Officio, as Forestry Commissioner.)

THOS. J. DAVIS, Duluth.

SAMUEL B. GREEN, St. Anthony Park.

(Ex-Officio, as Horticulturist State University.)

JOHN LIND, Minneapolis.

W. H. TOMLINSON, Le Sueur.

A. C. WEDGE, Albert Lea.

F. WEYERHAEUSER, St. Paul.

M. M. WILLIAMS, Little Falls.

December 15, 1908.

STATE OF MICHIGAN

9

REPORT OF THE

MICHIGAN FORESTRY COMMISSION

FOR THE YEARS 1903-4

UNDER THE ACT OF THE LEGISLATURE, ENTITLED "AN ACT TO PROVIDE A
PERMANENT FORESTRY COMMISSION FOR THE STATE OF MICHIGAN, TO
DEFINE ITS POWERS AND DUTIES, AND PROVIDE FOR ITS EXPENSES."

APPROVED JAN. 7. 1899.



BY AUTHORITY

STATE OF MICHIGAN

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APPROVED JAN. 7, 1899.



BY AUTHORITY

LETTER OF TRANSMITTAL.

Lansing, Mich., October 31, 1904.

Hon. Aaron T. Bliss, Governor of Michigan:

Sir—In accordance with legal requisition, I submit herewith the report of the Michigan Forestry Commission for the years 1903-4, with accompanying papers.

Yours respectfully,
CHAS. W. GARFIELD,
President Michigan Forestry Commission.

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WHERE 51,000 TREES WERE PLANTED IN THE SPRING OF 1904. OPEN SPOTS AT X SHOW POSITION OF TREES. ROSCOMMON FOREST RESERVE.



ONCE A MAGNIFICENT FOREST, NOW CUT AND BURNED-OVER LANDS, WITH LESS THAN 10 PER CENT WOODS, AND LESS THAN 1 PER CENT OF IMPROVED LAND, ROSCOMMON COUNTY.



JACK PINE PLAINS, LEVEL STRETCHES OF SANDY PINERY LANDS WITH PATCHES OF JACK PINE ALTERNATING WITH PRAIRIE-LIKE OPENINGS. THERE IS EVERY REASON TO BELIEVE THE CONDITION OF THESE PLAINS AS BEING DUE TO FIRE.

PREFATORY NOTE.

The Michigan Forestry Commission, in compiling this volume, is mindful of the fact that, although issued in a small edition, it is the permanent history of the initial movement which promises important results in the future development of our State. In our endeavor to stay the ruthless destruction of timber and awaken an interest in tree-planting as a commercial venture for the State, we are entering upon a new era of statecraft. In the rapid elision of our magnificent forest growth, we have not been entirely wasteful, for many grand purposes have been subserved through the commercial use of the products of Michigan forests. We have, in this process, however, been drawing heavily upon our capital without any plan of restoration or without the creation of anything allied to a sinking fund to care for exigencies of the future. Our commission has set itself about the work of impressing people with the importance of growing timber as an accessory to our agriculture, and one which shall, if well carried out, furnish a regular and continuous product from the soil, of great and increasing value. In doing this, the grower of timber will serve his State by supporting numberless commercial enterprises which use for raw material the products of the forest. In accomplishing this purpose, any effort of the State expressed in well defined methods will reap a reward not second to any other effort along the lines of production. The statistical matter furnished in many of the papers which are contributed to this volume furnish an unanswerable argument in favor of holding permanently in the State large areas of land to be kept as forest reserve lands.

There must be some legislation carefully thought out in connection with this change of policy on the part of the State, if it shall be adopted. In formulating this legislation, we are not traversing new ground. Other countries and other states have made advancement, and from their experience we ought certainly to evolve a plan which shall, in its application to our conditions, be of incalculable value to the future of our commonwealth.

We have a small forest reserve which is little more than an object lesson. The greater question and the solution of the greater problem are matters which have received the careful thought of the State Forestry Commission, and in its recommendations for legislation, there is the single purpose in view of maintaining the resources of our State so as to contribute in the highest measure to the welfare of its increasing population. Our recommendations are based upon the principles which influence the mind of a well-equipped business man in the management of his af-

fairs. In advocating the plan that our State shall become thoroughly acquainted with the comparative values of its land holdings and handle them with reference to the long future, and having in mind the peculiar capabilities of the varying soils and conditions, we are simply carrying out a movement based upon the best business principles. The State cannot afford to handle its land holdings in the interest of speculators or local newspapers or political aspirants, or for the purpose of furnishing employment to an army of clerks.

If it were possible for those who formulate the laws of our State to go over the ground and make the notes which have been made by the Forestry Commission, there would be no question as to perfect unanimity of action in moving for an improved plan of handling the State tax lands, and immediate support for measures which shall protect these lands from the sweep of forest fires.

The friends of progressive forestry who have supported the commission, and whose contributions are found in this volume, are actuated by the highest motives of public spirit, and their words should have great weight in connection with the modification of our land methods and in the promotion of a reasonable plan of reforestation. The press of the State and the rural organizations have been zealous in their support of our commission, and we have utilized to the best of our ability these means of spreading facts which shall influence the views of the people. We can see as a result a greater interest in reforestation. People are interested in acquiring information, and the campaign of education is each year producing results that strengthen the general forward movement. The members of the commission, in acknowledging the cordial support which we have received, desire to express our gratitude to all those who have shown their interest in our work by assisting in the propagation of our faith. In presenting this third volume of transactions and supplementary papers, we do it with courage and hopefulness.

OUR CONTRIBUTORS.

As a matter of interest and satisfaction to the reader of this volume, a word concerning the gentlemen who have so generously contributed to its pages may not only be permissible, but desirable. Aside from the members of the Michigan Forestry Commission, Prof. Filibert Roth has given, in attractive form, some of the most practical counsel concerning the future forest management in our State. Prof. Roth is a German, who in his boyhood learned from practical contact, the details of the most approved forest management in Germany. For years he had the experience of the practical worker in the lumber woods of Wisconsin, and in various capacities served the great lumber companies which successfully prosecuted their work in the State of Wisconsin. He had opportunities for wide observation upon the plains and mountains of the West before taking up a course of study in the Michigan University. After graduation, he became identified at once with the Bureau of Forestry at Washington, and afterward became an attache of the Department of the Interior, in charge of the Western Forest Reserves. In connection with Prof. Fernow, he was occupied for a time in the organization and development of the forest school in Cornell University. He has written quite extensively for the press upon forestry problems, and is the author of a most

attractive little volume upon forestry, written for beginners. Upon the organization of the School of Forestry in the Michigan University, he was called by the Board of Regents to organize it and be responsible for its development. The Michigan Forestry Commission, in naming its first Forest Warden, called Prof. Roth to the work, and it relies upon him, more than any one else, for the prosecution of the progressive measures which shall be adopted by the State.

Dr. Judson F. Clark is a Canadian by birth, and completed his course of study, with post-graduate work in forestry, at Cornell University. He was for some time assistant to Dr. Fernow in the Forest School at Cornell, and from there became an attache of the Bureau of Forestry at Washington. In furtherance of the work here in Michigan, and upon application of our Forestry Commission to the Bureau of Forestry for special work along the lines of wood lot development, he was assigned to work in our State, and his report in this volume is an epitome of his accomplishments here. He is now connected with the Department of Forestry in the Dominion, having been recently called to the important position of State Forester.

Hon. I. H. Butterfield is a pioneer in the forestry movement in this State. He is an enthusiastic lover of the woods, and during his long connection with the State Agricultural Society, as member of its executive committee and as secretary, he has been constant in his endeavor to awaken an interest in the preservation of woodland areas in Michigan. He was for years on the managing board of the Agricultural College, and became its secretary. For years he was the agricultural editor of the Detroit Tribune, and during the initial stages of forest legislation in our State, he performed a great service by putting into shape the text which was presented in the form of a bill, and, with some modifications, enacted into the first law providing for a Forestry Commission.

Dr. W. J. Beal, of the Michigan State Agricultural College, from his boyhood has been a great lover of trees. During his early life he was in the midst of the rich and varied forest growth of Lenawee county. While his specialty in the educational field has been botany, he has given large attention to matters of forestry, and, more than any other man, has continued the agitation of forestry subjects in this State, looking toward the preservation of woodland areas through the agricultural regions, and a rational system of lumbering in that part of our State which has been devoted to the lumbering interests. In the meetings of the State Horticultural Society he presented papers in the early history of that society upon forest preservation, and as a result of this agitation the Legislature provided for the organization of a Forestry Commission, consisting of the Board of Agriculture. Dr. Beal was appointed by the board as one of the men to carry out the provisions of the act, and in this capacity he made the first bulletin upon forestry subjects which was published in this State. Since the enactment of the more recent legislation, he has been of great help to the present commission. The writer of this word is under the greatest obligations for inspiration and assistance, and when Michigan forestry shall have attained the measure of success which is worthy of the cause and which is bound to come, Dr. Beal's name will occupy the greatest historical prominence.

Prof. James Satterlee is a graduate of the Michigan State Agricultural College, and afterward became professor of horticulture in that institu-

tion. He is the best type of a broad-spirited, enjoyable Michigan farmer. He has traveled widely, and has been a keen observer of Nature. He enjoys proximity to wild things and watches with interest the different phases of natural beauty as they develop with the season, as well as the movements and habits of bird, animal and insect life. He gets real comfort out of a farm environment, and knows all the attractive viewpoints in the vicinity of his farm home at Greenville, Michigan.

Ossian C. Simonds is a landscape gardener, whose home is in Chicago, but who has a very warm place in his heart for everything connected with the Peninsular State. Grand Rapids was his birthplace, and his school education was obtained entirely in Michigan. He is a graduate from the Michigan University. He prepared for engineering work, and expected to follow it or architecture, but as a result of circumstances, switched off to the landscape gardening, and has made his business a great success because he loves it. The field of his labor is from the Atlantic coast to the Great Divide, and from the lakes to the Gulf. His constant entertaining study is connected with Nature in her varying moods, and as a result he has adapted to his art the most beautiful pictures found in Nature's landscape. He has an unusually prophetic eye in his creations and a method of inducting into his plans his own conceptions of his art.

Prof. Charles A. Davis, of the Michigan University, is assistant professor of forestry, and is a co-worker with Prof. Roth in the Forest School established there. He was called from the natural history chair in Alma College to this work in the university because of his great interest in the work of reforestation in Michigan. He has traveled quite widely over the State and has been such a keen observer of conditions that his counsel with reference to the broad questions of reforesting Michigan is of the very best. He is prominent in scientific circles, and takes a deep interest in the work of the Michigan Academy of Science.

Lyman A. Lilly is a graduate of the Agricultural College in our State, and has most of his career followed farming in Allegan county. He loves the problems of the farm, and enjoys working at plans in connection with soil cultivation and management, with reference to gaining information rather than making money. He has filled positions of trust in his home county, and has only recently taken up his home in Petoskey.

Prof. C. D. Lawton, of Lawton, Michigan, has throughout his entire career taken a deep interest in the problems that affected the welfare and prosperity of Michigan. Through long years of experience, he became thoroughly acquainted with the mining possibilities and interests of the Northern Peninsula, and in these investigations became, through kindred associations, an enthusiast concerning the wood cover of our State. As regent in our State University, he took an active interest in the establishment of the School of Forestry, and in season and out of season combats anything in the way of vandalism as connected with the destruction of natural beauty. The Lawton family have been public-spirited citizens, and Regent Lawton's brother was a most efficient associate of the writer in forming the present law for planting and protecting trees on the highway, which was enacted in 1881. Prof. Lawton, from the early days of the Michigan Horticultural Society, has been one of its most active members, and has been very successful in awakening a practical interest in commercial fruit growing in Southwestern Michigan.

Hon. E. W. Barber is the accomplished editor of the Jackson Patriot,

and through his editorial utterances upon a wide range of subjects, has caused this paper to occupy a unique place in Michigan journalism. He has had an unusual experience in public life, having started his career in public vocations as reading clerk in the Michigan Legislature, and occupying a similar position later on in connection with the National Congress, afterward filling the position of Assistant Postmaster General, and becoming Inspector of Internal Revenue for a large central district in the West. He is a type of the result of acquiring a broad education outside of college or university halls through contact with men and movements and things. From the beginning of his editorial career in Michigan, he has been unceasing in his expression of sorrow at the serious loss which the State was sustaining through the reckless waste of its forest cover, and has brought to bear upon the subject facts secured through wide research and adaptation to our conditions.

Ed. H. Stein is a German, who, after spending some of his early years in this country, returned again to his native land, and from the standpoint of an American, viewed the processes in his home country. He is a student of American forestry conditions, and regrets more than anything else connected with this country the reckless destruction of this great heritage, with so feeble attempts at restoration.

Frank W. Ball is a Michigan product. He was educated in Michigan University and spent some years abroad. He is a journalist, and widely interested in economic conditions as affecting the industries of the country. His father, who gave to Grand Rapids that beautiful piece of landscape known as John Ball Park, was a wide traveler and a keen observer, and bequeathed to his son a great interest in Nature. The subject of this brief sketch was one of the organizers of the Scientific Club, upon which was builded the Kent Scientific Institute of Grand Rapids. Mr. Ball is an omniverous reader and student of social problems, and during his career as a journalist has aided materially in giving publicity to facts and observations concerning the importance of forest cover.

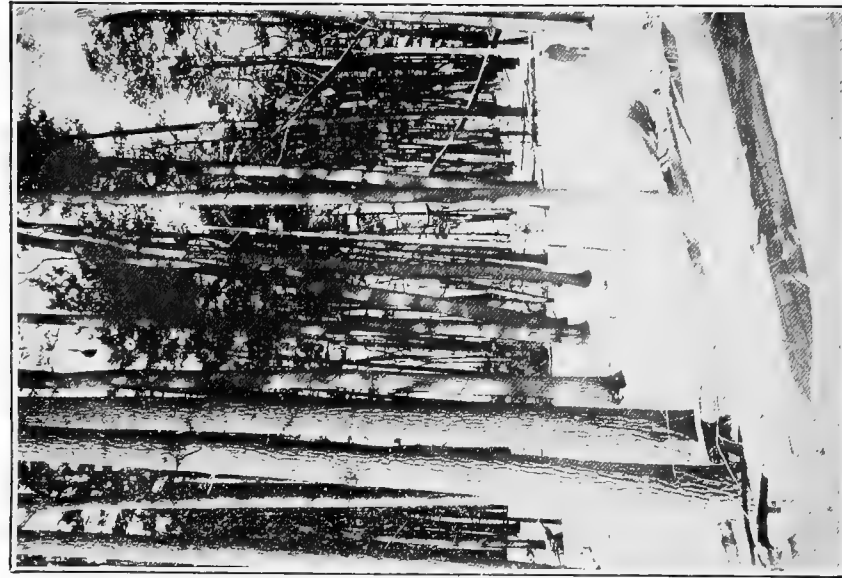
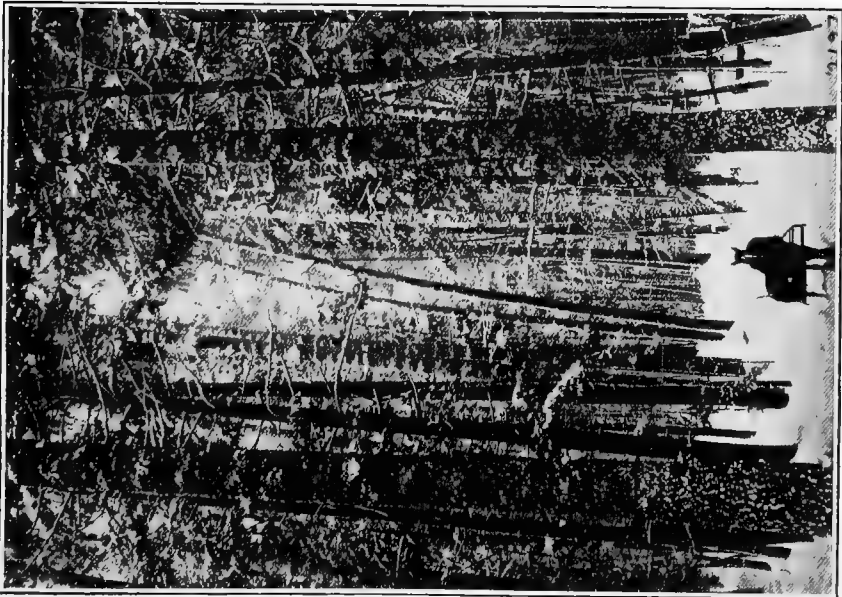
Prof. E. E. Bogue is at the head of the Forestry Department of the Michigan Agricultural College. He is an enthusiast in his work, and has a faculty of infusing his own enthusiasm into the minds and purposes of his students. He has a practical knack in connection with the educational side of the forestry movement, and has started a successful forest nursery as a means of illustrating primary work in forestry to his classes. He enjoys taking up special subjects like the one of which he treats in this volume, and working them out. Any problem having a relationship to the forest is interesting to him, and he is not satisfied until he has worked out a solution. He will be a strong factor in the work of rehabilitating Michigan, and is a strong co-worker with the Michigan Forestry Commission.

H. B. Cannon is a graduate of the Michigan Agricultural College, and has been engaged in experiment station work considerable of the time since his graduation. He is a farmer, and one of the most attractive Farmers' Institute lecturers in our State. He is especially interested in topics which affect the social conditions in rural communities, and responds promptly when called upon to perform any public-spirited duties connected with the advancement of his State.

Joseph B. Ware, who contributes an interesting article for this volume, was born in Indiana, and came to Michigan in his early boyhood, and

after taking a course of study in the high schools of Kalamazoo and Grand Rapids, spent some years at the Agricultural College in our State. He dropped out of college education for the purpose of taking hold practically of a shingle business, and for a number of years was engaged in handling forest products at wholesale and retail. He organized the Michigan Retail Lumber Association, was its first secretary, and has always retained a great interest in some plan of maintaining the great industries based upon the raw products of the forest. He was for some time a member of the Board of Education of Grand Rapids, and afterward did valuable service as a member of the Michigan Legislature. In recent years he has been identified in a prominent way with the Independent Telephone Companies, and is now in a managerial capacity, acting for the Citizens' Telephone Company of Grand Rapids.

John H. Bissell, of Detroit, is a lawyer and business man, who has resided for a long time in this State, and is a prominent member of the American Forestry Association. He is widely and deeply interested in the responsibility of the State with reference to the future progress of the forestry movement, and his statement embodies years of careful observation and experience in active business life, as well as careful compilation of the most pertinent statistical facts.



THE GREAT PINE FOREST, AS IT WAS. A CROP OF MATURE TIMBER, WHICH TODAY WOULD BE AND IS WORTH \$200-\$300 PER ACRE, COVERS THE LAND, AND THERE IS A GROWTH OF AT LEAST \$300 WORTH OF MATERIAL IN ALL THE YOUNGER STANDS.

OFFICIAL REPORT TO THE GOVERNOR.

To His Excellency, Aaron T. Bliss, Governor of Michigan :

Sir—We have the honor of submitting to you, under Act No. 227 of the Public Acts of 1899, approved June 7, 1899, the following report of the Michigan Forestry Commission for the years 1903 and 1904. Under provision of the last section of the act, the commission is directed to make a report to the Governor on or before the first day of December in each year of such facts or statistics as it may deem of public interest or importance; to recommend such legislation as the commission may desire to see enacted in the interest of forest preservation and reforestation of such areas in the State as seem best fitted for this purpose.

The commission, interpreting this section of the law, recalls that the sessions of our Legislature are biennial, and that any recommendation concerning legislation cannot be acted upon except in each alternate year, and has thought it wise to make the reports for two years in one, to be submitted to the Governor in the autumn preceding a session of the Legislature.

Under the direction of the act which provided for the appointment of the Michigan Forestry Commission, the members thereof have been engaged in acquiring and disseminating such information concerning forestry and forest products as would awaken in the people of the State an interest in this great problem of statecraft. We have issued circulars and bulletins; we have prepared articles for the press; we have made addresses at the gatherings and conventions of farmers and fruit-growers and lumbermen; we have presented papers and addresses before conventions of educators, ladies' literary clubs, boards of trade, manufacturers' associations, and we have carried on a correspondence of large volume for the purpose of disseminating the most modern and progressive views concerning the importance of forestry, and its relation to the progress of agriculture, and, in truth, civilization.

We have gathered statistical matter bearing upon the uses of timber products; the methods of growing them, and the commercial promise in the growing of raw material to meet the wants of railroads, telephone and telegraph companies, manufacturers, fuel consumers and those engaged in mining.

We have sought by every legitimate means to give exact and valuable information concerning the proper care of the farm wood lot, the utilization of thin, precipitous and waste areas of land and borders of streams in the production of a timber crop. We have striven by every means within our reach to enlist the sympathy and co-operation of individuals

and corporations in the treatment of timber production as a co-ordinate occupation with agriculture of untold importance in the maintenance of an independent commonwealth.

We have endeavored, and with a considerable measure of success, to interest our leading educators and scientists in the Michigan forestry problem. We have striven in this campaign of education to enlist the aid especially of the university and the Agricultural College and the organization known as the Farmers' Institutes of our State. In all this work we have used the small appropriation provided for in the act of our incorporation. A detailed statement of these expenditures will accompany this report as an exhibit.

Under an act of the Legislature of 1903 the Forestry Commission was given additional powers and duties in the establishment and management of the State Forest Reserve in Crawford and Roscommon counties. Under this act the commission appointed a Forest Warden, whose report will accompany this as a document to be presented to the Legislature and disseminated in our printed volume. We have taken hold of the forest reserve designated under the act, and have been acquiring as large an amount of information as possible concerning the conditions and requirements, in order to make it an object lesson in reforestation of value to the State.

We have established nurseries and done considerable planting in the open areas, an account of which will be given in the official report of the Warden. Through a misunderstanding of the purposes of the Forestry Commission, there was considerable opposition in the vicinity of the established reserve to the work of the Forestry Commission. We are happy to see, however, that as a result of our activities, there has been awakened in this community a great interest in our work and sympathy with our purposes, which is somewhat remarkable. Instead of open opposition, we have active co-operation in our efforts, and the contiguous land owners now understand that in the establishment of a forest reserve under our plan, the lands in the neighborhood will appreciate in value, and that every effort for reforestation in the reserve acts directly in the interest of land values in the vicinity. Men who were quite strong in the feeling that we were going to convert large areas of land into a wilderness understand now that a crop of forest products is as important to grow as anything we can develop from the soil in Michigan; that in the interest of the future of our State, and of every part of it, the growing of timber in order that we may furnish raw material for manufacturers and corporations which utilize timber products, we are carrying on a business that is co-ordinate with agriculture, and, in truth, a part of it.

In the public discussion of questions connected with reforestation in Michigan, we have found great interest in our purposes on the part of men interested in the utilization of the vast power which is hidden in our running streams. In transforming this power so that it shall be of practical use, men have learned that regularity and certainty of the flow is a factor of great importance, and that the forest cover which borders on streams, and particularly that which protects the sources of these streams, becomes a matter of great importance to those engaged in transforming the energy of the moving water into a power that runs machinery and performs other offices. In the business world it becomes apparent to these men that the maintenance of a reasonable amount of forest cover in the

basins of our streams is the surest way to secure immunity from the extremes of flood and drought. In this idea there is nothing antagonistic to the best information we have with regard to the conditions which subserve successful agriculture, for we find it not only desirable, but of great importance, that a reasonable proportion of the land shall be permanently in forest growth, that the best condition to subserve agricultural property shall prevail.

Incidentally, the attention of the commission was called to one result of a clean sweep of the forest from the areas drained by our leading rivers, which permits in springtime the rapid movement of tremendous volumes of water from the sources of these streams to the great reservoirs. This produces erosion of the soil and carries great quantities of it to fill up our harbors, which each year require large outlays that they may be of service in connection with the carrying trade.

You will observe from these illustrations that auxiliary questions arise in connection with the investigations of the Forestry Commission of tremendous moment in connection with the future of our State. The members of the commission are impressed with the vital questions that are involved in the duties with which they are charged.

We feel encouraged by the action of the last Legislature, which provided a small forest reserve to be developed as an object lesson. We are impressed, however, with the necessity of arousing the representatives of the people to a thorough understanding of the far-reaching influence which pertains to a business consideration of the vast area of tax lands which have come into the custody of the State. The utilization of these lands (or such portions of them as are found least valuable in the prosecution of agriculture) for the purposes of producing valuable forest products, to be used in the maintenance of our most important industries, and incidentally to conserve great values in the State, which, under our habit of forest destruction, will be irrevocably lost, is of vast importance.

Having this view strongly impressed upon our minds, we shall submit, in connection with this report, certain suggestions concerning legislation which will deal with these lands in a manner best calculated to subserve the great interests bound up in the future of our commonwealth. The Forestry Commission, after mature deliberation, is convinced that these tax lands, which are subject to be deeded to the State under the statute, should be turned over to the Forestry Commission for purposes of careful inventory, appraisalment and assorting. As a result of this work, those which are suited to the purposes of agriculture should, through the State land office, be placed on sale, the minimum price per acre being \$5; that the balance of these lands should remain under the control and management of the Forestry Commission, to be handled as forest reserve lands, to be treated as a permanent State investment. These lands should be handled with reference to developing a crop of timber to be dealt with after the most approved methods of forest management. In suggesting this plan, the commission has not in view the thought of segregating immense areas of land in any one region to be devoted entirely to the production of forest products, but rather the setting aside of lands not well adapted to the prosecution of agriculture, wherever they may lie, for the production of timber. There are many subsidiary questions that arise in connection with this plan, which must be worked out by legislation in such a way as to recognize the rights and interests of all the people.

One of the most important subjects to be treated under this title is the question of local taxation, and the commission is decidedly of the opinion that the State can afford to become responsible for its proportion of the taxes for carrying on local matters, and thus fairly meet the most important ground for opposition to the plans of a permanent forest reserve.

In considering carefully the auxiliary interests involved in this far-reaching plan of reforestation, the commission finds that legislation has already been initiated, looking toward the protection from fire of all that territory in the State which is in danger of devastation from this dangerous element. The Forestry Commission is impressed with the importance of having the machinery for carrying out this fire statute placed in the hands of the same authority which has in charge all matters of forest improvement, and hence suggests that amendments be made to the fire law which shall accord with this idea.

As an incident to the investigation made in connection with the relationship of a reasonable plan of reforestation to our system of agriculture, the commission finds the blowing sands in certain places a most serious menace to the practice of farming, and large areas of valuable land are in danger of being rendered useless by being covered with the sand which has been picked up by the wind from lands which have been divested of the surface soil. It is perfectly possible to enter upon a plan of protection by using methods of reforestation which shall not only bring values to the sand wastes upon which the wind makes great inroads, but in doing this protect from further injury arable lands in the vicinity, which are being rapidly submerged by this worthless sand covering. We shall present in our public transactions graphic illustrations, exhibiting the destruction brought about by these blowing sands, and explain more fully the remedial measures which the Forestry Commission has in mind for the State to adopt.

There is a strong movement in our State looking toward the adoption of some plan which shall stimulate the farmers in the more purely agricultural regions to maintain a portion of their farm holdings in permanent wood lots. In deference to the views of men of large observation and excellent judgment, the commission will suggest a form of legislation which has been adopted successfully by other commonwealths and which shall have for its purpose the general increase of the proportion of woodland in the sections of the State most denuded of forest cover. A modification of our plan of taxation which appeals very strongly to the commission is a provision which shall require the assessing officer to place a uniform value of \$5.00 per acre on lands permanently in timber as an accompaniment of the farm, and which are recorded with the State Forestry Commission as farm wood lot reserves, the management of which shall be directed by the said commission in the general interests of the State, the purpose being to awaken an interest in growing timber for a crop.

One of the most important things brought to the attention of the commission in connection with the prosecution of its purposes has been the wholesale vandalism practiced in connection with fringes of forest growth, which in many places in our State form an embroidery to its highways, and the members are impressed with the importance of taking radical measures to save men who are so short-sighted as to carelessly destroy tree values from their own thoughtless habits of vandalism. Having this

in mind, the commission in its transactions will treat this subject quite fully.

In the prosecution of its work, the commission desires to make acknowledgment in this formal word to the State's Executive, of the hearty cooperation of the press of Michigan in aiding the commission in its presentation of facts and suggestions. The journalists of our State have a keen appreciation of the importance of the forest problem, and with the heartiest kind of accord, use their columns in promoting our cause. The commission expresses the lively hope that your Excellency will recommend to the Legislature such consideration of the recommendations of our commission as will lead to carefully planned statutory provision for carrying on a business policy in connection with the large area of State tax lands, having permanently in view the vast importance of a timber crop to the future welfare of the great industrial interests of the State.

Respectfully submitted,

CHARLES W. GARFIELD,
ARTHUR HILL,
EDWIN A. WILDEY.



THE PINERY AS IT IS. THE MATURE TIMBER WASTEFULLY REMOVED, MUCH OF IT LEFT TO FIRE, AND THE FOREST ITSELF IS DESTROYED, ALL YOUNG GROWTH IS GONE AND FOR MANY YEARS THESE VAST STRETCHES OF LAND HAVE PRODUCED NOTHING, EVERY EFFORT OF NATURE BEING OFFSET BY ENTIRE LACK OF PROTECTION.

YEARLY REPORT OF THE WARDEN OF FOREST RESERVES.

To the Michigan Forestry Commission:

Gentlemen—The lands set aside by the act 1903 as forest reserves are all the State lands in Town 21 north, ranges 3 and 4 west, and the lands in the north half of Town 24 north, and the south half of Town 25 north, both in range 4 west, the lands of the last mentioned half town being in Crawford county, the rest in Roscommon county, of this State. The two bodies of lands being widely separated, those of Towns 24 and 25 located north and west of Higgins Lake will be spoken of as district No. 1, and those in Town 21 north, located south of Houghton Lake, will be mentioned as district No. 2 of the Roscommon reserves.

The lands forming these reserves are not in contiguous, solid bodies, but are interrupted by other holdings. The total area of the reserves of both districts amounts to about 34,000 acres, or about half of the entire area of the towns in which they are located. Of this 34,000, about 7,300 acres belong to district No. 1, and 26,700 acres to district No. 2. To this area must be added about 3,700 acres of United States lands, which have been withdrawn from settlement and entry, and may be regarded as part of the reserves.

In respect to distribution of reserve lands, the different towns differ. In the western half of district No. 2 (south of Houghton Lake) the reserve lands occupy about 70%, in the eastern half about 50%, while in district No. 1 they occupy only about 30% of the entire area. Similarly, there are but few entire, regular sections belonging to the reserves, the majority of tracts being fractional sections or irregular aggregates of such.

Practically all of the reserve lands are drained by the Muskegon river, and form quite an important portion of the upper watershed of this stream. As seen from the map, Muskegon river runs through a portion of the reserve in district No. 2, and a small part of district No. 1 touches on Higgins Lake.

While a detailed forest and land survey is now in progress, and the following statement will, naturally, have to be modified considerably in accordance with the findings of this survey, a brief general description in this connection appears desirable.

The lands of the reserve are a typical portion of the broad, flat rise of land from which the Manistee, Muskegon, Au Sable and Tittabawassee carry their large volumes of water west and east to the Great Lakes. As is well known, this rise of land bears the character of a low plain, and lacks entirely the well defined valleys and ridgelike backbone of the

watersheds of hill and mountain countries. This broad, flat expanse is dotted with lakes and swamps. All streams rise in wide spreading cedar and tamarack swamps or mossy bogs and lakes, and the long, winding arms of swamps follow the streams, and everywhere separate the irregular bodies of sandy uplands. And while the swamps naturally represent depression, the difference in elevation is, after all, very small, rarely more than a few feet, so that, commonly, the swamps, in the distance, appear on the level with the observer on the dry upland.

Speaking of the lands of the reserves more in detail, it is necessary to keep the two districts separate.

The reserve south of Houghton Lake, district No. 2, is a large flat, with about 20% of swamp, flat or gently rolling uplands, which here and there take on the form of pothole lands, and with a few small, low but rather steep, sandy hills in the eastern part, along and near the State road, which forms the east line of the reserve. Roughly estimated, it may be said that about 20% is swamp, 50% level, dry upland, and 20% rolling pothole lands, of which not over 3% are occupied by the few low hills mentioned.

The soil is generally sandy. In the swamps the usual cover of black muck hides the character of the subsoil. On the upland the soil varies from the poor, coarse sand of the typical jack pine plains to the sandy loam of the better pine lands. Real loam and clay lands, which throughout this region are sharply distinct by the large growth of mixed hardwoods, are practically wanting. From an agricultural standpoint the soils of the uplands may be classified about as follows: About 5% of the total area fair lands, 10% light, inferior pinery lands, and the rest 65% as light, non-agricultural sands. Of the swamps, some pieces will eventually prove to be the best land of the district, but require draining and much improvement.

It should be mentioned here that the better lands are by no means indicated by topography, and that, contrary to the common notion of people not familiar with these lands, the low flats are not like the bottoms of valleys of other districts, but are frequently the poorest land, while the elevated low ridges frequently are the best. This is so commonly true that nearly every tract of better land is spoken of as a "hardwood ridge," though frequently there is no sign of a ridge proper.

THE FOREST COVER.

Originally, i. e. before being lumbered, almost all of this land was covered by heavy forest. To judge from the stumps and other remnants of the former forest and the cover now seen on these lands, the following estimate seems warranted: Of the total area, about 20% was swamp, with at least 15 of the 20% covered with dense forest of the swamp conifers, cedar, tamarack, hardwoods, notably ash, poplar, birch, maple and, along the creeks, more or less of elm. About 40% was heavy pine forest, containing both white and Norway pine, practically devoid of merchantable hardwoods, and occupying the low flat areas, particularly the lands skirting the swamps and also some of the elevated lands. About 30% was covered with forests of Norway pine, occasionally mixed with jack pine, while about 10% was of the type known as "jack pine plains," where open stands of jack pine alternated with tracts of bare land. These lands

are clearly indicated by the absence of stumps or other signs of logging.

At present only the swamp forests and the "jack pine plains" retain anything of their former appearance, much modified by fire, and, in the swamps, by lumbering operations. The great pine forest is gone, and not a single acre of the original woods remains. The present appearance and cover of the lands varies according to the length of time elapsed since logging, and also according to the number and thoroughness of the fires which have passed over the lands.

In general the changes from the old pine forest to present conditions may be traced more or less clearly, and while the progress varies with land and former condition and recurrence of fires, the cover of most of these pine lands has passed through a circle of transformation about as follows: After logging, the fires consuming the tops and other debris destroyed the forest cover. Usually several fires followed each other at short intervals, and killed the young growth of pine, poplar, birch and oak which springs up after the fires, leaving the land in the blackened waste condition in which many thousands of acres may still be found throughout the pinery region. In spite of the injury to the soil, nature, after a few years' rest, begins again the work of reclothing these lands. Sprouts of oak, and, on the better pine lands, sprouts of cherry, maple, birch and poplar make their appearance, and in cases where a few fire-scarred pines have survived, there appear usually a few scattered seedlings of pine. This growth continues for some years, and with it comes a more ample cover of the low, long-lived, tenacious shrub tribe peculiar to this region, sweet fern, huckle blueberry, blackberry, bush honeysuckle, dwarf cherry, Jersey tea (*Ceanothus*), with occasional willow, witch hazel, rose, hawthorn and sumach, and among these a very variable amount of grass and sedge. Of these all, the sweet fern stands out conspicuous on the lands under consideration, and it is common to see it form a perfect mat, covering acres of land, almost to the exclusion of everything else. This dense shrub cover, one to three feet high, while of some benefit to the land itself, is a great obstacle to restocking with trees, either natural or by planting, and it is also a serious menace to the use of those lands by grazing, for grass and sedge naturally give way to these persistent, long-lived, rugged pioneer plants.

While in this stage, we find cases like the following: On a sample acre taken on a large, flat piece of good pinery land, there are about 100 pine stumps to the acre, indicating that considerable timber was taken from this land. The land was thoroughly burned over several times. At present there is a fair cover of shrubbery, about 80% sweet fern, and in addition there is a beginning of a forest cover consisting of about 160 oak "stools" (a stump with all its sprouts forms a stool) to the acre, besides about 50 to 75 small, bushy plants of jack pine, the seed of which had evidently blown from the neighboring stand of scattered jack pine.

A sample acre of another pine flat, with a much denser cover of shrubbery, again mostly sweet fern, has about 120 oak stools, with sprouts three to seven feet high, quite a scattered growth of cherry, poplar, willow and witch hazel, and over 200 small plants of white pine, the seed of which had evidently come from a neighboring swamp, along the edge of which a number of small white pine trees had escaped the fires.

Unfortunately, such conditions soon terminate. After a few years the accumulation of dry material, leaves, dead grass and twigs, makes it pos-

sible for a fire to run, and, since fires have always been supplied, the land is again burned over. While such a fire naturally is not very severe or dangerous, and while, in the opinion of most people, there "was no damage," yet the little prospect of a forest cover is again destroyed completely, the seedlings are all killed and the sprouts killed or injured sufficiently so that in a few years all the growth is gone, and nature must begin her work anew.

There are hundreds of acres of land in the reserve in this condition, and it is in this manner that the repeated fires have prevented millions of acres in this region from producing any timber or revenue for many years past. After a number of years the sprouts of oak, less of other growth, again mix in with the persistently returning ground cover of sweet fern and other shrubbery. In this condition the appearance of the oak is peculiar. A broad bush of ten to thirty green oak sprouts, two to five feet high, surrounds the 3-6 old, fire killed oak sprouts of the former growth stretching five to fifteen feet above the green sprouts and proving clearly by their blackened feet the cause of their destruction.

The second or third crop of these oak stool openings, as they may well be termed, usually resemble the first, but generally lack the seedlings of pine, especially of the white or Norway pine.

Where the land has had a longer period of rest from fire, the oak growth takes on the tree form, the majority of the sprouts die, leaving commonly 2-6 sprouts to occupy one old stump. Now the cover begins to appear distinctly "woody," or forest-like, and one is justified in speaking of this cover as a "stand" of coppice oak. Throughout, the oak retains the scrub oak character peculiar to the sand-land oak; it is limby, grows well in diameter, but lacks the height. In addition, it is too thin on the land, either to clear itself of limbs or to produce a satisfactory amount of timber per acre. Nevertheless, it is the best there is; it is a good material, excellent fuel, and well suited to posts and a variety of purposes in the manufacture of smaller objects, and above all it is a forest cover, a beginning to a forest such as will make these lands valuable and supply the material for which we are already going abroad.

Such a thin stand of the oak openings on fairly good pine lands was found, in one case, to be composed of about 130 young trees, 2-4 inches breast high, and 290 oak stools, 2-6 feet high, per acre. On another tract there were, per acre, 140 oak trees, mostly 4-8 inches in diameter and 25-30 feet high, and 300 oak stools, 2-6 feet high, besides a few sprouts of cherry, maple and poplar.

On good Norway pine lands, where the old forest contained some jack pine, and was rather open, i. e., free of brush or undergrowth, the young oak woods are sometimes mixed with considerable jack pine and sometimes a few Norway pine survivals. A sample acre of such a case, where the fires had been checked by a narrow arm of swamp, and thus reduced in their intensity, the following condition is met at present: There are on one acre about 30 jack pine, mostly between 3-8 inches, about 10 crippled, small Norway pine; about 40 young scrubby oak, mostly 2 to 6 inches in diameter, breast high, and about 90 oak stools with sprouts 2-5 feet high, and mostly injured by some recent ground fire. On this same tract about 80 Norway pine stumps clearly indicate the capacity of the land for the growth of a pine forest by the crop which was harvested some years ago.

The stands of jack pine vary from place to place. Few occupy small areas in the midst of former stands of Norway pine, and appear as if the stand of Norway pine had been broken by storm or other cause and the gaps had filled with jack pine, owing to its superior seeding capacity. In such places the jack pine stands close, has a height of 35-50 feet, is fairly well cleaned and generally runs from 6-10 inches in diameter. In one case a sample acre of this kind contained 511 jack pine trees, mostly between five and nine inches in diameter, with a few scattering oak sprouts in the more open spots, with no young growth of jack pine and a scanty ground cover of sedges, grass and huckleberry.

On another tract about 430 live jack pine, largely 4-8 inches in diameter, were counted on one acre. In addition there were found about 100 dead jack pine, 12 small oak, besides about 50 jack stools, a few scrub maples and cherry.

On the regular jack pine plains, the stand is very variable, and with it the character of the trees. Generally, the stands are open, so that each tree has room to spread, and as a consequence the trees are short, short-bodied, large crowned, bushy, limby and rather worthless from the timberman's standpoint. However, these bushy trees are generally prolific seeders and can be counted upon as a valuable aid in the process of reforestation. And while it might be argued that this runty growth of Jack Pine is but little better than no forest at all, the readiness with which Jack Pine finds a market and good use at the present time leaves no doubt of the usefulness of this growth in the future.

The *Swamp forests* vary; they are generally a Cedar-Tamarack combination with a variable mixture of Spruce and Balsam, Ash and Maple and a border or fringe of mixed woods in which the swamp-conifers associate with Poplar, Birch, Maple, Ash, White and Norway Pine in an almost endless variety of proportion. The swamp forests are by far the most valuable part of these burned pinery districts.

It is from these swamp woods that the only merchantable timber of this area comes; it is only in these swamp forests where a fairly satisfactory forest condition exists and a reasonable amount of valuable material is grown every year; it is here where natural conditions have protected the forest growth and where today a large amount (in the aggregate) of reproduction of the adjoining lands takes its start. Covering such a large portion of the total area these swamp woods deserve especial care and consideration. The following illustrates more fully the character and composition of these swamp woods: In one swamp one acre of a sample area examined contained in round numbers, 540 live Cedar trees, of which amount 120 were over six inches in diameter; 30 dead trees of Cedar, 200 trees of Spruce, 100 Tamarack, 20 Balsam. In addition about 700 young Cedar, 120 of young Spruce, 30 young Balsam and a few Tamarack and White Pine were counted.

The size of this swamp timber is never great. The usual height is from 50 to 70 feet and the diameter of mature trees ranges usually from eight to 14 inches, though the Cedar is apt to make an exception in this respect and develop a "bottle butt" often two feet in diameter and over.

As will be noted from the above count there is no lack of reproduction and the only thing required to perpetuate this forest is a careful exploitation of the dead and riper material and efficient protection against fire.

In another swamp 500 trees of Cedar, 120 of Spruce, 22 of Tamarack were counted per acre, besides about 240 trees of Cedar under two inches in diameter and a mixture of hardwoods as follows: 24 trees of Ash, 50 of Maple, 10 of Birch and eight of White Pine. In this case the Balsam was practically wanting, and the Tamarack occurred only as large trees eight to 17 inches diameter, and there was practically no young growth besides Cedar. Frequently tracts are met where the Tamarack predominates. In such a tract the following was observed: Of trees two inches and over in diameter, there were counted in round numbers 460 Tamarack, 190 Cedar, 40 Spruce, 18 White Pine, four Balsam, with practically no broad-leaved (hardwoods) trees, but over 150 young Tamarack filling in every opening or gap.

In another similar swamp there were counted per acre: 610 Tamarack, 170 Cedar, 40 Spruce, 20 Balsam, 12 White Pine, and nearly all young growth was of Cedar and Spruce.

Considering the different species as they appear on the Reserve, the following may be said:

The most important tree of the district has been the *Norway Pine*, and it is reasonable to suppose that it will prove in the future to be among the most valuable species for these sandy pinery lands.

Taking the Norway Pine as standard, we may readily distinguish three "sites" or qualities of land, and perhaps designate them good, fair and inferior. These three sites cover practically all of the uplands of the Reserve. On site No. 1 or good Norway lands the Norway was mixed with White Pine, reached a diameter of two to three feet and a height of over 100 feet; on site No. 3 or inferior Norway land, largely made up of the Jack Pine plains, the Norway Pine is short bodied, commonly not over 70 feet tall, with a diameter of 12 to 18 inches. But even here it clears itself of branches and produces the characteristic clean, sound stem.

The Norway is a fair seeder, seeds abundantly at intervals of probably about five years; it is a strong, thrifty plant, makes leaders of 10 to 18 inches when four to 20 feet in height. On good sites, it grows rapidly in height and diameter until 16 to 20 inches diameter, after which time it lets up in a way characteristic of this tree throughout its range. It grows in dense thickets, but in this case often fails to produce good timber in so far as all trees remain "spindly" pole-like specimens to considerable age. As an illustration may be cited that on lands which might be classed as "site" No. 2 for this tree, the growth in a close stand, as indicated by the stumps, was about as follows:

At age of	Diameter of Best tree.	Diameter of Poorest tree.	Diameter of Average tree.
50 years	9 in.	5 in.	7 in.
100 "	16 "	9 "	13 "
150 "	20 "	13 "	16 "
200 "	25 "	15 "	18 "

Which shows that even in a close stand the tree is capable of making fair timber in considerable quantities per acre in less than 100 years. While a few old fire-injured runty trees still remain here and there, the natural seeding is entirely inadequate and there is little prospect of this species re-establishing itself naturally in a reasonable period of time. Here and there small patches of scattered plants one to five feet high may

be seen, and there is no large tract of upland entirely devoid of young trees of this pine.

The *White Pine* was abundant on site 1 (Norway lands) and occurred scatteringly on site 2, but was practically wanting on site 3. It attained a large size, many of the fire scorched stumps still measure over 30 inches diameter. Most of the large *White Pine* occurred on the flats about the swamps. Here the growth was quite rapid and possessed the steadiness characteristic of this species.

At present the *White Pine* as a tree is restricted to the swamps, occurring, usually, along the edge of the swampwoods more rarely within the swamps. From here a little seeding has taken place and there are scattered tracts along nearly all swamps where a scant reproduction of this species is taking place. Where this occurs it is evident that the *White Pine* is thoroughly at home here and is perfectly capable of enduring even the much modified and damaged conditions of soil and soil cover.

These scattered young *White Pine* show a growth equal to that of the *Norway*, remain more bushy, clean less readily and begin to bear cones when 10 to 15 feet high. For all lands of site 1 and part of site 2 the *White Pine* is perfectly suited and deserves preference over any introduced species. As in the case of the *Norway Pine*, the *White Pine* trees are too few and too scattered to rely on their restocking these lands in reasonable time.

The *Jack Pine* is of importance because it is here on the ground, abundant and multiplying more than because of its other natural qualities. And yet even for purposes of future restocking this frugal tree of the sand plains deserves attention and care. It presents here no peculiarities. It is a small tree in height and diameter, apt to remain bushy; begins seeding when a mere bush, seeds profusely and at all times; grows rapidly for a short time and should then be cut to avoid waste. In spite of its small height it is capable of making a fair amount of material per acre since it stands considerable crowding.

Taken on the whole, there are now hundreds of acres on which this tree occurs, occasionally in dense thickets, commonly in open stands. Whenever of size it appears as ample seeder, and millions of young plants may be seen scattered or in dense clumps in the vicinity of the older stands. Next to the *Oak* it is the most important factor in the forest cover of these lands at the present time and it is hardly an exaggeration to say that the money now expended on the protection of these lands is well repaid by the growth of the *Jack Pine* alone.

The *Oak* occurs in several species, principally *Scarlet Oak*, little *Red* and *White Oak*. On the good clay and loam lands where a tall growth of mixed hardwoods clearly makes the agricultural qualities of the land the *Oak* is almost wanting in this region. On the pinery sands on the other hand and in all dry lands of the Reserve the *Oak* is at present the only important hardwood tree. Here by virtue of its capacity to sprout, it heals up the repeated fire scars and produces at least some semblance of a forest cover where all other species have been exterminated. Its abundance here is commonly a puzzle to the people of the district, who wonder at its origin. There is no doubt that the *Oak* was always here, but under the tall cover of the pine it could never assert itself so that the casual observer would hardly notice its presence.

After the first fire the *Oak* comes up usually in company with quite a

variety of other growth, notably, poplar, birch and young pine. But after a few fires have cleaned up the land, and thoroughly burned out the humus of the soil, the frugal Oak is the only tree whose sprouts begin the process of restocking. Nearly all uplands of the Reserve bear at least some Oak, and on several thousand acres the Oak today forms quite a valuable stand of coppice up to 30 feet in height and to 10 inches in diameter, while all intermediate conditions may be met. The behavior of this coppice Oak after the fires has been mentioned, and it is but natural that nearly all Oak on the Reserve today is coppice and not seedling growth. As a coppice the Oak here is first a fairly rapid grower in height and diameter, is bushy and early takes on the scrub-oak character. The Oak is a fair seeder and where not disturbed for some years the better coppice stands begin seeding and more or less seedling growth is observed. That the Oak never gets beyond the scrub-oak condition of these lands is clearly indicated by the few scattering old trees which have escaped the fires.

Thus of three such trees, 90, 118 and 123 years old respectively, none was over 45 feet high or over 10 inches in diameter, and while this may perhaps be rather a representation of slow than of average growth, yet all examinations indicate that the sprouts at least, grow fairly well for some years, but soon enter a period of very slow growth. A number of older coppice trees examined indicate that a diameter of eight to 10 inches, inside bark, and a height of 25 feet usually requires about 35 to 40 years. It is evident, from all appearances that this coppice is valuable as a first cover, amply justifies proper protection of the woods, but that it must be used early and can not be regarded as the proper final form of forest for any of these lands, which can produce a much greater return if stocked with pine. It should also be mentioned in this connection that this frugal species is apt to mislead in estimating the quality of the land. The Oak here is capable of active coppice growth with a very thrifty appearance on almost any kind of land while, as has been stated before, it is almost absent from the good mixed hardwoods of the real, good agricultural lands of the region. These mixed hardwoods, largely Maple, Elm, Basswood, Ash, Birch and Beech and usually mixed with Hemlock, are as distinct from the scrub oak cover of the sands as pine is from hardwoods. The forest is tall, the trees rise commonly to a height of 80 to 110 feet, diameters of 24 to 30 inches are common, and trees over three feet diameter and 100 feet in height are by no means rare.

The *Cedar* is, here on the Reserve, as it is over the entire region, one of the characteristic trees of the swamp. There is no swamp on the Reserve where it is wanting; in a number of them it predominates, often covering acres of ground almost to the exclusion of other species. It possesses no peculiarities here; as elsewhere, it is a good seeder, reproduces amply, stands shade and crowding, grows well in height and diameter as a young tree, but generally lets up in its growth at an early age, so that even old trees are rarely above 70 feet in height and 18 inches diameter breast high. Since it stands close crowding, the growth as observed on logs, poles, etc., in large piles, appears very variable, dependent, evidently, on the chance which each individual had for light and space.

Generally, however, it must be said that the mature Cedar, now cut in this district is of slow growth, fine grain or rings and is generally affected with the defect of "butt rot" peculiar to and almost normal with this species. From several trees examined it may be inferred that trees 100

years old are about 12 inches diameter inside bark, and 50 to 60 feet in height. Being exceedingly durable, especially here in its native home in the swamps, the old dead and down material remains useful for many years, but of course, remains more or less a menace from the fire-protection standpoint, for an equally long period. In most of the swamps of the Reserve the Cedar has been more or less culled, but even where this is the case a more thorough cleaning out of the old dead and down material and the removal of the old over-ripe, deteriorating trees appears advisable. In spite of its apparent slow growth, the Cedar seems destined to remain an important tree of the swampwoods, for which it is naturally adapted, and where its ready reproduction and the great value of its soft, durable material must always commend it.

The Tamarack or Larch on the Reserve resembles the Cedar, is a normal part of the swampwoods, varies in the proportion which it forms, and presents no peculiarities. Like the Cedar, it reproduces abundantly, comes up in dense thickets and stands crowding, but unlike the Cedar does not endure much shade. It grows rapidly as a young plant and sapling, lets up early, is straight, clean and sound; attains a height of 70 to 80 feet, but is rarely a heavy bodied tree, its diameter usually being from 12 to 16 inches inside bark. Despised formerly, the Tamarack today is "good timber."

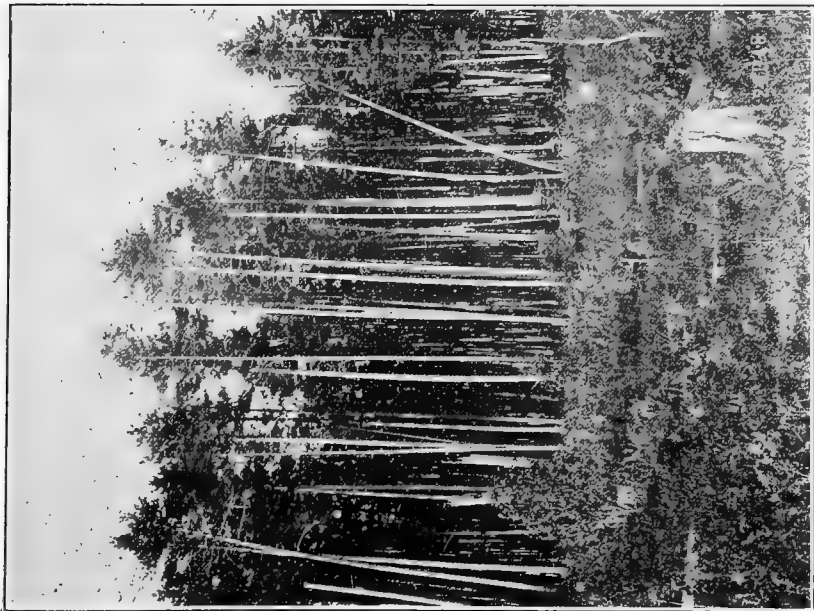
The Tamarack is now, and promises to be in the future, one of the most valuable trees for these swamp woods. Its slow growth as old timber make it probable that, like Cedar, it is destined to be cut early and thus promises only small but clean, long shafted timber.

As in the case of Cedar, considerable of the best timber has been cut, but there remains still a goodly number in every swamp which need removal to enable a thrifty and more valuable young growth to take the place of the old, and thus avoid an actual loss from deterioration.

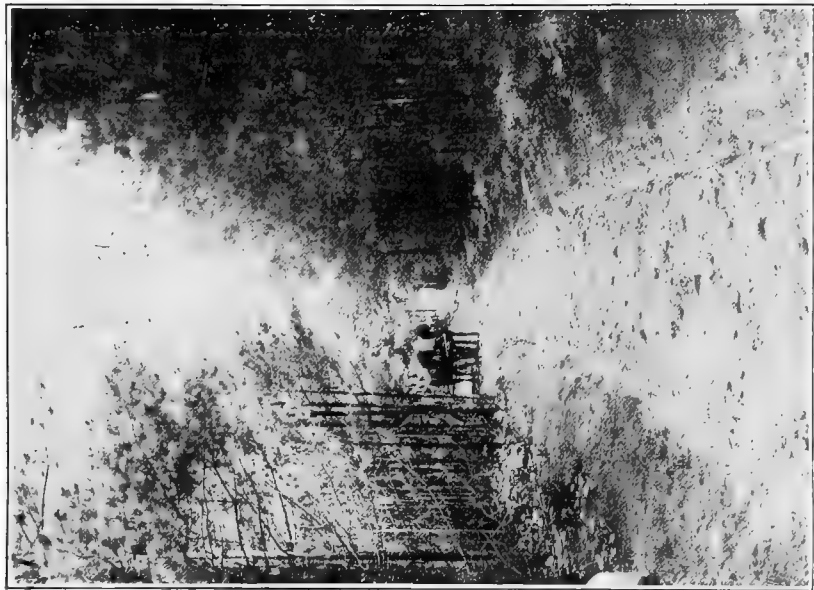
The *Spruce*, though far less conspicuous than Cedar and Tamarack, is equally characteristic of these swamps. There is no swamp without it, in one place it is abundant, in few cases it predominates; in one place it occurs only as a stand of old trees, in another it is found only as young growth or sapling material. Generally a poorer seeder, it reproduces much less abundantly and uniformly than Cedar and Tamarack; it grows more slowly, more steadily, stands crowding and shade as elsewhere; cleans fairly well in the swampwoods, but remains behind the Tamarack even for size. A height of 60 to 70 feet, and diameter of nine to 12 inches inside bark is attained at an age of about 100 years and appears to be about the normal for this tree in this locality. Though culled, considerable old over-ripe material of this species still remains to be removed. To what extent the Spruce will enter into the composition of these swamp woods in the future must remain a problem, but until replaced by something better this tree deserves consideration.

The *Balsam*, though common and quite characteristic of all swamp woods of the district needs hardly more than mention. It forms but a small part of these woods, being evidently deficient in its reproduction. It grows thriftily as a small plant and sapling, grows faster than Spruce, but like Spruce remains smaller than the Tamarack.

Generally it may be said that throughout the Reserve these swamp conifers, Cedar, Tamarack, Spruce and Balsam are restricted to the swamp and refuse to come out on the dry uplands, as they often do in other localities and on different soils.



A FINE STAND OF YOUNG WHITE PINE ON AN OLD "BURN" NEAR HOUGHTON LAKE. HUNDREDS OF CASES LIKE THE ABOVE CLEARLY DISPROVE THE OLD FALLACY THAT "PINE CANNOT SUCCEED PINE."



A REMNANT OF THE OLD FOREST. A BODY OF "SAPLING" TIMBER IN CRAWFORD COUNTY, TOO SMALL WHEN THE DISTRICT WAS LUMBERED, NOW WORTH MORE MONEY THAN THE BEST FARM LAND IN THE STATE. (NOTE THE TEAM TO ESTIMATE THE SIZE OF THE TIMBER.)

The *Hemlock*, which is such a conspicuous fine tree of the better hardwood lands of this region, occurs on the Reserve only as a swamp tree, being practically restricted to a few of the swamps and the edge of these. In keeping with this station it generally remains small and unimportant, though a few exceptions occur here and there.

The *Poplars*, of which the two species, the Small-toothed and the Large-toothed Aspen are the only important ones, are quite abundant on all uplands as well as along the edges of all the swamps. And yet, here as elsewhere they have failed to fulfill the promise which they had given after the first fires had destroyed the forest. There are few large tracts of upland devoid of Aspen, and there is not a single swamp in the Reserve without more or less Aspen growth along the edge and often in its interior, but in spite of this the amount of Aspen which really promises to grow into useful pulpwood is very limited and there are practically no poplars on the Reserve in a merchantable condition, i. e. large enough and abundant enough in any one tract to warrant exploitation.

Nevertheless it would be hasty to predict that the poplars are unable to do what has so often been predicted of them and it is almost certain that, if properly protected a large amount of the poplar coppice now on the better flats about the swamps will soon grow into useful material. On the dryer sands the poplar stays small, scragly, limby and of no promise; on the moister flats and in the edge of the swamps, trees 40 to 60 feet are common, the trees are straight, and clean and promise fair commercial value. Throughout, the poplar sprouts after fire and in this way promises a valuable aid in reforestation.

Like the Oak, the poplar can only be regarded a transient on the uplands, for the pine must excel it by far in production. Where the poplar thrives its growth is quite rapid; of some trees examined it was found that in the edge of swamps it may reach a height of 60 feet and in diameter of 12 inches inside bark at the age of 50 years.

The *Maple* appears so commonly all over the Reserve, both on the uplands and in the swamps that it gives the appearance of being able to become a valuable forest tree. A more careful study, however, seems to deny this and it is doubtful if the Maple on the sands will ever produce more than firewood coppice. In the swamps it succeeds here and there in making quite a tree of itself. While valuable enough to keep and protect, it is doubtful if the Maple will repay special additional care or help in reproduction.

The *Ash*, principally Black Ash, is common in nearly all swamps. It reproduces well from seed and sprout, grows well at first, is on the whole a slow grower and at present is seriously infested and a large portion of all old timber is in a dying condition.

The *Elm* occurs sparingly along some of the streams, but can hardly be regarded an important forest tree of the Reserve.

Summing up the matter of the forest cover on the Reserve it may be said that very little of merchantable material remains at the present day, that it might be, and is actually inferred from this fact alone, that a protection of these areas is hardly good business, and that forestry, in this case must be regarded as a wasteful effort, justified only by some presumed and hoped for good which it may do to some future generations. Such, however, is by no means the case. The present cover and prospect for cover, the millions of young forest trees fully established on the ground,

ready if given half a chance to grow into valuable material, disprove all pessimistic criticism. The present cover is of great value, its future is not in any wise problematic or doubtful, provided only that a reasonable effort is made to protect it against fire, and that such effort is properly supported and emphasized by suitable legislation and, what is far more important, by proper public opinion, especially in the immediate vicinity of the district.

FORMER TREATMENT.

With the exception of a few pieces of swamp woods, practically every "forty" of the Reserve has been logged over and every acre of upland and much of the swamp lands have been run over by fire, and most tracts have been burned over repeatedly.

Logging seems to have been begun about the end of the 60's. It was done largely in the old way of logging to the river and even when pole roads and some regular railways were built, they carried the logs to the lake or river to be floated to the mill towns below. Only a small portion of the timber was carried to mill per railway and this timber did not follow the stream but was carried east instead of west, mostly to Bay City. The logging itself, like the methods of transportation, changed with the years, the older cuttings being conspicuous by high stumps and signs of general wastefulness. Of late logging has been carried on in the cedar swamps, some of the lands having been purchased, others obtained under the State tax homestead act which appears specially convenient for this encouragement of further forest destruction and denudation. Some of this logging is still going on within the limits of the Reserve.

ROADS AND SETTLEMENT.

There are not to exceed half a dozen of actual resident farm settlers within the confines of the Reserve. Nevertheless the district is quite accessible, and many of the old "tote" roads have remained in a passable condition by the travel of berry pickers, hunters and timber men. The sandy impoverished soil, has effectively hindered the growing up to brush of these roads and was, of course, materially aided by the many surface fires which are most common along the highways.

USES OF THE RESERVE LANDS.

The principal uses, which are made of these lands are made by people who do not own these lands and consist in berry picking, grazing and hunting. Of these the gathering of huckleberries is far the most important. On some of the newly burned over lands the crop of the low-bush huckleberry is so abundant that but little effort is needed to make the work very remunerative and cases are on record where \$3 per day was earned by industrious persons. While precarious in many ways, this source of income is considerable and of great importance to many beginners.

But little of the lands in District No. 2 are grazed at present, the

amount of stock owned within, or in the vicinity of the Reserve being quite small as yet. In District No. 1 the amount of stock is much larger, in fact so large that a proper regulation of grazing on the Reserves seemed necessary. During moist or favorable seasons there is a considerable amount of grass-and-sedge-feed well reinforced by a large amount of "brouse" of young Poplar, Willow, Maple and other "brush." While always more or less destructive, to the young forest trees, it is quite evident that under present conditions the good from reasonable and moderate grazing will balance the mischief done to the forest cover. Besides the feed gathered by the stock direct, a considerable amount of tall marsh grass is being cut by the settlers of the vicinity in parts of the Reserve.

The hunting on the Reserve is done, as on all State lands, without let or hindrance, save the ordinary game laws of the State, and while little remains to kill, the eager nimrod during each fall faithfully roams over every section of the land and with his long range rifle, a weapon fully as dangerous as light field ordnance succeeds chiefly in making the district dangerous, as is clearly evidenced by the numerous accidents which have become part of the regular fall program. To what extent the troop of hunters, which visit these lands every year, are responsible for fires, as is so often charged against them, remains uncertain. Certain it is that some method of control whereby certain persons would be limited to certain districts and there held reasonably responsible for their proper behavior as regards fire, and gunning would vastly improve matters and undoubtedly could be made as welcome to the true, honest sportsman as it would be helpful to the settler and the forester.

MARKET CONDITIONS.

While perhaps of little importance at the present, with practically all merchantable material removed from the land, the market conditions must still remain a very important feature in all future work as well as in the general decisions concerning these lands and their use for forest purposes. It is pleasant to be able to say, therefore that the lands of the Reserve share with millions of acres more in our State a most extraordinary condition. Waterways in all directions permeating every part of the land, vie with a level accessible topography and an easily worked, well drained ground to make every effort at transportation easy and effective. Sled roads 14 miles in length, today carry cedar from within the Reserve. Pole roads and regular railways, abandoned after the logs were cut, all have proved as efficient and as economical as the proverbially cheap methods of driving the streams. A pleasant, healthy, frosty winter with certain and reasonable snows have added to make our State a woodsman's paradise and while millions of feet of timber go begging in Maryland, Virginia and other warmer states, every stick of timber in Michigan has a ready market value. While this very feature has been one of the temptations of the lumberman and has, undoubtedly, helped to hasten the destruction of much of our forest, it will also help in rebuilding it, since at every step the forester is met with the encouraging word that every foot of timber, regardless of species has even now its market and fair price.

WORK OF THE YEAR.

In keeping with the requirements of the law of creating the Forest Reserves, work was at once begun in three principal directions:

1. Protection and care of the lands. 2. Reforestation and improvement. 3. Survey and classification of the lands.

The protection of the Reserves is under present conditions naturally, by far the most important work, for it is here, not a case of caring for regular well established forests, containing a full assortment of timber from the young plant to the mature tree, but it is rather a case of guarding a sparse but valuable young growth coming up over a large area and under rather difficult, somewhat risky conditions. Since October last a regular Forest Ranger patrols District No. 2, the Reserve south of Houghton Lake. On April 1, 1904, another Ranger was added and assigned to District No. 1. Since, of necessity the patrol, at least against fire, extends over all lands within the confines of the Reserves, an area of two towns was patrolled for nine months, and one of one town for three months, making an amount of patrol work equal to the patrol of over 38,000 acres for one year. In this work the Rangers followed detail instructions (see copy of Manual of Forest Reserves) guarding the interests of the State in every direction. For a few weeks last spring the Rangers were reinforced owing to specially dry weather. As a result of the patrol work, there was not a single large fire on either district; the few cases of trespass were promptly discovered and, it is safe to say, further trespass permanently discouraged. Of the several cases of trespass three were recommended for prosecution, two of these were prosecuted and the offenders fined, while the third, and apparently the most mischievous case was, for reasons unknown to the Warden, dropped without prosecution.

While primarily protective officers, the Rangers found time to perform a large amount of additional work, locating and re-establishing monuments and lines, and improving trails, and both Rangers assisted in planting and one of them worked for weeks during all spare time in the nursery, at survey work and in construction of fire lines. For this reason the exact cost of protection is considerably below the figures given in this report, and even these show that the protection of over 38,000 acres for an entire year cost only \$491.63 or the small sum of less than 1.3 cents per acre a year.

While this must be regarded as too small for as thorough protection as is really desirable and while much depended on a favorable season, this figure fully demonstrates at what small expense, compared to the good accomplished, our State lands might be furnished the protection so sorely needed and so fully warranted.

The reforestation of the Reserve lands is commonly misunderstood to mean only the work performed in planting and seeding or artificial restocking. This is not the case, and, as has been stated before, the process of restocking these lands is aided far more by the protective work which enables the growth of the plants already established, than by the small efforts at actual artificial reforestation.

Nevertheless it would be an error also to make light of this line of work, of actual improvement by seeding and planting for there are sev-

eral thousand acres on the Reserve which, if left to themselves will remain bare or very poorly stocked for many years to come, and there are additional thousands of acres where a small outlay of money will restore to the land those kinds of trees which alone are able to make the best of all conditions, and produce the material wanted, and in amounts to insure a proper return for the outlay. For these reasons the work of planting and seeding was at once begun, and 51,000 plants of forest trees were set out this spring (1904) covering about 50 acres of lot 8, Section 36, T. 25 N., R. 4 W. in Crawford county. The plants were purchased from the nursery and comprised the following:

- 30,000 White Pine, 2 years old.
- 10,000 Norway Spruce, 3 years old.
- 10,000 Scotch Pine, 2 years old.
- 1,000 Black Locust, 1 year old.

The trees were set out in the ordinary slash lands, pretty well cleaned up by repeated fires but largely grown over by sweet fern, huckleberry, blackberry, etc., and a scattering growth of Oak, Maple and Poplar sprouts.

The planting was done by men working in pairs, one preparing a small plot about 18x18 inches, and digging the hole for the plant in the center of the plot while the other man planted the young trees, a supply of which he carried in a metal pail. As is always the case where plant stock is taken from distant nurseries and has to endure the handling in getting out, and selecting, counting, bundling, packing, shipping, unpacking, and handling in heeling in and subsequent removal to the final place, these plants had to endure a great deal and like all conifers, showed the hardships at the time of planting. In addition to this, very dry weather prevailed almost throughout planting, but in spite of this, the pine particularly took hold beautifully, and it is safe to say that fully 85 per cent of the pine, and over 90 per cent of the locust lives. The spruce, which naturally is more sensitive and less suited to this soil did not nearly so well, but even of this a goodly per cent is alive at this time, and some of the better plants have made a truly splendid growth. The work was done entirely by the help of the neighborhood, almost all young men used only to forest destruction and entirely new even to the notion of forest reproduction. But, in keeping with the true American spirit, the men took hold and performed their work well. This statement would be incomplete if mention were not made of the educational value of this kind of work. The same men who began their planting work with doubtful glance and sneer in their speech went away converted, the work had produced a large part of the change from the mere wood butcher into the forester, the man who is interested as much in seeing a tree start and grow as he is in the cutting of timber and its conversion.

The cost of this first plantation was, naturally, high. The plants which should be raised on the Reserve for certainly not to exceed \$2 per thousand, cost \$5 per thousand, besides long distance expressage and better transportation and labor. Similarly, the planting was done by men who had to be cared for in special camp, everything was new, had to be acquired and organized.

Beside this plantation there was established seedbeds and nursery in

the southeast corner of the northwest of the southeast one-quarter of section 35 of town 25 north range 4 west on a spot of about four acres, selected and partly used in an attempt at some experiment in this same direction. The land was neglected worse than raw land, full of stumps, and what was far worse for this enterprise, impoverished and full of weeds, including the mischievous trailing blackberry whose roots are almost indestructible. A large amount of work was done in grubbing, fencing and preparing the land.

A small portion of the tract was specially treated, given a liberal dose of one of Swift's fertilizers and then laid out in seed beds, 4x40 feet. The following seeds were planted:

13 lbs.	White Pine.
10 "	Scotch Pine.
15 "	Norway Spruce.
1/2 lb.	Nut Pine (European).
1/2 "	Sugar Pine.
1/2 "	Western White Pine.
1 "	Western Yellow Pine.
1/2 "	Norway Pine.
1/2 "	Pitch Pine.
1/2 "	Big Tree.
1/2 "	Western Cedar.
1/2 "	Jack Pine.

It was the intention to use more of Norway Pine, but the seed was not to be had in the market. The seed was put in under difficulties. The soil had to be worked just before seeding, and the dry weather had made a perfect dust bed of the upper layer, about two inches deep. To secure any results at all this had to be overcome. The dust was raked back, the half dry soil below this was watered at once with sprinkling can, the seed sown broad cast, the moist covering earth, specially prepared and mixed with fertilizer was then sifted on in a thin layer and the whole bed at once covered with straw before the hot sun had a chance to dry out the soil. In this way the seeds were all put in; closely watched and as soon as they began to peep through the covering layer of earth, the straw was removed and the beds were screened. The spruce were covered with over-head (high) screens, while all the rest were covered with low movable screens, mostly of lath frames.

Much of the seed proved of rather inferior quality, quite in keeping with the scarcity of coniferous seeds during the last few years. Nevertheless much of it came up in good shape. Considerable damage was done by birds but far more by the ordinary striped gopher which proved quite a pest and in spite of shot gun completely destroyed all seeds of nut and sugar pine and much of white pine.

(Further destruction of this sort and from mice it is the intention to stop by suitable screen fencing around all seed beds.)

By far the most trouble, however, lay in the weedy condition of the soil, and besides a large amount of labor, the weeds cost thousands of plants, over shaded, crowded, or pulled up in the efforts to weed. This evil, of course, will be reduced to a minimum as soon as the seed bed grounds are in a proper state of cultivation.

A recent count on sample plats made it appear that about 600,000 plants were in a thrifty growing condition in these beds today, August 15.

All expenses of reforestation including planting and all seed and seed bed work to the end of the fiscal year, June 30, 1904, are \$1,027.79, a sum far more than covered by the value of the crop of seedlings in the seed beds alone.

The survey work performed during the first year consisted in a co-operative effort, in which the United States Department of Agriculture in its Forestry Bureau, furnished part of the men and instruments and the Commission three men and all camp, etc., expenses. This work carried on in August and September, 1903, covered 14 sections in T. 21, R. 3 W. of District No. 2. This work was done according to a plan prepared by the Warden, and approved both by the Commission and the Bureau of Forestry. The section lines and corners were located and the monuments reestablished. The inside work was done by parties of three men each, with large Gurley compasses on Jacob staff, and all features, roads, streams as well as topography were noted and sketched. Each forty acres was crossed, two stations were made in each forty, and every ten acre tract thus received a special consideration, mapping and description. This description included the following points:

1. Lay of land (topography) whether level, slope, rolling, "pot hole," hilly, etc.
2. Soil: sandy, loamy sand, muck, loam, gravel, clay, etc., and also whether poor, fair or good agriculturally.
3. Moisture: dry, ordinary, moist, wet, swampy. (All swamps are mapped.)
4. Soil cover, i. e., the grass and bush cover, its composition and density.
5. Forest cover:
 - a. Kinds of timber, Jack Pine, Oak, etc., and proportions of these.
 - b. Merchantable material, or stuff over 12 inches in diameter, breast high. Here also the amount, quality and thrift of growth.
 - c. Pole stuff or material 6 to 12 inches in diameter, breast high. Here the estimated number, general height, diameters, and condition of growth (thrift). This is usually estimated by one-fourth acre sample circles, but was also examined into by regular caliper measurements of strips four rods wide where all stuff was actually measured.
 - d. Young stuff of all kinds. This was described by the amount of cover it produced, i. e., whether scattered or in an actual stand, whether uniformly distributed, and also of what species it is composed.
 - e. Former condition of the forest cover, as indicated by the stumps and stubs, i. e., whether there was a forest and about what size and amount of timber was removed or destroyed on the area.
6. Suggestions as to what prospects there are for a restocking and what, if any, should be the measures adopted to help nature in her effort to reclothe the land.

This work covered the following points and expenses to the Commission: Location of section corners, re-establishing of corners and part of the section lines. This work was done by resident land and timber surveyors, and cost in labor: \$96.00.

2. Regular forest survey or work inside of sections. This was done by student assistants, and the expense borne by the Department of Agri-

culture except 23 days' work by one of the resident surveyors at an expense, for labor, of \$46.00. This work covered 8,960 acres.

3. Five days' work of the entire party in making detail caliper measurements, or valuation surveys and examinations into the rate of growth of the different species. This was also work of the student assistants.

Leaving out the expenses for equipment, which was not used up in the survey, the total cost of this survey to the Commission is \$400.00 or 4.4 cents per acre, or \$28.16 per section, a considerable amount of which is due to team hire in hauling and moving to these far out of the way places, and in maintaining a cook camp for so small a party.

Of other work done during the year should be mentioned the work of regulating the use of the lands for grazing and the cutting of marsh grass. In keeping with the rules adopted by the Commission practically all grazing within the Reserves as well as all cutting of marsh hay is done under permit and this local overgrazing and the irregularities and squabbles of interested parties, usually resulting in mischief to the lands, have been avoided.

The present *organization* on the Reserve and the means at the disposal of the Commission are as follows:

The personnel of the Reserves:

Warden, the undersigned.

Forester, Mr. Werley Bradfield.

Rangers: W. S. Emory and Walter M. Hatch, the former in District No. 2, the latter in District No. 1; both residents of the neighborhood. The Rangers wear a badge, with the wording, "Forest Reserve Ranger" encircling a large letter "M."

Headquarters have been established on the newly acquired lands next to the forest nursery. The buildings are inadequate, consisting of a one-room log hovel and a small barn with a mere semblance of a roof and too small to store, even in bailed form, more than one month's supply of hay for the team. In this connection it should be stated that no headquarters or quarters of any kind exist in District No. 2, where the Ranger is obliged to house himself in other people's buildings, not suitably located.

The outfit or equipment acquired so far consists of: A team of horses, a heavy and a light wagon, one ordinary plow, one spring tooth harrow, a "bush and bog" plow (disc plow), a full set of planting and gardening tools for a good size crew, four tents, three stoves and one large range, a fairly complete cook outfit, straw ticks and blankets to supply a crew of about twenty men. Also a good surveying outfit consisting of two Gurley compasses, chain and pins. Every effort to do without suitable equipment has proved a failure, and the few cases where makeshift methods were employed resulted in actual loss.

Accounts. The expenses of the Reserves during this first year as far as accounted through the Warden's office, were as follows:

Total amount expended:

1. As per bills submitted by the Warden.....	\$3,378 62
2. Salaries of Warden, Forester and Rangers.....	1,397 21
Total	\$4,775 83

These expenses are apportioned among the different classes of accounts as follows:

1	<i>Administration</i> , including salaries of Warden and Forester, and their traveling and other expenses.....	\$1,098 25
2	<i>Protection</i> , including the salaries of Rangers and such of their expenses as are allowed by agreement, and also extra help guarding against fires, etc.....	491 63
3	<i>Reforestation</i> :	
	Materials, plants and seeds	331 88
	Materials, groceries, etc., supplies.....	181 22
	Materials, others, straw, fertilizer, etc.....	55 71
	Labor	458 98
	Total for Reforestation	\$1,027 79

The labor includes Forester, Warden and one Ranger from District No. 2, involves over 400 days work, so that the supplies of all kinds figure to less than 45 cents per man and day.

4	<i>Survey</i> :	
	Labor, resident surveyors	\$142 00
	Cook	66 67
	Other helps	36 00
	Groceries and supplies	115 33
	Team hire and rental of tents.....	40 00
	Total for Survey	\$400 00

The supplies here figure for round 320 days' labor or 35 cents per man and day.

5	<i>Equipment</i> :	
	Team, harness and light wagon.....	\$375 00
	Heavy wagon, planting tools, and camp outfit, including range, stoves and part of blankets.....	207 48
	Tents and canvas straw ticks.....	72 00
	Bedding for crew	74 00
	Plow, harrow and disc plow, etc.....	67 53
	Surveying outfit	43 00
	Other	40 19
	Total equipment	\$879 20

6	General expenses—horse feed	78 96
7	Purchase of lands—two lots in District No. 1.....	800 00

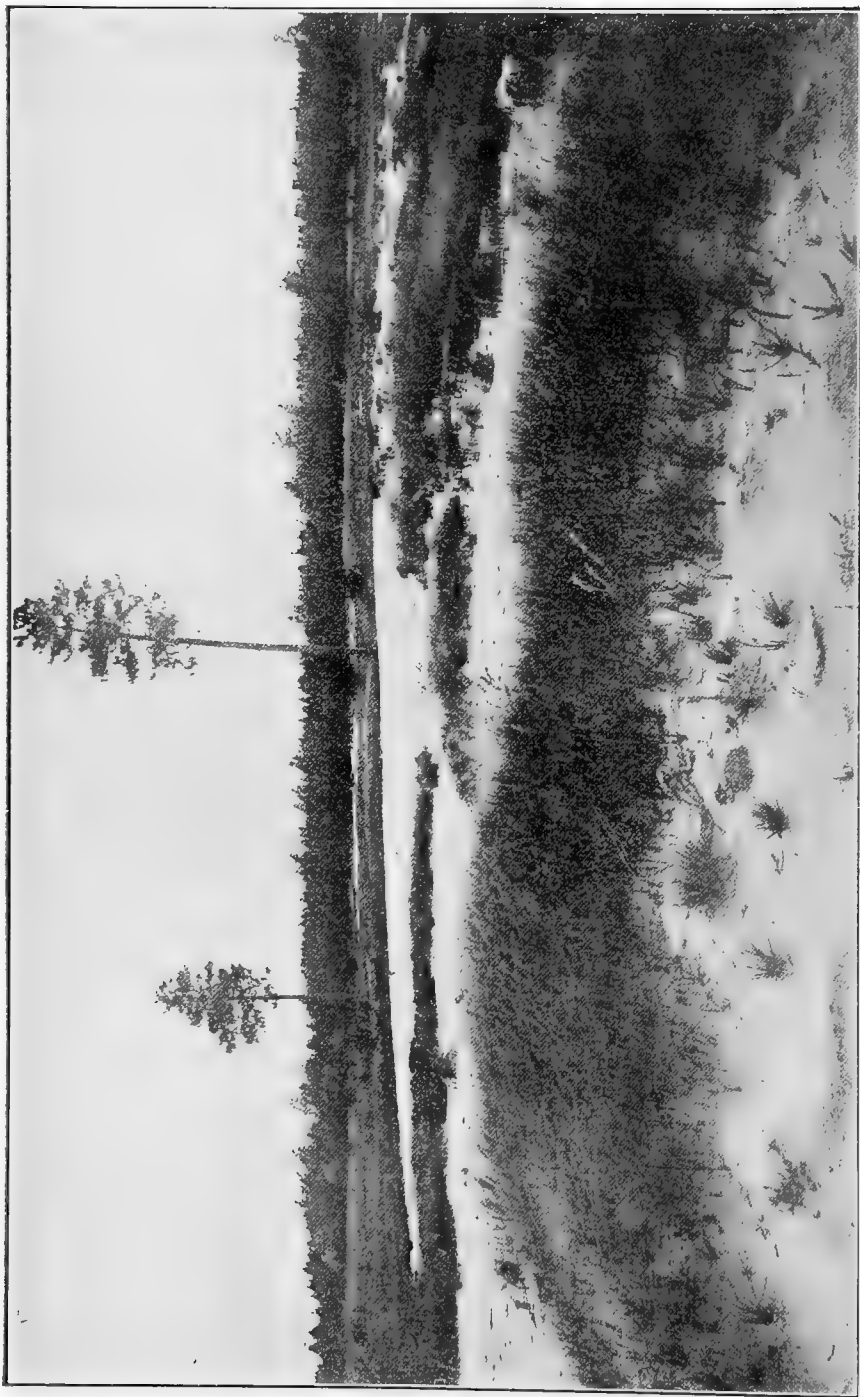
Income. The only income from the Reserve during this first year was \$100 taken in for the privilege of grazing a large herd of cattle in District No. 1.

This statement would be incomplete without calling attention to the

work of the Warden in way of addresses and correspondence calculated to bring the work of the Commission as well as the subjects of forestry in general, before the people of the State.

There should also be mentioned here the complete change in the attitude of the people of both Roscommon and Crawford counties, not only with regard to the Reserves but also with regard to forestry in general. The opposition, due in a large measure to a misunderstanding of the real objects of the Reserves, and undoubtedly stimulated and irritated by misrepresentations of interested persons has passed away almost entirely and there is today a spirit of coöperation and helpfulness such as could hardly have been expected at this early date, and one which puts the entire matter in a new light and in a much more hopeful condition. Not a small portion of this welcome and encouraging change of mind of the people of the region is due to the intelligent and broad-minded attitude of most of the prominent and influential citizens, among whom Hon. H. H. Woodruff, Prosecuting Attorney Chas. L. DeWaele, Mr. W. F. Johnston of Roscommon; A. N. King of Houghton Lake, and others are especially entitled to the gratitude of the Commission and of the people of the region and of the State. For certainly all effort of this kind whether large or small, important or not can succeed only if the people of the region are thoroughly alive to its value and are ready to lend it the coöperation which comes from an intelligent well disposed public opinion.

FILIBERT ROTH,
Forest Warden.



NOT ALL FARM LAND, MOVING SAND ON ABANDONED FARM LAND. THE HANDSOME NORWAY PINE TREES SHOW, HOWEVER, THAT IT IS NOT DESERT, BUT IF USED FOR FOREST, MAY GROW A USEFUL, AND MUCH NEEDED CROP OF TIMBER. VIEW IN CRAWFORD COUNTY.

THE GREATEST ENEMY OF THE FOREST RESERVE—FIRE.

BY ARTHUR HILL, SAGINAW.

Among the most vivid recollections of my early boyhood are those of certain days when the smoke from the burning forests about Saginaw was so dense that children living in the outskirts lost their way in coming to and going from school. We boys played hide-and-seek during school recess and could stand in the open not more than sixty feet apart yet not be recognizable.

Wild animals were driven by the fierce pursuing flames into the clearings and even into the very heart of the town where I saw a fine black bear treed and captured by Mr. Thomas Merrill whose courage and resolution filled my heart with an admiration, which in his ninetieth year, with his noble life and sturdy bearing, he still commands.

Immense conflagrations followed in 1871 and 1881 overrunning vast regions of the State with such destruction of life and property as to evoke the charity of the State and the nation.

These fires originated in and were mainly confined to the pine bearing areas, spreading either in the standing timber or over the debris left by our lumbermen.

Today with our pine forests gone and the old slashings generally burned over again and again, consuming the combustible material, the fire perils of these earlier days no longer seriously threaten us. The larger proportion of the territory which bore pine is now devoted to agriculture and this will be greatly increased.

It is now the aim and end of the State Forestry Commission, acting in obedience to a great and enlightened public demand to bring about a renewal of the forest growth over areas unfitted for profitable farming, and if forest fires can be prevented or controlled, this result can be easily obtained. There are scarcely any of our northern pine plains that will not produce timber of some variety and value. Experiments now being made will determine the varieties best suited to soil, climate conditions and ultimate benefit and money profit.

When plantings are made fire lanes can be established and there can be alternations or bands of coniferous and deciduous trees to diminish the fire risk.

When the timber is self seeding in pine, as in the case with the greater portion of the Reserve, these fire lanes must be established and outlined with a double line of plowed furrows, each year burned between.

With these preparations and proper diligence on the part of the Fire Wardens, the fire danger would be small, except for the gross carelessness of those who most enjoy the varied pleasures which the forest yields.

The hunter, the camper, the fisherman, the berry picker, build fires, which they wantonly permit to spread over the country before their eyes on their mission of destruction.

Camp fires unextinguished, burning smudges, carelessly thrown cigar stubs, are the cause of hundreds of forest fires each one preventable—unnecessary—criminal, because the property of another is destroyed.

All this in disobedience of present laws and until these laws are respected the fire hazard is great and the cost of the fire patrol proportional thereto.

Rather than rely too strongly upon the enforcement of the laws we must arouse in our people a sense of responsibility for their acts. For reasons which go back into our early history forest ownership has never had the general respect and sanctity that was accorded improved property. A citizen who sitting on a jury would send a man to prison for burning a \$200 building, lightly and without conscience fires and destroys \$2,000 worth of standing timber.

But when a state or individual is growing or virtually creating a forest, the sentiment of exclusive ownership and right to protection is bound sooner or later to be awakened, and the main obstacle to forest propagation removed.

Meantime, through the ever helpful press as our best ally, and the aid of the many friends who are upholding our hands, let us shame those who now despoil the State of her beauty and her wealth, and to those who are shameless, we can only mete out the measure that the law provides.

FORESTS CONSERVE WATER POWER.

BY SECRETARY E. A. WILDEY.

There are few agricultural topics before the people of the United States receiving more attention, at present, than forestry and irrigation. While they take good care of the older subjects pertaining to agriculture, these new topics engross a greater share of the legislators' time and attention than any other. They are interwoven, and necessarily so, from natural causes.

With regions abounding in forests, irrigation attracts but little attention, but on the other hand, when the natural forests have been completely removed, and no provision is made to maintain the water supply, in a short space of time irrigation naturally comes to the front.

Here in Michigan it will not receive the attention it must in the arid regions of the West, but its companion, forestry, must receive greater attention in the future, or many locations must necessarily suffer, and it is the location of the forestry reserves, whether established by the State or the individual, that must first engage the attention of those interested. The individual must, to a great degree, plan and plant with a view to direct pecuniary returns, and is necessarily confined in his choice of location.

But the State should take a larger view, and not be confined to any particular class of lands or location, inasmuch as what is done should result in benefiting all alike.

The observer of natural conditions has not failed to notice the drying up of small streams and springs, and the decrease in the flow of water

in their courses. The question naturally arises, in what manner can this affect the State? My reply is, in various ways. For instance, the State of New York has purchased large areas of land in the vicinity of the head-waters of streams that flow into the Hudson and Mohawk, and paying for them millions of dollars. This was done with two objects in view—to maintain an even flow in the navigable streams and to furnish a safe and sure water supply for the increasing needs of the growing population.

So must Michigan, in the near future, prepare for the conservation of the flow in her streams.

With this added idea in view, viz., the maintenance of this flow of water for power, a subject that at present has escaped the observation of all, except those who are directly interested in motor power in Michigan.

In the Lower Peninsula there are three distinct watershed systems. The first would be the system where arise the Monroe, Raisin and Huron, flowing to the east. The St. Joseph, Kalamazoo and Grand, flowing to the west. The second would be that watershed from which the Flint and Clinton, the northern branches of the Grand, the Shiawassee, and many other smaller streams, flow. Still farther north we have that river system comprising the Muskegon, Manistee, Black, Thunder Bay, Au Sable and Tittabawassee rivers.

It should be the duty of the State to so plant and locate these forestry reserves at the springs that head these streams that they should be protected from the drying up process brought on by the removal of the forests.

It is a well known fact that the excessive destruction of the forests is followed by the drying up of the springs and streams, and that the rainfall is the great factor in controlling the distribution and density of the forest growths.

With these two great factors in mind, we cannot be too earnest in our advocacy of a system that will bring about the results that are asked for by the advocates of reforestation.

In asking for this to be done by the State, there are two ways in which local opposition can be overcome. The first is by enlisting, through legislation, private individuals who own the lands surrounding the lakes or springs in which these streams arise. This can be done by exemption from taxation or by bounties paid for the growing of timber in localities where the State may establish reserves.

Any local opposition that might arise to the purchase of tracts of land for forest purposes should be placated, either by purchase of owners' rights, or by certain payments of taxes by the State for the support of their local governments.

As to the benefits that might arise, I call your attention to the fact that each year the value of the power contained in the streams is enhanced, and the time is not far distant when it will have a rating the same as other securities.

The maintenance of a constant flow throughout the summer season is an advantage that can only be appreciated when we notice the difference in the vegetation on the banks now and that which only a few years ago grew so luxuriantly about every spring, brook and stream in the southern part of the State.

The tendency, at present, is only to drain and improve these lands through which our streams flow, and this is as it should be, but something



SMALL REMNANTS OF THE OLD FOREST WHICH HAVE SEEDED THE GROUND. THE STATE HAS LOST MANY MILLIONS OF DOLLARS BY FAILING TO PROTECT YOUNG GROWTH OF THIS KIND. TO REPLACE THE YOUNG GROWTH SHOWN IN THESE PICTURES WOULD REQUIRE AT LEAST 2 TO 4 CENTS PER TREE, AND AN ACRE OF THIS GROWTH, THEREFORE, IS WORTH FROM \$10 TO \$30 IF PROPERLY PROTECTED AND ALLOWED TO GROW TO TIMBER SIZE.

should be done for the higher lands. All the rain and snow that may fall upon the lands adjacent is soon carried into the creeks and streams, and with the water a large portion of the fertility of the soil is washed away. Gullies are formed, and the result is an unsightly hillside and a depreciation in values of surrounding property.

WOODLOT FORESTRY.

BY DR. JUDSON F. CLARK, BUREAU OF FORESTRY, WASHINGTON, D. C.

The discovery of the silvicultural characteristics of our American forest trees, together with the dissemination of this knowledge among the owners of woodlands for practical purposes, has long been the most important feature of the work of the National Bureau of Forestry. During the last five years a special effort has been made to reach and solve the problems of the farmer. This effort has been induced because of a general lack of information on the part of the farmers in the management of woodlands and the increasing importance of the product of the woodlot.

Few appreciate the importance of the farmer's woodlot in the national economy. To emphasize this point, I shall quote a few statistics from the twelfth census (1900). The average farm in the United States contains 147 acres, of which 72 are recorded as "improved" and 74 "unimproved." This "unimproved" area of American farms foots up the enormous total of 426,000,000 acres. The unimproved areas consist of woodlands, treeless swamps and barren lands. A very conservative estimate of the amount of unimproved lands in the United States capable of producing timber is 300,000,000 acres. A vast empire of actual and potential woodlots! The value of the total product of the lumber camps of the United States (including logs, bark for tanning, charcoal, rived shingles, ships' knees, posts, ties and all other products of the lumber camp) was, in 1899, \$174,000,000. The value of the product of the woodlots of the United States (including "only the wood, lumber, ties, etc., which the farmers cut in connection with their ordinary farming operations",) and not including maple syrup or sugar, was \$110,000,000. In other words, in 1899, the farmers' woodlots of the country produced an amount very nearly equal to two-thirds of the value of the product of the regular lumber industry as it was delivered at the mills.

Not only is the present product of the woodlot of very great economic importance, but it will certainly be increasingly so as the natural supplies of virgin timber disappear. The following statistics from the twelfth census illustrate the increasing importance of the woodlot as development progresses in the different States:

TOTAL VALUE OF PRODUCT.

Of Lumber Camps. Of Woodlots.

Washington	\$11,332,000	\$1,002,000
Wisconsin	18,112,000	6,116,000
Michigan	20,462,000	7,530,000
Indiana	4,058,000	5,235,000
Ohio	4,384,000	5,625,000
New York	4,364,000	7,671,000
Connecticut	493,000	1,276,000

Washington represents the newest type. Its lumber camp product exceeds that of its woodlots in the ratio of 11 to 1. Michigan has an intermediate position, having a proportion of about 2.8 to 1. New York has the balance turned the other way, and in the proportion of 1 to 1.8, and Connecticut, where lumbering as a business has become very much reduced, has the proportion of 1 to 2.6 in favor of the woodlots.

It is only fair to add, however, that the product of the woodlot is used largely, though by no means wholly, in an unmanufactured or slightly manufactured form (cordwood, railway ties, posts, etc.), while the product of the lumber camps is in a much larger degree the raw material for a vast series of manufactures. It is also worthy of note in this connection that the farmer is usually his own logger. This work is done at a time of year when there is little else to do, and in many cases the entire amount received for the product may be regarded as clear gain to be credited to the woodlot. The lumberman, on the other hand, must build his camps, purchase his horses, camp supplies, tools, etc., and especially employ labor, the cost of all which must be deducted from the sale value of his product in determining his profit. The census returns show the value of the stumpage of the cut of \$174,000,000 worth of product by the lumbermen during the census year to have been \$58,177,000. It is not improbable that the farmers' cut of \$110,000,000 represents as large a real stumpage value.

The value of the woodlot as a national asset can hardly be overestimated, and it should in future, with improved methods of management, ever contribute an increasing amount of material for general consumption. In several respects it has distinct advantages over the timber tract. Among these may be mentioned its nearness to the points of consumption, together with the practicability of an intensity of management that can hardly be hoped for on the larger areas, and which is only in part offset by the cheapness of the wild land.

The value of the woodlot as a source of fuel has recently been brought very prominently to the notice of the public generally by realization that it is the only buffer that stands between the people and the higher prices which the coal combine may ask the moment they have the field to themselves. The people have also a fresh recollection of the fact that the woodlot is the only thing that stands between them and actual suffering by cold in the event of a coal strike. The cities and villages are more interested in this matter than the farmers themselves, for if a farmer has only a small supply of wood, he will naturally provide for the comfort of his own family before he offers any for sale. A consideration of this

should lead the urban population to heartily support a moderate and equitable tax rate for the farmers' woodlots.

This article, however, is intended to refer especially to the woodlot conditions as I have found them in Michigan. It is perhaps hardly necessary to say that these conditions are exceedingly unsatisfactory. A very few farmers, indeed, have made any real effort to improve this portion of their farms, and those who have done so have in many cases made very serious mistakes. Such mistakes were inevitable, for the farmers have not had access to information regarding correct methods of handling woodlands. The necessity itself for better methods is a comparatively recent development. The average Michigan farmer of today well remembers when the trees were regarded as the natural enemies of the tiller of the soil, and their removal was the farmers' greatest labor. The change in the times has come without bringing the knowledge necessary to meet the changed conditions. It is a most unfortunate fact that knowledge of correct methods of woodland management cannot be learned experimentally by the average farmer, as is the case to a greater or less extent with almost all other farming operations. Time element alone makes this a practical impossibility—years and even decades being often required for a demonstration, instead of days or weeks. Aside from this, few, if any, farmers have had the requisite training to enable them to carry out any really careful forestry investigation. The result has been that in the absence of instruction almost every effort for improvement has been merely guesswork, while the great majority of farmers have not interested themselves in the matter.

The average Michigan farm contains about 86 acres. Of this area 58 acres are recorded as improved and 28 acres as unimproved. It is probable that three acres per farm would on the average be a liberal reduction from the unimproved land for such waste areas as are unsuited for tree growth. This leaves an area of 25 acres which is at present occupied by trees or capable of being so occupied. This gives a woodlot area of over 5,000,000 acres on the 210,000 farms of the State. As already suggested, it is sadly true that the term "unimproved" is not inaptly applied to these 5,000,000 acres, for there is nearly or quite one-half of this area, which, in its present condition, is all but wholly unproductive, and on the remaining portion, as already indicated, there has been but little effort expended that would entitle any considerable portion to be classed as "improved."

The value of the woodlot product of Michigan has already been referred to as amounting to \$7,530,000 in 1899—a sum which compares favorably with the combined products of the orchard, grapey and small fruit garden, which in the same year totaled \$5,860,000 for the State. When we recall that about one-half of the unimproved area of the farms is at present all but wholly unproductive, it will be seen that the producing area has yielded about \$3.00 per acre to the woodlot owners in 1899. Michigan enjoys the distinction of having a larger return acre for acre from her woodlots than any other State in the Union. Were this assuredly a *bona fide* income, it would be a matter for congratulation. That it is largely a result of the stripping of the land at an unusually rapid rate is evidenced by the very unsatisfactory conditions for wood production obtaining on the average woodlot, and by the rapidity with which the woodlots are disappearing in the four southern tiers of counties.

This view of the importance of the woodlot as a producer of future tim-

ber supplies and as a very considerable source of income to a very large class of the population of the country has induced the Bureau of Forestry to offer to co-operate with farmers owning woodlands in their management.* On application, the bureau offers to send a trained forester to make a careful examination on the ground of the woodlot. It is the duty of the forester to point out the defects of the woodlot and their cause, and how they may be most quickly and economically remedied; to mark sample areas, showing which trees should be removed where removal is desirable, and where planting is desirable or desired; to advise regarding the species best suited to the soil and the locality. It is also customary for the forester to prepare a detailed report on the conditions found, with notes on their treatment. A copy of this report—which usually indicates the management for about ten years—is afterwards sent to the farmer for his future guidance. This service is free to all, but the bureau reserves the right to accept or decline applications, as may be deemed wise, with due regard to the objects for which the offer is made, and the limitations of the funds at their disposal for this work.

It is hoped that by this means it will eventually be possible to have in every county, and perhaps in every township, at least one woodlot which will be handled in a correct way, and which will thus serve as an object lesson to the farmers in its vicinity of the practicability of woodlot forestry. A report on a woodlot examined by the writer in St. Joseph county during the spring of 1904 is given herewith, that those interested may have a clearer idea of the scope of the woodlot work carried on by the government, and that all who read may get a forester's opinion of a very common type of woodlot in Southern Michigan.

*Applications should be sent to Thomas H. Sherrard, Chief of Division of Forest Management, Bureau of Forestry, Washington, D. C.

REPORT ON AN EXAMINATION OF THE WOODLOT OF MR. P. P. MAJOR,
THREE RIVERS, ST. JOSEPH COUNTY, MICHIGAN.

BY JUDSON F. CLARK.

Wish of Owner.

Mr. Major wishes to know what may be done to improve the condition of his woodlot. No immediate returns other than a small amount of firewood each year are especially required, and he is willing to go to some expense if necessary to put the less satisfactory portions in better producing condition.

General.

There is an excellent opportunity to greatly improve the present condition of the stand on this woodlot by the removal of the old, decrepit, and defective trees which are scattered almost everywhere over the area. The decay of these old trees offsets the growth of younger trees, and they are exceedingly injurious to those over which they stand. The value of the cordwood in them would leave a very satisfactory profit after paying the cost of the improvement cutting.

The vigor of the stand will be greatly improved, and reproduction aided by the exclusion of the sheep which are grazed on the neighboring pasture, and which have for many years been allowed the run of the woodlot. Reproduction is needed to fill the gaps in the stand and to provide a satisfactory ground cover.

Planting must be done to fill up some of the larger gaps in the stand and to provide a windbreak along the western border.

Details regarding these measures and other matters will be found below.

Location and Area.

This woodlot is located in Fabius township, St. Joseph county, Michigan, about five miles northwest of Three Rivers station, on the Lake Shore & Michigan Southern, and Michigan Central Railways.

The area is about 80 acres.

Topography.

The topography is quite rolling, the tract being a portion of a very irregular terminal moraine. The slopes vary from gentle to quite steep. The danger of serious erosion is such as to make the area unsuited for agricultural purposes.

Soil.

The soil varies in different parts from a sandy loam to a loam. It is everywhere deep, and on most parts contains more or less gravel. It is estimated that the normal annual production on the average acre does not exceed 60 cubic feet of hard-wood, such as oak, per acre (two-thirds of a cord of four-foot wood, or two cords of 16-inch stovewood). There are small areas in different parts, especially on the lower and more gentle slopes, where the normal annual production would probably reach 90 cubic feet per acre. The present average production is, however, not more than two-thirds of what it should be. This is due to three causes: (1) The presence of many defective trees whose decay largely offsets new growth; (2) the facts that in many parts the number of trees is insufficient to fully occupy

the ground, and (3) the fact that in many parts the soil is greatly exposed to the drying winds and is unable to retain moisture sufficient for satisfactory tree-growth.

The Stand.

Its History.

This area is a portion of a large "oak opening." The original stand, consisting of oak and hickory, was quite open, a result of very frequent fires in the early days before the country was settled. The stumps of these old trees show many fire-scars, indicating severe fires at various times. As the country became settled these fires ceased and gradually the open places became filled with young trees.

When the old timber was cut by the lumbermen it would appear that a very large proportion of these younger trees was also destroyed. A remnant survived, however, and they together with the sprout growth which followed the lumbering and the culls of the original stand which were not removed at the time, constitute the present stand.

Its present condition.

The present stand consists of three distinct age-classes, viz: (1) The scattering remnant of the original stand, consisting of old, crooked, unsound trees left as worthless by the lumbermen, (2) a sprinkling of 50 to 60-year-old trees which appeared with the cessation of the former fires and were not destroyed during the subsequent lumbering, and (3) the sprout-growth which came from the stumps of the younger trees cut or destroyed during lumbering. The ages of this last class vary from five years up according to the time of the lumbering which has been carried on at various times during the last 35 or 40 years.

The species occurring are almost exclusively oaks and mockernut hickory, with aspen on several areas. Dogwood and sassafras are very common in the undergrowth. White oak predominates, and red and black oak occur. Hickory forms about one-tenth of the stand.

The density of the stand varies greatly. In a few comparatively small areas it is all that could be desired; on much the greater part it is open, and in many places, especially on recently cut-over areas, it is very open. This is largely a result of the sheep-grazing which has been permitted in recent years, a satisfactory reproduction of timber trees being impossible under these conditions.

It has already been stated that the rate of growth of the trees is in many parts quite unsatisfactory. This is caused almost wholly by the destruction of the undergrowth by the sheep. The absence of the normal undergrowth permits the wind to blow the leaves from the more exposed parts, which are the very parts where they are most needed. Leaves are a natural and efficient mulch for a forest soil; their absence permits the soil to dry out by direct evaporation. The absence of an undergrowth permits the sunlight to reach the soil, causing the humus to be unduly oxidized, and stimulating the growth of the grass on the forest floor. The loss of humus causes a lessened moisture-holding capacity in the soil, and the growth of grass means a further drain on the depleted moisture supply. Since moisture is by far the most important element in a forest soil—is indeed almost the one factor that raises or lowers the producing capacity of most forest soils—it will be understood how much this absence of an undergrowth means to the thrift of the stand.

Treatment.

For the purpose of prescribing treatment, the three essentially different conditions of stand will be discussed separately.

1. Oak stand of all ages.

This will serve to designate the stand which occupies fully 60 of the 80 acres and the entire southern portion of the quarter-section. Although the sprout-growth varies greatly in age and density of the stand, its silvicultural condition is otherwise the same throughout the area.

Grazing should of course be discontinued at once in this as in the other stands.

Improvement cuttings.—All the old defective trees should be removed. This cutting should be made from year to year as fuel is needed, but the sooner it is completed the better for the woodlot. In connection with the removal of the old trees, all dogwood and sassafras should be cut. Much of this is suitable for

fuel, and the ground should be cleared of such inferior material to make way for better stock.

Thinnings.—After the improvement cuttings have been completed, say in 10 years, there will be many of the younger groups or portions of the stand that would be greatly helped by a thinning. In these thinnings, all dead and dying trees should be cut, and such of the remainder as are of inferior form or species and are injuring the crowns of better trees either by shading or by contact during wind storms. The openings in the crown cover caused by the removal of such trees should as a rule not be greater than may be reasonably expected to close again by growth in five to seven years. By closing is meant the coming together of the tips of the branches of the trees.

Planting.—There are many open places in the stand, and with the removal of the over-mature trees there will be many more where the natural reproduction has been and will be less satisfactory than is desirable. As Mr. Major wishes to produce fence posts, and has an excellent market for pulpwood, it is recommended that in the higher and dryer portions these open places be planted to black locust, and that the lower and moister situations be set out to cottonwood. The black locust should be set out as one-year-old plants and spaced 5x5 or at most 6x6 feet where it is entirely open and should be placed between the scattering bunches of oak coppice where such occur. The cottonwood can best be planted by the use of cuttings. Eight or ten-inch pieces of the one and two-year wood of the branches, pointed at the lower end and inserted in the soil will be entirely satisfactory. They should be placed in a sloping position, with one or two buds above the surface, at the distances above indicated for the black locust. These cuttings should be prepared during the dormant season, and kept in moist sand until needed.

A number of poplar occur throughout the stand, and there are two small areas where they form practically pure stands. The scattering poplar, which are now of very satisfactory size for pulp, may be utilized for that purpose within the next five or at most 10 years, greatly to the advantage of the other growth over which they stand. They are now of very satisfactory size for pulp and will in a few years be past their prime. The poplar groups are about 18 years old, six inches in diameter, and average fully 55 feet high. They are very thrifty, and may be retained to advantage 10 or 15 years before cutting.

2. *The 1877 Burn.*

All young trees on a small area towards the north end were destroyed and most of the larger trees scarred badly by fire in 1877. The best of the larger trees have since been cut, and the remainder should be cut at an early day. The area could then be planted to locust or white pine. Tall-growing weeds being absent, two-year-old untransplanted pine stock will be satisfactory if about 15 inches square of the sod be removed in each place before planting the pines. This sod should be placed around the pines in an inverted position after setting, for mulch purposes. The pines should be spaced five feet apart, each way.

3. *Old oak stand.*

This stand at the north end of the woodlot has been much less severely cut than the remainder of the area. The stand consists of red, black, and white oaks, with some mockernut hickory. Diameters up to 30 inches, and heights up to 70 feet occur. The quality is poor, the better trees having been removed some years ago. What reproduction formerly existed was largely killed by the fire in 1877 which ran over most of the area, but was not sufficiently severe in this part to scar the older trees. Grazing has prevented any reproduction in recent years. The ground is closely grassed over.

Treatment.—This stand is mature, and should be removed during the next ten years. The first consideration is to get a reproduction of good trees to form the basis of the future stand. Grazing must be discontinued, and weed trees whose seed is not desired should be removed at once.

In view of the heavy sod and the open condition of the stand it is recommended that the sod be broken before the fall of the nuts and acorns, by rough cultivation with a disk harrow. This should be followed after the fall of the seeds by dragging over with a light harrow. This will plant at a trifling expense many thousands of acorns and nuts per acre, and will insure a fine reproduction.

In order to admit light for the development of the new crop, a heavy thinning should be made the following winter, in which all of the most inferior trees

should be taken. This thinning should remove about one-third of the stand. As soon as the young growth is thoroughly established in satisfactory density the old stand may be entirely harvested. The very few trees of good form which are in the present stand may be retained to continue their growth with the new stand, but this is not especially recommended since they are few in number and would be liable to die at the tops as a result of their standing so open as to favor the development of "water-sprouts."

Protection.

Felling.—Care should in all cases be exercised to avoid as much as possible injury to valuable young growth by the felling of the old trees. Stumps should be cut as low as practicable, and with the saw. There should be no "brushing out" of the young growth.

Disposal of debris.—As much as practicable of the branches and tops should be utilized for firewood. The remaining debris should either be piled and burned in the open places during a time when the fire will not endanger the woods by running; or be scattered and made to lie as close to the ground as practicable in order to hasten decay, and thereby lessen the danger from fire and interference with young growth.

Grazing.—The importance of the exclusion of all live stock has already been fully discussed.

Fire.—The keeping of the woodlot free from dangerous debris is the only measure, other than care in the handling of fire within or near the woodlot, that is considered necessary for the protection of the woodlot from fire. The fact that but one fire of any importance has occurred on the area since the settlement of the country indicates that danger from this source is not great.

Windbreak.—It is recommended that a row of Norway spruce be planted along the western side of this woodlot wherever the stand is sufficiently open to admit of their growth. Such a row of spruce will be of great value in the future in shutting out the wind from the stand. The trees may be planted six or eight feet apart and if good stock be used a single row will be sufficient.

No treatment of woodlots is more commonly practiced than the removal of the valuable trees and the leaving of the inferior in full possession of the soil, and this notwithstanding the fact that it must appear evident to every thoughtful person that such practice must inevitably lead ultimately to the total exclusion of the more valuable trees, and consequently to a marked lowering of the value of the yearly product of the woodlot.

In the report quoted, the subject of thinnings is also touched upon. It might be of interest here to enlarge upon this topic which is so important in the management of young stands.

All stands grown under proper conditions of density in their early years require to be thinned later by the removal of a number of the trees present, that the remaining trees may be given sufficient room in which to develop. A density of at least 1,500 trees per acre is desirable during the early years in stands of any species, and a much larger number may be present with advantage. It is, of course, impossible that any such number can remain on the ground till maturity, and, if untouched by man, a natural thinning will take place, by means of which the original number is gradually reduced through the death of the trees which are overtopped by those making a more rapid growth.

A thinning by the hand of man may have several great advantages over an unaided thinning by nature. The chief of these are:

First. Control of the species in the stand.

It often happens that trees of less valuable species overtop and shade to death trees of the more valuable species in the natural forest. The re-

removal of such inferior trees before they have seriously injured their better neighbors is, of course, always desirable.

Second. Control of the quality of the timber produced.

It often happens that many of the dominant trees of the stand are more or less defective in form or in soundness. The stand will, of course, be improved by their removal before they have seriously injured better trees in their immediate neighborhood, which, on their removal, may be able to utilize the space to better advantage.

Third. The maturity of the crop may be hastened.

If we assume that a pine tree of thirty inches in diameter is mature, it is safe to say that the maturity of the pine stand may be hastened by at least twenty years by judicious thinning. This is accomplished by the opening up of the canopy or crown cover from time to time to enable the trees which are to constitute the final stand to enlarge their crowns and thereby make possible a more rapid increase in diameter.

Fourth. Valuable wood may be saved.

Just how valuable this wood may be depends entirely on the location of the woodlot and the character of the stand. Where the stand thins itself without the aid of man, all trees which are killed by this process are lost by the ravages of insects and decay. On most farms this material might be utilized to advantage for fuel, posts, vine crops, rails and other purposes.

The time at which a first thinning should be carried out in a dense young stand will be very largely determined by the local market conditions. As a rule, no thinning should be undertaken until the material to be removed will have acquired sufficient size to be of value for fuel or for some other purpose. On most woodlots in Southern Michigan this time will usually come when the stand is between fifteen and twenty-five years old. It is true that in leaving the stand so long untouched many good trees may be seriously injured by being overtopped by inferior neighbors, which have chanced to have gotten the upper hand in the struggle for light, but as a rule there will still remain many more good trees unharmed than are required for the future stand. In the case of some very rapid growing trees, especially where the quality of the wood makes the product merchantable at an early day, as in the case of Catalpa and Black Locust, the first thinning may be carried out to advantage as early as the sixth or seventh year.

The amount of material to be removed in a thinning of this kind will depend on the site, the species, and the purpose for which the timber is grown. In general, it may be said that trees occupying situations very favorable for tree growth may be thinned more severely than when the location is less favorable. The more rapid growing species, and those capable of enduring greater shade, may also be more heavily thinned than such as grow more slowly or are incapable of enduring great shade. As a rule, no opening should be made in the crown cover which cannot reasonably be expected to close again in the course of five to seven years.

It should be added in this connection that the margins of woodlot should not be as heavily thinned in any case as the interior, unless they are thoroughly protected by a windbreak mantle. This is particularly true of western borders.

The overcutting of the mature timber in woodlots is not of infrequent occurrence. A number of woodlots were noted where the owners, think-

ing to improve the stand, had very carefully cut out the inferior and defective trees, but to such an extent that the remaining stand was left in a very unfavorable condition for development.

The opening of the stand too freely checks the growth of the trees by making the conditions less favorable for the retention of moisture, and has, with many trees, the additional danger of checking their height growth by permitting the development of the base of the crown, and in some trees (e. g. Oaks) by the development of water sprouts on their trunks. In many cases such thinnings as those result in the ultimate death of the top of the tree. This, of course, occurs during some exceptionally dry time, and the weather conditions are usually blamed for it. The loss of soil moisture as a result of overcutting is due to the increased air motion at the soil surface and the admission of sufficient light to stimulate the growth of grass and other moisture-robbing weeds on the forest floor. The excessive light (and heat) increases the oxidation of the organic matter in the soil, thereby lowering its moisture-holding capacity, and raises the temperature, thereby increasing the direct evaporation of moisture.

If the trees of the stand are sufficiently matured to produce seed abundantly, such an overcutting will result in a natural reproduction of forest trees. Should the stand be nearly mature, this would be a desirable condition, but in all immature stands the harm done by the overcutting is but very slowly repaired by nature.

That overcutting in a woodlot open to the run of live stock should be more serious where grazing is practiced than otherwise can be readily appreciated. In the former case the absence of an undergrowth will leave the soil wholly unprotected, and there will be no young trees to develop to fill the gaps in the stand.

A detailed discussion of the injuries due to grazing, fire, insects, and other causes of injury common to Michigan woodlands would unduly lengthen an article already too long, and must be deferred for the present. Suffice to say, it is the intention of the bureau to publish at an early day a somewhat extended account of a study of woodlot conditions in Southern Michigan, which will be available for general distribution.

THE FARM WOODLOT AS A PART OF THE FORESTRY PLAN FOR MICHIGAN.

BY I. H. BUTTERFIELD, PONTIAC, MICHIGAN.

The farm woodlot has received but little attention in the consideration of the forestry question in Michigan, or in this country, but its importance can be established from an economic and esthetic point of view.

The preservation of large forests at the sources and headwaters of streams, and along the shores of large bodies of water, are very important features in the forestry plan, but the south half of the Lower Peninsula of Michigan is practically all capable of improvement for agricultural purposes, and few large forests are likely to be maintained, even with the most advanced methods of forestry that can be adopted for that part of the State.

Hence, the farm woodlot must be the only means of maintaining sufficient forest growth to accomplish anything of importance in the way of the general protection that forests afford, from cold or dry winds, from storms moving across the continent, or to prevent the rapid dispersion and waste of the rainfall.

If a few large forests could be maintained in certain sections, surrounding the sources of streams, as in Oakland county, where the sources of the Huron, Clinton and Shiawassee are in one township, or at the sources of the Raisin, Kalamazoo and Grand in Hillsdale county, and several other similar conditions, it would be of great advantage to the Lower Peninsula. These are not likely to be started or maintained.

It is, however, practicable to have a woodlot on every farm, and, with proper co-operation between the owners of farms and the State, through its Forestry Commission, it could be accomplished.

Some legislation would be necessary and considerable education in public sentiment and on the part of the individual. The American people are jealous of their rights in property, and resent interference with its use, hence would not take kindly to the restrictive and directive methods of European governments, in the management of private forests. Some concessions might and should be made by private owners for the general good, by which at least some general control might be exercised by the State over the maintenance of private forests and of timber growth on each holding of land of certain area.

And, first, people must be educated to the fact that the farm woodlot is profitable. It can be easily shown that it is so, for the production of wood, and even more so in the protection afforded the remaining cultivated land. It has been definitely shown that at least one-fifth of the land may be in forest, and the production of the whole area in field crop be not diminished. The protection afforded from cold or drying winds, the retention and prevention of evaporation of moisture are some of the reasons for this fact, so that, aside from any economic value from the

forest growth, we have, in its protection to the cultivated area, in its addition to the beauty of the rural landscape, its protection to the rural homes, the fruit orchards and gardens, a value sufficient to warrant the necessary care in planting and tending the farm woodlot.

A forestry plan that provides only for large forest areas in unsettled portions of the country is far from complete. Such a plan may provide timber for commercial use, and when forests are located to cover the sources of streams they may to some extent conserve the water supply, but the farm woodlot must be maintained to provide wood for home use, to protect from the sweeping winds, to conserve moisture for the adjacent cultivated areas.

The farm woodlot maintained on each cultivated farm would accomplish all these ends, and with no diminution in production—quite probably an increase. Rough hillsides and low places may be more profitable for timber growing than to attempt cultivation. It may be that people become too strenuous in draining all the lowland, and that some portions would better be left undrained, or at least drained only to the extent that timber may be grown on them.

If it is admitted that the general maintenance of the farm woodlot is desirable, and I maintain that it is; the question arises, how shall it be accomplished?

If at all, it must be by some systematic method of inducing all owners of land to co-operate, by growing each their share of timber.

Drastic legislation, seeking to compel each landholder to grow timber, would, if it could be passed, probably be considered as interfering with private rights, and fail of its object. On the other hand, if the Forestry Commission should be charged with the duty of educating all the landholders to the necessity or advantage of this growing of timber, it is very doubtful if it would be able to accomplish the end by this means alone.

A combination of education and moderate control would seem to be the only method that can be enforced in this country. The necessity, in my opinion, exists, and the means in detail to accomplish this end can be worked out just as soon as the Legislature and the people of the State can be convinced of its need.

A PLEA FOR THE FARMER'S WOODLOT.

BY HON. CHARLES D. LAWTON, LAWTON, MICHIGAN.

“Old wood to burn!
 Ay, bring the hillside beech
 From where the owlets screech,
 And ravens croak;
 The crackling pine and cedar sweet
 That freely render ready heat.
 The knotted oak,
 A fagot too, perchap,
 Whose bright flame, dancing winkling,
 Shall light us at our drinking;
 While the oozing sap
 Shall make sweet music to our thinking.”

—*Messinger.*

The dreams by the fireside, the scenes by the domestic hearth, ever rank as synonyms of human felicity. The bright blaze of the wood fire, with its pleasant heat, so conducive to cheerfulness and comfort; the flickering fire-light shining from the farm house window, the steady ascending smoke from the chimney of the old homestead to cheer the husbandman or wayfarer on a winter's evening—all are inextricably interwoven in the minds of our race as fundamentally essential to whatever is best and most durable of the pleasure of life. Who of us who has passed the meridian of life, and whose early days were spent in the farm house or in the old-time country village home, does not vividly recall the great wood fireplace and the associations that crowd upon the memory with its recollection? The foundation of many a notable New England family was laid, in the early days, by sighing swains and timorous maidens while sitting on the hearth by the flickering firelight of the backlog, in the long winter evenings. And while the old-time fireplace, while the backlogs and the joyful custom of the hanging of the crane have faded away with the disappearance of the material that sufficed for their existence, the memory of all the sweet and enduring associations that cling around them and throng upon the mind with their recollection can never be eliminated from the minds of those who participated in them in their youth.

How prone are we to be disregarding of what is most conducive and essential to our comfort and happiness! We are prodigal and wasteful of that which is most necessary and which we should exercise the greatest care to preserve and perpetuate. The old wood fireplace, with its simple, healthful influence and life, must inevitably have disappeared with the change of conditions and can only continue to exist in some modified form; but, alas, it was doomed, and much else that was truly dear, through the wasteful destruction of that upon which it fed.

Fire, air and water were the elements of the ancients; but while we have learned to resolve them into their component parts, we cannot abstract from them their primal importance as the supporters of life. Nothing that lives can exist without their aid; and while we may have no concern as to the perpetual sufficiency of air and water, it has already become a suitable question of consideration—what of the future of fuel? The forests have disappeared, or are disappearing, and the coal fields that are known are drawn upon to an extent that foreshadows their ultimate exhaustion. And, too, as the supply of fuel becomes lessened and more stringent, human greed and rapacity enter in and render the matter of obtaining it more difficult; and the matter of supporting one's fires, even now extremely burdensome, is, seemingly, sure of becoming more and more onerous as the years advance, unless measures are immediately attempted and successfully carried out to ameliorate the baleful conditions that have sprung up and which cast their portentous shadows into the future. Fuel is a primal necessity to every human being; and as the forests which once gave us supply have been cut away, the reliance has been coal. While trees are and may be universally found, coal, on the contrary, is limited to localities and restricted areas; and the lands in which it exists may be and are owned by individuals, and the production is controlled by these owners. And, unfortunately, too, the railroads which transport the products of these coal mines are to a great extent owned or controlled by the producers of the coal. So, thus it is, that

this article, so important, so essential to every one, approximating in necessity the water he drinks, is so utterly beyond his control. Very recently the people of this country have realized, to some considerable extent, what it is to be deprived of fuel; to be compelled to submit to the exactions, the rapacity, of those who own and control the supplies of coal. It is a foretaste of what must, to a greater or less degree, be perpetually endured, assuming conditions to remain as they are. But is there no relief from this menace of the future? Surely there is, and those of the farmers of Michigan who still possess a woodlot on their estate should know and appreciate this relief. He who is able to fill his stoves with wood cut from his own land is fortunate indeed—the possessor of an element of happiness that is truly great. And, really, there is little reason why, with few exceptions, every farm of ordinary size in this State should not thus have a good woodlot. Originally, the entire commonwealth was covered with timber; how easy to have reserved from wanton destruction of this great abundance, such a supply as should, under proper care, have rendered every farmer in Michigan independent of the coal barons and fearless of their exactions! In much of the State, in its newer portions, the remedy is still in the hands of the freeholders. They have timber still standing, and may exercise their wisdom and preserve it. And, too, in the older settled parts of the State there are still beautiful woodlots, and it is only to be hoped that the owners are awake to the importance of preserving them. But, with all this so recent experience of the danger of being at the mercy of the coal dealers, one sees yet the reckless destruction of trees. In the southern counties of the State there are still many farms with woodlots that, with prudence, would suffice for the uses of the owner for many years to come; but, unfortunately, in not infrequent instances, these owners, tempted by the high price of wood, are cutting their trees and hauling the product to market, making the excuse that the productive value of the land for crops will enable them to buy their fuel—a mistake and delusion.

One of the important facts about the farmer's life is, or should be, its independence; is the fact that, beyond any other calling in life, the farmer is sufficient unto himself; that is, that he can raise upon his farm, cause his farm to yield to him, so much that is essential for the support and comfort of himself and family. Eliminate this fact, have the farmer where others are, and you abstract from his calling one of its chief charms. The farmer's life should be an independent one. He should ever plan that his estate yield him as many of the necessities and the luxuries of life as the conditions will allow; and among the chief of these is fuel. His farm should contain a good woodlot. If there is one on the farm, he should care for it; and if there is not, it is his duty to raise one. This can easily be done in Michigan. Trees grow very rapidly. The years come and go in quick succession, and if one but takes the initiative and plants young trees, the time will seem to be but short ere they become of considerable size. How fortunate it would be for the people of our State if the farmers would seriously take hold of this most important matter of preserving the timber which they have on their farms and planting out to supply, when they have it not.

There is much else to be said in favor of the farmer's woodlot. How convenient it is to be able to go to the woods for a few stakes, a binding pole, or any other of the many necessities that continually arise in the

prosecution of the work of the farm! And how nice it is to be able, now and then, in the winter season, to get in a few logs to the mill, to be cut into such forms of lumber, etc., as shall be of important use for the pairing of tools and machinery and fences and buildings on the farm!

It is infinitely pleasant, too, to go into the woods—one's own woods—upon his own farm—and to saunter about among the trees, and to note them, and observe them, and study them. Or to lie upon the ground beneath their shade and listen to the stirrings of the woods, to the twitterings of the birds, and to watch the gambols and doings of the little animals who harbor there. All this the farmer may enjoy, to his inestimable advantage, when the mood is on him, if he is only wise enough to have the requisite—the few acres of woods on his farm.

Michigan is territorially made up of two peninsulas, which have great bodies of water about their borders. Deplete these areas of the timber which covered them, leave them wholly exposed to the sweep of the winds that gather force as they move without obstruction over the surface of these great lakes, and it is easy to imagine how greatly the change would be for the worse in climatic conditions.

But, alas! it is plain to see how sadly so many of the people of Michigan fail to appreciate how much they owe to its trees. The southern peninsula lies between two great bodies of water, but Nature kindly covered its area with magnificent forests, that suitably checked the winds that come with unimpeded force over the waters. As the trees have been cut away, the vigor of the storms becomes more manifest, and all may realize the importance, from this point of view, of preserving our trees, guarding them, and having them for wind breaks, an important matter to our farmers. Again, without question, trees promote the deposition of moisture. Air saturated with moisture, when meeting with obstruction as it moves over the surface of the earth, is forced to give up some of this moisture by reason of the compression which it suffers, and thus the trees, the woods, of our State are to the farmer, in a measure, an insurance against drought.

Thirty years ago I passed a portion of a winter in Kansas and Nebraska. My business caused me to do much riding over the prairies, and I learned then, as never before, to appreciate the value of timber, the comfort of a good fire, and the utter forlornness of a farmer's home without it. The winds which blew continuously unobstructed over the prairies chilled one, even when the sun shone pleasantly, to the extent of longing for a good fire and a warm meal; but when, in entering a farm house and finding no fire, it seemed cheerless indeed. A handful of cobs and a few chips of wood were sufficient for a blaze wherewith to cook the meal, after which economy required that the fire be suffered to die out. In Nebraska I conversed with a farmer who sat by the stove, feeding the fire with corn stalks, and when the bundle was exhausted he put on his hat and trudged out to bring in another bundle. I could not help but compare this with Michigan. In contrast, a log cabin in the woods in our own State, with a big, blazing fire, seemed like the home of the blessed. To be sure, they could get soft coal at the markets for sixteen cents a bushel, but times were hard, and many of them could not afford to pay the sixteen cents, and so they endured the inconvenience and suffering for want of fire because they could not do otherwise. Some farmers, I found, had wood lots along the rivers, and such fortunate ones were regarded with great



DR. BEAL'S DEMONSTRATION THAT THESE MOVING SANDS ARE NOT DESERT AND CAN DO FAR MORE THAN FEED A FEW SHEEP TO THE SQUARE MILE DURING FAVORABLE SUMMERS. A 15 YEAR OLD PLANTATION OF PINE, SPRUCE AND HARDWOODS, WITH TREES 10 TO 16 FEET IN HEIGHT.

envy by their neighbors. There are good things in Kansas and Nebraska, but timber, forests, trees, are not among them. We may lack some things that are desirable that they on the prairies possess, but we have an inestimable blessing that they have not in our trees and woodlots. Then let us appreciate this great advantage and preserve our forests—our woodlots—or trees, and multiply and restore them to our own advantage, to the blessing of our children and those who are to come after us.

TWO LESSONS IN FORESTRY.

GIVEN BY DR. W. J. BEAL, AGRICULTURAL COLLEGE, MICHIGAN, AT THE WEST MICHIGAN STATE FAIR.

The newer portions of Michigan have suffered terribly and often from forest fires. Think of the fires in Sanilac and Huron counties, and more recently the burning of Ontonagon, with a loss of over \$3,000,000, to say nothing of numerous smaller fires. Even in our beech and maple woods at the Agricultural College fires have several times in recent years burned over portions of the land enough to kill to the ground much of the very young growth. These woods are much frequented by all classes of persons, including students, and are more exposed than most forests in Southern Michigan.

On account of danger from fires, I have never fully satisfied myself that it would be safe and profitable for a person to attempt to grow timber in large areas in the newer portions of the State. The great mass of people are careless about fire in the woods, especially if the woods belong to the other fellow, or to the State. Still, in some way, improvements in managing forests should by all means not be neglected. This is very properly work for the State to undertake, especially on her own lands. Let the farmer begin to put into practice good management of his woodlot.

I began to talk and write about forestry in Michigan thirty years ago, and I began planting twenty-seven years ago, but I am inclined to think my efforts have availed very little.

You have heard much in general about forestry, and much less that is specific and definite for the people to apply. In the few minutes at my disposal, I shall try hard to give you something specific, hoping that many of you will get some good out of it. My main point is to induce some of the most sensible of your number not only to listen, but actually to begin some work in the line of forestry.

A beginner should start in on a small scale, like the man who finally succeeds in making good plows, stoves, or in selling dry goods. I will talk first of the management of the reserve woodlot. In most cases, this lot has received no care whatever. In early days this woodlot was most likely completely surrounded by forests of tall trees that were perpetually dying, to be followed by new growth. When a forest is cut away, leaving a woodlot, the tall trees near the margins of the reserve will be more exposed to sun, wind and insects, they will grow slowly and begin to die. Borers and woodpeckers come with such exposure. With more light, grass encroaches on the woodlot; wind blows away the dead leaves;

the farmer dislikes to see grass go to waste, and turns in his sheep and cattle. A woodlot so managed will disappear in ten to twenty years. The tall forest trees in such small lots must all come out sooner or later, giving place to young growth.

What is to be done with that twenty acres which is reserved as a woodlot? Keep out all grazing animals, encourage young trees to come in thickly. If necessary, plant seeds or young trees about the thin places of the margin. Do not be worried if the young trees crowd each other; this is necessary to make the stems run up tall. Low beeches, blue beeches, basswoods, box elders, or shrubbery are desirable to shade the ground, hold dead leaves in place, and keep out the sun, but they should not be permitted to extend their tops as high as the tops of trees that are to be allowed to remain. A tall beech is not a tree that any farmer should care to grow. The timber is not very valuable, the tree grows too slowly, and the dense shade of the leaves smothers other trees.

The minute a farmer begins to study and to practice on his patch of forest trees, that moment he begins to observe what others are doing, and he becomes interested in the cut-over land that belongs to the State, and can be depended upon to do his part in securing proper legislation, including appropriations, to help carry out the improvements. Henceforth, how many owners of land here present dare commit themselves on this question of making a diligent effort to obtain a woodlot that shall be a perpetual satisfaction to its owner and a model for the whole neighborhood? Please think of your woodlot, and do the best you can to improve it.

The second part of my short talk is to encourage these persons to plant half an acre or an acre or two to trees. Plant on hills and ravines, or adjoining the woodlot, or on good, arable land, remembering that the better the land, the better will be the crop of trees. Imagine some one is thinking of this topic right here now. I will tell you what he thinks: "Seriously, grow trees in Michigan, which has long been the paradise of lumbermen? I never heard of such a thing! You won't live long enough to grow good sawlogs for lumber. What is the use? It takes a big oak or tulip tree hundreds of years to grow. No, I will cut off all my timber and raise potatoes and wheat, corn and clover."

Talk as you please, only plant trees, or let them grow where Nature sows the seed. You are not expected to sit down and wait, as you would for an incoming train of cars, but keep busy with other things. In the meantime, the young trees will add year after year to their age and size. If the land can be cultivated, plant such trees as you decide upon, eight feet apart, and cultivate as for corn for three to five years.

Unless the trees planted are white pines, or some other evergreens, place between the rows box elders to shade the ground, help hold dead leaves, keep out grass, and crowd the young trees planted for timber. If box elders grow too fast, overtopping the good sorts, hack them off once or more. You won't select to grow blue ash, rock elm, hemlock, white cedar, and many other kinds, because they grow too slowly. Think over what valuable kinds formerly grew well on such land, and see that the trees are adapted to the soil you have. No black walnuts or basswoods or white ashes on sandy knolls; no chestnuts, whitewoods or hickories on river bottoms. You would like quick returns for labor in this matter of growing trees. Then you will like quick growing kinds of timber that may be

harvested when young and produce timber that will bring a good price. Such are the common locust, chestnut, white ash, basswood, hardy catalpa, perhaps the osage orange, cottonwood for paper, and a few others. You prefer not to wait one or two hundred years for the trees to mature. The kinds of trees above named, if well grown, may be harvested in twenty to thirty years; in some cases, sooner.

In the fourth report of the Michigan Academy of Science appears one of my short papers, much like contributions to the Michigan Farmer in 1962, entitled, "What Shall the Michigan Farmer Grow for Fence Posts and Telegraph Poles?"

If your land is deep gravel or sand, well drained, from Mecosta county southward, possibly farther north, you run little risk in growing trees of chestnut and common locust. Both grow very rapidly, both produce durable timber. For locusts, plant one-year-old trees; for chestnuts, plant nuts where you want the trees. Plant eight feet apart each way, one way in rows, and set in about as many box elders to shade the ground. For locusts, the box elders may be set in one year after planting the former; for chestnuts, two years or three years after. Cultivate as you would cultivate corn. The tops of chestnut trees and locust trees will not grow thick enough to shade the ground sufficiently to keep out grass and weeds, which will check the growth of trees very materially.

In case of locust trees, borers often damage the timber, especially where trees grow singly in the open, where the sun shines on the trunks. It is important that the nurse trees, the box elders, shade the trunks of the locusts to keep out the borers. Unlike chestnuts and locusts, box elders produce a dense shade. They grow rapidly, are cheap and easily managed, hence are selected for nurses, or for shade.

Much care will be needed to let the trees crowd just enough to run up straight and tall, and not enough to reduce too much the size of the tops and finally smother out the life of the trees you are growing. As the trees grow older and extend upwards, they will need thinning, a few *every* year.

With such a promising job on his hands, I hardly see how a farmer can fail to become interested, and interest in a good cause is one of the most important things to insure happiness in this life.

A well managed artificial forest will be worth, when harvested, three to five times as much as a forest of which Nature has had the entire care. I give the dimensions of a chestnut tree and a locust at the age of twenty-one years, which I grew at the Agricultural College. The diameter given does not include the thickness of the bark.

Chestnut—Age, 21 years; diameter 1 foot from ground, 9 inches; 25 feet, 4½ inches; 37 feet, 3½ inches.

Com. Locust—Age, 21 years; diameter 1 foot from ground, 16 inches; 30 feet, 3 inches.

FORESTRY PROBLEM OF MICHIGAN, FROM A BUSINESS MAN'S POINT OF VIEW.*

JOHN H. BISSELL.

In reading Prof. Green's recent book on Forestry, I was much struck with its statement of the many uses of wood and forest products. I give it in outline.

"Wood serves so many purposes and enters so largely into human activities, that it may be said to be one of the most useful of all natural products. Think for a moment of its many and varied uses at the present time.

"*In Carpentry*, the rough material is used in frame work, sills, studding, plates, joists, rafters; in sheathing, roofing, shingles, lath; while finished lumber is used in siding, floors, doors, window frames, sash, blinds, stairways, furniture, and fixtures of many kinds, mouldings, ornamental finishings (solid and veneer).

"*For Railways*, in wharves, piers, bridges, piling, etc., ties and culverts.

"*In Shipbuilding* its use is as general and varied as in house building.

"*In Joinery*, including furniture, cabinet and box work.

"*In Making Cars*, wagons and carriages.

"*In Coopersage*, barrels, casks, tubs, kegs, pails, churns of various kinds of wood.

"*In the manufacture of farm and household machinery* and implements, in wooden ware, baskets, parts of musical instruments, in machine building.

"*Timber for mining purposes* is in great demand and enormous quantities are required, so that mines are among the heaviest consumers.

"*Telegraph*, telephone, electric light and electric railway companies are heavy consumers.

"*In Lumbering operations*.

"*Wood Pulp and Distillation products*, in the manufacture of paper, boards, buckets, car wheels, and an infinite variety of articles.

"*The destructive distillation of wood* from which is obtained charcoal, vinegar, alcohol, creosote, gas, tar, pyroligneous, oxalic, acetic and other acids; acetone, paraffin, naphthalin, lamp-black, etc.; and from bark the tannic acid. Besides the bark, the saps are used to produce turpentine, resin, gums and rubber, sugar, liquors, and various medicines; the pith is used for food, and fibre for clothing; the fruit and leaves of some trees are used for food, medicinal and chemical extracts."

Surely it is a matter of the most serious concern whether the country's supply of timber is failing or not, and whether anything can be done by the individual or the State, to preserve the present stocks, to replenish some of the waste and depletion of the supplies—or utilize again the waste places, where once were forests, with the same most valuable crop.

* Paper presented to Michigan Academy of Science.

The superficial area of the State of Michigan, as given by the late Prof. Winchell, is 56,457 square miles; or in acres, that being the unit most common to the thought of business people, 36,128,640 acres, besides 404,739 acres of land on the islands belonging to the State, located in the Great Lakes. Total acreage, 36,533,370.

The number of small, or inland, lakes is something over 5,000, having a total acreage of 712,864. It may not be an unreasonable guess to say that the area covered by the cities, villages, highways, railroads, and rivers of the State occupy approximately 1,500,000 acres; taking this, with Prof. Winchell's estimate of lake area, from the total acreage of the State, leaves 34,320,506 acres, as the approximate area of the State, available for agricultural and forest purposes.

The pine forests have been by far the most valuable, but the whole State was not covered with pine forests. There are twenty-three counties of the State where there was little or no pine. The approximate acreage of these counties, having no pine of commercial value, is 7,200,000, which, so far as pine forests are concerned, reduces the area of the State to 27,120,000 acres.

Of this 27,120,000 acres, a portion has been brought under cultivation as farms; mainly, of course, on land formerly covered by hard wood, but some of it land which has grown pine.

The greater part of the land which was once so rich with its stand of the finest white pine, and Norway, is now waste, and much of it unfit for agriculture, and, so far as we can see now, never will be brought under cultivation. It is only fit for forest. Nature knew that! But we were talking about acres.

Other parts of our 27 million acres were, and much now is, occupied by a stand of hard-wood forest. And from eighteen to twenty million acres of it were in pine. This you will see assumes that from 50 to 55 per cent of the acreage of the entire State was originally pine forest. I ask you to remember this approximate estimate of the pine area when we come to speak of the money values.

As there are no mountainous regions in either peninsula of the State, there is no appreciable portion of this acreage not available for one of the two uses mentioned.

In searching for some definite figures to illustrate in outline, the former wealth of the State in its forests, my friend, Mr. Dwight, loaned me a copy of "The History of the Lumber and Forest Industry of the Northwest," compiled by Mr. George W. Hotchkiss, published in 1898. Wherever I give figures or estimates of the amounts or kinds of timber cut and marketed, without references, I am quoting from Mr. Hotchkiss' book.

The early settlement of Michigan was along its southern border. The southern counties of Michigan were originally clothed with dense forests of oak, cottonwood, poplar, black walnut, cherry, bass-wood, maple, birch, sycamore, hickory and elm, with occasional "oak openings." All statistics, so far as I have been able to find, show that the products of the forest have been the most important factor in building up the industries and wealth of the State, and more wealth has been created for use in industrial development of all kinds from the lumber industries than from any other. If this assertion is not true of all the States

in the Union, it certainly is of Michigan, Wisconsin, Minnesota, and some of the provinces of Canada.

About a half century ago, little or no importance was attached to lumber as an article of commerce. The early settlers were only concerned with the timber to build the log houses, stables, and sheds, or rail fences, and to get a supply of firewood, and the rest, when cut down to make room for the cultivation of the soil, went to the log-heap and was burned.

As the pine (including the red pine or Norway) is the most valuable of the forest products of Michigan, and as its surpassing value has attracted more attention than the forest products of any other kind, what I have to say will be mainly with reference to pine forests.

The virgin pine forests covered the lower peninsula of Michigan, interspersed with belts of hardwood (including in that term all of the broad-leaved trees), in the district north of a line drawn from Lake St. Clair through the center of Macomb and Oakland counties, across the southwestern corner of Genesee, then through Shiawassee, Clinton, Ionia, Kent, to about the east line of Ottawa, thence running to the south, it passed through the eastern part of Allegan, the north part of Van Buren, to Lake Michigan, at about the north line of Berrien county. In the Upper Peninsula it was the predominating forest growth, alternating with belts of hardwood forest, except some swampy places where, probably, there has never been a stand of timber, and a few rough and rocky places south and west of Marquette.

One other noticeable feature of the forest was the bottom lands of many rivers and smaller streams where there was a dense growth of cedar, and a few swampy places or lake margins abounding in tamarack.

The first authentic account of the use of pine as prepared lumber for the market, in Michigan, was about the year 1810, when a small mill was erected and operated in St. Clair county.

It was not until 1830 that a saw mill was built in the Saginaw valley, which, with one or two mills just before that time built in St. Clair county, was the beginning of the operations in pine lumbering in this State.

The product of the early mills was entirely for home consumption, as there were then no railroads and no steamboats available for transportation. The early settlers of Michigan were aware of the fact that extensive pine forests existed in the Lower Peninsula, that having been known from the days of the Jesuit Missions and the first French fur traders; it was, however, not until after the civil war that there seemed to be any appreciation of the commercial value of such forests; and it was not until about 1868 to 1870 that very extensive operations in lumbering were undertaken.

In order to enforce the main point of my statement, which is the vast extent and value of the original pine forests, and the enormous contribution of wealth which their destruction has made available to the Michigan of today, I ask your attention to the best estimate I can get of the production of lumber in the various centers of activity in that industry about the State.

The product of the land tributary to the St. Clair river, from 1867 down to 1896, is placed at 3,000,000,000 feet.

The product of lumber in the region of which Flint was the center, in 1867, was something like 68,000,000 feet and 40,000,000 shingles. The production in that region reached the highest point in 1874. The total is set at 1,500,000,000 feet.

In the Saginaw valley statistics were kept which give the cut of lumber from 1851 as aggregating 23,110,000,000. Besides the product in shingles, lath, pickets and other unreported uses, together with the estimate of the amount of timber cut and used locally, prior to 1851, gives a total of 30,000 million feet.

A considerable factor in the timber product of the Saginaw valley was the square oak timber and stave trade, which in the ten years from 1869 to 1879, was over 17,000,000 cubic feet, equal to 210,000,000 feet, board measure. This product alone was sold for about \$3,500,000 on board the vessel at Saginaw; and the stave trade, estimated from 1860 to 1879, at an average of the prices then obtained, was nearly \$3,000,000; so that from these two sources alone, the product of that region brought in money, nearly six million and a half of dollars.

This business was ended by 1880.

The lumber production of the Huron shore, from Saginaw bay to Alpena, is estimated at 12,000 million feet; the Cheboygan district about 3,500 million feet; Grand Rapids and its neighborhood about 3,500 million feet; Grand Haven and the Lake Michigan shore have sent to the Chicago market about 50,000 million feet; the total reported output of the Muskegon valley, from 1873 to 1896, was 518 million feet, log measure. Allowing for the cut previous to 1873, the unreported cut of small up country mills, and the reported lumber freight of the principal railroads, Mr. Hotchkiss makes a total estimate of 25,000 million of feet.

The White river (Whitehall and Montague) are credited with 2,000 million; Ludington with a production of 3,125 million; the Manistee river and region product is estimated at 8,204 million feet.

In 1892 a committee of leading men of Manistee, in a memorial to Congress asking for improvement of their harbor, estimated that there was then 4,200 million feet of standing timber tributary to the Manistee river. The timber tracts referred to were about the only extensive body of timber supply then remaining on the Lower Peninsula.

The Green Bay, or Menominee, region production is put at 20,000 million, which is divided between the Wisconsin lands, 3-7, and the Michigan forests, 4-7, the Michigan portion being 11,428 millions.

The Manistique river on the Upper Peninsula has made a gross production of 4,000 million feet; Marquette as a center has manufactured and shipped 1,000 million; Ontonagon county 4,000 million; Houghton county 3,000 million; Baraga county 6,000 million.

The railroads have hauled logs from the headwaters of the several river systems, where floating was impracticable, and their tonnage of logs must be taken into the account.

The F. & P. M. reports to 1896.....	4,920 millions.
The Jackson, L. & Saginaw (M. C.).....	4,500 millions.
Det. Bay City (M. C.) about.....	1,000 millions.
The D., L. & N. (now P. M.).....	2,818 millions.
The G. R. & I. (Pa.).....	6,000 millions.

amounts to a total forest production for Michigan of 211,475 million feet. The average sale value at the point of manufacture taken as \$13 per thousand, gives:

Pine	\$2,099,175,000
Hardwood, cedar, etc.....	550,000,000

A total forest production for Michigan.....\$2,649,175,000

The pine estimate... ..	161,475,000,000 ft.
The estimate destroyed.. ..	53,825,000,000 ft.

Total pine 215,300,000,000 ft.

Hardwood, cedar, etc.....	50,000,600,000 ft.
Estimate destroyed.....	16,666,000,000 ft.

Total hardwood, cedar, etc.... 66,666,600,000 ft.

Probable total of original forest..... 281,966,600,000 ft.

The amount of pine estimated as destroyed.....	\$699,725,000
The amount of hardwood estimated as destroyed.....	160,000,000

Total estimate lumber destroyed..... \$859,725,000

The statistics of the gold product of California during practically the same time is given by the U. S. census as \$1,330,000,000.

THE PINE FORESTS OF MICHIGAN ARE NOW EXHAUSTED!

As shown by the United States census of 1890, the cash value of the following natural products of this country, namely, petroleum, coal (bituminous and anthracite), iron, gold, silver, quick-silver, lead and copper, amount to 519 million of dollars.

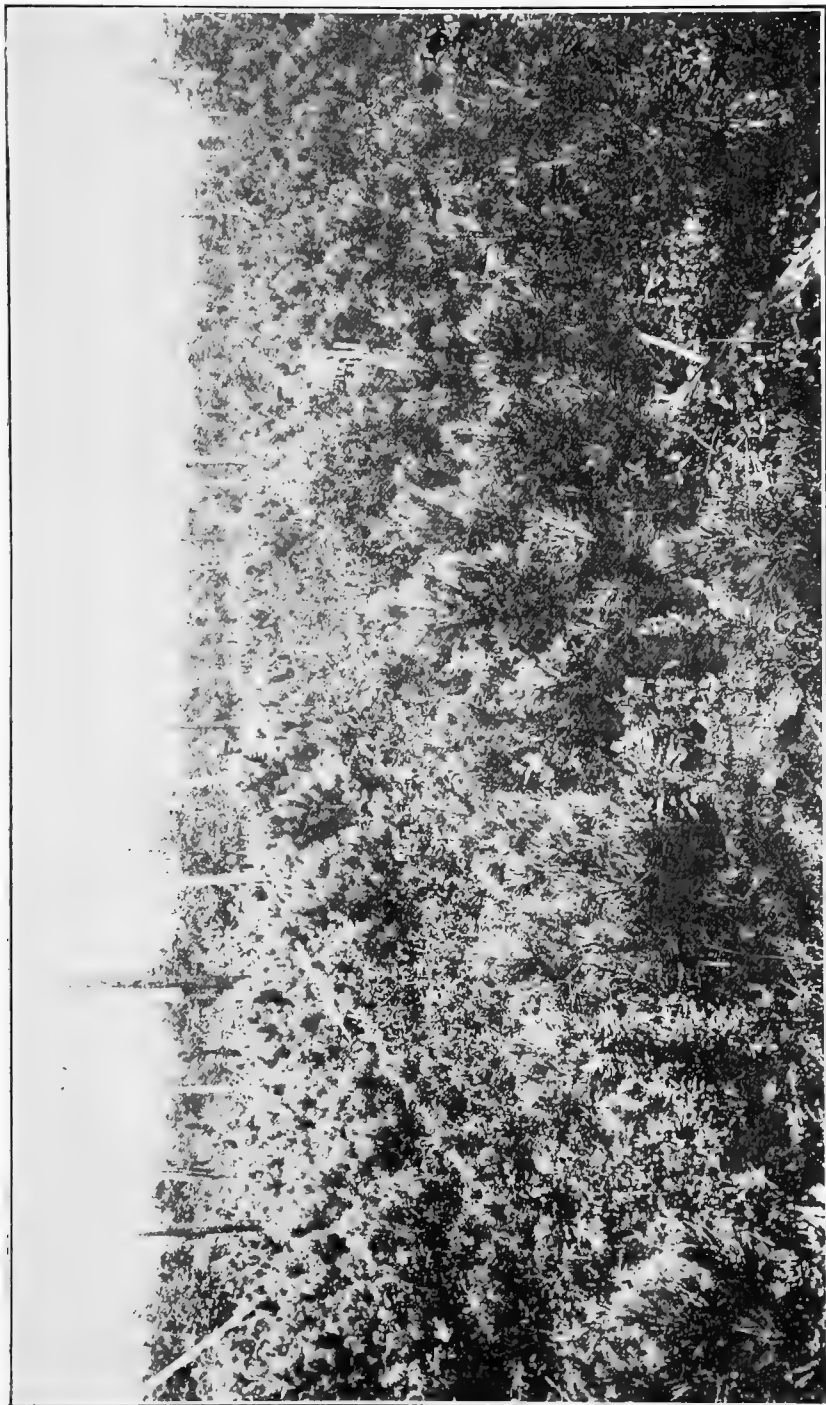
The value of forest products for the same year are given by the census as \$1,035,000,000.

It is well known that during the process of lumbering, and the clearing of farms, there has been an enormous waste of timber value. It is oftentimes asserted that as much has been destroyed in this way and in forest fires as has been utilized. This, Mr. Hotchkiss seriously questions and gives as the result of his observation (for there are no records available) that probably one-third as much pine and other timber has been destroyed as has been utilized for the purposes of commerce.

What is the present condition of the lands from which this enormous crop of pine has been cut? Let us ask the census of 1900.

The fifteen counties¹ comprising the Upper Peninsula of Michigan have 10,724,000 acres of land; 654,000 acres, or 6 per cent, is in farms. Of this, 215,000 acres are improved, 2 per cent of the total area; 94 per cent of the whole is unsettled, and 98 per cent of it unimproved.

¹Keweenaw, Houghton, Ontonagon, Gogebic, Baraga, Iron, Marquette, Dickinson, Menominee, Alger, Delta, Schoolcraft, Luce, Mackinac, Chippewa.



NATURE IS EVER KIND TO MAN, LITTLE AS HE MAY DESERVE IT. ONE OF THE THOUSANDS OF TRACTS WHERE NATURE MADE AN EARNEST EFFORT TO RE-CLOTHE THE LAND WITH A VALUABLE GROWTH OF NORWAY PINE. LACK OF PROTECTION HAS LOST TO THE STATE PRACTICALLY ALL OF THESE EFFORTS. NORWAY PINE 2 TO 5 FEET HIGH, WORTH \$10 TO \$30 PER ACRE FOR THE GROWTH ALONE.

are roadsides almost as beautiful as those along the Allegheny. I have no doubt that many other parts of the state have roadsides equally attractive. A row of sycamores near the Beaver River, planted by some early settler, has grown into one of the stateliest rows of trees I have ever seen. They have reached a height of seventy or eighty feet, with massive trunks in proportion. Little attention has been paid here, however, to roadside planting. The trees that have been left standing remain mostly because they are not needed for firewood in this land of universal coal and gas, or because the lumberman has not offered a high enough price to induce the owner of the trees to have them cut.

I think in many cases the trees are less appreciated here than in Michigan. I remember a sycamore that stood in front of a fine farm house at the edge of the highway in Greene county, this state, which had grown to be a grand specimen of its species, with a trunk straight and smooth for thirty feet and a great spreading, symmetrical top. It gave character to the place itself, a sort of seal or coat of arms. But the owner or some one else had chopped a deep girdle about the trunk, and when I saw it last its naked arms stood with a mute appeal to every passerby to notice the lack of sense of some human who ought to have known better. It only took a few minutes to destroy what had been a hundred years in developing. The stunted, black knotted plum trees of the front yard were still stunted and black knotted, and the farm had lost its most attractive ornament.

The first time I visited Dents Run I noticed a walnut tree that stood by the side of a little stream, just across the way from the store. I learned that it had been planted by the pioneer settler of the little town, some sixty years before. It had grown to a height of sixty feet, with a spread of branches even greater, and when fire destroyed the store and injured the tree so it had to be cut I felt that I had lost a beloved acquaintance. The store has been rebuilt, but only the naked stump of the walnut stands to mark the site of what seemed to me to be the finest monument that Abel Dent could have had erected to his memory. I have often wondered why his descendants do not plant another walnut by the side of the stump, which in time might rival its predecessor and give character to the now naked street and shade to the unprotected store front. But here, as in Michigan, there seems to be a lack of appreciation of the fine trees that have grown up along the roadside. Sometimes they are destroyed because they seem to sap the ground to the injury of growing crops. In a few cases, especially in Michigan, they are the last source of firewood the farmer has remaining. Here in Pennsylvania I have often seen fine specimens of oak and chestnut girdled even along the river banks, where their loss is irreparable, and where I could see no possible sense in thinking they ought to be destroyed. This is even more true in some parts of West Virginia than here.

The telegraph and telephone companies are less careful here when stringing their wires than they are in Michigan. Often a long row of trees are mutilated in horrible style and many trees entirely destroyed.

But in Southern Michigan we have passed the day when we destroy our trees for mere wantonness, and have reached a time when we are studying the best methods of replacing what has been destroyed or caring for what remains. We have many miles of roadway that could with a little care and attention be made very attractive. This is especially true in

our lake counties, like Oakland, Jackson, Hillsdale, Kent and many others, and in the counties of much uneven and rolling land, like Washenaw, there are exceptional opportunities for making the most attractive roadsides in the world. This is especially true where the roads follow the shores of lakes or banks of streams, or curve about the border of a swamp. Near my own home at Greenville we have some of the finest natural roadsides I have seen anywhere.



PINE SEED FLIES. A STAND OF YOUNG NORWAY PINE 4 TO 10 FEET HIGH, SPRUNG UP IN AN ABANDONED FIELD, QUITE A DISTANCE FROM ANY SEED BEARING TREES.

I am glad that attention is being called to these things more and more and that the number of people interested is increasing year by year.

I remember nothing I have done to which I look back with more pleasure than to the walnut trees that I have grown and given to friends and neighbors, and which now are growing by the roadsides of my home township. Although their size and the crops of nuts they bear remind me that I am growing old, it is always with a keen sense of pleasure that I watch their development as the years go by.

Butler, Pennsylvania.

THE AESTHETIC VALUE OF WOODED AREAS IN MICHIGAN.

BY OSSIAN C. SIMONDS, CHICAGO, ILLINOIS.

To appreciate, one has but to compare the coast of Michigan, where some forests have been left, with the barren looking shores of Spain or Italy, or the beautiful country extending from Niles to Ypsilanti, with the treeless region of Dakota. After riding through some of the barren regions of the West, one becomes hungry for such forests as he can see in Michigan. He wishes to look at the beeches, maples, lindens, oaks, ashes, butternuts, black walnuts, hickories, cherries, redbuds, dogwoods, larches, pines, hemlocks and cedars, with which those who live in the Peninsular State are so familiar. It is not alone the climate that causes thousands of people, each year, to seek Michigan as a summer home. They value the beautiful trees, as well as the pure air and agreeable temperature.

In the older portion of Michigan the forests, which have been allowed to remain, have become more beautiful during the last twenty or thirty years because their borders have become clothed to the ground with foliage. As one goes through the State, observing these forests, he sees, as a background, the larger native trees, and against them shrubs and trees of lower growth. Frequently there will be an oak forest, with leaves of a rich dark green, against which may be seen a growth of sassafras, hazel bushes, sumachs or elderberries. Again, one will be delighted with a growth of beech trees, with low spreading branches, and clean, strong-looking trunks. Or he will pass a stream, standing beside which the white bark of the sycamore will call his attention. Early in the year he may exclaim with delight as he passes a large group of wild crab-apples, a colony of thorn-apples, a border of Judas trees, the snowlike flowers of the Juneberry, or a flowering dogwood in full bloom. One can hardly fail to appreciate the beauty of the newly budded oaks, with colors ranging from deep red to white. In autumn, when passing through a maple grove, with its gorgeous coloring, one instinctively uncovers his head, as he would in a cathedral. If one has no book, and wishes to relieve a time of waiting, let him but think of the brilliant October foliage he has seen in northern Michigan, of the birches, with their white trunks and yellow leaves; of hillsides covered with scarlet sumachs; of the oaks, with their rich reds and browns; of the maples, with their well-known tints, and imagine these bright colors as they would appear against the dark background of an evergreen forest.

It is not alone the eyes that are rested and delighted with the beauty of our forests. Who does not remember the refreshing fragrance of our pines, spruces, balsams, hemlocks and cedars? One often longs for good, deep breaths from an evergreen forest as he would for a bite from



A MODIST' BEGINNING. HEADQUARTERS OF THE FIRST STATE FORESTER, AT COLD SPRINGS IN THE ROSCOMMON FOREST RESERVE.

transportation of timber impossible, many of the towns began to feel the evil effects of this bad usage, and conservative men began to plead for protection and better care of the forest. This agitation required time, but as early as the year 1165 the authorities of certain districts began to issue regulations and organize a suitable service to prevent further forest destruction. The matter was sporadic; the greater part of that immense forest was still to be subdued, but nevertheless the good work of a reasonable care and use of the forest spread from these many centers, and by the year 1300 a considerable number of districts had regulations concerning the cutting of timber, and in several of them further clearing without official permit was forbidden.

By this time, too, there had established itself in all the better settled districts certain rules concerning the use of the forest, the running of stock, the hunting, gathering of grass, fruits and seeds, the manner and time of felling timber, etc., had become matter of public discussion and official instruction, and thus forestry grew up, as it were, side by side, with the primitive agriculture of those times.

By the year 1600 the dangers of forest destruction and the proper use of the forest were quite fully understood throughout Central Europe, and practically all accessible forests of France, German, Austria and the neighboring states were under some form of control. At the same time the ownership of the forest was established, and instead of being commons, the forest now had passed into the hands of definite owners, a large portion fortunately falling to village, town, church and state.

A very instructive case in this connection is the forest property known as Sihlwald, belonging to the city of Zurich, Switzerland, ever since about the year 1000 A. D. As early as the year 1314 there existed here a forest service, and in the year 1342 the principal forester of the Sihlwald became the "Sihlherr," and as such was a member of the town council. At the same time a definite system of cutting timber had developed, and by the year 1422 the budget or amount of timber to be cut each year was determined and prescribed by the council, which expressed itself appropriately in its city order about as follows: "In order that this forest shall not be overcut or damaged, but shall be used in an orderly manner, maintained and its growth preserved for our children, therefore it is decided that the forester shall not order or cut more than 36,000 pieces (about 900 cords)." From the year 1630 to the present time a record has been kept of the amount of timber cut each year, and it is evident that we have here a forest property in the possession of this town for about 1,000 years, under good management for over 600 years, yielding every year its regular crop of timber and in better shape today than it was ever before.

It was in such ways as these that the forests of Central Europe attained their present form and systems.

At present Germany, for instance, has 25.7 per cent of its land area in forest, nearly half belonging to private persons, the other half to the states and corporations (cities and villages, etc.). About two-thirds of these woods are under state control, the other third being in the hands of private persons entirely free to do as they please with their forests. The state forests and those under state control are, as is so well known to all American travelers, in excellent condition and under the most per-

fight the forest policy of all the Central European states. Especially through Adam Smith and the French Revolution the unlimited right of the individual in its property gained many champions. France, especially, lost a large part of its valuable forest holdings, so that for the last fifty years she has found it necessary to spend many millions of dollars to correct the bad results of denudation in her hill, mountain and sand dune district. Nor is this all. She paid a heavy fine every year in form of a large sum spent in the import of lumber and timber which she might have raised at home.

But in spite of all sophistry the lesson of 1,000 years is thoroughly learned in nearly all states of Europe, and effort is being made everywhere to overcome the great difficulties and restore the poor lands and waste lands to forestry as the only form of agriculture which can use these lands, permanently preserve them and actually improve them.

In this connection, the experience of Great Britain is of interest. Less than 30% of its area is real plow land, another 30% is permanent pastures, while the rest, or about 40%, is not used for agriculture, the bulk of this being waste lands, worthless heath lands, where once a good growth of forest existed and where now the only income from the lands consists in a few tons of wool and mutton or a rent shilling paid by sportsmen for the privilege of shooting a few birds. Land monopoly, together with an utter disregard of forestry, the only good form of agriculture for these lands, has deprived England of millions of dollars of income which she might have had from these lands, to say nothing of the indirect benefits in woodworking industries which might have thrived, nor of the benefit to climate and the flow of her streams. And yet England pays over \$100,000,000 a year to supply herself with timber, and this import has increased with every year for over half a century.

In our own country there was ample and timely warning when the different colonies were first settled and the Old World experience was still fresh in the minds of men. As early as 1640 the people of Exeter, N. H., adopted a regulation concerning the cutting of oak timber; in 1701 the Governor of New York advocated that saw mill men should replace young growth on lands where they cut and did not clear. By the year 1800 numerous public efforts had been made to stay the destruction of the forest and to restore it on the non-agricultural lands. But all this was in vain, a spirit of recklessness was abroad, the people were waging a war on the wilderness and had no desire to practice forestry. Later on came the railway and steamboat, the phenomenal growth of our cities, of our industries, the settlement of the prairie, and with these an enormous market for lumber and forest products generally. In spite of the good advice and warnings of the old pioneers, in spite of occasional warning of contemporary writers, the forest was not merely cleared for plow land, it was not only the slow fight of the settler for a home, but the forest was invaded for timber only, and the destruction of the forest far outran settlement. What wonder then that Dr. J. T. Rothrock, the pioneer forester of Pennsylvania, as much as twenty years ago had to report to the people and the legislature that millions of acres had been denuded in their state without any intention and without any hope of making the lands useful for agriculture. The old argument which met former protests and presentations, namely, "Our lands are practically all agricultural lands," was disproved. Miles and miles of blackened hill-

cut, was scattered among a heavy growth of hardwoods the forest has generally held its own, and it is often difficult to see that the forest has ever been visited by hand of man. In these districts the hardwood is now being cut by the lumberman and the farm settler is following to subdue the land and build homes as fast as the forest disappears. It is here where the real settlement of our State is continued and where it will continue for many years to come.

From these considerations it appears that Michigan, like several other States of the Union, repeated the experience of the Old World. Centuries of experience indicate that in the settlement of forested lands the clearing of part of the forest is a necessity, that this good work is always carried too far and is extended to lands which are not suited to permanent agriculture, that the farming of such poor lands is an injury to the State, and that the countries having most experience in this matter have fully demonstrated that:

1. *Not all land is plowland.* This probably applies to every state in the world. In Europe we find in Great Britain little over one-fourth of the land cultivated and less plowland now than thirty years ago; in Germany but little over half of the area cultivated; and even in France we find a remarkable per cent of untilled lands, and in all these states, long and densely settled as they are, the amount of actual waste land is surprising and has engaged the attention of statesmen and others for years. In our own country we have the striking example of the New England States. Here several million acres of land which were regarded as agricultural as long as the forest cover protected the soil, were cleared and farmed and led into poverty thousands of families who tried in vain to eke out a livelihood on lands which should never have been deprived of their cover. But other states have fared little better and today the following figures from the census of 1900 clearly show the correctness of the above statement.

The per cent of improved land is as follows:

State.	Per cent of all land area now improved.	Remarks.
All North Atlantic states together	37%	Mc.-Pa. Del.-Fla.
All South Atlantic states	27%	
All forested states east of Mississippi river	36%	
Michigan	32%	
Wisconsin	32%	
Maine	12%	
Massachusetts	23%	
New York	51%	
Pennsylvania	45%	
Virginia	39%	

the wretched stay, and every period of bad seasons drives them to brigandage and beggary.

3. That even in extremely fertile districts it is hardly wise or safe for agriculture to dispense with forestry. The farmer of Indiana or Southern Michigan holds on to his wood lot in spite of all the smart calculation and advice which figures out for him that he can better afford to buy coal, oil or gas than raise his timber and tells him to a cent how much larger a per cent he can make on hay crops than wood crops. He knows that the wood crop is the only certain one of all the crops he has and he also knows that it costs a great deal of cash (a thing normally scarce on the farm), to buy coal and also that it is of no small importance in his business that he should have a few pieces of good hickory and oak seasoning in case an axle, a whiffletree, bolster or tongue need replacing. Nor is this all, but the farmer of the Iowa prairie who settles on twenty feet of solid fertility finds it a most excellent thing to supply himself with a small wood-lot and become independent of the coal and timber hawker.

Considering now the conditions in Michigan, we have: A good agricultural State with good climate and with nearly two and a half millions of people near the great markets of the land, almost surrounded by the greatest inland waters of the world, with numerous streams, abundant water power and amply traversed in all directions by numerous railways. Agriculture far more than supplies the needs of the people and is now and probably always will be the greatest industry of the State. The second greatest, the wood-working industry but a few years ago found an ample supply of raw material and its output went to the markets of the Atlantic and to the plains of the West as far as the Gulf. This is changed, the lumber industry has largely gone from the State, of the large capital invested in this industry in 1890, only about half was still so invested in 1900, and instead of Michigan being one of the greatest export states of lumber in the world, we are today importing timber and lumber. The Seattle cedar, the California redwood, the cypress from the Gulf, the pine from the Carolinas and the South Atlantic are filling our lumberyards and our people are paying every year large sums of money for a necessity which our State should never have to import, but should be able to export for centuries to come. Our people, in paying this fine for short-sightedness and careless misuse of the greatest natural resource found ready in the State, are paying out not only for the material, but are also paying for its shipment, partly at least, over the two great mountain systems of the New World, and in all cases for long distant railway transportation, little coming less than one thousand miles, and a very large amount over two thousand miles distance.

The wood working industry of our towns, notably the manufacture of furniture which has added so much to the building up of some of our towns, finds no longer a home supply, but is going as far as Arkansas and Tennessee for its raw material, and the enterprising manufacturer is exposed to the severest competition and is in danger, at all times, of being ruined by the competitor, who has located at the source of these supplies. Such a condition is little calculated to encourage further development in this direction and the outlook for this important branch of enterprise is anything but encouraging. What a loss this is to the

Area, land in farms and improved lands in Michigan.

U. S. census 1900. (Numbers rounded off.)

District.	Of entire district.			
	Total area—million acres.	Per cent.		
		In farms, or settled.	Improved land.	Unimproved land.
No. 1. 42 counties, the real, well-settled farming portion of the state. No county with less than 45% of its lands settled.	17	87	64	35
No. 2. 10 counties, no county with less than 30% nor more than 44% of its land settled. Largely forest, some cut-over pinery	3	34	15	85
No. 3. 16 counties, all but three in southern peninsula; largely cut-over pinery lands, with few belts of hard wood. No county with less than 10% nor over 29 per cent of its lands settled.	7.3	17	7	93
No. 4. 15 counties, three of these in southern peninsula; mixed lands in the northern peninsula, some sands. Nearly all sandy, pinery lands in southern peninsula. No county with over 10% of its lands settled.	9.3	5	1.1	98.9
Total entire state	36.6	48	32	68

Since the above refers to the land area as per United States Land Office Reports, and since the amount of land in towns and highways forms certainly less than five per cent, even if all highways were cut out, it appears that fully twenty-three of the thirty-six million acres of land in Michigan are unimproved.

Returning to the lighter pinery lands, it is but natural that after the great fires had swept the forest cover and not only destroyed it, but almost cleared it from the land, that little encouragement existed for the timber man to hold them or give them any further care. At first the lands were offered for sale and later a large portion of them reverted to the State for non-payment of taxes. They were offered for sale for taxes but usually bid in by the State so that today there are about six million acres of these lands either delinquent for taxes or actually deeded back to the State. This is a remarkable and a very significant state of affairs, six million acres, about one-sixth of the land area of the State is "in soak" for taxes. This fact not only indicates the proprietary relation but describes quite fully the natural and economic condition of these lands.

The policy of the State with regard to these lands has been liberal, in fact, too liberal. The State has made a persistent effort to get the

3. Even our lightest lands are today excellent stock range and worth more to us for this purpose than they will be for forest purposes.

4. You withdraw large areas of our lands from taxation and thus throw the burden of maintaining school and road and proper civic government on the shoulders of a few of us who have our homes and our interests here and cannot well escape.

There was much truth in these contentions and since this matter must come up again, it is of interest to inquire into these principal arguments. It is but natural, too, that much sentiment prevailed and that both sentiment and misunderstanding were fostered by interested persons, but on the whole, the protest was a fair one and well deserved the consideration which it received. "Why reforest and reestablish the 'howling wilderness' we are glad to have behind us?" This argument, as most of the people of the district have by this time fully learned, was based largely on a misunderstanding of the real objects of the Reserves. In a county where only about eight per cent of the land is settled, where one may ride for miles and miles on a kind of a "stump prairie" without seeing house, hovel or camp, and where marsh fires and brushwood fires burn for days without so much as attracting attention, in such a county, the protective efforts of the State can hardly be accused of producing a wilderness. Here a State Forest Ranger can only be of benefit to everyone and most of all to the local settler, to the stock farmer and the owner of lands and timber.

Nor is this all. In a district where 100 days of sleighing indicates the normal winter, where frost must be looked for practically in every month of the year, and where settlement is as slow as it has been in these districts, what could be more desirable and useful than a goodly cover of forest, a shelter against the winter storms, an ample supply of fuel and a local supply for the few mills, which, if proper management prevails, might find here such a supply for all times to come? Today it is the unsightly, blackened swamp waste which discourages the good settler, it is this stump waste which might be termed the "howling wilderness." What the State is attempting, not the increase of wilderness, but a most useful, in fact, here an indispensable branch of agriculture and the only form of agriculture which can be relied on as producing a useful, marketable crop on all of these lands irrespective of seasons.

"Our lands are practically all farm lands, etc." Here we meet again with the argument which has been considered before, it is the same argument which led to the clearing of the millions of acres of non-agricultural lands abroad, it is the argument which prevented the people of Pennsylvania from heeding the words of Penn, it is the same misconception which left unheeded the good advice and proper beginning of the Pilgrim fathers and which made people deaf to the pleadings of the governor of New York two centuries ago. As has been stated, the experience of Europe has proved it an error for those countries, which after a thousand years of trial, are spending millions of dollars every year to correct the evils brought about by this error. The experience of all our older states has proved the notion in error for those states, they have paid a costly fine for their error and they are just beginning to correct its bad effects. Nor is this all, the American



OVER HALF A MILLION PINE AND SPRUCE TREES FOREST NURSERY AT COLD SPRINGS ON ROSCOMMON FOREST RESERVE. LOW SCREENS IN THE FOREGROUND, OVERHEAD SCREENS WITH BRUSH COVER IN THE DISTANCE. NURSERY ESTABLISHED IN MAY, 1904, FIRST CROP OF TREES TO BE SET OUT WHEN 2 YEARS OLD.

farmer, the farmer of Michigan, who has known these lands in our State for many years and whose judgment in this matter is certainly worth all the expert testimony in the world has declared against the lands. The fact that he preferred to wrestle with the heavy hardwood forests of our and of other states and preferred to undertake the difficult problems of redeeming the arid regions of the west rather than settle these pinery lands, should be conclusive evidence that *they are not all farm lands*. But there is more to prove this fact. The vegetation of these lands is peculiar and is the vegetation characteristic of pinery lands. The elm, the basswood, the maple, the birch and ash refuse to make timber on these lands. The transition from this land to the hardwoods on clay and loam is usually so sharp that it is striking. Even the uninitiated, casual observer is astonished at the contrast. Here on one side of the line, hardwoods 80 to 120 feet tall, mostly maple, elm, basswood, birch and beech, little or no oak and no jack pine, the ground densely covered with young trees and brush undergrowth, and a luxuriant growth of grass fighting with young tree growth for possession of the ground in every new opening. There on the other side of the line, scrub oak, five to ten shoots from an old burned stump, older trees gnarly, limby, few trees over 50 feet high, few sprouts, or cripples of maple, cherry, poplar and white birch or else a scattered growth of jack pine or a mixture of this with scrub oak, everywhere pine stumps to indicate the former glory, but no elm, basswood, ash or beech, nor any tall hardwoods anywhere. The ground is not covered with a dense growth of shrubs and young hardwood. The oak forms a thin stand and most of the ground is covered with sweet fern, huckleberry, with bush honeysuckle, blackberry bramble and other persistent growth, among which a sparse growth of grass and sedges is vainly trying to hold its own. In this way nature has clearly indicated the difference between these lands and fully substantiates the correctness of the opinion of the farmer. Nor has there been a lack of actual trial and the hundreds of abandoned homes on the plains in every county containing such lands surely cannot all be accredited to shiftlessness.

There is one fact in this connection which is often overlooked. It is the experience of the pinery region of the Atlantic Coast Plain. Parts of New Jersey, Delaware, and from there to Texas are a pinery in which settlement has continued ever since the landing and founding of Jamestown, and yet this region is today wild woods. And in spite of a mild climate which extends the possibilities and range of agriculture, these lands remain unimproved and await the settler. Here is an area several times the size of Michigan still open to farming on sands. It must not be inferred from this, however, that none of this land is fit for agriculture. To the contrary, the lands are extremely mixed and one meets with surprises at every hand. It is for this reason that the law has left the power with the Commission to *sell lands* and there is no doubt but that any real well intentioned farm settler can get lands within the Forest Reserves provided the safety of the forest cover permits this exchange. Generally then, while it must be considered as more than doubtful that all these lands or even a large proportion are agricultural lands, the present State policy, the Forest Reserve policy fully considers

this claim and the State today, as ever before, stands ready to promote settlement and agriculture inside as well as outside of any Forest Reserve.

"The land is good grazing land." This claim is a dangerous one and it is heartily to be regretted that the State of Michigan, located as it is, surrounded and penetrated with natural and artificial means of communication, with a good climate, level lands, with deep soil, should ever fall into the errors of New Mexico and of other mountain regions and advertise its lands as sheep range.

To invite a land monopoly, a monopoly of "the second great asset of the State" a monopoly which has everywhere proved inimical to settlement and improvement is sheer folly and would be rued most by the very people who advocate it today. A few sheep sheds for improvements, a few lone herders, and a dozen men at shearing will represent the kind of civilization which this range business leads to and the output of this boasted industry will consist of a few tons of mutton and wool all going to distant markets leaving not a cent for conversion or further manufacture and save the meat, furnishing no article of local consumption. And the land? It will be a Scotch heath, range desert reproduced. It is rarely appreciated how thoroughly inimical such use of the land is to the real settlement. But anyone with experience in the west, particularly Wyoming, Nebraska, etc., will remember how natural, even necessary it is for any stockman to discourage the settler within the boundaries of his range. While the range on the whole might not be worth fifty cents per acre, he could better afford to spend twenty dollars per acre to get rid of a farmer in the midst of his holdings. It was this very feature of range business which led to the so-called "Rustler War," (should be settlers' war) in Wyoming; has led to special legislation in Congress; has caused the Department of the Interior to spend many thousands of dollars in trying to remove the high-handed range grabber and range fencers and it is this same feature which induced the wide awake farmer of Wyoming, Montana and Washington to pass a law which forbids the sale of any state lands for less than \$10 per acre. (And this in arid regions, for sage brush lands, while Michigan sells land for *ten cents* and accepts \$1.25 for the pick, ten per cent of an 80,000 acre tract.) Can it be possible that Michigan will remain blind to all the experience of the west, to the experience of the Old World where the range use of the Alpine lands and pinery lands alike has been a detriment for ages and is the greatest stumbling blocks in all efforts for the improvement of the conditions of the people and their lands?

The fourth argument in the protest demands equal and just taxation, and therefore is practically sound. If the people of Michigan expect the township of Denton to keep up roads and schools and protect life and property and generally do those things which any civil organization is expected to do, it should not take away from the few settlers living in this town the wherewithal to do their duty, New York pays taxes on its Forest Reserves, every state of Central Europe pays taxes on its state forests and any other holdings. Why should we, in a country which claims a government by the people and for the people, want to shirk and throw an unfair burden on a few pioneer people who are least

in position to bear it? And to the credit of our State, be it said that this argument was duly considered and the legislature provided as has been stated above that the town shall not lose all revenues but shall receive payment in lieu of these taxes, the money to be used for school and road. It has therefore practically admitted the soundness of the argument and the propriety of meeting this demand and it is but natural that this matter in the future will receive further consideration and be adjusted equitably and satisfactorily. In this way the fourth, the most just and formidable argument practically falls away as regards Michigan State Forest Reserves. The State has declared it right and meets it.

We see then that the protest may be and is fairly met and it is gratifying to note here that in the counties of Roscommon and Crawford where the reserve policy has made its beginning the people have completely changed their views and there is today a most hearty and intelligent cooperation between the State and the people in the matter of Forest Reserves.

And now, what is it that the State should do? The answer has practically been given in what has been said, but may briefly be stated more categorically as follows:

1. The reserve policy of dealing with all State lands has proved acceptable to the people, it is the only economical and safe policy, it is in keeping with experience of the older parts of our Union and with centuries of experience in the Old World. It should be continued and it should be extended to all State lands and to every acre of land as soon as it becomes delinquent for taxes.

2. No State land should be sold for less than \$5 per acre, for the land alone and any timber on the land should be sold according to rules established by the State Forestry Commission.

3. No lands or timber should be sold except by public auction to be held in the county seat of the county where the land or timber is located.

4. No lands once deeded to the State should be sold or offered for sale unless written application is made therefor and the useless wholesale advertisement of our lands and the forcing of these lands on the market should cease.

5. Lands delinquent for taxes should be offered for sale once in accordance with the present law, but it should be illegal to waste the funds of the State in repeated advertising as has been done in the past.

6. Lands on which the taxes have not been paid for five years should be deeded to the State irrespective of any circumstances and the title thus obtained by the State should be sufficient.

7. The policy of the Federal Government in selling its land only to actual settlers and in tracts not to exceed 160 acres is sound in principle and practice and should be followed in the disposition of our State lands.

8. Non-agricultural lands should not be sold at all and in cases where doubt exists the Forest Commission should decide, since lands of this character are generally more valuable for timber than for farms.

9. The appropriations at present devoted to the handling of the tax title lands should be used to give these lands protection, care and im-

provement and to defray the taxes which the State pays to the town where lands are reserved for forests.

10. The State in selling any lands once deeded to the State, should never give a quit-claim deed, but should always give a warranty deed. Cases are now on record where citizens of this State in good faith buy the lands claimed to be the property of the State, and after purchasing these lands are obliged to allow other persons to cut off the timber or endure other trespass. A deed from the State should be sufficient evidence before any court to enjoin trespass of any kind.

But why should the State do these things now? Why not wait and let things develop? The answer is largely given in the nature of the case as here presented. The State is rapidly growing and with it, the demand for timber. According to the best estimates we use each year more than two thousand million feet of lumber and timber in our State. If timber and lumber are high, the house is not built and the barn "has to do;" development in every direction is hampered and checked.

But it takes 150 years to make white pine such as we have used in the past and it takes 50 years to make even fair pole timber fit for ordinary market. It is hardly a matter in which it is wise "to hold on and go slow and see how things turn out." The State is losing hundreds of thousands every year now and will lose more in the future on account of the absence of a satisfactory home supply of forest material. Similarly it is easy to regulate the entire matter of State lands or poor lands today. A reasonable price alone will do this to quite an extent. If left undone and if the old policy of advertising our lands as sheep range and the encouragement of land monopoly prevails, and once these lands pass into the hands of the land shark and are hawked out and colonized, the matter will be precisely where the older states of our country and where the states of Europe have foundered. No matter how universally this colonization may fail, no matter how wretched and run down large areas of these lands may become, the application of any remedy will meet with so many heads and so many and such diversified interests, that it will be only by the sacrifices of enormous sums and much time that Michigan of years to come, may correct the evil which the mistakes of Michigan today will cause. With a little conservative restraint, with a bit of good will and effort, with some attention to the experience of older states and people, the State of Michigan may, in a very short time, develop out of a blackened waste, a property which to the State will mean millions every year and which will mean even more to the people of the district in which it is located.

To leave millions of acres in a waste-land condition is a waste of money which no state should be guilty of. But this waste can partly be stopped at once and it should be.

The State should go ahead with the good example. Millions of acres of private lands await the right care which can and will come, but can come only when the State goes ahead and establishes a proper and efficient system of protection and develops a just method of taxation for these lands.

Nor should it be forgotten that this matter is one of great magnitude. The possibilities are great and it is doubtful if our State will have such an opportunity again.

SUGGESTIONS FOR SECURING QUICK RETURNS FROM FOREST PLANTATIONS.

BY PROF. CHARLES A. DAVIS, ANN ARBOR, MICHIGAN.

A constantly recurring question to those who are engaged in trying to arouse an interest in forestry, and in the establishment of forest plantations, is: "How soon may returns be expected from the investment which you are asking us to make?" This question must be met, if met honestly, and without mental reservations, by an answer which will, in many cases, offer discouragements to the land owner, or to the prospective tree planter because of the length of time which it takes, and must always take, trees to grow to reach marketable size.

However, assuming that a land owner has decided upon making a forest plantation, there are certain considerations which he may take into account in making his choice of methods of management, and of species to be grown, which will materially hasten the time in which the forest crop may be put upon the market.

At the outset, it is evident that there are at least two classes of owners whose needs and resources must be taken into account, namely: (1) The holders of small tracts of land which can be watched constantly, frequently visited and cared for at no extra expense or a very small outlay, and (2) the owners of large areas, which are remote from their places of residence, and for the care of which, men must be hired especially. The first group would include the farmers, and it is to them that the following suggestions are chiefly addressed, although the principles involved are, in general, equally applicable to all classes of forest planting.

Before all other considerations preliminary to establishing a forest plantation, must come the matter of market, not only at the present time, but for the time when the crop will be mature enough to be sold. This, it is needless to say, is, perhaps, the most difficult of all the problems involved, and its discussion complicated to such an extent, that it has no place in the present paper, except in so far as it may be said that the kind or form of forest crop which has the most general market, is the safest to plan for, while special forms of crop, depending upon either temporary fashion or particular demands, are not likely to give as large returns and may find no market whatever, when ready for harvest, because of change of fashion, or the cessation of the demand. At the outset the location of the plantation, its remoteness from or nearness of probable markets, its accessibility to general lines of traffic, the kind of markets, the type of soil, value of the land for other purposes, climatic conditions, the size of the area to be planted, the amount of capital to be invested, the kind and amount of care to be given, and the cost of this, and other equally important matters, all need con-

sideration, and must receive it if the work is to have any successful outcome.

Again taking it for granted that all of these have been investigated, and the planting decided upon, it is the purpose of the present paper to point out some of the lines of procedure to be followed if quick returns are to be counted upon.

The simplest of these, and the one which would first suggest itself, would seem to be the choice of rapid-growing species. It is well known that some kinds of trees grow much faster than others, especially when young, and not a few are persistent, as well as rapid, in their growth. At once we may divide such species as make rapid growth into two general classes, those with relatively hard wood, and the soft wooded. In the hard wooded group, belong the hardy catalpa, the chestnut, the common or black locust, the ashes, and some other species which, under favorable conditions are quite rapid in reaching a marketable size. The soft wooded group would include the poplars, of which the cottonwood, sold under various names, such as Carolina poplar, Kansas poplar, etc., is the largest, and also probably the most rapid growing of all our trees, the European willow, the basswood, and the majority of the coniferous species which will grow in our climate. Intermediate between these groups would be one which would include the soft maples, the elms and other species which need not be taken into account.

A second consideration, which is mentioned at this point, because it must be taken into account in determining the availability of a species for securing quick returns, is the possibility of using the wood of the species while the trees are yet in the pole stage, for some commercial and general purposes, so that the smaller sizes of the trees have a market value and can be sold at prices which will make it worth while to market them.

In general, the soft and brittle wooded species have no value in small sizes, except for paper pulp or for use in the manufacture of certain novelties. The wood makes inferior poles and posts, and poor fire-wood and the demand for material of this sort is very local and very small, since it is only used where no better material may be had. It should be said that the lack of durability rather than softness is the chief reason why such wood is not more valuable, and there are some of the evergreen or coniferous trees which furnish durable wood, which, though very soft, is in large demand for poles, railroad ties and posts, but these are not of specially rapid growth, and need not be discussed at this time.

On the other hand, when the hard wooded species are taken into account we find some that have wood that is durable and strong as well, and for small sizes of these, there is a demand which is likely to be increasingly strong and steady. It is evident then that such species are much more desirable as a crop than those which simply grow fast.

In the list of species already given, those which have the most durable wood are the catalpa and the common locust, and for many sites these two species are the best adapted for plantations where quick returns are sought. Of these two, the hardy catalpa has been very carefully studied by the Bureau of Forestry of the United States Department of Agriculture at Washington, and the results of this work, with tables

showing yields from large plantations and full cultural directions are to be found in Bulletin No. 37 of the Bureau and this may be had by applying to the Forester.

This tree is hardy in Michigan, throughout the southern part of the lower peninsula, and grows, when planted, as far north as Bay City, in the Saginaw Bay region, and as far as Grand Rapids on the western side of the State, but whether the species will generally endure exceptionally cold winters, north of these places, is doubtful, as many trees of good size and thrifty habit were killed in the winter of 1903-4 in various parts of the State, while in the same localities other specimens survived. The contention is made by advocates of the more general use of the species, that the true hardy catalpa is rarely to be obtained from nurserymen and that its close relative, the common or southern catalpa is sent out in its stead, and that this is the tree which does not endure our winters. While this may be true, the natural range of the hardy species is south of the southern boundary of our State and it is probable that it will not grow to full maturity in the northern part of the State.

This tree in order to make most rapid growth should be planted upon good soil which is well watered, but it will do fairly well upon poorer sites.

The common or black locust is a more hardy tree, although also of southern origin. It grows rapidly in almost any situation, will thrive in poor soil, upon embankments, on steep and dry slopes, and is capable of making excellent post timber. If it is grown under the best conditions, it makes large growth in a short time, but if it is to be grown to timber size, it should be mixed with other kinds of trees, especially those of somewhat slower growth, and denser foliage, for, as it approaches maturity, the locust top becomes thin and this leaves the soil unprotected and open to weeds and to wash and the sweep of winds, all of which should be avoided. The proper mixture for different conditions of locality and type of soil can only be determined after the careful study of local conditions, but for the production of posts and other small material, the locust may be planted by itself and no mixture need be considered necessary.

The chestnut is a native of the southern and southeastern parts of the State and makes rapid and persistent growth in those places where it is found at all and will undoubtedly grow well upon well drained and fairly good soil in most of the counties of the lower peninsula. It has been planted with success as a shade tree in various parts of the State, and there are a few plantings which have been made for growing nuts, but none, so far as the writer knows, for the purpose of timber production. The tree has been very commonly planted for posts and poles in southern New England and in Pennsylvania and New York, and excellent results have been obtained from its use. Some writers upon the subject have urged that the species be planted for its fruit, the sweet chestnut of commerce, and, judging by the price at which these nuts are sold in their season, such plantings should be very profitable. It should be remembered, however, that the trees which are planted for this purpose must receive very different treatment from those set out for timber production.

Of the other trees mentioned, it is probable that the basswood will be one that will be used much more extensively in the future than it has been hitherto for plantations, because of its rapid growth, its dense crown and the value of its wood for various purposes in small sizes, for while it has no value as post or pole timber, it is in demand in the form of small sized bolts for the manufacture of excelsior, cooperage stock and other small materials for which there is a constant demand and for which this wood is particularly adapted. The great freedom with which the species sprouts from the root-crown makes it the more valuable for plantation purposes, since by this means reproduction is assured.

As has been mentioned above, the poplars are all rapid growing species, but most of them are small even at maturity and some species are very subject to disease. The cottonwood, however, grows to large size and its wood may be utilized for lumber for various purposes and for pulp wood. In fact, where there is a demand for it all species of poplar in all sizes above three inches, may be sold to be made into wood pulp, but as the markets are at present in most localities, it is difficult to sell the wood in small quantities except for fuel. The wood of various cone-bearing trees, the spruces especially, might be grown quickly on the right kinds of soil to such size that it would be suitable for pulp wood and unless some substitute for wood is discovered eventually the pulp mills will have to depend to a considerable extent upon planted timber for their supplies and then local markets will be developed.

The most likely way to secure quick returns from plantations of conifers, is to grow them for greens for the winter holidays and for Christmas trees and for these purposes the various spruces, the balsams the arbor vitae and the hemlock are well adapted and make sufficiently rapid growth so that they could be marketed at from five to twenty years after transplanting into the plantation. The greater beauty and symmetry of such trees would give them an advantage over forest-grown specimens, and the fact that a certain supply could be assured, would encourage dealers in the cities to make a market for such a product.

Under certain conditions of natural growth large numbers of small poles of various species of the broad-leaved or hardwood trees develop upon areas which it is desirable either to thin or to restock with other species and under such circumstances the poles may be converted into barrel hoops with profit, but it is very doubtful if any of our native trees could be planted and harvested for hoop poles at a reasonable profit to the owner of the land. On the other hand, stakes for grape vines, hop vine poles, and mine props are forms of small material which should find ready sale in certain parts of the State and give good returns.

The production of fire-wood is a method of securing quick returns which should be more often considered than it has been in the past. Here quantity of wood, rather than quality, will count much more in the future than at present, when there are still forest-grown supplies of the better sorts of wood to be drawn upon for fuel. Even now the difference in price between the best hard woods and the inferior soft woods, when sold for fuel, is not great enough to offset the difference

in the rate of growth of such species as the hard maple or hickory on the one hand and the elm, the cottonwood and the European white willow on the other. Plantations for fire wood production since quantity of wood in the shortest time possible is the aim, can be made much more open than for timber production and the trees given larger spaces so that they may have light and air in abundance. Such plantings may be made in fence rows, in ravines and in any places where the land cannot be made to produce satisfactory agricultural crops. Many farmers are now buying fuel who could readily grow enough for their own use in the uncultivated parts of their farms and the time is not far distant when much more tree planting for the purposes of raising fuel will be undertaken than at present. Fire wood production takes little care and less skill and the certainty of a market is, in this climate, absolute, whenever the owner is ready to harvest his crop. In planning for the production of fire wood, however, it should be remembered that since the amount of wood which will grow each year upon an acre of land is small on the average, about one cord, and the price for this kind of wood also small, only the most undesirable land and the fastest growing trees should be used if the crop is to be made a paying one from the financial point of view.

If the quickest possible returns are to be obtained from tree plantations it must be borne in mind that trees are like other plants and thrive best and grow most rapidly when they have good soil and good care and fail to give the best results if they are not cared for, hence after plantations are made they should be cultivated for such length of time as is necessary to keep the young trees from being choked out by weeds and grass, generally until the branches meet to form a soil cover. A type of situation in which tree plantations should be very successful in our State and one which is generally of little use for other purposes is the stream bottom lands. These are so subject to flooding and general washing that often they are abandoned to brush swamps, or sedgy growth and poor, weedy pastures, when, with a relatively small outlay they might be converted into timber plantations upon which the most rapid development of trees possible could be expected.

In small plantations and in cases where it is possible to afford a large initial expenditure and where the matter of rapid returns is of great importance, it is possible to secure them by the relatively wide planting of older stock, not however over four or five years old, then giving thorough cultivation and frequent pruning in order to secure the form of crop which is desired and to prevent too much branch development. This course of procedure is not to be generally recommended on account of the great cost, but it is possible that circumstances may sometimes warrant it. It is always to be considered that too much crowding of trees in plantations will cause a stunting of all the individuals which are over crowded from which they will recover but slowly, if at all, and this in turn will delay the harvest of marketable material. The over crowding may be avoided by thinnings made at frequent intervals in which the practice may be either to remove the poorer and imperfect individuals or the largest and best. It is probable that a compromise or middle course will give the greatest satisfaction and this would require the favoring of the better and stronger plants in the early thin-

nings and the taking out of the largest and best as soon as these reach such size that they have a market value, but in this connection it should be remembered that it is with trees and other plants as with animals, that some individuals are robust and vigorous by nature, while others naturally are weak and have a tendency to succumb to unfavorable external conditions of all sorts, and so, if the practice of removing the best individuals in the thinnings is resorted to the final cut will be somewhat delayed and its quality will be more or less inferior to what it would have been if the best instead of the poorer and slower growing individuals had been favored and allowed to form the final crop.

The final point in the consideration of securing quick and sufficient returns from forest plantations is also one of the most important. It is *finding market*. In a state where there are so many industries which depend upon a supply of various grades of lumber for their existence, it is surprising that there has not already been a greater development of markets, but the great quantity of timber which has been produced incidental to the clearing of our lands for agricultural purposes has, in large measure, prevented this, but as this vast natural supply is more and more depleted the competition of various industries will inevitably bring about a change in this respect and markets will be developed in which all forms of forest product will find ready sale, and even at present it is possible to find a market for most kinds of timber, if any quantity is offered for sale by making inquiries at the larger centers of distribution. Upon the successful marketing of the crop will depend the amount of income from the investment, hence the importance of finding the best possible buyer.

To summarize them, the following are the methods which are recommended for securing quick returns from forest plantations:

1. Plant rapid growing species which can be sold when of small size.
2. Plant kinds which produce largest amounts of wood for fire wood production.
3. Plant upon the best available soil.
4. Take care of the plantation and by cultivation and thinnings prevent stunting and cessation of growth.
5. In exceptional cases wide planting of rather large trees may be undertaken, these to be cultivated and pruned to hasten the development.
6. For all kinds of forest crop find the best possible market.

AN OBJECT LESSON IN GROWING FIRE WOOD.

BY LYMAN A. LILLY, PETOSKEY, MICH.

If we should compare the area of timber lands in this State at the present time with that of forty years ago and then estimate what it will be forty years hence we should not only be surprised but alarmed at the outlook.

While the people of each generation can look out for their present needs for food and raiment the future generations will be dependent on the present generations for their supply of fuel and building material.

The land owner, whether it be the State, corporation or individual, must be the one to take up, consider and solve this question.

The State has its duties to perform in looking after the lands under its control. Firms and corporations would do well to protect the young timber that will come up on lands that are too poor for general farming. And the Michigan farmer would profit by taking a trip through the prairie states and see the groves that surround the buildings and protect them from the heat in the summer and from the winter storms and furnish a little timber for use on the farm.

To wait for trees to grow sufficiently large to be cut for fuel is discouraging to many, but time moves on and before we realize it ten years have past and where then we had a small sapling, now we have a tree that commands our respect.

In the spring of 1886 I bought a farm that had been stripped of all its native timber. Some years previous to my purchase the owner had set out a willow hedge on three sides of a square forty acres of muck land and at the time I went on the place some of the trees were eight inches through and thirty feet high. In the course of a year or two I began to cut this hedge and use it for summer fuel. The willow cuts and splits easily, dries very quickly and makes a very hot fire, but does not last long, but when the good housewife gets used to it, she finds she has a quick, hot fire and is soon out of the way when she is through with it, and is altogether quite satisfactory.

The willow after being cut sprouts from the stump, but does not spread from the root, and grows very rapidly, the second and succeeding trees growing much quicker than the first on account of having the benefit of the strong root.

I cut what I needed each year and by the time I got around the second crop was ready and it would average as heavy as the first and would measure up a cord for each rod in length of hedge.

This hedge answered for a fence and furnished shade for stock. For live posts the willow is well adapted, as it will stand any amount of rough treatment and need not be allowed to grow any more than you wish it to. At the present price of fence posts in the older parts of the

State it will pay any farmer to consider this well before he expends much money in posts that are not permanent.

The willow on moist ground is easily propagated. It can be done by putting any sized sprout or stick into the ground where you want a tree or in the nursery row to be rooted and grown for transplanting on high, dry ground.

When wanted for shade the willow forms a nice bushy top, and grows very fast, the only objection is that after the tree gets some size the wind will break off some small limbs.

In conclusion we would say to every land owner, stop and consider this subject of forestry and after looking it up, you will certainly have to admit that you have a duty to perform in perpetuating the forests, not only for the convenience but to the profit of the coming generations. And to go a little further and look at this subject from a little different standpoint, we can readily see that we are only stewards of "Old Mother Earth," and if we are faithful in our trust we will deliver to our successors a legacy that will bring comfort to the millions that are to follow.

A RATIONAL VIEW OF REFORESTATION FOR MICHIGAN.

BY HON. E. W. BARBER, JACKSON, MICH.

Aside from the increasing money value of forest trees, which supply material for shelter, fuel, railway transportation, shipbuilding, telegraph and telephone service, furniture, implements of all kinds, and the varied utilities of civilized life—the mere economic value of timber—the protection that wooded areas afford to the arable lands of the State, rendering them more productive and the crops more certain, is a matter of the highest importance.

Human sustenance comes almost entirely from the soil. The wealth, the prosperity, the support, at a vigorous standard of living, of a large and thrifty population, instead of an impoverished and discouraged class striving for a poor living on unproductive land, depend largely upon the preservation and restoration of conditions which promote an increased supply of food, fuel and shelter to meet the requirements of a larger number of inhabitants.

The incidental advantages that would follow the protection of the arable lands of Michigan from being wind-swept and from the winter-killing of wheat and clover, as was the case last winter, involving the loss of labor, seed and millions of dollars by the farmers of the State, and in the protection of the streams from destructive freshets in the spring and from equally ruinous drouths in the summer, would be of permanent and incalculable value.

Michigan, when it had more forests and their protective influence, was a great wheat State. The crop was reliable and profitable. From the maximum of a comparatively few years ago the total yield has shrunk fully three-fourths, or from 35,000,000 to 8,000,000 bushels, and even less. Personal observation in Jackson county, and the same is true of other

southern counties in the State, showed that the acreage sowed in the fall of 1903 had a hard time. It was winter killed, and when the growing season came in the spring and early summer, the growth was uneven. There would be patches in fields near the fences and where sheltered by windbreaks of very good wheat, while in other parts of the field the stand was light and immature. Portions of fields were ready for the reaper when other parts were green, and the product only fit for chicken feed. Where there was a stunted growth of straw the grain shriveled, rendering much of the small amount of wheat produced simply good screenings.

The protection afforded by a strip of woods—the windbreak—reveals one cause of the failure. Where there were no trees the loss was total. During the cold and backward spring, and the springs are colder and later since the forests were cut away than they used to be, the winds swept over the unprotected fields of wheat and clover, killing the plants, and entailing losses to our farmers that run into millions of dollars.

The arable land of the State needs the protection of forests to insure its crops, to lessen the destructive danger from both floods and droughts. Let us take for illustration two hillsides of identical slope and exposure, one being forested and the other cleared. In passing, we may state that it is barren hillsides and hilltops, which do not pay for cultivation, that should be reforested. In the supposed case, the rain falls on the canopy of trees in the one instance and drops softly from leaves and branches and trickles slowly down the trunks. Who that has been familiar with falling rain in the forest does not realize this to be true? The soil beneath is soft and loose, and even in winter it does not freeze hard. It is a composition of disintegrated drift, of decaying leaves, twigs, and even logs, all tied together by a mass of roots and rootlets. The rain comes upon this forest soil so gently through the trees that the ground is not compacted and hardened or gullied as it would be if it fell upon the naked earth.

The loose and spongy soil absorbs the water as fast as it falls, and that which is not taken up by the roots for the nourishment of the trees is carried away into underground reservoirs, from which it slowly percolates, and finally comes out upon the surface again as springs. So slowly does this filtering go on, the spongy soil holding back the water, that the springs are furnished a constant and almost steady supply. Even drought will actually dry up but few of them. Snows also will melt slowly in the forest, thereby preventing disastrous spring freshets.

In the other case, that of the treeless slope, the rain falls directly on the bare ground, and makes it hard and impervious. The water for the most part runs off superficially, as from a roof. Not enough of it sinks into the ground to make the constant springs, and so the brooks dry up and become only a memory. The surface volume of a hard rain on a bare hillside is also conducive to washing and gullying of a most destructive nature, carrying away the most fertile elements of the soil, and the muddy waters being poured immediately in the stream beds, the natural drainage channels that traverse fertile valleys, cause freshets, and the accumulated waters rush quickly by, making havoc with fields, fences, bridges and mills—and in a short time the streams are nearly dry again.

One strong reason for the reforestation of the hillsides and hilltops of Southern Michigan is to protect and save the best arable areas of the valleys and the level stretches of the table lands for intensive cultivation, and thereby preventing the steady depletion, which has been taking place for the past twenty years, of its rural population. It is not saying too much to affirm that, really, the future welfare of our people, or of any people, will depend, in some not far distant time, in some nearby generation, on forestry laws and their observance.

Michigan is comparatively a new State. Some persons are living who remember the time when it was an almost unbroken forest. The best agricultural results are obtained if one-third of the area in States where the annual rainfall averages from thirty to forty inches is in forest, but in some of our counties not more than one-tenth to one-twelfth of their surface is woods of any kind, and generally these are not so distributed as to give to the arable land the best obtainable protection. The farm of eighty acres, with twenty-five acres in a permanent woodlot, from which timber is cut to save it, is worth a great deal more than one that is entirely cleared. If half of our area was forested and the other half subjected to intensive cultivation, the total yield of all crops would be greater than it can be under present conditions, and the rural towns would be able to support an increasing instead of a declining population. The acreage of cleared land is too large for the best results; and the acreage of the profitable arable land would not be decreased by covering one-third of our area with forest trees of the useful and rapidly growing kinds that are best adapted to our soil and climate.

Farmers sometimes think they are wasting too much land when they devote a few acres to trees that do not produce fruit, and at most only a row or two can be permitted to grow on the outer border of the farm, next to the fence, perhaps; for they shade too much ground, or the roots sap the soil and rob the crops. These are some of the objections urged to bodies of trees. The objections are delusive. The benefits are lost sight of. The salutary influences of heavy belts of trees far outweigh the injury done to a few rows of corn. More acres of corn, wheat, clover and other crops are not needed; for the time, money and fertilization devoted to fewer acres of arable land that is protected by forest windbreaks will bring more satisfactory results.

What is needed now in Michigan is not theories and plans, but practical tree planting; not words, but works; and all efforts should be turned in that direction. The actual planting of trees is the thing that should be done. To plant trees now is more important than to spend a year in thinking about it. True, there are many things to be learned in American forestry. What trees to plant for earliest maturity, what distance apart to plant for greatest economy of time and labor, with the largest possible income for the investment, as well as for the protection of the best arable land, are questions to be considered, as they are vital to successful forest perpetuation.

Unless methods are adopted that shall increase the productiveness and value of the arable land of southern Michigan, nothing seems more certain than that the population of the rural towns, many of which lost from fifty to seventy-five inhabitants between the time of taking the United States census in 1900 and the State census in 1904, will con-

tinue to decline. The welfare of Michigan demands that steps be taken to retrieve these losses. When settlers began to move into the territory and purchase the wild land of the government, about three-quarters of a century ago, nearly all of its acres were covered with magnificent forests. It was found, as they were cleared away, that the soil was very fertile and productive, so that "when tickled with the hoe it laughed with the harvest." Here and there were a few small prairies, mostly in the southwestern part of the State, but they were mere oases in a vast wilderness. Clearing the land of trees was the first hard work. Too much of it was cleared. As a rule, the highest lands were cleared first, the more fertile intervals along the streams being left for the final work of denudation. For many years, when a larger proportion of the acreage was covered with forests, there were no complaints of the winter killing of wheat. Half a century ago agriculture was prosperous in Michigan, and good farms rose in value to a hundred dollars an acre and over. As late as 1879 Washtenaw county was one of the few counties of the State composing the old Northwest, the value of the agricultural products of which amounted to over five million dollars. The hardwood timber on the land became valuable. Lumbermen bought the stumpage, or even the land itself, stripped the timber, and where they owned the land, sold it for what it would bring. The railroads that commenced traversing every southern county, even almost every town, some forty years ago, made marketable every tree that would produce good firewood or lumber, and the work of denudation went on rapidly. Not enough of the forests was left to afford windbreaks, shelter and protection for the arable land. It can now be seen by any investigator of census statistics that from the time this work of forest destruction was completed there has been a steady decrease in the rural population of what was once the fairest and most productive portion of southern Michigan, and that decline has been swifter from 1900 to 1904 than at any other period of our history. Cause and effect have never been more apparent and traceable.

From the viewpoint of the present, no one will dispute the statement that Michigan has been prodigal and wasteful of her natural wealth of timber. This has become more noticeable during the past decade than ever before, because the forest area has been so reduced that every acre denuded of its trees has changed the appearance of the landscape, until, finally, it has changed in many localities the outlook from beauty to barrenness when the fields are wind-swept in winter and spring, or when parched by droughts in the summer.

That the denudation of our forests has had some effect on climate, making crops more uncertain, and has greatly changed the character of our streams, increasing the volume of storm water flow, instead of holding it back and giving a more even volume through a longer period, are facts that are well established. The nakedness of a landscape, barren of trees, is to some extent a sentimental and aesthetic consideration, but should not be entirely overlooked. Not only the beauty and attractiveness of the State are increased, but the value of all the land will be enhanced by intelligent and systematic attention to forestry.

While what seems to be an incidental advantage, the increase of the productiveness of the arable land, with its consequent ability to sup-

port a larger and thriftier population, is really of the first importance, there is a strong argument in favor of forestry in the growing scarcity of timber and the great advance in price. This has reached a point where the Pacific coast and our Southern states are already marketing lumber in Michigan cities, without which many of our industries would disappear, and this demand cannot fail to increase steadily in the years to come.

It is quite difficult to convince Americans of the utility of something that will not pay. One bad effect of the prevalence of the merely commercial spirit is that it leads to the sacrifice of the limitless future to the immediate present. Quick returns are expected. Forests are destroyed in our time, as they have been in other countries for the sake of the money they bring, which is soon spent, and both the money and trees are gone, without any reference to their protective influence upon crops or future value. It is unwise for a nation or a state to sacrifice future welfare and prosperity for a few fleeting present dollars. Finally, neither the prosperity nor the dollars save the land from impoverishment and the people from poverty. With the spread of information on this subject, economic necessity will bring a change. Forestry will become popular in Michigan when the men who own its farms and those who are looking for safe investments that will bring reasonable returns, and are willing to labor and to wait for results, are convinced that reforestation will pay. Evidently, that time has come. In some sections of the State, at least, where almost barren hill lands have ceased to pay for their cultivation, a proper direction of wisdom and energy toward tree growing will bring good results on the capital invested, and at the same time help to make the arable land more productive. Nature has no use for the speculator, as something for nothing is not one of her lessons.

The profitableness of tree planting can be demonstrated by experiment, and the State should bear the expense of the test. The determination of the best varieties of timber trees for different soils, especially for the denuded hills that are of slight, if any, value for cultivation or pasture, cannot be worked out in a month or a year. It is a proper subject for study and experimentation by the Agricultural College, the State University and a Forestry Commission.

A beginning should be made. Land too poor for successful cultivation in farm crops, where grasses do not thrive for the pasturage of stock, yet where moisture enough for trees is not lacking, should be reforested with such trees as will improve the conditions of the soil, in order that agriculture may become more profitable on the arable acres that nature has best adapted for an ever-increasing yield of food for growing millions of population.

The State has enacted laws for game and fish protection, not because these were matters of so great importance as would be the policy of saving and increasing the fertility of its arable land, but because sportsmen have taken an interest in these subjects, and, incidentally, the State is benefited. Beyond question, the propagation of trees is of vastly greater importance, and yet the damaging and dangerous results of careless and heedless methods in dealing with our forests, as affecting coming generations and the permanent welfare of the State, receive scarcely any attention.

Men learn from experience. The pinch in fuel two years ago did much in the way of calling attention to the value of woodlands. Farmers who were so willing to cut off their timber that they might have more land for crops, began to ask themselves if it was not really practicable to plant some of the poorer acres of the farm with trees, so that they might be sure of fuel within a reasonable time. The vineyard interests, which use a great many stakes that cost a high price, are beginning to inquire if they cannot raise their own stakes and posts. The wood-pulp men, who are slaughtering forest acreage at a tremendous rate, are beginning to ask if it is not practicable to grow pulp wood at a profit. In answering these and other questions, which economic necessity is beginning to suggest, forestry advocates and forestry commissions are gaining some listeners to their contentions, and in a small way there are indications that within the next few years there will be a number of experimental woodlots planted; but as we are slow in getting started along practical lines, the larger question of the State's responsibility and duty, as well as opportunity, in connection with the lands that have neither private owner nor occupant, but are turned over to speculators and dealers in tax titles, is of immediate and great importance.

With reference to the arable lands, which determine with inerrant certainty the number of people who can be supported, according to the American standard of living, on a given area, the condition that confronts the people of Michigan is of a most serious character. Every census since 1880 has revealed a decline in the population of the strictly agricultural towns in southern Michigan, and the decline from 1900 to 1904 was more rapid than ever. The capacity of the soil to support inhabitants is the test of the number who will remain on it and cultivate it. As the land becomes poorer, the population is sure to fall off. This may not be wholly attributable to a single cause, but history and experience teach the lesson that in all countries where the rainfall and climatic conditions were at least as favorable for production as they are in Michigan, the destruction of the forests has been followed by disastrous consequences. It is folly to expect that Michigan, or any other portion of the United States, can escape what has been proven to be the inevitable result of too great a destruction of the forests. The law of cause and effect is the same for all. We can save our arable land and increase its productive ability only by the maintenance of the protection of a proper percentage of woodlands.

Dr. Felix L. Oswald, a wide traveler, observer and student, tells us what has taken place in other countries. In an article in the *National Magazine*, he says: "The climatic history of the Old World will repeat itself in America. If forest destruction, at its present state of recklessness, should continue much longer, our continent will have to dry up. So will an orator who should venture to urge that fact upon a boodle Legislature, in this era of lumber trusts. But the fact remains, and its significance may be inferred from the experience of the Mediterranean coast lands, where thousands of god-gardens have been turned into Gehennas of wretchedness and desolation. By tree destruction alone, a territory of 4,500,000 square miles has been withdrawn from the habitable area of our planet. The physical history of the eastern hemisphere is the history of a desert, that originated somewhere near the

cradle of the Caucasian race—in Bactria, perhaps, and, spreading westward and southward, has blighted the Edens of three continents like a devouring fire, and is now scorching the west coast of Africa, and sending its warning sand clouds out to seaward.”

Another author informs us that the eastern borders of the Mediterranean, previous to the time of King Solomon, maintained a population of ten millions of people. The rich agricultural region about Jerusalem at that time provided food not only for these millions of Solomon’s subjects, but for the dwellers of the country round about who dealt with the Israelites. Early it was a land flowing with milk and honey. This is fully attested by all ancient writers, as well as by sacred history. So long as the great range of the Lebanon mountains was covered with trees, the rains were regular and abundant, and agriculture was the principal occupation of the Jews. With the removal of the forests from these elevated coasts, electrical conditions were changed, droughts became more and more frequent, agriculture became a more precarious occupation, grazing took its place, and, finally, Palestine became uninhabitable, except to a handful of wandering Bedouins.

Hon. George P. Marsh, for many years the United States minister to Italy, in his work on “Man and Nature,” declares that if the countries which mankind have ruined could be restored, “The thronging millions of Europe might still find room on the eastern continent, and the main current of emigration be turned toward the rising instead of the setting sun.” He further says: “There are parts of Asia Minor, of northern Africa, of Greece, and even of Alpine Europe, where the operation of causes set in action by man has brought the face of the earth to a desolation almost as complete as that of the moon; and though within that brief space of time, which we call the historical period, they were known to have been covered with luxuriant woods, verdant pastures and fertile meadows, they are now too far deteriorated to be reclaimable by man, nor can they again become fit for human use, except through great geological changes, or other mysterious influences, or agencies of which we have no present knowledge, and over which we have no present control.”

No fact is better authenticated than that vast regions of country once fertile and populous, have been rendered sterile and tenantless by the destruction of their forests. Prof. Archibald Geike, the eminent geologist and student of nature, wrote in the *Popular Science Monthly* for September, 1879: “It must be owned that man, in most of his struggles with the world around him, has fought blindly for his own ultimate interests. His contest, successful for the moment, has too often led to sure and sad disaster. Stripping forests from hill and mountain, he has gained his immediate object in the possession of their abundant stores of timber; but he has laid open the slopes to be burned by drought, or to be swept bare by rain. Countries once rich in beauty, plenteous in all that was needed for his support, are now burned and barren, or almost denuded of their soil.”

In the *North American Review* for January, 1879, Dr. Felix L. Oswald declares that “since the beginning of the sixteenth century the population of the four Mediterranean peninsulas has decreased more than fifty-five millions, and the value of their agricultural products by at

least 60 per cent," and in a sweeping review of the cause, he adds: "Afghanistan, Persia, Mesopotamia, Syria, Asia Minor, Greece, Macedonia, the southern islands of the Mediterranean, and the whole of northern Africa, from Cairo to the western extremity of Morocco—countries which were once blessed with abundance and a glorious climate—are now either absolute sand wastes or the abodes of perennial droughts, hunger and wretchedness; and wherever statistical records have been preserved, it is proved, beyond the possibility of a doubt, that their misfortune commenced with the disappearance of their arboreal vegetation."

The author of "Conflict in Nature and Life" asserts: "Forests obstruct the winds and protect man, animal and plant. They prevent evaporation, absorb the rains, and thus feed perennial springs and maintain the constancy of the streams below. The forests gone, the floods which follow damage the labors of man, and the dearth of water which follows is often with difficulty made adequate to the supply of civilized needs. Driving winds, now unobstructed, blast the winter vegetation, while frosts strike with more force, and it becomes more difficult to grow the fruits and grains as the country becomes cleared. The very means which man uses to obtain greater production from the earth brings him trouble and renders production more precarious."

Prof. Charles Burton Gulick, in a book recently published on "Life of the Ancient Greeks," in comparing the rich past with the impoverished present of Greece, has this to say: "As early as the fourth century, Attica was becoming a waste, because the state and the people failed to realize the importance of preserving the once rich woodlands of Parnes, Pentelicus and Hymettus. The trees were cut down wastefully by lumbermen, who found their profit in the great demand for timber for house and shipbuilding, furniture and fuel. Perhaps most harm was done to the forests by shepherds and goatherds, who deliberately burned down trees in order to gain more pasture land."

Commenting upon this, the Portland Oregonian remarks: "Here is competent testimony as to the effect of forest spoliation upon Greece, a record of actual experience, not of speculative reasoning. Possibly Greece's glory would not all be in the dim past if her forests had been preserved. Her maritime power might not have vanished, her soil might not have become so lean and stony, her climate would certainly have been modified, the spirit of her people might have been perpetuated by an environment which brought it to so great a degree of refinement and strength. No good results of the destruction of Attica's mountain forests can be cited. The evil effects were many and obvious. May we not learn something from this history?"

While in most cases of desolation caused by the destruction of forests there is no record left of the slow but sure progress of the ruin, which has changed once fertile and populous arable areas to barren and depopulated wastes, there is abundant opportunity to study and know what has occurred within the last hundred years under the eyes of competent observers. Statistical returns show the gradual destruction of arable lands and the consequent depopulation of entire provinces in southeastern France from the cutting away of the forests. It did not require many years to deprive thousands of their homes and send them

elsewhere to find means of subsistence. It was stern necessity that in ten years, from 1842 to 1852, caused the department of the Lower Alps to lose 61,000 acres of arable land, which, Mr. Marsh, above quoted, tells us "had been washed away or rendered worthless by abuses of pasturage. In five years, from 1851 to 1856, the several departments of the French Alps lost 103,000 inhabitants." Then the French government took hold of the matter of re-forestation in earnest. The hills and sources of the streams were rewooded, the old area of arable land was restored, and so was the population.

Spain is a standing testimony to the immeasurable value of forests and the calamity which attends their loss. Writing of its changed conditions, Emil Rothe says: "Under the reign of the Moorish Caliphs, the Iberian peninsula resembled a vast garden, yielding grain and fruit of every known variety in the most perfect quality and in endless abundance, and was thickly populated by a highly cultivated people. But the Sierras and mountain slopes were covered with a luxuriant growth of timber, which was afterwards wantonly destroyed. * * * Now nearly all the tablelands of Spain, being fully one-third of its whole area, are desolate and unfit for agriculture because of the scarcity of rain and the want of water. * * * The average depth of the five rivers that cross Spain in all directions has greatly diminished."

Russia, too, furnishes a striking example of the ruin caused by deforestation. The large rivers, once bordered by immense forests, are growing smaller, choking up with wind-wafted sands, and some are already dry, even the springs having ceased to flow. Harvests are more frequent failures, and the famine of 1891 was severest in the districts where the destruction of forests has been the completest.

Every nation in Europe, once possessed of large forest areas, has learned the disastrous results of forest destruction in the costly school of experience. The most fertile parts of France and Italy were well-nigh ruined by the destruction of their forests. The drifting sand dunes on the Baltic coast threatened Germany with an inundation. Switzerland was rapidly being torn by avalanches. Portions of Austria-Hungary bordering the sea were denuded of all soil, because deprived of forest protection, only the bleak and glistening rocks being left.

Gradually, however, the foremost European nations began to realize the fact that their own ignorance and misconduct was the cause of their deteriorating condition, and they commenced to arrest the downward tendency by restoring their forests. Forestal influences became the subject of profound investigation. Laws for the protection of forests were enacted and were enforced. In France, since 1860, more than \$30,000,000 has been expended in reforesting portions of the country where, after having been stripped of the woods, the loss of arable land and of population became serious.

Can we expect to escape like consequences when our forests on hill-sides and at the headwaters of our rivers and their tributaries are destroyed? Considerable of the soil of Michigan is a sandy loam, the average annual rainfall is less than thirty-five inches, and droughts that shorten the yield of crops are liable to occur, for the soil dries out quickly in summer and is liable to be wind-blown in winter where unsheltered by forests. Referring to Ohio, and what is said is equally ap-

plicable to Michigan, Mr. Rothe observes: "Let the hills be deprived of the rest of the protection which the forest affords and half the area of the state will be sterile in less than fifty years. The rain will wash the soil from the hilltops first, then from the slopes; the limestone, which is now covered with productive humus, loam and clay, will be laid bare. * * * The rainfall will be diminished and become irregular. Snow and rainwater will at once run down in the valleys and cause periodical freshets."

Already in Michigan we have our bald and barren hills, our rivers flooded in spring and shallow or dry in the ordinary midsummer. Wet seasons are rare. Crops will be more certain with a larger timber area. Is it not time to call a halt in forest destruction and to commence reforestation on a systematic scale? Are not the necessities of the case sufficiently apparent? Can we not read history and learn the lessons of experience? Must destruction proceed until our prosperity is more seriously endangered and our rural population is further diminished?

In many European countries, where forest culture is taught as an exact science, the people have learned its importance in the dearest and most valuable of all schools—the school of experience. With them it is not a question of what will pay from the lumberman's viewpoint, but what will save and conserve the best arable land from the evils that are sure to follow the destruction of their forests. The necessity already exists, not only for preserving the forests we now have, but also for planting new trees and adding to them. Whenever the beginning is made to repair as far as possible the damage that has been done, it must be undertaken with the knowledge that the generation making it cannot profit much by it. To a large degree, the work will be unselfish. The great benefit will be for those who come after. Perhaps it may be too much to hope that a beginning will be made before imperious necessity compels it, in order to save our fair peninsula from becoming less populous and prosperous as an agricultural State. The census tables show that its decline in this respect has commenced. Every foot of its best arable soil can be made more productive by the reforestation of lands it does not pay to cultivate. Unless steps are taken to do this, nothing under the sun seems to be more certain than that our rural population will continue to decline from year to year, and from decade to decade, until a wiser generation than the present shall encourage some systematic and effective plan of tree planting and growing. No worthier work can be done by our own people.

What has been will be. Speaking of the devastation following the removal of forests the world over, George P. Marsh says: "When the forest is gone the great reservoirs of moisture stored up in its vegetable mould is evaporated, and returns only in deluges of rain to wash away the parched dust into which that mould has been converted. The well-wooded and humid hills are turned to ridges of dry rock, which encumber the low grounds and check the water courses with its debris, and—except in countries favored with an equable distribution of rain through the seasons, and a moderate and regular inclination of surface—the whole earth, unless rescued by human art from the physical degradation to which it tends, becomes an assemblage of bald mountains, of barren, turfless hills, and of swampy and malarious plains."

POLES FOR WIRE PURPOSES.

BY J. B. WARE, GRAND RAPIDS.

Until within very recent years the Cedar Swamps of Michigan were considered an almost inexhaustible source of supply for all poles needed for wire purposes for this and adjoining states.

The demand for cedar poles has been extraordinary during the past five years, by reason of their demand for electric road, electric light, telegraph and telephone purposes.

From the annual reports of telegraph and telephone companies filed with the Auditor General of the State, from computations based upon the railroad and electric road mileage, as shown by the railroad commissioner's reports; from an estimate of the poles used for electric light, fire and police department in its municipalities, the following estimate of the number of cedar poles now in use in Michigan is undoubtedly far short of the actual number:

Railroads	290,000
Electric car lines.	75,000
Electric light and city.....	90,000
Telegraph	365,000
Telephone	660,000
	1,480,000
Total poles.....	1,480,000

Besides the post and railroad tie products, the Michigan swamps have for the past three years furnished more than 350,000 poles annually.

Heretofore, the number of poles sent out of the State greatly exceeded the number used within its borders. With the supply about equal to the demand, during the past eight years, the poles have more than doubled in price, because the source of supply was rapidly getting less.

Estimates by practical cedar pole shippers and cedar timber owners, as to the Michigan supply for future pole consumption, naturally vary, but the writer, after some investigation, believes that there remain uncut less than 700,000 cedar poles in the State, and one of the best known pole men estimates but 400,000. Thus it is a question of but a few years at most until Michigan's cedar for poles will be entirely exhausted. Then what?

The telephone companies, as will be seen by the above table, now own the greatest number of poles in use. The business, from the pole standpoint, has been largely developed in a majority of the cities, towns and villages of the State, and the independent telephone companies have developed to a considerable extent the rural communities. There yet

remain in Michigan, as in neighboring states, thousands of farmers who need and must have telephone facilities, which cannot be furnished without poles.

No one can estimate with any degree of accuracy the number of poles that will be required for this rural development, but few indeed should be the country roads upon which there will not be a line of poles for farmer telephone purposes. Will 500,000 poles during the next ten years properly supply the demand in Michigan? Probably not, but, even so, where are the poles to come from at reasonable cost?

In addition to the demand in our own State, is the demand in neighboring states for like business.

Beyond the requirements already mentioned, is the problem of replacement of poles.

An estimate that within eight years over one-third of all poles now in use must be removed or reset after cutting off six feet of their butts, is probably too small an estimate. In fifteen years practically all the twenty-five-foot poles, six inches and less at the top, will be worn out, as will be the great majority of the longer and larger poles now in use.

Thus in the near future, within the lifetime of another generation, we need many thousands of poles, which will of necessity be secured outside the State, and probably at figures astonishingly high, as compared with present prices. But more important is the supply after the "near future" demands are cared for.

As a matter of fact there is no pole known to the pole using companies of today, having the many admirable qualities of the Michigan cedar.

It is symmetrical, smooth, straight, stiff and easy to climb, even after being long in use, and the most durable of native timber.

The tamarack pole is short of life and becomes so hardened after being one season in the ground as to make it difficult and dangerous to climb.

The poles cut from the oak and other native hardwoods are unsightly and undesirable as compared with the cedar. This latter is native to the State, and the State should promptly take proper steps to secure the cultivation of the cedar for the use of future generations.

Of those best posted on forestry subjects the claim is made that the cedar can be profitably grown by the State, even with its slow development. Under most unfavorable conditions, it requires more than one hundred years to grow cedar for pole purposes, but with proper state supervision it is claimed that the time required for growth of cedar will be greatly reduced.

The State Land Commissioner estimates that Michigan now owns of so-called worthless swamp lands to exceed one million acres, and over five million acres of "worthless" land not swamp. The State goes on and on, and time is of little value for the producing from said "worthless" lands and at exceedingly small cost, future value and fortune for our Commonwealth and its citizens.

While comparatively little has been done in demonstrating the possibilities, climatic, etc., of bringing into the State other tree products, yet everything points to flattering prospects along these lines.

Thus the Catalpa, which the Illinois Central Railway, the Denver & Rio Grande Railway and other railroad companies have begun to raise for pole and tie purposes, is probably a most valuable tree for Michigan culture.

It is a rapid grower, producing 25 foot 5 inch top poles in about twenty years and its poles are of long life. Catalpa poles and ties are in demand and apparently this State cannot consistently delay large efforts in the way of cultivation of the cedar, the catalpa and other trees of equal value.

It seems to the writer that the future need of its citizens and of its telephone and other wire interests demands that the State, without delay, earnestly consider and actively promote its forest interests for pole and other products.

October 26, 1904.

FORESTRY IN BADEN, GERMANY.

BY ED. H. STEIN, SECRETARY BOARD OF EDUCATION, GRAND RAPIDS, MICH.

During a residence of nearly six years in the Grand Duchy of Baden, in southern Germany, the writer had the very best opportunity to get acquainted with a system of forestry and reforestation, which system has been followed for centuries and is probably as nearly perfect as any now known. The fundamental requirement is that the area of woodland shall not be reduced, but shall at all times be kept at the maximum and, if possible, be added to as waste or unused lands become available.

When it is deemed profitable to cut a section of matured timber (by matured is meant timber like our Michigan forests were when the State was first settled), the trees are carefully classified and the greatest care is taken in felling them, the best of them being sometimes cut out by the roots in order to get the grain of the root growth. Every part of the tree to the very end of the topmost twigs is used either for lumber or fuel.

When the land is cleared it is at once carefully prepared, by deep cultivation, for replanting, generally for the same kind, or kinds of timber that before grew on it. This planting is done in the most systematic manner, everything being closely calculated, taking into consideration location, both as to exposure to prevailing winds and as to dry and moist situation. One of these plantations greatly resembles one of our modern nurseries, as the seeds are sown quite thickly, some to be transplanted, where the species will admit, others to be from time to time thinned out and utilized for poles for grapes, beans or hops. As growth continues this thinning process is carried on yearly, the timber removed being used for rafters, scaffolds and for fuel. So on until the section again matures.

The writer has in mind a visit made to a section of the Black Forest, lying nearly opposite to the city of Strasburg, in Alsace. This particular domain is owned by a corporation that has been in existence for centuries and its franchise gives it the right to use the streams which run through their land for the purpose of conveying the timber product to the Rhine, to be from there rafted to the sea. The management of this corporation is in itself nearly perfection, each department being in the hands of persons especially educated and trained for the work required.

So there are foresters whose duty it is to patrol the woods on regular beats and at schedule time, to see that no damage is being done by trespassers and also to control those who work at thinning or cutting timber, as well as those who are planting and cultivating.

Then there are the lumbermen, those who fell the trees and cut them into the best shape for profitable transportation and sale. This is considered quite a trade, as much depends on how the market is suited, in order to compete with other countries, especially Sweden and Norway.

Nearly all the large timber produced in Baden, at least that which can conveniently be rafted, is sold in Holland. This timber is all squared by hewing and it is shipped, the chips being carefully collected and sold for fuel.

The making up of the rafts and taking them down the Rhine to the sea is the work of another set of men who have learned this occupation from their fathers for generations back, and who are experts in rivercraft. They have comfortable houses on each raft and usually carry their families with them, returning home by steamer up the Rhine.

If there was one thing that the writer noticed more than any other it was the zeal which each person connected with this work showed for the interest and success of the work in hand. The chief forester would walk about the plantations showing to visitors or inspectors the various stages of growth, and it was a pleasure to see him pat his pet tree just as a farmer would caress a pet horse or cow.

So it was with all, whatever was given them to care for they did it cheerfully and with a spirit that showed that they took a living interest in what they did.

ED. H. STEIN.

GROWING MINING TIMBER—AN OBJECT LESSON.

FRANK W. BALL, GRAND RAPIDS, MICH.

For timber supports in plaster mines and other mines no timber seems to serve the purpose so well as oak logs, 16 to 20 inches in diameter. Elm and maple logs have been used to some extent, but oak, of either variety, seems to be preferred. These logs, of the required length, 9 to 10 feet, usually cost from \$2.50 to \$3 each, and until the use of oak in furniture and quarter-sawed oak in house building became popular the plaster mines were the best market for oak logs. The Grand Rapids Plaster Company, whose mines are located near the west bank of the Grand River, southwest of the city, in the early days of the enterprise stripped their upland "oak openings" of oak timber for logs and firewood, leaving the undergrowth to start a new forest. After about 25 years the second growth oak had reached its most profitable stage to cut for firewood, and as it was found that the increase in the price of cordwood for the furnaces had been considerable it was decided to cut the second growth, many of the trees having reached a diameter of 9, 10 and 12 inches, for firewood, and an excellent crop was harvested. The third crop is now making a fine growth, but it is not to be used for firewood,

as coal has come into use as universally for fuel as the process of deforestation in this part of the State has in the last decade become, lamentably, so nearly complete. The rapid increase in the price of hardwood timber in recent years has been so great that some of the plaster mines have entirely given up the practice of using timber supports for their roofs, but nothing has yet been found to take the place of timber, except columns of the solid plaster rock. These columns, six to eight feet in diameter, are left standing at much more frequent intervals than formerly, and whether this plan of working the mines and protecting the miners from cave-ins is really the most economical is doubted by many. It is becoming every year more generally the practice, however. Angle-iron supports are thought to be out of the question because they would cost, of equal supporting strength, more than double the price that has been paid for logs, and because the life of iron supports in the damp mine atmosphere is uncertain, and the cost of protecting the iron from deterioration, if it can be so protected for a long series of years, is a question with which Michigan mine men are wholly unfamiliar. Pillars of cement have been suggested, but the actual supporting power of a square foot pillar of cement is not certainly known; nor are the possibilities of decay or disintegration in mining conditions fully understood, so the operators hesitate to make experiments with them. At the time the plaster company found its second growth oak ready for firewood it was thought more profitable to use it in that way than to wait another 15 or 20 years for the trees to reach the size necessary for logs for timber supports in the mines. And so long as wood is at all generally used for fuel that judgment, sound then, would remain sound. But this does not preclude the possibility, nor indeed the probability that the growing of oak forests for mine support logs would not prove profitable. An average of 30 trees to the acre and \$10 per tree for logs, with enough other wood to pay for the cutting and hauling, would mean \$300 per acre.

THE CAMPAIGN OF EDUCATION.

The Michigan Forestry Commission has continued during the two years since the publication of its last report its campaign of education. Following the establishment of a Department of Forestry in the State University and the Agricultural College, the commission has sought to take part, wherever it could, in any scheme of university extension which has been organized in our State. We have particularly interested ourselves in the Farmers' Institutes, and through the courtesy of the Superintendent of Institutes we have been able to put forestry into a large number of the programs for the year.

The women's clubs of the State have been strong allies in this extension work and have used the publications of the commission in spreading the arguments for reforestation in our State. The aggressive and stimulating work of Mrs. John Sharp of Jackson has been of great use to the commission, and wherever in the State representatives of the commission have gone to give addresses they have found women who have been study-

ing up the matter of forestry to welcome them and aid in the work of education.

Through the instrumentality of the Michigan Academy of Science, some very valuable material was gathered at a session of that body which has been printed in various newspapers and thus reached a very wide audience. The Retail Lumbermen's Association has made forestry a feature of its annual meetings for the last two years, and adopted resolutions of support in the interests of our commission. Dr. Clark of the Government Bureau of Forestry, through the courtesy of the Government Forester, Mr. Pinchot, spent a number of weeks in giving advice concerning farm wood lots, visiting a number of sections in the State, speaking to clubs, business men's organizations and horticultural societies, and in truth, giving counsel wherever people were willing to welcome him and give him an opportunity. He expressed himself as well pleased with the interest manifested in Michigan, and on our part we feel that his work was a splendid auxiliary to the labor of the commission.

As yet, we have not accomplished very much in connection with the machinery of our common school system. This is certainly an avenue for accomplishing the very best results, if it can be utilized to the best advantage. We hope through the Department of Public Instruction, in the near future, to make some telling movements in this field. The most willing and satisfactory agent in the campaign of education is the newspaper, and not a journal in Michigan but that welcomes any new material in the interests of reforestation and is willing to give it prominence and editorial sanction.

If the State, upon its own lines, takes hold in a vigorous way, utilizing all the knowledge we have with reference to reforestation in a commercial way, we shall have no trouble in awakening a deep and active movement on the part of all the people in this great question of statecraft.

INTEREST OF SCIENTISTS IN FORESTRY.

BY DR. W. J. BEAL, AGRICULTURAL COLLEGE, MICH.

By all means capable persons should keep speaking and writing to the people of Michigan concerning the importance of giving more attention to the subject of forestry. It is best that these speakers should have been trained in science, though many may be termed scientific and yet know very little about forestry. It is very important that information and advice should not be visionary, and that as far as it goes, it should be available in planting and in the management of wood lands.

The thinking people of the State have already been given a great deal in the form of general advice, and are now eager for something specific. A man can certainly be appealed to, so far as his own land is concerned, and if he become interested he should learn how to plant, what to plant, where to plant, and how to take care of trees, and he may be expected to awaken his neighbors to the need of such work. You can appeal to a man to exert himself in behalf of good management of the State lands, and lands of the United States, and he may reasonably be expected to

show his interest in desiring State tax lands to go under the control of the Forestry Commission, provided he have no axe to grind, and provided he have implicit confidence in the wisdom and skill of the commission.

"Lands, like other private property, are held by the owners for the returns they yield, and the owners as yet have scarcely begun to understand that it pays better, as a rule, to protect a forest in harvesting the timber crop than to destroy it. A knowledge of how to bring about the desirable result is still more restricted, while trained men capable of advising forest owners in the matter are very few indeed. The object of the present undertaking (practical assistance to farmers, lumbermen and others in handling forest lands) is to show that improved ways of handling forest lands are best for the owner as well as for the forest, by assisting a few owners to make trial of them and then publishing the methods and results for the benefit of all."—Circular No. 21, Bureau of Forestry.

It is well for every farmer to know the effect of forests on lakes, streams, winds, the prevalence of insects, crops of the farm and orchard, but you can never expect him to plant a single tree on his land because the forest area of the State has dwindled below twenty-five or thirty per cent. He will plant only for what seems to him to be a prospect of profits to himself or his descendants.

Good examples of planting and management by many farmers scattered over the State are of the very greatest importance in arousing an interest in forestry. Let such men talk on every suitable occasion about the merits of their work, and let them take pains to show their neighbors and friends what they have done, following the example of a successful breeder of horses, cattle, sheep, pigs or poultry.

There is no better way in which to interest a farmer in forestry than to induce him by direct contact to take proper care of his wood-lot and to plant a small area to forest. The State, through its commissions, needs imperatively, not only lecturers in the field, but itinerant instructors who shall patrol portions of the State, showing people what to do and how to do it. By way of illustration, let me quote you a few sentences from a recent paper that I read at a meeting of the State Academy of Science. It was entitled "College Extension Work in Agriculture."

"Forty-seven years ago last May, the first agricultural college in America, almost in the wilderness, opened its doors to students. The conditions of farmers as a class were far from encouraging; most of them deemed an education of little value. In 1862, Congress granted means soon available for each state to establish an agricultural college. By slow degrees for many years these schools made little progress. * * *

"For a long time many farmers persistently maintained that no agricultural college could be organized that would benefit a farmer in his business. The courses of study in such colleges did not attract as many students as seemed desirable. By slow degrees preparations were made and the 'war carried into Africa,' in other words, 'Mahomet went to the mountain.' The farmers were to be reached and aroused. In a small, crude and expensive way a half dozen or more farmers' institutes per year were held in different portions of our State, as well as in many other states. This was the beginning of agricultural college extension, which was designed to help every young man or woman or older person who had any ambition to become more competent to successfully meet the

demands of life. The number of institutes increased and the quality improved. ^ * *

“Omitting most of the steps by which farmers have reached their present improved position in the social and business world, we find the past winter that upwards of 300 institutes have been held in Michigan. More than two-thirds of these institutes were held in the country at grange halls, churches or school houses, where farmers can be reached and awakened—people who could not be induced to go fifteen miles to the county seat for such purpose.”

The effect of this extension work on the Agricultural College, more than anything else, has changed the popular sentiment of the great mass of farmers from one of severe criticism to that of enthusiastic approval. The students have increased since the inauguration of extension work in 1875 from 156 to nearly 1,000 last year, and at this writing, in September, further growth is at present impossible, for all the rooms available at the college and in the neighborhood are filled to overflowing.

“In Illinois, as elsewhere, insects molest fruit and fruit plants, causing great loss to the farmer. That state appropriates money for the purpose, and at the proper season of the year experts are sent to twenty or more neighborhoods in as many counties to demonstrate the preparation and application of suitable remedies to aid in securing fruit free from attacks of fungi and insects. This year Illinois will keep two experts in the field instructing fruit growers in methods of spraying and general orchard management. Fruit growers need not only literature on these and other subjects, *but they need the work well done before their eyes, to make them alive to the ‘new horticulture.’*”

“Some fourteen years ago, Ontario employed experts to visit, inspect and instruct the makers of cheese and butter. Later this work has been chiefly devoted to cheese factories and creameries. This has been the means of improving the quality and raising the price of these products in a very marked degree.

“New York, Wisconsin, Minnesota have also made much use of itinerant teachers or inspectors of dairying. The Agricultural College of Illinois keeps two men constantly in the field in the dairy districts, giving their entire time to the study of all the conditions with a view to improvement. * * *

“In southern Illinois there is an extensive acreage of flat land, consisting of stiff clay, almost impervious to water. The land in question has enjoyed an enviable reputation as a wheat region, but it does not produce good crops of corn, such as is desirable in a good rotation of crops. Farmers living in that region said that laying tile in such land would be labor lost, but the Dean (Eugene Davenport) of the Agricultural College believed otherwise. He was educated at Michigan Agricultural College, and had the experience of the successful management of his farm in Michigan. In a prominent place near the road in southern Illinois he rented a piece of land, drained one-half of it and planted all to corn, showing a marked increase in yield of the portion previously drained. Here was an object lesson for the whole region. Farmers began to make observations and ask questions.* * * *

“A dry bulletin does little good to most persons, even though its teachings are of the utmost importance. The effect of many a good bulletin is nearly lost because it is delayed until the need for it is past. It

is agreed on all hands that we should aim to interest the children, as they are the most susceptible, and as they will very soon begin to assume the duties which now occupy the time of older persons."

OUR EDUCATIONAL METHODS AND FORESTRY PROGRESS.

CHARLES W. GARFIELD, BEFORE MICHIGAN ACADEMY OF SCIENCE.

It would be considered rather poor practice, in heating a kettle of water to apply the fire above rather than below the receptacle. One undertaking a plan of this kind would simply put himself in the position of furnishing laughing stock for the community, and still, there are occasions when this method must be adopted, because of adverse conditions. For instance, I have been watching men thaw out waterpipes during this past winter, by building fires on the surface and gradually working down through the earth by this slow method. Criticism may be made upon my analogy, and still, I think there is a strong element of application to our methods of education. We have been expending our energies in working from the top downward. Ours is a democratic country, and when we can understand thoroughly that the will of the people is supreme and that the average man is a commandant, our system of education must be looked at somewhat differently from a plan adopted under a monarchy or aristocracy. If we wish to accomplish far-reaching results in any progressive matter that affects the people, we must not begin at the university, but with the common school, and the theory of our education with the child must be, that in him we are building for the future, and it is right for us to center our energies in him. He is the most important product of our age or of any age.

In the prosecution of the forestry movement, which I cannot help but feel is one of the great movements in our land, we may have never so well equipped a Bureau of Forestry in connection with the general government; we may have the most satisfactory departments in our universities for the development of forestry, but the movement will be one of hesitancy and very unsatisfactory in its results until we can reach that element in the community which will have the influence and the votes in the adoption of methods and in the control of activities. The child must be imbued with the idea that the root of a tree is at least of equal importance to a Greek root; that the furnishing of raw material for industries is of as great moment as is method in expressing the most delightful sentiments concerning the evolution of the race; that the influence of the removal of our forest cover upon industries and upon manhood is of as great import as any information that can be given with regard to the revolution of the planets or the composition of the sun. Having this thought in my mind, and the desire that the great movement for reforestation shall take a strong hold upon the mass of the people, I am convinced that our work must be centered in our primary system of education. Let me illustrate what I mean: In my own township, when I was a boy, a stream known as Plaster Creek, traversing in an irregular way our township from corner to corner, had a very even

flow throughout the year. We never had any excessive flood that was dangerous to bridges, and the water itself was seldom, even during floodtime, filled with silt for more than a short period. Conditions have changed; the timber of the township has been almost entirely removed. The flow of this stream is periodical, rather than regular. The past fortnight it has been at floodtide, and has carried away with it an immense amount of soil, and bridges have been removed from their foundations, and carried away, entailing an immense expense upon the township for replacing them. There has been a constant increase in the expense of maintaining bridges across this stream during the last thirty years, until today it has reached a very large figure, and occupies a prominent place in the assessment of taxes. This is a matter that has affected the welfare of our township, and reduced its attractiveness as a location for maintaining a rural population, and still, in connection with our school system, the matter has never been a subject for any tuition whatever given to the growing boys and girls.

The remedy for this condition is so apparent, so simple, and so logical in its application, that even children can appreciate it, and the importance of instructing them in a subject of such moment in connection with their lives, can hardly be over-estimated.

The child has a right to be educated in a way to make it thoroughly acquainted with its own life in its environment, and in the terms of its life. In the prosecution of the forestry movement this is a matter of commanding importance. We may have never so good a theory of management of forest cover of this country, but it never can be made a matter of practice until it shall appeal to a large majority of our people, as one of importance to them and worth their while to consider and know about. Notwithstanding the importance of this subject and its intimate relationship to the welfare of our people, those who have been planning our system of common school education and have been its sponsors, have scarcely touched this subject in their activities. Our State Department of Public Instruction has, in a sentimental way, called attention to the matter of Arbor Day, and plumed itself upon the great thing it had done. I am glad to find this much has been accomplished, even if it is so very little, because sentiment lies at the foundation of action; but the merit of our proposition with regard to the importance of the forest problem, in the management of the commonwealth, has scarcely been approached in any proposition for the progress and betterment of our primary schools.

If the Academy of Science and the University and the Agricultural College desire to make their influence felt, they must adopt some system of educational extension which shall touch the common people, and the most promising method is to reach them through our common schools.

At once the objection comes in, "you are trying to add another burden to the curriculum that is already too full." I deny the allegation; our suggestion is to put into the curriculum something of real value that shall take the place of things, which have come down as a legacy to us from a time when school instruction was given to the few that they might be dictators of the masses. If we wish to give that kind of education which shall develop men and women in a manner to make the most of their lives, we must recognize in our pedagogic plan that, relatively, there is as much importance to be given a tree as to a Greek syl-



FARM SCENE NEAR ROCHESTER, MICHIGAN, ILLUSTRATING MODERN USE OF POSTS IN FENCING. VIGNETTE—20 YEAR OLD HONEY LOCUST ON ROADSIDE AT ROCHESTER, MICHIGAN.

logism; we must recognize as great an importance and value in a deal board, as in a Latin idiom; and when we come to the development of a highly cultivated mind, we must admit the existence of as great value in the things that the child touches in his every-day life, out of which he can develop powers of mind and heart, as can be found in any books which deal with literature, philosophy, or psychology.

My practical suggestion out of this is, that our best efforts shall be expended in bringing into our primary schools some method of awakening an interest, and an enthusiasm in the investigation of the merits and details of the forestry movement, and that we shall deal in a simple way with the elements of forestry, that the philosophy and far-reaching influence may follow in the wake of our processes.

All honor to the men who are willing to make studies of science for its own sake, but we must not lose sight of the fact that we are living in this world, and that a life of usefulness is an important factor in getting the largest measure of fruition from our undertakings; that while the greatest of all knowledge is the knowledge of God, in the development of the highest type of manhood, we must recognize as of infinite importance the solution of the problem of how to leave the earth in better shape, to evolve and support a higher and nobler plan of living, than heretofore existed.

In the highest expression of loyalty to God, we must not lose sight of service in giving utility to nature's facts and processes in promoting the welfare of the human race.

Grand Rapids, Michigan.

THE FENCE POST ARGUMENT FOR REFORESTATION.

BY HOWARD B. CANNON.

"The strength of the fence is in the post." Michigan has 165,000 farms, averaging nearly 90 acres in size. To fully fence these would require about 115,000,000 posts. To supply such an enormous amount of timber a vast number of trees must be available. The old board fences are in tatters; the old rail fences are fast being removed to fire the engine or furnish "summer wood." The steel wire fence is coming into its own; but it is of no service unless well supported by substantial posts. Tidy farmers dislike to fasten fencing to trees; nice alignment cannot be effected, and it is of no advantage to the trees to be the target of hatchets and staples. The wooden post so long as it lasts, fills the bill. Cement and steel may displace it eventually—but now the price seems prohibitive. If we use desirable timber likely the advantage is with the wooden post; it is relatively so light and handy.

The use of cedar posts is extending rapidly. The farm wood lots have been in many instances exhausted of suitable post timber so the dealer is asked to make good the deficiency. Oakland county requires some twenty-five car loads of cedar posts a year; and the demand is growing rapidly. The price keeps advancing as the demand grows. What are we going to do about it? Grow our own posts.

Those who are posted and experienced assure us that an acre of post

timber should furnish a harvest of 1,000 posts ten years after setting. The cost of this output is figured at \$75.00, or 7½ cents per post. These figures cover growing and harvesting; but do not reckon the value of the remainder of the tops, certainly of much worth for grape sticks, mine props and fire wood. When once cut over, if the sprouts which spring from the stumps are properly thinned, another crop may be obtained in much shorter time than the first.

To grow a crop of posts ought not to be very burdensome either on the farm or the farmer. A strip of land relatively narrow to admit of economical tillage should be selected. If this is so placed that the growing trees may serve as a shelter belt they may begin earning good money for their owner as soon as set out. Those interested in noting the advantage of shelter belts may refer to "The Soil"—King, p. 206. Of course every land owner has not the provision needed to urge him to plant trees. Some are content to eat the apples that grow from other's planting, but when it comes to posts and the thought of buying a lot of relatively short-lived cedar posts every few years, may be the whole thing of tree planting will seem easier. Plant trees; then attend to them.

Two sorts of trees are recommended by experts; the locusts, preferably the honey locust, and the hardy catalpa.—*Catalpa speciosa*. The timber from these trees proves very resistant to decay. Of the catalpa Mr. E. E. Barney, of Dayton, O., who employed a man to investigate the tree in Illinois and elsewhere, says: [This man] "Sends a piece of fence post with the bark on perfectly sound, that has been in the ground forty-seven years; * * * the posts have been taken up and reset, and the owner, Mr. Murphy, says they are good for the balance of a century."

Probably less than an acre of land would be required for furnishing a home supply of posts for the average Michigan farm. Mr. W. A. Brotherton suggests the planting of honey locust with the catalpa to help break the winds from the latter. It is found that in exposed spots the very unusual cold weather of last season killed the catalpa tops. This tree sprouts vigorously from the stump. Sprouts about seven feet high were observed bearing enormous leaves; attesting to the unimpaired vigor of the roots. The honey locust seems entirely hardy.

Tree men are offering small trees of these sorts at low prices; where it is inconvenient for one to secure seed for himself with which to make the start, the whips may be purchased. Care should be observed that the genuine hardy catalpa is furnished.

The road side specimen of honey locust, illustrated growing at Rochester, Mich., is probably twenty-four years old. It is large enough to furnish several posts. Under conditions of cultivation the same growth would likely be attained in much less time. The smaller tree at the left is a white-wood or tulip tree. It is of the same age.

The market for posts in Southern Michigan is illustrated by the other view on the farm of Mr. J. C. Day, near Rochester. In fencing his 300-acre property three car loads of posts and a car of wire were used.

It is in the hope that many may be interested in securing and studying Bulletin 149 of the Ohio Experiment Station on "The Hardy Catalpa as a Farm Crop," Wooster, O., that I have given more notice to this tree than to the valuable honey locust.

A SAND DUNE OR SAND BLOW IN NEWAYGO COUNTY.

BY E. E. BOGUE.

On May seventh, accompanied by State Land Commissioner Wildey, the writer visited a tract of land estimated to contain five or six hundred acres in the eastern part of Newaygo county (township 13 north range 11 west). It lies about seven miles east and about half a mile south of White Cloud and over 40 miles from Lake Michigan.

The tract may be called a sand blow, the name applied to it by the people of that neighborhood. As nearly as could be ascertained the history of the blow is this: The land was once covered with trees with open park-like patches of grass. The settlers cleared off the timber, plowed the ground and raised agricultural crops up to within a few years ago, when the soil having become depleted in fertility was allowed to run waste. No vegetation immediately took possession of the ground which left an opportunity for the wind to get at the dry light sand. There being considerable open country to the west the wind gathered considerable force and it was not long before the sand began to raise in great clouds and travel off to leeward, gradually dropping with the reduced force of the wind just as snow is carried and swept along in winter. This process has been going on until the present surface is three to four feet lower than the original surface. To the leeward land once tillable is now buried beneath several feet of sand and the process seems to be on the increase and will continue indefinitely until some artificial barrier stops it or it finds a natural one. Residents of the neighborhood say that the sun is not infrequently entirely obscured as if by dense smoke. We regret that neither time nor opportunity allowed us to make some accurate and reliable investigation as to the rapidity of the translocation of the sand, but we think that it would be safe to estimate that the surface of the blow itself is being lowered at the rate of four to six inches every year on the average and that land to leeward is being covered in a border at the rate of as many rods wide. Neither did we determine the distance to the water table, but the sand was moist only two or three inches or even less below the surface.

From the growth of the white pine it is evident that there is some clay not far away. A vigorous growth of running blackberries, or dewberries as they are sometimes called, was seen in one place and in another a strong plant of spreading juniper was noticed. In the brush were species of thorn-apple, cherry and so forth.

In anticipation of our intended visit a few rods of quack-grass about 100 willow cuttings, and a hundred each of yearling catalpa and locust had been previously shipped to White Cloud. No knowing very definitely what conditions we should meet we took these into the buggy at White Cloud, drove to the blow, and found ourselves far from a farm with the grass, trees and cuttings so we proceeded to plant the grass

roots, stick the cuttings, and with dibbles made from the branches of a nearby cherry tree to plant, in a most primitive manner, the seedling trees. A neighboring farmer had missed finding us at White Cloud, but seeing us at work on the blow on his way home drove out with others and kindly assisted in finishing to plant the trees without tools save with the branches from the trees. Mr. Dunworthy reported June sixth, one month after planting—that all were alive and doing well. If these can grow under these conditions there is every reason to believe that with proper care more of these and others will do as well or better.

The reclamation of this area is by no means an impossibility. In fact, it can be much more readily accomplished than many other areas of like size in the State. The natural presence of the white pine is evidence enough that the best timber tree in the State will grow if given some protection until it gets started. Lands along the ocean and lake beaches much less promising have been reclaimed. It would not probably be necessary to resort to sand binding grasses as is often the case in other places. Almost any material that the wind can not carry will do good service until the trees get started. A beginning should be made on the windward side and progress made as fast as possible toward the leeward. A nursery should be started right in one side of the blow so that the trees will not have to be transported far when large enough to plant out.

Of the species to be grown white pine should receive most attention. In mixture red cedar, Norway pine, and Norway spruce would be worth trial. Among the deciduous trees oak, cherry, locust, and chestnut would probably succeed and all would in time produce valuable timber. Within half a mile of the blow in soil very similar to that of the blow itself is a chestnut tree, the sole survivor of ten that were planted by a farmer some years ago. Growing in the open it takes on the form of an apple tree and now has a trunk about five inches thick. If ten per cent of trees planted by the inexperienced in handling this tree grew, at least fifty per cent ought to grow if the trees are grown on the ground from the nuts and properly handled. Oak and cherry seed should be planted where the trees are expected to stand, but the locust transplants very readily and could be grown in great abundance without much trouble.

The land at present is entirely worthless and even less than worthless because it is imposing upon tillable region more and more every year. It has been returned to the State for taxes and can not be sold again in its present condition for any of the purposes of agriculture. If it can be withdrawn from sale for a certain period and restocked with timber it will in time yield a handsome profit if properly managed. The expense will be considerable in the start but the compensation will warrant it. The soil was first stripped of its cover and then robbed of its fertility. If now a reasonable amount of the plunder is intelligently returned and applied to the soil it will show its appreciation in a better crop of better timber than nature produced unassisted.



PLATE I

DISCARE BOX: All figures referred to as if numbered from left to right. Figure 1. View on the northwest corner, giving a general idea of the appearance and illustrating the power of grass to hold the sand temporarily. Figure 2. View taken on the windward side of the blow shows how grass mounds turbid holds the sand and that several species of trees and shrubs will grow on the sand. The group of trees in the background to the extreme right consists of 22 black cherry trees, which average about six inches in diameter. The trees had thrived abundantly and the seedlings were plentiful under the trees. Figure 3. View of the west side of the blow showing how even dead brush, and grass holds the sand. Grass and white pine at the right.



PLATE II.

DESCRIPTION.—All figures referred to, as if numbered from left to right. Figure 1.—A broad view near the west side showing the light material has been swept away, leaving tracks and sticks. How soft the surface is, is shown by the tracks in the sand. Figure 2.—A general view, a part of the blow is shown in the distant horizon toward the east beyond the blow. Figure 3.—An attempt to show how the sand fills the air at times, shutting off everything except the nearest objects.



PLATE III

DISCUSSION.—All figures referred to as if numbered from left to right. Figure 1.—A few willow cuttings and yearling catalpa and locust planted May seventh. Figure 2.—A new meat west side looking west, showing the last remnants of a once grass sod in the foreground and a cemetery in the background. A church stands a little to the left but there are no residences near.



PLATE IV.

DESCRIPTION.—All figures referred to as if numbered from left to right. Figure 1.—Shows in the foreground a mound composed of a little firmer material than the surrounding, but fast cutting it away, as evidenced by the narrow top and the structure of the grass, covered all over the side. Other mounds farther back, with brush and trees in the foreground, are also seen cut into the side. Figure 2.—Shows how readily the white pine would cover the land if properly managed. The old tree on the right is dead but the numerous progeny are sufficient evidence of its usefulness. This figure well represents how the sand looks as it is carried over the adjoining fields. It will be noticed how the sand has lodged in among the young pines. This is near the east side of the blow. Figure 3.—Shows how even a loose fence breaks the force of the wind and allows the sand to fall. Notice the large dune formed in the distance. This figure also represents a common appearance of sand in the air.

FOREST COMMISSION ACT, 1899.

The following is the text of the forestry act under which the Michigan Forestry Commission is working:

An act to provide a permanent Forestry Commission for the State of Michigan, to define its powers and duties, and to provide for expenses.

Section 1. The People of the State of Michigan enact, A commission to consist of three members is hereby constituted, one the Commissioner of the State Land Office, and two to be chosen by the Governor by and with the advice and consent of the Senate; one of whom shall hold his office for the term of two years and one for four years. The appointment shall date from July first, eighteen hundred ninety-nine. The term of the Commissioner of the State Land Office as a member of this commission shall be co-extensive with his term as Commissioner of the State Land Office. At the expiration of the terms of the appointive members their successors shall be appointed, each for a term of four years. Such commission shall elect one of its members president, another member secretary. It shall maintain its office and records in the capitol at Lansing in the State Land Office, and shall serve without compensation, but shall be entitled to traveling and other expenses while on business relating to the work of the commission. Also all necessary cost of postage, stationery and printing and other incidental expenses: Provided, That the secretary may be paid such amount as the commission may determine, not to exceed three hundred dollars per annum: And provided further, That all accounts shall be audited by the State Board of Auditors.

Sec. 2. It shall be the duty of such Forestry Commission to institute inquiry into the extent, kind, value and condition of the timber lands of the State; the amount of acres and value of timber that is cut and removed each year, and the purposes for which it is used; the extent to which the timber lands are being destroyed by fires, used by wasteful cutting for consumption, lumbering, or for the purpose of clearing the land for tillage. It shall also inquire as to the effect of the diminution of timber and wooded surface of this State in lessening the rainfall and producing droughts, and the effects upon the ponds, rivers, lakes and the water power and harbors of the State, and affecting the climate and disturbing and deteriorating natural conditions. It shall also examine into the production, quantity and quality of second-growth timber and note and report upon all facts, improvements and changes in reference thereto; also as to the condition, protection and improvement of denuded stump, swamp and overflowed lands, and what means it may deem expedient in carrying into full effect the intent and purpose of this act. The commission shall recommend to the Legislature, in the year nineteen hundred one, within ten days from its opening,

their findings, in the form of a bill or bills to carry out the objects for which this commission is appointed.

Sec. 3. It shall be the duty of the Commissioner of the State Land Office to furnish the commission any and all data concerning lands of all classes in which the State is directly or indirectly interested, that may be valuable in formulating a method of managing State lands suitable for the growing of forests. He shall also as far as possible aid the commission in its investigations and render all the assistance in his power in preparing a report which shall embody a definite forestry policy for the State of Michigan.

Sec. 4. Upon the recommendation of the said Michigan Forestry Commission the Commissioner of the State Land Office shall withdraw from sale two hundred thousand acres of lands known as State tax homestead lands and swamp lands belonging to the State, and withhold the same until after the adjournment of the Legislature after such reservation. The commission shall be authorized to receive by deed to the State, from the owners, any tracts of land which in its judgment may be suitable as forest reserves, to be kept by the State: Provided, however, That this act shall not be construed so as to affect in any manner the rights or interests of any person to or in any lands which such person may have acquired previously to the day on which this act shall go into effect.

Sec. 5. Said commission shall make an annual report to the Governor, on or before the first day of December in each year, of such facts and statistics as it may deem of public interest, and recommend such legislation as may be necessary for the preservation and restoration of the timber and forestry of the State, or any portion thereof, and cause such number of reports, not exceeding two thousand copies, to be printed each year for public use and distribution, which report shall be printed by the Board of State Auditors. The expense of the commission, as provided in section one of this act, shall be paid on vouchers certified by the president of the commission to the Auditor General, and paid by the State Treasurer, out of the general fund, upon the warrant of the Auditor General: Provided, That not more than two thousand dollars shall be expended by the State in any one year under the provisions of this act.

FOREST RESERVE ACT, 1903.

An act to create a forestry reserve, to provide for its maintenance, management and regulation, by restoring for sale or homestead entry, lands heretofore reserved in certain counties in this State, to make an appropriation therefor, and to provide for a tax to meet the same.

Section 1. The People of the State of Michigan enact. All delinquent State tax, homestead, swamp and primary school lands now belonging or which shall hereafter be added to and belong to the State in towns twenty-one north, range three and four west; the north half of town number twenty-four north, range four west, and the south half of

town number twenty-five north, range four west, are hereby withdrawn from sale and entry, set apart for the creation of a forestry reserve, and for that purpose placed under the control of the Michigan Forestry Commission created by act number two hundred twenty-seven of the public acts of eighteen hundred ninety-nine. It shall be the duty of said Michigan Forestry Commission, first, to investigate and determine what part or portion of the lands belonging to the State, thus withdrawn from sale and entry and set aside, it will be for the best interests of the State and public to retain and devote to the purpose of forestry, having regard both to the soil and natural characteristics and conditions of said lands and their relative fitness for cultivation and forestry, and also the location of the various descriptions of the same with respect to each other, so that the lands to be devoted to such forestry reserve shall be composed of contiguous territory, or territory as nearly contiguous as possible, so as to render practicable and desirable, the establishment and maintenance of forestry reserves embracing the same. Second, to have care, custody, control and superintendence of the lands herein or hereafter set apart for or becoming a part of the forestry reserve, and to provide for the reforestation of the denuded lands so set apart and belonging to the State, by planting and preserving forest trees, establishing and maintaining fire lines and a system of fire patrol in the forestry reserve thus created.

Sec. 2. The Forestry Commission shall have power to appoint a forestry warden who shall hold office for the term of four years from the first day of January in the year in which appointed, unless sooner removed by the Forestry Commission. The said forestry warden shall receive an annual salary of not to exceed one thousand dollars, payable in the same manner as the salaries of State officers are now paid, and he shall be subject to the orders and directions of the said Forestry Commission, which shall prescribe his powers and duties and he shall have general charge, control and supervision of all deputy wardens or other persons appointed or employed for the performance of duties or services in respect to forestry lands or forest fires. The said forestry warden may appoint, upon recommendation of the Forestry Commission, a sufficient number of competent persons as forestry wardens, to hold office at the pleasure of the said commission, who shall be entitled to receive a sum not to exceed two dollars per day for each day actually and necessarily spent under the direction of the chief warden in the discharge of duties under this act. Said compensation to be paid by the Auditor General on the approval of the president and secretary of the said forestry commission.

Sec. 3. The said forestry commission shall have power to cut, remove or sell, (or to sell to any person with the power to cut, sell or remove, upon such terms and under such conditions and restrictions as it may deem advisable), any trees, timber or other forest products upon or derived from the said lands so set apart as forestry reserve lands, and shall have power to lease or sell any lands within such forestry reserve, the lease or deed therefor to be executed for and on behalf of the State by the Commissioner of the State Land Office. The said forestry commission shall likewise have authority to purchase such lands within the limits of said forestry reserve as it may deem advisable in order to connect and render contiguous separate tracts. All moneys received by or

payable to the said forestry commission on account of or arising from revenues from said lands, or from any other source, shall be paid to and received by the secretary of said commission, whose official bond as Commissioner of the State Land Office shall be responsible therefor, and shall be paid by him into the State Treasury and the receipt of the State Treasurer, countersigned by the Auditor General, shall be taken therefor.

Sec. 4. All forestry reserve lands set aside under or pursuant to the provisions of this act shall be exempt from taxation, except as herein otherwise provided. Said lands shall be assessed in the same manner as are the similar lands of individuals situated within the townships in which the same are situated. Within ten days after the final meeting of the board of review of each township, the supervisor of such township shall file in the office of the Commissioner of the State Land Office at Lansing, a certified copy of the assessment roll of his township, with the several assessments completed thereon and reviewed, said roll to specify which of the lands appearing thereon are forestry reserve lands and the valuation placed upon each description, and also the lands owned by private individuals, and the valuation of such lands; the several matters appearing in said assessment roll to be verified by the supervisor on oath. No assessment of forestry reserve lands shall be valid, nor shall any tax be spread thereon, until such assessment is approved by the Commissioner of the State Land Office, such approval to be attached to and become a part of the original assessment roll of the township. No tax shall be levied upon such lands except for the maintenance of schools and roads and no tax shall be imposed upon any of the forestry reserve lands for the support of any school or the building of any schoolhouse or the building or maintenance of any road which is not at present in existence, unless the same shall have been first approved in writing by the Forestry Commission. All taxes lawfully levied upon said lands in accordance with the provisions of this section shall, in each year, be paid by the State Treasurer to the township treasurer of the township in which the same are situate, by a warrant in favor of the said township, said warrant to be issued upon the filing with the Auditor General by the said Forestry Commission of a certificate that such taxes have been levied in accordance with the provisions of this act. No fee shall be allowed to the township treasurer or other official for the collection of such tax or taxes.

Sec. 5. For the purpose of carrying out the provisions of this act, the Auditor General shall add to and incorporate in the State tax for the year 1903, and each year thereafter, the sum of \$7,500. Such sum shall be immediately available upon the passage of this act, and shall be paid to the said commission upon the warrant of the Auditor General, in the same manner in which such appropriations are usually paid, and shall be governed in all respects by the accounting laws of the State.

Sec. 6. The lands hereby set aside shall be subject to the protection of the provisions of the several acts relating to the cutting, removing or destroying in any manner whatsoever, timber on said lands. This act shall be known and may be cited for any purpose in legal proceedings or otherwise, as the forestry reserve act.

Sec. 7. All other lands heretofore reserved from sale or homestead entry in Roscommon and Crawford counties either by Act No. 227 of the

Session Laws of 1899, or concurrent resolution No. 17 of the Session Laws of 1901, are hereby restored for sale or homestead entry as provided for other State lands.

FOREST FIRE ACT, 1903.

An act to provide for the preservation of the forests of this State and for the prevention and suppression of forest and prairie fires.

Section 1. The People of the State of Michigan enact. The State Land Commissioner 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 fires as hereinafter provided. The supervisors of towns, mayors of cities and the presidents of village councils are hereby constituted fire wardens of their respective towns, cities and villages in the State, and the supervisor of any township embracing more than one surveyed township, shall appoint a fire warden for each of the surveyed townships in his town in which he does not reside. The fire warden so appointed shall be, where possible, a resident of the surveyed township for which he is appointed.

Sec. 2. The aforesaid Forest Commissioner shall appoint a competent deputy, to be known as chief fire warden, who, from personal experience, is familiar with the conditions of the forest and methods by which fires may be controlled. Said chief fire warden shall receive a salary of five hundred 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.

Sec. 3. The chief fire warden shall have general charge of the fire warden force of the State and shall have authority to mass such fire warden force as may be available at any special point to suppress fires. In case the fire warden force of any locality is deemed by said chief fire warden inadequate to prevent or suppress forest fires, he shall appoint temporarily needed fire wardens whose duties and authority shall be the same as herein given to town supervisors acting as fire wardens. He shall cooperate 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 the timber growing herein, 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.

Sec. 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 several fire wardens in the State and to all railroad companies, and it shall be the duty of said fire wardens to post up such abstract as warning placards in twelve conspicuous places in their respective districts.

Sec. 5. During a dry and dangerous season, when forest fires are prevailing or are liable to break out, the chief fire warden 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 fund, upon the order of the forest commissioner.

Sec. 6. It shall be the duty of each fire warden to take precautions to prevent the setting of forest 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 fire warden 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 fire warden 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 dollars or imprisonment in the county jail not to exceed three months.

Sec. 7. The chief fire warden and the several fire wardens created by this act shall have authority to enforce the provisions of this act, and it shall be their duty to cooperate with the fire warden of any adjoining district, and in the absence of such fire wardens to direct the work of control and extinguishment of forest 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 fire wardens provided for in this act shall inquire into the cause of each forest fire within their districts, and shall report the same to the chief fire warden 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 fire warden may require. During the more dangerous season of the year the chief fire warden may require frequent reports from the several fire wardens in this State, as to condition of forest fires and as to what is being done to control the same.

Sec. 8. Each fire warden shall receive for his actual services rendered under this act two dollars per day, two-thirds of which shall be paid by the municipality where such service is performed, and one-third by the State; and any employe engaged in like service shall receive at the rate of two dollars per day, and said expense shall also be paid, two-thirds by the municipality 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 township board, city or village council, as the case may be. The clerk of the board or council, as the case may be, shall thereupon issue to each claimant his warrant

upon the treasurer of the municipality for the entire sum to which such claimant is entitled, and such treasurer shall pay the same. Such clerk shall transmit the original oath and copy of the warrant to the Auditor General, 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 Auditor General upon the State Treasurer in favor of the county in which the same was paid, and forward the same to the treasurer of said county, who shall pay it over to the treasurer of the proper municipality: Provided, That no fire warden shall be paid in any one year for more than ten days' service in extinguishment and preventing forest fires, nor for more than five days' service in each year in posting notices and making the reports required by this act, nor, in the aggregate, for more than fifteen days' service of whatever character, in any one year; nor shall any one person employed by fire wardens to assist in extinguishing or preventing forest fires be paid for more than five days of such service in any one year. Not more than fifty dollars shall be expended under this act in any one year in any city, village or surveyed township in this State.

Sec. 9. Any person who wilfully, negligently or carelessly sets on fire, or causes to be set on fire, any woods, grass lands 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 wilfully, 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 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, grass lands or other combustible material whereby the property of another is destroyed or life is endangered, shall be punished with a fine of not over five hundred dollars, or be imprisoned in the State prison for a term of not over ten years, or both such fine and imprisonment.

Sec. 10. Any person who shall kindle a fire on or dangerously near to forest or grass lands, 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 dollars or imprisonment in the county jail not exceeding three months.

Sec. 11. Every person who shall wilfully deface, destroy or remove any warning placard posted under the requirements of this act shall be liable to a fine not exceeding one hundred dollars for each offense, or imprisonment in the county jail not exceeding three months.

Sec. 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 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 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 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 wilfully violating the requirements of this act shall be deemed guilty of a misdemeanor and be punished by a fine not exceeding one hundred dollars for each such offense, and railroad employes wilfully violating the requirements of this section shall be guilty of a misdemeanor and be punished by a fine of not less than five dollars nor more than fifty 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.

Sec. 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 of not less than five dollars nor more than fifty dollars.

Sec. 14. Nothing in this act shall be construed as affecting any right of action for damages.

Sec. 15. Woodland territory within the terms of this act shall be construed to mean forest and brush land.

Sec. 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, and the treasurer of the county shall pay the same forthwith to the treasurer of the municipality where the offense occurred, to be used in defraying the expenses of enforcing the provisions of this act within such municipality.

Sec. 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 fire warden and from the several fire wardens of the State, and from other sources, together with his suggestions relative to the preservation of the forests of the State and the prevention and extinguishment of forest fires.

Sec. 18. This act shall apply and be in force only within the territory within this State lying north of the north line of township twenty north.

Sec. 19. All acts and parts of acts inconsistent with this act are hereby repealed.

APPENDIX

GENERAL.

Twenty years ago, a mere day in the life of a State or people, Michigan cut in one year, over 3,600 million feet of White Pine lumber alone and the forests of our State supplied the people of our country clear to Texas, with this choice material, and at the same time called into existence the great wood working industries which have built up our towns and our railways. Our forests supplied our people with an abundance of excellent timber at reasonable prices; our people could afford to build and they did build, and our many towns and farmsteads today testify to the great value of our former forests.

Today the State of Michigan imports lumber; the lumberyard of nearly every town in the State carries Yellow Pine and Cypress from the South and shingles and other materials from the Pacific coast. The consumers of this material, our farmer and townsman, pay not only a large price for the material, but, in order to haul this material from 1,000-2,500 miles, part of it over the greatest mountain systems of our land, they pay an additional sum for transportation, often greater than the value of ordinary lumber alone. And all this great waste of money on the part of our people without any good cause, for Michigan has lands in plenty where a good forest growth would supply its people with all it needs and more beside, if only fire and vandal were restricted and thus nature assisted instead of opposed by man.

The bad effects of this condition of affairs are noticed by all close observers. The much needed barn is not built and the farm suffers "because lumber is too high;" the worker of the town feels that he must crowd into flats and rent houses, because cheap lumber no longer invites him to build a comfortable home of his own. Nor are these the only bad effects of forest destruction. The lumber industry in Michigan represented 129 million dollars in 1890; it only employed 67 million dollars in 1900, so that about half the capital of this industry left the State during these ten years.

Similarly the great wood working industries of our State have ceased to find a sufficient home supply of timber. The Oak which goes into the beautiful and well known product of our furniture factory comes from Arkansas, Tennessee and other distant districts. The enterprising manufacturer is threatened with ruinous competition through men established at these new centers of supply of the principal and bulky raw material of their industry simply because the State of Michigan has failed to look ahead, has failed to husband what it had, failed to protect the forest against useless destruction.

Michigan has an abundance of forest lands, but the forests have largely disappeared, and what was once stately forest is now stump waste.

The following table fully illustrates some of the above facts in presenting the condition of agricultural settlement in our State:

Agricultural Classification of the Lands in Michigan. Census 1900.

LAND IN DISTRICT ON AN AVERAGE IS:

District.	Per cent of all land in district.					Remarks.
	Area round numbers million acres.	Settled.	Improved.	Unsettled.	Unimproved.	
1. Forty-two counties in which 45% or over of all the land of any county is settled. The real farm belt of Michigan	17	84	60	15	40	Mostly hardwood lands of great fertility and with a beautiful climate.
2. Ten counties 30-44% of land settled	3.1	34	15	66	85	The unimproved land is largely culled forest and some burned over stump wastes. Mostly fair farm lands but also large poor sandy districts.
3. Sixteen counties 10-29% settled:Alcona, Cheboygan, Chippewa, Clare, Delta, Gladwin, Iosco, Kalkaska, Lake, Manistee, Missaukee, Montmorency, Ogemaw, Osage, Presque Isle, Wexford	7.3	17	7	83	93	Considerable forests, culled for pine; some very good farm land. Also large areas of cut and burned over piney lands of light soil and completely denuded of forest growth.
4. Fifteen counties 1-9% settled, includes: Alger, Baraga, Crawford, Dickinson, Gogebic, Houghton, Iron, Keeweenaw, Leelanau, Mackinac, Marquette, Ontonagon, Oshtemo, Roseau, Schoolcraft	9.3	5	1	95	90	Includes a great variety of lands in the Northern Peninsula, and large stretches of sandy piney lands almost entirely denuded of forest cover in the Southern Peninsula.
Entire State	36.8	48	32	52	68	

From the foregoing table we learn two very important facts.

1. That even in the fertile and densely settled farm districts of our State, just as in all older states and the states of Europe, the good sense of the people realizes that not all land is plowland and that even on the farm which might all be put into fields it pays better to keep at least part of the land as woods.

2. That in spite of many years of effort, in spite of the low prices at which our denuded pinery lands have long been offered, their settlement is slow and that it is useless to expect that the light sandy soils of the Michigan pineries are going to settle up at once when many millions of acres of equally good lands along the coast of the Atlantic from Jersey to Texas, in a warmer climate, remain unsettled pine woods.

There is no question but there are large areas of good agricultural lands in every one of our counties and the State will continue to make every reasonable effort to encourage the settlement of these agricultural lands. But it is equally clear that no good can come from leaving millions of acres in an unprotected wasteland condition, where they do no good to town and county; bring no taxes, receive no care and merely discourage settlement by their unsightly, blackened stump waste appearance. The blackened skeletons of the former forest have done more to discourage the real settler than all other agencies combined.

To avoid the enormous waste due to leaving the millions of acres of denuded forest lands in their present idle, non-productive condition, the State of Michigan has inaugurated the policy of forest Reserves, and the object of a Forest Reserve is to secure to these much abused lands: Protection and Improvement. In spite of repeated fires, in spite of the fact that after the very soil itself was ruined by this arch enemy of the forest, nature renews her efforts and wherever seed trees exist, nearly every year new generations of trees spring into existence as tiny sensitive plants. Today millions of these trees are scattered, too thinly, to be sure, over the vast cut and burned over pinery lands and if the fire is prevented from destroying these trees they will in comparatively short time grow into a material of which we need every year more and—produce every year less. Even where man and fire have been too successful and removed all forest cover, so that no seeds (save the light-winged poplar and birch) are scattered over the lands, millions of scrub oaks are springing up from sprouts, and will make at least fuel, posts and other small size material if given reasonable protection. And it is chiefly for the purpose of providing this protection that these Forest Reserves were created and it is this protection which forms the foremost duty of every Forest Officer on the Reserve.

Where the denudation has proceeded beyond the point where natural restocking in reasonable time may be expected, the State proposes active improvement of the forest cover by planting. In this way the object of the reserve, protection and improvement of the forest cover, is to be accomplished.

But while thus the protection and improvement of the forest cover is the principal object of the Reserves, yet there are other important benefits which accrue from the creation of these reserves, especially to the people of the towns and counties in which the reserves are located. Generally, we may state them as follows:

THE OBJECTS OF THE FOREST RESERVES.

1. To protect and improve the forest cover and thereby:
 - (a) Produce a crop of timber on lands which are largely unsuited to other kinds of crops.
 - (b) Produce from lands now waste and useless, a material of which we use over 1,000 million feet per year in our State alone.
 - (c) Begin to provide for a home supply of timber which will assure reasonable prices of one of our most important necessities and thereby encourage building and general development.
 - (d) To produce the raw material for one of our most essential industries. To bring back the mill and factory and prevent the departure of those now with us.
 - (e) To begin checking the ill effects of forest denudation as seen in our streams, where destructive floods alternate with low water which prevent the use of many of our streams and lessen the value of all of them for power and other industrial purposes, and thereby rob our State every year of a great amount of wealth.
2. To encourage settlement by lessening the dangers from fire and by restoring to the land the attractive and useful cover.
3. To encourage by direct help and good example, better protection of private lands and thus hasten the good work above outlined by enlisting the co-operation of private owners of land.
4. To regulate the use of these lands and such materials as they now offer, especially to regulate the grazing upon these lands to avoid useless, destructive overgrazing and to guard the interests of the settlers of the immediate districts.
5. To assure to the county and town at least some return in place of regular taxes. The law now provides that the State through its Forestry Commission may contribute to the maintenance of roads and schools in the towns where the Forest Reserves are located.
6. To furnish employment in the protection and care of the forests which beside benefiting the people of the district directly, will do far more good, educationally, in introducing new methods and new ideas concerning the forest. Without this education, without a complete change of sentiment and attitude among the people, without a full and clear understanding of the practice and aims of forestry among the people, all efforts of the State and private holders alike must prove of little value.

Keeping in mind the objects and purposes of the reserves and their forests, it is clear that the first and foremost duty of every forest officer is to care for the forest, and every act, every decision he is called upon to make, should be guided by the thought: Will it improve and extend the forest?

REGULATIONS GOVERNING THE STATE FOREST RESERVES.

The following regulations have been prepared and adopted in conformity with the laws of the State, notably the law establishing the State Forest Reserve. They are intended to assure and orderly and equitable conduct of affairs on the Reserves. Since such order and equity are believed necessary to accomplish useful objects of the Reserves, a faithful observance of these regulations, on the part of the people, and a strict interpretation and enforcement of the same on the part of all Forest officers is essential and expected. It is hoped and believed that the good will and intelligent appreciation of the people concerning the usefulness of the Forest Reserves will co-operate to make these regulations and all arrangements for the proper conduct of these Reserves accomplish the purpose for which they are intended.

I.—SALE, PURCHASE AND EXCHANGE OF LANDS IN THE STATE FOREST RESERVES.

The law provides that the Forestry Commission "shall have power to *lease or sell any lands* within such Forestry Reserve." It also provides that the Commission "have authority to *purchase such lands* within the limits of said Forestry Reserve *as it may deem advisable. . . .*"

In general it may be said that the Commission stands ready to sell to any real bonafide farm settler any piece of real agricultural land within the Reserve, unless such sale would clearly be to the injury of the Reserve by separating or isolating tracts of Reserve lands, such as well established plantations, etc., in such a way that their proper management would be seriously hindered or rendered impracticable.

The method of buying lands from the Forestry Commission is as follows: Any one wishing to buy the land (the applicant) makes a formal application to the Forestry Commission through the Warden of the Forest Reserves. This application, together with the report of the Forest Officer, and with the recommendation of the Warden, is submitted to the Forestry Commission.

If approved, the applicant makes a deposit of \$. . . for the cost of advertisement. At the expiration of 30 days from date of first advertisement the land shall be sold at the County Seat of the county where the land is located at public auction by the Forest Officer designated for this purpose by the Forestry Commission. If the land is awarded to the applicant as the highest bidder, then the deposit for advertising is accepted as part of the payment for the land; if awarded to some other person it is refunded; but, if the land remains unsold, the deposit is forfeited to the State.

In all cases of sales the following holds:

1. No land will be sold at less than \$5.00 per acre for the land alone.
2. All timber or other valuable material existing on the land at the time of the sale shall be appraised by the Forest Officer, form a separate

item in the sale and must be paid for by the purchaser, the price approved by the Forestry Commission to form the minimum price accepted. Thus it becomes necessary that in all cases the purchaser shall pay at least the minimum (\$5.00) for the land, plus the minimum (variable with kind and amount of material) for timber and other valuable material upon the land.

The *purchase* of land is conducted as follows: Any one wishing to sell his land within the State Forestry Reserves makes application to the Forestry Commission through its Warden of Forest Reserves, in which he states:

1. Location of land.
2. Character of land, improvements and timber, if any exist.
3. Price asked.

This application must be accompanied by an abstract of title showing that a clean title rests in the applicant.

This application is reported upon by the Forest Officer and is submitted, together with report and recommendation of the Warden, to the Forestry Commission. The acceptance of this application by the Commission, a deed to the State and payment of the sum stipulated ends the transaction.

Exchange of land will be made by the above outlined procedures, the applicant sells his land and purchases the lands derived in exchange in the prescribed manner.

In cases of sale where the total value of the land and materials (improvements, timber, etc.) does not exceed \$100, the Commission may, if the case appears to justify such deviation, sell without previous advertisement, either at public or private sale.

II.—TAXATION OF RESERVE LANDS.

The law establishing the State Forest Reserves provides that: "No tax shall be levied upon such lands *except for the maintenance of schools and roads*, and no tax shall be imposed upon any of the Forest Reserve lands for the support of any school or the building of any schoolhouse or the building or maintenance of any road which is *not at present in existence*, unless the same shall have been *first approved in writing by the Forestry Commission*." It further says: "*All taxes lawfully levied upon said lands shall be paid by the State Treasurer to the township treasurer. . . .*"

In substance the law then provides:

1. That taxes on these lands shall be paid by the State to the township in which the lands are located.
2. To obtain this tax the assessment shall be made according to law, and approved by the Commissioner of the Land Office.
3. That the taxes can only be used to maintain school and road.
4. That new schools and new roads require the approval of the Forestry Commission if they are to be aided in their building and maintenance by the tax on Reserve lands.

III.—ROADS AND TRAILS IN STATE FOREST RESERVES.

The care and maintenance of existing highways shall remain with the township according to the laws of the State which provide for this care

and maintenance. As stated above, the taxes paid by the State shall, in part, be applied to this purpose.

New roads, including extensive changes of existing roads, require the approval of the Forestry Commission in all cases where the new road passes over Reserve land, and also where the funds derived from the taxation of Reserve lands are intended to be used in helping to build and maintain the new road.

The construction of trails over any part of the Reserve lands requires permission from the Forestry Commission.

Whenever any new road or trail is to be constructed the roadmaster or other official in charge of such work, or the person desirous of building such road or trail, shall make application to the Forestry Commission through the Warden of Forest Reserves. In this application the following points should be stated explicitly:

1. Location of road; where it starts, through what sections and forties it passes and where it ends. This is usually illustrated by a map, accompanying the application.

2. Kind of road, width of road, and, if necessary, right of way, and nature of construction.

3. Amount of corduroy and number of bridges and any other extra structures necessary.

4. Amount and character of timber necessarily cut or destroyed in construction.

5. Name of contractor or person to build the road.

6. Time when it is proposed to begin work and probable time required to finish.

7. Estimated cost of work.

8. Necessity or demand for such road. This, especially, should be fully stated. It should be shown that the road will serve a sufficient number of settlers, will connect important points, not otherwise conveniently connected, etc., to warrant the construction of the road.

Temporary roads to remove timber, etc., require similar application and approval.

Old abandoned, temporary roads and trails, such as old logging roads, etc., the Forest Officers may recommend to have closed, if such closing shall appear necessary for good patrol or otherwise facilitate the care of the forest.

IV.—TELEGRAPH AND TELEPHONE LINES.

Canals, ditches and other similar improvements require the approval of the Forestry Commission if they cross reserve lands, and no one shall be allowed to begin or proceed with the construction of such improvements until a written permit shall be secured from the Commission.

Application for permission to construct such improvements shall be made in the manner prescribed for roads and trails.

V.—ERECTION OF BUILDINGS.

Persons desiring to erect a building of any kind, large or small, permanent or temporary, must obtain permission to do so from the Forestry Commission. In applying for this permission the following points should appear:

1. Name and address of applicant.
2. Occupation of applicant.
3. Number, size and character of buildings. This statement should be quite in detail.
4. Use of buildings if constructed.
5. Necessity or explanation of reason for such buildings.
6. Amount of land desired in connection with the proposed buildings.
7. Period of years for which the land is wanted for this purpose.
8. Price offered by applicant for use of the land and the privileges sought.

Generally permits for privileges of this kind will be granted only where it shall appear perfectly clear that the safety of the forest cover will in nowise suffer through the occupancy of the land for the purpose under consideration.

VI.—TRAVEL OVER THE RESERVES AND CAMPING ON RESERVE LANDS.

All law-abiding people shall be permitted to travel in Forest Reserves for purposes of surveying, to go to and from their own lands or claims, and for pleasure or recreation.

But in every case the person or persons so traveling, camping, etc., must obey the rules established by the Forestry Commission for Forest Reserves, and particularly will they be expected to refrain from doing anything which may result in injury to the forests. See information concerning fire.

VII.—GRAZING IN THE STATE FOREST RESERVES.

The Michigan Forestry Commission is charged, by law, with the duty of protecting and preserving the forest cover and of providing for the reforestation of the denuded lands of the Reserves. To do this effectively, it is necessary to protect the forest not only against fire, but also against any other injury. Among the agents which injure the forest, grazing by cattle, horses and other live stock is one of the most serious unless properly regulated and restricted.

It is true that cattle may at times do a great deal of good in keeping the crops of grasses and sedges closely eaten off and thus actually assist in the protection of these lands. The removal of the grass prevents the accumulation of dead grass and other readily inflammable material, and thus the fire finds less food, is less able to run, and is more easily checked. But there is danger of over-estimating the good effects and of under-estimating the bad effects of grazing. These latter are involved in all cases of grazing. All kinds of stock are obliged to travel, and in so doing trample thousands of young trees, either killing them outright or crippling the small plants and preventing them from ever growing into valuable timber. But this is not all; during early spring when green feed is still scarce, and during dry seasons when feed is short, hard to find and of poor quality, nearly all stock is driven to browsing, and in this process the young forest tree, still a bush in size and appearance, is sure to suffer, as well as the less valuable willow and other shrub.

This kind of injury is worse with sheep and goats than with cattle and the grazing of sheep and goats should be, for this reason, more re-

stricted. In dealing with grazing the following rules will be observed:

1. A limited amount of grazing will be permitted.
2. The number of head of stock which will be allowed to run on any Reserve will be regulated according to the conditions of the forest cover.
3. Stock will never be allowed to congregate in large numbers to the detriment of the forest trees of the particular vicinity.
4. All persons wishing to graze their stock must obtain permission to do so. This permission shall be applied for on a regular printed form provided for this purpose. Every applicant shall promise, in his application, to obey the rules and regulations governing the Forest Reserves, and shall assist free of charge in protecting the forest cover, and shall help the Forest Officers, especially in preventing and fighting fires on the Reserve lands.

The application, together with the report of the Forest Officer and the recommendations of the Warden, shall be submitted to the Forestry Commission, where, on approval of the same, permit will be issued.

5. Actual settlers within or living in the vicinity of the Reserve and having an amount of stock not to exceed 20 head of cattle or the equivalent thereof may obtain a permit free of charge, but all persons having a larger number of stock shall be required to pay per head of stock for the grazing privilege.

6. The price to be paid for this privilege will vary according to conditions, and will depend especially on the following points:

(a) Whether or not the stock use the Reserve lands as their exclusive pasture, or graze on these lands only part of the time, as is commonly the case with the stock of men living some distance from the Reserve.

(b) Whether the stock use the Reserve lands all or only part of the season.

(c) It will also depend on the grazing value of the particular district or portion of the Reserve, good pasture being worth more than poor pasture.

7. Settlers in and about the Reserve will be given preference in the matter of grazing, and other persons will be allowed the use of range only if there appears to be a sufficient amount of feed over and above what shall be needed for the use of the settlers referred to.

8. Permits for 20 head or less and issued free of charge shall be obtained from the Warden direct.

9. All stock grazing on the Reserves under regular permit will have the protection of the Forest Ranger or other protective officers. Just as far as their other duties permit, the Rangers will assist the owners of live stock in preventing the injury or loss of stock from any cause, report "strays" and suppress useless dogging or other mischief. Where stock tends to accumulate, however, to the injury of stock and forest cover alike, the Ranger will direct their dispersal and a reasonable distribution over the range. Similarly stock will be kept off new plantations, and it is part of the agreement and promise of the applicant that he and his herders will assist in all reasonable efforts of this kind.

10. In matters of grazing on the Reserve one horse, or five head of sheep or goats will be considered the equivalent of one head of cattle, and all young stock, calves, colts and lambs, will be counted as full.

11. The herding of sheep or cattle on the Reserve under pretext of traveling across the Reserve will be considered as ordinary grazing, and

will not be allowed without permit. A small number of animals, up to 50 head of cattle, may be driven across the Reserve along the highway without special permit.

VIII.—MARSH HAY, BERRIES AND OTHER MATERIALS.

Any one desiring to cut *Marsh grass* for hay will make application on a regular printed form. Such application, with report and recommendations, will be submitted in the usual manner. In all cases a written permit shall be necessary, and the applicant will be expected to carry on his work of cutting and removing the material in keeping with the promises as presented in his application, especially will he abstain from trespass, and carelessness with fire, and will assist the Forest Officer in every reasonable way in the protection of the Reserve.

The picking of *Berries* will be permitted free of charge. But whenever it shall appear necessary in the proper protection of the Reserve lands against fire, the picking of berries will be regulated, and every one engaging in the work will be required to obtain a permit, and will be expected to share in the responsibility for the safety of the particular section assigned to him. Any one guilty of trespass or other violation of the laws and regulations governing the State Forest Reserves will not be permitted to share in the privileges of cutting grass, picking berries or otherwise utilizing any of the materials on the Reserves.

IX.—DISPOSAL OF TIMBER.

Timber will be sold, both live and dead, whenever the removal of such material shall be beneficial or at least not detrimental to the forest cover and therefore in keeping with the objects of the State Forest Reserves as prescribed by law and as outlined in this manual.

Generall all dead timber or timber affected by disease or insects, and all overmature or dying material will be sold and its removal encouraged. Notable exceptions will be made in case of scattering fire-injured pine trees and old trees of any kind which may be of great value to the Reserve in so far as they bear and distribute seed, and thus help in restocking the denuded lands with young growth.

Young, thrifty timber which is rapidly growing in quantity and quality alike, will generally be refused unless such material may be taken from dense thickets where a reasonable amount of thinning may not only be helpful, but even necessary to obtain the best results.

In all cases, the good of the forest cover is the first consideration, and all work in the removal of timber must be judged by this final criterion. Even dead timber, such as dead and down Cedar, will not be sold unless there shall be assurance that the removal will not injure and destroy young growth to such an extent that the cost is greater than the benefit. In such cases a definite value will be placed on the young growth of at least all more valuable species such as White and Norway Pine, Cedar, Spruce, Balsam, etc., and this value will be measured by the expense which would have to be incurred in replacing, by actual planting, a stand of young growth as good as the one destroyed, so that trees, properly spaced, may roughly be estimated to have a value of one cent for every foot in height; i. e., a young pine tree three feet high will be estimated at three cents, one 10 feet high at 10 cents, etc., and even trees less than

one foot in height will by no means be considered valueless. Where trees stand in dense clumps this valuation, of course, will be modified.

In the disposal of timber the following rules will govern:

1. Any one wishing to purchase or obtain timber will make formal application on the printed form provided for this purpose and furnished on request, and no person shall be allowed to cut timber or begin any operation of exploitation until he shall have received a written permit to do so. To cut timber without first obtaining this permit is trespass, and the sending in of an application to secure a shadow of right in the matter will not in anywise alter the case.

2. The application may be sent direct to the Warden or it may be transmitted through the Ranger or Forester.

3. The application will be reported upon by the Forest Officer in the manner prescribed below, and this report, together with the recommendations of the Warden, will be submitted to the Forestry Commission.

4. If the application shall be approved by the Forestry Commission, a minimum price shall be fixed, the timber advertised in a local paper and sold at public auction by the Forest Officer designated by the Forestry Commission at the County Seat of the County in which the timber, or the greater part of the timber sold, shall be located.

In cases where the stumpage value of the timber shall be 50 dollars or less the advertisement may be omitted.

5. A contract will then be entered into between the purchaser and the Forest Commission, duplicate copies being signed by both parties, and the receipt of this properly signed contract will serve the purchaser as permit to begin operations. In some cases, a bond will be required for the proper fulfillment of this contract.

6. The cutting will be watched over by the Forest Officer, who will also do the scaling in the manner agreed to in the application and contract.

7. Generally the scaling and measuring will be done according to local practice. Logs will be scaled by one of the common scale rules; poles, ties, posts, etc., will be sold by number and grade; shingle timber, pulp wood and fuel will be sold by the cord.

8. All material in every case must be measured and stamped or marked with "State" stamp before it can be removed. Forms No. 2 and 3 for application and contract found in appendix will illustrate this matter more fully.

9. In cases where the total stumpage value of the timber shall be 50 dollars or less, the manner of sale may be simplified, and permit to cut this amount of timber may be obtained from the Warden of Forest Reserves direct.

10. In cases where the dead and down material shall appear to be a menace to the safety of the Reserve and where emergency conditions shall exist, the Warden is authorized to grant a permit for a few loads of such material to any one person free of charge, the removal of the material, in such cases, being believed to be of greater value to the safety of the growing forest cover than the dead material itself.

11. Applications for timber will generally be attended to in the order in which they shall be received, but exception to this rule will be made whenever economy and efficiency of the service require such exception.

12. In all cases the working of cutting and moving timber will be stopped if it shall appear that the regulations, for any reason whatever, are not followed, and the safety and good of the forest is not sufficiently considered.

13. Usually the application asks for a certain quantity of timber located on a certain description, forty acres, or lot of ground, the assumption being based on an estimate, that there is this amount of timber on the particular area. If, however, the application calls for 100 M. feet b. m. of timber on lot No. 2, and it shall be found that the estimate was too high, and that only 75 M. feet b. m. of timber can be cut from lot No. 2, the applicant will have *no right* to cut the rest of the timber applied for (25 M. feet in this case) from some other lot. In other words, the timber shall be applied for, and sold by *area* and *not by amount*, and cutting of timber in violation of this rule will be considered trespass.

14. Any person having trespassed in timber will not be awarded any timber, until his case as trespasser shall be settled.

Such trespass may consist in:

- (a) Injury of timber.
- (b) Cutting and removing timber without permit.
- (c) Cutting on land not applied for, in connection with a timber sale.
- (d) Cutting, in cases of sale, timber which has not been marked by the Forest Officer, and yet is of a kind which should be marked before cutting.

15. It is a common mistake on the part of applicants and Forest Officers to suppose that any kind of timber under any circumstances must be sold whenever some one wishes to purchase. Such is not the case. Timber will be sold only:

(a) If its removal shall be rather a benefit than a detriment to the forest cover.

(b) If the applicant shall be willing and able to carry out the work of removal in such manner that the forest will be left in fully as good a condition as he finds it and not in the usual "slash" and "fire-trap" condition in which little young growth is left, and this little with hardly any future.

X.—FOREST FIRES.

There is no other agent which has done as much material harm to the State of Michigan as the forest fire. Not only has it destroyed many millions of dollars' worth of merchantable timber, but it has prevented completely the billions of saplings and young trees of our extensive forest districts from continuing in their growth and thereby maintaining the supply of timber.

While the damage first mentioned is very great, and is generally the only damage considered, yet there is not a shadow of doubt but this injury and destruction of the immature timber is far more serious than that of the old merchantable material. In destroying the old timber, the fire removed a *ripe crop*, in killing the young growth it destroyed *the forest*, it removed the very possibility of future supplies.

As long as it was supposed that all cut-over lands would settle up at once, it appeared of little moment, and "it helps to clear the land" was the usual excuse; but now that we realize that not all land is likely to be

settled or is even fit for immediate settlement, it is clear that the State has lost millions of acres of valuable forest.

Nor is this all. The fires have made wastes, and the enterprising, really desirable settler is not fond of wastes. He prefers a good green forest of the heaviest timber to a barren, fire-charred, unsightly, uninviting waste, and thus the fires have retarded settlement; they are responsible more than any other cause, for the fact that some of our counties have hardly one per cent of improved land.

To the settler the fires are a menace, they threaten his property; they destroy the range; they keep other people away; they kill the forest, and thus prevent the chance of work and chance for a market for his products. The forest fire is the enemy of everybody, and everyone interested in the good of his State as a loyal citizen is interested in preventing and in fighting the forest fire.

The laws of the State of Michigan strictly forbid, not only the malicious burning of woods, but also the careless neglect of fires set for useful purposes, such as campfires, fires used in clearing lands, etc.

More in detail:

1. The law provides a *fine of five hundred dollars and five years' imprisonment in State's prison* as the maximum punishment for *willfully or maliciously* burning, destroying or injuring wood, timber, or forest growth.

2. To allow by negligence a camp-fire, clearing or other fire to get away and destroy other people's or the State's forest growth is punishable by a maximum fine of \$1,000 *and imprisonment in the county jail for one year*.

3. The law also makes it obligatory on Supervisors, Commissioners of Highways and Justices of the Peace, in cases of forest fires to order all persons liable to work on the highways to report at the place of fire and assist in fighting the same, and any person refusing to help fight may be fined \$50.00.

4. During periods of unusual drouth the Township Board may prohibit setting fires of any kind, and any person disobeying the order of the Township Board in such a case is guilty of misdemeanor and may be punished in a maximum fine of \$1,000 and imprisonment for one year.

5. Every person living north of parallel 44 (i. e., north of Town 18 N.) who wishes to set fires for purposes of clearing land, etc., must give notice in writing to all resident owners or occupants of territory immediately adjoining one full day previous to setting such fires, and to neglect this may be punished in a sum of \$1,000 and one year's imprisonment.

In so far as the forest Reserve is occupied ground, being constantly under the actual care of resident Forest Officers, it is expected that the nearest Forest Ranger will be notified in writing by any one wishing to set fires on land bordering Reserve lands, in keeping with this act.

The act of 1903, applying to lands north of T. 20 N., provides for a special Forest Commissioner, a Chief Fire Warden, and makes every Supervisor and Mayor a Fire Warden. It increases the protective features of the fire laws, adds to the penalties and appropriates money (not to exceed \$50 per year for any surveyed township) for the purpose of protecting the forest and wild lands against fires.

In establishing the Forest Reserves the State of Michigan means primarily to give protection against fire, and in doing this not only to protect the forest cover of the Reserve lands, but also to assist the settlers of town and county in the protection of all property, farm and forest property alike, in the towns and counties in which the Reserves are located. To do this effectively, it is necessary that the people of the towns and the Forest Officers co-operate, that the people should never forget that the Forest Ranger is their servant and friend. At the same time there is need of a complete change of sentiment and habit among the people, and everybody should help in bringing this about. So far, as every one knows, there has been too much carelessness with fire. Camp-fires are left burning, "oh, it will go out itself," or "what of it, there is no good timber here, and if the fire does run it does no damage." This kind of sentiment and opinion should never exist and should not be tolerated. Again, it has been a common thing to set fire to old buildings; nearly every abandoned house or logging camp has been willfully burned, merely "to see it go." But aside from this wanton destruction there is much to reform in the habits of people. The match and cigar or open pipe combination is so common that no one seems to pay any attention to it. No one should throw a match away until put out; no cigar stump should be thrown away lighted; one second's crushing under the heel puts it out; then why endanger property by neglecting to do so? The open pipe is forbidden in all European forests; it costs hardly anything extra to have a closed pipe and to attend to the ashes when emptying them. All these and many other things are well known to most of our pioneer people, and it is not a matter of more knowledge, but of change in the habit, which is needed. This change can be accomplished if the farmers and townspeople alike co-operate with the Forest Reserve man, and with the local fire wardens, and let the guilty and the careless know that the bad habit is no longer excused, and that public opinion is against any kind of careless and negligent performance in dealing with the arch enemy of the forest of our north counties and of the State as a whole.

To warn people, the Forestry Commission posts up Fire Warning notices, and it is hoped that everybody will leave these little silent agents to do all the good they can. (See form No. 1 in appendix.)

To tear these notices down is willful trespass and will be prosecuted as such.

XI.—TRESPASS IN FOREST RESERVES.

In the law establishing Forest Reserves, the Michigan Forestry Commission is charged with the duty of "care, custody, control and superintendence of the lands herein or hereafter set apart. . . ." In performing this duty, the Commission and its Forest Officers and agents, including every person employed in any capacity on the Forest Reserve, is expected to guard the Reserve, especially the forest cover, against all kinds of injury or damage, and particularly also against trespass of various kinds.

There are different kinds of trespass, and only the more common are mentioned in the following enumeration:

1. Trespass in timber. A person commits trespass in timber by:

(a) Cutting and removing timber of any kind, green or dry (live or dead), standing or down, without having a written permit to do so.

(b) Cutting and removing timber on and from land other than the land specified in the permit to cut timber.

(c) Cutting and removing timber after the expiration of the permit.

(d) Cutting, mutilating or injuring in any way any kind of forest growth. This includes the careless or mischievous slashing of small trees, whether mere plants six inches tall or young saplings 20 feet tall, and it also includes the wanton, useless peeling of trees, such as Spruce and Birch, where beautiful trees and girdled and destroyed merely to get a few square feet of bark, often to be thrown away without even using the same. These practices, especially along highways and along the shores of lake and stream, do so much to mar the beauty of the landscape that every well-meaning citizen is expected to assist the Commission in its efforts to prevent such destruction.

In considering the character and damage in trespass, a distinction is made between knowing, willful or malicious trespass on the one hand and unintentional or mistaken trespass on the other.

In general a person who cuts timber on Reserve lands, far from his home, without owning any timber adjoining the lands upon which he cuts may be assumed to know that he has no right to cut, and may be considered to have committed trespass knowingly and willfully.

Similarly, a person who mutilates trees "just for fun" is a malicious trespasser, for he knows that the trees do not belong to him and that his acts are destructive to the timber. On the other hand, a person cutting timber on his own lands, or timber purchased in a legal manner may by accident cut across the lines, where these are not well marked. This is liable to occur especially where the cutting is done by persons not acquainted with the lay of the land. In such cases the trespass may in truth be due to mistake, and therefore unintentional. This statement must not, however, be interpreted to mean that a person under circumstances as above outlined, is always an unintentional trespasser. In all cases of timber exploitation a person is supposed to exercise proper care and diligence to find and to mark the lines bounding his tract of timber, and evident neglect in this direction must necessarily make the trespass due to this neglect seem willful.

The laws of Michigan with regard to trespass are quite sufficient, although trespass on State lands is regarded and treated with far more leniency than similar trespass on private lands. While willful trespass on private lands is regarded a *felony* and subject to (where the damage is \$25.00 and over) a maximum punishment of one year in State's prison, the trespass on State lands is regarded a *misdemeanor*, and the maximum punishment is *one year in jail and a fine* of \$500.

Where suit is brought against the trespasser for the value of material destroyed or removed, the *willful trespasser pays* treble the actual damage; while the "casual or involuntary" trespasser simply pays the actual damage in the case.

To receive material known to have been cut in trespass, to aid or abet trespass makes the person guilty of these acts subject to the same fine and punishment as the trespasser.

Whenever trespass of this kind is discovered, it is stopped at once, and all the information obtainable is gathered. It is then reported to the

Warden, with such recommendations as the case justifies. This report is submitted to the Forestry Commission, with the recommendations of the Warden, to settle or to prosecute, as the case may be. If concurred in by the Commission, the Secretary of the Commission, in his capacity of State Land Commissioner, lays the case before the Prosecuting Attorney of the county in which the trespass occurred, with request to prosecute.

To enable the Prosecuting Attorney and the court to assist in the proper protection of the Reserves, it is necessary that every effort be made to gather a sufficient amount of substantial evidence. In doing so mere hearsay is of no avail, and as far as possible every fact called for in the printed form of report should be established beyond question and doubt. In every case the trespasser should be among the persons interviewed, and he should be given opportunity to state his side of the case, preferably under oath.

2. Trespass in grazing is committed whenever any one grazes stock on the Reserve lands without permit. The rights of the State of Michigan in its own lands are exactly the same as the rights of a farmer in his farm holdings. Just as the farmer can not allow everybody to graze in his fields and meadows, so the State, of necessity, must regulate grazing on lands where it proposes to grow a crop of timber. In considering this trespass, the damage will always be regarded and judged as an injury to forest growth, particularly to the young, growing plants and the forest tree in its plant or bush size and form.

3. Unlawful occupancy of land and inclosure of the same. On land belonging to the Reserve, it is trespass to fence the land or otherwise permanently occupy the same without written permit from the Commission.

4. Miscellaneous trespass, such as doing the following without permit:

Building roads, trails, ditches, canals, telephone and telegraph lines, or erecting buildings of any kind, for any purpose, on any part of the Reserves. All kinds of trespass should be stopped by the Forest Officer and promptly reported, irrespective of any damage which may have been caused.

DUTIES OF FOREST OFFICERS.

The work of Forest Officers, Foresters and Rangers may be enumerated as follows:

1. Protective duty, guarding against fire and trespass, fighting fires and stopping trespass, as well as assisting the State authorities in the protection of game.

2. Care and propagation of the forest. Every Forest Officer is expected to familiarize himself thoroughly with and to assist in seedbed and nursery work and the methods of restocking the denuded lands. He is also expected to promote and improve the growth of the forest cover by a careful, painstaking supervision of all cases of timber exploitation.

3. Special work, such as arises in connection with grazing of stock, cutting of marsh hay, gathering berries, construction of roads, trails and bridges, leasing of lands and erection of improvements thereon, with sales, purchases and exchanges of lands and other cases requiring special investigation and report.

4. Permanent improvements carried on by the Reserve force, such as making surveys of land and timber, establishment and care of headquarters and other similar improvements under the immediate care of the Reserve force.

In this connection it should be stated emphatically that Forest Rangers and Foresters do not have the authority to grant timber, grazing, etc., permits, and the public should not find fault with the Officers and the Reserves if they fail to obtain permits and privileges through these officers. The Forestry Commission alone grants privileges, except in the few instances above stated, where minor cases have, for reasons of expediting business, been delegated to the Warden of Forest Reserves.

Considering the duties of Officers more in detail, the following should be kept in mind:

I.—PREVENTING AND FIGHTING FIRES.

It is expected that every Ranger and other Forest Officer shall be constantly on the lookout for fires.

Fire Notices.—An ample supply of fire warning posters will be furnished at all times, and it is imperative that the Reserves be thoroughly "posted" with these useful notices. The fact that, in a few rare cases, malicious persons destroy them is no excuse for neglecting this important preventive effort. In many cases the warning can be combined with some useful information, such as a sign board, to indicate the Reserve line, limits of districts, or excluded parts in grazing ranges, etc. The destruction of the notices is willful trespass.

Camp Fires.—Forest Officers should inform transients and others concerning the rules and regulations governing camp and other fires. This should be done cheerfully and politely; and an officer who is unable to talk with persons who, from ignorance concerning the rules, or from lack of experience in camping, appear to do wrong, without losing his temper or without using improper language, fails to that extent in one of his principal duties. In cases where inexperienced persons build a fire against a large rotten log merely to cook a cup of coffee, or where a fire is built in a mass of dry duff, dead leaves, branches, etc., and where the work of putting out such a fire is beyond ordinary effort, a Forest Officer should call their attention to such mistake and instruct them in the proper way of building and handling fires. The two main points in this connection are always:

(a) Do not start a fire where it will be difficult to put it out.

(b) Never leave a fire without putting it out. This is law. The puerile desire to see a fine balsam or spruce burn and show like a huge candle in the night, which has so often been expressed and carried out, must, of course, never be tolerated. It is malicious burning, and may bring a fine of \$1,000.

Lighting Fires.—Fires from this source are not rare, especially in dry seasons, and it is necessary after every electric storm to make a special effort to locate and extinguish any such fires before they are well under way.

Fighting Fires.—When once a fire has spread over an acre or more, especially on difficult ground where a large amount of dead and down material makes it a real hot fire, the matter is frequently beyond the

possibilities of one Ranger alone. In such cases it is often best to seek for help.

In fighting fires of this kind, the character and condition of the woods, the weather, and even the time of day, have so much to do with the case that a set of general directions has little value, and the experience and good judgment of the Ranger mean everything.

Generally, it may be said that the proper tools to fight the fire are the shovel, mattock, ax and rake.

For this reason the ranger should always carry at least shovel and ax during all the dangerous season, so that he is never unarmed against this arch enemy of the woods.

In humid, heavy timber the fire usually travels slowly, and a few men, if persistent, can keep it in check by trenching, though they can never extinguish it, and must therefore watch it until a rain helps them out.

In dry, open pine woods the fire travels faster, and it is often best to go some distance and hunt the most open and clean ground, trench, and *back fire* from there.

In handling back fires great care is required to avoid the useless burning of forest.

In all kinds of fires, the night or the early morning hours are the best time to work, whenever any choice of time exists; for nearly all forest fires die down more or less during the cool of the night, and then flare up again during the heat of the day.

Generally, we may say:

- (a) Protect the valuable timber rather than the brush or waste.
- (b) Never leave a fire unless driven out, or until it is put out.
- (c) Young sapling thickets suffer more than old, mature timber.
- (d) A surface fire in open pine woods, though not dangerous, does great harm in destroying the seedling growth.
- (e) A fire rushes up hill, but crosses a crest slowly, and is more or less retarded in traveling down. Therefore, if possible, use the crest of the ridge and the bottom as your lines of attack.
- (f) A good trail, a road, a stream, an open park, check or "bring down" the fire. Use them whenever possible.
- (g) A bit of thinking often saves labor and makes work successful. Ill-planned efforts suggested by haste and excitement rarely lead to success.

Expenses.—While the State is willing and anxious to prevent and fight fires, and is willing to go to considerable expense therefor, it is unreasonable to suppose that an unlimited amount of money is to be devoted to this effort. Experience has proved conclusively that in most cases a reasonable effort is all that is justified, and that a fire which cannot be controlled by 20 to 40 men will run away from 100 or even more men, since heat and smoke in such cases make the direct fight an impossibility.

Unusual expenditures will not be tolerated. They are unnecessary, wasteful, and even mischievous. For it is claimed, in not a few cases, that the fire was started and thrived because of the opportunity for a job. In and about nearly every Reserve it is possible to enlist the cooperation of the better citizens, and thus to have such an agreement that in time of need there can be had a sufficient number of men, and men of the proper kind. A crowd of men hastily gathered about the

taverns, etc., of a town, without organization, without interest, and without experience, is usually a poor makeshift with which to battle a fire.

Accounts.—The payment of persons in cases of fires will be made in the same manner as the payment for ordinary labor. Effort will be made to have this payment made at once as soon as the service terminates.

Persons enjoying privileges of any kind in connection with the Forest Reserves are expected to render a reasonable amount of assistance in cases of fire without additional compensation.

II.—GUARDING AGAINST TRESPASS.

Every kind of trespass, but particularly trespass in timber, must be prevented, or reported and stopped.

Whenever a Ranger or Forester passes by a place where timber cutting is in progress, whether under permit or not, he should, if possible, take the time to examine the cutting. He should see that the timber, if cut under permit, is marked; that the lines are blazed and marked; that the logs being hauled away are stamped; in general, that the cutting is done according to the rules of the Commission set forth in this Manual.

If the cutting is without permit, the Ranger should ascertain by what authority the timber is being cut; and if the authority is sufficient, he should ascertain if the lines limiting the area are clear, and that no cutting is being done across such lines.

If he finds that the cutting is without permit or without authority, or finds irregularities or violation of the rules, he should at once collect the facts, as required by the form of report on trespass in timber, and prepare such a report. This report he will transmit to the Forester. If the case appears to be unquestionably a trespass, the Ranger will notify the persons to stop cutting and hauling, taking care to note time of day, date, and place of such notice, giving such notice, if possible, only in presence of a witness.

Where the case requires prompt action, the Ranger or Forester will seize all material cut under trespass and invoke such assistance as appears necessary.

If the nature of the case warrants such procedure, the trespasser shall be asked to settle, and his offer of settlement can accompany the report. In all offers of this kind a *certified check* for the amount offered should accompany the report.

Forest Officers will note the above enumeration of trespasses and will guard against all of them. In no case should the officer pass any work, etc., without ascertaining whether or not it is done under proper authority. In reporting trespass other than in timber, the form prescribed for report on trespass in timber can be followed and adapted.

III.—CARE AND PROPAGATION OF THE FOREST.

In dealing with the regular timber sales the Forester will never lose sight of the main objects of the Reserve, and therefore never recommend the sale of any material, where its removal will do harm to the forest cover and its future.

In handling an application for the purchase of timber the following points and directions should be observed:

If, after examining a tract applied for, the Forest Officer shall decide to recommend the sale, he shall explain to the applicant all the requirements which will be demanded of him by the regulations, adding such as he may think necessary in the instance at hand, and these shall be agreed to in the signed application. To avoid misunderstanding later, it is important that all points concerning the proposed cutting be discussed fully before the application is submitted. Following are a number which must be included in all applications, and the Forest Officer is expected to add others when advisable:

1. To what minimum diameter on the stump will cutting be allowed?
2. How many seed trees per acre shall be left?
3. To what diameter in the tops must trees be utilized?
4. Should the brush be piled, and in what manner?
5. Will any extra work, such as cleaning up down stuff not cut by the purchaser or burning brush, etc., be required of him?
6. How high are the stumps to be (usually not higher than the tree is thick, and in valuable stuff not above 18 inches)?
7. Should felling be done with saws?
8. Will hewing be allowed except at skidways and openings?
9. Will cutting be allowed throughout the year?
10. What material may be used for skidways, road material, and camps, and shall it be paid for?
11. Where will applicant be allowed to locate camps, roads, dams, etc.?

In cases where the application is for "dead" or dry material it must be understood that this includes only wood, standing or down, which is actually dead, and in no case trees which are apparently dying. In the case of evergreen species, all trees having any green leaves are classed as living timber. Since deciduous species, such as tamarack and most hard woods, have no foliage in winter, special attention must be given during this season. Trees dead at the top and green below, generally called spike-topped trees, are classed as living, and must never be cut under dead-timber permits.

If an agreement shall be reached in the matter, the case will be reported upon by the Forest Officer on the prescribed printed forms, copies of which appear in the appendix.

Unless part of such information has been previously secured, the examination of the tract by the Forest Officer must include:

1. Surveying, mapping and blazing out the lot or lots on which the cutting will be located.
2. Locating definitely enough to permit estimate, description and locating on map of cutting area itself.
3. Measuring and estimating of timber on proposed cutting area, and on entire block when practicable.
4. Description of lot and cutting area.
5. Recommendations concerning proposed sale, with reasons for them. These should embrace such points as the probable effect on the future composition and reproduction of the forest; the condition of the timber in so far as it affects the policy of holding it for advance in price; the need for the timber applied for; the possibility or difficulty

of getting it in some better place; the reliability of the applicant, and the price which should be obtained. The latter point is one of great importance, and should be decided, not by general precedent in the region, but by the actual value of the timber as determined by its character, difficulty to log, and distance from market. Timber on a gentle slope and near a mill or drivable stream may be worth more than twice that made inaccessible by lack of roads or distance. The Forest Officer should determine the cost of marketing all material and recommend prices which will make it approximately equally desirable.

In the marking, cutting and scaling the following is to be noted:

If the application shall be approved, the Forester or Ranger (with assistance if necessary) will mark at once all trees to be cut. This is imperative in all cases involving living timber. Where only dead timber is purchased, and there is no danger of confounding it with timber in various stages of injury or disease, the marking of individual trees will be dispensed with. In such instances the Forest Officer may simply blaze and mark the boundary of the cutting area and instruct the purchaser in the manner of cutting.

The marking of standing timber must be done with the "State" stamping hammer, and all trees must be marked near the ground, in order that the stumps may afford positive evidence of the marking. Where snow may conceal such marking from the cutters, it will be necessary to mark each tree at a point several feet from the ground also.

Cutting in any case will not begin until the Forester is informed of the fact that the timber has been awarded to the applicant or highest bidder.

From the time that cutting shall begin the Ranger or person entrusted with the scaling of the material shall make a report on the progress of the cutting. This report shall be made on the regular printed form prescribed for this purpose and submitted on the 15th and at the end of each calendar month to the Forester of the district, and by him transmitted to the Warden's office.

It shall be the duty of the Ranger to see that the cutting shall be confined to the least possible area and not distributed here and there over the entire tract; also, that, so far as reasonable, all branches of the logging operations keep pace with each other. In no instance will the brush piling be allowed to fall behind the manufacture and removal of logs, ties, and other material. The ground must be cleared as fast as the work proceeds.

The manner of piling brush may be varied according to conditions, but the object is always to insure ready and clean burning, as soon as possible, with the least injury to standing timber and seedlings. The piles should be compact and large enough to kindle easily and burn clean without repiling. When possible, they should not be nearer than 15 feet from standing green trees or dead trees having many branches or a covering of moss which might be ignited. Where the density of the standing timber makes the above rule impracticable, openings should be made by cutting, or, if this is not feasible, the piling should be near the least valuable trees and where there is the least danger of the fire spreading. All chunks, knotty sections, or other unutilized portions of trees, as well as the branches, must be piled, and as much of such material as possible should be piled together to insure clean burning.

Where the contract does not oblige the purchaser to utilize the trees into the extreme tops, all the remaining portions must be cut up and piled or dragged full size into openings where large piles may be burned safely.

The above instructions will be followed, as far as they apply, in all cases where timber is cut or disposed of. The fact that only a few trees, dry stubs, a few loads of dry material are under consideration does not in any way change the case. A few minutes' work on the ground will suffice in such cases to supply the information for a complete and satisfactory report, and thus enable an orderly conduct of business.

In estimating and scaling in connection with timber sales, the following points should be considered and the work should always be done in a careful, workmanlike manner:

Since all timber is sold on actual scale after cutting, a simple estimate of the timber, as distinct from caliper measurement, will be permitted in most cases. In making the estimates, the entire area of the lot may be covered by going over the land along lines 20 rods or less apart, or the area may not be entirely covered, and mere sample tracts estimated. The former is much the better method in large timber, especially where the timber is irregular or scattered. The sample methods are justified in dense thickets of small timber, such as cedar thickets in swamps, etc., especially where much dead and down material has also to be accounted for. Of sample methods only the following two should be employed, so that a certain degree of uniformity in the work will be attained:

(a) The "circle method," either by quarter-acre or full acre circles, where the estimator places himself in the center of a circle whose radius in case of full acre circle is 40 yards, and counts and tallies all trees within this circle. This is an easy and very satisfactory method. The beginner will do well to carry a staff and place it at the center of the circle, and from this pace out to make sure that he does not include material outside of the circle. In using this method it is necessary to take the sample area or circle, not by choice, but along certain definite lines and at fixed and uniform distances apart. In covering a 40 acre tract the lines may be 20 rods apart and the circles also 20 rods apart along these lines, so that 16 circles are estimated for the 40 acres, and thus 40% of the area covered by the estimate if full acre circles are used and 10% if the circles are one-quarter of an acre each. A common mistake of the beginner is to "fudge," i. e., to go a little beyond the fixed 20 rods, because the spot has little or no timber. This is wrong, and makes the estimate perfectly useless. The value and reliability of the estimate lies in the strict adherence to the system chosen.

(b) The "strip method," where the estimator counts and estimates all trees along his path on a strip two or four rods wide. By using a four-rod strip and closing the tally every 40 rods, each tally sheet contains the results for one acre. Here again the strips are taken along definite lines. This also is a very good and satisfactory method, and in some kinds of timber deserves preference over the circle method.

Whichever method is used, the map and report should indicate the method employed, thus, for instance, the report should state:

"Circle method; full acre circle, 20 rods apart on lines 20 rods apart; 40% of area covered."

In any case the estimate should not be mere guess, but should be based

on an actual tally of the trees, divided by kinds and recorded in diameter classes, usually differing by two inches.

These tally sheets should be preserved and serve as basis of the report. Wherever the case justifies a more careful method, it will be found that a regular caliper measurement is but little more costly and far more satisfactory than the ocular estimate.

Where this method is employed two calipermen and one tally man work through the timber in a four-rod strip, covering either the entire area or a definite per cent thereof.

Scaling and Stamping.—Larger pieces should all be scaled separately. Hasty methods of averaging diameters or length or both cannot be allowed. Ties and tie pieces are simply counted. Posts and poles are counted, but must first be classified by length and upper diameter. Shingle timber, pulp wood and fuel are measured by the cord, but the length of the material is specified. Square timber is reckoned as full, like sawn timber.

In making allowance for decay, crook and other defect, the local custom may be followed. Where controversy arises in important cases, the judgment of the Forester of the district prevails. "Flat" logs, i. e., with elliptical cross-section, are scaled on the average diameter; material, hewn on two sides, is scaled on the diameter parallel to the hewn faces. In "long lengths" a scale will be required such that no log over 18 feet receives but one measurement. For instance: A 20-foot log 14 inches at upper diameter should be treated as one 10-foot log 14 inches, and one 10-foot log 15 inches diameter, a taper of one inch per 10-foot length being generally assumed.

When scaled, each stick of saw logs, timbers, ties, posts, poles, or piles must be stamped with the State mark on at least one end, and on both when possible. Cord material, such as wood or bolts, must be stamped at both top and bottom of piles and at least 12 pieces in each cord must be stamped.

PLANTING OF TREES.

The planting of trees or the restocking of denuded areas is one of the duties imposed by law on the Forestry Commission.

For this reason every Forest Officer should acquaint himself with the methods employed for this purpose, he should learn to sow, and tend nursery, to plant and care for plantations as they are made on these "slash" lands.

In addition he should learn the value of seed trees and of sprouts, of "improvement-cutting" and "thinning" and should use every minute of his time when not otherwise engaged in furthering the growth of the forest. Every day he meets, on his rounds, patches of ground where a fine reproduction deserves special care and attention, where hundreds of young trees still in their "bush" stage are laboring under cripples or inferior kinds with little hope of getting on and where a few days' work would save more well established valuable young trees than could be set out at ten times the expense involved in giving these established trees the necessary help. A little good sense and an industrious spirit will suggest a multitude of things to do and an enthusiastic Forest Officer will find that the forest, like the farm is never without want of help and is ever ready to repay well every effort made in its behalf.

So far the work of reforestation has but just begun. Over 50,000 trees have been planted and a seed bed and nursery is established in District No. 1 of the Roscommon Reserves. In conformity with the law, it is the intention to continue this work, enlarge the facilities, and assure greater economy and better success by growing the plant-stock in the vicinity where it is to be used.

These plantations and all other important or specially valuable or promising tracts of young growth will receive special care, and will be surrounded by fire lines and thus be assured better protection than could otherwise be furnished.

IV.—SPECIAL WORK.

The grazing of stock, cutting of hay, construction of roads and trails and the many similar cases require special investigation and report of the Forest Officer and it is expected that he will act promptly and with perfect frankness and fairness. He should be just, polite and helpful, and should always endeavor to earn the respect and good will of the people of the district, and enlist thereby their hearty co-operation in the protection and improvement of the forest.

V.—PERMANENT IMPROVEMENTS.

In the forest survey and classification of lands prescribed by the law establishing the Reserves, the present division of lands, i. e., the U. S. Land Office system will be adhered to; its landmarks will be left undisturbed and the designation of Town, Range, and Section retained. It will be the duty of all Forest Officers, at every opportunity to re-establish and maintain the original landmarks and also such landmarks as will be established in carrying on the forest survey. In this latter the section lines will be re-blazed, and quarter and eighth posts will be established on all east and west lines. The Section will be divided into eight lots, each quarter section forming two 80-acre lots, these lots to be numbered 1-8 and thus the description considerably simplified, since the longer description for instance of "E $\frac{1}{2}$ of S E $\frac{1}{4}$ is replaced by lot 8." This simplification will prevent mistakes and at the same time does not interfere in the use of the original designation where this appears preferable.

Other improvements, such as the erection of fire lines, shelter camps, trails, will be taken up as time permits, and the necessity for such work appears. In all cases of this kind and especially if an outlay of money or extra help is required, the Ranger or Forester first submits a plan of the work, its scope, estimated expense as well as the reasons for undertaking the work at the particular time and place. No work of any importance should be undertaken or even provision made for the same before such a plan has been submitted and approved by the Warden.

VI.—PROTECTION OF GAME.

In the protection of game the Forest Officer shall act as an assistant to the game wardens of the State. It shall be his duty to discover violators of the game laws and help to stop their depredations.

Reports on violations of the game laws shall be made to the Warden and to the local or State game warden.

VII.—PATROL OF RESERVE.

In his patrol of the Reserve the Ranger should not only visit a few convenient points at irregular intervals but he should so arrange his work that every section shall be visited and sufficiently often that the Ranger shall be able to keep in mind the character of the forest cover, its condition and needs. To do this properly it is necessary that a network of trails be gradually established, and that these trails follow as far as possible, section lines and other landmarks so that the Ranger may know at every moment just what portion of his beat of district he has about him. For this reason the patrol should be combined with regular land-looker work, the Ranger should devote part of his time to locating and marking section corners and lines until the regular survey shall be completed, and even where this is done, he should maintain and improve the landmarks, corners, etc., reblaze obscured lines, improve old and build new trails, clean out bad spots in fire lines and do such work as can well be combined with patrol and where a single person can really accomplish marked good.

At all times the Ranger should keep close watch of all that is going on within the Reserve, whether on private or Reserve lands. He should know all the settlers, and the conditions of the settlement; he should visit all lumber camps, large or small, and should know at any time whether these camps are in operation, about how many men are at work and should anticipate any difficulties or trespass. Where the Ranger is in doubt and fears complications of any kind, either in matters of trespass or of fires, as in case of clearing lands, he should see the person in charge and in a friendly helpful spirit and manner, he should state his fears or his side of the case and endeavor to persuade the person to carry on the work in a way which will preclude all difficulty and remove any danger from fire or other injury. Where this remonstrance and persuasion fails he shall report the case at once to the Forester with such recommendations as he sees fit to make.

VIII.—THE FOREST OFFICER AND THE PUBLIC.

As servant of the people the Forest Officer should, at all times, be ready to give information as to the condition of affairs on the Reserve, the methods pursued, the results attained and the plans and policy followed. At the same time he should be discreet, and should, especially refrain from any statement as to what the Commission would or would not permit or approve, since such officious anticipation of the action of his superiors is certain to lead to trouble and bring the officer and his work in disrepute and confusion.

IX.—REPORTS.

A proper management of the Reserves demands that all conditions, all work, and all occurrences which affect the Reserve in any way should be properly reported and recorded. Without a fairly complete knowl-

edge of the character of land and timber it is impossible to regulate properly the utilization of the Reserve.

In nearly all cases a mere general information is of very little value. For instance, an application for timber can not possibly be properly considered simply upon a showing that there exists an abundance of timber in the Reserve, or even in the particular township. The conditions and amount of timber on the particular quarter section is what is needed.

Accordingly, every Forest Officer should learn to report, and, in order to report well, should learn to observe and record fully and correctly. Clearness, completeness, and brevity should be combined in reporting as far as possible; long dissertations and reference to irrelevant matters must be avoided.

The different reports are classified as follows:

RANGERS' REPORTS.

1. *Report of Service.*—This is a weekly report to the Warden of the Reserves transmitted through the Forester of the district. It is made out on a regular printed form, and contains primarily the items of service or work rendered by the Ranger during the week. Special information, request for assistance or other recommendations accompany this report.

2. *Reports on Regular and Special Work.*—These are reports in connection with sales of timber, with grazing, applications of any kind transmitted by the Ranger. All reports of this kind are made according to the regular forms, and on regular blanks, where such are furnished. In making the report the Ranger should never have more than one subject on a sheet of paper. Thus, he should not report an application for grazing on the same sheet with an application for timber, but should use a separate sheet for each report. The reports may be made with a hard pencil or in ink, but where rain is likely to spoil a manuscript in ink the pencil is preferred.

REPORTS OF THE FORESTER.

1. *Weekly Reports.*—These are brief statements of the progress of the work in hand, together with a tabulated statement of the number of days' labor performed on the different kinds of work, the expense which this represents and the amount of work accomplished as far as this is feasible.

In this enumeration the time of the Rangers and Forester is not included and only the extra help is recorded. For the present the different kinds of work are classified as follows:

- (a) Protection including the fighting of fires.
- (b) Reforestation.
- (c) Survey of lands.
- (d) Disposition of timber.
- (e) Permanent improvements, such as roads, trails, Ranger cabins, etc.
- (f) Miscellaneous work, such as extra work in connection with exchange of lands, grazing and special applications of any kind.

2. *Monthly Reports.*—These are more extensive statements of the condition of affairs the work performed, work in hand and work planned for the coming month, together with such requisitions for purchase of materials, and recommendations for new work to be undertaken as the conditions of the Reserve appear to demand.

The monthly report is accompanied by reports on fires, scale reports in cases of timber sales and reports on grazing, condition of range, distribution of stock, etc.

EMPLOYMENT AND OFFICIAL STANDING OF FOREST OFFICERS.

I. WARDEN OF FOREST RESERVES.

The Warden is appointed by the Forestry Commission for a term of four years, but may be removed at any time. No person is eligible unless in good health, able bodied, thirty years of age or over, a graduate of some college of repute, with an amount of training in forestry sufficient to pass the U. S. Civil Service examination for Field Assistant, or its equivalent, and at least four years' experience in the direction and office routine of actual forestry work.

The Warden is the direct representative and agent of the Forestry Commission, and has authority to:

1. Recommend the employment and dismissal of Rangers and Foresters.

2. Employ help, purchase material and incur expenses necessary to carry on the work on the Reserve as far as approved or ordered by the Commission.

3. Plan the work on the Reserve.

4. Report and recommend to the Commission any change in personnel, methods and policy of managing the Forest Reserves.

5. Issue permits in sale of timber and other material where the value of the material does not exceed \$50.00 in any one case; the judgment of this value to be left with the Warden, subject to revision by the Forestry Commission.

6. Issue permits for the grazing of live stock in cases where the permit is issued free of charge or where the value of the grazing privilege does not exceed \$20.00 in any one case or for any one applicant.

7. In cases of flagrant violations of official behavior, the Warden may suspend any subordinate Forest Officer, and, if the officer shall be dismissed subsequently his pay will terminate with the date of suspension, and not of dismissal.

The duties of the Warden are:

1. Plan and direct the work on the Forest Reserves. In doing so the Warden submits from time to time plans and estimates of work and in no case is he permitted to undertake expenditures without specific written approval and authority of the Forestry Commission. The Warden

is expected to visit the Reserves as often as the business of the Reserves requires, and is held responsible for an honest, economic, and efficient conduct of this business. All Forest Officers and other employees on Reserves are under order of and directly responsible to the Warden.

2. Keep a complete record of the business of the Forest Reserves. Until further order this record will involve the following distinct items and cases:

- (a) Lands, purchase, and sale of lands.
- (b) Protection, Rangers and Foresters' reports.
- (c) Survey of lands.
- (d) Reforestation.
- (e) Disposal of timber and other materials.
- (f) Grazing of live stock.
- (g) Trespass.
- (h) Fires.
- (i) Expenses, classified by:
 - Administration, protection, reforestation, survey, equipment, permanent improvements.
- (j) Income, classified by the various sources.
- (k) Plans and authority for differen kinds of work undertaken on the

Reserves.

3. The Warden attends to all applications, recommendations and accounts coming from the people or Forest Officers, and submits applications and accounts with his recommendations to the Forestry Commission.

4. The Warden shall report to the Forestry Commission from time to time the condition of the Reserves and all special occurrences or cases of sufficient importance. At the end of each quarter of the calendar year, he shall report all permits issued by him and all sales of materials, not otherwise coming before the Commission.

On or before the first day of October of each year the Warden shall submit his yearly report, covering the past fiscal year.

The Warden is not a bonded officer, and has no authority to accept money for any privilege, material or concession. Such payments, whether checks, money orders or otherwise, should all be made to the Michigan Forestry Commission or its Secretary.

The salary of the Warden is \$1,000 per year.

II. THE FORESTER.

1. Foresters will be employed from time to time as the needs for their services arise.

2. The applicant for this position must be able bodied, of robust health, good habits, of good repute and character, a graduate of some college of repute; must have had a full course of training in forestry, covering two years of study and at least two seasons of actual active field work in pursuit of some line of forestry work.

He may be required to pass an examination and will always be expected to submit satisfactory recommendations.

3. The Forester shall be appointed by the Forestry Commission upon the recommendation of the Warden and shall hold his position subject to the pleasure of the Commission.

4. The salary of the Forester will vary with the man and the work and shall be fixed by the Commission.

5. The Forester shall be the superior officer in his district; have charge of men and equipment, but have no authority to issue permits, grant privileges, sell material of any kind or enter any agreement which should bind the Forestry Commission in any way whatsoever.

6. The Forester shall carry out the orders and plans assigned to him by the Warden, and will be responsible for an efficient, economical conduct of affairs and satisfactory work.

7. The Forester will be expected to be in the field daily, direct, in person, all important work as far as this is possible; direct and assist the Rangers in their work; keep time of all help; issue pay orders in cases where this method of accounting is permitted or prescribed and receive the materials purchased for work in his district. He shall be responsible for the equipment and materials entrusted to him.

8. The Forester shall submit plans and estimates of work; make recommendations for new work, for the purchase of lands and equipment, for the employment of extra help, and suggest changes of methods and improvements.

9. In purchasing materials and in the employment of men the following rules will hold:

The Forester will make a requisition for the purchase of the material, this requisition shall be sent to the Warden and receive his approval and thereby become a valid order.

The Forester can employ men and teams only on direct written order of the Warden.

Both the above rules or requirements may be waived in extraordinary cases, such as fire, emergencies in times of planting, etc., and may also be deviated from at express order of the Warden.

10. The Forester will transmit and report on all applications, adding his recommendations.

11. He will transmit the reports of the Rangers, and submit both weekly and monthly reports of his own.

12. The Forester will keep records of:

(a) Expenses incurred in his district. This does not include salaries of Rangers and Foresters.

(b) Requisitions issued.

(c) Help employed, men and teams, i. e., regular time book.

(d) Pay orders issued.

13. The Forester will also keep at his headquarters copies of:

(a) Maps of district.

(b) Forest description of district.

(c) List of lands in district, including all lands properly included within the boundaries of his district.

III.—FOREST RANGERS.

1. The Rangers will be appointed by the Forestry Commission on recommendations of the Warden.

2. The salary of the Ranger will be fixed by the Commission, and his term of office at the pleasure of the Commission. Long and efficient service will entitle the Ranger to promotion in salary.

3. Applicants for this position must be 21 years of age or over, robust, able bodied, of good habits; properly recommended. Experienced woodsmen and local men are given preference.

4. The Ranger shall be a protective officer, but will assist in other work as the circumstances and time permit.

The foremost duty of the Ranger shall be to patrol the beat assigned to him, and he will be held responsible for the safety, from all injury, of the property intrusted to his care.

5. The Ranger will receive, and transmit, and report on applications, and his recommendations will be generally necessary before issue of permit.

6. The Ranger will submit a regular weekly report of service to which he will add such suggestions and recommendations as may appear necessary for the safety and good of the forest.

7. In cases of fire or extraordinary danger the Ranger may employ assistance, but must notify at once the Forester of the district to which his beat belongs.

8. Trespass and fire shall be both specially examined and made subject of special report on regular prescribed form.

9. The Ranger will have no authority to grant privileges of any kind, to sell or purchase materials or enter any agreement which should appear binding upon the Forestry Commission, except in emergency cases as above specified. The acceptance by the Ranger of money, in any form, in connection with any transaction or affairs of the Forest Reserve, save his own, is forbidden.

FOREST RESERVE LAW.

AN ACT to create a forestry reserve, to provide for its maintenance, management and regulation, by restoring for sale or homestead entry, lands heretofore reserved in certain counties in this State, to make an appropriation therefor, and to provide for a tax to meet the same.

The People of the State of Michigan enact:

Section 1. All delinquent state tax, homestead, swamp and primary school lands now belonging or which shall hereafter be added to and belong to the State in towns twenty-one north, range three and four west; the north half of town number twenty-four north, range four west, and the south half of town number twenty-five north, range four west, are hereby withdrawn from sale and entry, set apart for the creation of a forestry reserve, and for that purpose placed under the control of the Michigan Forestry Commission created by act number two hundred twenty-seven of the public acts of eighteen hundred ninety-nine. It shall be the duty of said Michigan Forestry Commission, first, to investigate and determine what part or portion of the lands belonging to the State, thus withdrawn from sale and entry and set aside, it will be for the best interests of the State and public to retain and devote to the purpose of forestry, having regard to the soil and natural characteristics and conditions of said lands and their relative fitness for cultivation and forestry, and also the location of the various descriptions of the same with respect to each other, so that the lands to be devoted to such forestry reserve shall be composed of contiguous territory, or territory as nearly contiguous as possible, so as to render practicable and desirable, the establishment and maintenance of forestry reserves embracing the same. Second, to have care, custody, control and superintendence of the lands herein or hereafter set apart for or becoming a part of the forestry reserve, and to provide for the reforestation of the denuded lands so set apart and belonging to the State, by planting and preserving forest trees, establishing and maintaining fire lines and a system of fire patrol in the forestry reserve thus created.

Section 2. The forestry commission shall have power to appoint a forestry warden who shall hold office for the *term of four years* from the first day of January in the year in which appointed, unless sooner removed by the forestry commission. The said forestry warden shall receive an annual salary of not to exceed one thousand dollars, payable in the same manner as the salaries of State officers are now paid, and he shall be subject to the orders and directions of the said forestry commission, which shall prescribe his powers and duties and he shall have general charge, control and supervision of all deputy wardens or other persons appointed or employed for the performance of duties or service in respect to forestry lands or forest fires. The said forestry warden may appoint, upon recommendation of the forestry commission, a sufficient number of competent persons as forestry wardens, to hold office at the pleasure of the said commission, who shall be entitled to receive a sum not to exceed two dollars per day for each day actually and necessarily spent under the direction of the chief warden in the discharge of duties under this act. Said compensation to be paid by the Auditor General on the approval of the president and secretary of the said forestry commission.

Section 3. The said forestry commission shall have power to cut, remove or sell (or to sell to any person with the power to cut, sell or remove, upon such terms and under such conditions and restrictions as it may deem advisable), any trees, timber or other forest products upon or derived from the said lands so set apart as forestry reserve lands, and shall have power to *lease or sell any lands* within such forestry reserve, the lease or deed therefor to be executed for and on behalf of the State by Commissioner of the State Land Office. The said forestry commission shall likewise have authority to purchase such lands within the limits of said forestry reserve as it may deem advisable in order to connect

and render contiguous separate tracts. All moneys received by or payable to the said forestry commission on account of or arising from revenues from said lands, or from any other source, shall be paid to and received by the *secretary of said commission*, whose official bond as commissioner of the State Land Office shall be responsible therefor, and shall be paid by him into the State treasury and the receipt of the State Treasurer, countersigned by the Auditor General, shall be taken therefor.

Section 4. All forestry reserve lands set aside under or pursuant to the provisions of this act shall be *exempt from taxation*, except as herein otherwise provided. Said lands shall be assessed in the same manner as are the similar lands of individuals situated within the townships in which the same are situated. Within ten days after the final meeting of the board of review of each township, the supervisor of such township shall file in the office of the Commissioner of the State Land Office at Lansing, a certified copy of the assessment roll of his township, with the several assessments completed thereon and reviewed, said roll to specify which of the lands appearing thereon are forestry reserve lands and the valuation placed upon each description, and also the lands owned by private individuals, and the valuation of such lands; the several matters appearing in said assessment roll to be verified by the supervisor on oath. No assessment of forestry reserve lands shall be valid, nor shall any tax be spread thereon, until such assessment is approved by the Commissioner of the State Land Office, such approval to be attached to and become a part of the original assessment roll of the township. No tax shall be levied upon such lands except for the maintenance of schools and roads and no tax shall be imposed upon any of the forestry reserve lands for the support of any school or the building of any school-house or the building or maintenance of any road which is not at present in existence, unless the same shall have been first approved in writing by the forestry commission. All taxes lawfully levied upon said lands in accordance with the provisions of this section shall, in each year, be paid by the State Treasurer to the township treasurer of the township in which the same are situate, by a warrant in favor of the said township, said warrant to be issued upon the filing with the Auditor General by the said forestry commission of a certificate that such taxes have been levied in accordance with the provisions of this act. No fee shall be allowed to the township treasurer or other official for the collection of such tax or taxes.

Section 5. For the purpose of carrying out the provisions of this act, the Auditor General shall add to and incorporate in the State tax for the year nineteen hundred three, and each year thereafter, the sum of seven thousand five hundred dollars. Such sum shall be immediately available upon the passage of this act, and shall be paid to the said commission upon the warrant of the Auditor General, in the same manner in which such appropriations are usually paid, and shall be governed in all respects by the accounting laws of the State.

Section 6. The lands hereby set aside shall be subject to the protection of the provision of the several acts relating to the cutting, removing or destroying in any manner whatsoever, timber on said lands. This act shall be known and may be cited for any purpose in legal proceedings or otherwise, as the forestry reserve act.

Section 7. All other lands heretofore reserved from sale or homestead entry in Roscommon and Crawford counties either by act number two hundred twenty-seven of the session laws of eighteen hundred ninety-nine, or concurrent resolution number seventeen of the session laws of nineteen hundred one, are hereby restored for sale or homestead entry as provided for other State lands.

Form No. 1.

FOREST FIRES.

WARNING.

STATE FORESTRY COMMISSION,
Lansing, Michigan, July 15, 1904.

Fires run over large areas of forest and cut over lands in our State every year. In doing so the fires:—

- Destroy large amounts of valuable timber;
- Destroy entirely all the young growth of trees, which otherwise would grow into valuable timber;
- Destroy the humus material of the soil and thereby make soil much poorer;
- Destroy the feed, grass and sedges, which might otherwise be of much value to the settler;
- Destroy the natural beauty of the land and make the country look like a desert.

By doing these several kinds of damages, the fires have done more to hinder and actually prevent settlement and the development of our northern counties than all other agencies combined.

The laws of Michigan:

Forbid setting fire to the woods, and also,

Forbid leaving fires, camp fires and others without extinguishing the same.

The law provides a maximum punishment of:

A fine of \$1,000 and imprisonment for one year; and, in case of malicious burning of forests, by imprisonment for five years.

These lands, forming a part of the State Forest Reserves, are regularly patrolled by forest rangers, whose duty it is to see to the enforcement of the law and thus to protect the property of State and settler alike. It is to every settler's interest, therefore, to assist in this work of protection.

These notices are posted for the *good of the people*, of every settler, of farmer and townsman alike, and it is expected that the people will therefore see to it that these notices stay in place, to do as much good as possible.

CHAS. W. GARFIELD,
Pres. Mich. Forestry Commission.

MICHIGAN STATE FORESTRY RESERVES.

APPLICATION FOR TIMBER, HAY, ETC.

Name of applicant.....

Address

Date, 190....

I, the undersigned, respectfully request permission to..... the following:

(Cut, gather, remove.)

Kind of material applied for..... (Hay, green, dry timber, etc.)

Amount of material (Tons of hay; cords, etc. of timber.)

Location of material: T..... N; R.....; Sec.....
Town of; County of

Price offered

Where material will be taken to

The material will be (Used by applicant, cut or taken.)

(For market.)

If this application is granted, I, the undersigned, promise to obey cheerfully all laws and rules governing Forest Reserves, and especially:

- 1. Commit no trespass of any kind, and never to assist trespass by purchasing material obtained in trespass or otherwise.
- 2. To do all in my power to assist the forest officers in the protection of the forest, especially against fire.
- 3. To pay the Forestry Commission for any and all damages sustained by reason of my use and occupancy of the Forest Reserve, regardless of cause or circumstances under which such damage may occur.

In case that I am permitted to cut the timber applied for I promise also to:

- 1. Use the material only for the purpose and at the place stated in my application, namely, for
- at
- 2. Cut no timber until it is assigned to me.
- 3. Cut no timber outside of the area assigned to me.
- 4. Cut only timber properly marked by the forest officer.
- 5. Conduct the cutting and removal of the material in a careful manner, and to injure as little as possible any of the remaining timber and young growth.
- 6. Leave no trees "lodged" and leave no logs or other material on the cutting area.
- 7. Leave stumps no higher than inches.
- 8. Use the shaft of the trees down to inches diameter.
- 9. Work up cordwood down to inches in diameter.
- 10. Drag out the tops into openings ready for burning or
- 11. Lop the tops and pile the brush, as directed in the case
- 12. Do no hewing except at skidways or assigned spots.

13. Cut only material, and to cut all sound dead material, both standing and down.

14. Pile all material ready for measurement.

15. Remove no material before it is measured and stamped.

16. Cut and remove the material before day of when this permit shall terminate.

Violations of Nos. 1, 2, 3 and 15 of the above rules will render the applicant liable to suit for trespass, and the violation of any of the rules will be liable to deprive him of further "free-use" privileges.

..... (Name of applicant.)

REPORT AND RECOMMENDATION OF FOREST OFFICER.

1. *Brief descriptions of woods where this timber is to be taken.

2. Does the forest officer know the applicant?

3. Is there danger of collusion between applicant and others of obtaining timber illegally?

4. Will the removal of this material endanger the material left behind?; is there danger of bad or careless exploitation leading to the destruction of much young growth?

5. I do approve this application for the following reasons:

....., Forest Ranger.

6. I do approve this application.....

....., Forester.

Form No. 3.

MICHIGAN STATE FORESTRY RESERVES.

CONTRACT FOR THE SALE OF TIMBER.

Lansing, Michigan,, 190...

This contract is hereby entered into by and between Mr. of party of the first part and the Michigan Forestry Commission, party of the second part, for the purchase of certain timber on the Michigan State Forestry Reserves, based upon the bid of the said for said timber, submitted in pursuance of a duly advertised proposal to sell said timber, which bid has been accepted by the Michigan Forestry Commission, said bid and advertisement being made a part of this contract.

Amount and kind of timber involved in this contract:

All of the (Fill out thus: All of the dry cedar, etc., located on certain areas.) located on certain areas assigned and estimated to contain

(Here state cords, M. feet, B. M. of material, etc.)

Location of the above timber:

No. of acres covered by this contract; in lots; Secs.; T. N; R.....

*To be used only in cases of free use or where the value is less than \$10,000.

In consideration of the sale of this to me, I
 promise to pay the Michigan Forestry Commission at Lansing, Michigan, the
 sum of dollars
 (\$.....), being at the rate of \$.....

(Here state values per M. feet, per cord, per piece, etc.)
 and to pay this money
 (In advance, in monthly payments, etc.)

due credit being given for the sums heretofore deposited with said commission
 in connection with this sale and purchase.

And I further agree and promise to conduct the work of cutting and removing
 said timber in accordance with the following specifications:

1. I will comply strictly with the laws and regulations governing forest reserves.
 2. Submit all timber and wood to measurement by the forest officer before the
 same is removed.

3. Pay in advance for all timber before cutting the same.
 4. To cut only timber on the area agreed upon and blazed and marked, and not
 to cut any of the live trees bounding this area.

5. To leave no logs, ties, lagging or other material in the woods, and to pay
 double the agreed price for any material thus left in the woods.

6. To pay for all material used in shanties, buildings in the construction of
 roads, skidways or any other improvement.

7. To cut all timber marked for me by the forest officer, this marked timber to
 involve the following kinds, grades and sizes

8. Of unmarked timber cut only the following kinds, as here agreed upon

(Dry timber, poles, etc., assigned by area and not separately marked.)

9. To leave no trees lodged in process of felling but avoid felling trees into
 unmarked timber and thereby necessitating the cutting of much unmarked tim-
 ber, or causing damage to such trees.

10. All felling to be with
 (Axe, saw or both.)

11. No stumps to be left higher than inches.
 12. Shaft of trees to be used to a minimum top diameter of inches,
 and all limbs to be used to a minimum diameter of inches.

13. The tops and brush resulting from the cutting of this timber to be
 (Piled, lopped, piled and burned.)

and no pile of brush to be piled or burned nearer to living trees than
 feet.

14. Hewing of ties and timber, and peeling of poles and posts
 (Not allowed, allowed only in assigned places.)

15. Dead material
 (Here state if all is to be cut and disposed of, or only the round, merchantable,
 only that of certain kinds, etc.)

16. Building of camps only at

17. Construction of roads of with not to exceed
 yards (in length) and all secondary roads to be not over feet in
 width and not closer to each other than yards. This entire matter
 to be approved by the Forest Officer, and any damage from the cutting of unneces-
 sary roads to be paid for at double the agreed value of the material.

18. Construction of dams and other accessory improvements

19. Scaling to be done by the Forest Officer at least once every days or oftener.

20. Scale rule to be used and the following special point in the measurement of the material are agreed to in this contract

(Upper end, inside bark, average diameter; scale for every feet.)

(Shorten log for scale; crook in inches per length; scale in open.)

(Scale fresh; scale of dead timber; poles, posts, ties per piece.)

(Classify by size or kind; measure by cord; shingle stuff; cordwood.)

(to be feet long; measurement of defect, etc.)

21. No piling of material on piles already scaled or received, or any other act which would render difficult or impossible an accurate measurement of the material.

22. The cutting to be done at a rate of about (M. feet or cords per day or month.)

23. All material purchased in this case is to be removed before 190...

Signed at 190...

By.....

Signed

(For the Michigan Forestry Commission.)

Form No. 4.

MICHIGAN STATE FORESTRY RESERVES.

BOND FOR PRIVILEGES AND TIMBER CUTTING IN FOREST RESERVES.

Know all Men by These Presents, That we as principal, and and

as sureties, are held and firmly bound unto the Michigan Forestry Commission in the penal sum of dollars (\$.....), for the payment of which sum to the Michigan Forestry Commission at Lansing, Michigan, within thirty days from date of demand on us for such payment by the Michigan Forestry Commission the use and benefit of the State of Michigan, we bind ourselves, our heirs and legal representatives by these presents; subject, however, to the following conditions, viz.: Whereas, the above bounden

has been, on his petition therefor and in pursuance of the statute in such case made and provided, permitted by the Michigan Forestry Commission to enter upon the lands of the Michigan State Forestry Reserves, within the limits of the Forest Reserve, in the county of of and to

.....

 and has executed his contract of even date with this obligation, wherein he promises and engages to make full compliance with the laws and rules and regulations governing Forest Reserves now or hereafter in force during the continuance of said contract, and to obey all lawful orders and directions of the officers in charge of said Forest Reserve, and specially to pay the State of Michigan for any and all damage sustained by reason of his use and occupation of said forest reserve regardless of the cause or circumstances under which such damage may occur, and to do every act and submit to every requirement necessary to the promotion of the interests involved in the creation of the forestry reserve. Now, if the said shall pay the State of Michigan for any and all damages sustained as aforesaid, and shall well and truly do and perform all the requirements of such contract on his part to be done and performed and shall observe and comply with the aforesaid laws and rules and regulations in such case made and provided, then this obligation to be void, otherwise the same is to be and remain in full force and effect.

Dated at, 190...

.....

State of..... }
, County. } ss.

On this day of....., 190... before the undersigned, a in and for said county, personally came and to me personally known to be the identical persons named and who signed the foregoing bond, and each acknowledged that he signed and executed said bond voluntarily for the uses and purposes therein specified.

(Seal.) Witness my hand and official seal the date last above written.

State of..... }
, County. } ss.

..... and being duly sworn, each for himself, says that he is a citizen of the United States and a resident of; that he signed the above bond as one of the sureties thereon; that he is worth the sum of in property in the of his residence over and above all legal liabilities and exemptions, and that he has property therein subject to sale or execution with the sum of.....

.....

Subscribed in my presence by and , and by each of them sworn to before me this.....day of....., 190..

(Seal.) Witness my hand and official seal the date last above written.

Conditions of Permit. Applicant agrees to obey all laws and rules concerning Forestry Reserves.

Commit and encourage no trespass.

Assist Forest Officers in protecting Reserve.

Pay for any damages due to occupancy of Reserve by applicant. Also to:

1. Use the material only for the purpose and at the place stated above.
2. Cut no timber until it is assigned to him.
3. Cut no timber outside of the area assigned to him.
4. Cut only timber properly marked by the Forest Officer.
5. Conduct the cutting and removal of the material in a careful manner, and to injure as little as possible any of the remaining timber and young growth.
6. Leave no trees "lodged," and leave no logs or other material on the cutting area.
7. Leave stumps no higher than.....inches.
8. Use the shaft of the trees down to.....inches diameter.
9. Work up cordwood down.....inches diameter.
10. Drag out the tops into openings ready for burning or.....
11. Lop the tops and pile the brush, as directed in the case.....
12. Do no hewing except at skidways or assigned spots.
13. Cut only.....material, and to cut all sound dead material, both standing and down.
14. Pile all material ready for measurement.
15. Remove no material before it is measured and stamped.
16. Cut and remove the material before.....day of, when this permit shall terminate.

Violation of Nos. 1, 2, 3 and 15 of the above rules will render the applicant liable to suit for trespass, and the violation of any of the rules will be liable to deprive him of further "free use" privileges.

Form No. 6.

MICHIGAN STATE FORESTRY RESERVES.

APPLICATION FOR GRAZING.

Name of applicant
Address

To the Michigan Forestry Commission:

I, the undersigned respectfully request the permit to graze on the lands of the Michigan State Forestry Reserves in Section....., T....., Range....., in town of....., county of....., the following stock:

Cattle.....; horses.....; sheep or goats.....

This stock to graze from.....to..... of the season of 190.., and to graze..... on the lands of the Reserve.

(Entirely or part of time.)

For this privilege I offer to pay the sum of \$..... or \$..... per head for this one season.

If permit is issued to me I promise to obey all rules governing the State Forest Reserve; to assist myself, and through my agents, free of charge, as far as is reasonably compatible with my other duties and affairs, in protecting the forest cover against all injury, and especially to help the Forest Officers in preventing and fighting fires.

Signed.....

I do approve this application.

.....
Ranger.

I do approve this application.

.....
Forester.

MICHIGAN FORESTRY RESERVES.

GRAZING PERMIT.

Name

Address

Date of issue.....190..

Applied,190..

No head,190..

of

of

to graze part, all the time on reserve in

T.....N, range.....

....., Sec.....from.....

..... to

Lansing, Mich.,.....190..

Permit is hereby issued

to

of

to graze.....head of.....

..... " "

..... " "

on the lands of the Michigan Forestry Reserves, in T.....N, R..... Sec.

.....in town....., county.....

during the season of 190.. from.....to.....

This permit is issued in consideration of payment of \$.....and

on the conditions agreed to by the applicant in his request for this permit, in which

he especially promises to obey all rules and regulations, to assist free of all charge

in protecting the forest cover against all injury.

.....Warden.

.....Commission.

Form No. 8.

MICHIGAN STATE FORESTRY RESERVES.

DESCRIPTION AND ESTIMATE OF TIMBER.

(Used in all cases where value greater than \$10.00.)

County..... Date.....190..

1. Location of timber applied for: T.....N; R.....
 Sec.....; Lot.....; date or survey.....

2. Character of land, typography, soil drainage.....

3. Number of acres covered by application.....

4. Character of forest, species, proportion of those, density, age, thrift, reproduction, etc.,

5. *Additional information concerning the forest cover, methods to be followed in logging, likelihood of damage to forest, means to restock, etc.,.....

ESTIMATE OF TIMBER.

Method of survey used.....

Proportion of area covered by survey.....

Number of Trees.....

Diameters	Kinds of timber. Keep green and dry timber separate, also trees making only cordwood.
b. h.	
O. bark.	Cordwood.
	Hard. Soft.

Condition	
(Defect, etc.)	.....
Totals	.....
Logs	.....
M. ft. b. m.	.....
Cords	.....
Poles	.....

*If more space is required use back of page.

Tie pieces
 Posts
 Value of this timber at railway ar landing.....
 Probable cost of getting this timber:
 1. Cut
 2. Skidded
 3. Hauled to railway or landing.....
 Further remarks

The above is a true statement to the best of my belief and knowledge and is based on an actual and careful survey of the forest of the tract herein named.

.....
 Forest Officer.

Examined by me and believed to be correct.

.....
 Forester.

Form No. 9.

MICHIGAN STATE FORESTRY RESERVE.

SCALE REPORT.

County of 190..
 Case No..... Name of Purchaser.....
 The following amount of timber was scaled or measured by me in connection with this case during the..... week ending....., 190..

Logs.....	M. ft. b. m.	.....	.....
“
“
“
“
Cords	Cords.	.....	.....
	(Pulp, cedar bolts, etc.)		
Poles	Pieces	.....	.....
Tie Pieces.....	“	.....	.....
Posts .....	“	.....	.....
.....	
.....	

- 1. Has all material been measured and stamped before removal from the lands?
- 2. Has all material been marked before cutting according to instructions?
- 3. Is the purchaser doing clean work as he proceeds or is he picking over the land, leaving spots uncut, etc.?
- 4. Is the brush being piled?
- 5. Is the cutting in progress at this date?
- 6. Is there much injury to young growth?
- 7. Has purchaser failed in any way to observe the terms of his contract or the instructions of the Forest Officer?
- 8. Suggestions of Forest Officer in this case.

The above is a true statement to the best of my knowledge and based on personal examination.

.....
Forest Officer.

Examined by:

.....
Forester.

Form No. 10.

MICHIGAN STATE FORESTRY RESERVES.

REPORT OF TIMBER TRESPASS.

County of, 190..

- 1. Name of trespasser
- 2. Address of trespasser
- 3. His occupation
- 4. Has trespasser timber on his own land or claim?
- 5. Location of trespass: T.....N; R.....; Sect.....
Lot.....

- 6. Kind of trespass:
 - Did trespasser simply cut timber?
 - Did he cut and remove timber?
 - Did he merely mutilate or destroy timber?

- 7. Did trespasser claim to be on the land by any authority or right, if so, what claim did he make?

(Did he claim to be sent there by others; claim to own the land?)

.....
(Claim to own neighboring lands, etc.?)

- 8. Kind of material cut
- 9. Amount of material cut
- 10. When was trespass committed?

(Date found cutting, hauling,

etc. If hearsay, let it be so stated.)

- 11. Who did the cutting?

(Name of men and address.)

- 12. Who did the skidding?
- 13. Who hauled the timber?
- 14. Where was it hauled to?

- 15. Where was it sawed or further manufactured?
- 16. Is there any of the cut material on the cutting area at present, if so, how much?
- 17. Was any of the material cut in trespass found at other places, along road, at bank, at railway, at saw mill? If so, where and how much?
- 18. Has any of the material been seized? If so, how much?
- 19. How is this material guarded at present?
- 20. Where was the material cut in trespass used, and what was it used for?
- 21. Was any of this material sold? If so, to whom?
- 22. If sold, how much of the material was delivered to purchaser?
- 23. Did the purchaser make this purchase innocently or with knowledge of the trespass?
- Give reasons for your statement
- 24. What is the value of the material?
 - a. On the stump.....
 - b. After being cut, hewn, etc.....
 - c. At sawmill
 - d. At nearest lumber yard or market point.....
- 25. When did Forest Officer examine the land trespassed upon?
- 26. What did the Forest Officer himself find?
- 27. Was trespass wilful or unintentional? State carefully all reasons for thinking it wilful or not
- 28. Is trespasser financially responsible?
- 29. Has he offered to settle?
- 30. Action recommended by Forest Officer
- 31. Names and addresses of witnesses and brief of their testimony
- 32. *Did this trespass involve the destruction of any young growth? If so, how many young trees are estimated to have been destroyed?*
and what was their approximate size?

Signed

Forest Officer.

Examined by:

Forester.

Form No. 11.

MICHIGAN STATE FORESTRY RESERVES.

REPORT OF RANGER.

Submitted weekly:

The following is a true statement of the work performed by me and the observations made by me during the week ending, 190...

Monday:

Tuesday:

Wednesday:

Thursday:

Friday:

Saturday:

Signed
Forest Ranger.

MICHIGAN STATE FORESTRY RESERVES.

REPORT ON FIRES.

County , 190...

(Note.—Every fire is reported separately on this form.)

Fires are divided into three classes:

Class 1. Small fires, such as abandoned camp fires, etc., covering but a few rods of ground.

Class 2. Small fires, covering not over five acres of land, and checked by Forest Officer without extra help or expense.

Class 3. All larger fires, and especially all fires requiring extra help and expense.

1. Date of fire , 190...

2. Location of fire: Lots ; Secs..... ; T..... N;

R.

3. Fire was of class

4. Number of acres burned over

5. Number of acres of real forest burned over

6. Amount of timber destroyed:

 a. Probable number of trees killed having a diameter b. h. of:

 4 inches or less

 4-8 inches

 8-12 inches

 Over 12 inches

 b. Merchantable material destroyed:

 Feet b. m. of ft.

 c. Cords of fuel wood

 Poles of pieces.

 Posts of pieces.

7. Cause of fire

8. The fire was discovered by on , 190...

9. The fire was brought to the notice of the Forest Officer, date

10. Fighting the fire was begun

11. Work was finished

12. Number of extra men used

13. Cost of fire:

 Extra help days work, \$.....

 Material, provisions, etc.

14. Remarks

..... Sign Ranger.

..... Forester.

Form No. 13.

MICHIGAN STATE FOREST RESERVES.

REPORT OF FORESTER.

County Date, 190..
 To the Warden of Forest Reserves:
 The following is a true statement and report of the affairs of my district for
 the week ending, 190..

CLASS OF WORK.	Day's Work.		Expense (Excluding Board).
	Men.	Teams.	
Reforestation: Plantations.....			\$.....
Nursery work.....			
Protection, (including fires and excluding Forest Officers).....			
Survey of Lands.....			
Improvements (State kind.).....			
.....			
Miscellaneous Work.....			
.....			
.....			
Goods received during week (total value).....			
Total.....			

Work accomplished

.....

.....

.....

.....

.....

.....

.....

Forester.

No.....

Requisition No.....

MICHIGAN STATE FOREST RESERVES.

Date 190...

Mr.

REQUISITION.

Lansing, 190....

Address

Items Mr.

..... Address.....

Please furnish the following articles and charge to the Michigan Forestry Commission:

-
.....
.....
.....
.....

Approved by Warden
..... 190...

..... Warden.

MICHIGAN STATE FOREST RESERVE.

PAY ORDER.

No.
 Amount \$
 County
 Date, 190...

Pay order.
 Date, 190...
 Amount \$
 In favor of
 Name
 Address
 For

Mr.
 Address
 Please pay to.....
 Name
 Address
 The sum of dollars
 for

.....

 To be paid by

.....
 Forester.

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SIXTY-SIXTH ANNUAL REPORT 10

OF THE

COMMISSIONER OF THE LAND OFFICE

OF THE

STATE OF MICHIGAN

FOR THE

FISCAL YEAR ENDING JUNE 30, 1908



WILLIAM H. ROSE, COMMISSIONER.

LANSING, MICHIGAN
WYNKOOP HALLENBECK CRAWFORD CO., STATE PRINTERS
1908

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WILLIAM H. ROSE, COMMISSIONER.

STATE LAND OFFICE

WILLIAM H. ROSE,
HERBERT COLISTER,
EDWIN R. HAVENS, -
F. C. PARKER,
E. E. VANCE -

STATE LAND COMMISSIONER
DEPUTY LAND COMMISSIONER
CHIEF CLERK
BOOKKEEPER
DRAUGHTSMAN

COMMISSIONERS OF THE STATE LAND OFFICE AND TERMS OF OFFICE

APPOINTED.

DIGBY V. BELL,	February 2, 1844-1846
ABIEL SILVER, -	February 16, 1846-1850
PORTER KIBBIE,	April 2, 1850-1850

ELECTED.

PORTER KIBBIE,	1851-1854
SEYMOUR D. TREADWELL,	1855-1858
JAMES W. SANBORN,	1859-1860
SAMUEL S. LACEY, -	1861-1864
CYRUS HEWITT,	1865-1866
BENJAMIN D. PRITCHARD,-	1867-1870
CHARLES A. EDMUNDS,	1871-1872
LEVERETT A. CLAPP,	1873-1876
BENJAMIN F. PARTRIDGE,	1877-1878
JAMES M. NEASMITH,	1879-1882
MINOR S. NEWELL,	1883-1886
ROSCOE D. DIX,	1887-1890
GEORGE T. SHAFFER,	1891-1892
JOHN G. BERRY,	1893 to March 20, 1894
WILLIAM A. FRENCH,	March 20, 1894-1900
EDWIN A. WILDEY,	1901-1904
WILLIAM H. ROSE,	1905-

REPORT.

MICHIGAN STATE LAND OFFICE, }
Lansing, June 30, 1908. }

HON. FRED M. WARNER, *Governor of Michigan:*

SIR—In compliance with the provisions of law establishing the State Land Office, I have the honor to submit herewith for your consideration, and for reference to the Legislature, a report of the transactions of this department for the fiscal year ending June 30, 1908, being the sixty-sixth annual report of the State Land Commissioner:

The whole number of acres held by the State at the close of business June 30, 1907.....	657,978.32
The number of acres of part-paid lands that forfeited to the State during the year.....	.....
The number of acres of swamp homestead land that forfeited to the State during the year.....	431.85
The number of acres of tax homestead lands deeded to the State by the Auditor General under the provisions of Sec. 127, Act 206, Laws of 1893 and acts amendatory thereto.....	179,421.16
The number of acres of tax homestead land that reverted to the State during the year for non-compliance with the requirements of Act No. 206, of Laws of 1893 and acts amendatory thereto.....	4,485.65
Tax homestead lands omitted in former reports of deedings and reversions.....	8,388.65
The number of acres of swamp land patented to the State by the federal government during the year.....	.....
Total.....	<u>850,715.63</u>
Total number of acres of all classes of land, except tax homestead land, sold during the year.....	
Total number of acres of swamp lands licensed to homesteaders during the year.....	6,663.80
Total number of acres of tax homestead land entered as homesteads by settlers during the year.....	7,031.69
Total number of acres of tax homestead land sold under the provisions of Section 131, Act No. 206, Laws of 1893 and acts amendatory thereto	173,978.27

ANNUAL REPORT OF THE

Tax homestead lands added to permanent forestry reserve by operation of act of 1903.....	6,074.78
Tax homestead land restored to tax list by reason of certificates of error issued by the Auditor General against the deeds conveying such lands to the State.....	1,062.43
Total number of acres held by the State for sale and homestead entry, June 30, 1908... ..	655,904.66
Total... ..	<u>850,715.63</u>

The lands held by the State June 30, 1908, are classified as follows:

Agricultural College lands, acres.....	49,938.24
Asylum land, acres.....	718.98
Primary School land, acres.....	15,991.15
Salt spring land, acres.	120.00
State Building land, acres.....	40.00
Swamp land, acres.....	9,497.45
Tax homestead land, acres.....	579,598.84
Total, acres.....	<u>655,904.66</u>

The number of acres of all classes of lands disposed of, the amounts for which the same were sold, the amounts paid and the amounts unpaid thereon during the year were as follows:

Class of land.	Acres.	Amount sold for.	Amount paid.
Agricultural College.....	400.00	\$620 00	\$620 00
Primary School.....	2,875.99	4,847 00	4,847 00
Swamp land.....	3,587.81	7,592 31	7,592 31
Swamp land patented to settlers.....	80.00		
Tax homestead lands, including village lots.....	173,978.27	369,113 42	369,113 42
Tax homestead land deeded to actual settlers.....	16,520.14		
Totals.....	197,242.21	\$382,172 73	\$382,172 73

No lands of any class were sold on partial payments and no lands heretofore sold on part payments were forfeited to the State during the year.

The amount of money collected on account of trespass on State lands during the year has been \$5,623.99, which amount was divided as follows:

Agricultural College land.....	\$30.00
Primary School land.....	112.77
State tax land.....	1,323.78
Swamp land.....	139.64
Tax Homestead land.....	4,017.80
Total.....	<u>\$5,623.99</u>

A comparative statement of the number of acres of State land disposed of, and the amount sold for during the past five years:

Years.	Primary school land. Acres.	Agricultural College land. Acres.	Salt spring land. Acres.	Swamp land. Acres.	Asylum land. Acres.	University land. Acres.	Tax homestead land. Acres.	Total. Acres.	Amount sold for.
1904..	5,129.81	3,605.72	.....	19,925.33	40.00	.....	150,750.57	179,451.43	\$296,018.67
1905..	5,252.80	280.00	120.00	6,832.48	200.00	.....	142,782.75	177,118.15	184,655.79
1906..	11,868.58	1,008.25	.....	4,397.41	40.00	.....	231,894.05	249,208.29	263,119.65
1907..	8,095.42	720.00	.....	10,741.87	.....	68.75	235,133.74	254,759.78	250,076.75
1908..	2,675.99	400.00	.....	3,587.81	.....	.....	173,978.27	180,842.07	382,172.73

The receipts of the State Land Office on account of lands sold during the year and for principal, interest and penalty received on sales made in former years, and from other sources, have been as follows:

Primary school land:			
Principal.....		\$12,387.29	
Interest.....		3,249.66	
Penalty.....		100.54	
		<hr/>	\$15,737.49
University land:			
Principal.....		\$360.00	
Interest.....		277.20	
Penalty.....		.....
		<hr/>	637.20
Agricultural College land:			
Principal.....		\$2,620.00	
Interest.....		1,688.78	
Penalty.....		52.78	
		<hr/>	4,361.56
Salt Spring land:			
Principal.....		.....
Interest.....		\$25.20	
Penalty.....		1.40	
		<hr/>	26.60
Swamp land:			
Principal.....		\$6,267.27	
Interest.....		259.52	
Penalty.....		10.19	
		<hr/>	6,536.98
Asylum land:			
Principal.....		\$239.00	
Interest.....		60.46	
Penalty.....		3.15	
		<hr/>	302.61
Normal School land:			
Principal.....		\$10.00	
Interest.....		38.80	
Penalty.....		.....
		<hr/>	48.80

Dewey asset land:

Principal.....	.....
Interest.....	\$28.00	
Penalty.....	.....	\$28.00

State Building land:

Principal.....	.....
Interest.....	\$118.74	
Penalty.....	.....	118.74

Taxes on part-paid land.....	1,051.28
Trespass collections.....	5,623.69
Fees, plats, etc.....	2,343.14
Tax homestead entry fees.....	706.18
Tax homestead lands, sale of.....	369,113.42
Total.....	\$406,635.69

SWAMP LANDS.

The total sales of swamp lands during the year have amounted to 3,260.91 acres, for which there was paid in cash, \$5,992.31, no lands being sold on parting payments. In addition there was sold for scrip 200 acres, representing the value of \$1,600.00, and 206.90 acres were patented by the state under the authority of joint resolutions of the legislature of 1907, making a total disposed of of 3,587.81 acres representing a total value of \$7,592.31. As compared with the sales for the year ending June 30, 1907, this shows a decrease of 7,154.06 acres disposed of, and a decrease in the value of the sales of \$4,962.21.

AGRICULTURAL COLLEGE LANDS.

The sales from this class of land during the fiscal year just closed have been 400 acres, the receipts from such sales being \$620.00. No part-paid certificates were issued. As compared with the sales of the previous year there has been a decrease of 320 acres and of \$1,840.00 in the amount received for the same.

PRIMARY SCHOOL LANDS.

The sales from this class of land during the year have been 2,675.99 acres, and the moneys received from such sales have amounted to \$4,847.00. As in all other classes of lands no part-paid certificates have been issued for any of these lands.

ASYLUM LANDS.

No sales have been made from this class of land during the year.

SALT SPRING LANDS.

No sales.

UNIVERSITY LANDS.

All lands of this class have been disposed of in prior years.

TAX HOMESTEAD LANDS.

During the year just closed the Auditor General has deeded to the State 179,421.16 acres. Of lands of this class and heretofore entered as homesteads 4,485.65 acres reverted to the State on failure by those so entering them to comply with the laws and regulations governing such entry. In addition to the delinquent and abandoned lands so deeded many lots embraced within the limits of villages and cities have been deeded to the State under the provisions of the law. There has been sold from this class of land during the year last past 173,978.27 acres, for which the sum of \$286,112.07 was received. From the sale of village and city lots for the same period the sum of \$83,001.35 was received, making a grand total of moneys received from the sale of this class of land of \$369,113.42.

The statute authorizing the sale of this class of lands by this department provides that the moneys received from such sale "shall be accounted for to the State, county and township in which said lands are situated pro rata according to their several interests therein arising from the non-payment of taxes thereon as such interest shall appear in the office of the Auditor General."

The average of State tax and charges on village and city lots appears to not exceed twelve per cent. and upon lands not included in village and city plats the average of State tax appears to be twenty-eight per cent.

Since the passage of Act 141 of the public acts of 1901, authorizing the sale by this office of these lands the proceeds of such sales have been as follows:

Year.	Amounts received.		
	Acreage.	Village lots.	Total.
1902	\$4,152 20		\$4,152 20
1903	82,316 58		82,316 58
1904	178,760 54	\$13,630 50	192,391 04
1905	142,644 01	24,919 00	167,563 01
1906	238,824 90	6,091 75	244,916 65
1907	216,018 66	8,521 25	224,539 91
1908	286,112 07	83,001 35	369,113 42
Totals	\$1,148,828 96	\$136,163 85	\$1,284,992 81

A grand total of \$1,284,992.81. Applying the percentages referred to above we find that the several counties in which such lands have been sold have received from the State on account of these sales, approximately, the sum of \$946,980.60.

For details of transactions of this department reference is made to the tabular statements in the appendix submitted herewith.

Very respectfully,
 WILLIAM H. ROSE,
 Commissioner of the State Land Office.

APPENDIX.

TABLE No. 1.—Showing by counties the number of acres of Agricultural College land sold and the amount of money received therefor during the year ending June 30, 1908.

Counties.	Acres.	Price per acre.	Amount received.
Alcona.....	40.00	\$1 50	\$60 00
Oscoda.....	320.00	1 50	480 00
	40.00	2 00	80 00
Total.....	400.00		\$620 00

TABLE No. 2.—Showing by counties the number of acres of Primary School land sold, the price per acre at which they were sold, and the amount of money received from such sales during the year ending June 30, 1908.

Counties.	Original sales.			Forfeited lands resold.			Total sales.	
	Acres.	Price per acre.	Amount received.	Acres.	Price per acre.	Amount received.	Total acres.	Total amount received.
Arenac.....	235.99	\$0 75	\$177 00				235.99	\$177 00
Chippewa.....	200.00	1 00	200 00				280.00	350 00
	40.00	1 25	50 00					
	40.00	2 50	100 00					
	40.00	1 00	40 00					
Clare.....	40.00	1-25	50 00				200.00	350 00
	40.00	1 50	60 00					
	40.00	2 00	80 00					
	40.00	3 00	120 00					
Crawford.....	120.00	1 25	150 00	40.00	\$1 25	\$50 00	200.00	300 00
	160.00	1 25	200 00	40.00	2 50	100 00		
	160.00	1 50	240 00					
Dickinson.....	120.00	2 00	240 00				520.00	940 00
	40.00	3 00	120 00					
	40.00	3 50	140 00					
	40.00	4 00	160 00					
Iosco.....	40.00	4 00	160 00				40.00	160 00
Lake.....	40.00	1 00	40 00				40.00	40 00
	40.00	50	20 00				80.00	80 00
Luce.....	40.00	1 50	60 00				40.00	40 00
	40.00	1 00	40 00					
Mackinac.....	40.00	1 00	40 00				80.00	100 00
	40.00	1 50	60 00					
Manistee.....	80.00	50	40 00				80.00	40 00
	40.00	1 00	40 00					
Ogemaw.....	40.00	1 00	40 00				40.00	40 00
Oscoda.....	80.00	1 00	80 00				80.00	80 00
Otsego.....	200.00	1 50	300 00				320.00	650 00
	40.00	1 75	70 00					
Schoolcraft.....	40.00	3 00	120 00				320.00	1,380 00
	40.00	4 00	160 00					
	200.00	4 00	800 00					
Tuscola.....	40.00	4 50	180 00				320.00	1,380 00
	80.00	5 00	400 00					
Wexford.....				120.00	1 00	120 00	120.00	120 00
	2,475.99		\$4,577 00	200.00		\$270 00	2,675.99	\$4,847 00

Presque Isle.....	120.00 40.00 40.00 40.00 40.00 40.00 40.00 40.00	1.00 1.25 2.00 2.75 4.00 6.00 12.00 14.00	120.00 50.00 80.00 110.00 160.00 240.00 480.00 560.00	160.00	\$190.00	400.00 280.00	1,800.00 350.00	200.00	\$1,600.00	206.90	400.00	1,800.00
Rocommon.....	280.00	1.25	350.00	350.00		280.00	350.00				280.00	350.00
	3,100.91		\$5,802.31	160.00	\$190.00	\$3,260.91	\$5,092.31	200.00	\$1,600.00	206.90	3,667.81	\$7,592.31

TABLE NO. 4.—Showing by counties the number of acres of Swamp land standing licensed to settlers, June 30, 1908.

Counties.	Acres.	Counties.	Acres.
Alpena.....	320.00	Ioseco.....	80.00
Charlevoix.....	80.00	Kalkaska.....	80.00
Cheboygan.....	224.72	Lake.....	40.00
Clare.....	40.00	Menominee.....	40.000
Crawford.....	160.00	Montmorency.....	108.47
Delta.....	160.00	Presque Isle.....	80.00
Grand Traverse.....	120.00	Roscommon.....	400.00
Total.....			1,933.19

TABLE NO. 5.—Showing by counties the number of acres of Tax Homestead land that rverted to the State through the forfeiture of the homesteader in failing to comply with the requirements of the homestead law.

Counties.	Acres.	Counties.	Acres.
Alcona.....	120.00	Mecosta.....	80.00
Alpena.....	400.00	Missaukee.....	120.00
Bay.....	78.77	Montmorency.....	680.25
Clare.....	640.00	Newaygo.....	40.00
Cheboygan.....	40.00	Oceana.....	120.00
Crawford.....	80.00	Ogemaw.....	80.00
Emmet.....	153.40	Oscoda.....	80.00
Gladwin.....	620.00	Otsego.....	229.25
Huron.....	37.41	Presque Isle.....	345.57
Ioseco.....	100.00	Roscommon.....	80.00
Lake.....	360.00		
Total.....			4,485.65

TABLE NO. 6.—Showing by counties the number of acres of delinquent tax lands deeded to the State by the Auditor General, under the provisions of Section 127, Act No. 206, P. A. 1893, as amended, during the year ending June 30, 1908.

Counties.	Acres.	Counties.	Acres.
Arenac.....	83.44	Mecosta.....	2,525.26
Benzie.....	2,430.76	Menominee.....	8,689.94
Charlevoix.....	3,787.36	Montcalm.....	1,034.19
Cheboygan.....	28.96	Montmorency.....	31,466.09
Chippewa.....	3,529.54	Newaygo.....	9,153.55
Crawford.....	53,604.08	Oceana.....	2,373.35
Gogebic.....	1,470.94	Oscoda.....	40.00
Houghton.....	4,303.34	Ottawa.....	411.36
Iron.....	25,309.28	Saginaw.....	1,638.76
Maackinac.....	21,520.72	Schoolcraft.....	400.00
Manistee.....	5,020.24		
Total.....			179,421.16

TABLE NO. 7.—Showing by counties the number of acres of Tax Homestead land entered as homesteads, and the amount of money received as fees therefor during the year ending June 30, 1908.

Counties.	Acres.	Amount of fees.	Counties.	Acres.	Amount of fees.
Alcona.....	242.27	24.30	Mecosta—village lots.....		.20
Alpena.....	202.16	20.20	Missaukee.....	320.00	32.00
Arenac.....	147.47	14.80	Montmorency.....	320.00	32.00
Cheboygan.....	200.00	20.00	Muskegon—village lots.....		.40
Chippewa.....	80.00	8.00	Newaygo.....	1,081.08	108.12
Clare.....	649.07	65.00	Oceana.....	240.00	24.00
Gladwin.....	1,528.64	152.91	Ogemaw.....	360.00	36.00
Iosco.....	661.00	66.10	Oscoda.....	1,000.00	100.00
Mason—village lots.....		.20	Ottawa—village lots.....		.10
Total.....				7,031.69	704.33

TABLE NO. 8.—Showing by counties the number of acres of Tax Homestead land deeded to actual settlers upon their making final proof of occupancy and improvement of the same under homestead certificates, during the year ending June 30, 1908.

Counties.	Acres.	Counties.	Acres.
Alcona.....	1,652.87	Isabella.....	80.00
Allegan.....	501.12	Kalkaska.....	200.00
Alpena.....	1,020.39	Lake.....	200.00
Arenac.....	80.00	Mecosta.....	1,871.06
Bay.....	40.00	Midland.....	169.45
Cheboygan.....	80.00	Missaukee.....	874.70
Clare.....	2,834.11	Montmorency.....	1,019.59
Crawford.....	790.71	Muskegon.....	255.82
Delta.....	1,209.50	Newaygo.....	40.00
Emmet.....	200.00	Ogemaw.....	118.46
Gladwin.....	480.00	Oscoda.....	200.00
Grafton.....	80.00	Otago.....	480.00
Huron.....	120.00	Presque Isle.....	1,391.80
Iron.....	174.40	Schoolcraft.....	316.16
Total.....			16,520.14

TABLE NO. 9.—Showing by counties the number of acres of Tax Homestead land sold, the amount received for the same, and also the amount received from the sale of city and village lots of the same class during the year ending June 30, 1908.

Counties.	Acres.	Amount sold for.	Amount received for village lots.	Total amount received.
Alcona.....	1,754.65	\$2,388 06		\$2,388 06
Allegan.....			80 00	80 00
Alpena.....	12,885 84	23,528 87	1,247 50	24,776 37
Arenac.....	1,300.37	1,591 71		1,591 71
Bay.....			21,313 50	21,313 50
Benzie.....	1,645 84	3,239 54	877 00	4,116 54
Charlevoix.....	1,400 00	270 00		270 00
Cheboygan.....	3,093 73	3,658 04		3,658 04
Chippewa.....	14,184.69	28,926 18	221 35	29,147 53
Clare.....	4,539.82	3,805 77	75 00	3,880 77
Crawford.....	12,814.44	15,523 74		15,523 74
Delta.....	15,159.40	30,886 81	1,255 00	32,141 81
Emmet.....	160 00	200 00		200 00
Gladwin.....	7,862.17	9,069 73		9,069 73
Gratiot.....	240 00	1,260 00	498 50	1,758 50
Iosco.....	8,136.87	9,255 72	10,600 50	19,856 22
Iron.....	240 00	960 00		960 00
Kalkaska.....	40 00	20 00		20 00
Lake.....	1,310 00	1,797 50	62 50	1,860 00
Lenawee.....			10 00	10 00
Lucas.....	7,420 00	11,654 46	20 00	11,674 46
Macinae.....	989 90	1,421 55	1,469 00	2,890 55
Manistee.....	1,781.09	3,396 09		3,396 09
Mason.....	7,967.93	18,078 99	11,716 00	29,794 99
Meosota.....	1,373 63	2,738 85	4,329 00	7,067 85
Menominee.....	6,457 47	11,978 38	8 00	11,986 38
Midland.....	40 00	80 00		80 00
Missaukee.....	4,246.94	3,429 23		3,429 23
Montcalm.....	702.74	2,206 98	3,213 50	5,420 48
Montmorency.....	3,455.79	3,776 49		3,776 49
Muskegon.....	5,101.10	8,699 86	22,940 50	31,640 36
Newaygo.....	3,680.41	5,069 61		5,069 61
Oceana.....	443 00	879 00	368 00	1,247 00
Ogemaw.....	4,280.49	3,571 25		3,571 25
Ontonagon.....	12,207 50	29,559 35	817 50	30,376 85
Oscoda.....	7,026.32	8,666 99		8,666 99
Otsego.....	1,327.95	1,655 06		1,655 06
Ottawa.....	280 00	440 00	1,859 00	2,299 00
Presque Isle.....	4,001.73	6,496 13		6,496 13
Rosecommon.....	1,879.88	2,370 37		2,370 37
Saginaw.....	50	2 00		2 00
Schoolcraft.....	13,595.44	23,559 76		23,559 76
Van Buren.....			20 00	20 00
Totals.....	173,978.27	\$286,112 07	\$83,001 35	\$369,113 42

TABLE NO. 10.—*Showing amount of matured Swamp land credit June 30, 1908.*

	Amount.	Amount.
Lower Peninsula—General credit:		
Alpena, Montmorency and Presque Isle counties.....	\$0 33	
Alpena and Presque Isle counties.....	36	
Bay and Tuscola counties.....	13 33	
Gratiot county.....	74 69	
Midland county.....	14 63	
Newaygo, Mecosta and Osceola counties.....	10 51	
Newaygo and Muskegon counties.....	81 35	
Tuscola county.....	193 56	\$338 76
Lower Peninsula.....		2,392 46
Total in Lower Peninsula.....		\$2,781 19
Upper Peninsula—General Credit:		
Delta county, range 18.....	\$0 28	
Upper Peninsula.....	371 80	372 08
Total General Credits.....		\$3,153 27
Special Credits.	Acres.	Acres.
Under grant to Livingston county, Act No. 130, Laws of 1883, Lower Peninsula lands.....	2,398.48	
Under grant to Ingham county, Act No. 231, Laws of 1885, Lower Peninsula lands.....	403.16	
Under grant to Shiawassee and Clinton counties, Act No. 84, Laws of 1885, Lower Peninsula lands.....	2,607.87	6,409.51
Under grant to Houghton and Keweenaw counties, Act No 239, Laws of 1863, Upper Peninsula lands.....		1,645.27
		8,054.78

TABLE NO. 11.—Showing by counties the number of acres of all classes of lands held under business

Counties.	Primary school.		Agricultural College.		Swamp.		University.	
	Acres.	Amount unpaid.	Acres.	Amount unpaid.	Acres	Amount unpaid.	Acres.	Amount unpaid.
Allegan.....	240.00	\$569 93						
Alpena.....	420.00	800 00	260.00	\$525 00	927.91	\$841 16		
Antrim.....	289.50	579 00	640.00	1,920 00				
Arenac.....					80.00	75 00		
Barry.....	399.00	1,084 00						
Bay.....	80.00	200 00						
Benzie.....			199.08	627 93				
Berrien.....	240.00	720 00					120.00	\$1070.00
Calhoun.....	280.00	870 00			240.00	147 00		
Cass.....	40.00	120 00						
Charlevoix.....	336.00	872.00			40.00	37 50		
Cheboygan.....	680.00	1,440 00	675.70	1,647 10	277.38	411 07		
Chippewa.....	520.00	900 00						
Clare.....	200.00	400 00						
Clinton.....	30.65	61 30						
Delta.....	240.00	567 56			80.00	42 60		
Eaton.....	80.00	200 00			80.00	75 00		
Emmet.....	472.95	985 90						
Genesee.....								
Gladwin.....	40.00	80 00						
Grand Traverse.....	200.00	380.75	340.00	700 00				
Gratiot.....	200.00	560 00						
Hillsdale.....	40.00	120 00						
Huron.....	280.00	550.00						
Ingham { Lansing lots		574 00						
	120.00	280 00			160.00	90 00		
Ionia.....	90.00	270 00						
Iosco.....	320.00	640 00						
Iron.....	40.00	80 00						
Isabella.....	40.00	80 00						
Jackson.....	320.00	937 50			1,017.86	589 06		
Kalamazoo.....	39.93	119 79			40.00	22 50	200.00	1,680 00
Kalkaska.....	160.00	320 00	279.60	771 30				
Kent.....	360.00	1,285 00					40.00	360 00
Lake.....	80.00	240 00						
Lapeer.....	40.00	120 00						
Leelanau.....	430.40	1,123 15						
Livingston.....	320.00	1,020 00			40.00	22 50		
Luce.....	59.80	119 60						
Mackinac.....	360.00	720 00						
Manistee.....	200.00	480 00	1,146.40	3,210 80				
Mason.....	400.00	1,200 00						
Mecosta.....	240.00	533 91						
Menominee.....	40.00	80 00			51.00	47 75		
Midland.....	498.17	955 62						
Missaukee.....	80.00	160 00	360.00	905 00				
Monroe.....	164.00	492 00						
Montcalm.....	280.00	660 00						
Montmorency.....	40.00	80 00	399.00	1,366 25	911.27	854 31		
Muskegon.....	40.00	82 50						
Newaygo.....	550.00	1,220 00						
Oakland.....	345.70	997 10			40.00	37 00	66.66	460 00
Oceana.....	558.50	1,473 75						
Oscoda.....	295.95	817 85						
Oseoda.....			40.00	150 00				
Otsego.....	280.18	560 36	360.00	1,135 00				
Ottawa.....	280.00	720 00						
Presque Isle.....	280.00	560 00	80.00	240 00				
Saginaw.....	572 03	1,356 09						
Sanilac.....	200.00	400 00						
Schoolcraft.....	240.00	480 00						
Shiawassee.....	120.00	340 00						
St. Clair.....	520.00	1,498 75			40.00	37 50		
St. Joseph.....	120.00	600 00			169.29	95 23	100.00	810 00
Tuscola.....	360.00	1,018 82			80.00	75 00		
Van Buren.....	240.00	680 00						
Washtenaw.....					320.00	180 00		
Wexford.....	380.00	959 24	3,240.00	9,660.00				
Totals.....	15,412.76	\$38,395 47	8,019.78	\$22,858 38	4,594.71	\$3680 18	526.66	\$4330 00

part-paid certificates, and the amount of unpaid purchase price thereon, at the close of June 30, 1908.

Asset land.		Normal school land.		Asylum land.		State building.		Salt spring land.		Total acres.	Total amount unpaid.
Acres.	Amount unpaid.	Acres.	Amount unpaid.	Acres.	Amount unpaid.	Acres.	Amount unpaid.	Acres.	Amount unpaid.		
										240 00	\$.569 93
										1,607.91	2,166 16
										929.50	2,499 00
										80.00	75 00
										399.00	1,084 00
										80.00	200 00
										199.08	627 93
						38.29	\$29 74			398.29	1,819 74
										520.00	1,017 00
										40.00	120 00
										376.00	909 50
										1,633.08	3,498 17
										520.00	900 00
										200.00	400 00
										30.65	61 30
										320.00	610 16
										160.00	275 00
										472.95	985 90
40.00	\$240 00									40.00	240 00
										40.00	80 00
				80.00	\$240 00					540.00	1,080 75
										280.00	800 00
										40.00	120 00
										280.00	550 00
							1,666 57			280.00	2,240 57
										280.00	370 00
										90.00	270 00
										320.00	640 00
										40.00	80 00
										40.00	80 00
										1,337.86	1,526 56
										279.93	1,822 29
										439.60	1,091 30
								40.00	\$120 00	440.00	1,765 00
										80.00	240 00
										40.00	120 00
										430.40	1,123 15
										360.00	1,042 50
										59.80	119 60
										360.00	720 00
										1,348.40	3,690 80
										400.00	1,200 00
										240.00	533 91
								80.00	240 00	91.00	127 75
										578.17	1,195 62
										440.00	1,065 00
				120.00	300 00					164.00	492 00
										400.00	960 00
										1,350.27	2,300 56
				160.00	170 00					40.00	82 50
										710.00	1,390 00
										452.36	1,494 10
										558.50	1,473 75
										295.95	817 85
										40.00	150 00
										640.18	1,695 36
										280.00	720 00
										360.00	800 00
										572.03	1,356 09
										200.00	400 00
										240.00	480 00
		239.38	\$544 25							120.00	340 00
										799.38	2,080 50
40.00	160 00									389.29	1,505 23
										480.00	1,253 82
										240.00	680 00
										320.00	180 00
										3,620.00	10,619 24
80.00	\$400 00	239.38	\$544 25	360.00	\$710 00	38.29	\$1696 31	120.00	\$360 00	29,391.58	\$73,024 59

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EXPERIMENT STATION



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A DEPARTMENT OF THE STATE AGRICULTURAL COLLEGE, AND, WITH IT, CONTROLLED BY THE

INCORPORATED

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G. A. WATERMAN, V. S., Consulting Veterinarian.	T. T. LYON, So. Haven, In charge of Sub-Station.
	C. E. MARSHALL, Ph. B., Bacteriologist.

SUB-STATIONS

Grayling, Crawford County, 80 acres deeded.
 South Haven, Van Buren County, 10 acres rented; 5 acres deeded.

INTRODUCTION.

The forests of Michigan have been one of the chief sources of the wealth of her citizens. The vast tracts of white pine that once covered the central and northern portions of the lower half of the state and nearly the whole of the upper peninsula were fully ripe and ready for harvest in those decades in which the trees fell by the woodsman's ax. This harvest has been well nigh completed, until today, the areas covered with woods are no more measured by square miles but by acres. The influences of the cutting of the forests are felt in the 'spring freshets and summer disappearance of streams that used to be even in volume and perennial in flow, and in climatic changes that are hostile to the growing of crops.

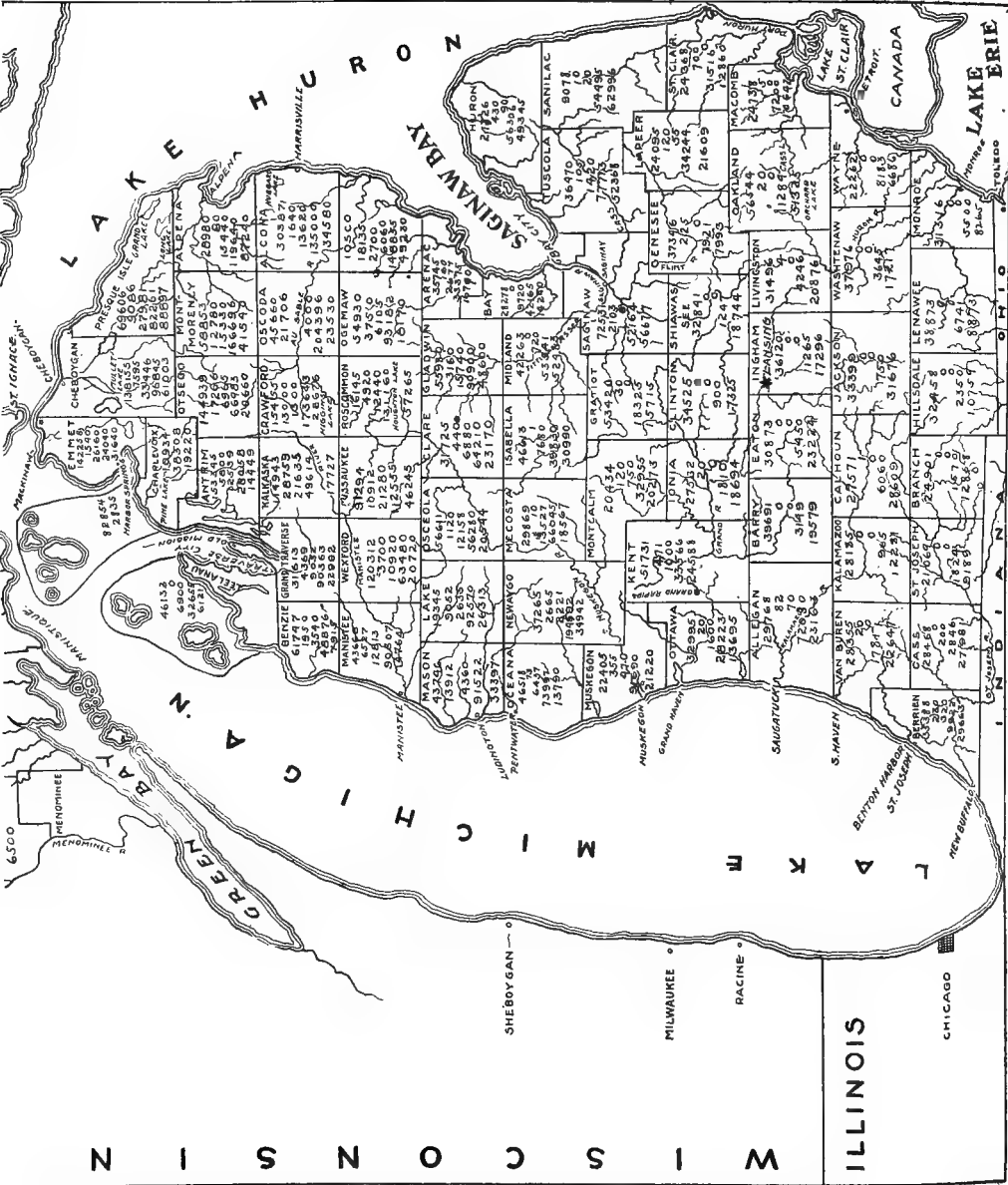
In what parts of the lower peninsula were the original forests found? Where are the standing forests of the present day and what is their extent? What is the present condition and the possible future of the denuded areas? What is the relation of the forests to meteorological conditions? Can these stump lands be reforested and how? Judging from the legislation in other states, may laws be passed and enforced that shall aid in protecting existing and proposed forest areas from fire and vandalism?

It is to answer these and incidently many other questions that this bulletin is issued. It is true, past all question, that if fire and domestic live stock can be kept out of the more fertile sections of the area once covered with pine and hardwoods, nature, left to herself, would in time cover them with a new and valuable growth of trees. Aided by the hand of the trained forester she will accomplish the end much sooner and will provide a forest much better suited to the wants of man.

Legislation aimed at the prevention of forest fires can be enforced no farther than it is supported by public opinion. Public opinion is a matter of education. It is hoped that this bulletin may be helpful in calling attention to the needs of forestry in this state on the one hand and to what is being done in other states for the preservation of forests on the other.

CLINTON D. SMITH,
Director

FORESTRY BULLETIN



M I C H I G A N

ILLINOIS

CHICAGO

SHEBOYGAN

MILWAUKEE

RACINE

6500

6500

CHEBOYGAN

TOLEDO

A SKETCH OF THE ORIGINAL DISTRIBUTION OF WHITE PINE IN THE LOWER PENINSULA OF MICHIGAN.

C. F. WHEELER.

In the lower peninsula of Michigan, the white pine (*Pinus strobus*) was originally found scattered throughout the part of the state north of the 43rd parallel of north latitude. The actual southern limit of lumbering operations, that is, where the pines grew in numbers sufficient to be lumbered, is shown in the accompanying map, on page 6, by a dark line extending across the state, from Port Huron on the east to Covert, in Van Buren county, on the west. South of this line were a few straggling white pines in Oakland, Shiawassee, Livingston and Ingham counties, while along the Lake Michigan shore they were found southward to the Indiana line. The actual distribution of the white pine in this extensive region was due, to a large extent, to the quality and condition of the surface soil. This most valuable tree delights in sandy ridges in the neighborhood of streams, rivers and lakes and seldom grows in large, solid tracts away from these water courses. Where gravels and clays and various mixtures of these soils are found, numerous broad leaved trees struggled for supremacy forming tracts of mixed hardwood and pine forest.

In the counties of Bay, Arenac, Presque Isle, Cheboygan, Otsego, Antrim, Kalkaska and all of Leelenau were found fine forests of hardwood containing more or less white pine intermixed. In the counties of Iosco, Oscoda, Crawford, Roscommon, Missaukee, Clare, Grand Traverse, Lake, Mason and Newaygo, occurred the so-called "barrens" or "plains," where the soil is sterile and more or less covered with Jack pines (*Pinus divaricata*) and little white pine is to be found.

The largest and best pines were scattered among hardwood trees, towering above them, relics, probably, of the time before the hardwood existed.

The geological conditions of the great northern lobe of the lower peninsula, north of the Grand-Saginaw valleys, due to the large extent of the very friable Marshall sandstone found there, furnish the sands and gravels that the pine tree delights in. The rainfall of this region, combined with evaporation from the surrounding great lakes was the chief remaining factor in the problem of the original distribution of white pine in Michigan.

Estimates of the total amount of white pine growing in our state have been made at various times. In 1835 the standing white pine was put down as one hundred and fifty billion feet, an estimate probably much too low. The census report for 1880 puts the amount of merchantable timber (white pine) remaining in the lower peninsula at twenty-nine billion feet. The total cut for that census year was estimated at a little over four and one-half billion feet.

The latest estimates of the amount of standing white pine remaining in Michigan were made in the year 1896-97 by Hon. Chas. H. Morse, the State Commissioner of Labor. These estimates appear in the 14th annual report of the Bureau of Labor Statistics. Schedules were sent to supervisors of townships and from the returns received the figures on the accompanying map are compiled. It was shown that there were approximately 775,208 acres of white pine still standing in the forests of Michigan at that date. The distribution of the pine, hardwood, "Jack pine plains," and swamp lands is shown on the map. The first set of figures in each county denotes the acres of hardwood in that county; the next set of figures the acres of pine; the third the acres of hemlock; the fourth the acres of "plains" land, and fifth the acres of swamp land.

C. F. WHEELER,
Consulting Botanist

PRESENT CONDITION OF MICHIGAN FORESTS AND STUMP LANDS
WITH SUGGESTIONS AS TO THEIR CARE.

F. E. SKEELS.

The map upon the opposite page is intended to convey some idea of the class, location and area of the lands of the lower peninsula of Michigan, which might be available for forestry purposes. These are classed as Tax Homestead, State Tax, Agricultural College and Primary School lands. The Tax Homestead lands are those which have for the most part been stripped of the original timber and forfeited back to the state for non-payment of taxes by the lumber men who had no use for the land, and in most instances would, under favorable conditions, produce another forest. These lands have been deeded by the Auditor General to the State of Michigan and are now under the control of the Commissioner of the State Land Office and can be located by bona fide residents for ten cents per acre. The State Tax lands have become the property of the state for the non-payment of taxes, and if not redeemed by the original owners, or by some speculator who sees enough timber upon certain tracts to warrant the payment of back taxes, will in time become Tax Homestead lands. The figures upon the map at the letter T denote the number of descriptions in each county, held by the state, as tax lands and although the descriptions vary in area from the village lot to entire sections of land it is safe to estimate that in the northern counties each description will mean at least 80 acres. The Agricultural College and Primary School lands are lands from which no timber has been removed and are for the most part too valuable for farming purposes to be used as forestry reserves, especially as there is so much other available territory which seemingly is not wanted for any other purpose.

A glance at the map will suffice to show that nearly all of our northern river systems have their source or sources in an area which has an abundance of Tax Homestead and State Tax lands. Thus the Muskegon river rises in Roscommon and Missaukee counties. The Manistee and Au Sable rivers, although the former discharges its waters into Lake Michigan on the west side of the state and the latter into Lake Huron on the east side, rise in Crawford and Otsego counties and the source of the one is but a mile or two from that of the other. The Sturgeon, Pigeon, Black and Thunder Bay rivers rise in this same locality and in these counties and those through which these streams flow we find the greater portion of these available forestry lands.

Thus in Missaukee we have 12,385 acres of Tax Homestead, and an estimated area of 113,000 acres of State Tax land, or in round numbers 125,000 acres or over five entire townships. In Roscommon county we have an aggregate of about 250,000 acres or over ten townships in these two classes of abandoned lands.

Crawford county has 185,000 acres, Otsego has 90,000 acres, Montmorency 240,000 acres, Oscoda, Ogemaw, Alcona and Iosco each over 250,000 acres; Alpena and Presque Isle nearly 300,000 acres each. This entire territory is abundantly watered with beautiful lakes and streams abound-

ing in trout, grayling and other fish that attest to the purity of the water, and the deer and other wild animals of the lower peninsula are almost entirely confined to this locality.

This region then, because of its area, water and excellent topography, is the place upon which to rear up a new forest and in fact there is no other location in the lower peninsula where the state can control an area of land sufficient in extent for that purpose.

The present condition of the original forests of Michigan is the same as that of any other property that has passed into the hands of an owner, who sees in it only the dollars and cents which the article will return when put upon the market. Fully ninety per cent of all the wooded lands in our state are owned by parties who will convert the timber into merchantable forms as fast as the market will receive it. This assertion can be verified by an inspection of the offices of the numerous lumbermen who still operate in this State, and who display maps showing lots, sections and in many instances, whole townships belonging to the company controlling the same. The forest lands so held are doomed, and the length of time they will remain in their present condition is dependent entirely upon the caprice of the owner and no great amount of good can come from any discussion of these lands. Nor is this condition to be entirely deplored. Much of the timber in these forests is already past its prime; especially is this true of the larger tracts of white pine and the crop should be harvested before many years pass by. Yet if we could interest some of these large owners, men who have become millionaires by handling Michigan timber, to use some care in the cutting of these forests, we should accomplish much.

There is always a good strong undergrowth in these wooded tracts, among which are many seedlings of the better sorts of timber, and if these could be preserved the undergrowth around them would shade and protect until they would finally take care of themselves. It is not necessary to remove the old tops and pieces of tree trunks that are always left as debris after cleaning off for timber, no person who is familiar with the woods and the conditions attending the lumbering of a tract of land, would ever advocate the removal of this refuse in order to burn it in some other location, and as a matter of fact, it is much better to let it lie and decay, helping to retain moisture and produce shade and protection for the remaining timber growth. But here we furnish fuel for the forest fire and upon the proper control of this one element almost entirely depends the future of Michigan forestry. Wherever we find stump lands that have not been burned and burned over again, we there find that Nature has done and is still doing her best to restore the conditions which existed before lumbering commenced.

Our government surveyors in the original surveys of the State some sixty years ago, noted numerous windfalls. The small mounds of earth fallen from the roots of the trees which went down before the great tornadoes still mark the route taken, but the valuable growth of timber which has since sprung up is a more substantial tracing.

Sections three, four and nine of Town 23 N., R. 13 W., in Manistee county are good examples. The United States Survey in the early forties noted an extensive windfall "grown up to brush." We find the early settlers avoiding this tract, because of the light timber growth, which to-

day is covered with a fine forest of young basswood, white ash and maple and was recently sold at a good price to a Michigan manufacturing concern. Had this tract been burned over repeatedly just as the seedlings were in their young growth, we should now find the area covered with an inferior growth of worthless stuff, if indeed there were humus enough to support any vegetation at all.

The 10 per cent of the timbered lands still remaining in the hands of the commonwealth is subject to the same management as is the 90 per cent in the hands of large owners. Most of these public lands are well timbered and would have been purchased long ago except for the fact that they are for the most part isolated and too far away from transportation facilities to become of use to manufacturers. They are fast passing from the control of the State, however, and it will not be many years before Michigan as a state will have very little timber to dispose of. Much of the timber belonging to the public is ripe and should be harvested.

If there were some manner in which the public could authorize selected agents to pick out and sell off this timber which is ready to cut, and thereby retain the title in the state, we might consider the plan, but past legislatures have not taken kindly to this idea and always look with suspicion upon any plan which has for its object the disposition of the timber upon public lands, even though the trees are blown or burned down, and fast spoiling in decay. This is to be regretted as a considerable income might have been derived from a saving made along this line—enough to have paid competent wardens for looking after these tracts of woodland. Until some such system of legislation can be had, the maintenance of the present forest areas must be at a loss of much of the valuable timber now standing, as the only method by which the value can be saved is by selling to parties who will cut it.

The maintenance of our present forests has two foes to combat, viz:—timber thieves and forest fires, and destructive as the latter may be and have been, they must bow in insignificance to the pirates who have preyed upon the forests of Michigan ever since there was sale for any of the products. It may seem a broad assertion, but it is a fact, that more than double the amount of timber is stolen from State lands annually than is destroyed by fire. The reason for this lies in the policy pursued in the settlement of trespass committed by these vandals. The State has a good law which should be enforced against this class of people, yet we find that in the hundreds of cases of trespass upon public lands none of the trespassers have ever been prosecuted. Why is this? If one of these people were to go upon the grounds of any of the State institutions and cut down and take away a tree, or commit any other felony, he would be at once punished as any thief should be. Yet the same person can trespass upon the forest lands of the State and run no fear of prosecution whatever. If caught, he will be called upon to pay the stumpage value, which really means that he is buying timber and paying no taxes. One reason why prosecutions have not been had, is the fact that the Attorneys General who have held office from time to time, hold that only the prosecuting attorneys of the county wherein the offence is committed, can commence suit against trespassers upon public lands (yet we find the same Attorneys General flying to the aid of the Game Warden whenever he has occasion to request their services. We assume that it would be quite as reasonable to protect the forests, which will surely become extinct under the present system, as without the forests we can have no game). This

protection can never be effectual through township or county officials, as they are too often implicated in the trespassing, or not competent to conduct the prosecutions if made. Few people in the southern portions of our State fully understand the conditions of this problem. First, it is almost impossible to impanel a jury in the northern counties, the majority of whose members have not themselves some day trespassed upon public lands. Second, in sparsely settled counties, the legal talent available for prosecuting attorney is limited to one or two persons, who are wholly unable to successfully cope with the attorneys which the trespasser will always employ, and the State is the loser thereby. Third, the trespassers and generally the representatives from these northern districts raise the plea that these timber thieves are poor men of family, who are starving and are forced to enter upon these lands and steal to support their families. We challenge this statement, for in an investigation which has extended over the last four years, we have noted that in nearly every instance the trespasser was a man who had a good bank account, and was not forced to steal for a living, but finding it a lucrative business with no risks or taxes, kept at it. He is still at it and still will be until more stringent measures are taken to stop this business, or until the grand old State of Michigan has not a tree left for him to steal. Our suggestions then, as to the maintenance of our present forest areas are entirely along the lines of legislation. We can do nothing with public property without laws governing the same—laws which are so plain and concise that there can be no quibbling or doubt as to their meaning.

These laws should cover, first the matter of trespassers upon State lands, and by trespassers we mean malicious trespassers. There are always some few who by mistaken lines or corners get over the true lines, but these are usually willing to settle and are already well provided for, but we want in addition to the good law we now have for malicious trespassers, a clause compelling the Attorney General of the State to prosecute in arrests made by the authority of the Commissioner of the State Land Office, or a clause authorizing the Land Commissioner to procure competent attorneys to so prosecute without the sanction of the Attorney General.

Second, legislation to prevent the destruction of our present forests by fire. It seems to us that the only solution of this matter is by the selection and appointment of efficient wardens by the State for the purpose. No system which depends upon the township or county officers for its execution, will ever be successful. These wardens must have the sovereign power of the State back of them and in their pockets, and must be entirely removed from political influences. Game Wardens, Fire Wardens and Trespass Agents should all be State agents with full power to make arrests and to prosecute in justice courts as the Game Wardens now do. There is no Game Warden but that knows of trespass upon public lands, and there is no Trespass Agent but that often sees flagrant violations of the game laws, and these men should all be vested with as strong authority to do anything to prevent the destruction of our forests and game as can be given them by any law that can be devised. The duties of the wardens should be to prevent the use of fires wherever there is danger of damage resulting to the surrounding territory, whether owned in private or by the State. We all know the difficulties which attend the fighting of fires in our cities where we have all modern appliances for their subjection, but none of these fires can compare with,

the genuine forest fire where great blazing brands go whirling, whizzing, hissing, ten, twenty, and in high winds, even forty-rods through the air, spreading fire so swiftly that no human power can stop it. The only place to stamp it out is before the match is lighted. Proper legislation along these lines will, we believe, do more to maintain our forest areas than any other method. If our land owners in both the southern and northern portions of Michigan would plant the sides of gulleys, hills, and rough, stony and unusually valueless ground for agricultural purposes, to forest seedlings, we would soon have an abundance of growing timber and to bring this about, the State should furnish seedlings or seeds of the ash, basswood, butternut, elms, maples, oaks, pines, walnuts and other valuable timbers to those who will use them, and also set aside similar places in its own holdings which are yet covered with forest or which have been denuded of forest by lumbermen or fires, and plant forests and properly care for them.

This brings us to the consideration of the stump lands, and by the stump lands we mean those lands which, within the memory of man, have been covered with timber, but which now are divested of everything of value and are patiently waiting for something to make them again valuable. We do not in any sense include the Jack pine plains. These are, however, oases in every desert, and we find them on the plains wherever the clay subsoil comes near enough the surface to retain the moisture, and we usually find here standing the Norway pine, or traces of its having been here; but there are hundreds of thousands of acres of good, fertile stump lands that will have ample time to grow another forest before they are wanted for agricultural purposes, and let us put our efforts here where we can show results. It is possible that the time may come when these plains may be utilized for other than grazing purposes, but it will be when our population has increased to such an extent that proper fertilization and irrigation can be brought with the people and not until then.

The legislation suggested for the maintenance of the present forest areas is also applicable to the stump lands in every feature, but there is need of more study and more clearly defined legislation along this line than the former. Most of these stump lands are or were at one time owned by some one of the wealthy lumber firms which have helped to build our State. In so far as possible, these men and firms should be induced to deed back to the State the lands for which they have no further use, and upon which most of them have ceased to pay taxes, thus again placing the lands under State control. Our present tax law introduces one of the most vexatious problems that we have to solve. If the State cannot give a good title to all tax lands, then there is no use of forestry legislation regarding these vast areas, for if she cannot give title, she has none herself, and we would not advocate the use of public money on the lands of men who only sit back and wait for them to become valuable before again claiming title and taking possession. The State cannot afford to carry on forestry experiments upon lands which she thinks she owns. The State of Michigan should never plant a tree upon lands over which the public has not absolute control and to which she has not a clear title and under the present tax law and the supreme court decisions regarding the same, it would be folly to try to re-forest the larger portion of the stump lands of this State. But once get the lands under the ownership of the Commonwealth and we can, by keeping out fires, reproduce a forest at little expense, of as much or more value than the original, and this by

letting Nature do her own sweet will, aiding by a little judicious planting and pruning.

To summarize:—We must then have legislation whereby we can have wardens to protect forests, stump lands and game from fires and thieves. These wardens should have authority to arrest and commence suit, thereby lessening cost of long journeys of officers in making arrest and expensive and tedious waiting for prosecuting attorneys. It should be the duty of the Attorney General to prosecute all cases when called upon to do so. There should be such a modification of the tax laws as will do away with evasion of tax payment, through error or incompetency of township or county officials; there should be such provision made that finally all lands taken back by the State should be held in the same manner as those to which original titles can now be given.

Influence owners of stump lands to deed back to the State instead of letting lands go back for non-payment of taxes. When the State has thus acquired absolute title to large tracts of stump lands, put them under the charge of competent wardens, help along by planting, pruning and keeping out stock, and we will soon have another forest.



METHODS OF REFORESTING PINE STUMP LANDS.

W. J. BEAL.

“The vandalism which hews down vast stretches of woodland for gain, without thought or care for the future, has too long gone on unchecked. The injury done by it has often been described and can hardly be exaggerated.” (The Providence Journal).

Fortunately for the people of Michigan, the conditions are still such that, if the annual or perennial fires, browsing animals and timber thieves are kept out, the land surface will very soon be clothed with a woody growth. This would come about through the agency of sprouts from living stumps, roots, or grubs of a considerable number of kinds of trees and shrubs that were not completely killed by a burning of the materials on the surface of the soil. Among these may be enumerated nearly all of the broad-leaved trees and shrubs. Again, it is not common to find an area of much size that does not have left standing some one or more old trees with tops still living that were unworthy the attention of lumbermen because of defects. These trees bear seeds every other year, or less frequently, which the kind breezes, the birds or squirrels give free transportation for long distances. Considering the assistance that Nature, unmolested, is ready to bring, my task of telling how to reforest stump lands of Michigan is not as formidable an undertaking as might first appear.

But Nature does her work slowly and often imperfectly. Quicker returns can be made by assisting Nature. Besides keeping out the fire and grazing animals, man can assist Nature by planting four small, desirable trees to nearly every square rod, thus restocking the ground evenly.

In undertaking the proper management of stump lands numerous problems confront us:

1. What kinds of trees shall we plant; shall they be native or foreigners?
2. How many shall we plant to the acre?
3. What preparations shall we give the land?
4. How shall we care for the trees, from seedlings to maturity?
5. How shall we plant to best advantage, and at what season of the year?
6. How large shall the trees be when planted, or shall we rely on sowing and planting seed?
7. Shall we plant one kind of tree on an acre, or shall we plant several kinds?

Prof. C. S. Sargent, Director of the Arnold Arboretum in Massachusetts, long ago began planting many kinds of forest trees, including those from Europe and other countries, and, as late as 1878, recommended for our use the planting of the Scotch pine, European larch, European linden, and several others, but in 1886, and since that time, he has turned completely about. He says “many of the conclusions reached in those papers, however, have not been substantiated by further investigations upon the same subject made during the past ten years. * * * I am now

as fully convinced that the native trees of Massachusetts are better suited to Massachusetts than any exotic trees can be, and that if our woods and plantations are ever to assume real importance, and to make profitable returns upon the money invested in them, they must be composed either wholly or in large part of our native trees."

The white willow of Europe seems to be an exception to the rule just mentioned, as it grows rapidly and reaches large size in this country, and is worth planting if anyone can make use of the lumber.

Most of the trees of Europe which attain much size were long ago planted more or less at the Agricultural College, some of them as early as 1860, and many others previous to 1875. The tests there made lead me to the same conclusion for Michigan that Prof. Sargent reached for Massachusetts. Furthermore, the trials that have been made in Eastern North America lead us to conclude that there is nothing on the Rocky Mountains or on the Pacific Slope that is worth planting for growing timber in Michigan.

Prof. Sargent says further, "the most instructive plantations of Massachusetts are not those which have been made upon the European fashion, or rather with European trees, by men who have studied the subject in Europe or in European books upon forestry. The real progress in silviculture in Massachusetts has been made by the farmers of Barnstable and Plymouth counties, who have taught us how to plant and raise forests successfully and profitably under the most favorable conditions. The secret of their success must be sought where they sought and found it, not in forest treatises, unsuited to the requirements of this community, but in the native woods in full view of their own doorstep, which told them what to plant and supplied them with material for planting.

It has been demonstrated in Barnstable county that a crop of pitch pine can be raised from seed with as much certainty as a crop of corn and with much less expense."

Half a century ago some experiments were begun in Eastern Massachusetts in planting white pines on barren sandy soil. The young trees were set in shallow furrows at odd times, with little expense, at a distance of from five to twelve feet each way, and after planting received no subsequent care whatever. They grew rapidly and vigorously. Prof. Sargent says "Here, no doubt, are the most profitable and successful attempts at silviculture ever made in the United States."

These experiments do not, unfortunately, show "the method of culture which can best be adopted in order to make this tree yield the greatest return. More experiments are needed with the white pine."

Where experiments were made in Massachusetts the land consisted of old fields, clear of stumps and other obstructions, while in Michigan the pine stumps are still left and the intervening spaces are often filled with logs, briars, shrubs and grasses in variety.

In making selections for planting, the nature of the soil and other conditions must be taken into account. On light sands we may not wish to rely on the conifers because of great risk from fire, but on such lands our broad-leaved trees are found to grow but indifferently, making timber of little value. For growing good timber on such lands, judging from our present knowledge, we are reluctantly forced to select some of the cone bearing trees. Still good pine has been grown on land in Michigan that also grew good hardwood. Where white pine or other kinds of first-class trees have been growing to some extent on our wild land and have not

produced good timber, it is a sure sign that it is unsafe to plant such trees for profit; on the other hand, if fire and browsing animals are kept out, it is pretty safe to rely on a good crop of timber on land where one fine crop of trees has been removed.

For Michigan the following kinds have been known to grow well, each in soil suited to it; white pine, Norway pine, American elm, white ash, basswood, sugar maple, black cherry, yellow birch, red oak, and perhaps also with good care, butternut and walnut. Many others have made valuable timber, but most of them grow too slowly for profit, or grow rapidly but make timber of poor quality.

In 1863, Prof. James Satterlee, with his father, planted near Greenville, Montcalm county, a considerable grove of chestnuts, butternuts and black walnuts. All have done well and are now healthy. The leading native trees on such land were white oak and black oak. Such an experiment begun thirty-five years ago, is worth considerable to one interested in tree planting.

In some places it may be profitable to grow aspens and some other poplars, with a view of using the timber for paper pulp.

There is no danger of planting the trees too thickly, but this work costs something. The better kinds selected to plant may be scattered about among the stumps, placing four to the square rod, 640 to the square acre, and among these, and near them, should be other cheap and quick growing trees or shrubs to shade the ground and help keep out grasses, herbaceous plants and weeds. For cheap nurse trees, to start quickly and shade the ground, there appears nothing better than box elder. On the light sand, jack pine started from the seed, is first rate.

What preparations shall be given the land?

To cover every case the answers would be numerous and long, because of varied conditions. If much rubbish is left unburned it may be best to fire it and clear the land. If grass and pasturing have left the surface with a good deal of sod, plowing will be beneficial, but this is not always possible. In case it is not, dig over a space two feet or more in diameter wherever a small tree is planted. In most places the ground is already somewhat shaded by trunks of small trees. In this case no preparation is needed, possibly, excepting the reduction of neighboring bushes the better to expose to light the young tree you are planting. Bear in mind that this planting anew has to be done but once for all time, and the work should therefore be well done.

After setting the young trees what care will they need?

Rigidly keep out fire and grazing animals. While your choice saplings are yet small, pass over the ground from year to year and lop off the tops of the surrounding bushes, if they reach much above those you are caring for. If two branches to the main trunk are very nearly equal in size, cut one off or remove a part of it, thus sending more vigor into the remaining branch, that a straight trunk may be produced. After the trees have grown so large that a crop is to be harvested there are two ways to proceed. One is to cut off every tree of any value and allow sprouts or seedlings to renew the forest, the other is to keep taking out from time to time a tree here and there as it is needed, leaving the rest to grow. On hilly land the latter method is always preferable.

Evergreens are best planted just as the buds are pushing in the spring, other trees may be planted in the spring or fall, while they are destitute of leaves

For setting out seedlings that are six inches to a foot high in unplowed ground if the obstructions are not too numerous, two men with long-handled dibbles and a boy to handle the plants kept moist, can plant from four to five thousand per day, enough for seven acres of land. The boy should carry with him a mixture of trees of several kinds. The man thrusts a dibble into the ground, a seedling goes into the hole, the dibble is thrust again into the ground and pried toward the young tree, closing in the earth about it. If the earth is packed a little about the tree all the better.

Chestnuts, acorns and the like, should be planted one in a place, about two inches deep, where the trees are needed. This should be done usually in the spring, for then there is less risk of destruction by squirrels. The nuts may be kept over winter without loss of vitality, by burying on high land in twice their bulk of sand.



An experienced gardener knows that the roots of a young tree when exposed to dry air will live just about as long as a trout or a black bass in the same situation; the inexperienced or thoughtless person might lose most of his labor in tree planting by not knowing this fact.

The trees to be set should usually be four to twelve inches high. At this size they cost less, can be more easily planted and are more likely to make good trees.

As a guide to the selection of trees for each kind of soil or location, plant those species that formerly grew in such places. Chestnuts, if planted, should be placed in soil that is sandy or gravelly, high enough and well drained.

I suggested that the boy helping in the work should carry a mixed bunch of the trees, that the different kinds be grown together. But why mix them, you ask? Trees so planted are less liable to the attacks of insects or fungi; less liable to loss from fire or wind; they economize the room above the soil and below the surface to better advantage. Their likes and dislikes are not just the same. Pines, beeches, oaks, maples, box elders and some others will hold their lower branches covered with living leaves very well in the shade, while ashes, walnuts and chestnuts are impatient of shade and cannot be grown closely enough together to keep out grass and weeds. It would be a mistake to attempt to grow white ashes or chestnuts by the acre, each sort by itself.

I shall not here attempt to produce a complete treatise on growing and managing seeds and seedlings, but a few words seem necessary.

In case you fail to secure seeds or to grow seedlings when you need them, they can be purchased at very low prices of some nurseryman. The man who has little horticultural tact will find it cheaper to buy; the man who has the tact needs little instruction from me. To grow seedling evergreens and other delicate things, secure a spot not likely to become very dry nor to become flooded with water. The soil should be good, with a surface of rich sandy loam or leaf mold. Above this should be shade. This spot should be but little exposed to wind. With a little care such places may be selected in almost any forest, though, the spreading roots are in the way and draw out the moisture. To produce the shade it will cost but little to set or drive posts five or six feet high, and from the tops of one to the other put on horizontal strips or poles, on which throw some fine brush destitute of leaves. Here you can grow seedlings with success. Sow the seeds in rows six to eight inches apart, covering them but slightly with one-fourth of an inch of light soil. Never let the ground get dry, nor become soaked with water for a very long time, nor exposed to the sun, nor become choked with weeds. Seeds of elms, birches and maples should be planted as soon as gathered or not long after. If seeds of ashes become dry before planting in the open (as they may be with safety), they should be soaked a day or two in water till they become swollen.

RELATION OF METEOROLOGY TO FORESTRY IN MICHIGAN.

BY R. C. KEDZIE.

The controlling influence of climate over forest growth is well recognized. The distribution of plants over the earth's surface is to a large extent determined by climate, but moisture as an element of climate is controlling. The climatic conditions, as related to forest growth, and especially in connection with the question of reforesting our denuded northern plains become matters worthy of consideration.

FOREST GROWTH.

The conditions favorable to growth of trees are good soil, proper temperature and moisture. Failure of any one of these will limit or prevent arboreal growth. A good illustration of the limitation by a poor soil is furnished in the government forests of Germany. Prof. F. S. Kedzie in a recent letter writes: "I have been all over the Royal Forest. It lies outside of the city about ten miles and is carefully watered and taken care of by a small army of foresters. The trees are all pines, planted a great many years ago, and through the forest run wild boar, deer and other game. I saw one lone red squirrel during my tour, which lasted over four hours. Only the Kaiser and his guests ever shoot or hunt the game here. * * * * At one point I found a plot of pines which was planted in 1889, but the result must try even the patience of a German—the average height was not more than four feet.

I was disappointed in the appearance of the trees in the forest—they don't compare with ours at home, and I expected they would be much larger on account of the more abundant rainfall. When I told the German friend who was with me that they were beginning to agitate the forest question in Michigan he seemed greatly astonished that a man was permitted to cut down trees without planting as many acres as he cleared. There is one thing clear to my mind; we don't need to try any experiments in forestry with pine trees—the millennium is too near."

The limiting conditions for forest growth are not found in our soil, which is in striking contrast with the thin sands of Prussia; but in certain sections the climatic condition, especially the rainfall, is the problem to be solved. While the climate of Michigan on the average is satisfactory, yet it still must be characterized as capricious—subject to wide variations from year to year. The influence of these climatic variations is shown in corresponding variations in tree growth. Spruce trees have grown for many years on the college lawn. When cut down, and a cross section of the trunk is examined, the concentric layers of annual growth clearly point out the good years of abundant rainfall, while the thin rings show the years of unfavorable climatic conditions. The meteorological tables for the last 34 years at this college, when compared with "the tables in wood" of annual growth, show very clearly the relations of climate to forest growth.

FORESTS AND MOISTURE.

Much has been written about the relation of forests to rainfall; some claiming that rain is increased by forests, and others that there is no connection between them.

Geo. P. Marsh in his admirable work "Man and Nature," has pointed out how forests restrain the rapid escape of the rain; preserving springs and small streams, retarding floods, and mitigating drought. Their influence in preventing the drifting of snow and keeping an even covering of that wonderful blanket for the sleeping earth, is well recognized.

The influence of forests in diminishing evaporation by restraining the velocity of the wind at the surface of the ground is worthy of consideration. I do not refer to the well-known influence of tall forests in restraining the violence of the wind as a body, but to the influence of forests, shrubs and vegetable growth of every kind in keeping the air quiet at the ground level, where alone soil evaporation takes place.

To obtain some measure of the relative rapidity of evaporation in a draft and in comparatively still air; the following experiment was tried: The air in one part of the chemical lecture room was so nearly still that a feather would not move perceptibly; by opening windows in another part of the room a strong draft could be secured at one window, the wind blowing 12 miles an hour. Two square pieces of Turkish toweling of same size, were thoroughly wet, just short of dripping, then weighed separately, one suspended in the still air of the room for an hour, while the other was similarly hung in the draft by the window, or in the mouth of the ventilating shaft. Both were left for an hour, then weighed again and the loss in weight showed the amount of water evaporated in each case. The trial was made seven times, with the result that the evaporation was four times greater in the draft than in the still air. The actual amount evaporated was not the same for each hour, but the ratio of evaporation was almost identical in the whole series, viz: four times as much in the draft as took place in the still air.

The reason for this is not hard to find. A volume of perfectly still air surrounding a wet body will take up moisture with progressive slowness till the air is saturated; but if this damp air is blown away and replaced by relatively dry air, evaporation will go on with increased rapidity, and if the air is constantly renewed as in a draft of wind, the evaporation will be more rapid. Every washer-woman knows that the clothes will soon blow dry when hung out in a stiff breeze, but will take hours if lined up indoors.

The principle of my laboratory experiment will hold in the broad open of Nature. The air in contact with the moist ground will take up water till it is saturated and then evaporation will be suspended, provided the air remains still and undisturbed. But if this bottom air is swept away by wind, evaporation will be renewed and the drying of the soil will again go on. The influence of trees, shrubs and even the grasses in preserving in some degree this shallow pool of quiet air at the ground level and thus diminishing evaporation from the soil may seem a trifling matter at first thought, but becomes of great moment on the large scale of nature.

RELATION OF SOIL TO MOISTURE.

The capacity of a soil to imbibe and retain water is intimately connected with its composition. The open and porous soils of a sandy character;

take up water most readily, retain it in least quantity and part with it most rapidly by evaporation. One hundred parts of pure sand will take up 25 parts of water, and will lose 22 parts by evaporation in four hours when spread out in a thin sheet in dry air. Such soil is well called leachy and very subject to drought.

If to such sand, clay, oxide of iron and marl, carbonate of lime, are added, the power of such mixed soil to retain water is much improved, but the material that has the greatest influence, and the one most within our control is humus or the organic matter of soil. An experiment showed this clearly. A glass funnel was used holding a very small filter paper in its throat (and thoroughly wet) to prevent the sand flowing through. Into this funnel 100 grains of dry sandy soil from Grayling were placed, and water poured over the sand till completely wet, and the excess of water drained off till dripping had ceased. This soil contained 95 per cent. of sand and $2\frac{1}{4}$ per cent humus. It took up and retained by capillary attraction 29 per cent. of water. Left undisturbed for 3 days in the shade it lost 27.7 parts of water, retaining only 1.3 parts out of the 29.

A soil was prepared by mixing two parts of Grayling sand with one part of Kalamazoo muck (containing 63.76 per cent. of humus). The materials were thoroughly mixed and sifted and 100 grains of the mixed soils were placed in a glass funnel the same as in former experiment, and water poured over it till saturated, when it was found that 100 parts of this soil took up and retained 65 parts of water. On leaving it exposed for 3 days in the same way, the soil lost 45 parts of water, but still retained 20 parts of the original 65. In other words, the addition of 21 per cent. of humus to a sand containing $2\frac{1}{4}$ per cent of organic matter, more than doubled its capacity to take up water by capillarity, and increased by more than 15 fold its power to resist evaporation.

A similar set of experiments, using jelly cups in place of funnels, gave concordant results. It is thus shown that the beneficial influence of the organic matter of the soil in mitigating drought in sandy soils is twofold: assisting such soil to take up and hold the rain when it falls, and preventing excessive loss by evaporation.

The damage by forest fires sweeping over the country, burning up leaves and grasses which would form humus, and consuming much of the humus already in the soil, becomes evident to all. These forest fires inflict incalculable injury upon our northern plains. The thwarting of Nature's efforts at reforesting, by burning up all trees and shrubs too young to resist the fire, is clearly seen as one travels over the blackened country.

Keep out the fires is the first and great commandment in forestry for Michigan. Without this no effort at reforesting will accomplish much.

METEOROLOGICAL OBSERVATIONS FOR THIRTY FOUR YEARS AT THE MICHIGAN AGRICULTURAL COLLEGE.

To satisfactorily study these questions of the relation of climate to forestry, we need a long series of observations taken at leading points in the State. Unfortunately these are wanting, but as a contribution to this end the following mean monthly observations at the Agricultural College are presented. They are too local to be decisive of the average climatic condition of our State, but may yet be of some value in future studies.

Abstract of the Meteorological Observations taken at the State Agricultural College for thirty-four years from 1864 to 1897.

By R. C. KEDZIE, Professor of Chemistry.

Year.	JANUARY.						FEBRUARY.					
	Mean Temperature.	Pressure of Vapor.	Relative Humidity.	Barometer reduced to frost point.	Cloudiness.	Rain.	Mean Temperature.	Pressure of Vapor.	Relative Humidity.	Barometer reduced to frost point.	Cloudiness.	Rain.
1864	22.26	.105	66	28.875	66	0.94	27.32	.150	70	28.771	69	0.27
1865	21.10	.090	72	28.887	77	0.65	27.59	.118	75	28.949	75	1.76
1866	21.16	.104	82	29.013	74	2.08	22.71	.111	81	28.970	71	2.28
1867	17.61	.091	87	28.857	76	1.68	30.89	.152	85	28.904	71	3.23
1868	19.00	.090	80	28.894	82	1.47	18.72	.093	83	29.014	65	1.28
1869	20.38	.162	96	28.830	66	0.87	26.66	.148	95	28.839	71	2.95
1870	25.37	.125	85	28.867	80	1.93	24.25	.112	84	28.807	65	1.20
1871	24.75	.135	93	28.903	82	3.95	25.65	.132	90	28.816	69	1.73
1872	21.59	.107	88	28.838	71	0.43	21.34	.100	84	28.842	50	0.49
1873	15.87	.069	95	28.873	79	2.98	19.10	.110	95	28.847	61	0.77
1874	27.70	.135	88	29.048	75	3.53	25.51	.128	89	28.928	70	1.55
1875	12.87	.074	88	29.005	76	1.81	27.99	.075	91	28.875	53	2.20
1876	30.22	.157	84	29.073	58	1.63	27.38	.131	84	29.063	58	3.04
1877	18.07	.097	91	29.057	64	1.33	32.31	.155	85	29.124	45	0.00
1878	29.11	.135	89	29.123	76	1.12	28.07	.138	89	29.029	56	2.74
1879	19.19	.099	89	29.130	68	0.49	20.40	.105	92	29.107	73	1.43
1880	37.10	.171	75	28.995	63	2.67	29.19	.144	68	29.007	63	1.62
1881	16.98	.082	81	29.077	65	2.27	21.58	.122	93	29.152	68	3.77
1882	24.89	.125	89	29.144	72	1.47	35.12	.156	75	29.053	56	2.28
1883	14.39	.077	95	29.129	67	1.53	19.76	.106	93	29.252	61	4.50
1884	15.46	.093	93	29.130	77	1.23	23.43	.135	92	29.093	85	3.69
1885	15.34	.113	90	29.144	75	2.70	8.94	.124	91	29.005	49	0.73
1886	18.78	.106	91	29.074	77	2.66	22.27	.132	86	29.106	65	1.35
1887	18.20	.103	90	29.000	71	3.25	24.26	.127	89	29.176	78	5.71
1888	15.40	.085	89	29.202	77	2.18	21.95	.112	85	29.070	61	1.70
1889	28.04	.165	84	29.008	71	1.53	18.25	.092	85	29.091	73	1.17
1890	31.54	.161	87	29.146	72	2.31	31.54	.152	84	29.073	69	1.79
1891	26.72	.137	90	29.092	70	0.82	26.67	.137	81	29.055	68	2.20
1892	19.20	.098	86	29.064	63	0.96	27.30	.139	86	29.133	79	1.93
1893	14.80	.082	82	29.008	78	1.78	21.31	.098	87	29.115	66	1.83
1894	26.88	.131	83	28.989	64	1.37	21.15	.100	77	29.016	58	0.53
1895	17.50	.095	88	28.966	66	1.04	16.40	.091	81	29.055	66	0.12
1896	24.65	.136	96	29.117	76	0.79	24.28	.138	96	28.916	67	1.51
1897	22.34	.136	97	29.124	73	4.17	26.38	.146	97	29.090	80	0.67
Means	21.87	.114	87	29.020	72	1.61	23.69	.124	86	29.010	66	1.88

Abstract of the Meteorological Observations.—Continued.

Year.	MARCH.						APRIL.					
	Mean Temperature.	Pressure of Vapor.	Relative Humidity.	Barometer reduced to frost point.	Cloudiness.	Rain.	Mean Temperature.	Pressure of Vapor.	Relative Humidity.	Barometer reduced to frost point.	Cloudiness.	Rain.
1864	°31.74	.155	77	28.764	68	2.26	°45.86	.275	84	28.843	76	3.87
1865	36.96	.182	74	28.806	68	2.79	47.40	.248	74	28.815	66	2.32
1866	29.06	.140	83	28.959	71	3.39	48.94	.236	64	28.848	57	1.41
1867	29.72	.134	88	28.930	72	0.68	48.20	.196	57	28.752	60	2.19
1868	37.80	.213	87	28.887	63	4.65	43.68	.224	56	28.911	56	1.83
1869	27.60	.124	82	28.934	67	1.65	45.70	.222	67	28.827	61	3.42
1870	30.28	.148	84	28.845	75	3.01	50.39	.267	76	28.902	50	2.02
1871	38.18	.194	83	28.810	66	3.91	49.80	.261	74	28.722	63	2.97
1872	24.75	.109	85	28.911	54	2.04	47.39	.260	74	28.852	52	1.26
1873	28.30	.142	86	28.852	62	1.73	43.17	.220	76	28.798	73	3.88
1874	32.30	.161	83	28.895	54	1.79	36.87	.169	75	28.941	46	1.67
1875	26.20	.136	87	28.844	49	1.02	41.11	.182	69	29.047	45	0.61
1876	30.55	.150	95	28.929	65	4.84	44.16	.195	66	29.000	51	2.08
1877	24.51	.127	91	28.981	63	5.60	46.16	.214	30	28.974	50	4.14
1878	40.90	.219	83	29.072	72	3.12	50.55	.269	69	28.874	59	3.76
1879	33.19	.152	78	29.102	56	1.57	44.84	.195	66	29.050	44	1.25
1880	35.50	.145	79	29.181	56	1.70	45.87	.232	74	28.984	48	6.10
1881	30.28	.145	86	28.899	67	2.66	45.59	.200	71	29.054	49	1.75
1882	35.96	.163	77	29.110	68	3.58	44.70	.202	67	29.101	57	1.88
1883	24.89	.113	93	29.059	48	0.71	43.48	.188	69	29.042	54	1.90
1884	29.89	.149	86	29.083	55	3.67	43.66	.183	68	29.023	57	1.95
1885	21.26	.159	88	29.096	52	0.58	43.59	.223	73	29.097	60	2.47
1886	31.33	.169	80	29.013	60	2.63	50.18	.356	73	29.113	57	1.99
1887	28.29	.124	78	29.118	54	1.78	45.37	.204	66	29.048	58	0.90
1888	27.03	.123	79	29.154	62	1.88	44.03	.179	61	29.202	49	1.15
1889	37.60	.151	72	29.010	51	1.22	46.59	.212	68	29.069	56	2.02
1890	28.20	.129	79	29.100	56	1.54	47.20	.226	68	29.159	46	3.20
1891	29.27	.133	80	29.124	71	2.41	47.44	.237	70	29.080	55	1.74
1892	29.86	.129	77	29.121	52	1.31	44.50	.202	63	29.107	50	2.04
1893	28.16	.148	85	29.063	57	2.82	43.50	.228	75	28.978	71	4.81
1894	40.06	.203	77	29.008	63	1.25	48.44	.249	72	29.055	61	2.76
1895	27.20	.125	80	29.064	54	0.27	48.57	.255	74	29.062	49	0.67
1896	28.70	.159	95	29.052	52	1.31	52.64	.376	81	29.067	46	2.77
1897	33.00	.190	94	29.085	65	2.08	44.58	.282	90	29.143	65	2.74
Means	30.84	.151	83	28.996	61	2.28	46.00	.232	70	28.996	56	2.40

Abstract of the Meteorological Observations.—Continued.

Year.	MAY.						JUNE.					
	Mean Temperature.	Pressure of Vapor.	Relative Humidity.	Barometer reduced to frost point.	Cloudiness.	Rain.	Mean Temperature.	Pressure of Vapor.	Relative Humidity.	Barometer reduced to frost point.	Cloudiness.	Rain.
1864	60.19	.470	77	28.787	62	2.87	67.62	.632	81	28.949	48	3.88
1865	57.65	.373	76	28.807	54	1.77	70.76	.596	82	28.868	54	3.55
1866	55.04	.261	59	28.823	49	3.48	66.60	.488	74	28.783	64	5.37
1867	51.11	.234	62	28.781	69	3.81	71.61	.556	73	28.872	46	2.83
1868	59.08	.336	66	28.822	46	2.80	68.46	.317	76	28.966	45	3.55
1869	56.02	.322	70	28.749	70	2.05	64.45	.496	80	28.856	65	4.40
1870	64.32	.441	73	28.857	39	1.16	70.87	.588	77	28.880	42	7.27
1871	61.39	.405	72	28.904	37	1.97	68.21	.522	74	28.865	42	2.93
1872	58.48	.380	77	28.868	60	3.72	71.82	.616	78	28.879	49	3.45
1873	56.98	.345	72	28.826	58	3.05	70.60	.534	72	28.840	40	2.96
1874	59.58	.323	62	28.844	47	1.77	70.61	.559	75	28.878	54	5.07
1875	60.82	.334	67	29.061	47	4.48	68.57	.437	65	29.029	52	1.84
1876	57.95	.349	73	29.009	52	4.13	68.14	.539	79	28.911	50	4.34
1877	58.25	.337	66	29.056	34	2.23	65.93	.476	75	29.020	51	3.53
1878	54.57	.290	61	29.020	54	3.44	64.08	.441	73	29.030	45	3.15
1879	58.76	.321	64	29.116	40	2.45	66.02	.478	75	29.073	43	2.87
1880	64.30	.533	71	29.061	41	5.59	67.60	.532	79	29.065	47	5.04
1881	65.24	.448	71	29.116	37	2.11	64.31	.472	78	29.018	58	4.37
1882	52.73	.269	66	29.077	53	4.04	66.49	.471	72	28.971	53	5.57
1883	52.78	.289	72	29.007	66	5.66	65.87	.530	81	28.998	62	11.35
1884	56.90	.342	73	29.007	50	3.95	68.92	.527	76	29.268	41	2.83
1885	55.76	.353	67	28.988	55	2.30	64.69	.576	75	29.105	43	6.01
1886	58.06	.457	79	29.036	46	2.67	65.72	.589	73	29.068	47	1.92
1887	64.28	.401	68	29.096	36	2.42	68.53	.500	73	29.107	47	2.47
1888	53.65	.305	68	29.023	64	3.66	67.89	.497	72	29.032	44	2.51
1889	57.37	.269	64	29.009	52	3.61	62.83	.439	79	29.057	65	3.42
1890	53.70	.299	70	28.960	58	4.98	70.30	.532	73	29.033	50	3.92
1891	55.69	.275	61	29.164	36	1.63	67.40	.493	73	29.062	50	2.55
1892	54.50	.322	76	29.003	70	5.92	67.70	.561	83	29.019	59	4.33
1893	54.40	.316	75	28.984	52	2.86	66.60	.532	78	28.767	40	4.85
1894	56.94	.355	75	28.987	62	4.33	71.38	.551	72	29.039	42	1.30
1895	61.80	.392	67	29.098	46	2.06	71.40	.521	68	29.151	40	1.01
1896	66.48	.547	83	29.035	41	3.14	69.87	.622	83	29.060	44	2.60
1897	55.79	.421	90	29.089	49	3.29	64.21	.562	88	29.050	52	2.57
Means	57.96	.356	70	28.973	51	3.23	67.77	.524	76	28.939	49	3.52

Abstract of the Meteorological Observations.—Continued.

Year.	JULY.						AUGUST.					
	Mean Temperature.	Pressure of Vapor.	Relative Humidity.	Barometer reduced to frost point.	Cloudiness.	Rain.	Mean Temperature.	Pressure of Vapor.	Relative Humidity.	Barometer reduced to frost point.	Cloudiness.	Rain.
1864	74.52	.788	80	28.925	46	1.25	70.72	.558	82	28.854	68	0.39
1865	65.60	.535	85	28.788	64	3.91	65.84	.542	85	28.953	53	3.38
1866	71.72	.629	74	28.905	52	4.19	62.60	.464	81	28.884	66	3.44
1867	71.60	.547	70	28.915	44	1.78	69.78	.522	74	28.911	39	1.74
1868	77.19	.782	77	28.912	44	1.11	70.33	.545	73	28.943	50	2.42
1869	70.35	.590	79	28.844	53	5.77	70.58	.598	75	28.968	48	4.85
1870	74.40	.659	79	28.836	48	8.02	70.11	.594	81	28.890	50	5.53
1871	70.60	.579	77	28.891	49	3.10	71.19	.586	78	28.907	44	1.42
1872	74.91	.671	77	28.924	47	3.86	71.22	.650	83	28.967	50	4.18
1873	70.82	.575	75	28.914	51	5.12	69.49	.559	79	28.927	45	0.80
1874	72.02	.539	71	28.907	37	2.56	69.39	.527	74	28.924	31	1.28
1875	69.67	.535	78	29.044	46	2.42	65.48	.470	77	29.025	47	1.47
1876	72.48	.617	78	29.009	46	2.10	71.55	.576	76	29.048	43	1.28
1877	71.43	.522	70	29.062	44	2.25	68.46	.519	78	29.046	49	6.57
1878	73.04	.639	68	29.084	37	2.96	70.15	.535	74	29.009	40	1.85
1879	74.03	.573	71	29.057	36	2.19	70.00	.494	70	29.100	35	1.61
1880	63.04	.559	78	29.069	45	6.27	68.58	.571	82	29.126	52	6.02
1881	73.14	.590	73	29.093	38	1.81	72.69	.540	70	29.107	40	1.63
1882	67.71	.485	72	29.108	43	2.32	69.52	.603	83	29.074	54	5.72
1883	68.94	.569	80	29.072	54	11.27	64.90	.452	74	29.154	34	0.18
1884	67.95	.524	76	29.016	46	2.60	66.91	.498	75	29.132	36	1.30
1885	72.70	.599	71	29.052	43	2.52	63.62	.545	80	29.061	52	5.82
1886	70.68	.711	65	29.064	43	0.65	69.30	.665	71	29.062	44	4.69
1887	75.51	.556	65	29.104	36	1.50	67.96	.427	66	29.117	48	0.89
1888	70.53	.514	71	29.119	43	2.40	67.55	.476	71	29.103	42	1.87
1889	70.19	.579	78	29.141	42	3.41	68.56	.493	71	29.070	32	0.68
1890	71.07	.481	65	29.104	33	0.92	65.40	.452	71	29.137	42	3.60
1891	65.30	.432	70	29.109	37	1.88	67.93	.479	67	29.134	44	4.82
1892	70.29	.539	73	29.178	32	2.00	68.30	.521	75	29.111	37	5.12
1893	71.50	.571	75	29.069	39	1.86	65.10	.537	78	29.119	31	0.56
1894	73.22	.559	65	29.064	29	0.86	68.80	.591	83	29.035	42	0.00
1895	70.50	.525	72	29.102	45	1.47	71.20	.616	80	29.050	41	4.64
1896	71.83	.701	88	29.070	53	6.73	69.99	.683	89	29.087	45	4.73
1897	73.79	.743	88	29.017	32	8.49	65.94	.566	88	29.066	29	1.69
MEANS	71.39	.589	75	29.017	44	3.27	68.59	.543	77	29.034	44	2.80

Abstract of the Meteorological Observations.—Continued.

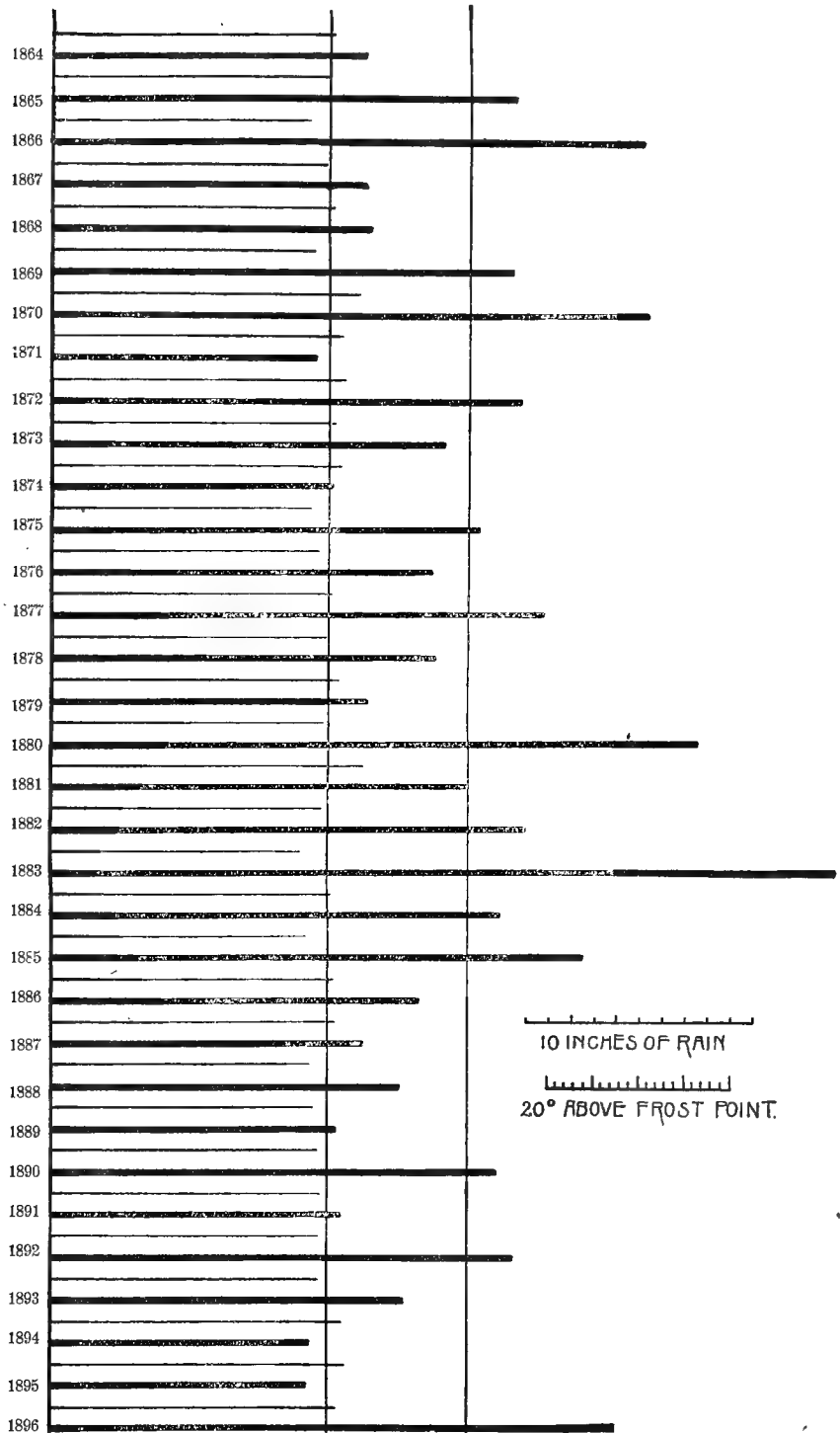
Year.	SEPTEMBER.						OCTOBER.					
	Mean Temperature.	Pressure of Vapor.	Relative Humidity.	Barometer reduced to frost point.	Cloudiness.	Rain.	Mean Temperature.	Pressure of Vapor.	Relative Humidity.	Barometer reduced to frost point.	Cloudiness.	Rain.
1864	59.62	.475	81	28.902	66	3.53	*45.74	.256	80	28.824	72	1.85
1865	67.66	.522	88	28.954	63	4.79	46.50	.265	83	28.905	54	2.79
1866	55.80	.407	85	28.956	64	5.81	49.50	.307	82	28.979	66	3.57
1867	56.60	.438	77	29.000	37	1.42	50.60	.285	77	28.960	45	2.11
1868	58.77	.373	80	28.936	59	2.95	45.19	.240	73	29.000	57	1.11
1869	63.45	.459	83	29.020	41	1.43	40.80	.219	86	28.920	68	1.72
1870	63.66	.490	83	29.022	51	2.85	52.45	.346	85	28.939	66	2.29
1871	59.10	.391	78	29.038	48	0.79	53.91	.307	72	28.909	53	1.43
1872	62.03	.495	85	28.890	48	5.21	47.44	.295	84	28.979	47	0.67
1873	67.38	.383	80	28.928	48	3.50	44.68	.245	80	28.917	55	1.91
1874	62.85	.422	86	28.964	36	1.27	49.10	.282	78	28.958	58	0.49
1875	58.50	.388	76	29.031	51	2.89	42.93	.219	76	29.016	64	5.81
1876	56.30	.391	83	28.995	57	3.65	43.74	.220	76	28.929	59	1.26
1877	61.28	.430	80	29.121	36	1.38	50.83	.314	83	29.077	66	5.69
1878	63.15	.477	78	29.156	45	3.43	48.33	.269	76	29.080	54	1.99
1879	56.21	.356	78	29.152	47	3.19	57.28	.395	76	29.160	55	1.57
1880	55.83	.439	74	29.098	46	3.10	46.23	.260	81	26.130	52	2.51
1881	69.69	.515	73	29.077	50	2.91	52.51	.346	84	29.181	67	5.56
1882	59.98	.429	83	29.198	43	0.67	52.67	.330	81	29.124	50	2.64
1883	56.43	.360	78	29.162	53	2.34	46.17	.256	78	29.158	70	3.66
1884	65.06	.481	76	29.130	36	3.34	50.91	.322	80	29.195	53	5.73
1885	58.94	.431	78	29.215	44	3.75	44.95	.283	83	29.056	60	3.08
1886	62.07	.539	80	29.148	55	5.40	52.37	.370	73	29.266	49	0.95
1887	58.86	.373	75	29.200	48	4.72	44.97	.237	75	29.103	60	1.86
1888	57.76	.327	71	29.128	45	1.89	45.70	.238	76	29.027	70	3.00
1889	61.14	.379	72	29.157	40	0.79	44.19	.184	69	29.061	64	0.65
1890	57.70	.367	76	29.230	48	1.67	49.11	.284	80	28.981	70	4.56
1891	65.10	.470	72	29.222	35	1.10	41.81	.252	71	29.158	51	0.82
1892	60.80	.418	77	29.132	41	2.17	48.30	.281	78	29.096	42	0.78
1893	58.40	.463	88	28.993	42	1.84	49.70	.311	81	28.980	45	3.61
1894	63.66	.491	80	29.103	45	2.59	49.80	.308	85	28.982	67	1.91
1895	66.60	.568	82	29.158	32	0.85	45.00	.274	86	29.084	41	1.41
1896	57.62	.459	92	29.064	60	6.73	44.61	.282	89	29.090	42	1.06
1897	62.92	.535	87	29.267	19	0.80	53.06	.375	88	29.227	30	2.75
Means	60.91	.439	80	29.081	46	2.79	48.18	.28	80	28.954	57	2.42

Abstract of the Meteorological Observations.—Continued.

Year.	NOVEMBER.						DECEMBER.					
	Mean Temperature.	Pressure of Vapor.	Relative Humidity.	Barometer reduced to frost point.	Cloudiness.	Rain.	Mean Temperature.	Pressure of Vapor.	Relative Humidity.	Barometer reduced to frost point.	Cloudiness.	Rain.
1864	37.88	.193	77	28.814	73	4.12	24.37	.111	73	28.777	77	3.20
1865	38.63	.193	81	28.947	54	0.68	26.72	.121	80	28.891	75	1.43
1866	37.94	.189	81	28.946	71	2.60	25.53	.123	79	28.893	76	1.90
1867	40.44	.192	72	28.832	56	1.77	25.31	.118	76	28.868	78	1.34
1868	36.77	.193	84	28.909	70	2.44	21.16	.114	90	28.958	74	1.35
1869	32.05	.156	86	28.863	77	1.92	28.16	.126	82	28.999	78	2.11
1870	38.40	.187	80	28.903	54	0.91	24.80	.139	94	28.772	79	2.57
1871	31.95	.160	86	28.964	69	1.25	21.12	.108	86	28.880	81	1.76
1872	29.80	.158	89	28.881	69	0.98	15.74	.092	91	28.992	72	1.06
1873	28.49	.148	89	28.833	75	2.03	29.54	.158	89	28.929	75	3.02
1874	35.00	.145	77	28.937	63	1.61	26.96	.135	85	29.001	65	0.37
1875	32.96	.155	84	29.054	67	1.11	31.58	.172	80	28.955	75	2.80
1876	36.33	.191	85	28.953	80	0.91	15.23	.088	92	29.203	72	1.29
1877	35.24	.188	87	29.099	73	3.67	36.57	.203	89	29.180	71	1.03
1878	36.29	.188	87	29.081	68	2.16	21.29	.108	95	29.147	89	2.27
1879	38.22	.198	75	29.027	68	4.55	27.46	.129	80	29.032	84	3.55
1880	27.45	.143	89	29.192	70	2.32	22.07	.118	91	29.155	77	0.85
1881	38.20	.190	79	29.129	74	4.09	34.31	.163	84	29.134	67	1.75
1882	36.30	.195	85	29.187	75	1.83	24.80	.128	92	28.124	86	0.88
1883	36.08	.194	80	29.128	58	3.98	26.39	.130	86	29.124	65	1.28
1884	34.11	.169	83	29.123	61	1.84	24.71	.140	90	29.139	87	4.15
1885	37.22	.178	84	29.013	79	2.90	27.75	.124	90	29.062	82	2.14
1886	33.94	.182	78	29.061	64	1.48	19.74	.105	87	29.186	69	1.56
1887	35.66	.161	80	29.096	55	2.28	27.30	.131	87	29.096	74	3.32
1888	38.50	.196	82	29.167	62	3.12	30.39	.145	83	29.070	72	1.20
1889	37.39	.193	84	29.061	72	2.67	36.75	.184	82	29.063	55	2.61
1890	39.06	.185	77	29.081	57	2.30	26.45	.114	81	29.093	62	1.12
1891	33.90	.175	81	29.097	80	3.34	34.55	.160	78	29.074	56	1.47
1892	34.20	.169	83	29.098	82	1.84	25.59	.113	89	29.092	83	1.52
1893	35.63	.183	87	28.993	62	2.19	27.60	.294	83	28.984	79	2.28
1894	32.48	.164	86	29.056	74	0.97	30.12	.157	86	29.075	68	0.93
1895	35.40	.204	90	29.122	63	3.87	28.50	.161	92	29.008	70	5.39
1896	37.09	.231	92	29.112	71	1.05	28.13	.152	91	29.047	74	0.80
1897	36.49	.204	89	29.154	63	2.94	52.62	.148	96	29.095	72	2.02
Means	34.51	.181	83	29.027	68	2.29	26.54	.139	86	29.032	72	1.95

Abstract of the Meteorological Observations,—Recapitulation.

Years.	THE YEAR.						
	Mean Temperature.	Pressure of Vapor.	Relative Humidity.	Barometer reduced to frost point.	Cloudiness.	Rain and melted snow.	Snow in inches.
1864.....	°48.99	.347	76	28.980	66	28.37	31.5
1865.....	47.70	.313	80	29.001	63	29.82	30.0
1866.....	45.61	.264	77	29.033	65	39.51	42.5
1867.....	46.95	.297	75	29.002	55	24.58	52.0
1868.....	46.34	.293	79	29.051	59	26.45	56.5
1869.....	46.27	.302	82	29.007	59	33.17	56.0
1870.....	49.10	.347	83	28.996	58	37.76	54.0
1871.....	49.90	.307	80	28.988	59	27.21	54.0
1872.....	45.54	.328	82	29.007	57	26.84	42.5
1873.....	41.54	.285	82	28.994	60	31.74	75.5
1874.....	47.05	.277	79	29.055	53	32.00	32.0
1875.....	43.06	.267	79	28.998	56	28.24	63.5
1876.....	46.17	.300	81	29.049	58	30.55	46.5
1877.....	47.42	.299	80	20.066	54	37.42	2.56
1878.....	48.29	.308	78	29.054	58	31.19	61.0
1879.....	46.88	.291	76	29.080	54	26.82	30.0
1880.....	47.32	.337	75	29.103	55	43.98	29.5
1881.....	47.88	.318	79	29.086	57	34.66	77.5
1882.....	47.57	.296	78	29.106	59	32.88	30.5
1883.....	43.51	.273	81	29.107	58	48.36	41.0
1884.....	45.66	.298	81	29.111	57	36.28	45.0
1885.....	42.90	.303	81	29.075	58	35.00	57.0
1886.....	46.20	.365	78	29.101	57	29.95	57.0
1887.....	46.60	.279	76	29.105	55	31.10	4.0
1888.....	45.03	.266	76	29.108	58	26.56	26.75
1889.....	47.43	.273	74	29.073	56	23.78	38.5
1890.....	47.61	.283	76	29.095	55	31.91	14.75
1891.....	47.40	.232	70	29.113	59	24.78	29.75
1892.....	45.88	.291	78	29.096	58	29.92	30.5
1893.....	44.97	.313	81	29.006	55	31.29	53.35
1894.....	48.5	.322	78	29.038	56	19.30	20.38
1895.....	46.67	.319	80	29.077	51	22.80	49.14
1896.....	47.99	.374	90	29.057	56	35.20	35.75
1897.....	47.01	.359	91	29.117	52	33.61	39.63
Means	46.56	.304	79	29.059	57	31.27	46.00



10 INCHES OF RAIN
 20° ABOVE FROST POINT.

*Noted temperature above frost point

VARIABLE CLIMATE.

The climate of Michigan is subject to wide variations, especially in the rainfall. The average rainfall, including snow, is 31.27 inches at the Agricultural College, yet in 1894 the rainfall was only 19.3 inches, while in 1883 it was 48.36 inches. The fluctuations in temperature are less, the mean temperature being 46.56, yet in 1871 it was 49.90, while in 1873 it was 41.54 degrees, or more than eight degrees colder.

To enable one to see at a glance the fluctuations in rainfall, and in temperature above the frost point for the six growing months, from May to October, the following plate is inserted: The heavy black horizontal line denotes the relative amount of rainfall for the six months, while the vertical heavy black line shows the normal rainfall for the period: The light horizontal line shows the relative temperature above frost point for the six months of the year, and the light vertical line shows the normal temperature above frost point for the same period.

The changes from year to year in the amount of rainfall are so great as to be confusing in studying the weather. To equalize this in some degree and see whether our climate is changing, the results are recast in periods of five years, both in the annual rainfall and in that for six months of the active growing season.

Inches of mean rainfall by periods:	Year.	6 months.
1864 to 1868.....	31.70	17.67
1869 to 1873.....	31.34	19.18
1874 to 1878.....	31.88	17.23
1879 to 1883.....	37.34	23.24
1884 to 1888.....	31.78	17.34
1889 to 1893.....	28.34	18.22
1894 to 1897.....	27.73	18.73

PROXIMITY TO THE GREAT LAKES.

The influence of the great lakes on the climate of neighboring land, especially when the prevailing winds blow from the water over the land, is recognized. To show the extent of this influence as far as possible, observations were consulted in the office of the State Weather Bureau, and by the kindness of Director Schneider, are here presented. They cover a period of ten years past, and embrace the mean temperature and rainfall for the six months—May to October:

	Temperature.	Rainfall.
Grand Haven, Ottawa Co.....	60.60	18.38
Hart, Oceana Co.....	60.71	17.06
Ivan, Kalkaska Co.....	59.40	17.33
Charlevoix, Charlevoix Co.....	59.39	16.83
Cheboygan, Cheboygan Co.....	57.45	18.00
Alpena, Alpena Co.....	56.63	19.89
Harrisville, Alcona Co.....	59.48	18.15
Jeddo, Sanilac Co.....	61.41	16.46
Port Huron, St. Clair Co.....	60.53	16.91
Grayling, Crawford Co.....	58.18	14.11
Ovid, Clinton Co.....	61.60	15.70
Alma, Gratiot Co.....	61.03	16.86
Flint, Genesee Co.....	60.90	13.84
Agricultural College, Ingham Co....	.....	.....

A progressive fall in temperature is to be expected as we pass northward. The variation in the amount of rainfall for the active six months is a matter of interest. Note the rainfall at Ivan (17.33) at Grayling (14.11) and at Harrisville (18.15), all of them in the same tier of counties. Also at Grand Haven (18.38) at Ovid (15.70) at Flint (13.84) and at Port Huron (16.91)—all in the same tier of counties, reaching across the State from west to east.



FORESTRY LEGISLATION.

CLINTON D. SMITH.

In Michigan, as early as 1846, a law was enacted (Howell's Annotated Statutes 9,402, 9,403 and 9,404) making it a misdemeanor to wilfully or negligently set fire to any woods, prairies or ground not the property of the person committing the deed, or wilfully or negligently permitting any fire to pass from his own woods, prairies or grounds, to the injury or destruction of the property of other persons. The maximum penalty is a fine of \$1,000 or imprisonment in the county jail not exceeding one year. The guilty person is also liable to the party injured in double the amount of the damages sustained.

"Whenever the woods or prairies of any township shall be on fire so as to endanger property, it shall be the duty of the justices of the peace, the supervisor, and the commissioner of highways of such township, and each of them, to order such, and so many of the inhabitants of such township, liable to work on the highways, and residing in the vicinity of the place where such fire shall be, as they shall severally deem necessary, to repair to the place where such fire shall prevail, and there to assist in extinguishing the same, or in stopping its progress. If any person shall refuse or wilfully neglect to comply with such order, he shall forfeit a sum not less than five nor more than fifty dollars."

An act, approved May 29, 1897, adds three more sections to these statutes, as follows:

Sec. 9404 a. (Sec. 4). "The township boards of the several townships of this State are hereby authorized, and it shall be their duty to prohibit the setting of forest fires or fires for the purpose of clearing lands, and disposing by burning, of refuse material and waste matter within their respective jurisdictions, whenever, in the judgment of a majority of the members of each of said boards, it shall be deemed necessary to prevent the spreading of such fires over the territory of such township, or any part thereof. Each of such boards may make such rules and regulations as it may deem proper for the purpose of carrying this act into effect, which rules and regulations shall be published by posting notices thereof, together with a copy of this act, in five of the most public places in such township."

Sec. 9404 b. (Sec. 5). "Whenever in pursuance of the authority hereby given, any township board shall designate a period during which it shall be unlawful to set such fires, any person who shall be found guilty of violating the order of such board by setting any such fire in such township contrary to the provisions of any section of this act, shall be deemed guilty of a misdemeanor, and on conviction thereof, shall be subject to the same punishment as is prescribed in section one of this chapter: Provided, That any person desiring to dispose of refuse material by burning the same during the time prohibited by the board of such township, may do so after first procuring permission in writing, signed by the supervisor and township clerk, or by a majority of such township board, and the said supervisor and township clerk, or a majority of the said board, are hereby authorized to grant such permission, in their discretion,

under such conditions as they may prescribe, upon application, made in writing, for such purpose; Provided, further, That said board is hereby authorized at any time to repeal by resolution any action theretofore taken by them under the provisions of this act."

Sec. 9404c. (Sec. 6) "Hereafter it shall be the duty of every person residing north of parallel forty-four of north latitude, before setting fire for any of the above mentioned purposes, to serve a notice in writing on every resident owner or occupant of lands or grounds immediately adjoining the tract upon which such fires are to be set, at least one full day previous to the setting of such fires, personally, or by leaving the same at the residence of such adjoining owner or occupant, in the presence of some member of the family of suitable age and discretion, who shall be informed of the contents, and neglecting to give such notice, shall be deemed prima facie evidence of negligence on the part of the person so offending."

The laws passed in 1857 in regard to trespassers on the public lands are still in force. They are found in sections 9405 to 9414 of Howell's Annotated Statutes. These sections declare it to be a felony to knowingly enter upon any of the public lands of this State to cut down or destroy trees growing thereon. If the value of the trees so cut down exceeds twenty-five dollars, the maximum penalty is fixed at five years' imprisonment at hard labor in the State Prison, or by fine not less than one hundred nor more than two thousand dollars. Whoever shall take away any timber or lumber from the State lands is deemed guilty of a felony, and upon conviction, is fined not less than a hundred nor more than two thousand dollars, and is also liable to imprisonment for not less than three nor more than twelve months, or imprisonment alone for not more than five years. If the value of the trees cut down or destroyed be less than twenty-five dollars, the punishment is fixed and may be either imprisonment not less than three months nor more than a year, or fine of not less than fifty nor more than one hundred dollars and imprisonment for a period not to exceed three months.

Whenever timber upon the public lands has been destroyed the prosecution of the supposed offender is begun by preliminary examination, had within the county where the alleged offense was committed. When the accused person is held for trial upon such preliminary examination, the subsequent proceedings may take place either in the county where the offense was committed or in some other county to which the venue is changed by the circuit court.

The law further provides that if any owner of a sawmill or his agent receives and saws logs knowing them to have been stolen from the public domain he shall be deemed guilty of a felony, and shall receive the same punishment as would have been inflicted had he been the original timber thief.

It is the duty of the prosecuting attorney of the county to promptly report to the Commissioner of the State Land Office all trespasses committed upon public lands in his county which may come to his knowledge, and it is his further duty when directed by the Commissioner both to prosecute all actions for trespass or injury to the public lands and to advise the Commissioner and give opinions upon all questions of law which the Commissioner may submit to him.

It is evident that the Michigan forests are not unprotected for lack of legislation. Existing statutes provide means both for preventing depre-

dations upon the public domain and for employing the inhabitants of the vicinity in suppressing forest fires. If the public lands are defenseless that condition arises rather from lack of enforcement of the law than from want of legislation. What is wanted in the communities surrounding the public lands is a public spirit which will convict offenders when found guilty, and will aid in the prevention of crimes against the public by making such offenders unpopular and retribution certain. One would hesitate long before recommending that the enforcement of the law be placed in the hands of State agents rather than local officers were it not that the experience of forestry management both in this State and elsewhere had demonstrated the necessity of such a course. The difficulty of enforcing a law for the protection of public property is too great to be left in the hands of local officers who have every temptation to favor the trespassers.

In other states.—The Division of Forestry of the United States Department of Agriculture, has brought together in circulars No. 13 and 17, the recent legislation on state forestry commissions and forest reserves.

The legislature of the state of New York passed in 1897 an act to provide for the acquisition of land in the territory embraced in the Adirondack Park and making an appropriation therefor. By the first section of the act the Governor of the state was directed to appoint from the Commissioners of Fisheries, Game and Forests, and the Commissioner of the State Land Office, three persons to constitute a board which is known as the Forest Preserve Board, the members of which receive no compensation except their actual and necessary expenses. The duties of the board relate to the acquisition for the state by purchase or otherwise, of such of the lands and waters embraced in the Adirondack Park as it may deem advisable for the interest of the state. The state is securing title to a large body of land already covered with timber and located at the head waters of its principal rivers. A portion of this land has been lumbered, it is true, but it is still well covered with young and growing timber.

Beginning on page 1 of chapter No. 17 of the United States Division of Forestry, there is the following epitome of the New York forestry law:

"The original forest commission of the state of New York appointed under the act of May 15, 1885, was superseded in 1895 by the Commission of Fisheries, Game and Forests, under the law of April 25, 1895. This law is a comprehensive measure in which allied interests are brought under the control of a single board. Under this law the commission consists of five members, appointed by the Governor, with the consent of the senate, the term of office being five years. The President, who is designated as such by the Governor, receives a salary of \$5,000 per year and traveling expenses, and devotes all of his time to the work of his office. The remaining four commissioners receive \$1,000 per year and traveling expenses. The board holds at least four meetings on designated days each year. It has a secretary at \$2,000 per year, and necessary clerical force. The duties of the board are to propagate and distribute food-fish and game; to enforce all laws for the protection of fish and game and for the protection and preservation of the forest reserve. It has full control of the Adirondack Park and forest reserve, and is authorized to make rules for its care and safety.

"The commission appoints thirty-five 'Fish and Game Protectors and Foresters' (hereafter called Foresters) one of whom to be known as chief,

and two others as his assistants, the chief to have the control and direction of the entire force. The Foresters give bonds for the proper discharge of their duties. The Chief Forester receive \$2,000 per year and traveling expenses; the assistant Foresters \$1,200 each, and the remaining Foresters \$500 each; all having an extra allowance for traveling expenses and each of them to receive one-half of all fines collected in actions brought upon information furnished by them. It is their duty to enforce all laws and regulations of the commission for the protection of fish and game and for the protection and preservation of the forest reserve and all rules and regulations for the care of the Adirondack Park. They have full power to execute all warrants and search warrants and to serve subpoenas."

"Article XII, chapter 395, laws of 1895, describes the forest preserve (Sec. 270), and defines the powers and duties of the commission (Sec. 271), whose duty it is (1) to have the care, custody, control, and superintendence of the forest preserve; (2) maintain, protect and promote the growth of the forest in the preserve; (3) have charge of the public interest of the state in regard to forests and tree planting, and especially with reference to forest fires in every part of the state; (4) possess all the powers relating to the preserve which were vested in the Commissioners of the Land Office and in the Comptroller on May 15, 1885; (5) prescribe rules and regulations affecting the whole or any part of the preserve 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 roads, streams, or water as the same may have been heretofore used, or may be reasonably required in the prosecution of any lawful business; (6) take measures, for the awakening of an interest in forestry in the schools, and imparting elementary instruction on such subjects therein, and issue tracts and circulars for the care of private woodlands, etc.; (7) print and post rules for the prevention and suppression of forest fires."

By a law passed in April, 1898, a College of Forestry was founded at the Cornell University. Thirty thousand acres of land in the Adirondack Park are set aside for the use of this college as an experimental area. An annual appropriation supplies the college with sufficient funds.

The Minnesota forestry law is modeled after the laws of New York and Maine. All of these laws entrust the enforcement to some responsible officer. The chief features of the Minnesota law follow:

The law is entitled "An act to provide for the preservation of forests of this state, and for the prevention and suppression of forest and prairie fires."

Section 1, enacts that the State Auditor shall be forest commissioner. The supervisors of towns, mayors of cities and presidents of village councils are constituted fire wardens of their respective localities, but the chief fire warden may appoint such other persons as he may deem necessary as fire wardens in unorganized territory.

The sections following provide that the forest commissioner shall appoint a competent deputy to be known as chief fire warden, who is to receive a salary of twelve hundred dollars per year. He is a trained forester and it is his duty to enforce the provisions of the law. He has general charge of the fire warden force of the state and can mass it at any special point to suppress fires. He can appoint, temporarily, needed fire wardens in cases of large fires and divides into fire districts all un-

organized territories of the state and appoints competent fire wardens therein. He investigates the extent of the forests, the amount and varieties of timber, the damages done to them from time to time by forest fires, the causes of such fires, the methods used to promote the regrowth of timber and any other important facts relating to forest interests which may be required by the forest commissioner. He makes an annual report including the information so gathered and his suggestions.

It is made the duty of all fire wardens to post in conspicuous places in their respective districts warning placards containing abstracts of the forest law, rules and regulations that accord therewith as promulgated by the forest commissioner who furnishes the placards.

During the dry season when fires are liable to occur, the chief fire warden is authorized to use such means as he may deem necessary to prevent or suppress such fires at the expense of the state, but his expenditures in one year are not to exceed five thousand dollars.

It is the duty of the fire warden to take precautions to prevent the starting of forest or prairie fires and, when fire threatens, to go to the place of danger, to call to his assistance able-bodied men, and if any such person refuses to assist, or if the fire warden himself neglects to perform the duties assigned him, such officer or person is deemed guilty of a misdemeanor and upon conviction is punished by a fine of not more than a hundred dollars or by imprisonment for three months.

The chief fire warden and the local fire wardens are given authority to arrest without warrant any person violating the provisions of the act and to take the offender before a magistrate and make complaint against him. It is made the duty of the fire wardens to inquire into the cause of each forest or prairie fire within their district and to report the same to the chief fire warden, with the method used to control such fires, the amount of property destroyed, the number of lives lost and such other facts as the chief fire warden may require.

The fire wardens receive for actual services two dollars per day, two-thirds of which is paid by the county and one-third by the state. The other employees receive one dollar and fifty cents per day. It is provided, however, that no fire warden shall be paid in any one year for more than ten days service in extinguishing or preventing forest or prairie fires, nor for more than five days' services in posting notices and making reports. No county shall expend more than five hundred dollars of public money in any one year under this act.

Any person who wilfully or carelessly causes to be set on fire any woods or prairies by means whereof the property of another is injured, is guilty of a misdemeanor and upon conviction is punished by a fine not exceeding a hundred dollars or by imprisonment not exceeding three months. If the act is malicious, destroying property and endangering life, the maximum fine is \$500 and the imprisonment ten years. Any person who shall either kindle a fire dangerously near the forest or prairie lands and leave it unquenched, or who shall use other than incombustible wads for fire arms or who shall carry a naked torch or exposed light in or dangerously near forest land, or who shall wilfully or heedlessly deface or remove any warning placard posted as required by the act, is liable either to a fine not exceeding a hundred dollars or to three months' imprisonment.

The railroad companies are required to use efficient spark arresters on all their engines and to keep their right of way, for fifty feet each side

of the center, clear of all combustible material, between the fifteenth day of April and the first day of December. Deposits of fire, live coals or hot ashes are forbidden in the immediate vicinity of woodlands, and trainmen are required to report fires discovered along the line at the next telegraph station they may pass. The railroad companies are required to instruct their employees in the means for preventing and extinguishing fires and to post the warning placards furnished by the forest commissioner in their stations in the vicinity of forest and prairie grass lands. "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."

The railroad company violating the requirements of the act is punished by a fine not exceeding a hundred dollars for each offense, the railroad employee violating the law is deemed guilty of a misdemeanor and is punished by a fine of not less than five dollars nor more than fifty.

It is made the duty of every owner of a threshing or portable steam engine to use efficient spark arresters and to put out or cover with three inches of earth any live coals or ashes which they shall deposit in any place from the engine.

The Forest Commissioner is required to make a written report to the Governor of his proceedings under this act annually, which report shall include such statistics and facts as he has obtained from the chief fire warden and other sources, with suggestions for the preservation of forests and the prevention and extinguishment of forest and prairie fires.

In the legislative session of 1897, in Minnesota, an important bill was introduced, passing the house but failing in the senate. Its purpose was to encourage the growing and preservation of forests and forest reserve areas. Among the novel features of the bill was a section providing that any person or corporation being the owner of any tract of land partly cut over or entirely so, which, however, would not probably be utilized for agricultural purposes for many years, might deed the same to the State of Minnesota, if in the judgment of the State Forestry Board the land should be received for forestry purposes. Lands deemed necessary for the preservation of water courses are specially mentioned in the act as tracts to be thus accepted. Provision was made for the distribution of the revenues accruing from such land, two-thirds to be paid to such public educational institution as the grantor in the deed might designate.

The Wisconsin law is similar in general character to the Minnesota law, except that the chief clerk of the State Land Office and his deputy are made State Forest Warden and Deputy Forest Warden, respectively, without additional salary.

The Maine laws make the State Land Agent the Forest Commissioner. The selectmen of towns are made fire wardens. Anyone who neglects to extinguish a camp fire is liable to a fine not exceeding \$100, or imprisonment in the county jail one month, or both. Railroad companies are required to burn or cut and remove all grass and debris from the right of way once a year, to use spark arresters on their locomotives, to refrain from depositing live coals, fire or ashes on their track, and to report fires along the right of way at their next telegraph station.

The Forest Commissioner encourages interest in forestry in the public schools and publishes circulars of information as to the care of woodlands.

Pennsylvania has a law, passed in 1895, and approved by the Governor, March 13, of that year, creating a Department of Agriculture, and charging it with the duty of caring for the forestry interests of the state. Section 3, of the law reads as follows:

Sec. 3. "That it shall be the duty of the Secretary to obtain and publish information respecting the extent and condition of the 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 woodland and starting new plantations. He shall also, as far as practicable, procure statistics of the amount of timber cut during each year, the purposes 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, and shall have direct charge and control of the management of all forest lands belonging to the commonwealth, subject to the provisions of the law relative thereto."

The legislature of 1897 passed several additional acts, making the constables of townships *ex officio* fire wardens and authorizing them without a warrant to arrest persons reasonably suspected by them of offending against the laws protecting timber lands. The owner of any land in that state having on it forest or timber trees, not less than fifty trees to the acre, measuring at least eight inches in diameter six feet above the ground, with no portion of the land clear, shall receive a rebate of 80 per cent of the taxes assessed and paid upon such land as long as the trees are maintained in sound condition. Such rebate shall not exceed forty-five cents per acre.

It is made the duty of the Commissioner of Forestry to examine the location and character of lands advertised for sale for non-payment of taxes, and if he finds them so located and of such a character as to make them desirable for the purpose of a forestry reservation, he may purchase them at the tax sales, subject of course, to right of redemption, to become part of a forestry reservation system, having in view the preservation of the water supply at the sources of the rivers of the state and the protection of the people of the commonwealth and their property from destructive floods.

By the same legislature a commission was created to be composed of the Commissioner of Forestry, the Chairman of the State Board of Health, the Deputy Secretary of Internal Affairs, a lawyer or conveyancer of ten years' professional experience, and a practical surveyor. The duty of this commission is to locate and report to the legislature three forestry reservations selected from lands suited to the growth of trees rather than to mining or agriculture, and with an average altitude of not less than six hundred feet above the sea level. Each of these reservations is to consist of not less than forty thousand acres. One reservation is to be located upon the head waters of the Delaware river, another upon the head waters of the Susquehanna and the third upon those of the Ohio.

Upon several points the legislation, in the states adjacent to Michigan, seems to be in substantial accord. In each of them a state forest park of broad area has been reserved and is to be maintained. These forest tracts subserve several purposes, they are the laboratories in which ex-

periments aimed at the solution of forestry problems are tried; they are the equipment for forestry instruction to the people of the State who, unfortunately, are grossly ignorant of the fundamental principles of the sciences relating to tree growing; they are broad enough to conserve the moisture at the head waters of the rivers and allow it to percolate slowly through the soil, keeping up the flow of the rivers during periods of drought, and finally each is the nucleus about which shall spread larger forests, owned either by the State or by private individuals.

In the second place, the enforcement of laws against forest fires and for the protection of forests generally is placed in the hands of a trained and well organized department. The chief officer is either elected or appointed solely as a commissioner of forestry, devoting his whole time to the work, or the duties of some existing state official are enlarged to include the enforcement of the law, and a sufficient number of trained assistants are provided. It is evident that until the public conscience is awakened to the enormity of the crime of starting forest fires and the public intelligence is aroused to comprehend the financial losses which they entail, it is impossible to so far enforce the best laws as to control or prevent devastating conflagration. The efficacy of legislation depends largely upon supporting public opinion. It is made the duty of the forest commissioner, therefore, to educate public opinion through the public schools and by means of special circulars and reports.

MICHIGAN FORESTRY

SOME QUESTIONS ANSWERED

CONNECTED WITH

A VITAL SUBJECT

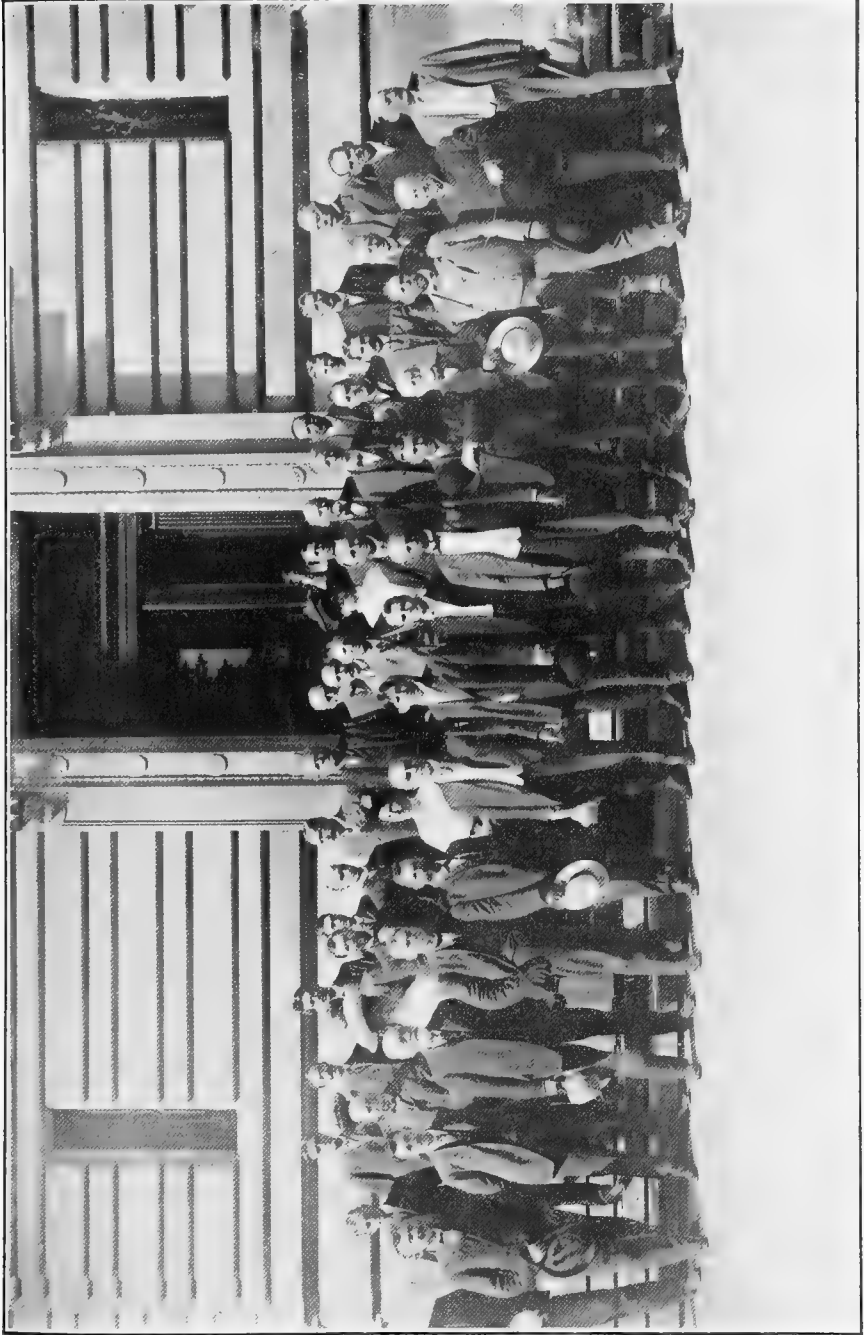
MICHIGAN FORESTRY COMMISSION:

CHARLES W. GARFIELD, Grand Rapids

ARTHUR HILL, Saginaw

WM. H. ROSE, Lansing

FILIBERT ROTH, Warden, Ann Arbor



Some of the people who organized the Michigan Forestry Association at Grand Rapids, August 30, 1905.—Photographed at entrance to Ryerson Library.

A FOREWORD.

The great demand for forest literature has led the Michigan Forestry Commission to make this reprint of certain important contributions to the last report to the governor, the supply of the formal reports required by statute having been exhausted. The papers selected for this brief compilation are placed here as a result of a large correspondence involving a great many interrogations with regard to the details of forestry in our state. The papers incorporated in this pamphlet will answer a good many of these questions and we have taken the liberty to add some new matter which will give important facts brought to the front under the suggestion of the newly organized Michigan Forestry Association. The Forestry Commission has drawn quite heavily upon the resources of its Forest Warden, Prof. Filibert Roth, in putting together the forest contributions to this little volume.

We desire to make our small appropriation go as far as possible in meeting the demands upon our resources, and we respectfully ask any person who shall be fortunate enough to be a recipient of this pamphlet, to pass it on and enable it to reach as many inquiring people as possible.

THE MICHIGAN FORESTRY COMMISSION.

BETTER LATE THAN NEVER.

BY E. W. BARBER, JACKSON, MICH.

After an agitation and discussion that has lasted something over a quarter of a century, the organization of a Michigan Forestry Association seems like the beginning of the end. Reading history and the study of economic questions lead me to believe that saving the forest cover of at least one-third of the area of all the counties in Southern Michigan was essential to the present and future welfare of the best agricultural portion of our state. But reason and argument have had little or no weight. At last the forestry movement has received an impetus for an economic necessity. Better late than never, of course, but it would have been much easier to have saved a due proportion of our wooded area and made it of permanent commercial value, than it is to restore the forests that are needed to render the arable lands more productive and capable of supporting the larger interests of a dwindling population. It was easier to make the state than it will be to save it. It will be sixty-six years in October since my father's family and I came to Michigan, and during this average lifetime of two generations of humanity that the state has been my home, nearly all of the land, as there were only scattered settlements in the interior of the peninsula, has been denuded of its magnificent forests. Many a single tree is now worth more in the market than an acre of soil that might be tilled, but too many of the acres were denuded. It is hoped that the educative efforts of the Michigan Forestry Association will inspire our people to begin in every town to set out forest trees upon lands that have already ceased to be valuable for cultivation, and restore to the state something of its former sylvan beauty and splendor. There is no state which presents a more beautiful outlook and invites intelligent effort with greater certainty of ample reward for forest restoration, than does Michigan. Please have my name enrolled as a charter member of the Michigan Forestry Association. All of the words in favor of the forestry movement thus beginning have not been used up. Michigan's greatest problem, organized effort alone can solve.

THE GREATEST ENEMY OF THE FOREST RESERVE.—FIRE.

BY ARTHUR HILL, SAGINAW.

Among the most vivid recollections of my early boyhood are those of certain days when the smoke from the burning forests about Saginaw was so dense that children living in the outskirts lost their way in coming to and going from school. We boys played hide-and-seek during school recess and could stand in the open not more than sixty feet apart yet not be recognizable.

Wild animals were driven by the fierce pursuing flames into the clearings and even into the very heart of the town where I saw a fine black bear treed and captured by Mr. Thomas Merrill whose courage and resolution filled my heart with an admiration, which in his ninetieth year, with his noble life and sturdy bearing, he still commands.

Immense conflagrations followed in 1871 and 1881 overrunning vast regions of the state with such destruction of life and property as to evoke the charity of the state and the nation.

These fires originated in and were mainly confined to the pine bearing areas, spreading either in the standing timber or over the debris left by our lumbermen.

Today with our pine forests gone and the old slashings generally burned over again and again, consuming the combustible material, the fire perils of these earlier days no longer seriously threaten us. The larger proportion of the territory which bore pine is now devoted to agriculture and this will be greatly increased.

It is now the aim and end of the State Forestry Commission, acting in obedience to a great and enlightened public demand to bring about a renewal of the forest growth over areas unfitted for profitable farming, and if forest fires can be prevented or controlled, this result can be easily obtained. There are scarcely any of our northern pine plains that will not produce timber of some variety and value. Experiments now being made will determine the varieties best suited to soil, climate conditions and ultimate benefit and money profit.

When plantings are made fine lanes can be established and there can be alternations or bands of coniferous and deciduous trees to diminish the fire risk.

When the timber is self seeding in pine, as in the case with the greater portion of the reserve, these fire lanes must be established and outlined with a double line of plowed furrows, each year burned between.

With these preparations and proper diligence on the part of the fire wardens the fire danger would be small, except for the gross carelessness of those who most enjoy the varied pleasures which the forest yields.

The hunter, the camper, the fisherman, the berry picker, build fires, which they wantonly permit to spread over the country before their eyes on their mission of destruction.

Camp fires unextinguished, burning smudges, carelessly thrown cigar stubs, are the cause of hundreds of forest fires each one preventable—unnecessary—criminal, because the property of another is destroyed.

All this in disobedience of present laws and until these laws are respected the fire hazard is great and the cost of the fire patrol proportional thereto.

Rather than rely too strongly upon the enforcement of the laws we must arouse in our people a sense of responsibility for their acts. For reasons which go back into our early history forest ownership has never had the general respect and sanctity that was accorded improved property. A citizen who sitting on a jury would send a man to prison for burning a \$200 building, lightly and without conscience fires and destroys \$2,000 worth of standing timber.

But when a state or individual is growing or virtually creating a forest, the sentiment of exclusive ownership and right to protection is bound sooner or later to be awakened, and the main obstacle to forest propagation removed.

Meantime, through the ever helpful press as our best ally, and the aid of the many friends who are upholding our hands let us have the

despoil the state of her beauty and her wealth, and to those who are shameless we can only mete out the measure that the law provides.

FIGHTING FOREST FIRES.

BY PROF. FILIBERT ROTH.

The great power of proper moral conceptions has been recognized since the beginning of man's social and political life. It is the proper moral conception of the "mine and thine" which, far more than all written law, keeps ninety-nine per cent of our people from interfering with their neighbor's property, and it is the moral conceptions of the people which make and unmake law, enforce law or make the written word a "dead letter." One of the most striking illustrations of this is found in the moral conception and consequently in the legal attitude of the people of the United States toward the forest as a property.

Centuries of experience have gradually established among the people of Central Europe a proper moral conception with regard to the forest. It has taught them to look upon and to treat the forest like the farmer's home, his buildings or his crops, to provide in their laws for the protection of the forest as for his other property against injury and theft, but above all against that arch enemy of the present, the forest fire.

When the pilgrim with the severe, clear-cut moral conceptions of his former home came to the shores of this country he found the forest not as a property of great value, carefully parcelled out among its many owners, but he found it a serious obstacle to progress, a cumbrance on the land to be fought with axe and fire before the soil could yield the crops he needed most. In spite of the warnings of thoughtful men the moral conception with regard to the forest as a property changed, the few regulations which were passed remained a dead letter and the forest was fought with fire and axe.

This change in moral conception or rather this perversion continued and grew. It is this lamentable perversion which finds expression in the firing of hundreds of thousands of acres of forest in the south to "start new feed," in the incendiary's wanton burning of the abandoned camps, farmsteads of Michigan pineries, in the periodic devastation of the sandy pineries districts of New Jersey and New England, in the burning of our farmers' woodlots by the young nimrod. It is this same perversion which makes forestry today seem an impossible task even to the most enterprising of lumbermen. "Why, it would take an army of men to protect my lands" is the usual reply of men who speak from abundance of experience. Naturally enough, the perversion of conception is greater in the district where most of the land is burned over stump waste and sells at less than \$1 per acre than in a district where land is worth \$50 per acre, is all settled and 75 per cent of it is improved. For this reason it is to be expected that the right sentiment, the re-establishment of right conceptions and their enforcements must come from the district where the value of the forest is recognized. As long as Massachusetts, New Jersey or Wisconsin leave the lands of their pineries to the few local people, toiling and battling with no end of difficulties, so long will progress in the right direction be slow, for even the best of senti-

ment and the best of law must fail, if but for reason of poverty alone. We might as well expect a few pioneer settlers to build macadam roads as to inaugurate a proper system of forest protection.

Abundance of timber and vast opportunities in many directions prevented an early change in sentiment for the better. Although earnest agitation in favor of forest protection and preservation began as early as the sixties, we have still some states in which one man suffers imprisonment for stealing \$5, while another goes unpunished although guilty of destroying thousands of dollars' worth of timber by fire. And, strange as it may seem, we have even had the governor of one of our states veto a bill for forest protection on the plea that he did not believe in the state spending money to protect the property of private persons or corporations. And yet what do these people pay taxes for if it is not primarily to get protection?

Perhaps more as a matter of legal learning than of appreciation of the forest, laws have been introduced in most states of the Union forbidding the setting of forest fires; but even here we see the difference of opinion and appreciation. In Minnesota the malicious setting of forests fires is punishable by ten years in the penitentiary; in Wyoming by thirty days in jail.

In keeping with the slow change in sentiment the forest fire laws of all of our states have remained a dead letter. In spite of the losses amounting to hundreds of millions of dollars; in spite of catastrophies like the Hinckley, the Phestigo and our Michigan forest fires, where hundreds of homes were destroyed and hundreds of lives were sacrificed, there is not a single state in the Union which has ever risen to the occasion and attempted with a will to prevent a recurrence of these disasters or to provide for the proper protection of forest property. If, during a strike, a factory, a mine or a few thousand dollars' worth of property are in jeopardy, the sheriff is expected to call out help, and even the state is expected to respond by sending troops at great expense to protect this property. But here in our state, in Wisconsin, in Minnesota and other states we have hundreds of thousands of such properties in the form of forests attacked by a far more serious enemy, an enemy too certain to come regularly and properly announced by dry weather and definite seasons, and yet did any state ever call out its troops to guard against or to fight this enemy; to protect these properties; to give these taxpayers anything for the millions of dollars which they have paid into the coffers of town, county and state? No. Up to 1903 the state of Michigan never spent one cent providing for the protection of its second greatest property. Only eighteen out of the forty-five states of our Union have any system of protection against forest fires. In a few it is left as an indefinite duty to the sheriffs, in others to the game wardens; in a few it is made the duty of those poor overworked and underpaid officers, the town supervisors; in others it is an affair of the town constables, while only in a few states there exists a definite system of fire wardens with a central head and a regulated, although altogether insufficient, appropriation for doing the work.

In our own state a man receiving a yearly salary of \$500 is supposed to direct the work of the fire wardens (town supervisors and extras, since one is to be appointed for each surveyed township). This chief fire warden is to prepare instructions for, inspect, direct and help in a work where today there is need for active effort of 2,000 men, while tomorrow a good rain may reduce the danger to a point where 100 men can do all that is needed. Experience, energy, administrative capacity to direct 800 men and more and full understanding of the country and the woods—all this the state supposes to get for \$500 a year!

The supervisor, normally a farmer and a man who has enough to do of other work, is expected to be on the lookout for fires. But he gets no pay unless actually at work fighting fires, so he must not travel around and prevent fires, but must wait until he sees one or someone tells him of a fire. Then he calls out all the help he can get to fight the fire, but he must be careful not to do too much, for he must not spend more than the magnificent sum of \$50 in a whole year no matter what sort of fire he faces. But some of these fires require considerable effort. Suppose a captain of a fire company was told not to spend over \$25 on any one building in case of fire. The absurd results require no picture, and yet is it not fully as absurd to stop the fighting of a fire which may readily destroy \$100,000 worth of timber because there is a clause limiting the man to \$50? Similarly every citizen is obliged, under penalty, to help fight. But suppose \$48 worth of fighting has been done, is it not taking the man's labor without compensation to ask that he continue fighting when he knows he gets no pay? Two-thirds of this pay comes out of the town, that poor, forlorn town, the very concern least able to pay; most likely a town in which the state owns three-fourths of all the land and refuses to pay any taxes at all. The results are what we see everywhere. The local fire warden never sees his superior, the relation is one of the usual "reports" affair, the warden is discouraged, the people see the uselessness of the thing. They are disgusted with slow pay or no pay and, what is far worse, that it does not stop the fires. For, after all, a forest fire once under way is an affair not readily overrated. The fire which, if taken in time can be beaten out with a green branch, needs only a few hours or few days to form a line of battle several miles in length, and if fanned by a strong wind readily puts all direct efforts at extinguishment to shame. Then we are usually told two things: "You can not stop them" and "The fires did no harm," both equally absurd, especially in our state.

That we might learn something from the people who have fought forest fires for a thousand years; that we might try their methods and spend our money in preventive effort, in effective patrol of all forest districts, this does not seem to have occurred to anyone as yet. Strange as it may seem, there is as yet not a single state where a state forest fire patrol, permanent or temporary, exists, and while some European states have succeeded in reducing the yearly fire damage in pineries to a burn of one acre in 15,000 (i. e., to 1-15 per mile), we allow millions of dollars' worth of property to be burned up without as much as an effort to save it.

Forestry we need and must have if we are to use the resources of our state and our country. But forestry and fire go together as water and fire, the two cannot exist together. As long as the country at large is subject to regular yearly firing no person cares to invest money in forestry. Private enterprise, after all the chief force in our development, can not engage in forestry until some protection is afforded to the forest. What form this should take ought to be one of the subjects of discussion of the Michigan Forestry Association as a matter of vital importance to this State. It also should be a matter of consideration from the Legislature at its next session, for surely it ought to be clear to anyone that here in Michigan at least the right sentiment, the right moral conception has returned with most people, that forest interests are the states' interests, the interest of statesmen and press, and that it is good politics as well as good journalism to help this important branch of agriculture and thereby save millions of dollars every year to our state in

direct growth and by indirect benefits through our special industries and general industrial life of our commonwealth.

WOODLOT FORESTRY.

BY DR. JUDSON F. CLARK, BUREAU OF FORESTRY, WASHINGTON, D. C.

The discovery of silvicultural characteristics of our American forest trees, together with the dissemination of this knowledge among the owners of woodlands for practical purposes, has long been the most important feature of the work of the National Bureau of Forestry. During the last five years a special effort has been made to reach and solve the problems of the farmer. This effort has been induced because of a general lack of information on the part of the farmers in the management of woodlands and the increasing importance of the product of the woodlot.

Few appreciate the importance of the farmer's woodlot in the national economy. To emphasize this point, I shall quote a few statistics from the twelfth census (1900). The average farm in the United States contains 147 acres, of which seventy-two are recorded as "improved" and seventy-four "unimproved." This "unimproved" area of American farms foots up the enormous total of 426,000,000 acres. The unimproved areas consist of woodlands, treeless swamps and barren lands. A very conservative estimate of the amount of unimproved lands in the United States capable of producing timber is 300,000,000 acres. A vast empire of actual and potential woodlots! The value of the total product of the lumber camps of the United States (including logs, bark for tanning, charcoal, rived shingles, ships' knees, posts, ties and all other products of the lumber camp) was, in 1899, \$174,000,000. The value of the products of the woodlots of the United States (including "only the wood, lumber, ties, etc., which the farmers cut in connection with their ordinary farming operations,") and not including maple syrup or sugar, was \$110,000,000. In other words, in 1899, the farmers' woodlots of the country produced an amount very nearly equal to two-thirds of the value of the product of the regular lumber industry as it was delivered at the mills.

Not only is the present product of the woodlot of very great economic importance, but it will certainly be increasingly so as the natural supplies of virgin timber disappear. The following statistics from the twelfth census illustrate the increasing importance of the woodlot as development progresses in the different states:

TOTAL VALUE OF PRODUCT.

	Of Lumber Camps.	Of Woodlots.
Washington.....	\$11,332,000	\$1,002,000
Wisconsin.....	18,112,000	6,116,000
Michigan.....	20,462,000	7,530,000
Indiana.....	4,058,000	5,235,000
Ohio.....	4,384,000	5,625,000
New York.....	4,364,000	7,671,000
Connecticut.....	493,000	1,276,000

Washington represents the newest type. Its lumber camp product exceeds that of its woodlots in the ratio of 11 to 1. Michigan has an intermediate position, having a proportion of about 2.8 to 1. New York has the balance turned the other way, and in the proportion of 1 to 1.8, and Connecticut, where lumbering as a business has become very much reduced, has the proportion of 1 to 2.6 in favor of the woodlots.

It is only fair to add, however, that the product of the woodlot is used largely, though by no means wholly, in an unmanufactured or slightly manufactured form (cordwood, railway ties, posts, etc.), while the product of the lumber camps is in a much larger degree the raw material for a vast series of manufactures. It is also worthy of note in this connection that the farmer is usually his own logger. This work is done at a time of year when there is little else to do, and in many cases the entire amount received for the product may be regarded as clear gain to be credited to the woodlot. The lumberman on the other hand, must build his camps, purchase his horses, camp supplies, tools, etc., and especially employ labor, the cost of all which must be deducted from the sale value of his product in determining his profit. The census returns show the value of the stumpage of the cut of \$174,000,000 worth of product by the lumbermen during the census year to have been \$58,177,000. It is not improbable that the farmers' cut of \$110,000,000 represents as large a real stumpage value.

The value of the woodlot as a national asset can hardly be overestimated, and it should in future, with improved methods of management, ever contribute an increasing amount of material for general consumption. In several respects it has distinct advantages over the timber tract. Among these may be mentioned its nearness to the points of consumption, together with the practicability of an intensity of management that can hardly be hoped for on the larger areas, and which is only in part offset by the cheapness of the wild land.

The value of the woodlot as a source of fuel has recently been brought very prominently to the notice of the public generally by realization that it is the only buffer that stands between the people and the higher prices which the coal combine may ask the moment they have the field to themselves. The people have also a fresh recollection of the fact that the woodlot is the only thing that stands between them and actual suffering by cold in the event of a coal strike. The cities and villages are more interested in this matter than the farmers themselves, for if a farmer has only a small supply of wood, he will naturally provide for the comfort of his own family before he offers any for sale. A consideration of this should lead the urban population to heartily support a moderate and equitable tax rate for the farmers' woodlots.

This article, however, is intended to refer especially to the woodlot conditions as I have found them in Michigan. It is perhaps hardly necessary to say that these conditions are exceedingly unsatisfactory. A very few farmers, indeed, have made any real effort to improve this portion of their farms, and those who have done so have in many cases made very serious mistakes. Such mistakes were inevitable, for the farmers have not had access to information regarding correct methods of handling woodlands. The necessity itself for better methods is a comparatively recent development. The average Michigan farmer of today well remembers when the trees were regarded as the natural enemies of the tiller of the soil, and their removal was the farmers' greatest labor. The change in the times has come without bringing the knowledge necessary to meet the changed conditions. It is a most unfortu-

nate fact that knowledge of correct methods of woodland management cannot be learned experimentally by the average farmer, as is the case to a greater or less extent with almost all other farming operations. Time element alone makes this a practical impossibility—years and even decades being often required for a demonstration, instead of days or weeks. Aside from this, few if any, farmers have had the requisite training to enable them to carry out any really careful forestry investigation. The result has been that in the absence of instruction almost every effort for improvement has been merely guesswork, while the great majority of farmers have not interested themselves in the matter.

The average Michigan farm contains about eighty-six acres. Of this area fifty-eight acres are recorded as improved and twenty-eight acres as unimproved. It is probable that three acres per farm would on the average be a liberal reduction from the unimproved land for such waste areas as are unsuited for tree growth. This leaves an area of twenty-five acres which is at present occupied by trees or capable of being so occupied. This gives a woodlot area of over 5,000,000 acres on the 210,000 farms of the state. As already suggested, it is sadly true that the term "unimproved" is not inaptly applied to these 5,000,000 acres, for there is nearly or quite one-half of this area, which, in its present condition, is all but wholly unproductive, and on the remaining portion, as already indicated, there has been but little effort expended that would entitle any considerable portion to be classed as "improved."

The value of the woodlot product of Michigan has already been referred to as amounting to \$7,530,000 in 1899—a sum which compares favorably with the combined products of the orchard, graperies and small fruit garden, which in the same year totaled \$5,860,000 for the state. When we recall that about one-half of the unimproved area of the farms is at present all but wholly unproductive, it will be seen that the producing area has yielded about \$3.00 per acre to the woodlot owners in 1899. Michigan enjoys the distinction of having a larger return acre for acre from her woodlots than any other state in the union. Were this assuredly a *bona fide* income, it would be a matter for congratulation. That it is largely the result of the stripping of the land at an unusually rapid rate is evidenced by the very unsatisfactory conditions for wood production obtaining on the average woodlot, and by the rapidity with which the woodlots are disappearing in the four southern tiers of counties.

This view of the importance of the woodlot as the producer of future timber supplies and as a very considerable source of income to a very large class of the population of the country has induced the Bureau of Forestry to offer to cooperate with the farmers owning woodlands in their management.* On application, the bureau offers to send a trained forester to make a careful examination on the ground of the woodlot. It is the duty of the forester to point out the defects of the woodlot and their cause, and how they may be most quickly and economically remedied; to mark sample areas, showing which trees should be removed where removal is desirable, and where planting is desirable or desired; to advise regarding the species best suited to the soil and the locality. It is also customary for the forester to prepare a detailed report on the conditions found, with notes on their treatment. A copy of this report—which usually indicates the management for about ten years—is afterwards sent to the farmer for his future guidance. This service is free to all, but the

*Applications should be sent to Thomas H. Sherrard, Chief of Division of Forest Management, Bureau of Forestry, Washington, D. C.

bureau reserves the right to accept or decline applications, as may be deemed wise, with due regard to the objects for which the offer is made, and the limitations of the funds at their disposal for this work.

It is hoped that by this means it will eventually be possible to have in every county, and perhaps in every township, at least one woodlot which will be handled in a correct way, and which will thus serve as an object lesson to the farmers in its vicinity of the practicability of woodlot forestry. A report on a woodlot examined by the writer in St. Joseph county during the spring of 1904 is given in Michigan Forestry Report 1903-4, that those interested may have a clearer idea of the scope of the woodlot work carried on by the government, and that all who read may get a forester's opinion of a very common type of woodlot in southern Michigan.

THE DUTY OF MICHIGAN.

BY CHAS. W. GARFIELD.

The immediate duty of the state of Michigan in connection with its land holdings, it occurs to me, is to put this whole matter upon a business basis, that is: the same basis a business man would use in handling a like area of real estate as an investment. Michigan is not so desirous of securing immigrants as to offer such extraordinary inducements as has been the case for years, to get them to settle upon Michigan lands. Michigan does welcome within her borders thrifty people who may be poor, but who desire to work out a livelihood in a legitimate way. It can afford to make such men inducements as to the method of payment in its land offers.

Michigan is not land poor. It is not obliged to dispose of its holdings at a sacrifice in order to throw the responsibility of taxation on the shoulders of would-be purchasers with a total disregard of their character or ability to get on in the world. The state has this immense area of lands that has come into its hands for delinquent taxes. A business man under like circumstances, would very carefully size up the situation put a fair price upon the lands it seemed desirable to dispose of for the sake of getting thrifty settlers, then utilize the remainder of the holdings in such a manner as to make them, as rapidly as possible, grow more valuable. This sorting process our state has never done.

The state of Wisconsin, with an immense area of lands in a similar condition, has entered upon the sorting plan, with the idea of disposing of the lands valuable for agricultural purposes to the farmer, and retaining the thinner lands, not adapted to successful agriculture, to grow upon them forests for the benefit of the state, and incidentally for the benefit of every inhabitant of the state. This is a valuable step in progress, and one that Michigan could well afford to take. It should retain vast holdings of lands (unsuited to agriculture) forever, and grow upon these lands forests, having in view the maintenance of a diversity of industries supported by forest crops. This is a philosophical way for the state to treat its landed investment. This plan recognizes forestry as a branch of agriculture and has in view the maintenance of the largest possible power of production from the land; and it also recognizes the principle of mixed husbandry as a most important one in connection with agriculture.

It is a mistaken policy on the part of the state to seek its development by striving to have every acre of its land under cultivation for the production of ordinary agricultural crops. An immense line of industries of vast importance to the state are supported by the productions of the forest. Individuals will not undertake to grow forests, having in view the support of these industries. The state, because it goes on forever, can enter upon this project with every promise of success in the interest of its larger development. My contention then, is, that the state, in handling its vast area of lands, shall attack the problem of the wisest method of handling them in a business way, and that it shall recognize forestry as an intrinsic factor in its agriculture and shall undertake to supplement the activities of the individual with a forest policy that shall make the poorest and least valuable lands of great value in promoting its future prosperity.

To this end it is of the utmost importance that the state shall immediately take hold of the training of experts in forestry in the same business-like way it has under solution the problem of educating its husbandmen. In its university and college instruction; in the development of its great common school interests, the importance of this line of education should never be lost to the sight. In the future economy of the state the tree will be as important a factor as the grain or the fruit, and an educated husbandry which shall maintain the high character and standing of Michigan agriculture must include a proper training of the forester.

THE AESTHETIC VALUE OF WOODED AREAS IN MICHIGAN.

BY OSSIAN C. SIMONDS, CHICAGO, ILLINOIS.

To appreciate, one has but to compare the coast of Michigan, where some forests have been left, with the barren looking shores of Spain or Italy, or the beautiful country extending from Niles to Ypsilanti, with the treeless region of Dakota. After riding through some of the barren regions of the west, one becomes hungry for such forests as he can see in Michigan. He wishes to look at the beeches, maples, lindens, oaks, ashes, butternuts, black walnuts, hickories, cherries, redbuds, dogwoods, larches, pines, hemlocks and cedars, with which those who live in the peninsular state are so familiar. It is not alone the climate that causes thousands of people, each year, to seek Michigan as a summer home. They value the beautiful trees, as well as the pure air and agreeable temperature.

In the older portion of Michigan the forests, which have been allowed to remain, have become more beautiful during the last twenty or thirty years because their borders have become clothed to the ground with foliage. As one goes through the state, observing these forests, he sees, as a background, the larger native trees, and against them shrubs and trees of a lower growth. Frequently there will be an oak forest, with leaves of a rich dark green, against which may be seen a growth of sassafras, hazel bushes, sumachs or elderberries. Again, one will be delighted with a growth of beech trees, with low spreading branches, and clean, strong-looking trunks. Or he will pass a stream, standing beside which the white bark of the sycamore will call his attention. Early in the year he may exclaim with delight as he passes a large group of wild crab-apples, a colony of thorn-apples, a border of Judas trees,

the snow-like flowers of the Juneberry, or a flowering dogwood in full bloom. One can hardly appreciate the beauty of the newly budded oaks, with colors ranging from deep red to white. In autumn, when passing through a maple grove, with its gorgeous coloring, one instinctively uncovers his head, as he would in a cathedral. If one has no book, and wishes to relieve a time of waiting, let him but think of the brilliant October foliage he has seen in northern Michigan, of the birches, with their white trunks and yellow leaves; of hillsides covered with scarlet sumachs; of the oaks, with their rich reds and browns; of the maples, with their well-known tints, and imagine these bright colors as they would appear against the dark background of an evergreen forest.

It is not alone the eyes that are rested and delighted with the beauty of our forests. Who does not remember the refreshing fragrance of our pines, spruces, balsams, hemlocks and cedars? One often longs for good, deep breaths from an evergreen forest as he would for a bite from a Jonathan apple and he cannot be insensible to the lindens when in bloom, to the spiciness of the sassafras, or to the blossoms of the thorns and the crab apples. It is not merely the timber, grain, fruit, hay or vegetables which a tract of land produces that make it valuable. The beauty of a region often adds more to the value of the land than its productiveness, and the forest is an important element of this beauty. A piece of woods may add materially to the selling price of a farm. There are cases where tree-covered areas, in combination with water views and hills and valleys, give to land many times the value it would have for agricultural purposes.

Such areas are especially valuable near cities and villages, and that town is indeed fortunate which can boast the possession of a tract of original forest. It seems to me that I could have no better wish for the children of the future than that they should enjoy native woods, with the wild flowers that should go with them, as much as I enjoyed, many years ago, the unbroken forest near Grand Rapids.

The woods help to mark the seasons. In early spring we note the swelling buds, and are filled with hope and joyous anticipation. A little later come the young leaves, yellowish green, pink, purple, white, silvery gray, changing later to the various greens of summer; the blossoms to be followed by fruits, attractive in color and shape. Later still the autumn foliage far surpasses any painting, and often vies with the clouds at sunset in its rich and varied effect. Finally, the graceful, naked branches, outlined against the sky, or against the dark gray of the receding forest, make pictures which many artists delight in putting on canvass.

I have known people to treat lightly a beautiful forest, or the beauty of a country of which it is a part. If the soil is rich, and if there is a convenient market, their requirements and desires are satisfied, but I wish I could impress them with the feeling which Prof. McBride had when he said: "The problem, my fellow citizens, goes deep; it touches, as I think, the very perpetuity of our institutions. No man can love an unbeautiful land. No people, no civilized people, can long remain content when all vestige of natural beauty has been removed from sight, nor can a free government rest upon an unhappy or discontented people. The French revolution came when rural France was almost a desert. The German loves the fatherland because of its beauty. He will ever bear imperial tyranny if he may but gaze upon the forest-bordered streams. England is a land of parks, not in the great cities only, but everywhere from the Land's End to John O'Groat's, and we know what Englishmen think of England. If we wish our own people to most speedily reach the maximum of contented peace, we shall exert ourselves to preserve to our

God-given heritage its original, wonderful features of surpassing natural beauty."

In order to live, we need something to eat, something to wear, something to keep us warm, but we need something more than all this—something to live for, and the beauty of the forest may be compared favorably with sculpture, architecture, painting, literature, music, and all the things that make life worth the while.

TAXATION AND FORESTRY.

The following letter from E. A. Robinson, surveyor of Charlevoix county, located at Boyne City, takes up so important a matter in connection with Michigan forestry that it is given to the public by the commission together with some practical observations from State Warden Filibert Roth which were brought out through his perusal of the letter.

MR. ROBINSON'S LETTER.

Michigan Forestry Commission—Gentlemen:

I live in northern Michigan, Charlevoix county, where large tracts of land now covered with timber, are being lumbered by the various large lumber companies. To reach these lumbermen, for the purposes of taxation, on the basis of actual value of the property being cut off, as shown by the purchasing prices, the state tax commission has ordered supervisors to raise the valuation of all lumbered lands to ascertain empirical value.

"Now as far as large lumber companies are concerned, it is all right, for the reason that they are converting the timber into money as fast as it is possible to saw it into lumber, but there are a few farmers who have reserved timber lots on their farms, ranging from five to forty acres, for their own uses, such as stove wood, sugar bushes and pasture lots. These reserve lots have been valued on a par with the commercial timber lots, by these misguided officials, making taxes so high for these farmers that it offers a premium on cutting the timber away, solely in order to avoid taxes. Our taxes on 115 acres, forty of which is reserved for a sugar bush, pasture and woodlot, last year was \$56. Almost as bad as a mortgage, or rent.

You are the state forestry commission, the object of which is to promote the preservation and maintenance of forests, on farms, state lands or wherever possible. You are urging farmers to keep a wood lot, and at the same time the state tax commission, by ordering large valuations on forest lands, is offering a premium on forest destruction, the one working against the other, and the farmer pays the tax in order to avoid having his home sold from over his head.

It seems to me that the state forestry commission should see to it, that farmers who are protecting and saving timber lots, for other than immediate speculative purposes, should be encouraged in so doing by being only nominally taxed thereon.

You can do farmers a great favor by using your influence in the direction I have indicated, and also promote the upbuilding of our forest preserves.

I therefore appeal to you to bring this phase of taxation to the notice of

those in authority, with the result of offering a premium, directly or indirectly, on forest preservation, rather than destruction.

Most respectfully,

E. A. ROBINSON.

PERTINENT SUGGESTIONS BY PROF. ROTH.

That forestry is not a mere experiment, that it is an old, well tried and approved business, that it is the only kind of business capable of using certain classes of land, and that even in fertile farming districts a goodly per cent of land should be devoted to raising a timber crop, all of these things are pretty well conceded. There's no lack of enthusiasm all over the country, from Maine to California we have forestry associations, forestry commissions, forest reserves and state forests and from one end of the country to the other private owners are trying to find out just how far the matter is practicable and profitable for private enterprise.

But everywhere private enterprise meets two serious obstacles. Unreasonable taxation, and lack of protection, chiefly protection against fire to a less extent, trespass.

TAXES TOO HIGH.

One of our prominent governors very properly stated in a recent article that taxation beyond the average or reasonable rate of income or interest on a man's money or business is nothing less than confiscation of property and should be prevented by law.

If all the business in the state of Michigan, profit and loss properly balanced, pays about two per cent (and it is doubtful if it pays more,) it is quite a burden to pay 1.7 per cent in way of taxes. Again, if the farmers of Washenaw county on land readily saleable at \$40.00 per acre find it quite a tax to pay 1.2 per cent it surely is more than a trial for the settler in the pinery region on land sold by the state at \$1.00 per acre to pay as high as six per cent and commonly over three per cent in way of tax in the same kind of business. It will be argued that business pays at a better rate, that in a state where money readily brings five per cent and over, there is no kind of business which does not pay, at least, this interest of five per cent. Let us see.

REVENUE OF AVERAGE FARM.

According to the census of 1900, the average farm in the United States is worth, buildings, stock and implements included, \$3,574 and produces a gross income of \$656.00 all told. Out of this, \$74.00 goes for extra labor and fertilizer and if we put the taxes at only \$35.00 and the necessary repairs horseshoeing, etc., at another \$40.00, the total income shrivels down to \$507. This \$507 represents the wages of man and wife and usually one child together with the net income on the investment. Such a man however, is with \$450 and the keep of himself and family if he is engaged by the year so that \$450 plus the part of the provisions not raised on the farm should be deducted from the \$507 of income, which at best would leave perhaps about \$25.00 as the net revenue on \$3,574.

In Michigan, these figures are: The average farm contains eighty-six acres; is worth (including stock and implements) \$3,398, or very near the average for the country. It has a gross income of \$540, which leaves perhaps about \$400 to be divided between labor of the farmer's family, part of keep and net income on the investment.

POOR LANDS USED FOR FORESTRY.

Now these figures are not put here to slur farming, for few people appreciate better than the writer the importance of farming as the greatest industry of man. They are set down to show that when we take the business of the country, of a state, or even a county and average it up as we should when we want to settle on a proper basis of taxation, that the sheer folly to suppose that the business pays at the rates of interest which the money lender gets out of a few fortunates or unfortunates as the case may be and that, as has been very properly claimed by the students of this subject, the business of the state pays at small rate of interest and generally at less than two per cent rather than at more.

But forestry is a class of farming, it raises a crop from the land and naturally enough, it has only the poorer lands at its disposal. So that if taxes on these poorer lands, stocked with timber, rise above two per cent, a point is soon reached where an income is out of question, where even the capital itself is being attacked; in other words, where confiscation of the man's property begins.

RATE OF TAXATION.

But are the taxes really so high in our state? According to a report of the state tax commissioner (a most excellent and necessary part of any reasonable government) the people in our state paid taxes as follows:

ON \$1,000 OF ASSESSED VALUATION.

	1901	1902
	No. of counties.	
Counties paying over \$50.....	1	0
Counties paying from \$40 to \$49..	5	3
Counties paying from \$30 to \$39.....	13	16
Counties paying from \$20 to \$29....	30	26
Counties paying from \$15 to \$19.....	18	13
Counties paying from \$10 to \$14.....	15	23
Counties paying less than \$10.....	1	5

According to this the people over half our counties paid more than two per cent on their property as taxes, and in about one-fourth of the counties they paid over three per cent, while in one county, at least, in 1901, the average tax rate was over six per cent. And it must not be inferred that such things have ceased, for within the month the writer was shown tax receipts where over five per cent had been charged.

HIGH TAX DETRIMENTAL TO FORESTRY.

Has this state of affairs lasted long? Yes, and it is exactly this tax rate which has discouraged not only lumbermen from holding their forests and caring for them, but has even obliged some of our best farmers to sacrifice their handsome woodlots, to have them cut before the tax gatherer should succeed in his efforts at confiscation. That the state failed utterly in giving the lumberman any return for his taxes, failed to protect his property against fire or trespass, is a sad additional which need not be discussed in this connection.

What the state's policy in this direction is today may be inferred from the reports referred to. In the reports of 1901-1902 it is admitted that the "lumber industry of the state is small and the quantity and value of lumber and

timber now subject to assessment is meagre." It is stated that much property of this kind had escaped taxation, that the commission employed experts and has "helped supervisors to learn the quantity and value of timber," etc., and that by this extra effort the assessment of the counties in which the larger part of our denuded pinery lands are located has been increased by over \$5,000,000, and that since the tax rate in "these towns is not less than three per cent." Additional taxes to the value of over \$166,000 were obtained.

TIMBER REGARDED AS CROPS.

That this was squeezing the proverbial turnips for blood evidently did not occur to these certainly well meaning and fair minded men. And yet it is quite evident that under these conditions any man possessing a wood lot or patch of forest is bound to cut it clean, to denude the land in order to avoid serious loss. The standing timber on a piece of land is a crop and differs from a crop of sugar beets chiefly in the fact that it stands many years instead of only a few months. And yet it would be just as fair to assess farm land used to raise sugar beets at the time the sugar beets are just about ready to harvest and assess crop and land together, as it is to assess the forest crop and land together, as is actually done. In case of the farm, we assess the land and perhaps high. Since it can raise a special crop we assess it on the assumption of its being able to produce a valuable income. Why not assess it at some value commensurate with the income it can produce if kept as a forest and in that way make it possible and even desirable to the owner to keep it as woodland? Where the forest is stocked on good farm land, of course, there would be no just reason for shirking.

JUDGMENT REQUIRED ON TAXATION.

But it must be assessed at its cash value, says the law. But the experience of our tax commission, of every assessor, has long demonstrated that the three forms of value, the cost of replacing the property, the sale or market value and the value as based on the earning capacity are forever mixing up in these considerations. Generally the market or sale value has been taken as the measure, but when applied to railway and kindred property this basis fails. And it is to rigid adherence to this basis which makes farm assessment so high. For it is well known that while the factory, store, or railway line, is bought and sold on its earning capacity, the farm is normally bought to build a home, and sentiment, often far more than cash net income, is the deciding factor. And yet, would it not be well for the state to take a broad view of the matter and demand that while the farm may have been bought chiefly for the sentimental reasons of having a home, that in the assessment the value based on sentiment should be modified by a consideration of income, and thereby bring the assessment of this farm on the same basis as that of other property?

EARNING CAPACITY TO BE CONSIDERED.

The same reasoning applies to the forest, except that sentiment is left out and all that is asked is that the cash value of the forest should be considered chiefly from the standpoint of its earning capacity when kept as a forest. To be sure, many a piece of forest will be cut off, and the value, based on an earning capacity, will be changed suddenly into a simple market value of timber land. But is the loss of a few dollars of taxes so serious that the state must resort to a system which completely forbids one of the most essential industries one of the principal forms of agriculture? Suppose the state should suddenly

want to assess land and ripe crops on the farm and make the sugar beet industry impossible thereby? Would it not provoke the strongest of criticisms and justly so? But this is exactly the case with the farmers' woodlot as well as the large forest.

SIX MILLION ACRES ABANDONED.

The effects of our taxation, strange as it may seem, falls more heavily on the large owner than the small one. The owner of a number of farms, worked by hired help, is simply without revenue, and may be, is losing even part of his capital. The small farmer simply loses part of his wages. He does on his own farm what he is not willing to do for anyone else if hired, he gives up part of his just wages to the tax collector. In reality, of course he pays more taxes and his small loss means more to him than the larger loss to the richer man, but certain it is that these small holders can, and do hold on to their lands, while the larger holder, who from necessity, runs affairs on a business basis, removes what there is of value and abandons them. Six million acres of tax title land, one-sixth of the land area of the state, is soaked for taxes fully testify to this truth. What are you going to do about it? The answer is for the statesmen of Lansing.

Certain it is that a farming community, in managing affairs on business principles, can not afford a tax rate of over one per cent and expect to make any interest on the investment. And equally certain it is that private owners can not go into forestry and expect success in an enterprise where large tracts of poor lands are to be restocked at considerable cost, and where every bit of work must be done by hired help and under difficult conditions, unless there is some assurance of a more equitable system of taxation than prevails in our north counties today.

BENEFIT TO THE STATE.

As regards the work of the state, all is different. State lands are exempt, or practically so, and besides this the benefit which the state seeks in reforestation is not merely in stumpage, but it is more in secondary benefits, added industries, better market for farm products and the utilization of lands otherwise lying idle.

Why the state should permit this tax rate system to go on is difficult to see. It has done incalculable damage, it has led to abandonment of lands, to the deterioration and misuse of these lands, it has prevented development in a number of our counties and is today one of the most serious obstacles to improvement.

Still more is it difficult to see why the state should want to load a special burden on these very districts by holding areas of lands, whole townships, without itself paying taxes or in some way easing the unreasonable and mischievous burden of these people.

Everyone is agreed and our statesmen are ever ready to proclaim that the development of any country or town is an advantage to the state on the whole. Why, then, should the state shirk its duty and thereby seriously hinder the development of any district, merely under the pretense of saving the penny?

LOSS TO STATE LARGE.

And such a penny! Take eleven of our pinery counties in the southern peninsula and the aggregate assessed value in 1902, of real and personal property, amounts to but a trifle over one per cent of the property of the state. But this pitiful one per cent must be squeezed for an extra penny, even at the risk

of keeping seventy-five per cent of its lands in a wild, waste and unproductive condition, and thereby losing to the state the use and growth of millions of acres involving a loss of millions of dollars.

Forestry we must have. Michigan is losing \$10,000,000 every year by leaving idle millions of acres of land. Forestry on private lands we must have, for state action will not be sufficient to cope with the problem. But if we want forestry, we must first have assurance that a man's property will not be confiscated by unreasonable taxation.

WHAT THE STATE SHOULD DO AND WHY IT SHOULD DO IT NOW.

BY PROF. FILIBERT ROTH, ANN ARBOR, MICHIGAN.

"History repeats itself." This old statement is only too often true, and it seems that generally the people on the whole have much more difficulty in profiting by the experience of some other people than has the individual. The farmer of Michigan profits by the experience of the farmer of New York, the lumberman of Texas copies from his brother in Michigan, the engineer of America sets pace for engineers in all parts of the world, and yet the people of Pennsylvania, in spite of the prophetic warning of William Penn, the founder of that colony, did not profit by the experience of Central Europe, with regard to its lands and its forests; New York, in spite of the emphatic arguments of its governor two centuries ago, did not copy from the people of Switzerland or Germany, but went ahead, irrespective of consequences, denuded its good lands and its bad lands alike, threw away the lands of the Adirondacks at five cents per acre, which it has difficulty now in buying back, slashed and burned as they are, for \$3.60 per acre.

The conquest of the wilderness, with its dark forests, its swamps and moors; the building up of a large civilization in Central Europe, France, Germany and the neighboring countries resembled so much the same development here in our state of Michigan, that a glance at the history of this development must be helpful in a better understanding of our own conditions.

To be sure, the pace at which this development proceeded was very different in the two countries; there it was by hand, on foot and per raft, here it was per steam railway, the bandsaw and its "shotgun feed."

From about the year 800 to about the year 1400, the "inexhaustible" forests of Central Europe were fought with fire and axe, the forest over large districts was free for any one to burn and clear as he chose. Millions of acres were cleared and the settlements of this part of the world took on much the form and extent which they present today. Six centuries were needed for this first "rough hewing" of these settlements or countries. There were no distant markets, no rapid and cheap means of transportation to induce wholesale clearing of land for its timber, it was a slow, steady fight for plowland and meadow and permanent homes. There was an abundance of wood everywhere and the forest suffered only in the vicinity of towns and along drivable streams. At these points the cutting of timber naturally went beyond the clearing; there was overcutting, and in many places this gradually led to trespass, fire and general forest devastation, even on lands not suited and not desired for agriculture. Since few and poor roads made long distance trans-

portation of timber impossible, many of the towns began to feel the evil effects of this bad usage, and conservative men began to plead for protection and better care of the forest. This agitation required time, but as early as the year 1165 the authorities of certain districts began to issue regulations and organize a suitable service to prevent further forest destruction. The matter was sporadic; the greater part of that immense forest was still to be subdued, but nevertheless the good work of a reasonable care and use of the forest spread from these many centers, and by the year 1300 a considerable number of districts had regulations concerning the cutting of timber, and in several of them future clearing without official permit was forbidden.

By this time, too, there had established itself in all the better settled districts certain rules concerning the use of the forest, the running of stock, the hunting, gathering of grass, fruits and seeds, the manner and time of felling timber, etc., had become matter of public discussion and official instruction, and thus forestry grew up, as it were, side by side, with the primitive agriculture of those times.

By the year 1600 the dangers of forest destruction and the proper use of the forest were quite fully understood throughout Central Europe, and practically all accessible forests of France, German, Austria and the neighboring states were under some form of control. At the same time the ownership of the forest was established, and instead of being commons, the forest now had passed into the hands of definite owners, a large portion fortunately falling to village, town, church and state.

A very instructive case in this connection is the forest property known as Sihlwald, belonging to the city of Zurich, Switzerland, ever since about the year 1000 A. D. As early as the year 1314 there existed here a forest service, and in the year 1342 the principal forester of the Sihlwald became the "Sihlherr," and as such was a member of the town council. At the same time a definite system of cutting timber had developed, and by the year 1422 the budget or amount of timber to be cut each year was determined and prescribed by the council, which expressed itself appropriately in its city order about as follows: "In order that this forest shall not be overcut or damaged, but shall be used in an orderly manner, maintained and its growth preserved for our children, therefore it is decided that the forester shall not order or cut more than 36,000 pieces (about 900 cords.)" From the year 1630 to the present time a record has been kept of the amount of timber cut each year, and it is evident that we have here a forest property in the possession of this town for about 1,000 years, under good management for over 600 years, yielding every year its regular crop of timber and in better shape today than it was ever before.

It was in such ways as these that the forests of Central Europe attained their present form and systems.

At present, Germany, for instance, has 25.7 per cent of its land area in forest, nearly half belonging to private persons, the other half to the states and corporations (cities and villages, etc.). About two-thirds of these woods are under state control, the other third being in the hands of private persons entirely free to do as they please with their forests. The state forests and those under state control are, as is so well known to all American travelers, in excellent condition and under the most perfect management. That these forests are not merely a hobby or an expensive luxury is best proved by the fact that, for instance, the state forests of Wurttemberg, Baden and Saxony produce a yearly income over and above all expenses of over \$5.00 per acre. To be sure, such an income is not produced by neglecting the forest and leav-

ing it to fire and vandal, but it is produced by care and protection. None of the states mentioned spends less than \$2.50 per acre each year on the forest lands, so that Wurttemberg, for instance, expends on its 400,000 acres of state forest over a million dollars, in order to secure the net income of over two million dollars.

In this way, comparatively poor lands are utilized, they are kept covered and kept fertile, they are protected against washing and gulying and general deterioration, and they are made to produce an income and pay and interest such as is not secured from even much better lands by any other form of agriculture. At the same time these forests have furnished a home supply of timber at reasonable prices and thus assured comfort to the people. They have done more, they have encouraged wood-consuming industries, have justified the building of pulp and saw-mills, and various factories, for everyone knows what the regular supply has been for a century and more and has reasonable assurance that this supply will continue for indefinite time to come. Nor has Germany too much forest, for even now the rapid development of industry and commerce in all directions, the general rise in the standards of living have so increased wood consumption that of late Germany has been obliged to import some of its timber.

As might be expected in the long fight against the forest in early times, much land was cleared in Central Europe which was not really agricultural land. Much of this was again abandoned, but much also was held and farmed down to the present day. In districts of this kind many tracts became more and more impoverished like the "run down farm" of New England and the Atlantic coast, farming dwindled into a miserable form of stock raising, and whole villages became half paupers, all the more enterprising of the population leaving as soon as opportunity offered. For more than a century the injury to the state caused by these pauper and half pauper conditions has been recognized. For more than fifty years efforts have been made to assist these districts and generally it is found that reforestation of the poor lands alone is of any permanent value. Generally the people are too poor and the state and province must help, but where real effective work is to be accomplished it is necessary to buy up the lands and give the people a chance to find better employment. Thousands of acres are thus bought up and reforested every year by the German states, and similar work is going on in Austria, Switzerland and France. The prices for such land, ranging generally from \$10 to \$25 per acre, seem high to an American, but it has been demonstrated that even at this price the forest will pay better than agriculture.

But just as the old time clearing extended to much real poor land, so the forest retained many an acre of fairly good land, or at least land which, as long as the forest carries on its regular cultivation and fertilization, has the appearance of good agricultural land. For this and other reasons there was no lack of protest against keeping so much land in forest, and up to recent time sophistry and demagoguery combined to fight the forest policy of all the Central European states. Especially through Adam Smith and the French revolution the unlimited right of the individual in its property gained many champions. France, especially, lost a large part of its valuable forest holdings, so that for the last fifty years she has found it necessary to spend many millions of dollars to correct the bad results of denudation in her hill, mountain and sand dune district. Nor is this all. She paid a heavy fine every year in form of a large sum spent in the import of lumber and timber which she might have raised at home.

But in spite of all sophistry the lesson of 1,000 years is thoroughly learned

in nearly all states of Europe, and effort is being made everywhere to overcome the great difficulties and restore the poor lands and waste lands to forestry as the only form of agriculture which can use these lands, permanently preserve them and actually improve them.

In this connection, the experience of Great Britain is of interest. Less than thirty per cent of its area is real plow land, another thirty per cent is permanent pastures, while the rest, or about forty per cent, is not used for agriculture, the bulk of this being waste lands, worthless heath lands, where once a good growth of forest existed and where now the only income from the lands consists of a few tons of wool and mutton or a rent shilling paid by sportsmen for the privilege of shooting a few birds. Land monopoly, together with an utter disregard of forestry, the only good form of agriculture for these lands, has deprived England of millions of dollars of income which she might have had from these lands, to say nothing of the indirect benefits in woodworking industries which might have thrived, nor of the benefit to climate and the flow of her streams. And yet England pays over \$100,000,000 a year to supply herself with timber, and this import has increased with every year for over half a century.

In our own country there was ample and timely warning when the different colonies were first settled and the old world experience was still fresh in the minds of men. As early as 1640 the people of Exeter, N. H., adopted a regulation concerning the cutting of oak timber; in 1701 the governor of New York advocated that saw mill men should replace young growth on lands where they cut and did not clear. By the year 1800 numerous public efforts had been made to stay the destruction of the forest and to restore it on the non-agricultural lands. But all this was in vain, a spirit of recklessness was abroad, the people were waging a war on the wilderness and had no desire to practice forestry. Later on came the railway and the steamboat, the phenomenal growth of our cities, of our industries, the settlement of the prairie, and with these an enormous market for lumber and forest products generally. In spite of the good advice and warnings of the old pioneers, in spite of occasional warnings of contemporary writers, the forest was not merely cleared for plow land, it was not only the slow fight of the settler for a home, but the forest was invaded for timber only, and the destruction of the forest far outran settlement. What wonder then that Dr. J. T. Rothrock, the pioneer forester of Pennsylvania, as much as twenty years ago had to report to the people and the legislature that millions of acres had been denuded in their state without any intention and without any hope of making the lands useful for agriculture. The old argument which met former protests and presentations, namely, "Our lands are practically all agriculture lands," was disproved. Miles and miles of blackened hillsides could be and can now be seen in that state along every trans-mountain railway, and the lesson of Europe is learned over again. But, thanks to the untiring efforts of Dr. Rothrock and the friends of forestry (might better be called the best friends of the state), the people of Pennsylvania have taken the first big step in the right direction. The state is buying up these waste lands and pays up to \$5 per acre for them and has already begun to give them protection and the necessary care to restock them with woods.

The experience of New York was similar. Later than the year 1800 she sold her large holdings of virgin forest in the Adirondacks for about five cents per acre. By the year 1880 the people of the state realized that the destruction of the woods and the denudation of the poor lands had gone too far, and before the year 1900 New York had bought back over a million acres of these

woodlands, mostly culled, to be sure, and paid on an aggregate over \$3.60 per acre. And even at this price New York has made money by buying the lands. New York, like Pennsylvania, proposes to care for its woods and to restock the poor lands with woods as fast as seems practicable.

The experience of New England is similar to that of the states mentioned. Here too much land was settled in farms that has proved useless. The area of improved land in New England has decreased for the last twenty years so that in 1900 it was only about sixty per cent of what it was in 1880, and the forest is allowed to spread and efforts are being made by the states and by many private persons and corporations to assist in this spread and in the improvement of the forest.

Here in Michigan the fight against the wilderness proceeded much as it did in the old world centuries ago, and as it did in the older states of our country until about the middle of the last century. From that time on it went along two rather distinct lines. In the southern more settled and better agricultural regions it continued as before, acre after acre was cut and cleared and the wild lands step by step gave way to the plow lands. Incidentally, many an acre of rather inferior land was cleared, and will no doubt sooner or later revert to forest; but on the other hand, the good sense and conservative spirit of the farmer prevented a total clearing, and, thanks to this good sense and the safety from fire, due to close settlements and roads, there is today over twenty-five per cent of the land area of the southern portion of Michigan in forest. It is in small tracts, the farmers' woodlots, rather badly cut over and too much pastured, but in woods, and adds much to the safe comfort of the people, and every year yields several million cords of fuel and timber.

In the northern counties in the pinery region of our state, however, the fight against the wilderness was entirely different. Here settlement did not follow the cutting of timber, the forest was cut over solely for its timber, and whole sections were cut during a single winter. In the pinery portion the forests on the lighter, drier soils, the tops of the cut timber led to fires, the forest was destroyed. Usually the first fire was followed by others, until many thousands of acres were converted into the well-known cut and burned over, fire-scarred waste which has done so much to retard the healthy process of development of portions of the state, and has failed for years to contribute to its wealth, having remained in an utterly non-productive, waste condition.

On the better lands where the pine, formerly almost the only timber cut, was scattered among a heavy growth of hardwoods the forest has generally held its own, and it is often difficult to see that the forest has ever been visited by the hand of man. In these districts the hardwood is now being cut by the lumberman and the farm settler is following to subdue the land and build homes as fast as the forest disappears. It is here where the real settlement of our state is continued and where it will continue for many years to come.

From these considerations it appears that Michigan, like several other states of the Union, repeated the experience of the old world. Centuries of experience indicate that in the settlement of forested lands the clearing of the part of the forest is a necessity, that this good work is always carried too far and is extended to lands which are not suited to permanent agriculture, that the farming of such poor lands is an injury to the state, and that the countries having most experience in this matter have fully demonstrated that:

1. *Not all land is plowland.* This probably applies to every state in the world. In Europe we find in Great Britain over one-fourth of the land cultivated and less plowland now than thirty years ago; in Germany but little

over half of the area cultivated; and even in France we find a remarkable per cent of untilled lands, and in all these states, long and densely settled as they are, the amount of actual waste land is surprising and has engaged the attention of statesmen and others for years. In our own country we have the striking example of the New England states. Here several million acres of land which were regarded as agricultural as long as the forest cover protected the soil, were cleared and farmed and led into poverty thousands of families who tried in vain to eke out a livelihood on lands which should never have been deprived of their cover. But other states have fared little better and today the following figures from the census of 1900 clearly show the correctness of the above statement.

The per cent of improved land is as follows:

State.	Per cent of all land area now improved.	Remarks.
All North Atlantic states together.....	37%	Me.-Pa. Del.-Fla.
All South Atlantic states.....	27%	
All forested states east of the Mississippi river.....	36%	
Michigan.....	32%	
Wisconsin.....	32%	
Maine.....	12%	
Massachusetts.....	23%	
New York.....	51%	
Pennsylvania.....	45%	
Virginia.....	39%	

It should be said that in several of the old states like Pennsylvania, much of the land now recorded as improved land hardly deserves this name and is certain to be abandoned and revert to woods sooner or later.

But strikingly as this truth comes out on closer inquiry, it seems very difficult for many to realize. Thus a well meaning and very prominent citizen of Wisconsin stated in a conversation that it was his belief that practically all land in his state was agricultural land, and the same statement was repeated emphatically at a meeting of people interested in this subject. And yet every one who has made inquiry and traveled that state has seen the farms in the sands on both sides of the Wisconsin river, abandoned by the most frugal and hardworking foreigners, after the most desperate struggles for existence, and has seen the one crop, potato farming on these same sands hardly yielding a livelihood to people whose existence might suit Russian or Turkish conditions, but is entirely unworthy of an American, and one which is sure to colonize poverty and work harm to any state in which it exists.

2. That it is not good policy to colonize the poor man on the poor acre, but that much colonization tends to pauperism and is a public injury. In this matter the experience in our country is quite ample, but it has never been carefully studied or gathered, and is as much masked by the general welfare of the land. A family from one of

promises and representations to exchange its little home in town for a 160-acre piece of pinery sands. "You are unwise to work here in the city and be a slave all your life; you ought to provide for your growing sons" and similar arguments usually catch the man from the old world to whom a 160-acre piece of land looks like a prince's estate. They move, but unacquainted with farming, new to the land, they begin and usually begin poorly. Crops fail, work in the neighborhood is scarce; each year sees poorer living; women and children of course taking the brunt of the suffering for they stay in their isolated home, while the man works in a camp or at some mill where ample board is provided. A few years later the place is abandoned, a family of disheartened, distrustful paupers return to the city or are scattered in the neighborhood among less unfortunate people. Now we are informed that these "moss-backs" are poor farmers, that they have the bad habit of neglecting their farms and following lumbering operations and going to the mills and that the land is all right and well suited to agriculture if only the right kind of men would take hold of it. There is some truth here, but also much error. A well-to-do man might possibly improve this land, but he certainly does not care to. But suffice it to say that right here in our state there are several (many?) thousand old abandoned places, the houses still standing, or as is usually the case, burned up by some shiftless vagabond.

But while our own experience is as yet not sufficiently gathered, the experience of the old world is ample and the lesson it teaches a most important one. Whether they live as shepherds on the mountains of the Karsh, the Alps or the Pyrenees, as small farmers on the sands of Prussia or France, or whether they eke out a wretched livelihood on the highlands of Scotland and the Apennines they all have the same character, it is the "pine-woods cracker" grown old. The best leave, the wretched stay, and every period of bad season drives them to brigandage and beggary.

3. That even in extremely fertile districts it is hardly wise or safe for agriculture to dispense with forestry. The farmer of Indiana or southern Michigan holds on to his wood lot in spite of all the smart calculation and advice which figures out for him that he can better afford to buy coal, oil or gas than raise his timber and tells him to a cent how much larger a per cent he can make on hay crops than wood crops. He knows that the wood crop is the only certain one of all the crops he has and he also knows that it costs a great deal of cash (a thing normally scarce on the farm), to buy coal and also that it is of no small importance in his business that he should have a few pieces of good hickory and oak seasoning in case an axle, a whiffletree, bolster or tongue need replacing. Nor is this all, but the farmer of the Iowa prairie who settles on twenty feet of solid fertility finds it a most excellent thing to supply himself with a small wood lot and become independent of the coal and timber hawker.

Considering now the conditions in Michigan, we have: A good agricultural state with good climate and with nearly two and a half millions of people near the great markets of the land, almost surrounded by the greatest inland waters of the world, with numerous streams, abundant water power and amply traversed in all directions by numerous railways. Agriculture far more than supplies the needs of the people and is now and probably always will be the greatest industry of the state. The second greatest, the wood-working industry but a few years ago found an ample supply of raw material and its output went to the markets of the Atlantic and to the plains of the west as far as the gulf. This is changed, the lumber industry has largely gone from the state, of the large capital invested in this industry in 1890, only about half

was still so invested in 1900, and instead of Michigan being one of the greatest export states of lumber in the world, we are today importing timber and lumber. The Seattle cedar, the California redwood, the cypress from the gulf, the pine from the Carolinas and the south Atlantic are filling our lumberyards and our people are paying every year large sums of money for a necessity which our state should never have to import, but should be able to export for centuries to come. Our people, in paying this fine for short-sightedness and careless misuse of the greatest natural resource found ready in the state, are paying out not only for the material, but are also paying for its shipment, partly at least, over the two great mountain systems of the new world, and in all cases for long distant railway transportation, little coming less than one thousand miles, and a very large amount over two thousand miles distance.

The woodworking industry of our towns, notably the manufacture of furniture which has added so much to the building up of some of our towns, finds no longer a home supply, but is going as far as Arkansas and Tennessee for its raw material, and the enterprising manufacturer is exposed to the severest competition and is in danger, at all times, of being ruined by the competitor, who has located at the source of these supplies. Such a condition is little calculated to encourage further development in this direction and the outlook for this important branch of enterprise is anything but encouraging. What a loss this is to the state may be inferred from the census statistics of the lumber industry. In 1890 this industry employed 129 millions of dollars, in 1900 only sixty-seven millions and while it might be held that this decrease meant only a change in employment, it is quite generally known that such is not the case, but that the Michigan lumberman has gone south and west, that he and his capital, much to our detriment, have left the state.

The present condition of the forests, once the greatest natural resource of the state, may be briefly summed up as follows: The great hardwood belt of the southern tiers of counties and the belt of fertile land extending from Saginaw Bay west and formerly stocked with a mixed forest of pine and hardwood is today, a well-settled farm district, and what is left of the former forest is in form of wood lots from a few to a few hundred acres in size. The condition, the value, and probable future of these wood lots, which in their aggregate form a very important part of our forests, is fully discussed in this volume in the paper of Dr. J. F. Clark.

The forests north of this, now well settled district, were generally of three great types. A large portion of them was almost pure pine forest stocked on rather light sandy lands. A small portion of this forest was composed of open and broken stands of Jack pine dotted with openings and known as the Jack Pine Plains. A second portion of this north woods was a mixed forest of hardwoods, largely maple, elm, basswood, ash, beech and birch (hardly any oak) and mixed with hemlock and pine, which here was nearly all white pine of large size and fine quality. These mixed forests were stocked on good land, sandy loam, gravel, and even heavy clay lands running in irregular broad belts across the peninsula and skirting portions of the shore lines. Throughout these regions are dotted with lakes and swamps and it is in these swamps that we meet the third form of the forest, the swamp forest of cedar and tamarack, usually mixed with more or less of spruce and balsam and a little of inferior hardwoods.

The forests of almost pure pine or pinery proper have practically all been cut and as has been stated before, the fire consuming the large amount of inflammable material left in cutting, led to complete destruction of the forest.

The mixed hardwoods have been culled of pine, they have not been burned and are now cut for the hemlock and hardwoods, and the land, being of good quality, is being settled.

The third form, the swamps, were lightly culled here and there in logging times and are now more systematically exploited. Part of these swamps have been burned over but generally the swamps have escaped great injury. Some of the swamps make fine farms and as time goes on many of these will be settled and improved.

On the whole, this half of Michigan, is still sparsely settled in spite of the fact that settlement in almost every county began as early as thirty or more years ago.

The following table shows the proportion of settlements and improved land and at the same time fairly indicates in figures the amount and distribution of the lighter sandy soils which form the most important part of the subject here under consideration.

The state is divided here into four districts (not contiguous,) according to the proportion of land settled in the counties composing the district.

Area, land in farms and improved lands in Michigan.

U. S. census 1900. (Numbers rounded off.)

District.	Of entire district.			
	Total area—million acre.	Per cent.		
		In farm, or settled.	Improved land.	Unimproved land.
No.1 42 counties, the real well-settled farming portion of the state. No county with less than 45% of its land settled.	17	87	64	35
No. 2. 10 counties, no county with less than 30% nor more than 44% of its land settled. Largely forest, some cut-over pinery.	3	34	15	85
No. 3. 16 counties, all but three in southern peninsula; largely cut-over pinery lands, with few belts of hard wood. No county with less than 10% nor over 29% of its lands settled.	7.3	17	7	93
No. 4. 15 counties, three of these in southern peninsula; mixed lands in the northern peninsula, some sands. Nearly all sandy, pinery lands in southern peninsula. No county with over 10% of its lands settled.	9.3	5	1.1	98.9
Total entire state.	36.6	48	32	68

Since the above refers to the land area as per United States Land Office Reports, and since the amount of land in towns and highways forms certainly less than five per cent, even if all highways were cut out, it appears that fully

twenty-three of the thirty-six millions acres of land in Michigan are unimproved.

Returning to the lighter pinery lands, it is but natural that after the great fires had swept the forest cover and not only destroyed it, but almost cleared it from the land, that little encouragement existed for the timber man to hold them or give them any further care. At first the lands were offered for sale and later a large portion of them reverted to the state for non-payment of taxes. They were offered for sale for taxes but usually bid in by the state so that today there are about six million acres of these lands either delinquent for taxes or actually deeded back to the state. This is a remarkable and a very significant state of affairs, six million acres, about one-sixth of the land area of the state is "in soak" for taxes. This fact not only indicates the proprietary relation but describes quite fully the natural and economic condition of these lands.

The policy of the state with regard to these lands has been liberal, in fact, too liberal. The state has made a persistent effort to get the lands settled, or at least to get them into private hands, and thus back on the tax rolls. This effort was but natural and was strongly urged, of course, by the local interests in order to increase the revenues of town and county and reduce the most unusual and exorbitant tax rates to which the people of some of these counties are at present exposed. But in spite of all efforts, the lands have remained unsettled, as is so clearly brought out in the above table. The good loam and clay lands never reverted for taxes and the poor lands even now do not find ready sale. Thus of eighty thousand acres offered at one sale last year, only about one-tenth were sold and these only brought the pitiful sum of about \$1.25 per acre, to what may have been presumed to have been the choice one-tenth of the total lot and probably was bought rather for the remnant of forest material existing thereon than for actual settlement.

Nor was this policy altogether inexpensive. It appears that the State spent in the five years, 1898-1902, the large sum of about \$834,000, of which about \$570,000 went for clerk hire to keep record against these lands, and about \$264,000 went for advertising the lands. And while thus the state spent over \$800,000, the amount sold amounted to only about \$300,000, so that a clean deficit of over half a million appears to have been the net result of the transaction. And at the same time, not one cent of this vast sum was ever spent to protect these lands, to put out a single fire or plant a single tree.

In 1903 the state adopted a new policy and it enacted a law by which the state lands located in three townships at the head of Muskegon river in Roscommon and Crawford counties, should be set aside as forest reserves, to be managed by the state Forestry Commission. (For more detail concerning the character of these lands, the work attempted and performed, see the report of the warden of forest reserves in this volume.) This law provides that the commission shall:

1. Survey and examine the lands and determine their real character.
2. Protect whatever forest growth is found on these lands against fire or injury.
3. Restock the lands with forest growth (since it was known that much of the land is practically bare of forest), and it further provides that the commission:
4. May buy, sell or exchange lands within the limits of the reserves as far as such exchange is in keeping with the objects of the law.
5. May cut and sell the timber on the reserves.

And it also provides:

6. That the state may pay to the town a tax on these lands, which shall be used only for road and school purposes.

When the bill for this law was up for consideration, it was quite fully discussed and was protested against, particularly by the committee representing the two counties in which the lands were located.

The principal arguments may be summed up in the following four points:

1. Why reforest our lands, we are glad to be rid of the "howling wilderness" which you seem to wish to establish.

2. Our lands are fair agricultural lands and can and will be practically all settled.

3. Even our lightest lands are today excellent stock range and worth more to us for this purpose than they will be for forest purposes.

4. You withdraw large areas of our lands from taxation and thus throw the burden of maintaining school and road and proper civic government on the shoulders of a few of us who have our homes and our interests here and cannot well escape.

There was much truth in these contentions and since this matter must come up again, it is of interest to inquire into these principal arguments. It is but natural, too, that much sentiment prevailed and that both sentiments and misunderstanding were fostered by interested persons, but on the whole, the protest was a fair one and well deserved the consideration which it received. "Why reforest and re-establish the 'howling wilderness' we are glad to have behind us?" This argument, as most of the people of the district have by this time fully learned, was based largely on a misunderstanding of the real objects of the reserves. In a country where only about eight per cent of the land is settled, where one may ride for miles and miles on a kind of "stump prairie" without seeing house, hovel or camp, and where marsh fires and brushwood fires burn for days without so much as attracting attention, in such a county, the protective efforts of the state can hardly be accused of producing a wilderness. Here a state forest ranger can only be of benefit to everyone and most of all to the local settler, to the stock farmer and the owner of lands and timber.

Nor is this all. In a district where 100 days of sleighing indicates the normal winter, where frost must be looked for practically in every month of the year, and where settlement is as slow as it has been in these districts, what can be more desirable and useful than a goodly cover of forest, a shelter against the winter storms, an ample supply of fuel and a local supply for the few mills, which, if proper management prevails, might find here a supply for all times to come? Today it is the unsightly, blackened swamp waste which discourages the good settler, it is this stump waste which might be termed the "howling wilderness." What the state is attempting, not the increase of wilderness, but a most useful, in fact, here an indispensable branch of agriculture and the only form of agriculture which can be relied on as producing a useful, marketable crop on all of these lands irrespective of seasons.

"Our lands are practically all farm lands, etc." Here we meet again with the argument which has been considered before, it is the same argument which led to the clearing of the millions of acres of non-agricultural lands abroad, it is the argument which prevented the people of Pennsylvania from heeding the words of Penn, it is the same misconception which left unheeded the good advice and proper beginning of the Pilgrim fathers and which made people deaf to the pleadings of the governor of New York two centuries ago. As has been stated, the experience of Europe has proved it an error for those countries, which after a thousand years of trial, are spending millions of dollars every

year to correct the evils brought about by this error. The experience of all our older states has proved the notion in error for those states, they have paid a costly fine for their error and they are just beginning to correct its bad effects. Nor is this all, the American farmer, the farmer of Michigan, who has known these lands in our state for many years and whose judgement in this matter is certainly worth all the expert testimony in the world has declared against the lands. The fact that he preferred to wrestle with the heavy hardwood forests of our and of other states and preferred to undertake the difficult problems of redeeming the arid regions of the west rather than settle these pinery lands, should be conclusive evidence that *they are not all farm lands*. But there is more to prove this fact. The vegetation of these lands is peculiar and is the vegetation characteristic of pinery lands. The elm, the basswood, the maple, the birch and ash refuse to make timber on these lands. The transition from this land to the hardwoods on clay and loam is usually so sharp that it is striking. Even the uninitiated, casual observer is astonished at the contrast. Here on one side of the line, hardwoods eighty to 120 feet tall, mostly maple, elm, basswood, birch and beech, little or no oak and no jack pine, the ground densely covered with young trees and brush undergrowth, and a luxuriant growth of grass fighting with young tree growth for possession of the ground in every new opening. There on the other side of the line, scrub oak, five to ten shoots from an old burned stump, older trees gnarly, limby, few trees over 50 feet high, few sprouts, or cripples of maple, cherry, poplar and white birch or else a scattered growth of jack pine or a mixture of this with scrub oak, everywhere pine stumps to indicate the former glory, but no elm, basswood, ash nor beech, nor any tall hardwoods anywhere. The ground is not covered with a dense growth of shrubs and young hardwood. The oak forms a thin stand and most of the ground is covered with sweet fern, huckleberry, with bush honeysuckle, blackberry bramble and other persistent growth, among which a sparse growth of grass and sedges is vainly trying to hold its own. In this way nature has clearly indicated the difference between these lands and fully substantiates the correctness of opinion of the farmer. Nor has there been a lack of actual trial and the hundreds of abandoned homes on the plains in every county containing such lands surely cannot all be accredited to shiftlessness.

There is one fact in this connection which is often overlooked. It is the experience of the pinery region of the Atlantic coast plain. Parts of New Jersey, Delaware, and from there to Texas are a pinery in which settlement has continued ever since the landing and founding of Jamestown, and yet this region is today wild woods. And in spite of a mild climate which extends the possibilities and range of agriculture, these lands remain unimproved and await the settler. Here is an area several times the size of Michigan still open to farming on sands. It must not be inferred from this, however, that none of this land is fit for agriculture. To the contrary, the lands are extremely mixed and one meets with surprises at every hand. It is for this reason that the law has left the power with the commission to *sell lands* and there is no doubt but that any real well intentioned farm settler can get lands within the forest reserves provided the safety of the forest cover permits this exchange. Generally then, while it must be considered as more than doubtful that all these lands or even a large proportion are agricultural lands, the present state policy, the forest reserve policy fully considers this claim and the state today, as ever before, stands ready to promote settlement and agriculture inside as well as outside of any forest reserve.

"The land is good grazing land." This claim is a dangerous one and it is

heartily to be regretted that the state of Michigan, located as it is, surrounded and penetrated with natural and artificial means of communication, with a good climate, level lands, with deep soil, should ever fall into the errors of New Mexico and of other mountain regions and advertise its lands as sheep range.

To invite a land monopoly, a monopoly of "the second great asset of the state" a monopoly which has everywhere proved inimical to settlement and improvement is sheer folly and would be rued most by the very people who advocate it today. A few sheep sheds for improvements, a few lone herders, and a dozen men at shearing will represent the kind of civilization which this range business leads to and the output of this boasted industry will consist of a few tons of mutton and wool all going to distant markets leaving not a cent for conversion or further manufacture and save the meat, furnishing no article of local consumption. And the land? It will be a Scotch heath, range desert reproduced. It is rarely appreciated how thoroughly inimical such use of the land is to the real settlement. But anyone with experience in the west, particularly Wyoming, Nebraska, etc., will remember how natural, even necessary it is for any stockman to discourage the settler within the boundaries of his range. While the range on the whole might not be worth fifty cents per acre, he should better afford to spend twenty dollars per acre to get rid of a farmer in the midst of his holdings. It is this very feature of range business which led to the so-called "rustler war," (should be settlers' war) in Wyoming; has led to special legislation in congress; has caused the department of the interior to spend many thousands of dollars in trying to remove the high-handed range grabber and range fences and it is this same feature which induced the wide-awake farmer of Wyoming, Montana and Washington to pass a law which forbids the sale of any state lands for less than \$10 per acre. (And this in arid regions, for sage brush lands, while Michigan sells for *ten cents* and accepts \$1.25 for the pick, ten per cent of an 80,000 acre tract.) Can it be possible that Michigan will remain blind to all the experience of the west, to the experience of the old world where the range use of the Alpine lands and pinery lands alike has been a detriment for ages and is the greatest stumbling blocks in all efforts for the improvement of the conditions of the people and their lands?

The fourth argument in the protest demands equal and just taxation, and therefore is practically sound. If the people of Michigan expect the township of Denton to keep up roads and schools and protect life and property and generally do those things which any civil organization is expected to do, it should not take away from the few settlers living in this town the wherewithal to do their duty. New York pays taxes on its forest reserves, every state of Central Europe pays taxes on its state forests and any other holdings. Why should we, in a country which claims a government by the people and for the people, want to shirk and throw an unfair burden on a few pioneer people who are least in position to bear it? And to the credit of our state, be it said that this argument was duly considered and the legislature provided as has been stated above that the town shall not lose all revenues but shall receive payment in lieu of these taxes, the money to be used for school and road. It has therefore practically admitted the soundness of the argument and the propriety of meeting this demand and it is but natural that this matter in the future will receive further consideration and be adjusted equitably and satisfactorily. In this way the fourth, the most just and formidable argument practically falls away as regards Michigan state forest reserves. The state has declared it right and meets it.

We see then that the protest may be and is fairly met and it is gratifying to note here that in the counties of Roscommon and Crawford where the reserve policy has made its beginning the people have completely changed their views and there is today a most hearty and intelligent cooperation between the state and the people in the matter of forest reserves.

And now, what is it that the state should do? The answer has practically been given in what has been said, but may briefly be stated more categorically as follows:

1. The reserve policy of dealing with all state lands has proved acceptable to the people, it is the only economical and safe policy, it is in keeping with experience of the older parts of our Union and with centuries of experience in the old world. It should be continued and it should be extended to all state lands and to every acre of land as soon as it becomes delinquent for taxes.

2. No state land should be sold for less than \$5 per acre, for the land alone and any timber on the land should be sold according to rules established by the State forestry Commission.

3. No lands or timber should be sold except by public auction to be held in the county seat of the county where the land or timber is located.

4. No lands once deeded to the state should be sold or offered for sale unless written application is made therefor and the useless wholesale advertisement of our lands and the forcing of these lands on the market should cease.

5. Lands delinquent for taxes should be offered for sale once in accordance with the present law, but it should be illegal to waste the funds of the state in repeated advertising as has been done in the past.

6. Lands on which the taxes have not been paid for five years should be deeded to the state irrespective of any circumstances and the title thus obtained by the state should be sufficient.

7. The policy of the federal government in selling its land only to actual settlers and in tracts not to exceed 160 acres is sound in principle and practice and should be followed in the disposition of our state lands.

8. Non-agricultural lands should not be sold at all and in cases where doubt exists the Forest Commission should decide, since lands of this character are generally more valuable for timber than for farms.

9. The appropriations at present devoted to the handling of the tax title lands should be used to give these lands protection, care and improvement and to defray the taxes which the state pays to the town where lands are reserved for forests.

10. The state in selling any lands once deeded to the state, should never give a quit-claim deed, but should always give a warranty deed. Cases are now on record where citizens of this state in good faith buy the lands claimed to be the property of the state, and after purchasing these lands are obliged to allow other persons to cut off the timber or endure other trespass. A deed from the state should be sufficient evidence before any court to enjoin trespass of any kind.

But why should the state do these things now? Why not wait and let things develop? The answer is largely given in the nature of the case as presented. The state is rapidly growing and with it, the demand for timber. According to the best estimates we use each year more than two thousand million feet of lumber and timber in our state. If the timber and lumber are high, the house is not built and the barn "has to do;" development in every direction is hampered and checked.

But it takes 150 years to make white pine such as we have used in the past and it takes fifty years to make even fair pole timber fit for ordinary market.

It is hardly a matter in which it is wise "to hold on and go slow and see how things turn out." The state is losing hundreds of thousands every year now and will lose more in the future on account of the absence of a satisfactory home supply of forest material. Similarly it is easy to regulate the entire matter of state lands or poor lands today. A reasonable price alone will do this to quite an extent. If left undone and if the old policy of advertising our lands as sheep range and the encouragement of land monopoly prevails, and once these lands pass into the hands of the land sharks and are hawked out and colonized, the matter will be precisely where the older states of our country and where the states of Europe have foundered. No matter how universally this colonization may fail, no matter how wretched and run down large areas of these lands may become, the application of any remedy will meet with so many heads and so many and such diversified interests, that it will be only by the sacrifices of enormous sums and much time that Michigan in years to come, may correct the evil which the mistakes of Michigan today will cause. With a little conservative restraint, with a bit of good will and effort, with some attention to the experience of older states and people, the state of Michigan may, in a very short time, develop out of a blackened waste, a property which to the state will mean millions every year and which will mean even more to the people of the district in which it is located.

To leave millions of acres in a waste-land condition is a waste of money which no state should be guilty of. But this waste can partly be stopped at once and it should be.

The state should go ahead with the good example. Millions of acres of private lands await the right care which can and will come, but can come only when the state goes ahead and establishes a proper and efficient system of protection and develops a just method of taxation for these lands.

Nor should it be forgotten that this matter is one of great magnitude. The possibilities are great and it is doubtful if our state will have such an opportunity again.



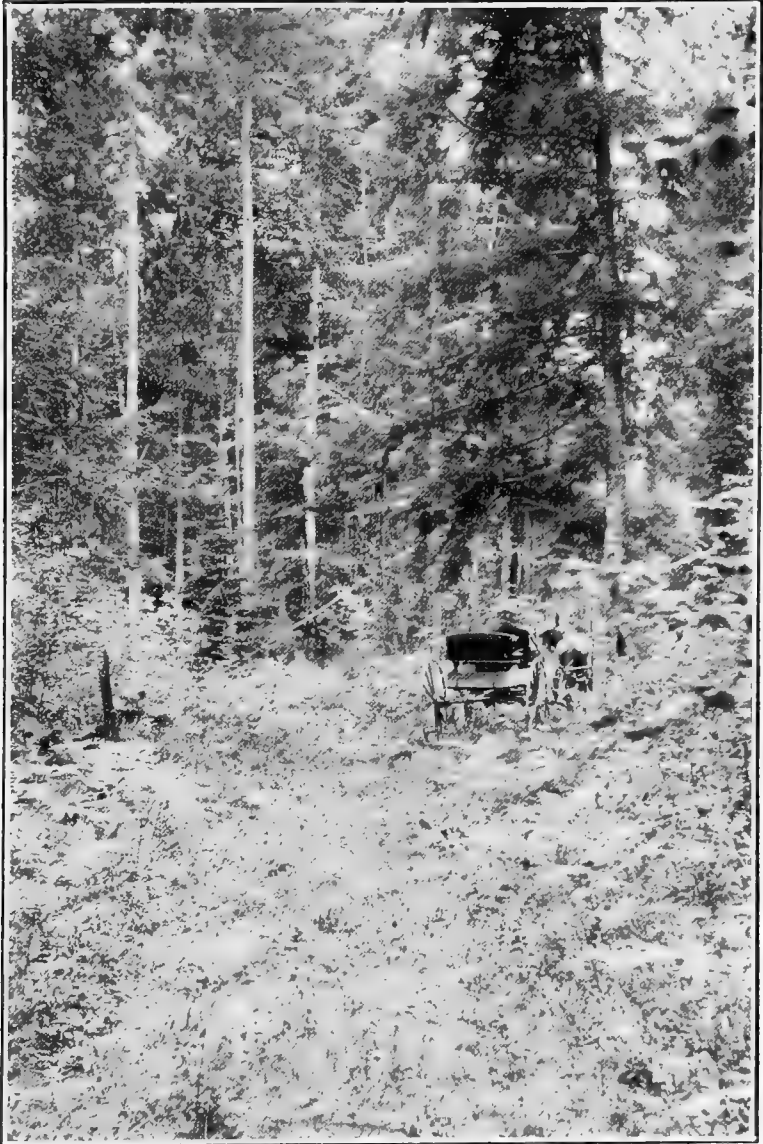
The great enemy to Forests—Fire. Carrying lunch to the men at the front who are in the fierce fight.



Vanquished by the enemy—Fire. Not even a seed tree is left to assist in rehabilitating the land.



A gallant fight to save the elements of a new forest. A lesson for Michigan.



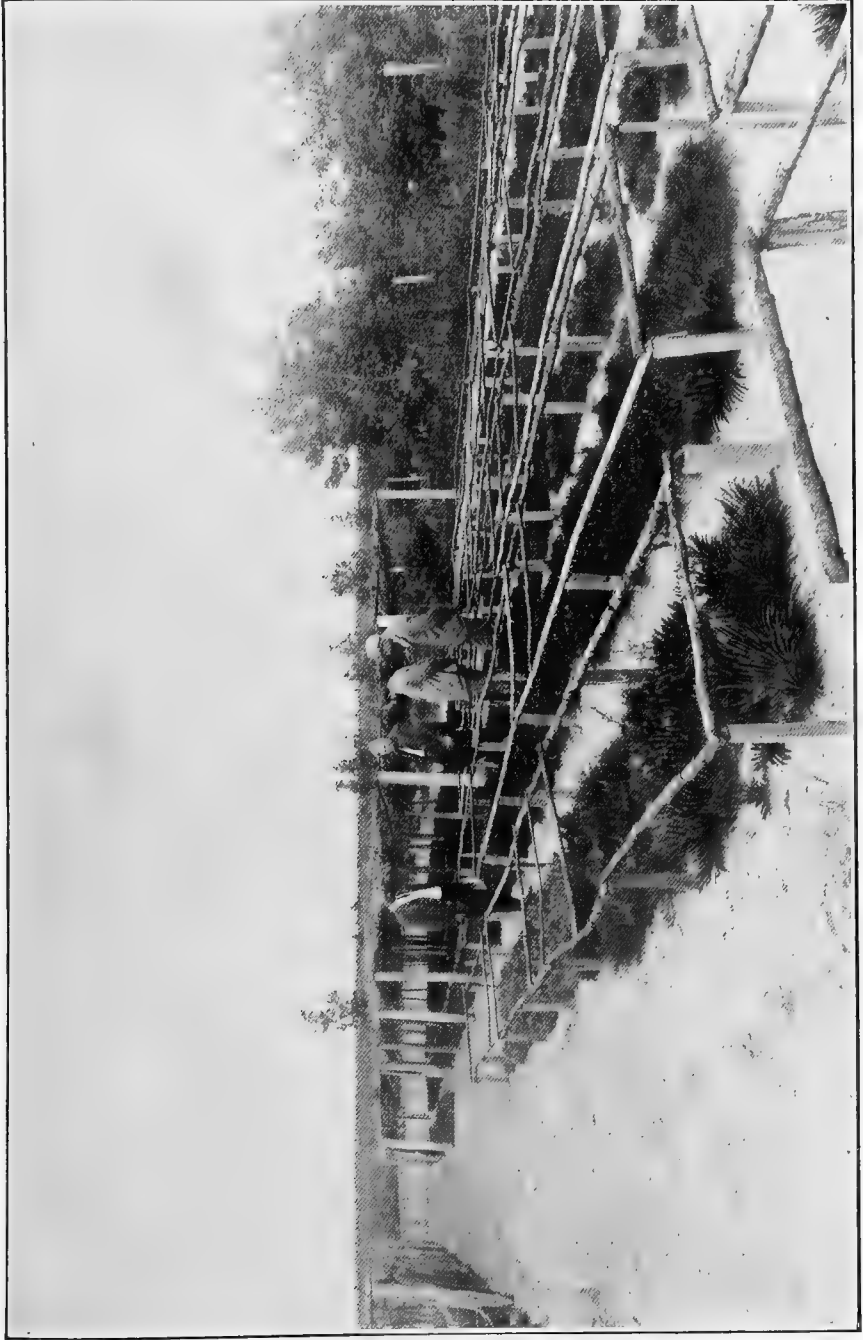
The beauty and delicious coolness which awakens delightful pulsations of the heart as one enters the farm woodlot.



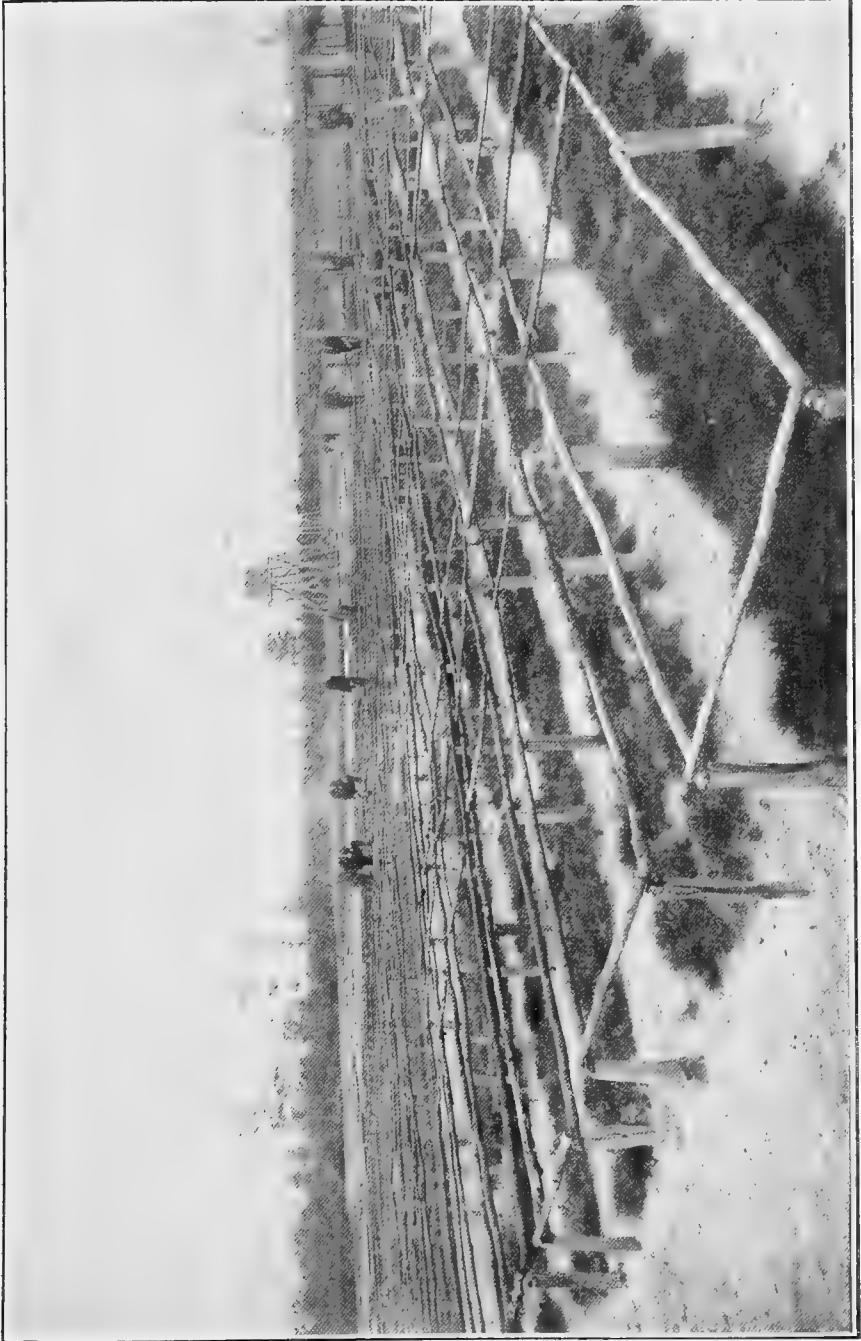
A young Black Locust forest 12 years old, trees 6 to 8 inches in diameter and 20 feet high.



The beginning of a catalpa harvest. Thinnings for posts from a young plantation 9 years old, 4 to 6 inches in diameter, many trees made two posts.



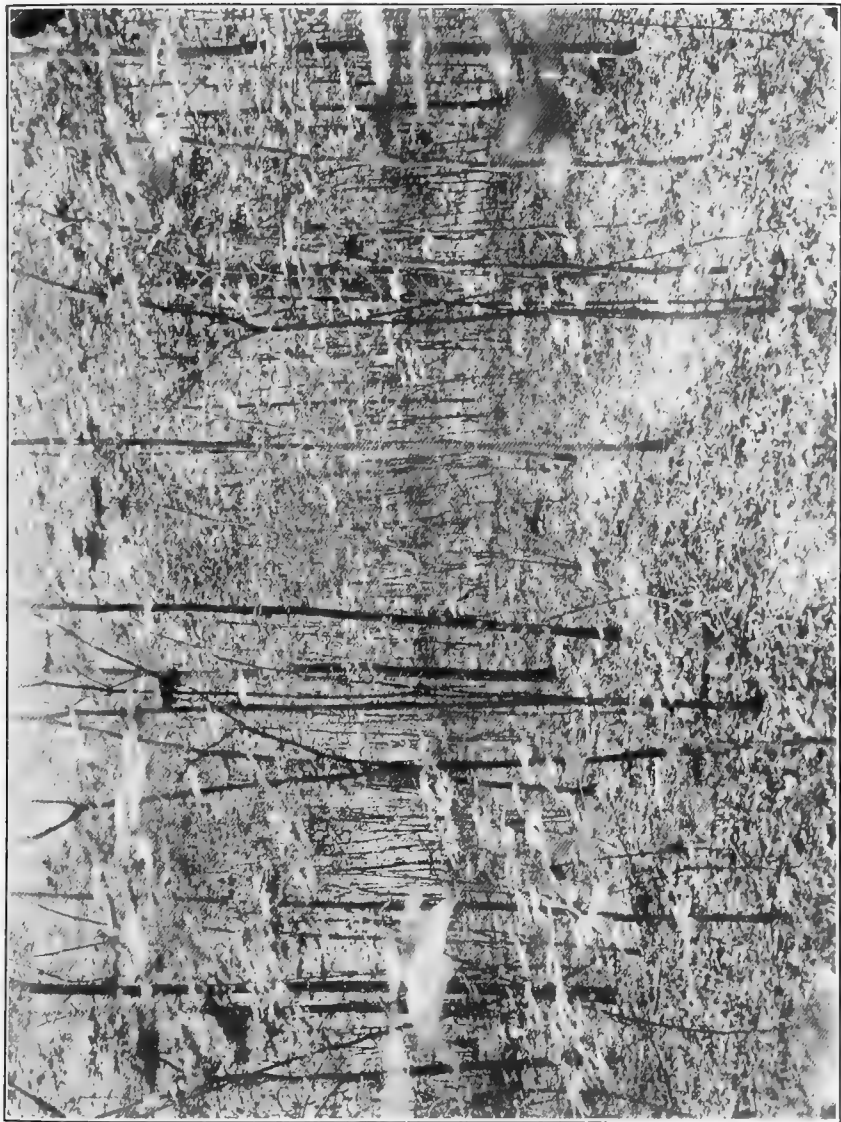
View in one corner of the nursery in Crawford county, near Higgins Lake. Counting from the left, Secy. W. H. Rose; Pres. Chas. W. Garfield; Forest Warden, Filibert Roth; Forester, Dorr Sheels.



General view of the forest nursery, near Higgins Lake, showing method of growing and protecting young stocks.



A young growth of mixed broad leaved trees in an open spot in unpastured woods.



Scene in midst of Geo. B. Horton's woodlot in Lenawee county where several large trees were removed making a clearing of one-eighth of an acre. Nature is performing a work of reforestation.



An example from Geo. B. Horton's woodlot in Lenawee County showing natural forest succession in unpastured woodland.



The pinery as it is. The mature timber wastefully removed, much of it left to fire, and the forest itself is destroyed, all young growth is gone and for many years these vast stretches of land have produced nothing, every effort of nature being offset by entire lack of protection.



Not all farm land. Moving sand on abandoned farm land. The handsome Norway Pine trees show, however, that it is not desert, but if used for forest, may grow a useful and much needed crop of timber. View in Crawford county.



Dr. Beal's demonstration that these moving sands are not desert and can do far more than feed a few sheep to the square mile during favorable summers. A 15 year old plantation of pine, spruce and hardwoods, with trees 10 to 16 feet in height.

REPORT

OF

COMMISSION OF INQUIRY,

TAX LANDS AND FORESTRY

TO THE

GOVERNOR AND LEGISLATURE

OF THE STATE



BY AUTHORITY

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UPON THE SUBJECTS REFERRED TO THAT COMMISSION BY ACT NO.
188 OF THE PUBLIC ACTS OF 1907.

TO HON. FRED M. WARNER, *Governor*:

Sir:—We submit to you for transmission to the next legislature our report and recommendations made as the result of our investigations under the act of the legislature of 1907, creating the Commission of Inquiry, Tax Lands and Forestry.

We submit also a duplicate for use of the Board of State Auditors and State Printer.

Our report and recommendations are as follows:

THE SCOPE AND OBJECTS OF THIS INQUIRY.

This Commission of Inquiry was appointed under Act No. 188 of the Public Acts of 1907. Its primary duty under this act is to submit to the legislature of 1909 a report setting forth a comprehensive plan for the protection, improvement, utilization, and settlement of the delinquent State tax lands, now owned or that may hereafter be acquired, and for the better and more economical administration of the affairs and business of the State connected therewith, and with other denuded waste or forest land; to the end that henceforth a consistent and complete policy may be pursued in reference thereto. The act directs that the report shall (1) define the proper attitude of the State toward the de-

linquent State tax lands and toward other forest, denuded or waste lands owned by individuals, particularly as affecting the fire problem, the conservation and increase of water supply, and the equalization and regulation of stream flow; (2) prescribe some method of defining the limits of forest reserves, and the manner in which the delinquent State tax lands, now owned or that shall hereafter be acquired, shall become a part thereof; (3) submit a draft of such laws as, in the judgment of the Commission of Inquiry, will best enable the State to perfect its title to said delinquent State tax lands, protect the timber thereon, provide the most practical means of checking and preventing the starting and spreading of fires thereon, or on other waste or forest lands situated in the State; (4) submit a draft of such other law or laws as the Commission of Inquiry may deem conducive to the profitable and economical administration of the business and affairs of the State in reference to the matters which are the subject of this investigation; (5) submit, as a part of its report, such findings and recommendations, germane to the subject, as the Commission of Inquiry shall deem advisable.

The title of the act in express language calls for a plan that shall be comprehensive, to the end that the policy hereafter pursued by the State may be consistent and complete. It is therefore expressly directed that this plan shall suggest a course of action for the State in reference, not only to its present and future holdings of land forfeited for taxes, but also in reference to denuded, waste and forest land owned by others. A plan is called for which shall not only provide for the utilization of the tax lands by their settlement and improvement, and by the establishment of State Forest Reserves upon them, but which shall also deal with the relation of the State to these tax lands, and to other forest, waste or denuded lands, as it concerns the general subject of forestry; and, in this connection, a report is called for upon reforestation, the fire problem, and the conservation and betterment of water supply and stream flow. It is obvious that these large benefits to public welfare were not less in the mind of the legislature than was the utilization of the tax lands, or the solution of the purely administrative questions clustering about them. Reforestation of the waste areas of the State, the furnishing to future generations of an adequate timber supply, the conservation of water supply and the betterment of conditions affecting floods, water power, stream flow, are questions of as great moment as any State can face.

Inasmuch as, for reasons more fully presented hereafter, these benefits can be secured only by the bringing back into forest conditions of greater areas than any reserves the State can create out of the delinquent tax lands; it follows that the requisite area must either be purchased by the State, or its reforestation must be brought about through encouragement to individual effort. It is therefore within the clear meaning and intent of the language of this act, if not within its express words, to submit suggestions for such legislation as will lead to forestry by individuals, especially in the way of farm forestry in the older and more settled portions of the State, and in the way of reforestation of cut-over, denuded and waste lands as a commercial venture in the less settled districts of the northerly portions of the State.

THE FORFEITED TAX LAND.

The primary subject for our consideration is the State land which the act refers to as "delinquent State tax land." The act itself makes it entirely clear that the land in question is that which has been, or shall hereafter be, owned by the State by reason of forfeiture of the title for non-payment of taxes by the former owner. For convenience we designate this land in this report as forfeited tax land. It includes the tax homestead land in the Land Office, and the State tax land in the Auditor General's Department.

The title to this forfeited tax land is acquired by the State under the present tax law as follows: The owner having failed to pay taxes within the time prescribed by law, the land is returned to the county treasurer, and in the spring following the year for which the tax was levied, it is returned by the latter to the Auditor General, who applies, early in the year next following, to the circuit court in chancery of the county where the land is located. His petition sets up that the land is delinquent for taxes, and asks that the court by its decree fix the amount due and direct a sale of the land therefor, unless the amount be paid before a date specified. Pursuant to this decree, the land is offered for sale at the county treasurer's office in the May following the decree, that is, in May of the third year following that for which the tax was laid. The sale held, for example, in May, 1907, was for the taxes of 1904. At this sale, land which is not bid in by individuals, is struck off, or bid, to the State by the county treasurer, and is so returned to the Auditor General. It then remains subject to redemption by the owner for one year. If it is not redeemed within this year, it becomes State tax land and goes on to the State tax land list. At this point, the original owner's title is cut off; the State has become, as against him, the absolute owner. *Hickey vs. Rutledge*, 136 Mich. 128; *Alcona Co. vs. Aud. Gen.*, 136 Mich. 133. Under the present tax law, the Auditor General is not required to deed to the State such State tax land until, upon examination, it is found to have been delinquent for five years or more, and to be abandoned. The title of the State, however, does not rest upon this deed, but accrues at the end of the year of redemption before mentioned. *Jackson & R. Co. vs. Lumber Co.*, 146 Mich. 207; *Gibson vs. Comr.*, 121 Mich. 50; *Alcona Co. vs. Aud. Gen.*, 138 Mich. 499. The purpose and function of the Auditor General's deed is not to convey title to the State, but to convert what was State tax land into tax homestead land, and to transfer the same to the jurisdiction of the State Land Office so as to bring it within the operation and effect of the law relating to homesteads and to sales. *Platz vs. Englehardt*, 138 Mich. 489. The origin of the State's title, both to the tax homestead land and State tax land, is in the original owner's continued failure to pay taxes, and in the proceedings taken under the tax law and under the decree of the court of chancery. Both are equally forfeited tax land, and are clearly within the contemplation and purpose of the act creating this Commission of Inquiry.

It appears from the foregoing that no land can appear upon the State tax land list until it has been delinquent three years, and that no land can, by the Auditor General's deed, be converted into tax homestead

land unless it has been delinquent at least five years. Examination of the State tax land list of any year in the Auditor General's Department will disclose that most of the land which has been deeded, or which is in condition to be deeded, has been delinquent for a term of years greatly exceeding five. It is believed that it is a conservative estimate to place the average period of habitual tax delinquency at upwards of ten years; and it is quite certain that this average considerably exceeds five years, and that all but a very small part of the forfeited tax land (State tax land as well as tax homestead land) has been delinquent for a period of five years or more.

THE TAX LAW HAS AUTOMATICALLY CLASSIFIED THE FORFEITED TAX LAND AS THAT WHICH IT IS WISE TO USE FOR FOREST RESERVES.

The forfeited tax land, situated largely in the sandy cut-over pineries, is, therefore, the residuum of a sifting process that has worked automatically for a long period of time. It is the land selected impartially by the self interest of the original owners as that which, for a series of years, has not been worth paying taxes upon. It is an obvious and safe conclusion that land which has been derelict for taxes continuously for many years is, in general, not of the better class of land in the town or county. Habitual and continuous tax delinquency, ending in forfeiture of title and total abandonment, establishes, with reasonable certainty, that such derelict land is, generally speaking, of the poorest in the particular town or county where it is situated. Moreover, many of the choicer pieces of what, at some time, have been included in the State's holdings, have been picked up from time to time by the homesteader or purchaser; so that in the course of time less and less of good land has been left in the list, until at present the sifting process of natural selection has furnished a safer guide to the poorer lands of the State than would be obtained by actual official examination. It is probably true that there is a good deal of this forfeited tax land which might profitably be farmed. We believe it is equally true that a good deal of it is too poor for success in this direction. In our opinion, no one can speak with conclusive authority (compare appendices 2 and 3) as to what percentage is of the one kind or the other, nor do we think it can be accurately determined by official examination. We believe it to be a safe and fair conclusion, however, that in general the land forfeited to the State for taxes is of the poorest class of land in its particular locality.

If, therefore, the State wishes to establish State forest reserves, and to utilize for this purpose the forfeited tax land, it will find it already selected automatically and impartially as the land that prima facie should be devoted to forest growing, because it is in general the poorer land in each county; and therefore in taking it for State forest reserves there will be no violation of the principle that forestry should be directed, as far as practicable, to the lands less valuable for tillage, leaving the better tillable land for settlement. While some land of the better class might fall into forest reserves that were formed by taking all the forfeited tax land, without discrimination, in limited districts where the State's holdings are bunched in sufficient area, nevertheless, this would, under the circumstances, be a desirable result rather than one to be avoided; for there should be considerable land in the State reserves

suitable for the growing of hardwoods, since the greater part of the forfeited tax land is too light for the best results with that kind of trees. Moreover, the fact, hereafter shown more fully, should be remembered, that the entire area of such reserves as it is possible to form out of the tax lands can be but a small percentage of the area of any county; and if every acre taken for reserves should be good agricultural land, nevertheless, the total can never exceed the quantity necessary for a reasonable balance between cultivated fields and forest areas. It is as true of regions that are all good agricultural land, as it is of regions in which a part of the land is non-agricultural, that the needs of society require that a considerable percentage of the area occupied be devoted to growing forests. Of course, forest growing should, as far as practicable, be directed to non-agricultural land. Confusion has perhaps arisen due to a want of failure to discriminate. Forest areas are a vital need in every community, and it should be the purpose of the State to establish reserves and promote forestry, even where all its land is excellent for agriculture. The real importance of the question (where it has any importance) whether land that is to be devoted to forest growing is agricultural or non-agricultural is not as bearing upon the wisdom of establishing reserves or encouraging forestry, but as bearing upon the question where those reserves or forests can be located most profitably, to the public interest. This question has been solved for this State by the automatic action of its tax law through a long period of years. The forfeited tax land has already been selected as the land which is, on the whole, the best land to form into State forest reserves, because its history proves that it is in general of the poorer class of land in each locality.

Whether the State should establish and maintain forest reserves; whether the forfeited tax land should or should not be utilized for this purpose, and if so, to what extent and in what localities—these are questions which do not depend for their solution upon a determination of the value, relative or absolute, of the soil of any county or town for agricultural purposes. It is no part of the duty of this Commission to investigate or determine whether Roscommon county or Crawford county, or any other county, is largely composed of non-agricultural land, or is chiefly, if not entirely, made up of land well adapted to tillage. We do not propose to go into an investigation of the conflicting claims (compare Appendix 2 and 3) that have been made upon that subject. Whether the land is of the one class or the other does not determine whether it is wise and advantageous to establish State forest reserves, or to utilize the forfeited tax land for such reserves. Both questions we believe are beyond controversy, whatever the fact may be as to the tillable or non-tillable nature of the soil. Public opinion every where has crystallized firmly into the accepted belief that it is essential to our future welfare that large areas be devoted to forest raising as State forest reserves; and it needs no argument to show the wisdom of devoting to this purpose such available land as the State has, rather than of purchasing land for such reserves. New York, Pennsylvania, and other states have followed the latter course because they did not own the necessary land. Michigan now has a large area of land available for reserves, and it is self-evident that it should use what it has rather than buy other land.

We repeat, so as to make it clear, that the recommendations herein do not imply, and are not based upon the idea, that the land of any county in the State is chiefly, or largely, non-agricultural and fit only for forest raising. We do not go into that question at all, because it is not essential.

THE QUANTITY AND DISTRIBUTION OF THE FORFEITED TAX LAND.

According to statements furnished to the Commission by the State Land Office and Auditor General's Department, the forfeited tax lands amounted, in November, 1907, to 1,112,757 acres. Of this amount 545,009 acres was State tax land subject to purchase in the Auditor General's Department, Nov. 8, 1907; and 567,748 acres was tax homestead land in the State Land Office undisposed of Nov. 26, 1907. A compilation based on these statements is here presented to show approximately the distribution of the State holdings at about the end of the year 1907, in those counties in which there was such an area of such land as is material for consideration in connection with this report. In this compilation is given the area of forfeited tax land, the total area of the county, and the ratio of forfeited tax land to total area of the county.

County.	Number of acres of					Ratio.
	State tax land.	Tax homestead land.	State forest reserves.	Total.	Total acreage of county.	
Oscoda.....	39,207	59,580		98,787	365,127	27
Montmorency.....	6,838	62,225		69,063	330,052	21
Alcona.....	50,879	15,370		66,249	358,456	18
Crawford.....	2,457	55,127	9,041	66,626	359,459	18
Iosco.....	8,026	46,897		54,923	327,610	16
Roscommon.....	18,334	1,814	32,676	52,825	339,420	16
Alpena.....	18,672	33,753		52,425	370,765	14
Kalkaska.....	39,815	3,697		43,512	359,966	12
Ogemaw.....	26,385	13,033		39,418	365,962	11
Otsego.....	16,793	13,239		30,032	334,088	08
Gladwin.....	13,250	14,722		27,972	330,018	08
Presque Isle.....	20,118	2,325		22,443	429,209	05
Cheboygan.....	22,130	20,084		22,214	507,492	04
Grand Traverse.....	19,994	321		20,315	355,407	05
Missaukee.....	15,265	3,536		18,801	362,708	05
Clare.....	5,831	10,054		15,885	364,020	04
Arenac.....	7,798	8,032		15,830	235,002	06
Oscoda.....	12,535	80		12,615	367,247	03
Midland.....	10,974	80		11,054	334,307	03
Manistee.....	9,344	1,269		10,613	350,205	03
Chippewa.....	10,336	49,886		60,222	1,002,248	06
Luce.....	4,195	43,442		47,637	581,436	08
Schoolcraft.....	2,470	31,965		34,435	758,202	04
Marquette.....	30,207			30,207	1,228,828	02
Delta.....	3,481	26,689		30,170	741,061	04
Iron.....	21,592	668		22,260	759,551	03
Baraga.....	21,153			21,153	566,365	04
Alger.....	17,162			17,162	588,759	03
Dickinson.....	9,323			9,323	491,926	02

In order to show as clearly as possible the location of the forfeited tax land, the location of each parcel with respect to the rest, and the location of the whole, and of the different parcels, with respect to lakes,

rivers and important streams, the Commission has had prepared a map for submission herewith. It is to be considered only as approximately correct. As sales are made every day in each of the departments, any map which is accurate and complete today, will cease to be so tomorrow, and every day that passes will lessen its accuracy. The mapping of the forfeited tax land on the map submitted was based upon information contained in plats by townships of the tax homestead land and of the State tax land furnished by the State Land Office and Auditor General's Department. These plats show the State holdings generally about the end of the year 1907, although the showing as to the Upper Peninsula is of a later date. As the parts of the different counties were made in the Land Office at different dates, it can not be said that the general map based upon them is now accurate, or that it shows the State holdings as of any particular date; but it is sufficient to convey a clear idea of the essential facts to be dealt with, and of the method which this report proposes for defining State forest reserves.

The tabulations furnished by the Auditor General's Department and by the State Land Office are subject to the same qualifications as to accuracy. It requires considerable time to make up such a tabulation; and, as the work progresses, the routine work of the department is making changes constantly. The plats of each county or township having been made at different dates, the tables and figures having been made at dates not corresponding with the plats, and plats and tables dealing with matters that are undergoing constant and hourly change in the routine of departmental business, do not of course correspond exactly; nor is it practicable under existing conditions to have them made so that they will. We are dealing with a matter that may be likened to a kaleidoscope that is always running slowly; there is nothing fixed, and the changes are not according to an invariable rule. Both the tables of figures and the map are submitted with the foregoing qualifications as to their accuracy.

We submit in this report a plan for the utilization of the forfeited tax land in such ways as we believe will tend to the best ultimate development of the State. This plan, and the reasons for it, will be better understood after such a general review of the land policy of the State as will show the workings of the present laws governing the disposition of the forfeited tax lands. For, it will appear from such a review, that in certain ways the present system is working against the best interests of the public.

OF THE RESULTS OF THE PRESENT LAND LAWS AND THEIR ADMINISTRATION.

(1) *Prices realized by the State for Tax Homestead Land.*

The sale of tax homestead land under Act 107 of 1899 and Act 141 of 1901 began in April, 1902. The homesteading of the tax homestead land began with the entries made in 1896, but none were actually deeded until 1901. The prices and returns to the State, and the number of acres deeded as homesteads, or sold under the laws referred to, is shown by the following compilation from the Land Office reports:

Acres and prices of tax homestead land disposed of either as homesteads or by sales as shown by reports of the Land Office.

	Acres.	Price.
1902 sales under Act 107 of 1899, which made certain Tax Homestead lands subject to purchase after April 1, 1902.....	448.51	\$808 51
“ under act 141 of 1901.....	12,408.49	3,343 89
1903 “ under Act 107 of 1889.....	3,431.04	4,850 13
“ under Act 141 of 1901.....	71,045.91	77,466 45
1904 “ under Sec. 131, Act 206, P. A. 1893, and acts amendatory.	151,101.37	192,391 04
1905 “ “ “ “ “ “ “ “	142,782.75	167,563 01
1906. “ “ “ “ “ “ “ “	231,894.05	244,916 65
1907. “ “ “ “ “ “ “ “	235,133.74	224,539 91
July 1 to Dec. 7, 1907, as per statement to Commission of Inquiry.....	101,477.79	199,312 73
Total.....	949,723.66	\$1,114,386 62
Deduct receipts from lots in cities and villages (see statement thereof, Appendix 1.....		84,347 25
		<u>\$1,030,039 37</u>
Total No. of acres of Tax Homestead Lands disposed of as homesteads to Dec. 21, 1907.....		244,431.72
Total No. of acres of Tax Homestead Lands sold to Dec. 7, 1907.....		949,723.66
Total number of acres disposed of.....		<u>1,194,153.38</u>
Money receipts from Tax Homestead Lands entered as homesteads estimated as 10c per acre.....		\$37,079 20
Money receipts from Tax Homestead Lands sold (after deducting amount received from sales of lots in cities and villages).....		<u>\$1,030,039 37</u>
Total money receipts.....		<u>\$1,067,118 57</u>
Average price received per acre.....		\$0.89
Average price received per acre from land sales.....		1.08

A considerable quantity of tax homestead land has been bought by land speculators in Chicago, Detroit and elsewhere for platting into small lots for summer resort purposes, and for subdivision into small holdings for farming, fruit raising and like purposes. This land has been bought in some instances as low as fifty cents an acre. Many sales have been made by these speculators to clerks, stenographers and working people of Chicago and elsewhere, and to others, on time at prices running as high as twelve and fifteen dollars and even twenty dollars an acre. The business has been sufficiently extensive and remunerative to justify extensive, full page advertising in Chicago and Detroit daily papers, Sunday editions, as well as to bear the expense of circulating advertising pamphlets. It is a fair inference therefrom that land good for farming and home making is worth very much more than the meagre price which the State has received for its tax homestead lands; and that any of the forfeited tax land that is fit for agricultural purposes will be cheap at a price which will net the State several times the average price it has heretofore realized, and which will, at the same time, enable those who wish to settle upon the land to acquire title at less than the cost of purchase from these speculators.*

*In appendix 2 will be found a statement from the Land Office concerning the purchases and operations of one of these land syndicates in Roscommon and Crawford counties, together with extracts from letters published, newspaper articles, etc.

(2) *Exploitation for profit to speculators at the State's expense, is the net result of the present land system and methods.*

For the purpose, among other things, of determining whether the State has received an adequate price for the tax homestead land that it has sold, the Commission has sent out investigators through several counties to look up such transactions as seemed to need it. The result shown generally in all directions and by a great number of transactions, justifies the conclusion that a very large percentage of the land sales result in the transfer of land on which the timber values at the time were enormously out of relation to the price realized. This is largely the result, it seems, of inadequate service in the examination and appraisals of land and of the shrewd workings of a very considerable body of self-interested men, who habitually deal in these State lands as speculators for profit realized in various ways. The evidence is conclusive that there are many of this type of land speculators; that no part of the State where there is any considerable area of forfeited tax land is without them; that a very large part of the tax homestead land that is entered as homesteads, and most of that which is sold, passes through the hands of these men. (See appendix 2, part 2.) This fact alone clearly shows that the present law and methods in vogue result in a vast body of transactions attractively profitable to speculators.

Our investigations of many of these transactions convincingly confirms this inference. Moreover petty misdeeds, irregularities, and inefficiency of service, appeared all along the line of investigation. The State's large money loss through the combined effect of these things is the least important part of the injury. In the language of the committee which conducted this investigation, the effect on the minds of the public, and especially on the people in the various districts most involved, is indefinitely more serious than the money loss. It is the general lack of adequate State protection and State care and interest in these north counties and in the State lands generally, that has made the State lands "commons" in the eyes of the people, to be dealt with as any one desires. This conception and attitude has been extended until all through our northern counties unoccupied lands are treated as common property; cut-over lands held in contempt as not worth the attention of a community or worth the protection accorded property elsewhere and under different conditions. This sentiment finds expression today in the public attitude toward trespass and fire; and it is especially in this latter respect where it will stand for years, as the most potent influence for the continuation of the waste land condition of large districts.

An efficient, well-controlled, business-like execution of our present system, faulty as it is in principle, a well-organized State patrol of the northern wild woods and State lands as is evidently contemplated in our trespass service, would long ago have established respect for law and property and thereby prevented the destruction and loss of much property, and would have made it easy to introduce better care of forests and other works helpful in the development of these districts.

The much dreaded fire question is trivial compared to many of the achievements of the modern industrial world; a few years of real adequate effort will restore law and order to a point where extraordinary care become superfluous and where a moderate expenditure well in

keeping with the results to be accomplished, would protect our woods and cut-over districts, and give nature a chance to restock the land.

Everywhere county abstractors, treasurers, registrars of deeds, State trespass agents, etc., are found to be either directly or indirectly, through agents, interested in the buying and selling of these State lands.

As to the loss to the State, because of inadequate or fraudulent appraisal—aside from the loss because of advertising and clerk hire—this has been enormous. The 21,451 acres which it has only been possible to examine because of the short time, show a loss to the State of \$10.20 per acre average. According to the lists received from the Land Office, there has been sold by the State, during the past five to six years, 882,000 acres. At this average the loss to the State was \$8,996,400. The value of the timber alone was five times that of the price obtained by the State for the land and timber.

The report of the special examiners sent out by the Commission covers 21,455 acres examined, and is tabulated by them as follows:

County.	Area.	Sold.	Value.			Loss to State.
			Timber.	Land.	Total.	
Muskegon.....	1,600	\$1,988 00	\$6,849 00	\$5,600 00	\$12,459 00	\$10,471 00
Newaygo.....	3,760	7,240 00	9,182 00	36,840 00	46,022 00	38,782 00
Lake.....	7,387	6,147 00	24,963 00	29,778 00	54,741 00	48,459 00
Benzie.....	240	594 00	2,048 00	1,200 00	3,248 00	2,654 00
Kalkaska.....	480	690 00	5,640 00	640 00	6,280 00	5,590 00
Emmet.....	461	669 00	3,693 00	1,141 00	4,834 00	4,165 00
Cheboygan.....	5,407	10,499 00	61,590 00	13,117 00	74,707 00	64,208 00
Crawford.....	200	810 00	4,280 00	200 00	4,480 00	3,670 00
Roscommon.....	1,360	2,470 00	31,598 00	1,840 00	33,438 00	30,968 00
Missaukee.....	200	310 00	5,600 00	840 00	6,440 00	6,130 00
Clare.....	360	360 00	3,157 00	720 00	3,877 00	3,517 00
	21,455	\$31,777 00	\$158,610 00	\$91,916 00	\$250,526 00	\$218,749 00

Our special examiners further say:

Most of the land examined was not sold to actual settlers, but to people who are either in the timber business or to persons regularly engaged in land traffic and who evidently purchased them for speculative purposes. Everywhere certain persons or cliques of persons appear either personally or through agents as the purchasers of State lands. Thus all the lands examined, showed that less than 5% were sold to actual settlers, the remainder being sold to timber dealers and land speculators, many of them not even residents of the State. (See appendix 2, part 2).

The homestead law, as far as our examinations extended, in its actual operation, has not lead to homesteads but has generally been used to secure timber or land and timber, for speculation. Thus of the cases examined, with the possible exception of one township in Newaygo county, less than 10% were taken with the evident idea of establishing a home, but were apparently taken for the timber values only.

A complaint frequently met with during our investigations was that, because of the large purchases of different land speculators, actual settlers are kept out of the districts. Such a complaint was made by Wm. E. Lincoln, of Peacock, who said that such people as Swigart who pur-

chased State lands in large quantities, at \$.50 to \$1.00 per acre, were holding these same lands at from \$7.00 to \$15.00 per acre. The same may be said of such people as Geo. A. Hart, of Manistee, who is holding his lands at \$10.00 per acre; Granville W. Browning, who has personally purchased over 30,000 acres of State lands at an average of about \$1.00 per acre, and is now selling these lands for from \$8.00 to \$12.00 per acre.

Another matter which was forcibly brought to our attention while making these investigations, was the fact that certain dealers and speculators are apparently able to at any time obtain any State lands they may desire. We come to this conclusion because we find that certain dealers have sold State lands from days to months before they had acquired a title from the State, and unless they felt sure of their ability to get what they wanted, when they wanted it, it is reasonable to suppose that they would not have made these sales.

These facts, in addition to indicating that certain speculators have apparently an inside track in the Land office, would further go to show that the State is exercising no supervision over its appraisers, for in all of these cases speculators were assured a handsome profit before they were even obliged to pay any money to the State.

These investigations are sufficient to make it apparent that the present system, law and methods are not ideal, and that it is advisable to try some radical change which holds forth a reasonable prospect of public benefit from a different use of, and method of dealing with, the forfeited tax land.

The report of the committee, which conducted the investigations referred to, and the report of the special examiners, will be found in full with a more detailed statement of results in the appendix, and are referred to as a part of this report.

(3) *Loss of opportunity to assert and hold control of conditions affecting streams, water supply, stream-flow and manufacture and distribution of power.*

No natural resource of the State is of greater importance than the water in our streams. Its utility is for needs that are many and vital: for stock and for irrigation in rural districts; for the supplying of urban communities for domestic use; for fire protection; and for development of power for street lighting, transportation and manufacturing. The use of streams for purposes such as these, requires the impounding of the water, and this in turn involves the overflowing of the immediate banks, and of more or less land in addition, within the limits of what is called the flowage area. The utilization of this natural resource, therefore, is dependent upon the right to flow such land as is within the flowage area of the impounding operation necessary to make the waters of the stream available for the particular purpose in view. This flowage area for any particular operation is fixed, both as to location and extent, by the surface formation or topography of the land on and near the stream above the point at which the dam to raise the water is located. The right to flow is a property right, requiring either the title of the land within this flowage area, or the consent of the owner of that title. If, therefore, the State owns even a little land

within the necessary flowage area, it can either prevent the impounding of the water altogether, and thereby defeat the whole plan, or it can, as the price of its consent, impose any conditions it sees fit. Its power is not in any way defined by the vague limits of the so-called police power. Its power is not only absolute, but the State cannot be divested of it, since the title can not be taken under the power of eminent domain. The ownership of only a few acres, therefore, may enable the State to keep forever the destiny of a stream within its absolute and unrestrained power. A very little land of small value, measured by the standards that ordinarily fix the value of land, thus becomes of immeasurable importance to the public welfare. Through its ownership the State may be enabled to take and forever keep a central control over both original development operations and subsequent distribution of the water in our streams. This central control would make it possible for the State, not only to protect the public in the matter of rates and charges, but to dictate concerning both development and operation in such manner as to prevent clashing of interests and secure fair and impartial service between communities as well as between individuals, to minimize flood conditions, to prevent pollution of water needed for urban uses, and generally to secure the maximum of public benefit. The maps and township plats submitted with this report show that a great many parcels of tax homestead land have been sold, and that many are still left, on important streams known to have considerable fall, and to possess a large capacity for the development of power. The Commission has not attempted to ferret out the facts concerning these sales because it seems unnecessary, since what is done can not be undone, and those from whom such information must be obtained are naturally close-mouthed, especially where the project is in process of working out. In some instances full information has been freely given. One instance will sufficiently illustrate. A company organized to develop and exploit a part of the water power on the Manistee river purchased from the State eighty-seven parcels of land aggregating three thousand and ninety acres, all tax homestead land except six forties, two hundred and forty acres. The prices ranged from fifty cents to two dollars an acre. Six parcels brought the latter sum. Most of the sales were at one dollar or less per acre. The diagram of the engineers based, on actual survey, shows that practically every parcel of this land is in whole or in part, within the area that will be flowaged by the proposed dam. A rough copy of the engineers' map and township plats from the land, will, for reference, be filed with this report but not printed. Like schemes will, unless the law is changed, shortly result in all State land within the flowage area of all the important streams being picked up by interested speculators. It is known in a general way to many that agents of those interested in acquiring such lands are numerous and active in different parts of the State, locating flowage areas and State lands therein. Alfred C. Lane, the State Geologist, writes: "I may say that I know that private interests have been carefully looking up the various water powers of the State and their flowage, and that such topographic maps as the United States and the State have been issuing conjointly would be of very great service in determining lands subject to such flowage. I am not, however, anxious to have our present series of maps cover such areas

until the State lands are at least temporarily reserved from sale, because I know that the result would be that they would at once be picked up. I know that land agents have made trips along many of our principal rivers and blocked out the flood plains and secured the acreage thereof."

The state of things indicated by Mr. Lane's letter is the natural result of the increase of utility and value of water power within very recent years by reason of the progress made in ability to transmit power by electricity for use at different points. This has made all land within the flowage areas of streams having the necessary fall for development of power, a valuable asset, and it must be expected that it will be quickly picked up by speculators, to be turned over to more permanent investors.

It is not our purpose to recommend any change in the policy evidenced by that clause in the Constitution which forbids the State from undertaking works of internal improvement; nor is it the thought of the Commission that ownership of land under discussion other than that in the State reserves, should be retained in the State permanently. It is desirable that this land should be made available for any use that it may be suited for, subject only to such provisions as will retain in the State the power that ownership of the land would enable it to assert over the development, operation and distribution of the water. All the incidents of ownership consistent with the State's retention of control in manner suggested should be secured to the State's grantee. One section of the draft of a proposed statute, submitted as a part of this report, seems appropriate for the attainment of the purpose in view, viz.:

Section 12. Every grant, conveyance or transfer of the title of the State to, and every contract made by it affecting, any land within the operation and effect of Section 1 which lies upon, includes, or is bounded or crossed by, any lake, river or stream, or which lies within the flowage area thereof hereinafter mentioned, shall be subject to the following stipulation binding upon the land and upon all grantees and assigns thereof as follows, to-wit:

All such parts of the land included in such grant, conveyance, transfer or contract as will be flowed by any present or future work, dam, or operation for impounding, diverting or controlling the waters of any lake, river or stream in order to develop water power, or to furnish water supply, or to regulate stream flow, or for any other purpose, are conveyed by the State only to the extent that the grantee and his successors in title may use, possess and enjoy the same, except for the purpose of flowage as aforesaid; the right of flowage being reserved to the State subject however to the agreement that such right of flowage shall not be used by the State, or conveyed or granted to any person, except either with the consent of said grantee of the land or his successor in title then owning the same, or upon condition that compensation by the grantee of such easement or reserved right shall be made to the said owner of said land in the same way as though he were the absolute owner thereof without restriction or reserved right aforesaid; and provided further, that any grant or conveyance by the State of the easement or right of flowage shall be held and deemed to be subject to the reservation and agreement that the same is, and shall forever remain, subject to such rules, regulations and requirements as the State

may at any time see fit to impose for the protection and betterment of public welfare.

Protection of the State's interest requires action by the legislature at as early a date as possible. The particular parcels of forfeited tax land, having value in the way suggested, can not be readily or quickly ascertained; nor would it be wise to point them out publicly, in advance of legislative action, as that would enable speculators to take them up under the present law before the legislature can act. It is essential that the forfeited tax land be withdrawn from sale or other disposition (except redemption of State tax land in the Auditor General's Department by the owner of the record title) while action along the lines recommended in this report is under consideration by the legislature. Action of this nature, immediately upon the convening of the legislature, is earnestly recommended as of great importance for the preservation of public interests.

(4) *The laws allowing sales of tax homestead land have not contributed materially to bring in actual settlers.*

It seems to be well established by our investigations that the laws under which tax homestead lands have been sold have contributed to the actual settlement of the regions of cut-over lands but very little. Some of this land brought by speculators is resold at large advance in prices, and often after the stripping of the timber. But it is comparatively seldom that the man who is seeking a home buys tax homestead land; if he wishes such land he takes it up under the homestead law. Most of the sales of tax homestead land are to those who buy in order to strip the land of timber on it, or to acquire it for ranches to be used as cattle or sheep ranges. Some is bought for sporting or game preserves; some to control the flowage as already stated; some for summer resort purposes; some as a measure of tax dodging. (See the statement in Appendix 4, of Wm. H. Rose, Commissioner of the State Land Office.)

All the sales that have been made in the Land Office are shown by statements prepared in that office for this Commission. These statements will be filed with this report but are not printed. Examination of these will disclose that most of the land sold in any county taken as a sample, was sold in many parcels, but in large aggregate acreage, to a few individuals or corporations. It is evident from such an examination (see Appendix 2, Part II.) that the purchasers of very much the greatest part of the acreage were not persons who designed to settle on the land purchased.

(5) *The present law, both the feature allowing sales and that allowing homesteading, is operating to the devastation of great areas, and to the rapid destruction of the capacity of the cut-over lands of the north to reforest naturally without artificial aid.*

The results of our investigations show that the most of the forfeited tax land that the State disposes of is acquired primarily for the purpose of stripping it of timber. So far as sales are concerned we have already sufficiently covered this subject. It is a matter of common knowledge in the State.

So far as the homestead feature of the law is concerned, we have official figures that furnish valuable information. The following table, compiled from figures furnished by the State Land Office, shows by years, from the time entries began under the law to Dec. 21, 1907, the number of acres of tax homestead land entered as homesteads; the number of acres deeded at the end of the five years' residence required by law; and the number of acres abandoned and that reverted to the State for non-compliance with the requirements of the law.

Year.	No. of acres entered as homesteads.	No. of acres deeded to settlers at the expiration of the 5 years residence required.	No. of acres reverting to State for non-compliance with the law.
1893.....			
1894.....			
1895.....			
1896.....	40,125.49		
1897.....	59,689.69		2,179.05
1898.....	61,107.03		3,957.29
1899.....	26,651.91		13,845.89
1800.....	42,359.42		9,713.59
1901.....	34,268.42	21,807.17	16,189.72
1902.....	33,361.60	24,749.09	19,410.49
1903.....	22,422.96	35,979.28	23,026.91
1904.....	12,098.18	12,647.51	12,637.24
1905.....	2,928.56	20,465.55	9,115.47
1906.....	14,384.02	13,764.17	4,127.18
1907.....	17,693.02	16,741.29	10,131.84
July 1, '07, to Jan. 31, '08.....	367,090.00	146,174.06	124,334.67
		9,162.99	21,531.90
		155,337.05	145,866.57

The general result shown therefor, is that 51½% of the acreage taken up as homesteads is deeded to settlers on compliance with the law, while 48½% is abandoned and reverts to the State. A compilation from the Land Office reports of the acreage of deedings by counties, together with a statement of abandonments as given to this Commission by the chief clerk, shows a slight difference between the total of deedings as given by years and that as given by counties:

HOMESTEADED LANDS.

Statement by counties of the number of acres deeded and the number of acres abandoned.

County.	Acres abandoned.	Acres deeded.
Alcona.....	8,346.62	8,601.22
Allegan.....	11,371.81	5,646.50
Alpena.....	11,990.09	10,366.24
Arenac.....	4,817.15	3,693.22
Bay.....	2,525.01	7,843.68
Crawford.....	6,220.13	5,706.83
Cheboygan.....	400.00	320.00
Clare.....	8,163.17	9,188.16
Delta.....	2,962.79	3,433.66
Emmet.....	1,520.00	1,661.25
Grand Traverse.....	80.00	160.00
Gratiot.....	1,998.25	1,638.57
Gladwin.....	2,865.15	4,028.20
Huron.....	1,246.20	1,071.75
Iron.....	651.80	571.80
Isabella.....	2,336.15	3,829.12
Iosco.....	460.00	.....
Kalkaska.....	1,686.70	2,292.13
Kent.....	.....	560.10
Lake.....	960.00	960.00
Lapeer.....	.....	160.00
Menominee.....	40.00	120.00
Mecosta.....	8,238.81	22,656.45
Midland.....	6,190.19	7,619.89
Missaukee.....	6,256.46	9,417.87
Montcalm.....	2,402.77	4,161.96
Montmorency.....	11,722.55	7,121.95
Muskegon.....	3,009.92	1,380.92
Newaygo.....	360.00	360.00
Oceana.....	1,000.00	1,428.37
Ogemaw.....	9,550.77	5,481.74
Osceola.....	1,278.25	3,035.25
Oscoda.....	.....	120.00
Otsego.....	1,146.85	520.00
Ottawa.....	40.00	320.00
Presque Isle.....	13,742.57	9,167.47
Roscommon.....	9,233.39	7,916.80
Saginaw.....	.....	120.00
Sanilac.....	120.00	796.00
Schoolcraft.....	80.00	356.16
Tuscola.....	850.00	1,625.30
	145,866.55	156,458.56

Taking a district in the Lower Peninsula in which the State holdings of cut-over land are the largest, viz.: Arenac, Gladwin, Clare, Missaukee, Roscommon, Ogemaw, Iosco, Alcona, Oscoda, Crawford, Kalkaska, Otsego, Montmorency, Alpena, Presque Isle and Cheboygan, we find that 53% of the acreage homesteaded is abandoned and reverts. The following table shows the result by counties:

County.	No. of acres deeded on compliance with the law.	No. of acres abandoned and reverting for non-compliance.	Percentage of abandonments.
Arenac.....	3,693.22	4,817.15	
Gladwin.....	4,028.20	2,865.15	
Clare.....	9,188.16	8,163.17	
Missaukee.....	9,417.87	6,256.46	
Roscommon.....	7,916.80	9,233.39	
Ogemaw.....	5,481.76	8,550.77	
Iosco.....		460.00	
Alcona.....	8,601.22	8,346.62	
Oscoda.....	120.00		
Crawford.....	5,706.83	6,220.15	
Kalkaska.....	2,792.13	1,686.70	
Otsego.....	520.00	1,146.85	
Montmorency.....	7,121.95	11,722.55	
Alpena.....	10,366.24	11,990.09	
Presque Isle.....	9,164.47	13,742.57	
Cheboygan.....	320.00	400.00	
Total.....	84,438.85	96,601.60	53%

THE TIMBER SKINNER AND THE "RUBBER 40."

These abandonments, in the main, point to the operations of the timber skinner. This well-known character is one who, pretending to be a bona fide settler, has, under the cover of the homestead law, made a practice of squatting temporarily for his nefarious purpose upon what, in the common speech of the whole region of the cut-over lands, has come to be familiarly known as a "rubber forty"; that is, an anchorage in the neighborhood of some mill where there is a market for everything in the shape of timber or wood products. Here he locates in a crude shanty, built to be abandoned, and from it reaches out in every direction to strip off all that grows which is convertible into money, whether it be found upon land owned by the State, or by individuals who are not watchful of their interests. It is this man who is surely divesting nature of power and capacity to reclothe and rehabilitate the waste cut-over lands of the north. His destructive work supplements the devastation of fire, and both work together to a common end—desolation. It is doubtful whether fire or the unwise policy of disposing of these lands to those who acquire them for the timber is the greater foe to the true interest of the State. Each so supplements the evil work of the other as to increase its destructiveness and make the ruin more complete. These two evils, fire and the timber skinner, are so interwoven that they are in reality one, and the elimination of both is essential if there is to be any hope of a rational and wisely balanced development of the cut-over lands, or of securing forests capable of supplying enough lumber for the future, or of producing the incidental benefits to public welfare that come from having adequate forest areas.

The homestead abandonments officially recorded do not relate exclusively to the timber skinner, for many poor people have been enticed into attempting to make homes on land unfit for their purpose. These people were poor and not above the average in knowledge of and skill in agriculture, and so lacked both the means and the ability to create homes and family supporting farms out of light, thin lands. Capital and skill sometimes can do this, of course, but these people were without either.

The necessary result was failure—a disaster to the man who made the attempt, and anything but profitable, either to the neighborhood in which he settled, or to the State at large. Abandoned homes there are without doubt in the pine barrens.* It has been suggested, however, (See Appendix 2), in quarters not altogether disinterested, that none of the failures evidenced by the abandoned homes to be seen in some of these northern counties, were due to the unfitness of the land, but that (so far as they represent not timber skinning but the failure of an honest effort to make a home), they were all due entirely to the unfitness of the man who made the attempt to create a farm out of such light, sandy lands. Inasmuch as a great quantity of land has, by the aid of questionable advertising matter, been sold by land speculators, to clerks, stenographers and working people of Chicago and elsewhere, it is easy to believe that a large number of persons may have been caught who had neither the means nor the knowledge to fit them for the task of farming. But it matters not at all whether failure of honest effort was due to the unfitness of the land, or of the man who was enticed into making the attempt. So far as the land policy of the State has made easy either result, it merits only condemnation, and a change in that policy should be made which will prevent the recurrence of like results.

But making due allowance for the actual failure of bona fide attempts at home making that are included in the figures above quoted, the greater part of the abandonments shown represent the pernicious and destructive work of the timber skinner, the man of the "rubber forty," who is vying with fire in the work of bringing the cut-over lands of the north to a condition of waste and desolation.

THE CAPACITY OF THE CUT-OVER LANDS FOR NATURAL REFORESTATION.

The forfeited tax land is chiefly found in the regions once covered with pine forests. This land is light. Very little hardwood land, which is generally heavier, has been allowed to fall to the State for taxes. The typical history of the cut-over land of the original pineries, is that, after removal of the pine, fire, invited by the topplings and inflammable debris, has swept over the region. This devastation is often several times repeated, and its completeness is in proportion to the number of fires and their intensity. Sometimes the vitality of the land is destroyed; sometimes a few trees escape destruction, or a little young growth, and the possibility of natural reproduction, if fire is kept out, is preserved. The State has tried neither to keep fire out, nor to preserve the seed trees and young growth. It has ignored the value in forest growth except when large enough to yield lumber or wood. The value of seed trees, because of their equipping nature to reforest without planting or other artificial aid, has been overlooked. The policy of the State has been to crowd its holdings of cut-over lands upon purchasers for a mere song for the very purpose of having them stripped of this scattered growth. This policy, and the supine inaction of the

* Extract from a letter of W. B. Mershon of Saginaw:

"I spent five days around Harrison and I saw abandoned farms in great numbers. I will bet I saw 100 farm houses boarded up and desolate, and in some of them were the cook stoves, rocking chairs and a lot of other stuff left behind, for they evidently had no money to cart it away. A whole lot of life's tragedy is written on the Michigan sand barrens. New settlers are going in right along to try the same old experiment of threshing a living out of the sand and nothingness, and will meet with the same result. See also appendix 2.

State and residents in reference to forest fires, are working together towards the reduction of great areas to desert conditions. The stripping of the scattered growth, where it does not bring fire upon the land as its immediate accompaniment, leaves the inflammable topplings and cuttings scattered about, converting the land into the very condition most inviting to fire and contributing its readiest means of spreading. Another fire leaves the land bare, and probably kills not only all the young growth, but all the seed that may be scattered on the ground, leaving nothing in many cases with which nature can work to reforest; the young growth, the forest cover, the seeds, the seed-bearing trees, all are gone.

This unwise land policy, and the State's neglect of the fire problem, are, in a large measure, due to failure to recognize the function and value of the scattered forest growth upon cut-over land. It constitutes an asset of large value, quite distinct from the land itself. It gives the capacity to reforest naturally without artificial aid. It is true, perhaps, that much of nature's unaided work of reforestation will not be as quickly done as if the same area were artificially planted, and that she will often restock the land with trees less valuable than pine and the more desirable hardwoods; but, on the other hand, the cost of planting artificially is saved, and the product, whatever the character of the timber produced, will be of substantial value in time to come when all timber and wood values must of necessity be higher than they are now, and when much forest growth will have a market demand that never has been considered merchantable. Moreover, in all the ways that forestry aids agriculture or contributes to the public benefit, in the betterment of water supply and regulation of stream flow, the forest cover resulting from nature's unaided work of reforestation will be as valuable as though the trees were all of the most desirable kinds for timber. The capacity of nature to reforest therefore, is an asset of great value. If the timber skinner is allowed even a few years longer to make way with the seed trees, every acre on which fire follows, as it will shortly, will be divested permanently of this capacity to reforest itself; and as seed trees on one forty may mean the capacity to reforest not only this forty, but its eight adjoining like parcels, the extent of the area affected by the loss is evident. Moreover it means a distinct injury even to the agricultural land destined to become farms; and to all the large acreage that is non-agricultural, and that in wisdom should be again turned into forest, it means the difference between the cost of natural and of artificial reforestation.

Letters and statements from people well acquainted with the condition of the cut-over lands of the north will be found in Appendix 5. They picture the condition of these lands as it relates to their ability to reforest naturally. They present the subject from the points of view of many people widely scattered in the State. Taken together as a whole they make what may be likened to a composite photograph.

THE PURPOSES AND PRINCIPLES UNDERLYING THE FORMULATION OF A PLAN
FOR UTILIZATION OF THE FORFEITED TAX LAND.

For the best ultimate development of a State it is, next to securing settlers in adequate number, important to provide for a wise and proper balance between forest areas and tilled fields. Settlement should not be encouraged by State action beyond this point, but it should be the aim both to have settlers, and to have forest areas adequate for the needs of those settlers.

Moreover, State action should not seek to direct settlement to any of this forfeited tax land except such as is of the better class, having real value for farming. Just as forestry should be directed to the non-agricultural and poorer land, so conversely settlement should be directed away from, not toward, the poorer agricultural land. Since the forfeited tax land is a residuum, largely culls, resulting from a sifting process that has segregated the poorer lands of the locality, we are justified in concluding that so far as settlement is to be directed by the action of the State, it should not be toward the forfeited tax land, but away from it, toward the *prima facie* better land which has been protected from taxes, and the available supply of which is, as the figures show, altogether beyond present demands for settlement. In the fourteen counties having the greatest percentage of forfeited tax land, there is from seventy-five to ninety-five per cent of the area of the county that is tax paid, and in every other county of the State the tax paid land exceeds ninety-five per cent of the area of the county. In order to secure a proper settlement of any county, preserving a wise and advantageous balance between forest and cultivated areas, it is therefore clearly not necessary to turn prospective settlers towards the forfeited tax land.

It is equally clear that such of the forfeited tax land as is opened to sale should be disposed of in such way as will not incidentally operate to the disadvantage of the State. It is also our opinion that the best interest of all concerned will be subserved by providing that such of the forfeited tax land as residents of the townships in which it is situated desire for private timber reserves shall be made available for that purpose.

A plan for the utilization of the forfeited tax land should find its support and foundation in these considerations, and should therefore have for main ends the following, viz.:

(1) To secure for settlement as much of the forfeited tax land as is possible, consistently with the reservation of adequate areas thereof for forests; but (a) only to the extent of such parcels thereof as are clearly well fitted for tillage and the making of successful farms; (b) only in such way as is consistent with the exclusion of the practice of timber skinning; (c) in such way as will, so far as practicable, eliminate the land speculator, or middleman, whose profits represent what is added to the price paid by the settler over and above the paltry price realized by the State, and whose work it is which is responsible for unfit land being taken up by homesteaders, and for unfit men undertaking the task of making profitable farms out of a class of land for which skill and knowledge are especially necessary.

(2) To secure for use for forest purposes, in part by the State as

State forest reserves, and in part by individuals as private timber reserves, an area sufficient, if possible, to adequately provide for the public needs in the future as population grows.

(3) To allow the disposition of the forfeited tax land not utilized as above only at such time and in such way as will not operate, either directly or indirectly, to thwart or hinder the accomplishment of the purpose aforesaid.

(4) To reserve to the State, whenever State land on or near streams or lakes is disposed of, all rights of control over them or their waters that full ownership of the land would give if the title were retained by the State permanently.

(5) And any wisely conceived plan along these lines, should, as its complement, include the adoption of a policy aimed to secure the aid and co-operation of individual effort in the fire problem and in commercial and farm forestry.

TO ELIMINATE PURCHASES FOR TIMBER SKINNING, ALLOW SALES OF LAND ONLY AT A MINIMUM PRICE PER ACRE PLUS THE VALUE OF FOREST PRODUCTS.

So far as these objects relate to the disposition of the forfeited tax land for settlement, they will be secured, it is believed, by fixing by law a minimum price per acre of not less than five dollars, with the provision that to it shall be added the amount of the value of all saleable timber and wood products. Land that is really good tillable land, will find purchasers, and will be cheap enough at this price; and it is certainly wise to direct settlement away from the forfeited tax land if, where there is any demand for land, it is not deemed good enough land to command this price. Such a law will eradicate the practice of timber skinning, if the law is properly enforced by honest appraisal of timber values. This execution of this feature of the law is the critical point of this entire branch of the subject.

To effectively eliminate the practice of timber skinning will also require a modification of the general tax law so as to prevent sale of the State's bid by the Auditor General in such way as to give the purchaser color of title as a protection for the removal of timber. The Auditor General should be authorized to sell the State's bid, at any time after expiration of the year of redemption following the tax sale, for the full amount due for taxes, interest, expenses and charges, and to execute to the person making such payment an acknowledgment thereof, the same to operate as a cancellation and total annulment of the right, title and interest of the State in the land; but there should be no conveyance of title or interest in the land grounded on the tax proceedings adverse to the original record title, or to title resting on actual possession. Express provision should be made that the law shall not be so construed as to extend the period of redemption, nor to extend the right of the owner of the original title beyond the last day of the year following the tax sale. It should be made clear that the law is not designed to confer any vested right or interest upon the holder of the original title, but is intended to operate solely in the interest of the State, so as to enable it to cancel its right and title on receipt of all the back taxes and incidental charges, but to do this in such way as will prevent a stranger

to the title from acquiring an interest founded on the tax proceeding with the design of making it a cover for timber skinning to the detriment of the public interest and welfare.

OF THE DELIMITATION OF STATE FOREST RESERVES.

The map prepared for submission herewith shows that the State's holdings of forfeited tax land are much scattered and that a large part lies in small parcels widely separated from other State holdings. Only now and then are districts found in which these parcels are located with respect to each other in such way as to make it possible to form out of them a forest reserve of sufficient extent and compactness for economical administration. Hence the location of State reserves is dictated almost entirely by an established fact. They must be placed where the State has the land, and even if the land is tillable, it must be appropriated for reserves. To this extent even settlement must be regarded as a purpose of secondary moment. For the sake of effectiveness of fire protection and of economy of administration, it should be provided that future acquisitions of forfeited tax land so located as to fill in gaps and round out the State's holdings shall, as acquired, be added automatically to the State reserves near which they are located. For this purpose the first step recommended is the defining of districts to be called reserve districts, to be located so that they will include within their limits the compact holdings of the State. It should be provided that within the limits of each reserve district all future acquisitions of land shall automatically be added to, and become a part of, the State forest reserve within that district, subject to the limitation fixed as the maximum area of State forest reserves in any county. Careful consideration of the map will show that the State holdings, so located with respect to each other as to be available for reserves, are but a very insignificant part of the State's area, and clearly insufficient in extent to furnish the future with lumber or to have material influence on stream flow, or to bring about ultimately such a development as will produce a wise balance between agriculture and forest lands, or to produce generally or in any large way, the incidental benefits to the public welfare which are to be expected from having adequate forest areas.

By the time the next legislature convenes the State, in districts where it now has extensive and comparatively compact holdings, may have little or nothing left. The limits or location of reserves, therefore, can not be determined by reference to the map submitted, nor to the plats above mentioned; nor is it possible for the Commission, reporting in advance of legislative action, to submit any map which can be used as the basis of the delimitation of State forest reserves. That requires knowledge of exact location and quantity at the exact time. It is not possible to obtain such knowledge, except by a temporary withdrawal from entry, sale or other disposition of the tax homestead land and State tax land (except redemption of the latter by the owner of the original title), and by the making of an inventory and map showing the holdings of the State at date of such withdrawal. Legislative action direct ing such withdrawal is the first necessary step to the creation of State forest reserves.

It was perhaps in the mind of the legislature when it adopted the

statute under which this Commission is acting, that the report which is called for would specifically define State forest reserves. But it will become evident at once, upon consideration, that it is impossible for this Commission to locate definitely the limits either of reserve districts or of State forest reserves, because the first and essential condition that must determine the location of both is undergoing change from day to day. Moreover, if the report of this Commission should define reserve districts, it is quite certain that there would be a rush upon the Land Office to acquire lands within those districts, either because of the prospect of more adequate fire protection therein, or in order to compel the State either to repurchase, or abandon the project of a State reserve in that district. Moreover, the location and defining the reserve districts and State forest reserves is a matter which ought not to be determined solely by reference to the map. Some considerable examination in the field is highly desirable. It would seem an unwise expenditure of money to make this examination, involving considerable expense, in the face of the fact that, before the legislature meets, the entire work may be made useless by a purchaser stepping in, and, under the law in force, acquiring the land necessary to the creation of a reserve. No action can therefore be taken safely or wisely to definitely fix the limits either of reserve districts or of forest reserves until after the legislature shall have temporarily withdrawn all of the forfeited tax land from sale or homestead entry.

We therefore recommend that the Commission in charge of forestry be authorized and directed to proceed with all convenient speed to locate and define the boundaries of reserve districts, making selection (1) with regard to the State land therein, which by reason of its lying in comparatively compact bodies is capable of being effectively and economically administered; (2) with regard to having the State reserves as far as practicable where they will contribute to the betterment of conditions affecting streams and stream flow; and (3) with regard to bringing into use for farms as much of the State land suitable therefor as is consistent with the establishment of State reserves in manner aforesaid. The statute should provide in substance as follows: All land within the operation of this act and now owned, or which shall hereafter be acquired by the State because of non-payment of taxes, and which is situated within any reserve district, is hereby designated as, and shall be, a part of the State forest reserves; provided that not more than 20% of the area of any county shall be included in the State forest reserves; and provided that the Commission in charge of forestry may elect to take over as a part of the State reserves any land in excess of the aforesaid limit which shall be acquired by the State, and, in lieu thereof, to drop from the State forest reserves other land in the same county of sufficient area to reduce the State Forest Reserves in the county to the limit aforesaid.

The Commission having charge of matters of forestry is authorized to employ the necessary surveyors and others for the delimitation of reserved districts; and to incur such expense for maps, surveys and other purposes as may be necessary for the matters aforesaid in this section, the same to be paid out of the general fund when audited and allowed by the State Board of Auditors.

OF THE EXTENT OF RESERVES, AND THE RELATION OF THEIR AREA TO THE
TOTAL AREA OF THE COUNTIES IN WHICH THEY WILL BE LOCATED.

The map, and the figures quoted also show that, by taking over as reserves all the land that is available, no county in the State will be overloaded with forest land. The figures we have quoted show that there are only fourteen counties in the State in which the quantity of forfeited tax land is as much as six per cent. of the area of the county, and only two counties in which it exceeds twenty per cent., and that the highest percentage is reached in one county having twenty-seven per cent. It is clearly not necessary that a single acre of this land be taken up for settlement in order to save any county from becoming permanently a wilderness, or from having more land in forests than is wise and conservative, or than will preserve a proper and advantageous balance between woodland and tilled fields. Moreover, the map shows that it will not be possible in any county to utilize all the State's holdings of forfeited tax land for State reserves. Consequently the percentage of the area of any county that is really involved is much less than that shown by the foregoing figures.

But it is not wise, in our judgment, to rest the matter entirely upon the facts disclosed by the figures we have quoted. In the last analysis the working out of a policy, such as it is the duty of this Commission to formulate, must depend upon success in solving the fire problem; and it seems clear to us that there is nothing of quite so controlling importance in reference to this fire problem, as to secure locally, among the residents of the regions most directly affected, a sentiment favorable to the results which such a policy has in view as its final purpose. Where it is the common thought of the community that the forestry movement is an enemy of the neighborhood, and that young forest growth not yet having merchantable size is valueless; where carelessness, and even wilful intention, in starting fire to run through young forest growth, is, even if distinctly forbidden by law, condoned and the law treated merely as a notion of theorists or of cranks; it is evident that the more settlers who come in with these ideas, the more will the difficulties and the expense of fire protection grow. Conversely, if such local sentiment be replaced by an attitude of friendliness toward the forestry movement, and by a just estimate of the value of young forest growth, the coming of more settlers will decrease the difficulties and the expense of the State in relation to the fire problem.

Moreover, there is nothing that will contribute so much to make possible the adoption of a rational and satisfactory State policy as to remove the opposition of the residents of the counties in which the cut-over lands chiefly abound. It is a well-known fact that the only real opposition to forestry that has shown itself in the open, claiming to be based on defensible public grounds, has heretofore come from counties like Roscommon and Crawford; and this opposition has been largely based upon the claim that the forestry movement in this State is working for ends that will result in the conversion of these and like counties into permanent woods, to the exclusion of legitimate and desirable settlement. As such is not in fact the intention of the movement, and as the facts shown by the figures already quoted demonstrate that such a result is in fact impossible; it seems the part of wisdom to make such

provision as must necessarily quiet the apprehension and allay the fear upon which so much objection and opposition has heretofore been based. It is wise therefore to have the law expressly limit the area of forest reserves in any county to such proportion of the total area of the county as must, by any candid mind, be conceded to be well within the limits of a fair, proper and advantageous balance or proportion between agriculture and forestry. The law may, therefore, wisely provide that the State reserves shall be limited to 20 per cent. of the total area of the county in which they are situated. It will be wise also to put a limit upon the acreage, both of State reserves and private timber reserves hereafter mentioned. If this limit be fixed at 25% of the total area of the county it will leave no room for legitimate doubt that a proper balance between forestry and tilled land will never be upset by reason of the action of the State in dealing with the tax lands.

TAXATION OF STATE FOREST RESERVES.

A ground of objection that has been strongly insisted upon, not only in this State but elsewhere, to the establishment of State forest reserves, is that a relatively large part of the township or townships in which the reserves are located will be thereby removed permanently from the tax roll, making the burden of taxation unduly severe on the rest of the locality. We believe this objection is well founded. New York and Pennsylvania met the same objection by providing either for taxation, for local purposes, of the State's holdings of forest land, or for payment annually, in lieu of taxes, of a fixed sum per acre. This tax, or payment in lieu of taxes, should, as in the States mentioned, be required by law to be expended only for roads and other specified local purposes. We believe it wise to follow the example of Pennsylvania, and to fix the amount, thus making it an annual acreage fee; and to require, in lieu of taxes, payment of the same amount by the holders of the private timber reserves, provision for which is recommended hereafter. Such a provision will be found in the draft of the proposed law for putting into operation the plan recommended by this report, and reference is made to it for details. We recommend the adoption of this provision, not only because we believe it just that the State should bear its share of the burdens of local expenses, but also because it will tend to secure the good will of the residents of the regions to be most directly affected by the location of State forest reserves—a matter of vital necessity to forestry, as already pointed out.

DONATION OF FORFEITED TAX LAND FOR PRIVATE TIMBER RESERVES.

The fire problem is the most fundamentally important of all the problems before us. Nothing is so much responsible for the dangers of fire and the difficulty of protection against it as the mental attitude of the residents of the regions of the cut-over lands. Young forest growth is almost universally considered valueless and entitled to no protection. If this unfortunate belief can be changed, and a local sentiment be substituted in favor of forestry and of fire protection, the greatest difficulty in the fire problem, and the chief obstacle to reforestation, will be removed. For the purpose of eradicating the widespread and pernicious notion that

young forest growth should have no protection, it is proposed to give to residents in the township or locality limited holdings of the forfeited tax land, to be held as private timber reserves. These should be entered under a contract with the State, containing reasonable terms calculated to preserve and protect young forest growth and forest cover, and forbidding the cutting of trees within a period of time (not less than fifteen years) sufficient to give them a chance to scatter the seed necessary for reforestation. Careful provisions for the protection of all the interests of the State will be necessary; and in case of destruction of the reserve by fire, it will be necessary to provide for a determination of the rights of all parties in such way as will be equitable under all conditions. In addition to such power as the law may specify, very large discretionary powers should be left to the Commission in charge of forestry matters to require further terms for its protection. The powers and discretion vested in this Commission should, like those conferred by contract on architects or engineers, be adequate and sufficient to work out the equities of each individual case which is not expressly provided for within the letter or spirit of the statute. For a liberal term of years, these private timber reserves should bear no taxes beyond a moderate annual acreage fee to be applied in part for fire protection and in part for roads and local township purposes in the same manner as elsewhere recommended for the payment and distribution of an annual acreage fee by the State upon the State forest reserves. Title should, at the end of say 25 years, be given without payment of any purchase price, if meanwhile the terms of the contract have been fully complied with.

The chief purpose of this suggestion for small, private timber reserves is to secure throughout the region of cut-over lands as many resident owners of growing timber as possible. Every holder of a little timber reserve would be a help against forest fires, and an aid toward a change of that mental attitude of disregard for young forest growth which is the most difficult feature of the fire problem. If substantial advance be made toward the obliteration of that widespread and pernicious notion by the plan suggested, the State will have given away wisely whatever land may be taken up as private timber reserves.

INDIVIDUAL EFFORT IN REFORESTATION VENTURES MUST SUPPLEMENT FORESTRY
BY THE STATE IF ADEQUATE FOREST AREAS ARE TO BE SECURED.

As we have pointed out, the State has not sufficient land to establish State reserves of the requisite area to furnish the people of this State with necessary timber and forest products, nor to secure the incidental benefits that adequate forest areas will bring to the public welfare. Material results as respects streams and stream flow can not be expected except for such an area of forest land as has a reasonable ratio to the area of the drainage basins of the streams to be affected. To provide adequately for the future, therefore, imperatively requires more than the taking over and protecting of such forfeited tax land as can be used for State forest reserves. The purchase of waste and cut-over land and its reforestation might be resorted to by Michigan following the example of New York, Pennsylvania and other states and countries; but we believe that an alternative course, at present more acceptable, is still open to the State.

NATURAL, RATHER THAN ARTIFICIAL REFORESTATION SHOULD BE RELIED ON, AND AMPLE APPROPRIATIONS FOR FIRE PROTECTION SHOULD NOT BE CURTAILED TO PROVIDE FOR ARTIFICIAL PLANTING.

Reforestation of the cut-over lands will come in a large way by natural growth if general fire protection is provided, and it is reasonable to hope that, with such protection, individual effort may be induced to undertake reforestation ventures upon a scale that will ultimately produce a proper balance between forest area and tilled land. Much of the land that yearly crowds the Auditor General's list of lands returned delinquent for taxes is cut-over, denuded, waste land that is now kept practically useless. Whatever grows upon it grows in vain, for before it can reach a point of utility fire comes in and destroys it. Repetition of this process is steadily reducing this land toward ultimate conditions of permanent waste. The loss involved is in the aggregate very great. It would be saved by adequate fire protection, and such protection would convert great areas of land that are now a nuisance into productive forest land essential to our material prosperity and development. In this way, only, is it feasible for the State, without purchasing immense areas, to make provision for forest land sufficient in extent to produce enough lumber and wood products to satisfy the needs of the people of the State, or to influence materially conditions effecting water supply and stream flow.

The furnishing of general fire protection, therefore, is the most vitally important of all the problems under consideration. If any curtailment of expenditure is deemed necessary, the last place for it is in reference to the fire problem. Reforestation of the State's reserves, in part at least, will be necessary by planting or seeding; but such artificial reforestation should be postponed rather than the furnishing of general fire protection, if a curtailment of expenses is necessary. Such reforestation by artificial means as shall be resorted to for the State reserves, should be undertaken only in a conservative, careful and deliberate way. Wherever there is a prospect that nature will do something herself unaided, it is wise to wait and let her do it; for she works for nothing. Such planting as is to be done should be undertaken piecemeal, from year to year, so as to bring the annual expenditure within reasonable limits. And the expenditure of money for work of this nature should first be given the approval of the legislature, acting upon definite recommendations submitted from time to time by the Commission in charge of forestry matters. State action along the line of artificial reforestation must be taken against a certain conservatism on the part of many who regard forestry generally as more or less a new and unproved experiment. Many people, in spite of the historical facts, still have a feeling that what has not been within their own personal knowledge or observation, that what their nearest neighbors have not actually done, must be more or less experimental; and they have a fear that the State, should it undertake to reforest artificially in a large way, may involve itself in expenditure beyond reason. It is not well to override even prejudice or unfounded fear in the adoption of a plan which must, for its successful working, largely depend upon the general good will and co-operation. But it is well to lay down clearly, as the cardinal rules of future action in the way of reforestation of the State reserves,

that expenditure will be incurred for planting or other artificial aid to nature only where unaided she can not adequately reforest; that expenditure of money for this purpose will be made only after its appropriation specifically for a definite tract or plan; and that such expense for this purpose as the State shall incur shall be incurred from year to year and be kept within the limit of conservative annual expenditure. Whatever planting or seeding is done by the State will, of course, be confined to its reserves and must be accompanied by a system of patrol for proper care, for protection from fire, and ultimately from trespass. It is altogether too early, in our judgment, to attempt to solve problems connected with this feature of the State's work. It is not our purpose to combat the opinion of expert foresters, often expressed, that the best method of reforesting State reserves (at least generally in the Lower Peninsula where fire has had longer opportunity to run) is by planting, rather than by natural regeneration. But this is the minor problem, not pressing for present solution. The main and immediately urgent problem is the general rescue of the cut-over lands and the restoration of an adequate forest area for the sake of the individual benefits to public welfare rather than for the ultimate money profits from sales of lumber. This can, as we have said, be looked for only as the result of effective control of forest fires by the State. Conceding as we do, all that expert foresters claim as to the advantages of planting of State Reserves as against natural regeneration, we nevertheless adhere to the belief that work of this sort, except experimentally, or in special cases for special reasons, ought not to be taken up at present, if so doing involves any curtailment of expenditure necessary for fire protection. The securing ultimately of adequate forests for this State is fundamentally dependent upon the raising, in the immediate future, of money enough to provide efficient fire protection. No other feature of the matter should be allowed to stand in the way.

THE PROSPECT FOR INDIVIDUAL EFFORT IN FORESTRY.

It is believed that with general fire protection much may be expected of private enterprise in reforestation from corporations whose business requires a constant consumption of timber and wood products in large quantities. The consumers of wood for production of charcoal or for pulp; mining companies requiring timber for supports which must be periodically replaced and be added to as excavation goes on; railroads requiring vast quantities of small timber for ties lasting but a few years—these and many other like uses suggest themselves. Many concerns with a large business looking to permanence, and depending directly upon a large yearly consumption of forest products for continuance of their operations (especially where the consumption is chiefly of the coarser sorts that may be grown comparatively quickly), have already begun to attempt forest raising on a large scale in this State and elsewhere, even under the adverse tax conditions now generally prevailing. While forestry, as a mere investment, may not be attractive generally because of the necessarily long wait before satisfactory returns can be looked for, yet a concern which must be a large consumer of forest products in order to continue permanently in business, is not free to

pick and choose as a mere investor of money is; the incidental benefit rather than the direct money profit is the controlling inducement.

TAXATION OF FOREST GROWTH WHERE LAND IS UNDER PROCESS OF
REFORESTATION.

Individual effort, however, cannot be relied upon to aid in any large way while taxation remains as at present, because our present tax laws make it impossible to see a reasonable profit in forest raising under present conditions.

Under the law, as interpreted, and the practice followed generally (so far as there is sufficient consistency in the action of assessing officers to warrant use of this word) forest raising is impossible as a commercial venture, because, if the assessing officers do their duty and tax annually what the law directs them to tax, the result must be the confiscation of all the profit within the period of years necessary to grow a tree from the seed to maturity. This is not from intention, but because the system of taxation in vogue does not conform to the facts nor recognize the inherent natural and unchangeable differences that, for purposes of taxation, distinguish forest growth from all other forms of property, and make it a separate and distinct class.

A forest property must always consist of two things, the land and the forest growth. The land should be taxed as unimproved land, the same as any other land of like nature in the same locality. The improvement on it, the forest growth, should be taxed annually, but according to a system of taxation recognizing its inherent conditions and characteristics. The question is not merely whether the forest growth is a crop, or whether it is personal property, or real estate. The real matter of importance is that its inherent natural characteristics, and the conditions affecting it, are radically different from those of other kinds of property. Whether the law recognizes the fact or not, it is in its essence a distinct class by itself. This will appear from a brief consideration of well-known facts. The increase of forests comes only through a process of natural growth, by which annually a small ring is formed within the bark and about the heart of the tree. This ring must stand until the tree reaches the age or size agreed upon as that of productive maturity. This, of course, is a variable point, and more or less arbitrary. The ring, meanwhile, can not be taken away for use by the owner, or be put to any purpose, as other personal property can be. It earns nothing for the owner. It does not increase in size. It is forced to stand idle. It is a source of expense for protection from disease, insects and fire. It is misleading to speak of it as invested capital, or invested income. It is not invested, because it is earning nothing and paying no returns. It is stored. The only beneficial use of it is that which enures to the public from having forest areas. If we assume that the average period of productive maturity is eighty years, the first of the annual rings of year growth will have before it an enforced period of idleness of seventy-nine years. The next year's growth will be stored in like way, seventy-eight years, and so on. At the end of eighty years there will be eighty of these rings. If taxes are levied annually meanwhile on the cash value of these rings as they are year by year accumulated, the result will be that, when the tree arrives at this

assumed point of productive maturity, the first ring will have borne a tax upon its assessed value seventy-nine times, the second ring will have borne a like tax seventy-eight times, and so on. In other words, there will have been a tax on the assessed value of 3,160 annual rings, which is about forty times the number of such rings actually in the tree at the agreed age of eighty. The longer you make the period, the greater will be the excess of taxation.

It is the opinion of this Commission that so far as reforestation of the State is sought through the encouragement of commercial forestry as distinguished from farm forestry, it should be treated in matters of taxation strictly as a business proposition, requiring no special favor in the way of bounties or tax exemptions. It does not need special favor, but only rational treatment. All that is necessary is to treat it fairly and justly in accordance with the facts and conditions which are inseparable from such property. The commercial forest raiser should not be placed, in the public eye, in the light of an object of charity, or as entitled to a bonus, but he should be treated as one undertaking a business venture for profit. The business is as capable of paying taxes as any other kind of business if the taxes be graduated in accordance with the unchangeable facts and conditions to which the property is, and must always be, subject. All that is needed, or that should be asked for, or that is wise to grant, is taxation according to a rational system. The fact that great benefit, direct and indirect, will result if reforestation is undertaken on a sufficiently large scale, does not call for the giving of bounties or special favors, but is an excellent reason for changing unjust tax laws that discourage such investments, to the extent of substituting a system of taxation that will be rational, because conforming to the controlling facts. In this connection it should also be remembered that the State desires to induce individuals to reforest denuded lands, and that this involves an investment of money on their part which must stand for a much longer period of time than is usual for investments in the financial world, and while so standing must always be, to a greater or less extent, in danger of destruction from fire, wind, fungi and insects. Moreover, before any return can be expected there must be a wait longer than the term of ordinary investments. This is true, even though it be conceded that a forest will begin to yield returns long before it arrives at what can properly be termed maturity. These are repellent features to the ordinary investor. On the other hand, the proposition can not be considered as attractive to those who seek commercial ventures for profit. The results are too long in coming. Consequently the number of possible investors in ventures of forest raising is restricted; and if the States wishes to secure the co-operation of sufficient individual effort, it will wisely make concessions wherever injustice is being done by its laws; and taxation which piles itself up during the entire period that forest growth must stand stored and idle is clearly both irrational and unjust.

Any system of taxation of forest properties must, to be rational, recognize the distinction between the land and the forest growth. No one can justly complain if the land is taxed like neighboring unimproved land. The improvement thereon, the growth that forms during each year, should be taxed at the rate borne by other property, but each year's

growth should be taxed only once while the tree is standing; that is, the tax on forest growth, as distinct from the land, should be based on the value of the annual increase. This may readily be arrived at by a table giving results according to acreage, such tables to apply to the whole State, and to be prepared and adopted by the State Tax Commission with expert aid. Under such a tax system the tree at the assumed time of maturity will have paid a tax on eighty valuations of annual growth. Hence the taxes paid will, in the aggregate, be a tax on the matured tree as it stands when it is fit to cut. But inasmuch as the tree while growing has had protection from the State for the long term of years necessary to bring it to maturity, it is just that a reasonable cutting tax should be paid as compensation to the State which has furnished this protection. This tax, if reasonable in amount, will not operate to deter ventures in commercial forestry. It will be looked at, and properly, as a rational substitute for the cumulative taxation that now stands in the way of forestry as a business proposition. At the same time, the taxes that the towns and counties are entitled to consider their due will be paid annually, the full value of the product or crop being taxed as fast as it comes into existence; whereas the protection for years that makes the venture possible is furnished by the State, and the harvest tax should therefore be a tax fixed by, and accruing to, the State.

TAXATION OF FARM WOODLOTS.

It is conceded universally that the farm woodlot contributes largely to the public welfare. Objections that might be advanced against the lowering of taxation upon commercial tracts of timber now standing, do not apply to the farm woodlot or to farm forestry: neither does the same reasoning as to tax exemption apply that we have advanced concerning commercial reforestation. The very purpose of the farm woodlot is permanence: it is not for lumbering and exploitation for profits. It is not strictly a business venture. Each woodlot is small, and a part of a farm. Woodlots are located usually in the more settled districts where land is of greater value than is such cut-over land as will generally be used for commercial forest raising. By taxing the land as unimproved land, the burden of taxes on woodlots will therefore be relatively greater, so that exemption of the forest growth on the woodlot will no more than equalize as between these classes of forest raisers.

We recommend that it be provided that farm woodlots be taxed by assessing and taxing the land only as unimproved land, giving entire exemption to the forest growth thereon; provided that the owner manages the woodlot, and conforms in regard thereto, to such proper rules and regulations as may be imposed by law.

A constitutional amendment will be necessary to the validity of such a modification of the laws governing taxation of forest properties as will be necessary. Such amendment, for the reasons stated later, should, so far as applicable to commercial forestry, be limited in operation to projects of reforestation of cut-over, waste land; and, so far as applicable, to farm forestry and farm woodlots, should clearly empower the legislature to exempt from taxes the forest growth thereon as distinct from the land itself.

The following is the form of constitutional amendment recommended:

Forest growth upon cut-over, denuded or waste lands in process of reforestation may, for the purpose of taxation, be separately classified, and be assessed and taxed in such manner as the legislature shall deem fitted to promote reforestation by individuals of cut-over, denuded or waste lands; and the legislature may pass such laws as the public and domestic welfare may demand for the encouragement of farm forestry, and, for this purpose, may exempt from taxation the forest growth upon farm woodlots.

TAXATION OF PRESENT STANDING TIMBER.

The conserving of standing timber in such manner as will be for substantial public benefit necessarily involves the conversion of the property into a forest property to be handled according to the principles of business forestry, i. e., for periodic returns by the cutting off from time to time of no more than the natural growth upon the tract during the interval between cuttings. Anything which induces present owners of standing timber to merely delay the time of cutting, is at best only a temporary relief, helping to tide over the coming period of increased scarcity—a result of some, but not fundamental, importance.

Whether any modification of the system of taxation, or even the total removal of taxes, would operate generally to induce the owners of the mature timber tracts now standing to convert the same into forest properties as aforesaid, is a matter which admits of some doubt. The timber was generally bought under conditions based on the intention, and involving the necessity, of early cutting. The capital invested, the business organized by lumbering it and handling its product, all look to a yearly cutting commensurate with the capacity of the plant constructed for the purpose; and the making of a profit in many cases, and its extent in all cases, are directly dependent upon the plant being kept in operation to its capacity. When prices are high, the pressure to realize as fast as possible the quick profit which was the original inducement of going into the venture, is difficult to withstand. Lumbermen and most owners of standing timber are not generally simple investors of surplus funds looking for fair annual interest returns. The money embarked is often borrowed, interest must be paid, expenses must be met, and dividends are expected. The ownership of timber land is usually acquired as a commercial venture, entered into for the purpose of securing large returns quickly. All is based fundamentally on the expectation and the necessity of quickly cutting off the standing timber. Taxes and interest have the same relation to this matter: the lowering of either makes it easier to carry the investment and therefore tends to prolong a little the time of waiting; but neither is the controlling thing. The basic thought of the venture is an early profit. To expect the conversion of the tracts of timber now standing, into properties to be indefinitely held as forest property for periodic returns, is to expect such a change generally in the attitude and policy of owners of such property as amounts to a revolution, completely overturning the whole basis on which their business was entered into and is maintained.

It is, however, true that there are, even under present adverse conditions as to fire and taxation, some owners of large areas of standing

timber who are treating their holdings in accordance with the principles of scientific business forestry. It is obvious that if others can be induced to do this in a large way it will be a great advantage to the State, because it requires much expense and lapse of time to duplicate any of the forest now standing. That forest serves all of the purposes of public interest that any forest can serve. It is worth the effort, therefore, to make any attempt that fairly promises success to conserve the present forest and to induce its owners to permanently handle it according to scientific principles.

But it must not be overlooked that the public remember that these forests now standing were not grown by the present owners, but were obtained, full grown, by them or their predecessors, from the State at what seems a grossly inadequate price; and it is the general belief that, in the hands of the present owners, this forest property is held only as merchantable material for exploitation and sale at such time as will best suit the convenience of the holder. Hence there is no reason for special favors to the owner, nor to expect that the State will be benefited by a lowering of taxes on property so held. Unless the State, by modifying the taxation on standing forests, can assure itself that it will secure the conversion of such standing forest into permanent forest property, to be held and administered conservatively and in such way that the amount cut therefrom in any period shall not exceed the amount of growth therein, it would not be wise for the State to consent to lessen the taxes on this class of property.

Any change operating to lighten the burden of taxes upon the owners of standing timber, however just in itself, and however wise as a matter of State policy, will arouse opposition; for public opinion does not hold the lumberman or the owner of standing timber as a benefactor. The belief is general that a great natural resource, the original forest, has brought to the State very little and to those who have destroyed it very much. Any change in taxation will require constitution amendment; and therefore in our judgment, it will be unwise to hitch up a proposal for lower taxation upon standing timber with a proposal such as we recommend for the regulation of taxes upon cut-over lands in process of reforestation, or upon farmers' woodlots. Reforestation and conservation of forests now standing are two distinct propositions requiring separate handling; and those engaged in reforestation are clearly entitled to the betterment of tax conditions which we have recommended, even though it be thought unwise to change taxation as it effects commercial tracts of mature timber now standing.

It is our belief that the conserving of the standing forests requires change in taxation so as to secure, in the assessment, equality of treatment between timber properties and other kinds of property, through a more direct and effective check upon over-valuation in the assessment; and by the imposition of a reasonable limitation upon the tax rate in rural districts. The latter is confiscatory in many counties, and cannot but operate to drive the owners of standing timber to lumber it even when they would otherwise wish to hold it. The report of the State Tax Commission shows, for instance, that in 1901 the average tax rate was \$63 on the thousand in one county and \$40 to \$49 in five counties and from \$30 to \$39 in thirteen counties. That is, in nineteen

counties the average tax rate was from about two to four times the average rate of the rural districts of the State. This state of affairs indicates that the time has come when the same reasons that have led to the placing of limitations on the power of municipalities to raise money by tax or otherwise, call also for the placing of like limitations upon the power of rural communities.

ADEQUATE FOREST RESOURCES CAN BE ACQUIRED ONLY BY GIVING THE CUT-OVER LANDS OF THE NORTH PROTECTION FROM FIRE.

The foregoing brings us face to face with the fact that, if the future is to be provided with forests adequate to supply sufficient lumber and wood products and to secure the benefits possible through forests to agriculture and stream flow, they must be largely the result of efforts by individuals to reforest the denuded, cut-over and waste lands of the north. It is evident that this can not be hoped for unless conditions are brought about which will make forestry comparatively safe. In the last analysis, therefore, the problem of State forest fire protection is the controlling one.

GENERAL FEATURES REQUIRED IN A FIRE LAW.

Adequate fire protection for the extensive regions in which it is needed requires efficient organized service, and that in turn requires legal machinery and authority under competent management, and with sufficient money. The machinery of the present fire law, with a few modifications, is believed to be satisfactory and sufficient, if its administration is in competent hands, and if sufficient money is appropriated for the purpose of fire protection.

Expense of fire protection may be expected to decrease as the enforcement of law spreads a better view of the value of young forest growth, keeps down reckless and thoughtless starting of fires, eradicates the lawless element, enforces the exercise of more caution, improves conditions that can be bettered, and as residents come to be owners of young growing timber. Adequate protection involves at least supervision and frequent reports during dangerous times. This, for so large a territory, requires, to be of any value at all, several hundred temporary employees. Their duties will vary according to the needs and conditions of their respective districts, which should be so laid out as to make the most use possible of the cheaper methods of supervision, such as observation from high places and watch towers, use of telephone, etc. Actual patrol should be resorted to only when unavoidable, because it is much more expensive. The whole must be worked out in detail, suiting the methods and kind of supervision to each locality, with the purpose always in view of keeping down expense. In seasons of danger, daily or other frequent observation for fire, and report of results of the observation, should be required. These reports should center in the deputy at the head of the district. In time of actual fire, there should be authority to call on citizens for help and money provided to pay for it. In times deemed dangerous, the services and authority of the sheriff's force of the county and supervisor of the town should be made subject to the warden's call.

The working out of an effective system of fire protection is obviously not a matter for paper elucidation, but for the exercise of sound judgment by some responsible and competent authority, backed up by the law. The machinery provided by the present law, aided by the amendments and additions suggested in the draft of a fire law accompanying this report, will be ample, if placed in the proper hands for execution, with provision for the money necessary for so extensive a service.

Efficient organization also requires division into districts not too large for practical handling of the territory included. There should be at least twenty-five districts, each with a deputy at its head and with a sufficient number of local wardens serving temporarily only in dangerous seasons of the year or special periods of danger, as above suggested. At the head of all should be one responsible, active man, having both the expert knowledge and the ability to organize and administer, which is essential to the successful working of any machinery of this kind. This requires money for employment of the many helpers necessary, and the elimination of politics in their appointment.

CONCENTRATION OF PUBLIC LANDS, FORESTS AND AFFAIRS OF RURAL POLICE,
ETC., IN A PUBLIC DOMAIN COMMISSION.

The handling of the fire question demands, in a large degree, expert knowledge and experience. Without it, more money can easily be wastefully spent than will be necessary for the installing and maintenance of an effective system of fire protection under the guidance of men qualified by experience and knowledge for the task.

The duties which must be performed in the interest of the State in connection with State forest reserves, with the fire problem, with the protection from trespass of the public lands, with the enforcement of game and fish laws, and in other like directions, are in substance rural police duties, or their performance is analogous thereto, and may be performed by one force of men. Such a concentration of duties is in the interest of economy and effectiveness. But neither effective nor economical results can be expected where there are several ultimate fountains of authority. The force whose tenure of office depends upon the game warden, can not be expected to render the best service in the way of fire protection for State forest lands under another jurisdiction.

To place the duties of trespass agents on the persons whose duty is to look after forest fires or breakers of game laws would result in economy, if there were but one source of authority over all; but, under the divided authority of the present system, such a concentration would lead to friction, clashing and jealousies, destructive of effectiveness of service. The duties of fire wardens, of trespass agents, of game and fish wardens, are chiefly police duties, and of a nature so kindred that it is obvious that economy and effectiveness will be much promoted by their concentration in one force of men, under one controlling administrative head.

We believe, therefore, that the interests of the State affecting the public domain and natural resources should be brought under one department, to be administered by a commission having general charge, and sub-departmental heads having charge of the routine of administration. These several heads of sub-departments should, as far as the constitution

allows, be appointed by the Commission. The Commissioner of the State Land Office is at present a constitutional officer. If the new constitution is adopted, it will be within the power of the legislature to abolish this office and substitute therefor some other officer. Under the present constitution, the duties of the Commissioner of the State Land Office may be prescribed by the legislature. In either event, therefore, whether the new constitution be adopted or rejected, it is within the power of the legislature to bring the performance of the duties of this office under the control of such a Commission as we recommend. We suggest that the office business connected with the matters under the Commission's jurisdiction be devolved upon the Commissioner of the State Land Office, or such officer as may be substituted; and that the affairs of the State involving police duties and work in the field, as distinct from office work, be vested in a Forest Warden to take the place of the Game, Fish and Forestry Warden and other officials. The Forest Warden should have sole charge of the enforcement of trespass laws, game and fish laws, fire laws, land and timber examinations, and other like work. This active administrative officer in charge should be subject to the appointment and control of the Commission. The employees of all these sub-departments should be employees of the Commission assigned to duty in a particular sub-department; their appointment, tenure of office and duties being within the control ultimately of the Commission, but being primarily prescribed by the active, practical heads of the sub-departments. Their compensation, also, except as the law itself may expressly fix the same, should be subject to the same final source of authority.

The exclusion of politics from the Commission's work and appointments will, we believe, be best accomplished by making the Commission non-salaried and by securing the exclusion of politics from the manner of the appointment of the members of the Commission. It should be so arranged that it will not be possible to convert this Commission into a political machine. The proposal submitted to the recent Constitutional Convention for a Commission, to be known as the Public Domain Commission, is recommended as the basis for legislation along the line of these suggestions:

APPROPRIATIONS MUST BE COMMENSURATE WITH THE EXTENT OF THE FIRE SYSTEM NECESSARY.

While the placing in a non-partisan commission of authority to choose the active administration officer having charge of this machinery, and responsible for its results, will tend to secure competent servants and efficient service, nevertheless the law, however perfect, or however ably its machinery is handled, cannot keep forest fires out of the millions of acres that comprise the regions of cut-over lands, without money appropriations, and these must be adequate to the task. Not less than \$100,000 a year for the necessary service of fire warden, exclusive of salaries of wardens and deputies, should be provided for the present, and until conditions have so improved as to lessen the need. This should be appropriated to be used only when and to the extent the forest warden shall deem necessary. All responsibility must finally settle on him.

This is at present the real forestry question in Michigan. Until the

fire problem is adequately coped with, there can be no forestry having possibilities commensurate with the certain needs of the next and succeeding generations. The fire problem cannot be successfully handled without adequate appropriations. The spending of this money wisely and economically requires expert knowledge and experience in those who have the control and management of the large number of men necessary; and this result, it is believed cannot be confidently expected without a concentration of forces and responsibility in those who are free from all political alliances and entanglements. In our judgment all efforts should, after the setting apart of reserves, be subordinated to the eradication of the fire evil. Planting and other artificial methods of reforestation can be allowed to wait, if it is necessary to curtail expenses. The fire evil is the last thing on which retrenchment of necessary expenditure should be practiced. Economy may be promoted by concentration of forces in the manner indicated; but when as efficient an equipment and service as possible is organized, sufficient money should be placed at its disposal to do the work required; and full responsibility for the manner and amount of expenditure should be placed with the administrative officer at the head of this service.

In conclusion the essential features of the commission's recommendations are as follows:

1. The taking over as State forest reserves of such of the forfeited tax land as is so grouped as to be available for the purpose.

2. To open to entry for small private timber reserves such of the balance of the forfeited tax land as is desired for the purpose by actual bona fide residents of the township.

3. Open to sale all of the forfeited tax land not taken into State reserves at a minimum price of \$5.00 an acre plus the value of the forest products on the land. Appraisals to be made only of land applied for and at the expense of applicant and to be kept of record and published in the county in which the land is located.

4. To make provision for adequate fire protection by furnishing sufficient appropriations and providing an efficient non-political force of men, under a single person, on whom will finally rest all responsibility for efficient service.

5. This will make it possible for nature to reforest naturally a very large part of the cut-over lands of the north, and for large results, commensurate with the State's needs, reliance is placed by the Commission upon this natural capacity to reforest rather than upon expensive artificial planting.

6. Concentration of the forces and rural police affairs of the State under a single commission with a single executive officer, the State Forest Warden, having sole active charge of and final responsibility for the proper execution of fire laws, forest laws, game laws, fish laws, trespass laws and, in general, all matters of rural police.

7. Elimination of all features of the present laws which have led to the injurious work of the timber skinner and to the building up of an extensive class of speculators at State expense.

8. Constitutional amendments, to enable the legislature to adopt a more rational system of taxation of forest growth.

The legislation recommended for immediate adoption in order to give

effect to the recommendations of this Commission will be found in the annexed appendix numbered 8. Appendix 6 is made up of extracts from various sources bearing more particularly on taxation of forest growth.

Adopted by the Commission and respectfully submitted.

R. S. GRAHAM,
President of the Commission.
C. V. R. TOWNSEND.
CARL E. SCHMIDT.
FRANCIS KING.
A. E. PALMER,
GEO. B. HORTON.
D. B. WALDO.
A. B. COOK.
W. E. OSMUN.

Dated July 24th, 1908.

Attest:

CHARLES B. BLAIR,
Executive Agent of the Commission.

APPENDIX 1.

TABULATIONS AND STATISTICS FURNISHED BY THE STATE LAND OFFICE AND AUDITOR GENERAL'S DEPARTMENT.

Statements furnished by the Auditor General showing acreage of lands subject to purchase on State tax land List No. 20, May, 1906, on List No. 21, May, 1907, List No. 22, May, 1908, and State tax land subject to purchase Nov. 8, 1907: and statements by Commissioner of State Land Office of Tax Homestead Land, subject to sale Nov. 26, 1907, and June 30, 1908.

Counties.	State tax land list No. 20, May, 1906.	State tax land list No. 21, Nov. 8, 1907.	State tax land list No. 22, May, 1908.	Tax homestead land Nov. 26, 1907.	Tax homestead land June 30, 1908.
Alcona.....	79,186.95	50,879.00	66,732.27	15,370.07	14,242.22
Alger.....	15,619.95	17,162.00	19,207.46		
Allegan.....	728.45	565.00	728.50		
Alpena.....	21,250.10	18,672.00	24,244.78	33,753.92	29,730.20
Antrim.....	1,614.82	1,207.00	1,521.33		
Arenac.....	7,054.33	7,798.00	12,687.45	8,032.83	7,403.41
Baraga.....	22,361.52	21,153.00	23,762.91		
Barry.....	310.34	310.00	314.34		
Bay.....	1,109.24	1,099.00	1,028.51	40.00	
Benzie.....	3,044.90	412.00	672.48	3,304.10	778.32
Berrien.....	261.26	260.00	181.19		
Branch.....					
Calhoun.....	180.00	180.00	185.00		
Cass.....	4,919.42		5.00		
Charlevoix.....	4,919.42	535.00	867.11	4,379.96	4,197.23
Cheboygan.....	26,286.24	22,130.00	25,928.97	20,084.81	18,483.22
Chippewa.....	49,993.04	10,336.00	27,095.69	49,886.16	38,525.33
Clare.....	7,180.01	5,831.00	9,317.22	10,054.99	8,493.94
Clinton.....			121.50		
Crawford.....	52,959.61	2,457.00	9,774.74	55,127.50	53,020.50
Delta.....	26,675.26	3,481.00	5,956.72	26,689.89	21,087.42
Dickinson.....	2,052.69	9,323.00	13,314.37		
Eaton.....	273.48	237.00	271.88		
Emmet.....	8,692.16	7,369.00	8,225.58	1,470.80	1,663.23
Genesee.....	.36				
Gladwin.....	10,727.44	13,250.00	15,126.08	14,722.45	9,839.80
Gogebic.....	2,210.97	642.00	3,205.31	1,430.94	1,430.94
Grand Traverse.....	21,697.75	19,994.00	20,354.21	321.40	321.40
Griatiot.....	585.65	731.00	933.65	200.00	
Hillsdale.....					
Houghton.....	5,104.63	346.00	1,696.72		4,223.94
Huron.....	134.56	104.00	150.33		117.40
Ingham.....	215.00	215.00	215.00		
Ionia.....	1.50				
Iosco.....	7,631.92	8,026.00	13,179.57	46,897.37	40,860.69
Iron.....	65,706.17	21,592.00	10,485.64	668.45	26,408.83
Isabella.....	5,454.62	5,897.00	5,857.59		
Jackson.....	137.20	137.00	137.40		
Kalamazoo.....	1.15	1.00	1.15	3,697.45	
Kalkaska.....	43,619.09	39,815.00	41,706.56		3,696.21

THE COMMISSION OF INQUIRY,

Counties.	State tax land list No. 20, May, 1906.	State tax land list No. 21, Nov. 8, 1907.	State tax land list No. 22, May, 1908.	Tax home- stead land Nov. 26, 1907.	Tax home- stead land June 30, 1908.
Kent.....	127.03	121.00	120.60	80.00	80.00
Keweenaw.....	3,438.05	1,502.00	2,199.15		
Lake.....	6,257.09	2,270.00	6,804.03	1,379.31	379.31
Lapeer.....	246.25	245.00	247.20		
Leelanau.....	1,835.23	1,488.00	1,633.11		
Lenawee.....	2.30	2.00	2.30		
Livingston.....	10.00				
Luce.....	11,018.15	4,195.00	7,109.88	43,442.75	42,989.69
Mackinac.....	31,930.89	3,467.00	8,576.15	3,802.22	23,606.19
Macomb.....					
Manistee.....	23,087.52	9,344.00	1,495.76	1,269.00	5,912.76
Marquette.....	17,948.11	30,207.00	34,292.38		
Mason.....	1,860.31	21.00	1,107.38	3,176.45	2,120.00
Mecosta.....	3,714.61	755.00	1,851.10	3,024.61	1,769.76
Menominee.....	9,463.12	120.00	221.77	8,489.38	2,162.42
Midland.....	13,463.70	10,974.00	11,586.90	80.00	40.00
Missaukee.....	15,633.75	15,265.00	17,457.74	3,536.82	3,387.85
Monroe.....	40.00	40.00	40.00		
Montcalm.....	719.85	606.00	845.85	331.45	251.45
Montmorency.....	40,926.71	6,838.00	13,269.14	62,225.41	62,643.36
Muskegon.....	3,467.80	1,272.00	3,654.05	3,975.97	2,674.69
Newaygo.....	17,115.47	1,583.00	2,853.12	2,965.52	11,302.99
Oakland.....	3.00		175.98		
Oceana.....	3,300.94	227.00	1,355.65	5,854.39	5,690.91
Ogemaw.....	30,154.27	26,385.00	29,727.45	13,033.60	11,872.27
Ontonagon.....	1,090.70	598.00	4,551.09	4,246.05	3,726.05
Osceola.....	13,382.91	12,535.00	14,181.94	80.00	80.00
Oscoda.....	43,105.08	39,207.00	43,182.67	59,580.94	57,859.93
Otsego.....	17,306.39	16,793.00	21,187.60	13,239.11	12,040.34
Ottawa.....	836.26	627.00	610.40		
Presque Isle.....	25,841.43	20,118.00	24,860.81	2,325.02	22,208.43
Roscommon.....	13,245.40	18,334.00	56,625.05	1,814.25	35,220.17
Saginaw.....	2,740.76	668.00	1,415.48	1,817.44	1,619.04
Sanilac.....	920.09	1,023.00	1,365.69		
Schoolcraft.....	11,025.75	2,470.00	10,295.90	31,965.64	29,592.81
Shiawassee.....	101.40	103.00	129.72		
St. Clair.....	601.75	588.00	617.08		
St. Joseph.....	146.92	106.00	145.94		
Tuscola.....	1,335.57	1,111.00	1,983.91		
Van Buren.....	1.25			80.00	80.00
Washtenaw.....	.75		.75		
Wayne.....			1.00		
Wexford.....	27,267.02	1,655.00	22,965.51		
Totals.....	889,605.36	545,009.00	715,439.44	567,748.42	623,834.25

Statement showing acreage of counties of Michigan as furnished by Commissioner of State Land Office:

County.	No. of acres.	County.	No. of acres.
Alcona.....	358,456.47	Lake.....	365,392.78
Alger.....	588,759.60	Lapeer.....	424,030.05
Allegan.....	528,072.46	Leelanau.....	217,685.53
Alpena.....	370,765.74	Lenawee.....	466,876.28
Antrim.....	283,368.91	Livingston.....	370,845.51
Arenac.....	235,002.65	Luce.....	581,436.62
Baraga.....	566,365.24	Mackinac.....	622,030.60
Barry.....	353,072.07	Macomb.....	278,264.30
Bay.....	290,598.18	Manistee.....	350,205.49
Benzie.....	249,401.84	Marquette.....	1,228,828.92
Berrien.....	530,828.80	Mason.....	315,526.01
Branch.....	320,445.94	Mecosta.....	361,876.64
Calhoun.....	447,133.49	Menominee.....	622,386.46
Cass.....	323,425.55	Midland.....	334,307.24
Charlevoix.....	260,326.95	Missaukee.....	362,708.23
Cheboygan.....	507,492.43	Monroe.....	
Chippewa.....	1,002,248.53	Montcalm.....	454,286.49
Clare.....	364,020.65	Montmorency.....	330,052.33
Clinton.....	364,902.77	Muskegon.....	299,033.36
Crawford.....	359,459.52	Newaygo.....	542,230.07
Delta.....	741,061.33	Oakland.....	575,500.66
Dickinson.....	491,926.71	Oceana.....	344,965.14
Eaton.....	366,489.04	Ogemaw.....	365,962.69
Emmet.....	321,493.83	Ontonagon.....	844,609.46
Genesee.....	404,129.12	Osceola.....	367,247.70
Gladwin.....	330,018.42	Oscoda.....	365,127.38
Gogebic.....	711,415.34	Otsego.....	334,088.84
Grand Traverse.....	355,407.38	Ottawa.....	357,177.61
Gratiot.....	364,623.07	Presque Isle.....	429,209.94
Hillsdale.....	384,541.45	Roscommon.....	339,420.39
Houghton.....	646,148.17	Saginaw.....	534,856.57
Huron.....	537,067.43	Sanilac.....	439,517.88
Ingham.....	354,429.36	Schoolcraft.....	758,202.30
Ionia.....	366,669.75	Shiawassee.....	343,964.02
Iosco.....	327,610.92	St. Clair.....	405,776.87
Iron.....	759,551.55	St. Joseph.....	319,986.66
Isabella.....	368,740.90	Tuscola.....	429,730.44
Jackson.....	455,256.35	Van Buren.....	391,301.60
Kalamazoo.....	357,872.65	Washtenaw.....	454,636.87
Kalkaska.....	359,966.69	Wayne.....	326,517.48
Kent.....	543,148.02	Wexford.....	366,058.70
Keweenaw.....	325,858.50		

Statement of Commissioner of State Land Office showing by counties the acreage of tax homestead land deeded to actual settlers under the homestead law, during fiscal year ending June 30, 1901:

Counties.	Acres.	Counties.	Acres.
Bay.....	3,013.57	Montcalm.....	2,699.02
Isabella.....	1,857.82	Montmorency.....	440.00
Kalkaska.....	693.33	Presque Isle.....	200.00
Kent.....	240.00	Sanilac.....	240.00
Lapeer.....	160.00	Tuscola.....	200.00
Mecosta.....	11,150.59		
Midland.....	672.84	Total.....	21,807.17
Missaukee.....	240.00		

Statement of Commissioner of State Land Office showing by counties the acreage of tax homestead land deeded to actual settlers under the homestead law during the period July 1, 1907, to January 31, 1908:

Deeded during period commencing July 1, '07, and ending Jan. 31, '08.

Alcona.....	560.00	Lake.....	200.00
Allegan.....	341.12	Mecosta.....	478.63
Alpena.....	456.19	Midland.....	80.00
Arenac.....	80.00	Missaukee.....	594.70
Bay.....	40.00	Montmorency.....	280.00
Clare.....	1,617.43	Muskegon.....	255.82
Crawford.....	790.71	Newaygo.....	40.00
Delta.....	320.00	Oceana.....	40.00
Emmet.....	160.00	Ogemaw.....	60.46
Gladwin.....	360.00	Oscoda.....	120.00
Gratiot.....	40.00	Otsego.....	480.00
Huron.....	120.00	Presque Isle.....	931.77
Iron.....	160.00	Schoolcraft.....	316.16
Isabella.....	80.00		
Kalkaska.....	160.00	Total.....	9,162.99

Statement of Commissioner of the State Land Office showing the proceeds received to Dec. 7, 1907, from city and village lots sold as tax homestead land and the net proceeds of sales of such land outside of cities and villages:

Sales in fiscal year ending June 30, 1904:

" village of Baldwin.....	\$1,020 00	
" " Chase.....	490 00	
" " Luther.....	132 50	
" city of Muskegon.....	9,078 50	
" " Muskegon Heights.....	560 00	
" village of Montague.....	2,115 50	
" " Maple Grove.....	55 00	
" " Fruitport.....	50 00	
" " Twin Lake.....	23 00	
" " Whitehall.....	106 00	\$13,630 50

Sales in fiscal year ending June 30, 1905:

" village of Kawkawin.....	\$30 00	
" " Pinconning.....	1,866 00	
" " Bay City.....	21,111 00	
" " Rockford.....	430 00	
" " Chase.....	80 00	
" " Baldwin.....	23 00	
" " Montague.....	205 00	
" " N. Muskegon.....	819 00	
" " Muskegon Heights.....	30 00	
" city of Muskegon.....	315 00	24,919 00

Sales in fiscal year ending June 30, 1906:

Bay county cities and villages.....	\$1,257 00	
Clare county.....	1,679 00	
Gratiot county.....	150 00	
Lake county.....	22 00	
Muskegon county.....	2,841 50	
Oscoda county.....	96 50	6,046 00

Sales in fiscal year ending June 30, 1907:

Allegan county.....	\$240 00	
Bay county.....	3,897 00	
Clinton county.....	40 00	
Clare county.....	487 00	
Lake county.....	23 50	
Montmorency county.....	793 50	
Muskegon county.....	3,009 25	
Saginaw county.....	31 00	8,521 25

Sales July 1 to Dec. 7, '07, of village or city lots in

Allegan.....	\$50 00	
Alpena.....	1,377 50	
Bay.....	16 00	
Clare.....	40 00	
Delta.....	1,075 00	
Gratiot.....	423 50	
Lenawee.....	10 00	
Mackinac.....	807 50	
Montcalm.....	2,896 50	
Mason.....	8,560 00	
Muskegon.....	15,133 50	
Ontonagon.....	821 50	
Van Buren.....	20 00	31,231 00

Total..... \$84,347.75

Statement, showing the number of acres of tax homestead land sold during the year ending June 30, 1908.

Counties.	Acres.
Alcona.....	1,754.65
Allegan.....	1,300.37
Alpena.....	12,835.84
Arenac.....	40.00
Charlevoix.....	3,093.73
Cheboygan.....	4,539.82
Clare.....	12,814.44
Crawford.....	15,159.40
Delta.....	160.00
Emmet.....	7,862.17
Gladwin.....	8,136.87
Iosco.....	240.00
Iron.....	40.00
Kalkaska.....	40.00
Lake.....	1,310.00
Mackinac.....	989.90
Mecosta.....	1,373.65
Midland.....	40.00
Missaukee.....	4,246.94
Montmorency.....	3,455.79
Muskegon.....	5,101.10
Newaygo.....	3,680.41
Oceana.....	443.00
Ogemaw.....	4,280.49
Osceola.....	7,026.32
Otsego.....	1,327.95
Presque Isle.....	4,001.73
Schoolcraft.....	13,595.44
Saginaw.....	50
Manistee.....	1,781.09
Ontonagon.....	11,807.50
Luce.....	7,820.64
Gratiot.....	24.00
Mason.....	8,557.62
Montcalm.....	702.74
Chippewa.....	14,184.69
Benzie.....	1,645.84
Ottawa.....	280.00
Menominee.....	6,457.47
Total.....	174,567.96

Table showing by counties the number of acres of tax homestead land deeded to actual settlers during the year ending June 30, 1908.

Counties.	Acres.
Alcona.....	1,652.87
Allegan.....	501.12
Alpena.....	1,020.39
Arenac.....	80.00
Bay.....	40.00
Cheboygan.....	80.00
Clare.....	2,834.11
Crawford.....	790.71
Delta.....	1,209.50
Emmet.....	200.00
Gladwin.....	480.00
Gratiot.....	89.00
Huron.....	120.00
Iron.....	174.40
Isabella.....	80.00
Kalkaska.....	200.00
Lake.....	200.00
Mecosta.....	1,871.06
Midland.....	169.45
Missaukee.....	874.70
Montmorency.....	1,019.59
Muskegon.....	255.82
Newaygo.....	40.00
Ogemaw.....	118.46
Osceola.....	200.00
Otsego.....	480.00
Presque Isle.....	1,391.80
Schoolcraft.....	316.16
Total.....	16,520.14

Table showing by counties, the number of acres of tax homestead land that reverted to the State during the year ending June 30, 1908, through the forfeiture of the homesteader in failing to comply with the requirements of the homestead law.

Counties.	Acres.
Alcona.....	120.00
Alpena.....	400.00
Bay.....	78.77
Clare.....	640.00
Cheboygan.....	40.00
Crawford.....	80.00
Emmet.....	153.40
Gladwin.....	620.00
Huron.....	37.41
Iosco.....	100.00
Lake.....	360.00
Macosta.....	80.00
Missaukee.....	120.00
Montmorency.....	680.25
Newaygo.....	40.00
Oceanb.....	120.00
Ogemaw.....	80.00
Oscoda.....	80.00
Otsego.....	229.25
Presque Isle.....	345.57
Roscommon.....	80.00
Total.....	4,485.65

APPENDIX 2.

I. PROFIT FOR SPECULATORS VS. RESERVE MINIMUM PRICE.

"I have prepared and am sending you plats showing the lands [between 17,000 and 18,000 acres, purchased at prices from fifty cents to two dollars, the top price paid for one eighty-acre parcel; the average price paid per acre was eighty-six cents], purchased in the name of Myrtle E. Hellen, of Chicago, Illinois. These lands are situated in Roscommon and Crawford counties, with one purchase in Muskegon county. The lands in Roscommon and Crawford counties are being exploited by the "Michigan Central Park Co." and are being sold, so I understand, at a uniform price of \$12.00 per acre. The purchasers are laboring men, clerks, stenographers, etc., who are influenced to invest their savings in small parcels of these lands on contracts at long time. Of course, this is a swindle on the purchasers, but something that this department is not accountable for and is powerless to prevent. I have entered on each tract the sum received by the State for it and have endeavored to show just what information this department had concerning the lands."

E. R. HAVENS,
Chief Clerk of Land Office.

GRAND RAPIDS HERALD, APRIL 24, 1908.

Charles S. Pierce, State Forest Warden and Game Warden, states that his forestry work is greatly hindered by lack of funds with which to properly guard the forest lands from fire. Speaking of the barrens, he said:

"It certainly is a great shame that certain companies can buy sand wastes from the State at 50 cents an acre and sell at \$10 an acre to the poor steel workers and others in the large cities who have dreams of the independence of the farmer. I notice each week in the Chicago papers great ads. which are intended to entice men from the large cities to these barrens, where it is pictured that they will be in the land of milk and honey and independent for life. A man will have more fun for his money by throwing it into the lake and seeing the splash. When these poor fellows from the cities buy a section of this land they expect to be able to grow something upon it. The result is they eke out a miserable existence for a year or so and then abandon the farm and are glad to get back to the city, where the pay envelope is handed out each Saturday night.

"There should be some legislation of some sort to prevent this sort of speculation. I don't know what would be required but certainly something is."

EXTRACT FROM LETTER PUBLISHED IN ROSCOMMON HERALD, FEB. 13, 1908.

^ It is true that the Michigan Central Park Company purchased largely from the State the forfeited lands. They accepted the price and conditions and carried out their obligations in every case. Today we will buy all of the land of the same kind and pay \$5.00 to \$10.00 per acre. * * * It is true that the Michigan Central Park Company are selling these lands very cheap to settle the country, and in so doing make a profit. * * * There has been more land sold in Roscommon and Crawford counties in the past seven years to active farmers than in all of the rest of the State together. About 40,000 people bought lands and lots around Higgins Lake. * * * We do not think there is an acre of State land for sale in Roscommon or Crawford counties today. If there is, the Michigan Central Park Co. would be willing to pay \$5.00 to \$10.00 for the same, and more if they are worth it. * * *

Michigan Central Park Co.

To All who it may Concern.

I sell the same kind of lands these farms are made of for \$10.00 per acre; terms $\frac{1}{4}$ down and the balance in equal annual payments with interest at 6 per cent. per annum; 10 per cent. discount for cash.

We have a glorious climate, the best water on earth and easy cleared land which produces as much money per acre as any in the United States or Canada. Come and be one of us.

Wm. F. Johnston,
Roscommon, Mich.

EXTRACT FROM LETTER PUBLISHED IN ROSCOMMON HERALD, FEB. 13, 1908, BY
W. F. JOHNSTON, OF ROSCOMMON, SEC'Y OF ROSCOMMON BUSINESS MEN'S ASSOCIATION.

We, in northern Michigan, were not afraid to have the appraisal at five dollars, we knew it was worth it and would sell for it. In fact, the greatest handicap to our settlement and development and one of the hardest obstacles we had to overcome was the fact that the State itself put such a low value on its lands, and that paid servants of the State were continually putting themselves out to tell and advertise what a poor piece of property it had on its hands. The property seems to have sold readily enough, once it got in the hands of private owners. In this article I am not defending the business methods of any Chicago syndicate if they are wrong. It may be true that a certain number of clerks, stenographers, etc., have made investments in property which will never be profitable in their hands. Those things occur even in Grand Rapids and Chicago, but again I say it is not the fault of the property. The same clerks, stenographers, etc., would have less chance of making a success of farming were they to purchase land in Kent county than in Roscommon or Crawford counties, and still it would not be the fault of the land. There are other companies and individuals who have bought State lands and are selling it, not to clerks and stenographers, but to good, solid, substantial farmers from Ohio, Indiana and Illinois, who are coming in and settling our counties.

I am just as much in favor of the State of Michigan taking a progressive stand in relation to the conservation of timber and the proper protection of the sources of our waterways as any man, but think it can be done without crippling any county or community or isolating any large section of country from development. I think that if the lands in Roscommon and Crawford counties were worth fifty dollars per acre the State can afford to put certain areas of it into timber growth and I think the counties cannot afford to be without it. I do not think it necessary to be in such blocks as to break up good, progressive farming communities. I think some of it would be a good thing in Kent county too, and in other southern counties. I think that the State should hold out every inducement to individual effort toward reforestation of and preservation of woodlots by farmers.

ADVERTISEMENTS.

THE MICHIGAN STOCK RANCH CO. has decided to dispose of a portion of its holdings by placing on the market a vast tract of their thousands of acres of first-class farming land in lots of 20 acres or more. This land is located in Troy and Home Townships in Newaygo County.

Land capable of producing 50 bushels of wheat to the acre, 150 baskets of corn per acre, 75 bushels of oats per acre, and where clover and grasses grow abundantly, and in addition thereto all of the various fruits and vegetables that can be raised in the middle west, and owing to the nearness of markets can be disposed of at a large profit. A section of the State noted for its mild climate, owing to its being sheltered from the lake breezes. Land which is watered not only by the Pere Marquette river, but by a number of tributary streams and lakes. The soil varies from a light to a heavy dark sandy loam with a deep clay sub-soil and drouth is entirely unknown in this section. Potatoes can be grown here with great profit, some sections producing as much as 300 BUSHELS PER ACRE of a superior quality of potatoes, and the markets are in easy reach. * * * In fact we can honestly say to you that there is no section in the United States where the farmer can receive larger returns for his labor than he can in Western Michigan.

This land will be sold in lots of 20 acres or more at from \$7 to \$15 per acre.

Michigan Stock Ranch Company,
508-509 Majestic Bldg. Detroit, Michigan.

"Back to the Land."

The soil of Roscommon County has never been exhausted and yields splendid crops. * * * This land is already worth double its price. It is sold on easy payments. * * * As shown by the records of the County Clerk of Roscommon County, 44,000 acres of land in the vicinity of these lakes changed owners between July 1, 1904, and June 1, 1905.

Inter-Lake Land Improvement Co.
84 Adams Street, Chicago Ill. J. M. Munn, Manager.

5, 10, 20, 40, 80, or 1,000 Acres or more of land for Fruit, Vegetables, Poultry Raising, or general farming in Sections 15, 16, 18, 19, 20, 30, as shown in plat at \$8.00 and up, per acre on easy payments of \$1 per acre down and 50c per acre per month.

FRANK W. SMITH & COMPANY,

—Owners—

Room 60, 88-90 Washington Street. - Chicago, Illinois.
Agents Wanted.

Roscommon County will grow more and better wheat, oats, rye, speltz, timothy hay, clover seed, beans, field peas, potatoes, cabbages, sugar beets, turnips and rutabages to the acre than any other County in the State, or in Illinois, Indiana or Ohio. * * *

Our land will pay double the value per acre that the average high priced land of Illinois, Indiana and Ohio does. And yet such land can be bought for \$6.00 an acre up. Land upon which, the third year it is under cultivation, a clover seed crop will yield from \$75 to \$100 per acre.

St. Helen Development Co.,
Chicago Offices:—607 Atwood Bldg. St. Helen, Michigan.
Corner Madison and Clark Streets.

W A T C H

For a large advance in
values of Roscommon and
Ogemaw county lands this
spring. : : : :

Last Year's Crop Warrant It

Don't Wait Get in on the Ground Floor

W m. F. J o h n s t o n

Roscommon Michigan

II. TIMBER STRIPPERS AND SPECULATORS, NOT SETTLERS, GET THE LAND SOLD.

In the body of the report, reference is made to the fact that but little of the land sold is bought by those who come in as settlers to establish homes, most of it being purchased by those who buy for speculation, whereas most of the real settlers come in as homesteaders. Reference is also made in the body of the report to the fact that most of the tax homestead land sold is bought by habitual purchasers who buy in large quantities. These large purchasers, it is stated, constitute

a very considerable body of speculators who habitually deal in these state lands. This body of speculators includes many county and state officers, as well as those who deal in this class of land regularly as a business. It is also shown in the report, that the law operates rather to the hindrance of legitimate settlement than to its encouragement because it increases the cost of the land to the actual settler. The latter pays more and the state gets less. As a partial corrective the five dollar minimum price is recommended.

The Commissioner of the State Land Office in his examination states that in his judgment it is a large estimate to place the amount of tax homestead land purchased for settlement at ten per cent. Mr. Fremont Skeels coincides in saying that ten per cent is a high estimate. Mr. Burgess and Mr. Wilson, the examiners sent out by the Commission, estimate the amount at five per cent.

With a view of throwing light on the matters referred to above, the Commission directed its Executive Agent to carefully examine the schedules of the land sales furnished by the State Land Office in as many counties as possible. In compliance with this direction, examination has been made of the schedules of land sales in 19 counties, to-wit: Ogemaw, Crawford, Apena, Roscommon, Presque Isle, Montmorency, Otsego, Missaukee, Cheboygan, Manistee, Iosco, Oscoda, Alcona, Lake, Oceana, Mason, Kalamazoo, Benzie and Muskegon. In these counties sales appear upon the schedules in the aggregate amount of 715,115.80 acres. The purpose kept in view was to eliminate such of the sales as were presumably not made to persons buying for the purpose of settling. It was assumed that those who purchased more than a half section, 320 acres, were not settlers and did not make the purchase for the purpose of establishing homes. Accordingly all individuals who purchased more than 320 acres were eliminated. The total acreage purchased by these individuals in the counties named was found to be 540,981.82, being about 76 per cent of the total amount sold. A list of the names of these purchasers, alphabetically arranged, with their residence, counties in which their purchases were made, and the number of acres bought by each, is printed below. There are other large purchasers not named in this list, or named for small amounts, who purchased in other counties not examined.

Deducting the last mentioned amount there remains 174,134.31 acres. This land was sold to those who purchased each 320 acres or less. It is probable that many of these purchasers bought as agents for, or in connection with, others whose names appear on the list above mentioned, but information on this head could not be obtained completely enough to be of any value, and no attempt therefore was made to follow up this suggestion. In many instances, particularly those purchasing 200 or more acres, it appears that parcels are so scattered that they could not have been bought with the design of making a farm. A few instances that happened to be noticed were taken note of, but the labor involved in examining all the sales of this class was so great that the time would not admit of its being done. But by examining the lists of purchasers after the same were alphabetically arranged in each county, it was found possible to determine that about one-quarter of the land purchased in quantities of 320 acres or less, was purchased by individuals who were, by the aid of the Michigan

State Gazetteer and the city directories of Muskegon and Alpena, identified as not settlers. Their names appear as residents of cities and villages and doing business therein as merchants, lawyers, doctors, saloonkeepers, manufacturers, lumbermen, saw-mill operators and even ministers. In this way it was determined that a total acreage of 43,320.08 acres was purchased.

By elimination therefore, a total of 584,301.59 acres was eliminated, being about 82 per cent of the total amount sold.

It will be noted that the method pursued does not reach any of the numerous cases known to exist of resident farmers and homesteaders purchasing in their neighborhood for the sake of taking off the timber to sell to some neighboring operator or purchaser, for the names of these men do not appear in the Michigan State Gazetteer. Neither does the method pursued reach any purchaser who is not now in business in his own name and listed as such in the Michigan State Gazetteer. Neither does the method pursued reach the numerous cases of non-residents of the state, many of whom are known to have purchased for summer resort purposes, as well as for speculation. Another class that is omitted is those who have moved since their purchase was made, so that their names would not appear in the town or city given as their residence at the time of purchase. Other cases of omission will doubtless occur to anyone who gives the matter attention.

Considering these omissions it is submitted that the examination of these schedules confirms strongly the estimate referred to as made by Messrs. Rose, Skeels, Burgess and Wilson, and it seems a fair inference to conclude that the estimate of five per cent fixed by Messrs. Burgess and Wilson is probably nearer the mark than the ten per cent fixed by the Commissioner. Indeed it is believed that five per cent is too high, and the general conclusion at which we arrive is that the present law providing for sale of the tax homestead land is not contributing to the bringing in of actual settlers to any material extent. Its effect in this direction is believed to be so small as to be negligible.

As stated in the report, the land that is taken up by settlers is taken up under the homestead feature of the law; and of the land entered as homesteads, about 48 per cent is abandoned before the deed is earned. Of that which is deeded in fact the examination of Messrs. Burgess and Wilson shows a considerable part to be resold by the homesteader and stripped of its timber. No method is known to us of ascertaining even approximately what quantity of the homesteaded land is thus treated except actual field examination of every parcel. The partial examination made by Messrs. Burgess and Wilson, however, sufficiently prove that it is a considerable part.

List of those who have purchased Tax Homestead Land in quantity exceeding 320 acres in the counties of Muskegon, Mason, Oceana, Manistee, Benzie, Lake, Kalkaska, Cheboygan, Presque Isle, Alpena, Alcona, Iosco, Ogemaw, Roscommon, Oscoda, Missaukee, Otsego, Crawford and Montmorency.

Purchasers.	Residence.	Location of land.	Acres.
Abel, Wm. C.....	Calumet.....	Otsego.....	640
Aldrich, Chester P.....	Battle Creek.....	Alpena.....	360.00
Alpena Power Co.....	Alpena.....	Alpena.....	792.38
		Oscoda.....	3,915.81
Alpena Cedar Co.....	Alpena.....	Alcona.....	1,162.19
		Montmorency.....	240.00
Anderson, Palmer E.....	Princeton, Ill.....	Crawford.....	400.00
Aylsworth, Nellie E.....	Fostoria, O.....	Crawford.....	838.73
Alexander, Mrs. Anna M.....	Chicago, Ill.....	Muskegon.....	640.00
Alcona Stock Farm.....	Detroit.....	Alcona.....	280.00
Byrne, Wm. H.....	Chicago.....	Missaukee.....	1,240.00
		Missaukee.....	600.00
Benthien, Enwold A.....	Lake City.....	Roscommon.....	1,455.04
Buckon, Theo. W.....	McBain.....	Missaukee.....	640.00
		Cheboygan.....	717.00
Butler, H. J.....	Wolverine.....	Otsego.....	71.24
		Cheboygan.....	76.52
Browning, John M.....	Chicago.....	Roscommon.....	400.00
Bliss, Chas. S.....	Saginaw.....	Roscommon.....	1,080.00
		Ogemaw.....	440.00
		Cheboygan.....	160.00
		Montmorency.....	452.93
		Otsego.....	2,040.58
Brack, Conrad C. and Henricke.....	Unionville.....	Presque Isle.....	2,075.44
		Crawford.....	5,419.08
		Ogemaw.....	1,680.00
		Oscoda.....	221.13
		Montmorency.....	960.00
Butler, Ciphaz.....		Otsego.....	1,119.01
Bound, Alb T.....	Onaway.....	Presque Isle.....	184.39
Bach, Miss Carrie.....	Unionville.....	Otsego.....	360.00
Bloomer, Colon A.....	Grand Rapids.....	Lake.....	480.00
		Presque Isle.....	396.32
Burrell, Thos. W.....	Chicago.....	Cheboygan.....	160.00
Blackburn & Prince.....	Alpena.....	Alpena.....	1,076.87
Beck, Lewis H.....	Detroit.....	Montmorency.....	40.00
		Iosco.....	383.46
		Iosco.....	1,386.00
Bell, Wm. J.....	Rose City.....	Ogemaw.....	803.40
		Oscoda.....	355.34
Bauman, Henry H.....	Grayton.....	Crawford.....	494.44
Barnes, O. F.....	Lansing.....	Otsego.....	80.00
		Crawford.....	960.00
Blanchard, Chas.....	Roscommon.....	Crawford.....	560.00
		Roscommon.....	332.17
		Ogemaw.....	329.02
Buch, Amos.....	Hardron.....	Crawford.....	512.12
Baker, Maud.....	Chicago.....	Crawford.....	995.86
Buell, Chas. E., Ed. and Ida M.....	Detroit.....	Ogemaw.....	3,720.00
Bennett, B.....	West Branch.....	Ogemaw.....	966.22
		Ogemaw.....	506.37
Barber, Myrtle.....	Rose City.....	Oscoda.....	40.00
Bennett, John H. Trustee.....	Musk. (Chic.).....	Muskegon.....	560.00
Bullard, O. K.....	Sioux City, Ia.....	Muskegon.....	580.00
Bolen, John L.....	Chicago.....	Muskegon.....	1,520.00
Browning, Granville W.....	Chicago.....	Lake.....	13,763.45
		Cheboygan.....	556.00
Chandler, M.....	Onaway.....	Presque Isle.....	40.00
Cornwall, L., est of B. and E. J. } Martin.....		Cheboygan.....	360.00
		Otsego.....	960.00
Curtis Lumber Co.....	Ludington.....	Mason.....	1,493.71
Carter, John.....	St. Helen.....	Roscommon.....	7,310.05
Coan, Ed. A.....	Nolan.....	Roscommon.....	1,451.09
		Roscommon.....	472.60
Cavanaugh, et al.....	Lake City.....	Missaukee.....	40.00
		Otsego.....	981.80
Carpenter, Elmer E.....	Detroit.....	Crawford.....	80.00
Cross & Cornwell.....	Salling.....	Otsego.....	800.00
Campbell, Frank P.....	Carson City.....	Lake.....	595.32

LIST OF THOSE WHO HAVE PURCHASED TAX HOMESTEAD LAND.—CONTINUED.

Purchasers.	Residence.	Location of land.	Acres.
Cashion & Fisher.....	Bladwin.....	Lake.....	520.00
Crail, Chas. S.....	Fairfield, Ia.....	Lake.....	640.00
Churchill, L. Co.....	Alpena.....	Presque Isle.....	476.05
Currey, Jessie E.....	Tawas.....	Alcona.....	80.00
Christian, Dorcas E.....	Alpena.....	Iosco.....	360.00
Conklin, Chas.....	Harrisville.....	Alcona.....	560.00
Clark, Geo. B.....	Sibley.....	Alcona.....	1,420.00
Crooker, H. Delos.....	Bay City.....	Alcona.....	3,700.00
Clark, Chas. S.....	Grayling.....	Crawford.....	1,760.00
Campbell, Calvin A.....	Roscommon.....	Kalkaska.....	80.00
Clark, Herbert A.....	Pinconet, Ill.....	Crawford.....	360.00
Converse, Frank.....	Boyne City.....	Crawford.....	440.00
Coon, Wm. Martin.....	Rose City.....	Ogemaw.....	4,466.08
Covell Bros.....	Whitehall.....	Ogemaw.....	640.00
		Muskegon.....	862.00
		Oceana.....	480.00
		Iosco.....	320.00
Courtright, Morris L.....	Bay City.....	Alpena.....	120.00
		Ogemaw.....	80.00
Clark, Lewis E.....	Onaway.....	Montmorency.....	320.00
Cowhan, Wm. F., et al.....	Jackson.....	Cheboygan.....	320.00
Dennis, Orville.....	Lake City.....	Presque Isle.....	458.03
Davy, Vernon R.....	Ewart.....	Missaukee.....	800.00
		Missaukee.....	644.77
Dalton, Grant & Leo.....	Litts, Ia.....	Missaukee.....	720.00
Decker, John W.....	Lake City.....	Manistee.....	520.00
Dubey, Geo.....	Wolverine.....	Missaukee.....	960.06
Decker, John.....	W. Branch, B. City, Decker.....	Cheboygan.....	640.00
Deuel, Andrew L.....	Harbor Springs.....	Roscommon.....	1,400.02
		Montmorency.....	1,034.00
		Montmorency.....	586.73
Davidson, Sam. H.....	Alpena.....	Alpena.....	275.91
		Alcona.....	80.00
Douglass, T. E. & Co.....	Grayling.....	Otsego.....	1,332.15
Dickinson, Chas. F.....	Toledo, O.....	Crawford.....	554.63
Davis, Alonzo C.....	Alpena.....	Otsego.....	880.00
Dye, Ellis L.....	El Paso, Ill.....	Alpena.....	762.37
		Alcona.....	38.80
Dodge, Henry.....	West Branch.....	Crawford.....	754.43
		Oscoda.....	200.00
		Ogemaw.....	758.00
Doud, Edmond D.....	Rose City.....	Oscoda.....	211.15
Davis, Elisha T.....	Chicago.....	Ogemaw.....	400.00
Dixon, Wm. J.....	Marengo, Wis.....	Lake.....	2,934.17
Dueltgen, Rudolph and August.....	Lakefield, Minn.....	Lake.....	3,000.00
Daubney, J. W.....			351.13
		Roscommon.....	327.99
Essington, John.....	Streeter, Ill.....	Iosco.....	2,124.66
		Alcona.....	510.18
		Ogemaw.....	1,080.00
Eldred, Zenas C.....	Jackson.....	Oscoda.....	2,325.13
Eales, John F. & A. M.....	Alpena.....	Iosco.....	200.00
		Alcona.....	585.42
Fry, Alton S.....	Lake City.....	Montmorency.....	160.00
Fultz, C. H. & Cath.....	Cheboygan.....	Missaukee.....	760.08
Filer, Mary M.....	Detroit and Manistee.....	Roscommon.....	320.00
Fletcher, Wm. A.....	Chicago.....	Cheboygan.....	833.00
Farrier, Jas. W.....	Fairview.....	Presque Isle.....	200.00
Fairbanks, Luther Est.....	Flanders.....	Benzie.....	746.00
Fowler, Granville F.....	Flint.....	Oceana.....	1,363.95
		Montmorency.....	404.08
		Lake.....	1,306.41
		Presque Isle.....	539.96
Flint Land Co., Ltd.....	Flint.....	Presque Isle.....	356.52
		Iosco.....	554.88
		Ogemaw.....	3,304.66
Fletcher, Frank W. et al and Fletcher } Paper Co.....	Alpena.....	Alcona.....	432.53
Ferguson, Geo. S.....	Detroit.....	Alpena.....	241.53
Frutchey, H. F.....	Cass City.....	Alcona.....	374.08
Finar, Jas. (Mrs.).....	Iron.....	Alcona.....	1,420.01
		Cheboygan.....	240.00
		Missaukee.....	80.00
Graham, Stephen H. and Graham } Land Co.....	Port Huron.....	Roscommon.....	1,406.58
		Montmorency.....	3,517.72
		Oscoda.....	2,114.26

LIST OF THOSE WHO HAVE PURCHASED HOMESTEAD TAX LAND.—CONTINUED.

Purchasers.	Residence.	Location of land.	Acres.
Gustin, H. K.	Alpena	Montmorency	7,522.85
		Presque Isle	517.46
		Alpena	1,080.00
		Oscoda	240.00
Gillman, Edwin H., Turtle Lake Club	Detroit	Alcona	499.68
		Montmorency	8,523.88
		Alpena	5,999.24
		Lake	1,079.61
Green, Sadie	Chicago	Muskegon	488.00
		Manistee	160.00
		Roscommon	80.00
Grace Harbor L. Co.	Detroit	Presque Isle	377.19
Gardu, Ad E.	Hammond	Presque Isle	586.27
Graves, S. E.	Adrian	Presque Isle	768.46
		Alcona	538.44
Gritzner, Silas A.	Montague	Muskegon	4,400.00
		Iosco	137.16
Gibbs, Howard G.	Princeton, Ill	Crawford	400.00
Gordon, Geo. T.	Lewis	Ogemaw	565.92
Goodrich, J. Archie	West Branch	Ogemaw	680.00
Guliford, U. M.	West Branch	Ogemaw	2,124.34
Glenn, Thos. S.	West Branch	Ogemaw	520.00
Horton, C. M.		Cheboygan	400.00
		Presque Isle	126.65
Haak, L. Co.		Cheboygan	1,171.00
Holmes, Clyde J.	Grand Rapids	Manistee	1,518.34
Hamm, Harry B.	Chicago	Manistee	4,143.30
		Manistee	2,163.76
Hart, Geo. A.	Manistee	Lake	2,551.15
		Roscommon	840.00
Hanson, Rasmus	Grayling	Crawford	400.00
		Roscommon	12,833.86
		Crawford	5,550.09
Hellen, Myrtle E.	Chicago	Muskegon	280.00
		Montmorency	2,480.40
		Presque Isle	248.97
		Alcona	40.00
		Alpena	40.00
Holmes, Geo. B.		Lake	1,320.00
Hackley, Phelps Bonnell Co.	Grand Rapids	Presque Isle	360.00
Hidney, Anderson I.		Presque Isle	610.55
Hill, B.	Millersburg	Cheboygan	40.00
Horwitz, Harris	Hawkes	Presque Isle	520.00
Holihan, R. P.	Millersburg	Presque Isle	1,717.76
Hasenberg, Edward and Anna	Rogers City	Presque Isle	2,409.30
Hoelt, Herman, Paul H. and John	Rogers City	Presque Isle	2,819.89
Hasenberg, Herman	Rogers City	Presque Isle	1,012.88
Hitchings, H. B.	Copemish	Iosco	840.00
		Cheboygan	160.00
		Presque Isle	200.00
Hartnigh, N. C.	Tawas	Presque Isle	400.00
		Iosco	1,995.76
		Alcona	40.00
		Cheboygan	323.00
Hughes, F. D.	Onaway	Cheboygan	274.65
		Presque Isle	120.00
Hansen, M.	Grayling	Otsego	235.15
Hilton, Chas. E.	Detroit	Crawford	598.84
Harger, Henry D.	Mio	Oscoda	956.37
Hicks, Wm. C.	Benton Harbor	Oscoda	400.00
Hayes, Jas. H.	Glennie	Oscoda	760.00
		Alcona	81.01
Hartman, Geo. and Gertrude	Jack Pine	Crawford	894.16
		Oscoda	79.31
Harvey, Douglas	West Branch	Ogemaw	649.88
Haviland, Jas.	Lennon	Ogemaw	1,000.00
		Roscommon	80.00
Johnston, Wm. F. et al.	Roscommon	Roscommon	1,156.47
		Crawford	40.00
		Montmorency	1,080.00
		Otsego	717.47
Jensen, Lewis	Salling	Ogemaw	360.00
		Cheboygan	40.00
		Kalkaska	399.86
Jorgenson, Waltman	Grayling	Crawford	5,966.00
		Otsego	1,120.00
Jorgensen, Alden	Grayling	Crawford	439.00

LIST OF THOSE WHO HAVE PURCHASED HOMESTEAD TAX LAND.—CONTINUED.

Purchasers.	Residence.	Location of land.	Acres.
James, Vaclay	Dublin	Lake	600.00
Johnson, Wm. H.	Alpena	Alpena	362.32
Johnson, Collie	Traverse City	Iosco	1,680.81
Jarmuth, Emma	Chicago	Iosco	671.42
Jacklin, Jerem	Unionville and Lansing	Ogemaw	800.00
		Oscoda	240.00
Kanna, Oren W.	Alpena	Alcona	40.00
		Alpena	41.57
		Montmorency	160.00
King, Robert	Lapeer	Otsego	614.00
		Ogemaw	80.00
		Otsego	565.69
Karslake, Arthur C. and Alfred	Vanderbilt	Montmorency	156.00
		Cheboygan	40.00
		Lake	420.00
Karm, Adolph	Manistee	Manistee	320.00
Krauth, John E.	Millersburg	Presque Isle	514.19
Klein, A.	Alpena	Presque Isle	1,027.60
		Alcona	240.00
Kauffman, Jos.		Presque Isle	1,023.62
Kuhlman, W. R.	Toledo, O.	Presque Isle	398.24
Kimball, Fred A.	Alpena	Presque Isle	440.00
Kieley, J. Burt	Roscommon	Roscommon	680.00
		Montmorency	231.45
Kinney, J. M.	Onaway	Cheboygan	124.00
		Presque Isle	234.70
Kehoe, J. E. & M.	Tawas City	Iosco	360.00
Lumberman's State Bank	Bay City	Iosco	1,214.70
Luce, C. W.	E. Tawas	Iosco	835.25
Luce, Edward C.	Marseilles, Ill.	Iosco	680.00
Lund, Carl M.	Harrisville	Alcona	560.00
Lewis, Roland M.	Rose City	Ogemaw	434.86
Lott, Matilda	Dewitt	Ogemaw	360.00
		Roscommon	1,089.15
Lux Paullus, et al.	Star City	Missaukee	809.83
Laird, Wm. C.	Indian River	Cheboygan	2,453.00
Lemden, Herman	Lewiston	Montmorency	1,772.36
		Montmorency	400.00
Loud, H. N., E. F. & H. N. Loud Son.	Au Sable	Oscoda	2,644.78
		Alcona	6,188.74
		Iosco	985.09
Lake, Thos. H.	Hillman	Montmorency	480.00
Laugh, A. A.	Alpena	Montmorency	2,056.80
Lacy & Lister	Clare	Lake	836.33
Lacy, Francis D.		Lake	551.82
Leavitt, Chas. R.	Alpena	Presque Isle	1,616.30
Lerke, Fred D.		Presque Isle	519.13
LeRoy, Wm. H.	Alpena	Alpena	386.80
Minthorn, Wm. A. et al.	Lake City	Missaukee	2,602.72
		Roscommon	2,860.33
Morey, Wm. J.	Lake City	Missaukee	1,440.00
Markette, B.		Cheboygan	400.00
		Presque Isle	40.00
Moran, Pat.	Whitehall	Oceana	400.00
		Muskegon	1,600.00
		Roscommon	4,222.87
Michelson, Nels	Grayling	Crawford	360.00
		Missaukee	158.68
		Montmorency	3,076.00
Mills, John B.	Metamora	Iosco	444.49
		Ogemaw	2,000.00
		Oscoda	280.00
Morrill, Jesse H.		Montmorency	440.00
Mills, Myron W.	Maysville	Montmorency	624.03
Michigan Cedar Co.		Kalkaska	360.00
Merrill, Edward T.	Reed City	Lake	1,298.78
Malloy, Jos. P.	Chicago	Lake	440.00
Malley, Thos.	Chicago	Lake	1,029.02
Michael, Jos. S.	Sioux City	Lake	626.87
Michigan Mfg. & L. Co.	Holly	Presque Isle	440.00
		Roscommon	670.35
		Iosco	2,326.40
		Ogemaw	3,521.14
Maltby, Alvin and Maltby Cedar Co.	Bay City	Otsego	79.05
		Missaukee	240.00
		Roscommon	234.00
		Presque Isle	40.00

LIST OF THOSE WHO HAVE PURCHASED TAX HOMESTEAD LAND.—CONTINUED.

Purchasers.	Residence.	Location of land.	Acres.
Myers, Noah.....	Springfield, O.....	Iosco.....	517.93
Monaghan, Jas. H.....	Rose City.....	Alcona.....	586.87
Miller, Frank.....	Maltby.....	Oscoda.....	582.28
Mills, Alvin G.....	Toledo, O.....	Ogemaw.....	361.03
McTiver, Silas.....	Onaway.....	Oscoda.....	360.00
McArthur, W. S.....	Cheboygan.....	Presque Isle.....	222.56
McPhee, Malcolm.....	Alpena.....	Alcona.....	720.00
McCoid, Robt. M.....	Chicago.....	Cheboygan.....	2,428.00
McRae, John.....	Bay City.....	Cheboygan.....	441.00
McDonald, A. S.....	Cheboygan.....	Montmorency.....	1,716.57
McKay, Lloyd G.....	Prescott.....	Presque Isle.....	640.00
McGraw, Jos. W.....	Bay City.....	Alpena.....	624.93
McKay, Robert C.....	West Branch.....	Cheboygan.....	40.00
McDonald, B. J.....	Flint.....	Otsego.....	79.51
Miller, Luman J.....	Kingston.....	Lake.....	589.27
Manaco, Attilio.....	Chicago.....	Presque Isle.....	440.00
Montgomery, Eleanor F.....	Chicago.....	Iosco.....	411.70
Miller & Veit.....	Flint.....	Ogemaw.....	440.00
Miller, L. H.....	Chicago.....	Oscoda.....	80.00
Michigan Pipe Co.....	Bay City.....	Cheboygan.....	80.00
Macomber & Bale.....	Lake View.....	Alcona.....	160.00
McRae, Geo. F.....	Alpena.....	Presque Isle.....	389.59
McDonald, John et al.....	Chicago.....	Iosco.....	920.00
McGraw, Jos. W.....	Bay City.....	Oscoda.....	120.00
Naughton, Jos. E.....	Chicago.....	Oscoda.....	1,112.11
Nepil, Louis.....	Chicago.....	Ogemaw.....	3,622.83
Nepil, Anton J.....	Chicago.....	Roscommon.....	200.00
Neff, John S.....	Syracuse, Ind.....	Ogemaw.....	640.00
Newberry, Frank J.....	Iowa City, Ia.....	Crawford.....	2,319.40
Nicholas, Homer C.....	Roscommon.....	Ogemaw.....	960.00
Newton, Ida.....	Chicago.....	Oscoda.....	80.00
Nicholson, G. R.....	Alpena.....	Crawford.....	1,378.71
Olds, Millard D.....	Cheboygan.....	Crawford.....	360.00
O'Brien, Michael.....	Alpena.....	Ogemaw.....	1,541.87
O'Brien, Mrs. Catherine.....	McKinley.....	Iosco.....	40.00
Powell, Alynn A.....	Allegan.....	Roscommon.....	438.28
Patterson Bros.....	Indian River.....	Roscommon.....	320.00
Paesler, Augusta.....	Chicago.....	Cheboygan.....	280.00
Pendock, Edward D.....	Atlanta.....	Montmorency.....	342.64
Pollak, John J.....	Chicago.....	Cheboygan.....	40.00
Parkhurst, L. K. & J. W.....	Reed City.....	Alpena.....	160.00
Parsons, Howard H.....	Detroit.....	Alcona.....	120.00
Peters, S. & L. Co.....	East Lake.....	Montmorency.....	229.40
Platz, Henry & Dueltgen, Rudolph.....	Rogers.....	Roscommon.....	820.50
Preston, F. B.....	Detroit.....	Lake.....	156.94
		Iosco.....	71.25
		Ogemaw.....	273.04
		Montmorency.....	528.37
		Otsego.....	400.00
		Lake.....	781.60
		Lake.....	320.00
		Iosco.....	602.22
		Alcona.....	6,471.69
		Crawford.....	427.23
		Muskegon.....	560.00
		Oceana.....	30.00
		Lake.....	40.00
		Alpena.....	360.00
		Presque Isle.....	462.03
		Cheboygan.....	343.00
		Alpena.....	394.74
		Alcona.....	3,366.00
		Oscoda.....	680.00
		Alcona.....	1,799.72
		Missaukee.....	370.48
		Cheboygan.....	520.00
		Roscommon.....	5,407.79
		Montmorency.....	1,565.61
		Lake.....	640.00
		Lake.....	480.00
		Lake.....	900.00
		Lake.....	655.12
		Manistee.....	320.00
		Presque Isle.....	398.41
		Presque Isle.....	682.12

LIST OF THOSE WHO HAVE PURCHASED HOMESTEAD TAX LAND.—CONTINUED.

Purchasers.	Residence.	Location of land.	Acres.
Prince, Will H.	Alpena.	Presque Isle	80.83
		Alpena.	3,614.56
		Alcona.	1,199.62
Poch, Rudolph.	Rogers City.	Presque Isle	1,876.83
Purdy & Begole.	Unionville.	Presque Isle	769.67
Phillips, Chas. B.	Blissfield.	Iosco.	520.00
		Iosco.	527.11
Pierce, Chas. S.	Oscoda.	Alcona.	1,147.99
Porter Harry L.	Chicago.	Alcona.	480.00
Potter, Nathan S.	Jackson.	Crawford	7,345.34
Passolt, Wm. J.	Saginaw.	Ogemaw.	440.00
Poppleton, Edgar C.	Birmingham.	Roscommon.	2,300.00
Paine, DeForest.	Detroit.	Oscoda.	343.71
		Oscoda.	320.00
Prescott, Miller & Co.	Rose City.	Ogemaw.	160.00
		Oscoda.	320.00
Penoyer, W. C.	Bay City.	Crawford	80.00
		Missaukee.	440.00
Rought, Eph. B.	Leota.	Missaukee.	400.00
Reed, Edwin.	Toledo, O.	Montmorency.	2,939.53
Rea, Robt. and Wm. J.	Hillman.	Otsego.	635.45
		Presque Isle.	1,180.76
Richardson, L. Co. and F. L. R.	Alpena.	Alpena.	282.78
		Alcona.	40.00
		Cheboygan.	80.00
Randolph Live Stock Impr. Co.	Gladwin.	Otsego.	684.40
Richards, John.	Millersburg.	Presque Isle.	440.00
		Alcona.	40.53
Rogers Bros.	Alpena and Chaumont, N Y.	Alpena.	800.00
		Alcona.	2,955.12
		Oscoda.	955.75
Richardson, Ira H. et al.	Roscommon.	Crawford.	2,713.73
		Roscommon.	432.65
Root, Elihu N.	Chicago.	Crawford.	560.00
Redhead, John B.	Judge.	Crawford.	400.00
Reel, Emmet C.	Chicago.	Crawford.	598.93
Roth, Herman.	Ludington.	Mason.	285.00
		Lake.	160.00
Smith, Lottie B.	Manistee.	Lake.	1,521.72
Selke, Alb.	Hawke.	Presque Isle.	680.00
Schmidt, Wm.	Rogers.	Montmorency.	259.56
Stubbs, Geo.	Alpena.	Presque Isle.	673.92
		Alpena.	360.86
		Oscoda.	2,560.39
		Alcona.	2,430.78
Soloman, Harry.	Au Sable.	Crawford.	557.53
		Iosco.	120.00
		Montmorency.	160.00
Swisher, Lovell.	Iowa City, Ia.	Oscoda.	400.00
Scoville, Leroy A. J. L.	Clarksville.	Alcona.	435.07
Sanborn, Jas. L.	Ossineke.	Alcona.	1,097.20
Scheiber, Hugo.	Perecheney.	Crawford.	360.00
Stitt, Frank B.	El Paso, Ill.	Crawford.	385.51
Swigart, Geo. W. and Canfield, S. Co.	Manistee.	Manistee.	7,569.05
		Mason.	979.39
		Lake.	4,953.14
Salling, Ernest N.	Grayling.	Manistee.	1,436.87
		Crawford.	280.00
		Manistee.	1,770.08
Sands S. & L. Co. and R. W. Smith.	Manistee.	Mason.	2,004.33
Smith, Frank W.	Chicago.	Kalkaska.	560.00
		Roscommon.	704.31
		Montmorency.	437.18
Sanborn, Wm. H.	Alpena.	Alpena.	1,359.61
		Alcona.	1,464.90
Scott, John C.	Vanderbilt.	Presque Isle.	200.00
		Otsego.	1,416.59
		Lake.	18,617.66
Sadler, Fred W.	Montague.	Manistee.	208.20
		Roscommon.	120.00
		Muskegon.	160.00
Swan, Chas. M.	Sioux City.	Lake.	1,205.73
Stark, Lena G.	Baldwin.	Lake.	791.26
Sayles, Elmer E.	Baldwin.	Lake.	440.00

LIST OF THOSE WHO HAVE PURCHASED TAX HOMESTEAD LAND.—CONCLUDED.

Purchasers.	Residence.	Location of land.	Acres.
Salling, Hanson & Co.....	Grayling.....	Crawford.....	7,171.30
Stephen, Harry.....	Grayling.....	Otsego.....	160.00
Stephen, John G.....	Grayling.....	Crawford.....	440.00
Smith, James.....	Frederick.....	Crawford.....	372.24
Snodgman, F. L.....	West Branch.....	Crawford.....	600.00
Sheldon, Harry O.....	Lansing.....	Ogemaw.....	1,160.00
Summer, Gilbert L.....	Lansing.....	Ogemaw.....	1,486.80
Stark, Wm. H. et al.....	Rose City.....	Ogemaw.....	1,190.83
Stanley, Geo. T.....	Lupton.....	Oscoda.....	794.34
St. Helen Development Co.....	St. Helen.....	Oscoda.....	280.00
Stockrider, Geo. W.....	Roscommon.....	Ogemaw.....	679.03
Swanson, Frank H.....	Chicago.....	Roscommon.....	3,520.00
Stoddard, John L.....	Bay City.....	Roscommon.....	530.03
Stuckey, Curran S.....	Chicago.....	Roscommon.....	1,850.81
Smith, Margaret E.....	Chicago.....	Roscommon.....	324.82
Stewart, Eugene.....	Muskegon.....	Roscommon.....	522.92
Spens, Edw. C., Sawmill.....	Alpena.....	Muskegon.....	880.00
Spens Bros. Sawmill.....	Hammond.....	Alcona.....	80.00
Sheldon, Benj. C.....	Paw Paw.....	Presque Isle.....	333.84
Thorpe, Sam S.....	Detroit.....	Alpena.....	195.64
Turnbull, Wm. H.....	Chicago.....	Presque Isle.....	754.49
Truax, Fred.....	Godfrey.....	Ogemaw.....	324.00
Topping, Mary H.....	Chicago.....	Missaukee.....	2,534.47
Thompson, Wm. U.....	Jackson.....	Manistee.....	781.09
Tolfree, John.....	West Branch.....	Mason.....	1,951.61
Telzer, Maria.....	Milwaukee.....	Montmorency.....	520.00
Underhill & Co.....	New York.....	Alpena.....	40.00
Underhill, Chas. F.....	New York.....	Presque Isle.....	40.00
Valentine, Jos. et al.....	Hammond.....	Muskegon.....	1,146.58
Valentine, A. B.....	Onaway.....	Muskegon.....	520.00
Wier, John et al.....	Chicago.....	Crawford.....	710.40
Wheeler, M. B.....	Grand Rapids.....	Ogemaw.....	7,158.70
Webb, Wm. T.....	Williamston.....	Roscommon.....	290.68
Wheeler, John A.....	Onaway.....	Roscommon.....	560.00
White, Wm. H. Co.....	Boyne City.....	Otsego.....	800.51
Wellings, Chas. R.....	Millersburg.....	Crawford.....	117.72
Wilton, Henry L.....	Detroit.....	Otsego.....	1,727.52
Warner, Fred M.....	Farmington.....	Presque Isle.....	360.00
Wiltsie, Afl. H.....	Whittemore.....	Presque Isle.....	160.00
Weideman, Alfred W.....	Saginaw.....	Cheboygan.....	40.00
Wright, E. J.....	Lansing.....	Montmorency.....	291.00
Wood, Jas. C.....	Secor, Ill.....	Missaukee.....	810.31
Widner, John H.....	Alpena.....	Oceana.....	2,078.74
Welch, Jas. L.....	Lawrence.....	Montmorency.....	520.00
Weir, Robert.....	Chicago.....	Montmorency.....	622.20
Wickersham, O. L.....	Onaway.....	Presque Isle.....	642.25
Young, John.....	Onaway.....	Cheboygan.....	256.00
Yuill, John.....	Vanderbilt.....	Montmorency.....	1,019.78
Yockey, Chas.....	Oscoda.....	Presque Isle.....	842.18
Zelenka, Frank.....	Chicago.....	Oscoda.....	928.00
Zeran, Henry.....	Prescott.....	Iosco.....	928.98
		Ogemaw.....	1,000.00
		Iosco.....	442.32
		Iosco.....	1,480.00
		Iosco.....	3,240.00
		Montmorency.....	80.00
		Oscoda.....	3,104.86
		Oscoda.....	360.00
		Alcona.....	80.00
		Ogemaw.....	400.00
		Roscommon.....	583.80
		Montmorency.....	200.00
		Presque Isle.....	162.67
		Cheboygan.....	400.00
		Presque Isle.....	40.00
		Montmorency.....	3,505.04
		Otsego.....	240.00
		Iosco.....	240.00
		Alcona.....	240.00
		Lake.....	640.00
		Ogemaw.....	156.60
		Oscoda.....	164.55

APPENDIX 3.

RATIO OF FARMING AND FOREST LAND, AND SURPLUS OF UNOCCUPIED LAND.

I. Statement of Frank Leverett, U. S. Geological Survey, and others of the relative area of good farming land and of land better employed as forest land in various counties of the Lower Peninsula:

I have made estimates for each of the counties in the northern half of the Southern Peninsula of the percentage of land that, in my opinion, after personal inspection of the ground, would be better for forestry than for agriculture. The origin of the soils in their relation to the drainage from the melting ice sheet that once covered this region, was one of my main lines of study. The adaptation of certain kinds of forest and certain classes of soil was given considerable attention.

County.	Per cent farm land.	Per cent forestry land.
Emmet.....	66	34
Cheboygan.....	55	45
Presque Isle.....	52	48
Alpena.....	56.5	43.5
Montmorency.....	39	61
Otsego.....	52	48
Charlevoix.....	60	40
Antrim.....	83	17
Leelanau.....	70	30
Benzie.....	37.5	62.5
Grand Traverse.....	43	57
Kalkaska.....	37	63
Crawford.....	18	82
Oscoda.....	27	73
Alcona.....	37	63
Iosco.....	32	68
Ogemaw.....	52	48
Roscommon.....	26	74
Missaukee.....	57.5	42.5
Wexford.....	60	40
Manistee.....	30	70
Mason.....	41	59
Lake.....	25	75
Osceola.....	62	38
Clare.....	45.5	54.5
Isabella.....	70	30
Mecosta.....	59	41
Newaygo.....	38	52
Oceana.....	45.5	54.5
Muskegon.....	21	79
Montcalm.....	76	24

From statement of Fremont E. Skeels: I saw Mr. Leverett and was with him a good deal of the time while he was actually going over the ground and know that his estimates were carefully and conscientiously made. As far as careful examination can get at such a matter, and allowing for differences of individual judgment, I think Mr. Leverett's conclusions are approximately correct so far as they relate to the counties with which my work has made me familiar. This is a matter upon which individual judgment will differ always, no two men are likely to agree absolutely, even upon the same piece of land.

See also statement of Wm. H. Rose, Commissioner of State Land Office, conferring the above estimates as substantially correct with some unimportant changes. With the foregoing compare the views expressed by those who are exploiting cut-over lands for farming and like purposes, Appendix 2.

II. Extract from article by John H. Bissell in Roscommon Herald, March 26, 1908, in reference to area of unimproved land in excess of present demand:

In the northern half of the Lower Peninsula of Michigan, there is the largest area of idle or unused lands. By the United States census of 1900 there are sixteen counties in the Lower Peninsula having an area of a trifle over 5,000,000 acres of which a little over 1,000,000 acres are reported as in farms, or about 17 per cent., but the same report shows that the area improved is approximately 400,000 acres or 6 per cent. of the total. Eighty-three per cent. of these sixteen counties were unsettled, that is, not taken up or used, and ninety-four per cent. of the area was unimproved. Undoubtedly, there has been some increase in population and in the amount of land taken up in the last eight years, but there is still room for forests.

Cram's map of Michigan, under copyright of 1908, gives the population of Roscommon county as 1,787; Roscommon city, 465; Crawford county, 2,943; the village of Grayling, 1,143. Grand Traverse county, 20,497, and its county seat 9,407. Deducting the "urban" population from that of the county gives Roscommon county a country or agricultural population of 1,322 persons; Crawford, county 1,800; and Grand Traverse county, 11,000. Roscommon and Crawford counties have 16 townships each, with an area of, approximately, 369,640 acres. Grand Traverse county has about 14 townships, with an acreage of about 322,560 acres. These figures show that the acreage for each rural inhabitant, that is, for each man, woman and child, in these three counties is: Roscommon, 278.86 acres per individual; Crawford, 204.80 per individual; and Grand Traverse county, 29.08 per individual. If four persons to a family, including hired help, is a fair average (I think according to the figures of the city of Detroit directory it is a fraction higher than that), it will give 1,115 acres of land for each rural family in Roscommon county; Crawford county, 819 acres of land per family, and in Grand Traverse county 116 acres.

THE COMMISSION OF INQUIRY,

A compilation showing the acreage of unimproved land in seventeen counties in the Lower Peninsula, in excess of 100 acres per family.

		Tp.	Total pop.	Urban pop.	Rural pop.	Approx. acreage.	Acreage pr. indiv.	Acreage per fam.	Acreage in excess 100 per fam.
1	Emmet.....	14	17,892	7,208	10,684	322,560	30.19	120.76	55,449
2	Cheboygan.....	21	17,256	7,880	9,376	507,492	54.12	216.48	273,029
3	Presque Isle.....	19	10,872	2,908	7,964	429,209	53.88	215.52	137,930
4	Alpena.....	15	19,748	12,700	7,048	370,765	52.60	250.40	265,004
5	Montmorency.....	16	3,515	800	2,715	330,052	121.20	48.48	261,183
6	Otsego.....	15	7,239	2,351	4,888	334,088	68.34	273.36	211,845
7	Kalkaska.....	16	7,608	2,355	5,243	359,966	68.65	274.60	228,856
8	Missaukee.....	16	10,266	1,334	8,932	362,708	40.61	162.4	139,339
9	Crawford.....	16	3,854	2,400	1,454	359,459	247.21	988.84	323,093
10	Roscommon.....	15	1,731	950	881	339,420	385.27	1,540.08	318,293
11	Oscoda.....	16	1,888	300	1,588	365,127	229.93	919.72	325,428
12	Ogemaw.....	16	9,121	2,795	6,326	365,962	57.85	231.40	207,809
13	Alcona.....	18	5,684	1,350	4,334	358,456	82.71	320.84	239,280
14	Iosco.....	15	10,540	6,385	4,155	327,610	78.85	315.40	219,071
15	Lake.....	16	4,999	1,386	3,613	365,392	101.12	404.48	275,346
16	Clare.....	16	9,189	2,952	6,237	364,020	58.36	233.44	208,066
17	Gladwin.....	15	8,601	2,091	6,510	330,018	50.69	202.76	167,241
		275	150,003	58,145	91,948	6,192,304			3,856,262

The excess acreage not required for farms is 3,856,262 or 62% of the total.

APPENDIX 4.

STATEMENTS OF WM. H. ROSE, LAND COMMISSIONER, AND OF FREMONT E. SKEELS, EXPERT LAND LOOKER.

WILLIAM H. ROSE, State Land Commissioner, appeared before the Committee of the Commission and made the following statements and answers:

Q. Is the present land system, in your opinion, working in any large way for the actual settlement in the making of homes or farms of the lands disposed of by you?

A. In some localities this is true, in others it is not true; for instance, I might say that in some localities where the land is of an agricultural nature that is true. In other localities where the land is not adapted for general agriculture, it is not true.

Q. What is the relative importance of those regions in which it is not true—I mean the relative size—what per cent., in other words?

A. I would not think more than ten per cent.

Q. As resulting in homestead making?

A. Yes, sir.

Q. Take the homestead feature of the law, state what its operation has been in this direction.

A. The operation of the State homestead law has not been satisfactory. In many instances it has taken on the form of fraudulent transactions for the purpose of removing the timber, and abandoning the homestead. In other instances the homesteaders have made applications for lands that were not suitable for homesteading, not suitable for agriculture, and after a few years have been compelled to abandon it and let it revert to the State.

Q. There are two classes of homesteaders, are there not?—one who is making an honest attempt to establish a homestead, and one who goes in for the purpose of skinning off such little scattering timber as there may be in the neighborhood.

A. There are three classes of homesteaders: one class of the bona fide kind that makes application for the homestead and occupies it as a homestead. There is another misguided class that is just as honest that makes application for land for a homestead that is not suitable for agriculture, and after a series of years and a strenuous attempt to make a living, is compelled to abandon. This is quite a large class and scattered all over the northern part of Michigan. There is another class that makes application for lands especially for the purpose of their timber value, removing the timber and abandoning the land.

Q. Does that third class necessarily confine itself to a particular 40 or 80 acres located upon?

A. It never does.

Q. Those are what is known as rubber forties?

A. Yes, sir.

Q. Mr. Rose, look at this article in the Canadian Forestry Journal and glance over the marked portions. Does not that pretty fairly describe the three classes of pretended settlers of whom you have spoken?

A. I think this article referred to coincides with the views just expressed.

Q. Your official experience has shown you that substantially the state of affairs exists in Michigan that is depicted and referred to in that article?

A. Just exactly; and that is very well expressed.

Q. There are a great many instances of these so-called homesteaders who are merely plunderers in the disguise of settlers?

A. That is true.

Q. Mr. Edwards says there is a tendency to systematize this form of robbery. Referring to that statement which I showed you, does your official experience lead you to the conclusion that that statement is the case in Michigan?

A. It certainly does.

Q. Is it not true also that the same practice obtains to a considerable extent in reference to the lands that are sold as well as to those that are homesteaded?

A. I do not think so, no; I do not think that obtains to so great an extent.

Q. But to a considerable extent?

A. I presume that is true of the lands entered as homesteads.

Q. Do you know the per cent of abandoned lands?

A. That I could not tell without looking up the records. From consulting the records it appears that 45% of the land entered as homesteads had been abandoned up to December last.

Q. That is before the time for deeding?

A. Certainly.

Q. Taking up the sales feature of the law, are these land sales made to prospective settlers or mainly in large quantities to speculators for profit?

A. I presume the greater portion of the land sold at the public sales is sold to speculators.

Q. How is it at private sales?

A. That is beyond our knowledge to know what they buy lands for.

Q. You have, however, your official relation to the matter which brings you certain general information upon which to make that presumption?

A. That is true. I have no authentic authority for making the statement.

Q. A large amount of this land that is sold through your office is sold to persons who buy it for scattered timber, cedar, tamarack, etc., upon it?

A. There is a certain portion.

Q. How large a portion?

A. I would not be able to state to you. It is a considerable amount, however. The land is purchased by various interests, some purchased for actual homestead farms, some purchased for timber, some for ranching purposes, some for the purpose of completing record title. Much

of this land is purchased by the men who own the original record title, the lands having been returned for taxes until the taxes accumulated until they are ten times the value of the property.

Q. A short cut to a cheap way to paying the taxes? .

A. Yes, sir.

Q. Some considerable portion of it is bought to control water power along streams?

A. The state has never had very much of that class. The per cent of that class would be very small.

Q. I note the chart shows that the State has disposed of a great many 40's adjoining the rivers in the region where the chief fall comes from the higher central portion of the State.

A. I think that would be the Au Sable and Manistee, and I think it is true of the Muskegon.

Q. On other streams on which there is a possible large water power?

A. Of course, that is a matter beyond my knowledge.

Q. How many acres of State lands have been sold real estate speculators in Chicago, Detroit and elsewhere? They have bought very considerable quantities of this land?

A. That is true.

Q. You say you have no means of estimating the relative quantities of land bought for real estate speculation?

A. I have no method of knowing, no method of giving you the percentage.

Q. Your knowledge extends far enough, does it not, to say that much the greater part of the land sold is not for purposes that lead directly to the establishment of homesteads and bringing in of settlers?

A. That is true—probably not 10%. It would be my judgment that not more than 10% is sold for actual residence.

Q. Cedar and tamarack grew largely in the swamps in this northern portion of the Lower Peninsula, did they not?

A. That would be true of the Lower Peninsula, but not true of the Upper Peninsula.

Q. Following the revival of business in 1898, cedar and tamarack situated in the swamps of the Lower Peninsula acquired a merchantable value where it had not had substantial value?

A. That is true.

Q. As a result of that, a very large acreage of the State entered lands was taken up by those who bought it for the cedar and tamarack upon it?

A. No; I could not say that was true. The State never owned an exceedingly large number of acres of that kind of land.

Q. About how much of that kind did it own?

A. I do not think it owned 10% of its total holdings. What it had was taken up in the way you have noted.

Q. Have you mentioned all the purposes for which land is bought in a large way by speculators?

A. I think I have not mentioned purchases for sporting reserves. A large amount of land is sold for this purpose.

Q. That is held unoccupied and is not a game or fish reserve?

A. Of course it is not occupied and must be fenced.

Q. But not settled?

A. No.

Q. The grazing land that is bought does not bring any settlers, does it?

A. It would not bring settlers in any considerable numbers.

Q. Do these real estate speculators, such as the Michigan Central Park Company, bring in many settlers?

A. I have been informed that is true, but I have failed to see where the settlers were living.

Q. Your own experience and observation are that it does not result in actual settlement and home-making?

A. That has been my observation. As a matter of fact, unless you sell land that is adapted for general agriculture no matter how many acres you sell, still you do not get settlers upon it—except on paper.

Q. Have your official duties led you to make any observation as to whether mill operators have made a practice of buying logs or forest products that residents have taken off the land they purchased from the State or from adjoining State lands?

A. That has been true to a great extent until within two or three years past, and they have come to learn that it is a very expensive proceeding and the mill owners are now very careful about buying timber until they know that the man offering it for sale has a title to the timber.

Q. You think the practice obtained extensively?

A. Yes; we were very severe on them and it has now practically ceased.

Q. Your agents do not protect any lands from such depredations except State lands?

A. We have been requested to look after some United States government lands, but have done that by request of the U. S. Land Office at Marquette, but not land of private owners. Of the land bought for grazing, a large proportion is good agricultural land.

Q. How do you account for the fact that it is abandoned for taxes?

A. Well, I am very glad to answer that question. The fact is that in the earlier history of our tax lands it was very much easier for a man to break down a tax title than it was for a man to pay his taxes. This land was originally owned by men having large holdings of timber. Twenty years ago it was easier to break down a title. They let the taxes accumulate until, in many instances, they far exceeded the value of the land. Times have changed, and through the improvements of tax laws and decisions of the courts there came a time when a tax title was pretty good. The tax had got to such proportions that nobody could pay the taxes for the land. They have a process of deeding such lands to the State, the State bidding them in and the taxes are cancelled.

Q. Since the change you speak of, made some fifteen years ago, do you account for much land being allowed to revert for taxes? Is that good agricultural land?

A. There is some that is good agricultural land.

Q. How do you account for that being forfeited?

A. There was much that was formerly owned by corporations that are dissolved, much owned by estates, and I do not know the many other reasons for which the land was returned.

Q. There is a demand for good agricultural land in this State everywhere in the Lower Peninsula, is there not?

A. There is some pretty good agricultural land that has been on the market a good many years and nobody has gotten to it yet. Almost every one of the northern counties has good land.

Q. The sales of the Michigan Park Company are in a district that is not very accessible, are they not? Not close to the railroad?

A. They are quite accessible.

Q. About 9 or 10 miles?

A. I think perhaps they would run from four to fifteen miles.

Q. Well, how do you account for the fact that good agricultural land has reverted for taxes, we will say in the last 15 years?

A. One reason would be its inaccessibility. Its distance from highways makes it difficult to get at.

Q. That would affect the price?

A. Certainly.

Q. But not necessarily make it worthless?

A. No; not worthless, certainly; simply affects the price, that is all.

Q. Is it not a fair inference, speaking broadly, that reverted lands in the county or town are, in general, the poorest class of lands in the county or town?

A. That is not true necessarily—it may be so.

Q. Is there not a natural process of selection through the tax law by which forfeited land (State owned land that is) has been selected as, in general, the non-agricultural land in the locality where the land is located?

A. That would be true. It would also be true of the U. S. government land, many thousands of acres of which are contiguous to State lands and have been for many years.

Q. Would you not say that if the State held forfeited tax land in a particular county this land is prima facie the land which the State should select for its forest growing land?

A. Yes; that would be true. Still, I am inclined to the belief that the better your land, the better your prospect for forestry would be. I believe the State holds thousands of acres of land that could not be utilized for growing forests.

Q. Especially for hardwood?

A. If the State is to regrow hardwood for the future, it would have to retain some portion of the better class of its holdings in land. The best hardwood timber was in the better lands.

Q. As a general proposition, the land that originally grew hardwood forests does not revert to the State in any great quantity, does it?

A. No; mostly pine lands and the lands that grew Jack pines. The latter is never good land.

Q. I have a tabulation by Frank Leverett, a geologist in the employ of the United States Geological Survey, which shows his estimate of the percentage of land in about 30 counties which his examination leads him to classify as forest land and farming land. He estimates the percentage of farming land and of forest land in each county mentioned, which percentage of each class has reference to the nature of the soil as properly either farming land or forest land. In his figures are cer-

tain counties I will call your attention to, and ask you if you have any opinion as to the correctness thereof. Roscommon county, for instance, he divided into 26% farming land and 74% forest land. How would that correspond with your opinion?

Well, I think that estimate is about as nearly correct as I could arrive at it from a casual observance in traveling through the county.

Q. Take Oscoda county, 27% farming and 73% forest land.

A. I would put the percentage of Oscoda farming land a little higher than that. Oscoda county has some very good agricultural land. I should put Oscoda county at 30% farming land.

Q. Crawford county—farming land 18% and forest land 82%.

A. I think his figures are about right.

Q. Now take Alcona county—37% farming and 63% forest land.

A. I should put Alcona county at 40% farming land. Alcona has some good land.

Q. Iosco county—68% farming land and 32% forest land.

A. I should put that a little higher—72% farming land.

Q. Ogemaw county—52% farming land and 48% forest land.

A. That is putting the farming land too high in Ogemaw county; I should put that back to 30%. There are a good many abandoned farms in that county.

Q. Kalkaska county—37% farming and 63% forest land.

A. He has that about right.

Q. Montmorency county—39% farming and 61% forest land.

A. I should put the farming land to 30%.

Q. Otsego county—52% farming and 48% forest.

A. Otsego county is pretty good—that is about right.

Q. Alpena county—56½% farming and 43½% forest.

A. I should put the farming back to 50%.

Q. Presque Isle county—52% farming and 48% forest.

A. I would put that at 45% farming.

Q. Cheboygan—55% farming and 45% forest.

A. About right.

Q. Grand Traverse county—43% farming and 57% forest.

A. I should put that farming back to 40%.

Q. Missaukee county—57½% farming and 42½% forest.

A. I should divide that at 50% each.

Q. Manistee county—30% farming and 70% forest.

A. Manistee county ought to be 35% farming.

Q. Lake county—25% farming and 75% forest.

A. Twenty per cent farming would be high for Lake.

Q. Osceola county—62% farming and 38% forest.

A. I would put that at 65% farming land.

Q. Clare county—45½% farming and 54½% forest.

A. Well, that is probably about right. Clare has some pretty good land.

Q. How do you class Newaygo county?

A. Thirty-five per cent. farming would be a good guess.

Q. I show you a tabulation made up from the schedules furnished by your office and the Auditor General's office, giving the totals of tax homestead land not disposed of Nov. 28th. It shows also the total area

of the counties. That tabulation shows that the State's holdings in Oscoda county are 27% of the area of that county; in Montmorency county, 21%; in Alcona county and in Crawford county, including the State reserves, 18%; in Roscommon county, including the State reserves, and in Iosco county, 16%; in Alpena county, 14%; in Kalkaska county, 12%; in Ogemaw county, 11%; and that there is less than 10% in every other county in the State. In the Upper Peninsula, Luce has 8%; Chippewa, 4%; Schoolcraft, Delta and Baraga, 4% each, and the other counties less.

As I understand your previous answer, if all the State's holdings were devoted to forest reserves, there would not be an excessive quantity in any of these counties, but the balance between agriculture and forestry would be duly preserved. Is that true?

A. Yes; that is true as to totals, but as much of the land held by the State is in isolated parcels it would not be practicable from the administrative standpoint.

Q. Mr. Rose, does any reason occur to you why the State's holdings of land forfeited for taxes, except the isolated parcels you refer to, should not be held by the State and devoted to use as forestry reserves?

A. Under present conditions, or conditions as they exist, large areas are annually burned over with no adequate protection for the timber, and it is far better to dispose of the lands and reap some benefit from the timber than to allow it to be destroyed by fire. On much of the land that is sold by the State, the timber standing upon the land has already been destroyed by fire.

Q. If the State should take measures for adequate fire protection, that reason would be removed?

A. Absolutely.

Q. Is it not the most important phase of the question, this of fire protection?

A. Absolutely, the most important phase.

Q. You further state that in taking this land for forest reserves, the State should provide the required fire protection?

A. Solve the question of fire protection and you have largely solved the question of forestry protection. With the fire problem solved and the question of taxation on State reserves suitably arranged for the protection of the people living in the poor parts of the State where the lands are located, there is absolutely no reason why the whole should not be kept, but outside of the areas properly protected, the present policy of disposing of the lands is preferable.

Q. Should the State, in your judgment, pay a tax or something in lieu of a tax upon its holdings of forestry lands?

A. Not as the lands are now situated in isolated pieces and scattered over a large territory. I think under the present conditions we should concentrate the forestry holdings in such counties as we can adequately protect from fire, and then arrange for compensating the people with some sort of a mutual arrangement for taxation. My own personal opinion has been that a suitable amount of land should be set aside in each county and designated as a forestry reserve. Those lands should be contiguous as far as possible.

Q. If the Forestry Commission or whatever authority may perma-

nently have charge of the forestry interests of the State, should be given power to select out from the State's holdings (all of the State's holdings being made forestry reserves primarily), and all lands which for any reason they were of the opinion that it was not to the State's best interests to hold as forest reserves, would not that solve the problem adequately?

A. That seems to be true.

Q. Does it occur to you that authority to select could be better and more logically left than with the Forestry Commission?

A. No.

Q. Describe the process in detail under the law by which the State acquires its title, the deed from the Auditor General included. When and by what steps is its title brought to the point where the tax homestead lands may be entered or sold?

A. The land is first returned to the county treasurer by the town treasurer; by the county treasurer it is returned to the Auditor General. After a lapse of the statutory time, the Auditor General applies to the circuit court in the county where the lands are located for a decree against the lands. The lands are advertised for a hearing in the circuit court, and a decree is entered, at this hearing, against the lands for the amount of taxes charged up against them, with the necessary additional costs and penalties. This decree in the circuit court provides for a sale of the lands. The Auditor General advertises them and they are offered for sale in May of each year at the county treasurer's office. The sale in May, 1907, would be for the taxes of 1904. At the time of auction at the county seat, if there are no purchasers for the land, it is by the county treasurer bid to the State, and is so returned to the Auditor General as bid to the State. It is then subject to redemption for one year. If not redeemed within the year it then goes on to the State tax land list. The owner's right is at this point cut off; and if the land has been delinquent for five or more years it then becomes subject to being deeded to the State by the Auditor General, which transfers it to the Land Office and it then becomes tax homestead land.

Q. At the end of the year of redemption, the law provides for the State tax land being deeded upon examination if it is found abandoned and delinquent for five years?

A. That is true.

Q. Now describe the method in your office of disposing of the tax homestead lands.

A. After the lands have been deeded to the Land Department by the Auditor General, they are personally examined by examiners appointed by the Auditor General and the Land Commissioner. There is no fixed time within which this is required to be done. The lands are then advertised in the paper in the county where the lands are located, giving the date when the sales will take place at the Land Office, in the City of Lansing. The lands are sold to the highest bidder at public auction, providing the bid equals or exceeds the appraised value as placed upon the lands by the examiner and the Land Commissioner, but in no case can the lands be sold at private sale until they have first been offered at public sale to the highest bidder.

Q. After they are offered at public sale, can they then be sold at private sale, or is there a further process to be gone through?

A. They can be sold at private sale at the appraised value, but in no case for less.

Q. That covers the land sale phase of the act. When and how do they become subject to homestead entry?

A. They become subject to homestead entry as soon as they become subject to sale.

Q. What is your method in granting these entries?

A. My method has been, first, to ascertain if the land applied for was suitable for general agricultural purposes; secondly, to ascertain the character of the applicant, whether he is a bona fide applicant for a home or whether he is making application for speculative purposes. If the land is found to be suitable for agriculture and the applicant bears a proper recommendation, it has always been a pleasure to me to grant a homestead certificate, but in no other case.

Q. Who decides when the lands shall be offered at public sale?

A. The Land Commissioner and the Auditor General.

Q. What determines yourself and the Auditor General as to holding the public sales?

A. The rights of the people in the localities where the lands are located, as about 75% of the sale immediately reverts back to the county where the lands are located. Many of the township and county boards petition and ask for the sale of the lands.

Q. The quantity of the land and the date of sales are within the discretion of the Commissioner?

A. Yes. The Auditor General has nothing to say about it.

Q. About what proportion of the purchases made of these lands are made at the public sale and what proportion at private sale? I mean now, speaking of lands outside of cities and towns.

A. The private sales are very much greater.

Q. What determines the price? Merely the examination of the appraisers that go over it?

A. The appraisers, and, of course, estimates that we form on general principles, as to location, isolation of the land, and general conditions.

THE PRETENDED SETTLER OR TIMBER PIRATE.

Extract from a paper read by Hon. W. C. Edwards before Canadian Forestry Association and referred to by the Commissioner of the Land Office in the foregoing statement:

The mere pretence of settlement goes on as a means of plundering the public timber wealth of the country. Men take up land under the pretence of settlement. They comply with the necessary forms, hold the land long enough to sell the timber upon it, and then abandon their "farms." Being a plunderer who merely assumes the disguise of a settler, this man has no interest. If, by carelessness in carrying on his own petty and illegitimate operations, he should start a fire, he loses nothing.

In my opinion, at least ninety per cent. of the forest destruction in Ontario and Quebec had been due to settlers setting fires for the purpose of clearing the land.

There is a way to clear land by burning without destroying the coun-

try. By setting the fire in proper relation to the direction of the wind, carefully watching the fires set, and taking other simple precautions, fire can be restricted within any desired area. The bona fide settler, the man who is really making a home for himself and his family and who looks forward to spending a lifetime of growing prosperity in the home he is creating, is ready to take these precautions, for they are all in his own interest. But the so-called settler who has taken up a little patch of land merely that he may rob the country of the timber that stands upon it, is in a hurry to realize his gains, and expects to abandon the place as soon as he has done so; consequently, he has no more regard for the rights and interests of others than has any other pirate.

The so-called settler carries on his nefarious schemes. There is a tendency also to systematize this form of robbery, certain parties keeping as their employees or retainers a number of men who make a practice of securing timber lands by this illegitimate means of pretended settlement. The more valuable the standing timber becomes, the greater is the inducement to schemers of all kinds to find means of capturing the timber on the public domain without rendering an equivalent to the public either in money or in service.

If fires are to be prevented, it is not enough to maintain a fire-rang-ing system to put out fires—the man who most frequently starts the fires, the pretended settler, must be eliminated.

The problem of our forest wealth can be answered by keeping down the ravages of fire; and the problem of keeping out, or putting down, fire can be answered by our present methods together with the elimination of the timber pirate who operates in the disguise of a settler.

Fremont E. Skeels, of Cadillac, appeared before the Commission at its request and made the following statement:

I am a land looker and timber estimator and have been such actively for upwards of thirty years, and my experience during that time has been chiefly in the State of Michigan, mostly in the Lower Peninsula. I have worked some in the Upper Peninsula and some in Wisconsin and Idaho. I have been employed by Murphy and Diggins, of Cadillac; Wolf Bros., of Grand Rapids; Cadillac Handle Company, Cobbs & Mitchell, of Cadillac; and Dupont Powder Company of Wilmington, N. J., and by other land and lumber concerns. I appraised the Agricultural College lands for the State from 1892 to 1903. I am also at present engaged in appraising large areas of land for corporations. In the course of my work I have become familiar with a wide extent of the cut-over lands of Michigan, chiefly in the counties of Cheboygan, Presque Isle, Alpena, Montmorency, Crawford, Otsego, Antrim, Grand Traverse, Emmet, Wexford, Missaukee, Roscommon, Kalkaska, Iosco, Alcona, Oscoda, Lake, Manistee, Mason, Benzie, Leelanau and Charlevoix. Some portions of a few of these counties my business did not bring me in contact with, but with such exceptions I became generally familiar with all the counties named.

In my judgment and according to my experience, not more than 10% at the outside of the tax homestead land that is sold by the Land Office is sold to settlers, that is to purchasers who buy it for the purpose of making homes and farms. I think at least 75% of all the sales are

made to men who buy mostly, if not exclusively, for the purpose of getting the merchantable timber and wood. About 15% of the land is sold for these grazing fads of one kind or another. Included in the amount of my estimate for the timber there is a considerable area that is purchased for speculative purposes in addition to the purpose of getting the timber. There have been in particular many purchases by land syndicates for resale, sometimes for farms and sometimes for summer resorts along the shores of Lake Michigan and Lake Huron.

My employment by the Dupont Powder Company was in the years 1906-7. This company makes great quantities of powder and other explosives for use in the mines of Pennsylvania and elsewhere. Its operations involve the use of immense quantities of cord wood for the charcoal or carbon used in making powder. They employed me to look over the tracts of land for them in this State. They were considering the purchase of such an area as, if reforested, would give them an annual increase by natural growth of at least 10,000 cords. They proposed to reforest such a tract with maple, birch and beech. This would require a tract of approximately fifteen thousand acres to enable them to cut 10,000 cords every year without depleting their forest holding. Of course, they would replant as fast as each tract was cut over, treating the whole, in other words, as a rotary or periodic forest property. This company finally decided to go to Pennsylvania, and have located a large tract for the practice of Practical Forestry as a business proposition, inasmuch as so much of their product was used there. This gave that State an advantage in the way of freight rates, which are high on their product. With protection from fire secured by action of the State and with a modification of taxation so that the forest growth as distinct from the land, shall be taxed on a rational basis and not as at present on a basis where each year's growth is taxed annually during the long course of years, it must necessarily stand idle until the tree reaches maturity, I have no doubt that many large concerns consuming in their business annually large quantities of timber and wood products, will find it to their interest to reforest large areas of the less valuable cut-over lands.

"In township No. 24 north, range 3 west, Roscommon county, near Higgins Lake, the statement from the Land Office shows that there have been fifty-four attempts to homestead, of which twenty-three have been deeded and thirty-one have been cancelled or surrendered. In some instances there have been five attempts on the same parcel, four of which were acknowledged failures, and in the majority of instances at least two attempts have been made, one at least of which was a failure. Forty-three per cent of the total acreage taken up including duplications has been deeded. At present it appears that 1,970 acres have been deeded finally and that 1,196 acres now stand as abandoned. In other words, 37½% of abandonments is the final showing made by this particular township."

APPENDIX 5.

LETTERS AND STATEMENTS CONCERNING THE CAPACITY OF THE SO-CALLED
CUT-OVER LANDS TO REFOREST WITHOUT ARTIFICIAL AID, ETC.

Grayling, Mich., March 11, 1908.

The cut-over lands in this part of the country, as a general thing, reseed themselves, more or less, with pine, without any artificial aid. In most cases, it is mixed with hardwood and scrub oak—I should say, about 33% pine, and the balance, other wood. With a reasonable protection from fire, there would be no danger on that score, but what forestry would be a success. We have under our personal supervision, some 8,000 or 10,000 acres, that we are holding for forestry purposes, when it comes to such a time that we can get proper legislation, so as to make forestry a practical fact; on this area, fire has done very little damage, and the timber is now from ten to fifteen years old—and if it could stand for ten or fifteen years, in its infancy, without serious injury, I think that now it has got to a point where very little damage is likely to be done. On this tract of land, there is, I think, about 33% pine, and the balance all kinds of wood, such as soft and hard maple, oak of all kinds, and birch, and on some of the land, in about ten years there will be some merchantable timber. We would be pleased, at any time, to show you several sections of this land that has reseeded itself—but, of course, by the aid of forestry, much greater results could be obtained; nature, of course, does very well, but it is more or less in patches, and not in uniform growth, covering any great area.

Yours very truly,

R. Hanson.

Hart, Mich., March 17, 1908.

You will remember that about the first time that this matter was brought up in the State at a meeting was before the State Horticulture Society at Ann Arbor. Others, at that time, seemed to be very strongly impressed with the idea of planting trees. I was of the opinion that such a move was nonsense; that all we could afford to do at the present time was to protect the forests from fire.

My experience in recent years with reference to these cut-over lands has been quite largely in the vicinity of Big Blue Lake, in the north part of Muskegon county and the south part of Oceana county. This land was at one time covered with pine and cut over many years ago.

Private parties took an interest in keeping these lands from being burned over, and the result has been that a large track of country of poor soil that was cut over years ago is now covered with a second growth of pine and oak. Much of that timber is from three to twelve inches through and large tracts have much more pine than is necessary.

Perhaps a piece that I know as well as any is forty acres, about one-half of a mile east of Blue Lake that I own. This piece has white and Norway pine sufficient for a section if it were properly distributed and to give you something of an idea of the size, I will say that a year ago last winter an adjoining owner concluded that the timber was of sufficient size to make it profitable to come over the line and cut sixteen trees and cut them into logs.

This land was cut over by the Ferrys in an early day and I purchased it solely to see the timber grow. The pine is much more valuable.

Four years ago I took out \$150 worth of oak for ties and about \$100 worth of pine that I thought best to cut. If the oak that is now on the place was near enough to market so that it would be profitable to cut I am of the opinion that it would cut three thousand cords of wood, besides some white oak ties and a little pine that would be profitable. This piece is only a repetition of very much more in the vicinity, but is more fortunately situated than some, because it has been protected from the fire.

I am aware that there is considerable cut-over lands that probably have been burned over so much that there are no seeds. I doubt if it will pay at this time to replant these. Much of that land has grown up to June grass and will retard the small trees.

It is possible that it may be profitable to replant some of these in a small way, but the principal thing is to keep the fire out.

I am, yours truly,
Fred J. Russell.

Ann Arbor, Mich., March 31, 1908.

It seems to me that your contention that the capacity of the land to reforest itself without artificial aid is a natural resource of great value, is entirely correct.

In extensive traveling over the northern part of the Southern Peninsula, through the pine region, and in the Northern Peninsula, over a great part of the wild lands, I will say that I have never seen any areas, except in the rock hill country, where the humus has been entirely destroyed by fire, which would not, if protected for sufficient time, and thus kept from burning over, yield marketable timber. I have seen, in Midland county, a good area of second growth pine ready to be cut on land lumbered fifty years ago, which lay immediately adjacent to tracts of exactly the same character with nothing but bushes, poplars and scrub oak upon it, because it had been burned over frequently. The standing timber had been protected by the accident of its situation and shows of what the land is capable.

In various places, in Clare, Crawford and Roscommon counties, the land is now covered with a thrifty growth of three species of pines, from five to twenty-five years of age; these trees have a great potential value, not only as a source of marketable timber in the future, but as nuclei for reseeding the country around them for a considerable distance, as they grow to maturity; a fire sweeping over any part of this

region, absolutely destroys most of these trees in the area burned over. Such loss is commonly regarded as of no consequence to the State or the owners of the land; in reality, it is most serious; the land is damaged by the destruction of vegetable accumulations, the growth of the number of years which the trees have developed, is entirely lost, and, in many cases, from the lack of living, mature trees, in the region around, reseeding for these species can never take place, unless the expensive artificial planting is resorted to.

Again, while the land is capable of restocking itself, with some kinds of trees, and of supporting these to maturity, every fire which sweeps over them, causes them to become less capable of supporting thrifty growth of valuable kinds for timber purposes.

While I have seen no cut-over areas in Michigan, except bare rock hills, which could not produce, if protected from fire, some kind of marketable tree growth, those areas which have been burned over frequently show very little promise of producing wood of any value for long periods to come.

Yours very truly,
Chas. A. Davis.

Detroit, Mich., March 13, 1908.

There is no question in my mind but what, if a more careful supervision was carried out as to fire protection and trespass in connection with cut-over lands, a natural new forest growth would come up which would be of a good deal of value. There is quite a lot of old cut-over pine and Norway lands in Presque Isle county which, if protected, would produce a new crop without planting. These lands, I have noticed during the twelve years I have been lumbering in Presque Isle county, show a decidedly promising growth at times and then fires will sweep over them and it seems to burn off the young, promising tops, and it takes two or three years before they come up, and then not as promising as at first, and many of the small white pine and Norway seem to have their roots burned and never come up again.

Yours truly,
H. Leonard Wilton.

Traverse City, Mich., March 14, 1908.

I have observed, quite frequently, the second growth, that springs up after land has been cut over; this condition is quite noticeable in different localities; frequent fires destroy this growth, so that only here and there where the fires are infrequent does the growth have an opportunity to reach any considerable size; there are, however, small tracts here and there where the second growth has attained considerable size, in our own and Kalkaska county.

From my observation, the reproduction of the pine, on the cut-over pine lands, is more spontaneous than the hard woods. It is, however,

true that much of the pine lands after the timber is cut and fire burns the refuse, grows up to popple and cherry, with black and raspberry bushes, followed later by the pine. If this growth could be protected from the fires, a few years would suffice to reproduce valuable timber. To make the forest equally uniform, it might be essential either to plant or provide for other means of propagating the second growth.

The hard timber lands when cut and burned over, if not cleared, grow up to popple, cherry with black berry and raspberry bushes; if, however, the ground is not burned over or if the green hardwood is standing near by, the hardwood will be reproduced usually in dense thickets.

The great enemy to the reproduction of our forests is the forest fires. Could these be controlled it is certain vast quantities of our worthless pine lands would soon be covered by a valuable growth of timber; not large enough for saw timber but for many other useful purposes.

Yours truly,
E. S. PRATT.

Turner, Mich., Nov. 30, 1907.

I think there should be a classification of the State lands into three classes:

First: Those forties that are more valuable for timber than for farming purposes. Upon these the timber could be sold down to a certain size or the timber held as the best policy of the State shall decide. Second: Lands which have been valuable for timber and now have a thrifty growth of popple, pine and other timber, should be reserved absolutely till they can be placed in class number one. There is a large amount of this land, and it should be kept for a future timber supply, but individuals cannot afford to buy and hold it. Third: Lands which have more or less value for farming purposes but are not valuable for any present growth of timber. These should be sold or homesteaded as at present except that the sales should be at the county seat. This class would mostly be pretty poor, but I have more faith in their agricultural value than I used to have.

Yours sincerely,
A. H. Phinney.

Detroit, Mich., March 9, 1908.

I have owned, for a number of years, about 200 acres of forest land just five miles from the east arm of Grand Traverse Bay. Before I acquired the property all of the largest of the white pine had been removed. There were a few smaller white pine left, forming part of the mixed stand. From these few trees a very considerable and encouraging amount of seeding has taken place, and I now have many white pines from seedlings up to fifteen and twenty years old. There is

hardly a foot of that land which has not been burned over. A number of places have been partially burned three or four different times. I have seen a number of young pines, which had been killed, evidently by the fires, and some had been injured, but not killed, by the fire. There has been no artificial planting on the forest land referred to, and in due time there will be a fine growth of white pine there, fully as many trees to the acre, and I am inclined to think more than there were formerly. I am referring to lands in Whitewater township, Grand Traverse county.

At least once a year, for the past seventeen years, I have driven from Williamsburg south, southwest and southeast, sometimes directly east to the Boardman river. There were formerly on those plains some considerable blocks of white pine, the last of which was lumbered off ten or twelve years ago. There was, also, a fair amount of Norway, and there is now some Jack pine, some scrub oak, some poplar with plenty of sweet-fern and other small growth. Up to about 1903 many fires swept over these plains. There are a few white pine left at rather long distances apart, and a little more Norway with scattering Jack pine, and in several places small groves of Jack pine. Notwithstanding the fires, there has been a natural seeding and surviving of a considerable natural reproduction of both the white and the Norway pine. I estimate that very nearly a solid block of lands on these plains could be secured on the north side of the Boardman river, aggregating not less than 25,000 acres, and, possibly, forty or fifty thousand, without touching a single farm now under cultivation. If it were perfectly protected from fire and trespass, it would, in thirty or forty years, produce enough lumber stock to pay a little local tax and considerable more than will be realized from thirty or forty crops of huckleberries. There are many places on these plains where the natural seeding could be supplemented by seeding broadcast white and red pine seeds. A very large part of the valuable cedar has been cut from the valley of the Boardman river, and that ground, if protected, will slowly reseed back to cedar, fir and spruce, but the regeneration of the lands on the flat could be very largely improved by broadcast seeding, as there is, in most places, growth enough to preserve the moisture and shield the seeding. I am, also, more or less familiar with lands in 5 and 6, in 25 and 26 west, in the southeastern part of Kalkaska county. There on the terraces, bordering the Manistee river, I have seen within two years very thick, large groves of Jack pine. They were of various ages, from five to twenty-five years. That land must have been exempt from very severe fires during a good part of that time. There were a few of the older trees which showed some marks of former fires. In one ride I passed over and had a perfect view of not less than 10,000 to 15,000 acres where there was no cultivation of the soil, which, with proper care, could every year produce more and more of that kind of timber, not very valuable, to be sure, but quite acceptable for coarse lumber uses, when better can not be had. The same lands in the process of time could be converted into forests of Norway or red pine.

Yours very truly,

John H. Bissell.

THE FUTURE OF WHITE PINE AND NORWAY PINE IN MICHIGAN.

By W. J. Beal.

With scarcely an exception, no attempt has been made during these long years to save the young pines, which were started on the road to produce future crops of timber. The debris was left, and when dry it burned, destroying the young pines, and, in most cases, there were left no mother trees scattered about the land to produce seeds, and if there were such trees, the frequent fires spread over the land, destroying the last vestige of pines. With a continuation of the practices now generally in vogue, white pine must cut a very small figure in the timber supply of Michigan, unless artificial means are resorted to. After burning, white pine doesn't sprout again and again from the roots after the manner of oaks and red maples.

A small number of old mother trees are occasionally met with, their existence being due to the fact that they were never worth cutting for lumber. Some of the young pines when only eight feet high, begin to bear seeds. The dry pastured sand doesn't seem to be a favorite for seedling pines. But few start under the bushes, yet, on the whole, I think the pines would survive and continue to be more prominent, if fire did not occasionally break out destroying many of them. While a new crop of pines was slowly coming from seeds at disadvantage, the oaks came more rapidly in the form of sprouts.

FROM GRAND RAPIDS HERALD, JUNE 28, 1908.

"A good many years ago," said Mr. Mershon, "fifteen or twenty of us bought the Wingleton property, and about 1,700 acres of land west of Ludington, where W. D. Wing had been conducting a lumber operation for years. We bought it for the trout streams. About all the timber that was worth anything at that time had been taken off; a few young pines were growing around the little lakes and on the plains so-called scrub oak or red oak was growing, but not of much size.

"Had we at the time planted the land with Norway pine, the property would have been worth \$100,000 today, for the scrub oaks in the eighteen or twenty years we have owned the property have become of good size, big enough to make railroad ties, and the little pines that were around the lakes have now become practically merchantable timber. When up on the north branch last week fires were burning fiercely, and it was a shame to see the destruction to young growth that was taking place. White pine and Norway trees eight and ten feet high were being consumed by the fires set by railroads, though they had escaped the fire for years. This was on account of no protection or provision for protection being made by the State or private individuals."

Mr. W. B. Mershon of Saginaw: In Clare county there is a lot of white pine and Norway coming up that looks thrifty and a lot more that

looks sere and yellow from fire. I guess very little of it ever reaches the age of ten years before suffering disaster from fire, and yet if everything went right, in fifty years another pinery might cover that worthless land.

In going over the government plats it is not uncommon to find large tracts, some of them miles in extent, upon which is noted by the original government surveyor (in 1840 to 46 when the land was surveyed by the government) "entered wind fall" and farther along "left wind fall," showing that the timber was at that time destroyed. In such cases the reforestation has been complete and the timber is now again valuable for lumber and especially the bass wood and ash, which sprouted from the roots of trees that had been turned over while the other varieties had to be started from seed.

Fremont E. Skeels,
Surveyor, etc.

Mr. Edwin A. Wildey, formerly State Land Commissioner, in his report for 1902, page 10, says speaking of these lands:

"For the most part these are lands that were lumbered years ago and abandoned by their owners and became delinquent for taxes many years in succession. Upon many of these descriptions there are scattering trees of a size large enough to be marketable; but so few are they that they do not appeal to the legitimate lumberman but excite the cupidity of those who have but little regard for property that belongs to the State."

Whitehall, Mich., March 19, 1908.

The piece of second-growth timber which I have observed the most closely, is an eighty-acre woodlot that was cut over for wood, ties, bark and logs in 1880, just twenty-eight years ago. The timber was hemlock, soft maple, beech, pine and in two small low places, birch. The soil, except in the low places, is a very light sand, so light that in adjacent cleared fields it drifts like snow and looks like the sand upon the beach of Lake Michigan.

After several years a second growth of timber, like the original forest, had sprung up and there not having been any fires to interfere, it had a splendid start. When I went to examine the land I was surprised indeed, as I had not been over it since it was an open slash. Today, twenty-eight years since it was slash waste, it is covered with a fine second growth of soft maple, oak, pine, birch, cherry and beech. Much of the timber is six to eight inches in diameter and from 25 to 35 feet in height. A fine growth of young timber now covers this woodlot.

Very truly yours,

J. J. Gee.

EXTRACT FROM WOOD LAND TAXATION, BY JUDSON F. CLARK, IN CANADIAN FORESTRY JOURNAL, OCT. 1905.

Commercial tree planting must for the present be very largely limited to agricultural districts. As soon as the fire problem is satisfactorily solved, it will undoubtedly be extended to large areas of wild lands which have been devastated by unwise lumbering and by fire to such an extent that seed trees of the valuable species are not present, thus precluding the hope of satisfactory natural recovery. Wherever the forest still remains, however, a natural regeneration of the most valuable species by a conservative lumbering of the present stand must, in all cases, be regarded as the basis of the forest policy. Such natural regeneration is to be preferred as being vastly cheaper and in many if not most cases quite as efficient as artificial planting.

Au Sable, Mich., April 1, 1908.

At the present time the State is selling large bodies of land on which the timber has grown since the lumbermen have left it which runs from seedlings up to trees 8 to 12 inches in diameter. The State sells this land for less than it would cost to plant the trees and the party who buys the land thinks he is amply compensated if he goes in and does a good winter's work. This pine is just in its first commercial value and should be left to grow twenty years. All of these twenty years would be commercial growth and be of larger value to the State.

The present policy is nothing short of criminal. The State does not need the money, but it does need the forests. Within twenty-five miles of Au Sable there are, say, 300 square miles of area on which there is no inhabitant. The few farms that were ever taken up in this territory have been deserted. The coming generation will need all kinds of wood on this area and it should not be confined to all pine. The larger areas of land around the Soo are especially adapted to the growth of spruce.

You are entirely right along your line of moving forward and securing the ground for present growing of trees, and, if you secure this you will have accomplished a large benefit to the State.

A very large part of the waste area is covered with Jack pine. Many of them are now of merchantable value and other large areas are growing. In my judgment these areas should be selected for planting other pines, Norways or spruces as they will act as nurse for the younger trees, making them tall and straight bodied and the pines and spruces will seek the light and after ten to twenty years' growth will overtop the Jack pine. The Jack pine can be marketed leaving a beautiful grove of straight, smooth-bodied timber. Timber planted in this way and cared for will, in from fifty to one hundred years, produce from five thousand to a million feet, or more, to a forty.

Very truly yours,
Henry Nelson Loud.

FROM STATEMENT BY FREMONT E. SKEELS, LAND LOOKER FOR COBBS & MITCHELL, CADILLAC, MICHIGAN.

How many fires nature will withstand and retain its ability to reforest is a matter dependent on local conditions and on the extent and fierceness of the fire. After a number of fires nothing is left, that can to any great extent feed future fires and the work of rehabilitation by nature then begins again. Seeds of some kind are sure to find their way to the ground even though the seed trees are very distant. The first growth that comes abundantly is the fire weed, which follows almost immediately; the next growth is usually the wild cherry and briars and poplars. These growing form a natural young cover for the ground and after a few years they are followed by such forest growth as the seed trees near by can reseed. How far the seed trees will promote natural reforestation is a problem depending largely upon the topography of the tract and its relation to the prevailing wind and proximity to other forest growth. The seed of some trees will carry more easily and more quickly than of some other trees. Some trees will be replaced by shoots from the ground. This is true of the oaks, bass wood, and under certain conditions of the ash. In general, it is true that trees whose seeds do not carry easily will reproduce from shoots or sprouts. In one way or another the greater portion of all of the area of the cut-over lands would reforest more or less adequately in twenty years, if fire were kept out. There would, of course, be thin spots at the end of so short a period of time. I am speaking now generally of all classes of cut-over lands such as we have in northern Michigan, not merely the pine plains and original pineries, but hardwoods as well. I know from my experience and observation that all of these lands will reforest naturally if protected from fire long enough, and in my judgment a good deal more than half would reforest in such a way as to produce a timber stand of substantial value. This is easily within the fact. Of course, I do not mean to say that in twenty years all of the waste cut-over lands would be reforested naturally. There would be stretches probably of land, which, by reason of local conditions, would not reforest, but in my opinion the greater part of the cut-over land would reforest itself in the time I have mentioned. Of course, you understand that this forest would not be at a matured state, but would be a young growth on the way to a full-grown forest.

The oak has a tap root that goes deeply into the earth and is not killed even by a fierce fire. After such a fire these roots throw forth shoots from below the ground which will grow up if not reburned. These will keep coming after each fire. They are difficult to kill, but become more numerous after each fire. The seed of the oak is not spread except to a limited extent by squirrels and birds and the phenomenon often seen of oak following where pine originally predominated is accounted for by the fact I have mentioned. In the midst of the original pine growth and scattered through it, was originally a stunted small oak growth which is much more tenacious of life and survives against the fire much better than pine, which is easily killed. These small oaks grow an annual crop of acorns. The young pine and the pine seeds are usually destroyed by the first fire. Again the bass wood and ash propagate very readily from the root and also from the seed. The trees

bear seed very young, consequently it is a frequent sight to see much bass wood and ash in tracts that have been reforested naturally after several fires. Often the growth of shoots from an oak root will be repeatedly set back by fires and the root will be weakened from trying to reproduce many small weak stems. If these are thinned out, leaving one or two or three, the equilibrium will be re-established and they will grow and develop very rapidly into trees. I have seen this illustrated in many cases, notably in the land immediately adjoining the State farm at Grayling just over the fence on the south side. Here the owner went through a tract of oak grubs that had grown up in the manner I have just stated. He thinned out and pruned, leaving a few stems only and the whole tract immediately developed into a rapid growing oak forest.

As to the ability of the pine to reforest. This is dependent largely upon the prevailing wind and the topography of the region. The seed of the pine is furnished with a wing appendage similar to that of the maple, ash, elm or bass wood, which enables the seed to be carried a long distance and it is also coated with pitch which preserves the seed. It will lie therefore a long time in or on the ground without rotting.

All the so-called pine barrens will grow the pine luxuriantly if fire is kept out. This is demonstrated in many places in Roscommon, Missaukee and Crawford counties where the conditions above referred to exist. The whole problem depends on whether fire has left the seed.

Referring again to the matter of oak, and other tap root trees and reforestation therefrom after fires. In the woods, whether of pine, hardwoods or mixed timber, there are always found many small trees which the unpracticed eye would mistake for young seedlings. These are dwarfed, stunted specimens that have been unable to attain size or growth because of insufficient light, but yet have managed to live. Small oaks of this kind, very small above ground, will have very large roots. When the large growth is cut and fire afterwards follows, these roots beneath the ground withstand the fire and send up shoots. This explanation makes clearer the reason for the frequency of the phenomenon of oak following after a fire where pine originally stood. I have myself, in company with an expert from the Forestry Department at Washington, examined, under a microscope, specimens of small pines that have been taken up by myself as young seedlings. Under the microscope these specimens showed so many rings of annual growth that we could hardly count them. These small shoots must have been from sixty to seventy-five years old. Another instance in an artificial planting on Burton farm near Grand Rapids, set out by Mr. Garfield about 1885 or 1886, I assisted in the planting. Scotch pines were set out and near them small ash seedlings. The pine seedlings outstripped the others in growth and soon cut off their light. The ash seedlings are still there today, not over two feet high, while the Scotch pines have probably grown to twenty feet or more. In the natural forest state many of the very small specimens seem to have a better chance for development than those which are larger but still too small to keep up with the leaders.

This explanation of why oak so commonly follows pine is more elaborately shown by Prof. W. J. Beal of the State Agricultural College, in an illustrated article printed as part of the Report of the Michigan Forestry Commission for 1888. See pp. 25-29.

FROM REPORT OF WISCONSIN FOREST COMMISSION, 1906.

The statement is often made that pines will not follow pine, and that when the old pine is removed, poplar or aspen usually comes up. The latter is true, but it does not mean that pine will not follow pine, but simply that the repeated forest fires following lumbering operations, destroy all the pine seed and the young seedlings. Surrounding old burns are covered with poplar or aspen, their seed is very light, often being carried for miles by the wind, and, as a result, burned country is nearly always covered by these species. But where fire does not follow lumbering in the pineries, the young pines come up readily and often the reproduction is magnificent. It is only a question of putting a stop to the forest fires.

In many sections of northern Wisconsin, chance has accomplished just what the forester would strive for. Early in the lumbering operations only the best trees were taken and those that were left acted as seed trees. As a result of such fortunate conditions, thousands of acres are now well stocked with a fine stand of young timber.

Examples of particularly fine stands of second growth white pine and Norway coming up on cut-over land, are to be found in every county, proving that Wisconsin can, in a great measure, regain her wonderful forests by means of common sense rules in lumbering and protection from forest fires.

Lumbermen and woodsmen, as a rule, do not notice young growth, especially seedlings four or five inches high, for they are accustomed to look only for merchantable timber and the young growth has usually meant nothing to them but a hindrance in logging. Such men see thousands of acres covered with poplar, aspen; birch and cherry and take it for granted that this is the only growth which is coming up on the land. But if they would take the pains to walk through this advance growth, which is really nothing more than fire weed, they would find, in many cases, great numbers of young pine, all the way from little seedlings to trees ten and twelve feet high. Nature has provided species in the aspen, poplar, birch and cherry which can quickly reclothe burned over land and, after acting as a nurse to the valuable pine that comes up under its shade, die down, having performed their function.

Fortunately, the white pine, which is our most valuable timber tree, has a very strong power of reproduction, more so than the Norway with which it comes into direct competition. The following species all reproduce themselves well, and if a few seed trees are left when the mature timber is removed, very little planting will be necessary to secure a second crop; white and Norway pine, Jack pine, cedar, tamarack, soft and sugar maple, birch, basswood, elm. The following species reproduce themselves only fairly well and must be given a start or protected from the other species, or they will be crowded out: hemlock, spruce, balsam, red and white oak, ash, butternut and hickory.

Reforestation must play an important part in the forestry work of Wisconsin, for much of the state land which constitutes the forest reserves has in many cases not only been cut over but also repeatedly burned until it has been left almost a waste, without any young growth coming up. However, until the reserves can be consolidated, fire lines cut and rangers regularly employed, it will be a dangerous experiment to plant lands that are covered with old tops, brush, etc., and are liable to be burned over at any time.

Sault Ste. Marie, Mich., March 11, 1908.

In the Upper Peninsula we have considerable cut-over land which has been left to itself after the lumberman has reaped his harvest. We have all kinds, from heavy clay to light sand. I think it can be safely stated that in almost every case where the land has been divested of its mature forest, either by fire or the lumberman's and wood chopper's operations, nature sets about repairing the damage and reforesting begins, with some kind of growth which, if undisturbed, would eventually result in another forest; but not, necessarily, of the same species found there before.

The curse of the whole proposition is the fires which periodically sweep over the country, one year in one place and another year in some other section. I believe it would not be out of the way to state that you can figure the cut-over and abandoned lands will, on an average, be burned over at least every fifteen years—and that does the business. As things are, with that menacing him, it is idle for any man to devote time and money to reforesting. The big fires of the dry seasons, when once started, sweep over those growths of young timber, largely evergreen as they are here, as they would through prairie grass.

You ask if I know of cut-over lands where there has been some natural regeneration of either white or Norway pine, or spruce and fir or tamarack? I certainly do. We can point you to many such places back of here. Less, however, of white and Norway pine than of the others you mention.

So far as my observation goes a reseedling of white pine, after white pine has been cut from the land, is not the rule; but it does happen. Some of it began to reforest with Jack pine, spruce, balsam, birch and other inferior growths and, here and there in large patches, with a fine growth of white and Norway pine. They grew vigorous and thick; too thick in some places for a mature growth, and stood high above our heads. A fire swept from the east over a portion of that section a year ago last summer, cleaning off the old cutting absolutely, so that one could see a quarter of a mile in some directions, and not a green tree was left in its path. The growth I mention had been going on for, probably, ten to fifteen years. It wiped out, perhaps, between two and three hundred acres of as beautiful a regrowth of white pine as one could wish for.

On some sandy hills in a large swamp to the southwest of us, where had been cut a growth of merchantable pine, is now or was last fall, a fine reforesting of the land, mostly white pine, covering fifty or sixty

acres: everything indicates that, if undisturbed, the tract will have a thicker growth of merchantable pine on it in years to come than the one which was taken off; but any dry time in the next twenty years a match will wipe it out in a few hours.

While there are certain, so called, pine plains of very light, sandy soil, from which good pine was once cut, which never seems to reforest with anything but a stunted growth of Jack pine, I think we can safely say that most of the lands of this section which were cut over more than twenty-five years ago would be today reforested with a growth of some kind of merchantable timber, were it not for the periodical fires which have denuded them.

F. H. Steere.

Sault Ste. Marie, Mich., March 16, 1908.

I have charge of about two thousand acres of land bought in 1878 of the government by P. E. Roach in Town 45, 2 West. This tract was bought because it had been cleared by a succession of fires and at the time was almost fit for the plow so well had the several fires done their work.

About from ten to fifteen years ago much of it was covered with small evergreens, fit for Christmas trees. This season pulp-wood has been cut from said land.

Another tract of about the same size and about twelve miles to the north, you will remember, was bought for \$1.00 an acre after the pine had been taken therefrom. This was in '84. Since, the land has been cut over three times and is held today at \$7.00 per acre, the timber standing thereon being its only value.

I have talked with several of the farmers about here, and all agree that all the lands in this county would reforest themselves if protected from fires and trespass.

Go where you will on the sandy soil or the heavier clay soil that is not under cultivation or pasture and one will see young pine, spruce, balsam, tamarack, white wood, popple, birch and maple.

Yours truly,
John A. Colwell.

Sault Ste. Marie, Mich., March 16, 1908.

I came to Chippewa county thirty-two years ago and bought 320 acres of land covered with dead timber—remnants of previous fires. Soon after purchasing I started the last fire which burned the entire tract almost clean. I put all my land under cultivation within the next four seasons.

Some of the adjoining land was allowed to grow to tamarack, balsam and spruce, also white-wood. This winter they have been cutting from this land, timber for barns and saw-logs from eight inches to twelve inches through. It was very pretty timber. The logs straight and clear.

I have a woodlot of forty acres from which I had cut all the large timber years ago. Today there is a heavy growth, mostly basswood, six inches in diameter and from twenty-five to thirty feet in height.

In my opinion, all the land in Chippewa county would reforest naturally if protected from trespass and fire.

Very truly yours,
Simon Parker.

Sault Ste. Marie, Mich., March 16, 1908.

I am operating a little on the sandy plains in Chippewa county today, all of which would reforest if protected from fire. Small or large white pine will stand more fire than hemlock, spruce or tamarack. All timber is in danger, on the plains at least, from fire. There is considerable white pine in barren places all over this territory that I speak of. Fire runs through every few years killing it off.

Nature will seed all of our soil and would grow to timber if protected from the fire. On the sandy plains, moss, or some such substance, accumulates and fire once started will sweep through it killing everything.

None of our lands have been cut over clean, but much of them have been burned clean. They would not remain barren long if fire was kept from them.

The first growth of these burnt-over plains seems to be poplar or Jack pine, but this in turn protects the other varieties which springs up later.

Yours truly,
Walter W. Sykes.

Sault Ste. Marie, Mich., March 31, 1908.

I have walked through old choppings where white or Norway pine had grown, in every county of the Upper Peninsula. In nearly every chopping visited I have seen evidence of an attempt on the part of nature to reforest where pine had existed before. The first growth after the chopping would be dwarfed and hybrid trees of some sorts, and other bushes. When these had grown to a sufficient height to furnish shade and conserve moisture, I have seen the young pines start up and grow vigorously.

At the south end of Sugar Island, in this county, white pine is reforesting itself nicely. This is true of a great many places in the Upper Peninsula and instances can be pointed out in every county.

Yours very truly,
Chase S. Osborn.

Detroit, Mich., April 6, 1908.

Some of these lands were cleaned entirely of white pine a dozen years or more ago, and as there was no pine forest on the lands and only a few scattering trees within a mile or more, I thought there would be no reseeded to white pine, and great was my astonishment when young pines sprang up everywhere, and in many places very close together.

They grew thriftily until they were some seven or eight years old, when just as we were about to thin them out and prune, some trespasser set a fire that swept heavily the whole tract, and in a few hours converted it into a treeless waste, blotting out all visions of growing a new forest, and leaving me satisfied that any efforts on my part, in that direction, would be futile, at least so long as laws against setting fires were not obeyed, and the over taxing of cut-over lands continues.

Yours very truly,

R. J. Crane.

Foster City, Mich., Nov. 24, 1905.

I have a fine pine plantation of natural growth. Thirteen years ago the forest fires swept over this country and, seemingly, destroyed every living tree. The next year at plowing time I saw a lot of little pine trees started, so I thought I would experiment with it and let it grow. The result of it is I have eighty acres with pine trees from ten to twelve inches in diameter and from twenty-five to thirty feet high. There was pine on this land before, but it was cut twenty-six years ago.

Two years ago this past summer I cleaned up about nine acres, cut the brush, piled and burned it. The young pine have started up quite thick; I measured them several weeks ago and they range from eighteen to thirty-six inches in height.

Very truly yours,

S. B. Bridges.

Escanaba, Mich., Feb. 14, 1908.

The State's Cruiser, Mr. Ford, of Marquette, came to my house to stay for a few days, while looking over the State lands in my neighborhood, and we went over a good deal of land and I was surprised to find as much timber, for I had always counted it as company land. Two-thirds of these lands would have made good farm lands for the homesteader, with plenty of timber on them to induce people to homestead them, the rest I saw would have made forest reserve of growing value that would in time dry out the more the surroundings were cleaned off.

All the land that I saw was sold in December, 1907, for less than the value of the timber on them, and are already under process of being stripped. Then, of course, they will lay there useless to the State as before, for twenty-five years, until the brush grows heavy enough to

be worth cutting, four-fifths of them at least. This method does not build up the country.

I am a fisherman and a farmer and own 280 acres of land in Ford River township in Delta county.

George Jensen.

FROM A LECTURE GIVEN BY THOS. B. WYMAN, OF THE CLEVELAND CLIFFS IRON COMPANY BEFORE THE MICHIGAN AGRICULTURAL COLLEGE ON APRIL 7, 1908, ON REFORESTATION IN THE UPPER PENINSULA.

We are prone to believe that nothing has been done by nature toward reforestating the many thousands of acres which have been deforested either by the innumerable forest fires of unknown origin or by the woodsman's axe. But here we err, for there are very few acres which have not already restocked themselves or are now in the process of restocking. There are thousands of these acres, to be sure, which show only an occasional seedling, but that seedling will be followed by others from the same source or by others of its own production and eventually the entire area will furnish forest cover—provided fires do not continually prevent the efforts of nature. In other words, if protection were furnished every acre would, in time, reproduce itself.

Not always, however, is this restocking of the species desired, but it is a means to the desired end and acts as an usher growth for the more valuable and hence more to be desired species. The best example of this is our native pine or fire-cherry. It occupies the ground within a year after the removal of the hardwoods and the consequent exposure of the soil to the light and air. The cherry, acting as a nurse, keeps the light soil from blowing and erosion, maintains its moisture and furnished a quick leaf mould. After four or five years the hardwoods are noticeable under the cherry which is then from eight to twelve feet high. When the cherry is about twenty feet high it has reached the point of most rapid growth and begins to feel the effects of the black knot, which attacks it at all ages in this upper country. It then begins to shorten its annual height growth, puts on more body and, if severely crowded by the oncoming maple and birch or overtopped by the wolfish balsam, it may break at about half its height and so add its decaying top to the soil cover. By the thirty-fifth year the cherry has been practically superseded by the clean balled hardwoods, which have since their birth been kept in the straight and narrow upward path leading to light.

On typical hardwood soil—sandy loam with us—the natural reproduction comes in more slowly because it produces directly the maple, beech and birch with no usher growth of cherry.

Of the coniferous timbers there are large acreages reproduced in white, Norway and Jack pine and mixtures of the same on soil graded according to the needs of the species. This regeneration is of all ages from one to fifty years and in stands of all degrees of density. I know of tracts of Jack pine regeneration which are simply impassable and others which to duplicate and raise would cost from \$15,000 to \$20,000 to the acre.

APPENDIX 6.

EXTRACTS FROM VARIOUS SOURCES CONCERNING TAXATION OF FOREST PROPERTY.

Forest Taxation in Massachusetts.

By Ralph C. Hawley, Instructor in Forestry, Yale Forest School.

In the spring of 1905 a committee was authorized by the General Court of Massachusetts to investigate the subject of the taxation of forest lands. Under the system of taxation now used, the valuation on a piece of woodland is fixed by the local assessors at intervals of from five to ten years, the figures holding good until the next valuation. This valuation is made on both the value of the land and the standing wood, and so is steadily increased with each new valuation, because the amount of wood is constantly growing greater.

Often the valuation may mount up so high as to make the taxes oppressive. This leads to early cutting and places a heavy handicap in the way of the landowner who desires to hold this woodlot until it can produce large sized timber.

The fundamental trouble with the system lies in this method of valuation, since, as already explained, both the land and the crop itself are assessed. This is not done in the case of an agricultural crop, for there only the land on which the crop grows is taxed. But the forest crop is taxed, again and again, annually until it is cut. In this way the agricultural crop is unfairly favored at the expense of the forest crop.

In order to remedy this point, it was suggested that the law be so amended, as to place the tax only on the land and to allow the crop itself to go untaxed, except that the average annual growth or yearly production of the land should bear a tax. Under such a plan the crop would be taxed once, but once only. The valuation would be the same each year, thus enabling the owner to know in advance just what his taxes will be so long as the crop is growing. Since the tax is levied wholly on the value of the land and on the average annual growth, neither of which will vary appreciably for a given area from year to year, the tax will be the same whether the forest crop is young or old, and there will be no incentive in the taxation to cause the owner to harvest his timber prematurely.

In practice the value of the land for purposes of taxation would be its value as bare or cut-over land, a value fixed by its worth for the production of a wood crop, corresponding in principle to the method of valuing agricultural land. The two classes of land would then be placed on a more equitable footing so far as taxation was concerned; though with conditions still somewhat in favor of agricultural crops. Provided that no tax at all should be levied on the crop—not even on the annual growth—equality of treatment would approximately be obtained. It is believed that if such an amendment could be passed that

more careful management of forest lands would result. Greater interest in forestry would be developed. (1) When private owners know definitely what to expect in the way of taxes and (2) when they understand that these taxes will be the same, whether the land is well cared for or not, a tendency toward the use of better methods will gain ground. Indeed, if conservative management for private forests is to be generally adopted, it must have as a basis a system of just and uniform taxation.

EXTRACTS FROM THE REPORT OF THE COMMITTEE APPOINTED BY A RESOLVE OF THE GENERAL COURT OF MASSACHUSETTS, APRIL 28, 1905, TO CONSIDER THE LAWS OF THAT AND OTHER STATES AND COUNTRIES RELATIVE TO THE TAXATION OF FOREST LANDS.

As instructed in the resolve, we have carefully examined the laws of other states. We find that Colorado, Connecticut, Illinois, Indiana, Kansas, Maine, Massachusetts, Minnesota, Nebraska, New Hampshire, Pennsylvania, Rhode Island, Vermont and Wyoming have made special laws in regard to the taxation of forest lands, and, with the exception of Indiana, these laws are nominally in force. They have not, however, been productive of the best results—not because the problem involved is not capable of solution, but because the laws have, in most cases, been framed without sufficient investigation. They fall naturally into four groups: First, bounties; second, rebates; third, exemption for a period of years; and, fourth, exemption of a certain proportion of the area held by an owner. Some states have both bounties and exemption for a term of years.

(1) Bounties.

Illinois, Kansas, Massachusetts and Wyoming offer bounties to forest planters. A bounty in money is offered in order to encourage private owners to plant their non-agricultural lands to forest trees. In some cases the bounty takes the form of a competitive prize for the best plantation in certain districts; in other cases the bounty is paid for each acre of satisfactory plantation.

We made inquiries to ascertain the extent to which this method has proved of value in forest production. Except in the case of Minnesota, so far as the reports are obtainable, they indicate very small results.

In Minnesota \$440,000 have been spent in bounties, the amount appropriated being \$20,000 a year. The law has been in operation since 1877. The bounty is at the rate of \$2.50 an acre. It is claimed by those who are in a position to know that some 50,000 acres of standing timber can be traced directly to the operation of this law. It will be seen at a glance that, although the law has accomplished results, it has done so at an enormous cost.

(2) Rebates.

Pennsylvania is the only state which has tried the method of assessing woodlands at their sale value, but offering, under certain restrictions, rebate upon the taxes paid. Laws of this kind have been in force since 1887, but owing to defects in their phraseology they have not

been productive of great results. In order to make them more effective, they were redrafted and re-enacted in 1905.*

(3) Exemption for a Period of Years.

Colorado, Connecticut, Maine, Massachusetts, Nebraska, New Hampshire, Rhode Island and Vermont have laws which exempt young forest plantations for a period of years. Answers to our inquiries into the results of these laws were received from Connecticut, Maine, New Hampshire and Vermont. The Vermont law has been in force only since the spring of 1905, and, of course, has not had time to show any results. Although the law has been on the statute books in the other states for many years—in one of them since 1878—almost no results are reported. This is accounted for by the fact that in every case the law is at fault in its phraseology. A law which is restricted in its operation to plantations—that is, to artificial reproduction—must necessarily fall short of securing satisfactory results. Such laws, to give good results, must be drawn so as to include young stands produced by natural seeding and sprouting. Moreover, in several instances the specified number of plants per acre is unnecessarily large, and the number of species of tree which may be planted is unnecessarily small, not including some of the best native species. And, finally, the exemption in several instances is restricted to land which has been previously cultivated in field crops. This excludes any possibility of continuity of forest crops from the same parcel of land.

(4) Exemption of a certain proportion of the area held by an owner.

Indiana has tried the above method. After it had been in force a few years a test of its constitutionality was made, which resulted in its practical annulment.†

Why the Method of Taxing Forest Lands Should be Modified.

The tendency of the present law tax is towards early cutting, and neglect of cultivation. A reform, therefore, that would lead to a more conservative method of cutting, and careful cultivation, is of great importance not only to land owners but to all of our industries that consume wood.

The present method of taxing woodlands is an important factor in

*But have since been held to be unconstitutional in *Tubbs v. Tioga Co.*, 32 C. C. 504, because in violation of the requirement that "all taxes shall be uniform upon the same class of subjects." The principle of the following cases seems to point that way: *Bank v. Memphis*, 116 Tenn. 641, *Wallace v. Board of Equalization*, 47 Oreg. 584, and *Campbell Bryant*, 104 Va. 509.

†The State Forester of Indiana in his report of 1905 makes the following comment: Legislation for the exemption of land areas devoted to forest purposes exclusively was attempted before the last General Assembly, but failed because such could not be done constitutionally. It could not be made to come under any of the five things enumerated in the state constitution for which property may be exempted. It was attempted because there was a crying demand for the same and because the act of 1899 giving a partial exemption was impractical, and one aim in the legislation attempted was to remedy the faults of that act and strengthen the problem of forestry upon the cheap lands within the state. I can not say that I believe in the exemption of forest lands from taxation any more than any other form of property where the owner is the chief benefactor thereby. I also do not believe that in the end the institution of forestry would be helped by tax exemption. Such a course would remove forestry from the meritorious and place it upon a charitable foundation. It would snuff at any time the charitable element was removed, and consequently would be a menace instead of a beneficial factor to the cause.

keeping their output at a low figure. We have had convincing evidence of this fact.

The most objectionable feature of our system is that it provides for taxing the value of the growing crop, as well as the land upon which it grows. In the case of an ordinary agricultural crop, the value of the crop is not taxed. The soil is assessed at a fair, average figure; but the growing wheat, grass, turnips, potatoes, or other crop which may be on it, is not reckoned in the valuation, except insofar as it may indicate the fertility of the land. But in the case of wood or timber crop the land is taxed, and, in addition, the growing crop is taxed, not only once or twice, but year after year, at an increasing valuation until it is cut, when the valuation is reduced to that of the land without the crop. The consequence is that the owner is led to cut his crop before it has reached its productive maturity; that is, its greatest value to himself and to the State. While the tax on the crop may not seem large in any one year on a given parcel of woodland, it acts as a strong influence through a long series of years, and this influence is hostile to the forest and its proper management. The more capable and faithful the assessors are, under the present law, the more effective the law becomes in causing premature harvesting of the forest crop. Such a tax hinders the increase of wealth by cutting it off at its source. And, aside from the economic question involved, it discriminates against forest crops as compared with field crops, giving a decided advantage to field crops. In this respect it is not fair.

Another objectionable feature of the present system is that it taxes the property at a time when it is not bringing in any income. When a crop may be from a quarter to a half century in maturing, it is a hardship on the men to make payment during the intervening years. This accentuates the tendency towards cutting immature timber.

If the desirability of property as an income-bearing, private investment be taken as an indication of the proportion of the tax burden which it ought to bear, woodlands ought not to be taxed proportionately more than ordinary agricultural lands. Although a sharp buyer may trade in woodlands that have mature timber on them, and make on the investment, yet to buy land and to grow the crop is not a good investment, except perhaps for surplus funds, for three main reasons: First, because of the long period of time which must elapse before the crop matures; second, because the property is not readily salable at full value during that period; and third, because the crop is exposed to injury from fire, storm, fungous and insect ravages.

And, if the amount of protection which the property receives from the State and community be taken as an indication of the proportionate amount of the tax burden which it ought to bear, woodlands ought to bear less than many other forms, instead of more, as they now do. We can find no record of an insurance company which has taken a risk on standing timber in the commonwealth. We have found only one company which quotes a rate, and that rate is \$6.25 on \$100—a rate which exceeds the average of growing timber, and which is, therefore, prohibitive. From the point of view of protection, woodlands now bear far more than a fair proportion of taxes.

EXTRACTS FROM WOODLAND TAXATION, BY JUDSON F. CLARK, PROVINCIAL FORESTER FOR ONTARIO IN CANADIAN FORESTRY JOURNAL, OCTOBER, 1905.

The Assessment Basis:—Whether or not the assessment valuation should apply to the value of the land or the value of the land plus the value of the timber standing on it at the time.

It has been the custom and the law of most states and provinces in North America to include the value of the standing timber with that of the soil in assessing woodlands for taxation purposes. This is both unjust and unwise, and is certain to result detrimentally to woodlands wherever practiced.

Forest crops differ from field crops in that the product of any one year's growth cannot be harvested at the end of the growing season, as is the rule with other crops. Thus the portion of wood which is produced during, say, the fifth, tenth, or fifteenth year of a tree's or plantations' growth must remain on the ground until there has accumulated fifty, sixty, or seventy years' growth, when the whole may be sold to advantage. The growth produced during the earlier years of the tree's life is to all intents and purposes simply stored in the trunk of the tree until such time as the whole has reached a merchantable size. To add the value of a forty years' growth of pine trees to the value of the soil for taxation purposes is really as unfair in principle as to add the value of the last forty years' grain crops to the assessment valuation of a grain field. The forty years' growth of pine is not there for investment purposes. It is there simply because the nature of the crop requires the accumulation of decades of growth to make the whole merchantable.

It cannot be too clearly kept in mind in this connection that the soil and climate, and they alone, are the natural producing factors whether the crop be wood or wheat. To add the value of standing timber to the assessment is clearly a case of double taxation in that to the value of the producing agent—the soil—has been added the value of its product—the trees.

Woodland Tax Exemption:—Whether there be any special economic reasons why land bearing wood crops should be taxed at a different rate from lands producing other crops.

There are several reasons which may be urged in favor of the remission of part or all the taxes on such woodlands as are maintained wholly for the production of timber, and which receive sufficient intelligent care to keep them up to a reasonable standard of production. They are:

(1) The value of woodlands to the community in general by virtue of the beneficent influence exerted on the climate by moderating the force of heavy winds and by favorably influencing the humidity and temperature of the atmosphere; and by the very favorable influence exerted in regulating the flow of streams.

(2) The long time element in the maturing of a forest crop is a great discouragement in wood production. There is no line of business in which men ordinarily engage which requires the looking forward for more than a decade or at most two decades. Timber growing, however, requires the constant planning in advance for sixty, eighty, or even one hundred years. So profound is the influence of this long time element that the great law of supply and demand is paralyzed. To illustrate:

If the demand for wheat increases in relation to the available supply, the price rises, the farmers sow a larger acreage, and presently the increased demand has resulted in an increased supply. The same is true of hogs and horses, or of any other commodity which may be reproduced or even mined, except wood. This demand for wood has steadily and tremendously increased decade by decade for upwards of a century. The prices, notwithstanding the opening up of vast virgin forests which cost man nothing to produce, have steadily risen, and during the last decade, as exhaustion of supplies is seen in the distance, have very rapidly risen. This rise in price has not yet resulted in an increased production of wood, nor will it—judging from the history of nations—ever appreciably increase the production of wood until the evils of a wood famine have long been felt. On the contrary, although increased demand has meant increased prices, increased prices have only meant increased harvesting, and increased harvesting has meant and still means in North America that larger areas are annually cut more closely. This on account of the greater amount of debris left in the woods, leaves it in a much worse condition for the all but inevitable after-lumbering fire, which all too often leaves the land a waste, hence the net result of the greater demand for wood products in the case of lands held in private ownership is not an increased but a decreased production.

(3) A third plea may well be entered for the removal of all restraint on the production of a commodity which, while so peculiarly in a class by itself so far as regards the laws governing its production, is without exception the most useful raw material of all manufacture, and an indispensable agent in all production and transportation. Aside, indeed, from the character of its population, nothing contributes so much to the material progress and happiness of a nation as an abundant supply of timber at reasonable prices.

How Should Our Future Forest Lands be Taxed?

By S. B. Elliott, Member Pennsylvania State Forestry Reservation Commission.

Article IX, Section 1, of our State Constitution, provides that "all taxes shall be uniform upon the same class of subjects." It is held that, under this clause, land can not be exempted from taxation, save where it shall be used for public purposes. This view is certainly logical and must be correct.

There can be no truthful denial that the assessor of the past (and he of the present time is of the same mind), persistently laid a heavy valuation upon all land having growing or standing timber upon it, and what he has been doing in the past he will be almost certain to do in the future, unless positively forbidden.

Our legislature has endeavored to circumvent him to a certain extent by providing for a rebate of taxes, not to exceed forty-five cents per acre, on land which may have three hundred or more growing young trees upon it, but he promptly puts that rebate out of action by increasing the valuation on that or the remainder of the owner's holdings, and in this it may be reasonably expected that the county commissioner will uphold him. It must in some way be so fixed that it will be im-

possible to impose a tax on growing trees, or the owner thereof, until such trees have a value as a merchantable commodity if cut. Without that restraint no one need expect that land owners will plant or care for trees when they must wait half a century for returns on their investment and, in addition, endure increasing taxation besides.

The value of young trees is purely prospective. It may never materialize. Fire, disease, or insects may destroy it. It has no marketable value until large enough for use, and it can not be conceived that our Constitution contemplates taxing non-existent or prospective values. It is real ones, actual ones, present ones that should be the subjects of taxation.

Land from which all merchantable timber has been removed or killed by fire is subject to taxation; and under our Constitution and the law, any trees that may now exist there, or may come to grow upon it in time, may be considered by the assessor as having a value, when, in fact, the only value that can be conceived is a prospective one. The assessor may assume such value as he sees fit and add it, increasing it each year, to that of the land for the purposes of taxation * * right in the face of the fact that no revenue can be received for many years, and that this prospective value may be wiped out at any time by fire or disease.

To suppose that our national and State governments will be able, from their limited holdings, to supply this country with the requisite amount of timber that our civilization demands is to suppose what can not occur. Individuals, municipalities, corporations, companies and trustees of estates must engage in tree-growing and that speedily, or there will be so disastrous a timber famine that the car of progress in this country will not only not advance, but will go backward. Some relief and protection to tree growing must be given or it will cease. Whoever may engage in it will suffer enough in waiting for it to mature and in tying up money invested in the enterprise, and should be exempt from taxation in any form. Full relief can not be given under our Constitution, and it should be amended. It should conform to the changed condition of things. With us tree growing is new. It is unlike any other enterprise, because of the long period of time taken to bring returns. At present only such relief as will prevent confiscation can be given to our State.

EXTRACTS FROM A PAPER READ BY ALFRED GASKILL BEFORE THE SOCIETY OF AMERICAN FORESTERS, DEC. 8, 1904, ENTITLED

How Shall Forests be Taxed?

A few attempts to correct the evil, through partial exemption, rebates, or bounties, have been made. But, though such measures may serve for a beginning, the real need is for laws that recognize the public utility of forests, adjust the necessary tax levies to the facts and conditions that govern tree growth, and to the long periods of time that are required to produce timber.

In approaching this subject one naturally turns to those European countries in which forestry has become an art, for, manifestly, no oppressive burden of taxes could be borne where the growing of trees is

found to be so profitable. The conclusions from such a study are two: (1) That the systems of taxation are so radically different from ours that only general principles can be applied here; and (2) that the assessments are always based on the actual value of the forest, or on the earning power of the land, that is, its yield.

The first principle in all these laws is that the forest shall be considered and rated apart from the land upon which it stands. This principle finds universal acceptance in theory at least, though the practice differs in the various countries, and is based upon the fact that a forest is a crop of many years' growth. Trees thrive and make a growth, but at the end of the season they are not convertible into money as a corn crop is. So it is for many years. The tree crop is made each season, but must be left on the stump until enough wood is accumulated to make it salable.

Here comes in a second principle that it is unjust to require the owner to pay (a tax on forest growth) so long as the forest yields him nothing. There is no equity in making a man's other property carry his immature forest. In practice this works out in various ways. Most of the German states have not yet made the principle effective, but Baden exempts newly established forests from tax for twenty years (law of 1886). In Austria they are exempt for twenty-five years (law of 1869). In France three-fourths of the land tax is remitted for thirty years. In connection with these laws it should be remembered that forests in Europe begin to yield saleable material when they are from twenty to thirty years old. In most parts of the United States the productive period begins later, because there is no market for small wood.

This principle of exemption or rebate is familiar enough in this country, where undeveloped property of all kinds is taxed at a nominal rate. Farm land not cleared bears little. A comparison can not be made, however, with other forms of unproductive property—city lots, for instance. The owner of the latter produces nothing from his land; he hopes to gain by what others do. The forest owner, on the other hand, does produce something of value and will eventually pay a proper tax on it.

This is the equity of forest taxation; but communities have another interest than that of revenue, namely, to maintain the forests in the greatest possible extent and effectiveness for the sake of lumbering and its many dependent industries, and for the influence that they have upon stream flow and the modification of climatic extremes. These subjects are beginning to be well understood, and need not be dwelt upon.

The points that, in the writer's opinion, should be considered in any equitable scheme of forest taxation are the following:

- (1) Forests are necessary to the public welfare, and consequently each commonwealth should bear a part of the cost of maintaining them. This means that the State should, as far as is proper, relieve the counties, and that cities and towns should contribute to the maintenance of conditions that are as important to them as they are to the people who live close to the forest borders. Exemptions and rebates, as usually allowed, do not meet this requirement, because the county bears the

burden; that is, if one piece of property pays less, all the rest must pay a higher rate to make up the deficiency. In no case is an exemption justified, unless everyone who shares the burden of it, is correspondingly benefited. * * *

A state can not properly declare that its forest reserve shall be untaxed, because such action robs the counties of the revenue that they need. New York, which holds the largest state reserve, recognizes this principle and pays local taxes on its land. Under a new law, enacted in 1905, Pennsylvania pays to the counties in lieu of taxes five cents a year for each acre of state land. The Austrian state forests pay taxes on land and income.

(2) A forest is a form of property whose value is potential or prospective most of the time; only when the trees are market ripe can an income be derived from it.

(3) In consequence of yielding periodic returns, the greater part of the tax to be paid upon a forest should fall due when the timber is sold, and not made a burden upon the other property of the owner through many years.

(4) The deferred tax should bear a fair relation to the net yield of the property; that is, it should not exceed a sum that will leave the owner the equivalent of a fair annual return on his investment.

(5) Forests occupying land of the kind here considered grow too slowly in most situations to yield by their annual increment a rate of interest comparable with that commonly expected from ordinary business enterprises, though they may easily produce wood at a rate that will compare favorably with the interest derived from State or national obligations.

(6) Forests are exposed to unusual risks from fire and depredation, owing to their very general use by the public.

EXTRACTS FROM AN ADDRESS DELIVERED BEFORE THE MICHIGAN FORESTRY ASSOCIATION BY DR. B. E. FERNOW, NOV. 1907.

Will equitable taxation, or tax reduction or exemption secure the application of forestry practice to timber lands?

The first thing to recognize is that very widely differing kinds of property, of widely different value, are liable to be taxed as woodland.

There are at least three classes of woodland, the virgin, uncut, marketable timber; the cut-over lands with promising growth of value; the stump lands without value, unless through special effort. And a fourth class may be added, as yet little developed, namely, artificial plantations, on which this effort has already been spent.

The uncut timber land is property of high value, immediately available by mere exploitation—by destructive lumbering. It is also capable of being made a continuous revenue producer, by conservative lumbering.

The argument that the timber land owner, the lumberman has in view merely exploitation and the removal of values which he has not created—this argument, at least in a pioneering community, very naturally and properly weighs with the tax assessor in this attitude towards his property that distinguishes settler and lumberman, and that seems to explain and to justify a seemingly unjust distribution of the burdens of taxation. If it could be shown that the timber land owner had the

intention of making his property the basis of a permanent enterprise, the case would perhaps be looked at differently; but until such bona fide change of attitude can be shown, I fear practical considerations will favor continuance of present practice. In this connection a few questions may be formulated, which should be considered as pertinent from the practical point of view:

1. Does the lumberman as a rule buy land, or does he buy timber?
2. Is any lumberman known to have bought timber for any other purpose than exploitation or speculation, i. e., resale of the timber?
3. Does not every lumberman with business capacity, in buying timber anticipate the tax assessment and discount it in his price?
4. Does not the lumberman shift the tax on the consumer of his goods, wholly or in part, the tax being counted as part of the cost of production?
5. Has any lumberman actually been induced to cut his timber in order to avoid the tax rate, or are not other motives than excessive taxation invariably the reason, or at least more potent reason, for his removal of it?

With regard to forest properties it has been urged that the timber is really a crop, and should not be taxed any more than the farmer's crop. But those advocating this theory overlook the fact that the crop idea involves the idea of human effort, and that in most cases in this country the mature timber is an asset secured without such effort.

Only when an effort has been put forward to make the soil produce, can we speak of a crop. Here again, the attitude of the owner and the condition of the forest is of moment.

I have myself, again and again, attempted to show that forestry is a business *sui generis*, that, owing to the long time element mainly, it is exceptional, and may, therefore, justify exceptional treatment even by the tax gatherer. But, admitting all the arguments in favor of entire or partial exemption:—Is there any reason for expecting that the benefit of tax release will offset the objectionable features of the forestry business from the point of view of private enterprise.

There have been and there are, as you know, statutes in various states designed to encourage forestry by tax release, tax exemption and bounties. If you will investigate the results of the earlier attempts at such encouragement, you will find that they are practically nil.

I wish to raise doubts as to whether this encouragement can reasonably be expected to do much good, except perhaps in the case of the small farmer's woodlot. When it comes to raising a nation's and even a state's log supply the matter is very different.

On the other hand, will even promising returns from a forest-growing venture induce private enterprise to engage in this business, the profits of which are so long in coming, the risks of which are not only great, but the future of which is clouded somewhat in uncertainty?

If I were to express an opinion, I would declare that forestry is the business of the State, or the community, if for no other reasons than because of the long time element involved. That only large capital and large continuous corporations can really afford to go into this long-

winded business, and that to such the small tax releases, cannot possibly act as an inducement.

The sooner, therefore, the stump lands, either by abandonment for tax or otherwise, fall in the hands of the State or corporation, and the sooner these realize that the future of timber supplies and favorable monetary returns are their concern, the simpler will become the tax question.

APPENDIX 7.

REPORTS OF THE COMMITTEE ON LAND LAWS AND THEIR ADMINISTRATION AND OF THEIR SPECIAL EXAMINERS.

To the Commission of Inquiry, Tax Lands and Forestry:

Gentlemen:—We, Carl E. Schmidt and Francis King, appointed by you as a committee to investigate the "Land laws and their administration," do hereby submit to you the result of our findings as to the methods obtaining in the disposal of State tax homestead lands, with such recommendations as appeared to us as beneficial in remedying these conditions.

Insofar as the practices of an office for the administration of a law are largely determined by the law itself, and since shortcomings in the execution of the land laws will require some modification in these laws, it seems proper and necessary to call attention to certain features of the disposal of lands and timber by the State and the service employed in this work.

As reported by our special examiners, O. Perry Burgess and George Wilson, a copy of whose report is attached and made a part of this communication, the examination and appraisal of land was and is generally inadequate and in most cases so far from the true value of the land and timber that it seems doubtful if the appraiser ever actually visited the land, as may be seen from the State appraisal as given in detail in Cheboygan county, and the actual values as found by our examiners. That such flagrant neglect of duty was easily possible under present methods is clear, since there is no apparent systematic inspection of the work.

The appraising is poorly done, without instructions as to thoroughness, without control, and consequently leaves the State office entirely without any knowledge worth the name. In addition the lack of inspection and control makes it possible for interested persons to direct, influence and modify this appraisal for their own benefit.

In support of this we wish to call your attention to that part of their report in which they were informed by Fred Conant, of Cadillac, that his instructions were to take the supervisors' valuation as a basis for his appraisal, and further that a Mr. Brown, who was appraising tax homestead lands in Lake county, took the assessment roll of Wm. Vaughn, supervisor, and make his appraisal accordingly. That this system has been largely the cause of the heavy loss to the State would appear from the valuations placed on lands in Cheboygan county, where practically a flat price of from \$1 to \$2 per acre was placed on the lands, regardless of the fact that they were totally unsuited for agricultural purposes, as, for instance, the three forties in section 27, 35-1 E, which has no timber and the soil of which was a cold, wet quicksand and which was appraised at an average price of \$1.50 per acre.

On the other hand, the N E $\frac{1}{4}$ of 22-35-1 E, which has a stand of

timber valued at \$4,436.00, was appraised at \$1 per acre. The State, in this instance, lost \$4,800.00.

Undoubtedly this lack of adequate control led to the organization of land dealers, and is largely responsible, not only for the enormous loss to the State in the entire business, but has led to regular timber skinning and land monopoly. This, for instance, in Roscommon county is so great that it is claimed by the companies themselves that two Chicago land syndicates today control over two-thirds of the land of the county. As a result of this, less than 5 per cent. of the tax homestead lands were sold to actual settlers.

The possibilities of influencing, directing or modifying appraisals can be judged from the following instances: Erastus Branch purchased the S $\frac{1}{2}$ of the N E $\frac{1}{4}$ 36-15-13 at \$2.25 per acre. Our special examiners were informed that the appraiser was taken over these lands by Mr. Branch and his brother. Their value for farming purposes was \$6.00 per acre.

The N E fraction $\frac{1}{4}$ of section 1 town 38-3 W, Cheboygan county, was owned by Merrit Chandler. He did not pay his taxes for fifteen or sixteen years, and when the State Land Office appraised this description, our examiner was informed, Mr. Chandler was with him and drove him around through that part of the country where his lands were situated and that he purchased the description he desired when these lands were offered for sale.

We find that these lands were valued by the appraiser at \$1.25 per acre, and the State Land Office reports that they were sold to him at that private sale at this figure. There is standing on this quarter section 500,000 feet of poplar, tamarack and white birch, together with 1,000 cords of four-foot wood, having a total value of \$2,300, and the land is worth \$6.00 per acre, independent of the timber, making a total value of \$3,260, which the State appraiser has called worth \$200.

Mr. Chandler also bought of the State 62.55 acres in 39-3 W for \$121.95. This fraction was also originally owned by Mr. Chandler. Mr. James Fitzgerald, who joins this fraction on the south, states that he made application for its purchase at the proper time, but was told that it had been sold.

In connection with the sales in Cheboygan county a peculiar condition presents itself. Inquiry in Cheboygan county first brought out the information that the first public sale was advertised for Sept. 29, 1904. Repeated inquiry seemed to confirm this, until the State Land Office was asked to fix the date on which the first sale took place. We were then informed that the first public sale of tax lands in Cheboygan county had taken place Sept. 8, 1904. The Cheboygan Tribune, whose manager furnished our Mr. Burgess with a copy of what he then said was the first public sale advertised, stated to them (Burgess and Wilson) that no lands had been advertised for sale on Sept. 8, 1904, and showed them their books of entry to confirm this.

After receiving the information from the State Land Office we wrote the Cheboygan Tribune for a copy of the list of lands which had been advertised for sale on Sept. 8, 1904, and received in reply, a clipping purporting to come from the issue of Sept. 1, 1904. While these lands were advertised for public sale on this date, as would be inferred from

the said clipping, it is worthy of note that no lands were sold at PUBLIC AUCTION on that day, but that Mr. Chandler, Chas. Fultz, Wm. C. Laird, Silas McTiver, Haak Lumber Co., Wm. S. McArthur, Kenneth McLoird, Hamilton J. Butler, Malcomb D. McPhee, Michigan Pipe Co. and the Estate of Louis Cornwall, did on this day buy at PRIVATE SALE 168 forties. These forties were the choicest descriptions listed, and as the price obtained, in practically every case, did not exceed the appraised valuation, it would appear as though these people, who are timber dealers or lumbermen, had agreed among themselves as to what descriptions each wanted and so avoided bidding against each other and thus raising the price.

As stated in the report of the special examiners, the fact that trespass agents or representatives of the State Land Office have power to settle trespass cases, and receive money for timber, etc., has led to many abuses in this branch of the service, particularly as there appears to be no systematic control or inspection of this work.

The case which they bring out, where Chas. Roberts collected \$30 for trespass from 20-36-1 W, Reuben A. Simons cutting this timber for the purpose of building a house to shelter his children and the apparent poverty of his surroundings, illustrates one of the objectionable workings-out of the present system. If, instead of compelling this man to pay money which he could but ill-afford, this case had been reported to the Land Office, some arrangement might have been made that the State Land Office, like similar offices in the United States service, and other countries, issue a free-use permit to the poor family, and certainly humanity and common sense should prevent such blood money to be collected. How far this system can go in the other direction is illustrated by the case of Henry Williams, where 250,000 feet of timber had been cut and a settlement made for which he paid the State \$16.95.

A further objection to this system is brought out by the following information received under date of June 18, 1908, from the State Land Office: On Jan. 12, 1902, Wm. F. Johnson, of Roscommon, who was at that time employed as a special agent for the county of Roscommon, receipted for \$300 for trespass on section 3-4-9-10 T 22 N R 3-2 W to the Maltby Lumber Company. This money was not received by the Land Office until Oct. 22, 1902. We cannot see why the Land Office should allow the trespass agent to retain this money for almost a year.

On May 10, 1907, A. E. Imler collected of Dick Hunter of Spencer, at Kalkaska, \$76.00, being for 304 hemlock ties cut and removed from the S E $\frac{1}{4}$ of the N W $\frac{1}{4}$, 22-26-6 W. June 20 the State Land Office reports that this forty was not held and that no trespass had been reported. This case shows the possibility of fraud being perpetrated by the trespass agents. If, as the Land Office reports, this description is not held by the State, the fact that the trespass agent has power to collect money for timber, etc., makes it possible to make a collection illegally. On the other hand, if this description was held, it again illustrates that money due the State can remain in the hands of trespass agents for great lengths of time without anybody being the wiser.

These petty misdeeds, which naturally enough must creep into any service held in this form and condition, would not require mention were this matter not so serious in its effects on the public at large and

especially on the people in the various districts most involved. It is the general lack of adequate State protection and State care and interest in these north counties and in the State lands generally, that has made the State lands "commons" in the eyes of the people, to be dealt with as any one desires. This conception and attitude has been extended until all through our northern counties unoccupied lands are treated as common property; cut-over lands held in contempt as not worth the attention of a community or worth the protection accorded property elsewhere and under different conditions. This sentiment finds expression today in the public attitude toward trespass and fire; and it is in this latter respect that it has been for years the most potent influence for the continuation the waste land condition of large districts.

An efficient, well controlled, business-like execution of our present system, faulty as it is in principle, a well organized State patrol of the northern wild woods and State lands, as is evidently contemplated in our trespass service, would long ago have established respect for law and property and thereby prevented the destruction and loss of such property, and would have made it easy to introduce better care of forest and other works helpful in the development of these districts.

The much dreaded fire question is trivial compared to many of the achievements of the modern industrial world; a few years of real adequate effort will restore law and order to a point where extraordinary care become superfluous and where a moderate expenditure well in keeping with the results to be accomplished, would protect our woods and cut-over districts, and give nature a chance to restock the land.

Everywhere county abstractors, treasurers, registrars of deeds, State trespass agents, etc., are found to be either directly or indirectly, through agents, interested in the buying and selling of these State lands. For instance, we find that A. E. Imler, a State trespass agent, is buying tax titles and State tax homestead lands through Arthur S. Fudge and Wayne Simmons, who then transfer these lands to Imler, the consideration being generally given as \$1.00 and other valuable considerations.

The tax lands in the broader sense of the word, i. e., the lands which have become delinquent for taxes and have come under the care of the office of the Auditor General of the State, requiring advertisement, clerical attention, and involving the expenditure of State money, have amounted to from 5,000,000 to 9,000,000 acres, and their care has been very expensive. The following data is taken from the reports of the Auditor General's office:

Area, in Acres, of Lands Delinquent for Taxes.

1875.....	9,111,000
1880.....	7,395,000
1885.....	7,421,000
1890.....	7,967,000
1897.....	8,970,000
1901.....	7,022,000
1902.....	6,077,000
1903.....	6,310,000
1904.....	4,964,000
1905.....	5,132,000

Noteworthy are the large areas involved. Since the bulk of these lands fall to the northern half of the State, it is evident that in 1897, for instance, nearly half of the N $\frac{1}{2}$ of the State was delinquent for taxes.

Every year large portions of these tax lands are sold for taxes and large areas revert, that is, keep coming back. If this were a matter of a few thousand acres, as is the case in the southern counties of the State, and the taxes were promptly forthcoming, this whole matter might be regarded as one properly and naturally belonging to the general business of collecting taxes. That this is an extraordinary situation in our north counties, one need but see the above figures and remember that even in 1905 these lands equalled an area of fourteen ordinary Michigan counties.

The handling of these lands has been a very large expense to the State; thus we have from the official report the following:

Amount in round numbers expended in handling the tax lands in the Auditor General's office.

Year.	For advertising. (Generally 40c for each description.)	For "Extra help" in the Auditor General's office. (Clerk hire.)
1900.....	\$66,000 00	\$111,000 00
1901.....	54,000 00	114,000 00
1902.....	60,000 00	117,000 00
1903.....	56,000 00	120,000 00
1904.....	33,000 00	112,000 00
1905.....	30,000 00	111,000 00
1906.....	30,000 00	114,000 00

In the ten years ending 1905, these two items amounted to \$1,591,252.00. While there can be no doubt that a certain amount of expenditure is necessary to collect our taxes, the above sum, especially in the advertisement of the descriptions, seem exorbitant beyond all measure.

At this point two facts need particular emphasis: In many, if not most cases, the advertisement, with its extra clerical expenses of probably not less than 80 cents to \$1.00 per description, was continued for years and evidently far beyond the period intended by law. The law on this point seems quite clear and reads as follows:

The following are the sections of the general tax law relating to tax homestead lands: Section 127 is as amended by an act approved May 17, 1901:

Section 127. "Lands delinquent for taxes for any five years, where said lands have been sold and bid off to the State for the taxes of one or more of said years, and then so held, and no application having been made to pay, purchase or redeem the said lands for said taxes, and no action pending to set aside such taxes or to remove the cloud occasioned thereby, shall, within the meaning of this act, be deemed abandoned lands, unless such lands are actually occupied by the person having the record title thereto. Any lands delinquent for taxes for a period of five or more years, and said lands having been sold and bid in by the State, and held by the State for the taxes of any of said years, and

no application having been made to pay, redeem or purchase the same, and no suit pending to set aside said taxes or remove the cloud from the title occasioned thereby, shall be subject to the provisions of this section. Whenever it shall appear by the records in the Auditor General's office that any lands are delinquent for five years or more and that said lands have been bid off to the State one or more times by reason of such delinquent taxes, and that the time of redemption of such sale or sales has expired and that no application has been made to pay, to redeem or purchase the same, and it shall appear that no action is pending in the circuit court of the county where said lands are situated to set aside the taxes or remove the cloud on the title occasioned thereby, the title to the State shall be deemed absolute in and to said lands; and it shall be the duty of the Auditor General and the Commissioner of the State Land Office to cause an examination of such lands to be made as soon as practicable, to ascertain their value and if abandoned. Upon the examiner filing a certificate as to said examination and the occupancy of said premises, and the certificate of the county clerk of the county where said lands are situated, in the office of the Auditor General, showing that no suit is pending in said county to set aside any of said taxes or remove the cloud occasioned thereby, the Auditor General and the Commissioner of the State Land Office shall determine what lands so examined come within the provisions of this section, and record their determination in a book to be kept in the office of the Auditor General for that purpose. * * * Within ninety days after such determination, the Auditor General shall make a transfer of deed of all lands so determined by the Auditor General and said Commissioner of the State Land Office to come within the provisions of this section to the State of Michigan as an individual, as provided in section 72 of this act, so far as said section is applicable."

It seems evident that the spirit of the law here contemplates that at the end of five years, lands not sold or redeemed, should be deeded to the State, and all further expenses of handling them thus stopped. But this was evidently not always done, for as has been pointed out in this report before, most of these lands remained for longer periods, often twenty years and more in the Auditor General's office, and were thus a source of expense, apparently quite often unlawful.

The following case, being the sale by the Auditor General of the north $\frac{1}{2}$ of the S E $\frac{1}{4}$, section 36-16-14 W, for the taxes of 1889, 1890, 1891, 1892, 1893, 1894, 1895, \$27.20, being seven consecutive years. This land was disposed of to Lewis Retterstoff, who sold same to the Alaska Refrigerator Co., by whom it was lumbered, who cut 150,000 feet of green pine, worth \$1,500.00 on the stump.

That the view that many of the lands are unlawfully held in the Auditor General's office, is held by others well acquainted with the facts, is illustrated by a controversy between the former Land Commission and former Auditor General, in which the Land Commissioner finally compelled the Auditor General's Office to deed certain lands long overdue for this transfer.

Another point equally serious, and at present a dangerous menace, is the following:

Lands are bought from the State often at 50 cents an acre. They are

divided into small parcels—as small as ten to the acre—and then sold at any price obtainable as resort lots—fruit farms, etc., to people unacquainted with the conditions. These lots, or parcels in large numbers, revert for non-payment of taxes, and then become a source of great expense to the State. Thus, for instance, an acre of land sold by the State for 50 cents is divided into ten lots, sold and reverts to the State. The State originally paid for advertising and clerk hire on the basis of a description of forty acres, or 40 cents for advertising. The State now, after the division, pays 40 cents for advertisement alone, and probably twice this sum for clerk hire. That this is actually going on is shown by the following letter received from the Auditor General's office:

“\$15000

May 27, 1908.

Mr. Carl E. Schmidt, Detroit, Mich.:

Dear Sir:—In reply to your letter of the 23d inst. I have to advise you that there has been paid for advertising the sale of delinquent tax lands, in Roscommon county, the following amounts, for sale of May, 1901, to May, 1908, inclusive:

May 1901.....	\$1,734 40
1902.....	1,259 10
1903.....	696 90
1904.....	217 50
1905.....	1,028 30
1906.....	1,557 10
1907.....	1,855 10
1908.....	2,655 10

The increase is due, as you are undoubtedly aware, to the delinquency of resort lots and property about Higgins Lake.

Very truly yours,

James B. Bradley,

Auditor General.

By John F. Wilkinson, Deputy.”

That this condition may readily lead to fraudulent land dealing, merely for the purpose of getting advertisements and register of deeds fees needs no explanation.

Another very serious condition is involved in our present system, insofar as any person may buy for the taxes, a tract of land, such as a cedar swamp, and thereby obtain a title under which he may skin off the timber, much to the detriment of the real owner and the State. Such a case is that of Lewis Reterstoff, which we have mentioned above.

If the State really desires to protect our forests and secure conservative treatment, this method should be modified. The land should not be sold for taxes, but should be held for the full period of redemption, and if the real owner of the land then fails to redeem, it should become State land and be treated accordingly.

At this point, attention should also be called to the fact that the importance of the taxes to be gathered from the north counties has been, and is now, much exaggerated. In fact, the efforts such as those

of the Tax Commission, to raise the assessments of these lands, in these counties, good as were the intentions, seem absurd, especially in view of the following:

If we take sixteen of our north counties of the southern, and twelve counties of the Northern Peninsula (leaving out Keweenaw, Houghton and Marquette as pre-eminently mining counties), we have an area of 14,500,000 acres, making up about 40% of the entire State, of which fully 96% is unimproved land, and nearly 90% is not taken up for settlement. This large portion of the State, according to the report of the Tax Commission, had in 1905 a total assessed valuation of \$67,000,000, while the State on the whole had \$1,574,000,000 worth of property, so that this 40% of the land area of the State represented less than 5% of the total assessed value. From this it is evident that the taxation of the State on the whole is not materially affected by any changes which the legislature may see fit to make regarding the taxation of property, such as forests in these north counties.

The case where the local paper of a county received more money for advertising delinquent lands than the county paid in the form of State taxes, has occurred and apparently exists today.

Recurring to the homestead lands, that is, those lands which have been deeded by the Auditor General to the State and which have then been sold or granted as homesteads, we wish to add:

The examinations of the special examiners have developed the fact that practically all homesteads in the northern tiers of counties have been taken for their timber values only and that after this timber has been removed or sold, the lands are practically invariably allowed to revert for taxes and abandoned. That the supervision in this branch of the homestead business is extremely lax is shown by such homesteads as were granted, for instance, to Lewis F. Pitz, John G. McNabb, Wm. H. Cunningham and others. In the case of the Pitz homestead, it is clear that the law was never complied with. The only building that was erected on this land was a small hut about ten feet square, and, although it was clearly evident that no home was intended, a deed was given Nov. 13, 1902.

In the case of McNabb, he did not even take the trouble to build a house of any description, but was apparently able to use a small shanty, which had remained on the land from the time that the original pine was lumbered, as a basis for proving up, and the State evidently deemed this sufficient. Immediately after receiving a deed from the State, he sold his homestead to saw mill men, and it is almost needless to say that the place is now deserted.

That these abandonments are to be expected in certain sections, is clearly shown by the report of the soil conditions. In the hard wood district the soil conditions are generally good and the experience shows that when a homestead is taken up in such a district, it is usually maintained. In the northern pinery lands, where soil conditions are quite poor, the abandonments are more frequent, and in the Jack pine plains, where the soil is always poor, the lands are never taken for any other purpose than for the timber, or under a misconception of their value for farming and in the latter case the low price at which these lands are sold frequently proves attractive.

However, if a minimum price of \$5.00 per acre, or more, had been

placed on the land, it would gradually work out a system of selection, and the lands which are suited only for forest culture would no longer be denuded for the purpose of establishing a farm which never can be profitable. In this way the lands would gradually restock themselves from the natural growth, particularly, if, as before stated, they are given proper fire and trespass protection.

"As to the loss to the State, because of inadequate or fraudulent appraisal—aside from the loss because of advertising and clerk hire—this has been enormous. The 21,451 acres which it has only been possible to examine because of the short time, show a loss to the State of \$10.20 per acre average. According to the lists received from the Land Office, there has been sold by the State, during the past five to six years, 882,000 acres. At this average the loss to the State was \$8,996,400. The value of the timber alone was five times that of the price obtained by the State for the land and timber."

Another value which many of these lands have, and which has also been ignored, is that of flowage. For instance, the S W $\frac{1}{4}$ of the N E $\frac{1}{4}$ and lots 1 and 2 of 15-13-11-W, 107 acres, was sold by the State to Hugh French at \$1.25 per acre, or \$134. French sold this land to the Muskegon Realty Co. for flowage rights for \$2,000.

From the lists furnished by the Land Office, it was ascertained that the private sales outnumbered the public sales as 4.2 to 1. This is easily explained if the procedure at the sale of June 25, 1908, when the lands in Charlotte county were sold at public auction at Lansing, may be taken as an example of the methods usually followed. When the sale opened, Mr. Havens, chief clerk under Mr. Rose, stated that the lands were to be sold at public auction, that the State's appraised valuation would not be given, and that only such lands, as where the bid equalled or exceeded this appraisal, would be sold. He added that on the morrow such lands as were not disposed of at public sale, could be purchased at private sale, and that the State's appraisal on them would then be made known and that the lands would be disposed of at this figure to such as desired them.

It naturally followed that only such lands as are bid for by others would be taken up at the public sale, because these same lands could probably be bought cheaper the following day, whereas at the public auction the price would have to be at least equal to the appraised value and an offer might be made which was above this and which would then of course be accepted.

This sale further illustrated the great inconvenience of having these sales at the State capital, instead of at the county seat, or place where the lands are located, because at least one case is known where the owner of land, who was in unfortunate circumstances and unable to pay his taxes, did not have the necessary means to make the trip to Lansing to bid in his farm, and which would have probably or possibly been sold to some speculator, and thus deprived him of his home. This trip to Lansing is an unnecessary hardship and should be done away with by having the lands offered for sale in the locality where they are situated.

Respectfully submitted,
CARL E. SCHMIDT,
FRANCIS KING.

We, O. Perry Burgess, and George Wilson, respectfully submit the following report of our investigation in accordance with directions and instructions received from you under date of October 1, 1907.

Concerning our own qualifications, we wish to state the following:

I, O. Perry Burgess, 333 West 11th Street, Traverse City, Mich., am forty-three years of age, born in Mecosta county, Mich., and at present a practical timber cruiser and have been a resident of the State all of my life. My father, Johnson Burgess, was one of the pioneers in Mecosta county, where he established a farm on which I was born. He also took part in the original public land survey in various districts in the Southern Peninsula and carried on more or less the work of timber exploitation, as well as to serve as timber looker for different parties. From my fifteenth year I have been variously employed as scaler and estimator and in other capacities connected with the manufacture of timber, up to the present day, except for a single interruption of eight years, when I was engaged in railroading. During the last seven years I have been continuously engaged in cruising and land looking and to some extent in the buying and selling of lands and timber.

I, George Wilson, address Cheboygan, Michigan, sixty years of age, have been a resident of Michigan continuously since 1861. I was engaged as land cruiser from 1867 on. The greater part of this time I have been engaged in the survey of lands, estimating or cruising of timber, which has been my occupation exclusively for the last fifteen years.

On October 1st, after verbal conference, we received from you the following instructions, which have formed the basis of our operations throughout:

"You are hereby instructed to examine such bodies of land as will be listed to you from time to time in the following manner:

1. The estimating is to be done in a thorough manner by going through each forty at least along two lines, noting the standing timber in the usual manner.

2. Be perfectly sure of your lines and do not take any hearsay for facts.

3. Determine by careful inquiry the prices of material (a) on the stump, (b) at stream or railway, and thus ascertain as carefully as possible the real stumpage value of the timber.

4. Ascertain the character of the land and note the same, together with its real value, independent of the timber, in accordance with the blank form of report with which you are supplied. The attached is a copy of the blank form which was used throughout our investigations.

On receiving from you the lists which were furnished by the State Land Office, showing the sales of tax homestead lands and homestead entries, we went to the county court house of the particular county and verified, first, the transfer from the State. We then followed the records of the several transactions for any particular tract of land from the date of transfer by the State, to the time of our investigation. After the examination of these records, and gathering other pertinent information concerning such tracts, we proceeded to make an investigation on the ground. In every case reported herewith where such in-

formation is given, such an investigation of the land was made in faithful agreement with your instruction. In those cases where the timber was still standing, the work for any given description consisted of an estimate of the timber and such examination of the soil as was feasible under the circumstances. Where the timber had been removed the examination consisted of a careful count of the stumps, noting their kinds and sizes and judging therefrom the amount of timber removed, according to the methods usually pursued in such cases. After finishing the examination on the ground in the manner above outlined, inquiry was made until the facts concerning the time of removal and the name of the person who cut the timber were ascertained. In every case the value of the timber on the stump and in various conditions of manufacture was ascertained. In a number of cases reported herewith, the lumbering of the timber was still under way, so that we had an opportunity actually to scale and count all or portions of the materials removed.

In all cases where further transfers of land or timber occurred an attempt was made to ascertain the prices actually paid by the several purchasers. In the cases where the value of the land without timber was given in the report, such land values are based upon the reports of numerous transactions, or the ordinary sale value of land in the district.

We wish further to state that the forest growth as estimated, shows only the merchantable timber and in no case have we taken into consideration any timber not having a commercial value at the time our estimate was made.

In all cases the estimates are conservative.

A detailed statement, giving the results of our investigations, is attached hereto.

As to the method pursued by the State appraisers, we would say that we were informed by the appraiser, Mr. Fred Conant, of Cadillac, that his instructions were to take the supervisor's valuation as a basis for his appraisals. That these instructions were apparently given to all appraisers would appear from the statements of William Vaughan, supervisor of townships 18 and 19, 13-W, Lake county, and Benjamin Barrett, of Baldwin, to the effect that a Mr. Brown, who was appraiser of tax homestead lands in Lake county, came to the supervisor and took from his assessment roll the appraisals as he had them, only varying from these figures in some few instances and then only to establish a lower valuation. Copies of these sworn statements are attached to this report. In this way the State lost large sums of money as appears from the following general results:

County.	Area.	Sold.	Value.			Loss to State.
			Timber.	Land.	Total.	
Muskegon.....	1,600	\$1,988	\$6,859	\$5,600	\$12,459	\$10,471
Newaygo.....	3,760	7,240	9,182	36,840	46,022	38,782
Lake.....	7,387	6,147	24,963	29,778	54,741	48,459
Benzie.....	240	594	2,048	1,200	3,248	2,654
Kalkaska.....	480	690	5,640	640	6,280	5,590
Emmet.....	461	669	3,693	1,141	4,834	4,165
Cheboygan.....	5,407	10,499	61,590	13,117	74,707	64,208
Crawford.....	200	810	4,280	200	4,480	3,670
Roscommon.....	1,360	2,470	31,598	1,840	33,438	30,968
Missaukee.....	200	310	5,600	840	6,440	6,130
Clare.....	360	360	3,157	720	3,877	3,517
	21,455	\$31,777	\$158,610	\$91,916	\$250,526	\$218,749

"Most of the land examined was not sold to actual settlers, but to people who are either in the timber business or to persons regularly engaged in land traffic and who evidently purchased them for speculative purposes. Everywhere certain persons or cliques of persons appear either personally or through agents as the purchasers of State lands. Thus all the lands examined, showed that less than 5% were sold to actual settlers, the remainder being sold to timber dealers and land speculators, many of them not even residents of the State.

The homestead law, as far as our examinations extended, in its actual operation, has not led to homesteads but has generally been used to secure timber or land and timber, for speculation. Thus, of the cases examined, with the possible exception of one township in Newaygo county, less than 10% were taken with the evident idea of establishing of a home, but were apparently taken for the timber values only," and in many cases the settlers have so expressed themselves to us, as for instance, Archie Moore, who homesteaded the W 1/2 of the N W 1/4 of 34-35-4, and who told Mr. Wilson that he placed no value on the land but was offering the timber for \$1,000.

How far this law often failed in its purpose, is well illustrated in the following:

Homestead deed was granted George B. Brown, July 6, 1904, for the N E 1/4 of the S W 1/4 of 18-23-7. This place was sold by Brown for the timber value and is deserted at present.

Lewis F. Pitz, deed November 13, 1902, N W 1/4 of 10-24-7. No clearing was ever made on this homestead and the only building was a small hut about ten feet square, and it can be clearly seen that the law was never complied with on this homestead. This hut did not even have a place to stick a stovepipe through. Lumbering operations were begun about two years ago and for the accommodation of the lumbermen other buildings have been erected, but at the time that the homestead was granted, the only building was the hut mentioned.

Homestead of John G. McNabb, N 1/2 of S 1/2 of 15-23-7. Deed granted November 11, 1904, and McNabb immediately after (Dec. 5, 1904), sold the homestead to sawmill men for \$900. Apparently he used a shanty which had remained from the time that the original

pine was lumbered as a home, in order to prove up. Since the sale to the mill men, the place is deserted.

Homestead of William H. Cunningham, section 7-24-7, S E $\frac{1}{4}$. This place is now deserted. Mitchell Brothers, of Cadillac, lumbered to the extent of \$2,800 worth of timber.

The above cases and many others like them, illustrate the lack of inspection by the representatives of the Land Office in these matters. This inspection, much as it is needed in the operation of the homestead law, seems to be quite generally wanting. In this connection we wish to call your attention to certain other features of this same service as we meet it in our investigations. The fact that the trespass agent or representatives of the Land Office have power to settle trespass cases and to receive money for timber, etc., and also that there is practically no systematic control or inspection in this service, leads to rather unsatisfactory practices, which in some cases border on cruelty and in others to serious neglect of duty.

A case illustrating this is the following: On December 10, 1907, Charles Roberts collected from Reuben A. Simons \$30 for 1,500 hundred feet of white pine, which he had cut and removed from the N E $\frac{1}{4}$ of the S E $\frac{1}{4}$ of section 20'36-1-W. This man Simons had used these logs for the purpose of building a house. He was very poor and at the time the agent collected this money his children were obliged to go about barefoot, although it was practically midwinter.

On the other hand, Henry Williams, who made entry of the S E $\frac{1}{4}$ of the N E $\frac{1}{4}$, 3-36-5, in the spring of 1903, and who can only get his deed this year, has lumbered 100,000 feet of hardwood (maple, beech, etc.), 150,000 feet of hemlock, and 75 cords of hemlock bark, valued on the stump at \$1,000.00, and under date of Jan. 10, 1908, the State Land Office reports that settlement had been made for timber cut in the winter of 1906 on the basis of 1,800 feet of pine, for which he paid the State \$16.95.

We find the Williams homestead complicated in still another manner. On Sept. 29, 1904, E. A. Wildey, Commissioner of the State Land Office, by letter, issued a permit to Henry Williams to clear twenty acres of this forty. This permission was taken advantage of and although he had not proved up, in fact has not yet done so, and not having lived on the place for some time, it is quite improbable that he could obtain the necessary witness to make the final settlement. Williams sold the timber to the Belding & Hall Manufacturing Co., of Ely, who paid Williams, not the Land Office, \$250.00 for this stumpage. The estimate we have given of the timber removed is probably lower than what was actually taken, but to the best of our judgment, the amount is at least this.

This man, Williams, has made no secret of the fact that his only purpose in taking this homestead was because of its timber value.

This forty was not included in the list furnished by the Land Office when making a statement of the homesteads taken up in Emmet county.

Another flagrant case illustrating the lack of inspection and supervision by the Land Office of the tax homestead lands, is set forth in the following:

In the winters of 1903-4, Silas McTiver, of Onaway, lumbered the S W $\frac{1}{4}$ of the N E $\frac{1}{4}$ of 27-35-1-E, and under date of March 18, 1908, the Land Office reports that they have no record of trespass having been collected on this description. The value of the timber removed is estimated at \$1,155.50. As to the facts in this case, we have the signed statements of Leonard Walters, who worked on the N E $\frac{1}{4}$ of the S E $\frac{1}{4}$ and who says that the logs taken from this forty were hauled by his door; also, the statement of James Walters, who was lumbering the N E $\frac{1}{4}$ of the S E $\frac{1}{4}$ at the same time; also, statement of Ben Sayers, who worked for McTiver at that time and who assisted in cutting the timber; also, statement of Pete Lobsinger, copies of which are attached to this report.

The valuations put on the lands generally were ridiculous. For instance, the appraised valuation on the N E $\frac{1}{4}$ of the S E $\frac{1}{4}$ of section 3-13-11-W, forty acres, was \$1.25 per acre. This land was purchased by Guy Evans of the State at \$3.25 per acre, and he says he could have purchased it at \$1.25 per acre, but other parties who knew the value of this description also wanted it and so the bid was run up to \$3.25. The timber on this forty is valued at \$400. This alone is eight times the value placed on this description by the State examiners, and when it is considered that the land is good farm land and has a value, independent of the timber of \$6.00 per acre for agricultural purposes, the appraisal becomes still more ridiculous.

As illustrating the manner in which some of these valuations are placed, we wish to call your attention to some of the following: Erastus Branch purchased the S $\frac{1}{2}$ of the N E $\frac{1}{4}$ of 36-15-13 at \$2.25 per acre. We are told that they escorted the appraiser around when he was placing the valuation on the land. This eighty is sand, clay, loam and gravel, and good for farming, for which purpose its value is at least \$6.00 per acre.

Sumner Cross, who is supervisor of Troy township, made the statement to George Wilson that the appraiser, Mr. Thayer, who was valuing lands in that township, stayed with him and he, Mr. Cross, drove him around to investigate, and that the appraiser did not get out of the buggy to look at and examine any forty near or far, and never estimated any land at the value of timber whatever, but looked over the assessment roll and placed valued from that.

Mr. Hiram Schepers, treasurer of Missaukee county, made statements to O. P. Burgess, and said he would take his oath to the correctness of some, if necessary, that Mr. Sheldon, a brother-in-law of E. A. Wildey, the then commissioner of State lands, appraised 43 forties in Town 21-6-W, and on sections 13, 14, 16, 23, 24, 26 and 36 in the following manner:

He came to Mr. Schepers and asked him to show him the 43 forties and asked if they could be looked over in one day. Mr. Schepers drove Mr. Sheldon in the vicinity of the lands in question and Mr. Sheldon, from this, was able to satisfy himself sufficiently so that he felt at liberty to leave that same evening, and Mr. Schepers drove him to McBain, about eight miles away, the same evening. During the entire day Mr. Sheldon left the buggy but once and placed all his values

on the land from the rig.* We simply give these few instances but can give you more information on this point if you wish it.

That this practice seems to be general and that it is extremely doubtful if any considerable percentage of the lands are actually examined by the appraisers of the State Land Office, can be further seen by the report of the appraised value of the lands in Cheboygan county and the condition and values as they actually exist.

The N W $\frac{1}{4}$ of the S W $\frac{1}{4}$ of 27-35-1-E, was appraised by the State at \$2.50 per acre; the S W $\frac{1}{4}$ of the S W $\frac{1}{4}$ at \$1.25 per acre; and the N W $\frac{1}{4}$ of the N W $\frac{1}{4}$ at \$1.50 per acre. These three forties are situated close to the main road and the value placed on them is probably all they are worth, for they are a cold, wet, quicksand soil and of no value for farming.

As an opposite case, we wish to call your attention to the value placed by the appraisers on the N W $\frac{1}{4}$ of the S E $\frac{1}{4}$, S E $\frac{1}{4}$ of the N E $\frac{1}{4}$, the S W $\frac{1}{4}$ of the N E $\frac{1}{4}$ and the S W $\frac{1}{4}$ of the N W $\frac{1}{4}$, the N W $\frac{1}{4}$ of the S W $\frac{1}{4}$ of section 22 of the same town, and which were appraised at \$1.00 per acre, the 200 acres being sold to Chas. Fultz on Sept. 8, 1904, for \$276. These five forties had a total stand of 1,025,000 feet of No. 1 saw log timber, besides the wood and bark, the total value being \$4,436. This land was sold by the owner on Feb. 21, 1908, at \$4,000. It is simply ridiculous to believe that any man could have examined this land and placed such a value on it, unless with intent to defraud the State.

The S W $\frac{1}{4}$ of the N E $\frac{1}{4}$ of 27-34-1-E, was appraised at \$10.50 per acre. The value of the timber is \$1,495. The S E $\frac{1}{4}$ of the N E $\frac{1}{4}$, same description, was appraised at \$6.00 per acre, value of the standing timber \$1,495. The N W $\frac{1}{4}$ of the N E $\frac{1}{4}$ was appraised at \$1.50 per acre, timber worth \$1,150, and the N E $\frac{1}{4}$ of the N E $\frac{1}{4}$ appraised at \$2.50 per acre, had a timber value of \$1,415, so that on this quarter section we have forties valued at from \$60 to \$420, with practically the same timber value.

Further details of this can be gathered from the itemized report.

"Another matter which was forcibly brought to our attention while making these investigations, was the fact that certain dealers and speculators are apparently able to at any time obtain any State lands they may desire. We come to this conclusion because we find that certain dealers have sold State lands from days to months before they had acquired a title from the State, and unless they felt sure of their ability to get what they wanted, when they wanted it, it is reasonable to suppose that they would not have made those sales."

We find that John L. Bolan, of Chicago, purchased of the State Land Office, under date of Aug. 26, 1904, the S W $\frac{1}{4}$ of the S W $\frac{1}{4}$ of 13-10-16, at \$1.00 per acre. He had already, on Aug. 15, sold the W $\frac{1}{2}$ of this description to Chas. P. Schmidt at \$12.00 per acre. This same man, on Aug. 25, 1904, purchased the S E $\frac{1}{4}$ of the N E $\frac{1}{4}$ of 21-10-15,

*H. O. Sheldon, now clerk of the Board of State Auditors, having in charge the printing of this report, objected to this passage relating to these appraisals made by him, in the absence of mention of other facts which he himself states as follows:

"You have not mentioned the character of the land, nor how easy it is to drive over it with a team. . . . This work was thoroughly done, and the distance from Vogel Centre to McBain is only 8 miles, not 20."

at \$1.45 per acre, and on Aug. 17, or eight days before, he had sold the S W $\frac{1}{4}$ of this to Anna H. Ritter at \$12.00 per acre.

Again we find that Max Gluck, of Chicago, on June 16, 1907, purchased 160 acres in town 12-12, at \$1.50 per acre, or \$240.00, and that he, on June 1, or fifteen days previously, sold this land to Edward Hubert for \$600.00.

Probably the worst offender in this particular manner is F. W. Sadler, of Chicago, and, by the way, this man has probably bought and sold as much State land as any other of whom we heard. On November 3, 1904, he purchased the S E $\frac{1}{4}$ of the N E $\frac{1}{4}$ of 1-17-13-W, at \$1.00 per acre. On Oct. 26 he sold this land at \$5.00 per acre. On April 20, 1905, he purchased the N E $\frac{1}{4}$ of the N W $\frac{1}{4}$ and the N W $\frac{1}{4}$ of 26-18-14-W, at 50 cents per acre. On Sept. 29, 1904, or six months before buying it himself, he sold this land to Frederick C. Schmidt at \$3.50 per acre, or seven times what he later was able to buy it for.

On July 18, 1905, Sadler purchased the entire section 1, of town 18-13-W, 646 acres, at 75 cents per acre, or \$481.50. He had, on Sept. 29, 1904, or nine months and eighteen days before he purchased it of the State, sold it to J. J. Joseph, et al., at \$5.00 per acre, or \$3,200. "These facts, in addition to indicating that certain speculators have apparently an inside track in the Land Office, would further go to show that the State is exercising no supervision over its appraisers, for in all of these cases speculators were assured a handsome profit before they were even obliged to pay any money to the State."

"A complaint frequently met with during our investigations was that, because of the large purchases of different land speculators, actual settlers are kept out of the districts. Such a complaint was made by Wm. E. Lincoln, of Peacock, who said that such people as Swigart, who purchased State lands in large quantities, at 50 cents to \$1.00 per acre, were holding these same lands at from \$7.00 to \$15.00 per acre. The same may be said of such people as Geo. A. Hart, of Manistee, who is holding his lands at \$10.00 per acre; Granville W. Browning, who has personally purchased over 30,000 acres of State lands at an average of about \$1.00 per acre, and is now selling these lands for from \$8.00 to \$12.00 per acre." His agent in many deals is Chas. P. Sherwood, who told O. P. Burgess that he was at Baldwin and White Cloud when the appraiser was there, and that the appraiser had never seen 90% of the lands he was valuing.

Further, we found the State and county officials acting as agents for lumber dealers, and such a case is set forth in the following agreement made between Wm. F. Johnson, the probate judge of Roscommon, and Rasmus Hansen, of Grayling:

"March 7, 1908. For a valuable consideration of \$400.00, to me in hand paid by Rasmus Hansen, of Grayling, Mich., the receipt of which is hereby confessed and acknowledged, I hereby grant, bargain and sell in and to the lands hereinafter described, under certain bargain entered into by myself and said Rasmus Hansen, wherein I was to participate in said lands the title which was taken by said Rasmus Hansen under purchase from the State of Michigan, to-wit: * * * *
Signed, Wm. F. Johnson. Witness, Lulu E. Cronin, L. L. Moiles. No-

tary, Ella L. Moiles. My commission expires April 20, 1910.—Liber 34, page 180.”

The lands in question were 700 acres located in Town 22, N R 2-W, Roscommon county.

In Mecosta county our examinations have brought to light a reprehensible condition. These lands had been owned by various lumbering companies, who removed the pine, and the last two or three years of their occupancy failed to pay the taxes. The present owners obtained quit claim deeds from these lumbering companies, and as they are none of them lawyers, and did not understand the land and tax laws of the State of Michigan, deemed this title sufficient without having taken into consideration the fact that two or three years of taxes were listed against the various properties.

These people have paid the taxes for the past fifteen or twenty years, having, in the meantime, put forth their best efforts toward improving their several holdings. This spring an appraiser from the Land Office was sent to that part of the country, and this was the only notice they received that their homes were to be sold at public auction for taxes, which the original lumber dealers had refused or failed to pay. As a result, many of them were obliged to mortgage their homes in order to buy their land at the auction and so prevent their falling into the hands of speculators. This has been the cause of great hardships to many of the settlers and, as a consequence, many of these people have been obliged to seek work elsewhere, so as to get the money necessary to take up these mortgages. In some of the cases this will be almost an impossibility, and as a result they may eventually lose their homes because of these mortgages.

As evidence of these conditions, we name you the following owners, together with their holdings, and period of occupancy:

Samuel Holsworth has occupied the E $\frac{1}{2}$ of the S W $\frac{1}{4}$ of 28-15-8 for fifteen years, under title from the Joseph Collins Lumber Co. W. T. Brink has occupied and paid taxes on the E $\frac{1}{2}$ of the S E $\frac{1}{4}$ of 17-15-8 for the past twenty years. Wm. Thorn owns the W $\frac{1}{2}$ of the W $\frac{1}{2}$ of the S E $\frac{1}{4}$ of 17-15-8. His home was destroyed by fire last fall and he now has the additional burden of paying a mortgage made necessary because of the State's demand for \$80 on this homestead. S. J. Thorn has the E $\frac{1}{2}$ of the W $\frac{1}{2}$ of the S E $\frac{1}{4}$ of 17-15-8, which he has occupied for twenty years. He has a large family and must now work to pay off the mortgage which he placed on his home in order to buy it from the State at the recent sale. Eugene Hathaway lives on the S $\frac{1}{2}$ of the S W $\frac{1}{4}$ of 17-15-8 and has paid taxes on same for seventeen years. Geo. Gilmore owns the E $\frac{1}{2}$ of the S W $\frac{1}{4}$ of section 20-17-8. W. F. Jentzen lives on the S $\frac{1}{2}$ of the N W $\frac{1}{4}$ of 17-15-8 and has paid taxes for the past twenty years.

These are merely a few of the people who have in a sense been robbed of their homes in order to satisfy the State's claim against the lumbermen who stripped this section of its original pine.

Copies of Statements Received.

Grayling, Mich., April 28, 1908.

This is to certify that a Mr. Brown, who I understand was appraiser of State tax homestead lands in townships 18 and 19 of 13-W, which I was supervisor of at that time, did see and look over my Ass't roll and did copy by my help my Ass't rolls as I had them, only varying to a small extent, he making lower price than I had assessed at. I swear this to be true.

Witness my hand and seal.

Wm. B. Vaughan.

Witnesses

George Wilson

B. W. Brink

Subscribed and sworn to before me this 28th day of April, A. D. 1908.

Rolla W. Brink, Notary Public,

Crawford County, Mich.

My commission expires Nov. 22, 1908.

(Notarial Seal.)

Baldwin, November 21, 1907.

I, the undersigned, do hereby swear that statements made within are true. Mr. Brown, the appraiser of tax homestead lands in Lake Co., came to my home and hired me to go with him to supervisor Wm. Vaughn of Weber Township, and while there the appraiser did look over supervisor Vaughn's tax roll and talked with him about the values he had on such lands. We drove to some of the lands and followed the roads around same. I further swear that at the time this Mr. Brown, the appraiser of State tax homestead lands, was here, that it was impossible to drive around to said lands on account of no roads being open on account of snow. I also further swear I told another examiner of State tax homestead lands of some descriptions he had missed, the value I considered it worth, he taking my value of said land. This was on section 13, 17-14. I suppose I also went with other examiners of the State tax homestead lands to supervisors of different townships in Lake county, Mich.

Benjamin Barrett.

Subscribed and sworn to before me this 21st day of November, 1907.

Bertha D. Sayles, Notary Public.

Commission expires Jan. 15, 1908.

—COPY—

\$76.00

Kalkaska, Mich., May 10, 1907.

Received this day from Dick Hunter the sum of seventy-six and 00/100 dollars, for trespass on State lands. Being for 304 hemlock ties at 25 cents, cut and removed from South East quarter of the North

west quarter and by Wm. Coghlan, Section 22, Town 26-N, Range 6-W, prior to May 10, 1907.

A. E. Imler,
Agent for the Commissioner of the
State Land Office.

(Telegram)

June 19, 1908.

Wm. Rose, Land Commissioner,
Lansing, Mich.

Please wire immediately trespass collected on S E $\frac{1}{4}$ of N W $\frac{1}{4}$ Sec 22 Town 26, North Range 6-W.

Carl E. Schmidt.

Charge.

(Telegram)

Lansing, Mich., June 20.

Carl E. Schmidt,
Detroit, Mich.

Southeast quarter of Northwest quarter, section twenty-two, town twenty-six, north range six west, not held. No trespass reported.

W. H. Rose, Commissioner.

Statement of Ben Sayers.

In regard to S W $\frac{1}{4}$ of N E $\frac{1}{4}$, Sec. 27-35-1-E. I live on the N E $\frac{1}{4}$ of the N E $\frac{1}{4}$ of Sec. 34-35-1-E, one half mile South of above forty. I do swear I worked on the S W $\frac{1}{4}$ of the N E $\frac{1}{4}$, Sec. 27-35-1-E, the winter of 1903-1904, and I was working for Mr. Silas McTiver. I helped cut and skid and assisted in hauling the cedar and other logs taken from the S W $\frac{1}{4}$ of the N E $\frac{1}{4}$, Sec. 27-35-1-E, and I am thoroughly acquainted with the above forty.

(Signed) Ben Sayers.

Statement of Pete Lobsinger,

who lives in the vicinity of the S W $\frac{1}{4}$ of the N E $\frac{1}{4}$ of 27-35-1-E, says he is positive that Silas McTiver lumbered the timber from the above forty the winter of 1903-4.

(Signed) Pete Lobsinger.

Statement of James Walters of Tower in regard to the S W $\frac{1}{4}$ of the S E $\frac{1}{4}$ of 27-35-1-E.

I have lived near the above described land for 12 years and I know the above description well and was working on the N E $\frac{1}{4}$ of the S E $\frac{1}{4}$ of 27-35-1-E, the winter of 1903-4 and I swear positively that I am sure that Silas McTiver lumbered the S W $\frac{1}{4}$ of the N E $\frac{1}{4}$, 27-35-1-E,

the winter of '03 and '04 as I was lumbering the N E $\frac{1}{4}$ of the S E $\frac{1}{4}$ the same winter and the log road ran through the S W $\frac{1}{4}$ of the N E $\frac{1}{4}$ and Mr. McTiver was hauling his logs at the same time as I was hauling mine.

(Signed) James Walters.

Testimony of Lenord Walters of Tower, Mich., in regard to the S W $\frac{1}{4}$ of the N E $\frac{1}{4}$, Sec. 27-35-1-E.

I swear to the best of my knowledge that the S W $\frac{1}{4}$ of the N E $\frac{1}{4}$ was lumbered by Silas McTiver in the winter of 1903 and 1904. I have lived in this vicinity for 12 years and am well acquainted with the above land. The logs that were taken off from the above forty were hauled past my door to the railroad track of the D. & M. in winter of 1903 and 1904. I was working on the N E $\frac{1}{4}$ of the S E $\frac{1}{4}$, Sec. 27-35-1-E, the same winter and I am positive the above statement is true.

(Signed) Lenord Walters.

Field Examinations of Sales of Tax Homestead Lands.

MUSKEGON COUNTY.

No.	Description.	Purchaser.	Y'r.	Area	@	Am't.	Value.			Loss to State.
							Timb'r	Land.	Total.	
1	11-9-15	B. O. Clinger.....	1905	80	2.50	\$200		\$400	\$400	\$200
7	3-11-15	S. A. Gritzner.....	1905	80	1.00	80	\$360	80	440	360
8	9-11-15	"	1905	160	1.00	160	1,285	800	2,085	1,925
9	15-11-15	"	1905	40	1.00	40	430	200	630	590
10	15-11-15	"	1905	40	1.00	40	100	200	300	260
11	23-11-15	"	1905	160	1.50	240	1,150	800	1,950	1,710
12	23-11-15	"	1905	40	1.25	50	400	200	600	550
13	26-11-15	"	1904	40	1.50	60	400	200	600	540
14	6-11-16	C. E. Covell.....	1904	80	1.00	80		400	400	320
15	6-11-16	"	1904	40	1.00	40		200	200	160
16	32-11-16	A. P. Sanford.....	1904	40	1.25	50		200	200	150
17	32-11-16	"	1904	40	1.25	50		200	200	150
18	9-12-15	Mary Topping.....	1905	80	1.50	120	340	400	740	620
19	1-12-16	Pat Moran.....	1905	80	1.50	120	520	400	920	800
20	1-12-16	"	1904	80	1.00	80	360	400	760	680
23	25-12-16	Wm. Anderson.....	1906	80	1.00	80	280	80	360	280
25	26-12-16	S. A. Gritzner.....	1907	80	1.25	100	330	80	410	310
26	35-12-16	Pat Moran.....	1904	80	1.00	80	247	80	327	247
27	35-12-16	"	1904	80	.75	60	247	80	327	267
28	1-12-17	"	1904	80	1.00	80	75	80	155	75
29	1-12-17	C. E. Covell.....	1904	80	1.60	128	150	80	230	102
30	1-12-17	"	1904	40	1.25	50	185	40	225	175

NEWAYGO COUNTY.

41	1-13-11	Henry Allen.....	1904	40	.75	\$ 30	\$ 30	\$200	\$230	\$200
42	1-13-11	John Meyer.....	1903	40	.75	30	30	160	190	160
43	2-13-11	Henry Martins.....	1903	40	1.00	40		80	80	40
44	2-13-11	F. W. Fell.....	1906	40	.75	30		200	200	170
45	3-13-11	Henry Martins.....	1903	80	1.00	80	60	560	620	540
46	3-13-11	Geo. Mitchell.....	1903	80	1.00	80	90	480	570	490
47	3-13-11	L. S. Utley.....	1906	80	1.00	80	220	320	540	460
48	3-13-11	"	1906	80	1.00	80	1,75	320	494	414
49	3-13-11	Guy Evans.....	1903	40	3.25	130	400	240	640	510
50	3-13-11	J. C. Baker.....	1906	40	1.00	40	45	200	245	205
51	3-13-11	Guy Evans.....	1903	40	1.00	40	45	200	245	205
52	3-13-11	Henry Allen.....	1903	40	2.00	80	265	240	505	425
53	4-13-11	F. W. Riblet.....	1903	80	.75	60	30	640	670	610 Abst'r
54	9-13-11	H. H. Haight.....	1903	40	1.25	50	135	240	275	225
55	9-13-11	F. W. Riblet.....	1903	40	1.25	50	22	200	222	172
56	10-13-11	"	1903	80	1.25	100	15	400	415	315
60	15-13-11	Hugh French.....	1903	40	1.25	50	15	160	175	125
67	22-14-11	W. W. Taylor.....	1903	640	1.50	960		3,840	3,840	2,880
70	32-14-11	Z. B. Trumble.....	1903	80	1.25	100		640	640	540
71	32-14-11	W. Taylor.....	1903	120	1.25	150	36	960	996	846
72	33-14-11	Geo. A. Day.....	1906	80	1.50	120		480	480	360
73	33-14-11	"	1906	160		210		960	960	750
74	34-14-11	W. E. Howard.....	1907	200	1.25	250	30	1,200	1,230	980
75	35-14-11	Jacob Aller.....	1906	40	1.25	50	22	280	302	252
76	35-14-11	Wm. E. Howard.....	1907	40	1.25	50	12	200	212	162
77	4-14-13	G. P. Hensel.....	1905	640	1.00	640		3,840	3,840	3,200
82	26-14-13	Wm. Davis.....	1904	40	1.25	50		240	240	190
83	26-14-13	T. S. Sherwood.....	1905	80	1.00	80		480	480	400
84	33-14-13	"	1904	80	1.25	100		480	480	380
89	7-15-12	J. E. Richmond.....	1906	80	1.50	120	245	440	665	565
90	7-15-12	"	1906	40	1.50	60	55	120	175	115
91	7-15-12	"	1906	40	1.50	60	95	160	255	195
92	20-15-12	A. Branch.....	1906	80	1.00	80	15	400	415	335
93	29-15-12	J. E. Richmond.....	1906	40	2.00	80	22	400	422	342
96	22-15-13	J. L. North.....	1907	80	1.25	100	105	320	425	325
98	24-15-13	C. Mansfield.....	1905	40	1.25	50	15	200	215	165
99	24-15-13	"	1905	40	1.25	50	45	160	205	155
100	24-15-13	"	1905	40	2.00	80	9	400	409	329
101	24-15-13	"	1905	40	3.00	120	45	320	365	245
102	15-13	Susie Bradley.....	1905	800	1.25	1,000		3,440	3,440	2,440
103	33-15-13	Chas. P. Hall.....	1905	80	1.00	80	21	480	501	421
104	34-15-13	Joe. A. Ditton.....	1906	80	1.00	80		480	480	400
106	36-15-13	E. Branch.....	1904	80	2.25	180		480	480	300

NEWAYGO COUNTY—Continued.

No.	Description.	Purchaser.	Y'r.	Area	@	Am't.	Value.			Loss to State.
							Timb'r	Land.	Total.	
107	36-15-13	Elmer Branch.....	1904	80	1.25	\$100	\$100	\$320	\$420	\$320
108	8-16-13	A. H. Roehm.....	1905	80	1.00	80	560	400	960	880
113	1-16-14	O. Cook.....	1904	40	50	20	180	200	380	360
114	2-16-14	S. Cross.....	1903	40	50	20	200	200	400	380
115	2-16-14	Alaska Ref. Co.....	1903	80	50	40	275	400	675	635
117	2-16-14	H. W. Patten.....	1905	40	50	20	250	200	450	430
118	4-16-14	" ".....	1904	40	50	20	75	240	315	295
119	4-16-14	" ".....	1904	40	50	20	37	240	277	257
120	6-16-14	" ".....	1905	40	75	30	80	200	280	250
121	6-16-14	" ".....	1906	40	75	30	155	200	355	325
123	14-16-14	H. D. Keller.....	1904	80	62½	50	150	640	790	740
124	14-16-14	" ".....	1904	160		140	650	1,280	1,930	1,790
126	15-16-14	L. Retterstoff.....	1903	120	75	90	1,400	560	1,960	1,870
127	15-16-14	H. D. Keller.....	1904	40	50	20	150	320	470	450
128	15-16-14	" ".....	1904	40	50	20	250	320	570	550
129	15-16-14	" ".....	1904	80	50	40	200	640	840	800
130	15-16-14	" ".....	1904	40	50	20	50	320	370	350
131	15-16-14	" ".....	1904	40	50	20	100	320	420	400
132	15-16-14	" ".....	1904	40	50	20	80	320	400	380
133	15-16-14	" ".....	1904	40	50	20	75	320	395	375
134	15-16-14	" ".....	1904	40	50	20	37	320	357	337
137	23-16-14	Alaska Ref. Co.....	1903	160	50	80	280	640	920	840
138	23-16-14	" ".....	1903	240	50	120	250	960	1,210	1,090
139	26-16-14	" ".....	1903	160	1.00	160	750	640	1,390	1,230
140	27-16-14	I. Lameraux.....	1904	80		70	500	400	900	830

LAKE COUNTY.

153	18-17-12	A. R. Harmon.....	1905	145	2.00	\$290	\$2,612	\$290	\$2,902	\$2,612
156	22-17-12	J. Hoover.....	1905	80	1.25	100	40	160	200	100
157	22-17-12	Geo. Hawkins.....	1904	40	50	20	90	80	170	150
158	27-17-12	G. W. Browning.....	1906	480		560	1,000	960	1,960	1,400
159	1-17-13	F. W. Sadler.....	1904	40	1.00	40		200	200	160
162	13-17-13	H. H. Parsons.....	1904	40	1.00	40	790	200	990	950
163	13-17-13	" ".....	1904	80	1.00	80	260	400	660	580
167	22-17-13	" ".....	1904	80	50	40	1,048	160	1,208	1,168
168	24-17-13	" ".....	1904	80	50	40	1,080	160	1,240	1,200
170	33-17-13	Heath & Bloomer.....	1904	480		280	3,300	3,360	6,660	6,340
172	34-17-13	" ".....	1904	80	90	72	440	400	840	768
173	34-17-13	" ".....	1904	80	1.00	80	548	400	948	868
175	10-17-14	Hackley, Phelps, Bonnell Co.....	1905	40	50	20	50	80	130	110
176	12-17-14	Hackley, Phelps, Bonnell Co.....	1905	240	50	120	1,990	480	2,470	2,350
179	19-17-14	Hackley, Phelps, Bonnell Co.....	1904	320		232	480	1,600	2,080	1,848
181	31-17-14	Hackley, Phelps, Bonnell Co.....	1904	80	1.00	80	120	400	520	440
182	17-14	Hackley, Phelps, Bonnell Co.....	1904	640	75	480	1,135	320	1,455	975
183	31-17-14	Hackley, Phelps, Bonnell Co.....	1904	40	75	30	60	200	260	230
184	31-17-14	Hackley, Phelps, Bonnell Co.....	1904	40	75	30	60	200	260	230
186	17-14	Hackley, Phelps, Bonnell Co.....	1904	440	75	330	660	2,220	2,880	2,550
187	32-17-14	Hackley, Phelps, Bonnell Co.....	1904	100	75	75	150	500	650	575
191	30-18-11	E. T. Merrill.....	1904	630	1.00	630	75	3,150	32,255	2,595
192	31-18-11	L. Shuster.....	1906	78	1.00	78	250	388	638	560
193	31-18-11	A. Merrill.....	1904	80	75	60		400	400	340
194	32-18-11	F. Smith.....	1904	80	1.00	80		400	400	320
195	18-18-12	E. Delaney.....	1904	154	75	115	650	770	1,420	1,305
196	34-18-12	E. Frey.....	1904	40	1.00	40	250	80	330	290
198	18-18-13	F. W. Sadler.....	1904	200	50	100	2,000	500	2,500	2,400
202	18-18-13	" ".....	1904	160	2.50	400	2,000	640	2,640	2,240
203	13-18-13	C. J. Beebe.....	1904	80	1.00	80		320	320	240
214	1-19-13	W. E. Lincoln.....	1904	40	50	20	150	200	350	330
215	6-19-13	F. W. Sadler.....	1904	160	50	80	760	800	1,560	1,480

LAKE COUNTY—Continued.

No.	Description.	Purchaser.	Y'r.	Area	@	Am't.	Value.			Loss to State.
							Timb'r	Land.	Total.	
216	14-19-13	G. W. Browning.....	1906	40	1.00	\$40	\$130	\$120	\$250	\$210
217	18-19-13	F. W. Sadler.....	1904	560	50	255	633	2,300	3,433	3,178
220	24-19-13	" ".....	1904	80	50	40	155	400	555	515
222	10-19-14	H. E. Evans & Co.....	1905	40	1.00	40	120	240	360	320
223	11-19-14	" ".....	1905	40	1.00	40	160	240	400	360
224	14-19-14	" ".....	1905	40	1.00	40	362	120	482	442
225	19-14	W. J. Dixon.....	1905	960	75	720	250	3,840	4,090	3,370
236	32-20-13	A. F. Kelley.....	1904	40	50	20	50	200	250	230
237	32-20-13	F. B. Poff.....	1904	40	50	20	100	200	300	280
242	35-20-14	Evans & Retting.....	1904	40	1.25	50	715	240	955	905
243	35-20-14	Geo. W. Swigart.....	1905	160	1.00	160	240	960	1,200	1,040

BENZIE COUNTY.

244	14-25-13	C. C. Tuxbury.....	1908	40	2.00	\$80	\$876	\$200	\$1,076	\$996
245	14-25-13	" ".....	1908	40	1.50	60	607	80	687	627
249	29-25-15	A. H. Smith.....	1908	40	.....	74	145	320	465	391
254	27-26-13	M. M. Filer.....	1908	40	2.50	100	100	200	300	200
255	27-26-13	" ".....	1908	40	4.00	160	160	200	360	200
256	27-26-13	" ".....	1908	40	3.00	120	160	200	360	240

KALKASKA COUNTY.

258	18-25-6	Manistee L. Co.....	1902	160	.....	\$120	\$1,120	\$320	\$1,440	\$1,320
260	3-26-5	Geo. R. Rancor.....	1905	40	1.00	40	640	40	680	640
263	15-26-5	Giles Hodges.....	1903	80	2.50	200	1,200	80	1,280	1,080
264	15-26-5	Geo. Rancor.....	1905	40	1.00	40	560	40	600	560
265	22-26-5	Robert Babcock.....	1903	160	.....	290	2,120	160	2,280	1,990

EMMET COUNTY.

286	24-35-4	Finn & Rae.....	1904	40	2.50	\$100	\$750	\$200	\$950	\$850
293	33-35-4	John A. Phillips.....	1906	40	1.50	60	1,115	40	1,155	1,095
297	10-36-5	B. G. Byfoss.....	1904	40	1.00	40	300	200	500	460
308	36-35-4	Chas. E. Sams.....	1904	120	1.00	120	313	480	793	673
311	25-39-5	Emmett Lumber Co.....	1904	40	1.00	40	500	40	540	500
321	30-39-5	Wm. O'Neil.....	1906	111	2.00	222	460	111	571	349
322	32-39-5	C. M. G. Koach.....	1906	70	1.25	87	255	70	325	238

CHEBOYGAN COUNTY.

No.	Description.	Purchaser.	Yr.	Area	@	Amt	Value.			Loss to State.	Appr'd per acre.
							Timbr	Land.	Total.		
325	1-33-1 E	Wm. Gainer.....	1906	80	.....	\$380	\$1,087	\$240	\$1,327	\$947	\$4.75
326	12-33-1 E	P. H. Sanger.....	1907	40	\$1.00	40	220	120	340	300	1.00
327	12-33-1 E	O. Buzzell.....	1905	40	1.25	50	695	120	815	765	1.25
328	33-1 E	J. A. Wheeler.....	1905	80	.....	70	.....	240	240	170	8.75
332	23-34-1 E	H. B. Hitching.....	1904	40	1.00	40	320	40	360	320	1.00
333	23-34-1 E	D. B. Tinkerton.....	1907	40	1.50	60	355	160	515	455	1.50
334	23-34-1 E	E. G. Annabel.....	1907	40	1.50	60	300	40	340	280	1.50
335	23-34-1 E	Wm. Errat.....	1905	40	1.00	40	790	40	830	790	1.00
336	25-34-1 E	Chas. Fultz.....	1904	160	1.75	260	1,735	800	2,535	2,275	1.50
337	25-34-1 E	A. B. Valentine.....	1907	40	1.75	70	515	120	635	565	1.50
339	27-34-1 E	R. P. Holihan.....	1905	40	10.50	420	1,495	200	1,695	1,275	10.50
340	27-34-1 E	.....	1905	40	6.00	240	1,495	80	1,575	1,335	6.00
341	27-34-1 E	T. M. Moroney.....	1904	40	1.50	60	1,150	40	1,190	1,130	1.50
342	27-34-1 E	Onaway State Bank.....	1905	40	2.50	100	1,415	80	1,495	1,395	2.50
343	35-34-1 E	T. M. Moroney.....	1904	80	2.00	160	240	400	640	480	2.00
344	35-34-1 E	Frank Wilton.....	1904	40	3.62 1/2	145	.....	320	320	175	.....
346	3-34-2W	Walter Patterson.....	1906	80	1.00	80	605	80	685	605	1.00
347	8-34-2W	J. L. Lester.....	1904	40	1.25	50	505	40	545	495	1.25
348	10-34-2W	Mich. Pipe.....	1904	40	1.00	40	690	40	720	680	1.00
349	10-34-2W	.....	1904	40	1.00	40	280	40	320	290	1.00
350	10-34-2W	.....	1904	80	1.00	80	405	80	485	405	1.00
351	16-34-2W	Wm. C. Laird.....	1906	40	1.50	60	365	40	405	345	1.50
352	16-34-2W	.....	1906	40	1.50	60	210	40	250	190	1.50
353	16-34-2W	.....	1906	40	1.50	60	400	40	440	380	1.50
354	16-34-2W	.....	1906	40	1.50	60	370	40	410	350	1.50
355	16-34-2W	.....	1906	40	1.50	60	420	40	460	400	1.50
357	36-34-2W	H. J. Butler.....	1904	40	1.00	40	1,080	60	1,140	1,100	1.00
358	36-34-2W	.....	1904	40	1.00	40	740	60	800	740	1.00
359	36-34-2W	.....	1906	80	1.00	80	160	80	240	160	1.00
360	12-34-3W	Mrs. J. Simon.....	1906	40	2.00	80	200	80	280	200	2.00
361	12-34-3W	Wm. C. Laird.....	1904	40	5.00	200	475	40	515	315	5.00
362	12-34-3W	.....	1905	40	2.50	100	460	40	500	40	2.50
363	12-34-3W	.....	1904	40	5.00	200	625	160	785	585	5.00
364	12-34-3W	.....	1904	40	5.00	200	655	200	855	655	4.00
365	12-34-3W	.....	1904	80	.....	360	.....	700	700	340	*4.50
366	12-34-3W	Haac Lumber Co.....	1904	40	4.00	160	365	200	565	405	4.00
367	12-34-3W	.....	1904	40	5.00	200	310	160	470	270	5.00
373	22-35-1 E	Chas. Fultz.....	1904	200	1.38	276	4,436	720	5,156	4,880	1.00
374	23-35-1 E	H. B. Hitchings.....	1904	80	1.50	120	235	80	315	195	1.00
377	27-35-1 E	A. Murray.....	1906	40	1.50	60	435	80	515	455	1.50
379	35-35-1 E	Chas. Fultz.....	1904	80	3.60	288	1,345	480	1,825	1,537	1.50
380	35-35-1 E	.....	1904	40	2.00	80	520	240	760	680	1.50
381	35-35-1 E	.....	1904	80	2.00	160	460	480	940	880	1.50
382	35-35-1 E	.....	1904	80	2.00	160	595	480	1,075	915	1.75
383	35-35-1 E	.....	1904	40	2.25	90	105	240	345	255	2.25
386	6-35-2W	M. N. Griswojd.....	1905	40	2.00	80	120	40	160	80	2.00
387	6-35-2W	Wm. C. Laird.....	1905	160	2.00	320	560	160	720	400	2.00
389	10-34-3W	.....	1905	120	1.00	120	356	120	476	356	1.00
391	15-35-2W	.....	1906	40	1.00	40	115	40	155	115	1.50
392	15-35-2W	W. B. Patterson.....	1905	80	1.00	80	720	80	800	720	1.00
401	5-36-1W	Chas. Fultz.....	1904	34	1.50	51	480	136	616	565	1.50
402	13-36-1W	C. Chevelier.....	1905	40	1.00	40	200	40	240	280	1.50
403	14-36-1W	Chas. M. Horton.....	1904	40	1.75	70	300	120	420	350	1.75
404	14-36-1W	N. C. Hastings.....	1906	40	2.00	80	320	160	480	400	1.75
405	19-36-1W	Burt Marquette.....	1906	40	2.00	80	365	40	405	325	2.00
406	20-36-1W	.....	1906	40	1.25	50	662	120	782	732	1.25
407	20-36-1W	J. Jarvis.....	1905	40	1.25	50	200	40	240	190	1.25
408	30-36-1W	Burt Marquette.....	1905	40	1.50	60	1,185	80	1,265	1,205	1.50
410	30-36-1W	.....	1905	80	1.50	120	1,215	80	1,295	1,175	1.50
411	32-36-1W	Wm. C. Laird.....	1905	40	1.50	60	320	40	360	300	1.50
412	32-36-1W	.....	1905	40	1.50	60	680	40	720	660	1.50
413	32-36-1W	.....	1905	80	1.50	120	360	80	440	320	1.50
416	8-37-3W	Geo. Brill.....	1904	40	8.00	320	1,677	100	1,777	1,457	8.00
417	8-37-3W	Wm. F. Pew.....	1904	80	.....	250	1,215	160	1,375	1,125	3.12
418	3-37-3W	John B. McArthur.....	1904	38	2.50	95	715	76	791	696	2.50
419	8-37-3W	.....	1904	40	2.50	100	540	20	560	460	2.50
420	12-36-3W	A. McCullen.....	1905	40	2.50	100	315	40	355	255	2.50
421	12-36-3W	J. Brady.....	1905	40	1.00	40	342	40	382	342	1.00
422	36-36-3W	W. C. Laird.....	1905	40	1.25	50	200	40	240	190	1.25

*Sale.

CHEBOYGAN COUNTY—Continued.

No.	Description.	Purchaser.	Y'r.	Area	@	Am't	Value.			Loss to State.	App'd per acre.
							Timbr'r	Land.	Total.		
423	10-37-1 E	Wm H. Blake.....	1907	40	\$1.25	\$50	\$170	\$40	\$210	\$160	\$1.25
424	18-37-1 E	Arthur Roberts.....	1907	40	1.50	60	500	100	600	540	1.50
425	18-37-1 E	T. W. Burrell.....	1907	40	1.50	60	674	60	734	674	1.50
426	19-37-1 E	Cheboygan P. Co.....	1907	40	1.50	60	155	60	215	155	1.50
427	19-37-1 E	" " " " " " " " " "	1907	40	1.50	60	485	40	525	465	1.50
428	21-37-1 E	M. B. Oles.....	1905	40	1.50	60	305	40	345	285	1.50
429	22-37-1 E	Wm. B. Blake.....	1907	40	1.25	50	840	80	920	870	1.25
430	23-37-1 E	H. A. Blake.....	1907	40	1.25	50	200	80	280	230	1.25
431	25-37-1 E	Chas. H. Cook.....	1904	80	1.00	80	800	80	880	800	1.00
432	26-37-1 E	Chas. Fultz.....	1904	40	1.00	40	1,315	40	1,355	1,315	1.00
433	34-37-1 E	L. Jenson.....	1904	40	3.00	120	195	40	235	115	3.00
434	24-37-1 W	E. H. Lafriener.....	1907	40	1.00	40	655	80	735	695	1.00
435	24-37-1 W	R. Fredo.....	1907	40	1.00	40	335	80	415	375	1.00
436	24-37-1 W	F. Fisher.....	1906	40	1.00	40	900	40	940	900	1.00
437	24-37-1 W	E. H. Lafriener.....	1907	40	1.00	40	835	80	915	875	1.00
438	25-37-1 W	" " " " " " " " " "	1907	40	1.00	40	350	80	430	390	1.00
439	26-38-1 E	F. Lawrence.....	1904	40	1.50	60	325	40	365	305	1.50
440	26-38-1 E	Gus Norburg.....	1904	39	2.50	97	300	39	339	242	2.50
441	26-38-1 E	M. B. Oles.....	1906	40	1.50	60	220	40	260	200	1.50
442	26-38-1 E	T. W. Burrell.....	1906	40	1.50	60	450	40	490	430	1.50
443	26-38-1 E	F. Lawrence.....	1904	40	1.50	60	935	40	975	915	1.50
444	26-38-1 E	" " " " " " " " " "	1904	40	1.50	60	1,010	40	1,050	990	1.50
445	26-38-1 E	" " " " " " " " " "	1905	11	3.00	33	160	11	171	138	3.00
446	27-38-1 E	M. D. Oles.....	1906	23	3.00	69	320	23	343	274	3.00
447	1-38-3 W	Merritt Chandler.....	1904	160	1.25	200	2,300	960	3,260	3,060	1.25
448	1-38-3 W	Wm. Dingman.....	1906	40	1.50	60	180	160	340	280	1.50
449	1-38-3 W	G. C. Dodd.....	1907	80	2.00	160	320	320	640	480	2.00
451	13-38-3 W	N. Malava.....	1906	80	1.00	80	535	320	855	775	1.00
453	14-38-3 W	E. C. Dodd.....	1907	40	1.00	40	436	160	596	546	1.00
454	16-38-3 W	" " " " " " " " " "	1904	40	5.00	200	670	80	750	550	5.00
455	34-39-3 W	Wm. F. Pew.....	1907	40	2.50	100	255	40	295	195	2.50
456	35-39-3 W	" " " " " " " " " "	1907	40	3.00	120	315	40	355	235	3.00
456b	Sec. 36	Merrett Chandler.....	1904	62	.....	121	480	312	792	671	2.00

CRAWFORD COUNTY.

464	1-25-1 W	J. L. & S. R. R.....	1906	40	\$1.25	\$50	\$960	\$40	\$1,000	\$950	
465	1-25-1 W	Harry Cox.....	1907	40	12.00	480	1,800	40	1,840	1,360	
469	26-25-1 W	Geo. Hartman.....	1903	80	1.25	100	520	80	600	500	
470	36-25-1 W	M. Hansen.....	1903	40	4.50	180	1,000	40	1,040	860	

THE COMMISSION OF INQUIRY,

'ROSCOMMON OCUNTY

No.	Description.	Purchaser.	Y'r.	Area	@	Am't.	Value.			Loss to State.
							Timb'r	Land.	Total.	
536	6-22-2W	Paul Lux.....		40	2.25	\$90	\$520	\$40	\$560	\$470
537	6-22-2W	Hattie Becker.....	1905	40	2.25	90	520	40	560	470
540	18-22-2W	Paul Lux.....		40	1.00	40	400	40	440	400
541	18-22-2W	" ".....		40	1.00	40	100	40	140	100
542	18-22-2W	" ".....		40	1.00	40	280	40	320	280
543	18-22-2W	" ".....		40	1.00	40	954	40	994	954
553	8-22-4W	Wood & Menthorn.....	1906	40	3.00	120	600	40	640	520
560	13-23-3W	S. Graham.....	1904	40	1.00	40	80	40	120	80
561	13-23-3W	C. E. Shoemaker.....	1906	40	1.00	40	160	40	200	160
563	17-23-3W	Paul Lux.....	1904	40	3.25	130	1,480	40	1,520	1,390
564	20-23-3W	" ".....	1904	40	1.50	60	880	40	920	860
566	21-23-3W	" ".....	1904	40	7.00	280	1,974	40	2,014	1,734
567	27-23-3W	J. Jarvis.....	1904	40	1.00	40	565	40	605	565
568	35-23-3W	Margaret Doyle.....	1904	40	1.00	40	920	200	1,120	1,080
569	35-23-3W	" ".....	1904	40	1.00	40	50	200	250	210
570	35-23-3W	J. Jarvis.....	1904	40	2.25	90	140	40	180	90
571	35-23-3W	Paul Lux.....	1905	40	5.00	200	1,590	40	1,630	1,430
572	35-23-3W	" ".....	1905	40	4.00	160	550	40	590	430
573	2-23-4W	J. Cavanaugh.....		80	1.00	80	1,890	80	1,970	1,890
574	2-23-4W	C. S. Brooks.....		40	1.00	40	850	40	890	850
575	2-23-4W	J. L. Stodard.....	1903	40	1.00	40	1,160	40	1,200	1,160
577	2-23-4W	J. Cavanaugh.....	1904	40	1.00	40	1,185	40	1,225	1,185
578	2-23-4W	Chas. Brooks.....	1903	40	1.00	40	960	40	1,000	960
579	2-23-4W	J. McDonaid.....	1903	40	1.00	40	860	40	900	860
580	3-23-4W	Paul Lux.....	1904	80	2.00	160	4,325	80	4,405	4,245
581	3-23-4W	" ".....	1904	80	2.00	160	4,240	80	4,320	4,160
582	3-23-4W	" ".....	1904	80	2.00	160	3,010	80	3,090	2,930
603	19-24-4W	" ".....		40	1.25	50	1,055	40	1,195	1,045
608	23-24-3W	J. B. Willett.....	1905	40	1.00	40	50	200	250	210
614	25-24-3W	Robert Brown.....	1904	40	1.00	40	250	40	290	250

MISSAUKEE COUNTY.

650	12-24-5W	F. Wright.....	1903	40	75	\$30	\$1,200	\$40	\$1,240	\$1,210
651	2-24-7W	L. F. Fitz.....	1902	160	....	280	4,400	800	5,200	4,920

Record of Transfers of Tax Homestead Lands.

MUSKEGON COUNTY.

No.	Description.	Purchaser.	Year.	Area.	@	Amount.	Selling price.	Sold before purchased of State.
3	13-10-16	John L. Bolan.....	1904	20	\$1.00	\$20	\$400	11 days.
4	13-10-16	Geo. J. Cropp.....	1904	20	1.00	20	240	
5	13-10-16	" ".....	1904	20	1.00	20	240	
6	14-10-16	John L. Bolan.....	1904	10	1.00	10	120	
6b	21-10-15	" ".....	1904	40	1.25	50	480	11 days.

NEWAYGO COUNTY.

31	12-11-12	C. W. Florence.....	1907	80	\$50	\$40	\$800	15 days.
32	11-14	O. K. Bullard.....	1905	2,684	.....	1,480	13,419
33	4-12-11	W. B. Gilbert.....	1905	40	1.25	50	200	
34	13-12-11	A. E. Knapp.....	1904	40	1.00	40	200	
35	1-12-12	H. A. Bradford.....	1907	40	1.00	40	400	
36	12-12	Max Gluck.....	1907	160	1.50	240	600	
37	7-12-12	M. F. Hatch.....	1906	80	2.00	160	360	
38	16-12-12	W. B. Gilbert.....	1905	40	1.00	40	200	
39	16-12-12	M. F. Hatch.....	1906	80	1.50	120	360	
50	15-13-11	Hugh French.....	1903	107	1.25	134	2,000		Flowage rights.
61	3-13-13	W. W. Taylor.....	.....	40	50	20	200
62	28-13-12	L. L. Johnson.....	1906	80	1.00	80	40	
63	28-13-12	J. Terwilligar.....	1905	40	1.00	40	200	
64	28-13-12	" ".....	1905	80	1.00	80	400	
65	21-14-11	F. W. Riblet.....	1903	480	.....	1,000	1,500
66	14-11	W. W. Taylor.....	.....	1,360	.....	1,850	5,000
68	24-14-11	" ".....	.....	80	.....	90	200
69	29-14-11	O. K. Bullard.....	1906	40	50	20	600	
78	9-14-13	T. S. Sherwood.....	1905	160	50	80	560	
81	14-13	" ".....	.....	120	.....	130	1,200

LAKE COUNTY.

143	6-17-11	E. T. Merrill.....	1904-6	1,300	\$75	\$975	\$6,500	8 days.	
144	6-17-11	B. E. Burley.....	.....	158	.....	147	1,500
145	7-17-11	Frank P. Campbell.....	1907	160	75	120	1,000		
151	10-17-12	Mary Topping.....	1906	560	1.00	560	1,500		
154	20-17-12	" ".....	1906	80	1.00	80	1,000		
159	1-17-13	F. W. Sadler.....	1904	40	1.00	40	200		
169	28-17-13	" ".....	1904	80	50	40	560		
188	34-17-14	" ".....	1904	205	50	103	1,230		
189	34-17-14	" ".....	1904	6	1.30	8	200		
201	18-18-13	" ".....	1904	160	50	80	555		
207	14-18-14	" ".....	1904	160	50	80	400		
208	22-18-14	" ".....	1905	40	50	20	200		
218	23-19-13	Sadie Greene.....	1905	160	50	80	400		
219	24-19-13	F. W. Sadler.....	1904	160	50	80	350		
210	26-18-14	" ".....	1905	120	50	50	400	6 months.	
221	T 18 & 19	" ".....	1904-5	3,661	50	1,841	6,760		
228	5-20-13	" ".....	1906	160	50	80	800		
229	8-20-13	John Pollak.....	1905	80	75	60	640		
230	13-20-13	F. W. Sadler.....	1905	320	50	160	1,020		
231	15-20-13	" ".....	1905	320	50	160	1,020		
238	1-20-14	Geo. A. Hart.....	1906	80	50	40	304		
240	22-20-14	" ".....	1906	80	1.00	80	640		
197	1-18-13	F. W. Sadler.....	1905	646	75	482	3,200		9 months, 16 days

KALKASKA COUNTY.

259	6-25-8	A. Aldrich.....	1904	80	\$1.00	\$80	\$475	State trespass agent
267	16-26-8	A. E. Imier.....	1906	40	1.00	40	300	

THE COMMISSION OF INQUIRY,

CHEBOYGAN COUNTY.

No.	Description.	Purchaser.	Year.	Area.	@	Amount.	Selling price.	Sold before purchased of State.
329	31-33-1W	H. J. Butler.....	1904	80	\$1.00	\$80	\$300	
330	33-2	Butler & McPhee....		80	.....	110	900	
356	34-1-2	H. J. Butler.....	1904	240	1.00	240	1,267	
370	35-1 E	F. D. Hughes.....		80	1.25	100	500	
371	5-35-1 E	Chas. Fultz.....	1904	40	1.00	40	250	
394	28-35-2W	Wm. C. Laird.....	1904	49	1.00	40	200	Timber deed.
395	35 and 36	Chas. Fultz.....	1905	320	.....	450	3,500	Timber deed.
399	30-36-1 E	Chas. Fultz.....	1904	40	1.00	40	250	
400	30-36-1 E	".....	1904	40	1.00	40	175	Timber deed.

CRAWFORD COUNTY.

467	25-25-1W	L. J. Miller.....	1906	120	\$50	\$60	\$600	
473	36-25-1W	G. Hartman.....	1907	240	75	160	720	
474	5-25-2W	L. J. Miller.....	1906	240	.....	280	1,325	
476	5-25-2W	".....	1906	80	75	60	400	
477	20-25-2W	Wm. Johnson.....	1905	40	50	20	400	
478	29-25-2W	I. W. Richardson....	1904	20	75	15	500	
479	30-25-2	W. R. Jones.....	1906	400	75	300	5,040	
480	33-25-2	Myrtle Hellen....	1906	20	75	15	300	
483	7-25-3W	L. J. Cotton.....	1906	80	1.00	80	500	
487	17-25-3W	John Roof.....	1905	80	1.00	80	662	
488	24-25-3W	Gus Lynch.....	1906	40	1.00	40	375	
490	31-25-3W	H. E. Nichols.....	1905	480	1.00	480	2,500	
493	4-25-4	C. S. Clark.....	1903	80	.....	130	2,000	
495	12-26-1W	C. G. Longear.....	1905	80	25	20	1,500	
496	14-26-1	Walmer Jorgerson....	1905	80	25	20	1,600	
499	20-26-1W	E. Purchase.....	1903	40	1.25	50	700	
500	26-1W	N. S. Potter.....	1903	640	.....	250	3,500	
502	25-26-3W	L. J. Miller.....	1906	160	50	80	1,280	
505	25-26-3W	Walmer Jorgerson....	1904	80	75	60	2,000	County treasurer.
511	13-27-1W	C. S. Clark.....	1904	80	25	20	1,200	
512	26-27-1W	Geo. K. Force.....	1905	80	25	20	1,500	
518	33-27-1W	C. S. Clark.....	1905	160	25	40	2,000	
519	34-27-1W	".....	1905	40	25	10	600	
522	35-27-1W	".....	1904	40	25	10	1,000	
523	35-27-1W	".....	1904	80	25	20	1,500	
524	35-27-1 E	".....	1904	160	25	40	4,000	
525	36-27-1W	Harry Solomon.....	1903	160	25	40	1,200	

ROSCOMMON COUNTY.

533	22-1W	John Carter.....	1903	1,080	\$75	\$810	\$12,000	
534	22-1W	".....	1903	1,280	75	960	6,400	
538	22-2W	John Becker.....	1903	760	.....	820	5,000	
554	25-22-2W	St. Helens D. Co....	1906	160	1.00	160	1,600	
545	22-2W	".....	1906	1,920	1.00	1,920	19,000	
558	23-2W	M. O. Robison.....	1903	800	1.00	800	9,700	
562	23-3W	I. Richardson.....	1906	620	1.00	629	7,000	
588	31-24-2W	I. H. Richardson....	1904	40	1.00	40	100	
586	29-24-2W	N. E. Hollen.....	1906	80	1.00	80	960	

MISSAUKEE COUNTY.

616	21-5W	T. W. Breckon.....	1906	640	\$50	\$320	\$3,500	
620	22-21-6	H. DeBree.....	1903	160	50	80	1,800	
630	1-22-5W	John J. Cuff.....	1907	40	75	30	600	
637	10-23-6	A. S. Frey.....	1903	160	1.00	160	2,400	

*Record of State Tax Homesteads.**Newaygo County.*

No. 97. N $\frac{1}{2}$, S E $\frac{1}{4}$, 22-15-13. Entry July 2, 1906. Brinnial Robins. No buildings at present and cannot find evidence of any ever having been built.

Kalkaska County.

No. 257. N W $\frac{1}{4}$, N W $\frac{1}{4}$, 18-25-6. Entry Sept. 11th, 1903. William Harold. This man Harold never lived on this homestead; no house or buildings. Timber cut and removed and Harold's whereabouts unknown. Was a fraud from the start.

No. 268. W $\frac{1}{2}$ of N E $\frac{1}{4}$, W $\frac{1}{2}$ S E $\frac{1}{4}$, S E $\frac{1}{4}$ S E $\frac{1}{4}$, and N E $\frac{1}{4}$ S W $\frac{1}{4}$. 240 acres, 11-27-5. David James. Entry Sept. 10th, 1907. Never taken for a home as he has not lived on it since he proved up. Timber sold for \$9,552.50, land for \$1,000.

No. 271. S W $\frac{1}{4}$ and E $\frac{1}{2}$ or S W $\frac{1}{4}$, 31-27-6. Orville Walker. Lumbered winter of 1906-7 by Walker. Aug. 20th, 1907, he sold balance of timber to Gow and Campbell for \$1,300. Homestead now deserted.

No. 273. N $\frac{1}{2}$ N W $\frac{1}{4}$, 12-27-7. Wm. J. Little. After timber was removed, Little sold to A. Cross, Feb. 17, 1906, for \$45.00. Value of timber on this 80 was \$500.00.

Emmet County.

No. 287. S E $\frac{1}{4}$ or S E $\frac{1}{4}$ and lot 1 28-35-4-W. Entry Norman Rickford. All timber, valued at \$650, cut off. Small board shanty on this homestead and it does not look as if this man intended to make a home. Probably will be deserted soon.

No. 288. S W $\frac{1}{4}$ S W $\frac{1}{4}$, 28-35-4. Ben Arnock. Deed Dec. 3, 1906. Timber cut off, valued at \$680. No one living here now. Looks as though he has deserted. Small shanty.

No. 289. N E $\frac{1}{4}$ S E $\frac{1}{4}$ and lot 1, 29-35-4. Frederick E. Hill. Deed Feb. 26, 1902. Timber now standing, value \$670. Small frame house and about 20 acres clear.

No. 290. Lots 1 and 2, 30-35-4. Daniel M. Gallagher. Deed March 26, 1902. Timber cut, valued at \$500. Homesteader is not living on this land. Evidently taken for timber value.

No. 292. N $\frac{1}{2}$ N E $\frac{1}{4}$, 32-35-4. David K. Moore. Deed Feb. 26, 1902. Value timber cut \$960. Small board shanty. Will probably be deserted, as not much value is placed on land. Taken for timber only. Looks as though already deserted.

No. 294. W $\frac{1}{2}$ N W $\frac{1}{4}$, 34-35-4. Archie Moore. Deed Sept. 13, 1906. Value of timber standing, \$1,065. This man Moore places no value on the land. Only taken for timber. Asks \$1,000 per timber, or timber and land.

No. 296. S E $\frac{1}{4}$ N E $\frac{1}{4}$, 3-36-5. Henry Williams. Homesteaded spring 1903. Without proving up he commenced to log and now has practically lumbered all of this forty. Timber removed in 1904-5-6-7

valued at \$1,000. Jan. 10, 1908, Land Office reports total trespass collected to date \$16.95 on the basis of 1,800 feet of pine.

No. 309. Lot 1, Sec. 23, Lots 1-2-3, Sec. 24, and N W $\frac{1}{4}$ N W $\frac{1}{4}$, Sec. 26, 39-5. Homesteaded by Edward Loway. Certificate No. 2113, May 31, 1898. Value of timber standing Dec. 3, 1907, \$465. Never were any buildings on this homestead.

No. 312. N E $\frac{1}{4}$ S E $\frac{1}{4}$ and S W $\frac{1}{4}$ N E $\frac{1}{4}$ and lot 1 N E $\frac{1}{4}$, 25-39-5. Certificate 4314. Charles Harvey. Harvey claims to have house and barn on this homestead, but it is on Sec. 30, town 39-4. He has never lived in this house. No house of any description on this homestead. The house on 30-39-4 has not even a chimney.

Crawford County.

No. 508. N $\frac{1}{2}$ S E $\frac{1}{4}$, 33-26-4. James Phippney. Proved up Aug. 2, 1907. Sold Sept. 27, 1907, to Rasmus Hansen, lumberman, for \$1,500.

Roscommon County.

No. 592. E $\frac{1}{2}$ S E $\frac{1}{4}$, 2-24-3. Entered April 18, 1902, by Samuel Lennox. Deserted.

No. 593. W $\frac{1}{2}$ S E $\frac{1}{4}$, 2-24-3. Leonard Ware. Old log house and barn. Deserted for some time. Deed dated Sept. 4, 1902.

No. 601. Lot 5 and E $\frac{1}{2}$ S E $\frac{1}{4}$, 18-24-3. Wallace Schram. Deed July 18, 1904. Situated on Higgins Lake. Deserted.

No. 606. N W $\frac{1}{4}$ N E $\frac{1}{4}$ and N E $\frac{1}{4}$ N W $\frac{1}{4}$, 23-24-3. Wm. Snellgrove. Deed July 14, '04. Evidently starved out and has deserted.

Missaukee County.

No. 642. S W $\frac{1}{4}$ S W $\frac{1}{4}$, 13-23-7. Deed Feb. 12, 1908, to Ernest Ward. Abandoned.

No. 643. N $\frac{1}{2}$ S $\frac{1}{2}$, 15-23-7. John G. McNabb. Deed Nov. 11, 1904. Sold Dec. 5, 1904, to W. S. Combs, for \$900. Value of timber, \$1,050.

No. 645. N E $\frac{1}{4}$ S W $\frac{1}{4}$, 18-23-7. Geo. B. Brown. Deed July 6, 1904. Sold Aug. 24, '04, to E. A. Benthien for \$400. Timber standing, valued at \$600. Deserted.

No. 653. S E $\frac{1}{4}$, 7-24-7. Wm. H. Cunningham. Deed, April, 1902. Lumbered by Mitchell Bros. of Cadillac, to the value of \$2,800. Evidently taken for timber, as Cunningham has deserted and there is no one living on the place.

No. 654. N W $\frac{1}{4}$, 10-24-7. Lewis F. Pitz. Deed Nov. 13, 1902. This homestead was taken for the timber, and Mr. Pitz never complied with the homestead law by building a house or clearing the land. He built a small hut about 10 feet square which was evidently never intended for a home and was never occupied. Timber cut by Kelley Shingle Co., valued at \$6,490. Still on the land timber valued at \$2,300.

The above report has been given our careful consideration and represents the conditions as they exist, and as we have found them.

(Signed) O. PERRY BURGESS.

Detroit, June 27, 1908.

(Signed) GEORGE WILSON.

APPENDIX 8.

DRAFT OF STATUTES PROPOSED FOR IMMEDIATE ADOPTION TO CARRY INTO EFFECT
THE GENERAL RECOMMENDATIONS OF THE COMMISSION OF INQUIRY.

Proposed Statute for Utilization of the Tax Land for State Forest Reserves, for Private Timber Reserves and for Settlement.

The People of the State of Michigan enact:

Section 1. This act shall not extend to or include any land situated within the limits of any city or village, or any land situated in the platted portion of any township within one mile of the corporate limits of any city or village; provided, that no State forest reserve created by the operation of this act shall be affected by the subsequent incorporation of a city or village. Except as aforesaid, this act shall extend to and include all State tax land now subject, or which shall hereafter become subject, to purchase upon the records in the Auditor General's department, and which shall have been bid in to the State at one or more tax sales, and shall not have been redeemed or purchased within the year after the tax sale allowed by law for redemption, and which shall, according to said records, be delinquent for taxes for five or more years: provided, however, that any disposition thereof made hereby, or in pursuance of the terms hereof, shall be subject to any lawful action that may thereafter be taken upon any application, made within the year of redemption aforesaid, to pay the taxes or redeem the said land; and shall be subject to any decree or judgment that may be rendered in any suit or proceeding, commenced within the time allowed therefor by law, to set aside the taxes or remove the cloud on title occasioned thereby. This act shall, except as aforesaid, extend to and include all the tax homestead land not heretofore disposed of, and all tax homestead land heretofore disposed of, but which shall revert to the State for non-compliance with the terms of entry or sale. All State land included within the operation of this section is hereby withdrawn and reserved from sale, entry or other disposition except as hereinafter provided.

Section 2. All State tax land which under the terms of section one, is now, or shall hereafter come, within the operation of this act shall be deemed to be abandoned, and the title of the State thereto shall be deemed to be absolute and indefeasible; and the Auditor General shall forthwith deed the same to the State of Michigan as to an individual, and deliver the deeds thereof to the Commissioner of the State Land Office, who, after causing the same to be recorded in the proper register of deeds office, shall keep the same on file in his office. The records aforesaid in the Auditor General's department showing such facts as bring any land within the operation of this act and the said deeds, or either of them; or certified copies thereof, shall, in all cases, be sufficient proof of such abandonment and of the title of the State; and shall be

deemed conclusive thereof except as to such land as shall be shown to have been in the actual possession of some person claiming adversely at the time of the decree under which the title of the State is acquired. No person shall be held to have possession constructively, or by implication, of any land within the operation of this act beyond the limits of the parcel which (described as the smallest sub-division according to government survey) includes the land shown to have been in his actual possession as aforesaid.

Section 3. No suit, action or proceeding shall be instituted or maintained, nor shall any defense be entertained or given effect, in any court, to invalidate, annul, or otherwise impair, the title of the State to any land, within the operation of this act, or to any land which has heretofore been constituted forest reserves, or to establish or enforce title thereto adverse to the State, by reason of any defect, jurisdictional or otherwise, in any of the proceedings on which the title of the State in any manner depends, unless such suit, action or proceeding shall (if it relates to land to which the State now has title as against the original owner), be commenced, or such defense shall be pleaded in an action commenced, within six months after this act takes effect; or (if such suit, action, proceeding or defense relates to land to which the State shall hereafter acquire title), unless the suit, action or proceeding shall have been commenced within six months after the State acquired title against the original owner: provided, however, that this section shall not bar any person having actual possession as aforesaid claiming adversely; and provided further, that this section shall in effect be cumulative, and shall not exclude or impair the effect and operation of any existing statute for the perfecting or protection of the title of the State, or its grantees.

Section 4. The commission having charge of forest reserves may institute and maintain suits in the circuit court in chancery of the county (such court being hereby given jurisdiction thereof) to quiet title and to establish and declare the validity and priority of the title of the State to any forest reserve land as hereafter defined which is, or is claimed to be, in the actual possession of any person claiming title adversely to the State as aforesaid; and the Commissioner of the State Land Office may bring like suits (said courts being hereby vested with jurisdiction thereof) affecting any land within the operation and effect of section one of this act other than forest reserve land; to which suits all persons may be made defendants who have, or claim, any interest or title in or to any parcel of land adversely occupied as aforesaid; and all proceedings in such suit shall be according to the usual course and practice in cases in chancery, except that, at the time of entering appearance, any defendant may in writing demand a severance of the cause so far as it affects land in which he claims an interest; and the case shall thereupon be severed by the court in such manner as will keep before it the parties necessary to enable it to render a final decree adjusting the rights of all parties interested in the land in question; and except also that any party entitled under the laws of the State to a trial by jury, may (and, if he wishes to secure a trial by jury, shall) demand in writing, at the time of demand for severance of the case, that the same be tried as a case at law with a jury: and thereupon the same shall

be so tried; provided, however, that a final decree shall be entered by the court as a court in chancery. Costs may be awarded, and appeals may be taken, as in chancery cases.

The copy of a subpoena served shall contain, or be accompanied by, a notice that the suit affects the defendant only as respects his alleged right to the particular land described in such notice, and is brought to establish and declare the validity and priority of, and to quiet the State's title to, the said land.

Section 5. The commission having charge of State forest reserves shall proceed with all convenient speed to locate and define the boundaries of districts, to be known as reserve districts, that include land within the operation of section one, in such quantity and so located as to be desirable in their judgment for State forest reserves; such reserve districts to be located also, as far as practicable with a view to securing reserves that will contribute as much as possible to the betterment of conditions affecting streams and stream flow, and with regard also, so far as consistent with the foregoing, to bringing into use for farms as much of the State's holdings of land aforesaid as is suitable therefor. All land within the operation of this act and now owned, or which shall hereafter be acquired by the State because of non-payment of taxes, and which is situated within any reserve district, is hereby designated as, and shall be, a part of the State forest reserves; provided, that not more than 20% of the area of any county shall be included in the State forest reserves; and provided, that the commission in charge of forestry may elect to take over as a part of the State reserves any land in excess of the aforesaid limit which shall be acquired by the State, and, in lieu thereof, to drop from the State forest reserves other land in the same county of sufficient area to reduce the State forest reserves in the county to the limit aforesaid.

The aforesaid commission is authorized to employ the necessary surveyors and others for the delimitation of reserved districts; and to incur such expense for maps, surveys and other purposes as may be necessary for the matters aforesaid in this section, the same to be paid out of the general fund when audited and allowed by the State Board of Auditors.

As soon as a reserve district is located the boundaries thereof shall be certified by the commission to the Commissioner of the State Land Office and to the Auditor General, and thereupon it shall be the duty of the Auditor General and Commissioner of the State Land Office forthwith to prepare and file in the State Land Office a list of all land located in such reserve district and which is within the operation of section one of this act. Upon the filing of the said certificate in the State Land Office showing the boundary of any reserve district, all land therein which is within the operation of section one of this act shall be, and become a State forest reserve and all the provisions of this act relating to State forest reserves shall thenceforth govern the same. It shall be the duty of the Commissioner of the State Land Office to prepare forthwith and furnish to the county clerk of each county, in which any State forest reserve is, in whole or in part, located, a list or other description in duplicate in such form as will be suitable for readily informing the public, of all the land in the county that under this act

and the aforesaid action taken in pursuance thereof, has become State forest reserve. Such list shall also contain separately a description of all land in the county subject to sale under section nine or to entry as a private timber reserve under section ten of this act, and shall briefly state in substance the terms and conditions of such sale or entry as prescribed by this act, including the terms of section twelve. It shall be the duty of the county clerk receiving such list or description to immediately post up one copy of the same securely and permanently in his office, in a conspicuous and public place, and to forthwith make proof by affidavit of so doing upon the other copy and thereupon transmit the same by registered mail to the Commissioner of the State Land Office, who, upon receipt thereof, in due and proper form, is authorized to pay such clerk for reimbursement and fees the sum of one dollar. The Commissioner of the State Land Office shall have the aforesaid list or description, as furnished to the county clerk, printed for distribution and shall furnish the same to such person as shall apply and to each newspaper published in the county, and to such other persons as he shall deem it advisable to notify or as the commission in charge of State forest reserves shall at any time request him to notify.

The Commissioner of the State Land Office shall, once in each year, cause to be printed in a newspaper published in the county, a brief description of such land within the operation of section one, as is subject, by the terms of section ten, to entry as private timber reserves, and of such other land, if any, as is subject to sale under section nine, but not to entry under section ten; and shall briefly state the terms and conditions of sale or entry as herein prescribed.

It shall also be the duty of the Commissioner of the State Land Office to print annually, in each county, in a newspaper published within the county, a description of all parcels of land in that county sold under section nine or entered under section ten within the year, and to state the name of the purchaser, the price of the land and the appraisal of the value of forest or wood products, and the said commission shall, within the powers conferred and the means provided by general appropriation or otherwise, manage, care for, protect and administer such forest reserves in such manner as it deems best fitted to secure the maximum of reforestation thereon by natural processes; and shall from time to time, within the powers conferred and monies provided, acquire, as far as possible, definite knowledge of all land in such reserves, its characteristics, conditions and ability to reforest naturally without artificial aid, and shall prepare and submit to the legislature reports thereof, and whenever it shall be found that the best interest of the State requires that such reserves or parts thereof should be planted, or other artificial means be employed to reforest, an estimate of the cost thereof, and such specifications, plans and outline of the work as it deems proper, shall be submitted to the legislature for its approval and for the appropriation of the necessary monies. Whenever the commission in charge of State forest reserves shall certify that, in order that any State forest reserve may be made more compact and unbroken, or to promote economy and efficiency in its care, protection and administration, it is desirable and for the best interest of the State to exchange any lands in such reserve, for any other lands of substantially equal area within the opera-

tion and effect of section one, which are located in the same reserve district and not otherwise disposed of, such exchange shall be effected by written notice from the said commission to the Commissioner of the State Land Office; and it shall be the duty of the said Commissioner forthwith to withdraw from sale the land necessary to consummate such exchange.

Section 6. The commission having charge of State forest reserves may recommend to the legislature for adoption, from time to time, plans for economical and effective methods of reforesting defined tracts or areas of denuded, waste or brush lands within their jurisdiction, having regard to the special characteristics, surroundings or conditions of each parcel or tract. It may also, from time to time, submit plans for protecting and bettering, through the forest reserves and improved forest conditions, the water supply and stream flow of important streams; of securing economy in administering the affairs of the State connected with the public lands and matters aforesaid; and it may, for the purpose aforesaid, and within the monies appropriated and available therefor, cause examinations, surveys, maps and plans to be made of the lands within the forest reserves and fire districts and showing their relation with respect to important streams and lakes and their water sheds and drainage areas. The commission having charge of State forest reserves may co-operate and contract with the United States Bureau of Forestry of the Department of Agriculture or with the United States Geological Survey in the making of necessary investigations and obtaining data for the purpose of formulating plans and recommendations as aforesaid; but it shall not incur liability by any such contract in excess of monies that have been appropriated and are then available therefor; and the sum of five thousand dollars is appropriated annually for the purposes specified in this section, the same to be paid out of the general fund on vouchers of the said commission, to be audited by the State Board of Auditors.

Section 7. The commission having charge of State forest reserves may make such rules and regulations, and establish and maintain such service, as it deems best fitted to promote the reforestation of the State reserves and the preservation and protection of the forest growth thereon from fires and trespass; to govern the meetings and actions of the commission, and the conduct, duties, compensation and term of office of its agents and employes, except as otherwise provided by law; and to provide for the removal and sale of dead or matured timber when the best interests of the forest reserves will be promoted by the removal thereof; and it shall have full power and control over all property belonging to the State, acquired for forest reserves, or for other matters within its jurisdiction; and shall have, in respect to the forest reserves established under or by the operation of this act, all powers and rights, and shall be subject to all duties and obligations, now vested in, or imposed upon, the Michigan Forestry Commission respecting the lands heretofore constituted forest reserves, so far as the said powers, rights, duties and obligations are not inconsistent with the terms of this act.

All employes of the State whose official duty concerns the public lands, forest, fire protection or game and fish interests, shall, as a part of their official duties, give aid, so far as practicable, in the enforce-

ment of the laws of the State concerning the forest reserves; and all officials, branches and departments of the State government shall, upon request, render assistance as aforesaid, and furnish for the use of the commission having charge of the State forest reserves all information, records, documents, maps and papers within their power and control.

Section 8. No land within the effect and operation of this act shall be assessed or taxed so long as it is owned by the State; but whenever any such land shall be disposed of under the provisions hereof, it shall again become taxable and shall be assessed and taxed in the same manner as other land owned by individuals. In lieu of taxes the State shall annually pay upon all land held in the State forest reserves the sum of ten cents per acre; the amount thereof for each township in which State forest reserves are located, and the total amount for the whole State, shall be computed and fixed by the Auditor General and be paid only on his warrant in manner hereinafter prescribed. The Auditor General shall fix the amount as aforesaid on or before the..... day of.....in each year, and on his certificate to the State Treasurer this amount shall stand as an emergency forest fire protection fund for the year following; and be available and used only in emergency and for payment of the necessary expenses in excess of the ordinary appropriation available for fighting and putting out fires on any forest, waste or brush lands: and one-half of the unexpended balance of the said fund, shall on the expiration of the year aforesaid be allotted by the Auditor General to the several townships containing the land for which payment is made in lieu of taxes as aforesaid, such allotment to be pro rata according to acreage in each township. One-half of the amount so allotted to each township shall be paid to the proper township officer in payment or reimbursement for expenditures or liabilities actually incurred by the township within the preceding year in the building or improvement of roads and bridges, adjoining or passing through the fire districts aforesaid, or the building or improvement of which the commission in charge of State forest reserves shall request or approve in advance of the work: and the other one-half of the amount allotted to the township shall be paid to the treasurer of the township for use in the said township for local purposes as it may determine; provided, that no payment shall be made as aforesaid except on proper vouchers verified by a person having knowledge of the facts, and by an officer or agent of the township having supervision of, or authority in, the particular work, and approved by the township board and the said commission. The balance of the monies payable by the State under this section shall, after expiration of the year aforesaid, be available to meet the appropriations for forest fire protection, any balance to go into the general fund.

Section 9. All State lands within the operation of section one, except the State forest reserves aforesaid, shall be subject to sale by the Commissioner of the State Land Office at a price to be fixed by him, not less than \$5.00 per acre, and the value of all saleable timber, forest and wood products thereon. Such appraisal to be made at the expense of the applicant in detail and under oath upon application being made to purchase. The appraisal of all lands applied for and the timber thereon shall be filed and kept open to inspection in the State Land Office. The

provisions of section 131 of the General Tax Law, being section 3953 of the Compiled Laws of 1897 as amended governing homesteads shall apply, so far as the same relates to applications and proof and to the issuing of deeds and their effect, provided that no application shall be granted or deed issued, until the payment of the purchase price aforesaid. All monies received by the Commissioner of the State Land Office from the sale of lands herein mentioned shall be deposited in the State Treasury and shall be credited to the State, county and township respectively wherein such lands are located, in proportion to the amount of taxes due to each upon the land at the time of the deeding thereof by the Auditor General.

Section 10. Such parcels or descriptions of the lands subject to the operation of section one and not made State forest reserves under or pursuant to the terms of this act, and which have been heretofore deeded to the State by the Auditor General, may, if not applied for under section nine within one year from April 1, 1909; and all such parcels or descriptions thereof as shall hereafter be deeded to the State by the Auditor General, may, if not applied for under section nine within one year from the said deeding thereof, be applied for and taken up at any time as private timber reserves under a contract and subject to terms such as are prescribed hereinafter; provided, however, that where application shall be made under this section for any parcel or description, which, within one year thereafter shall be applied for under section nine, priority and precedence shall be given to the application made under section nine; provided also, that the aggregate total acreage in any county of private timber reserves under this act and of the State forest reserves shall not together exceed twenty-five per cent of the area of the county, which limit may be extended to thirty per cent by the board of supervisors of any county; and provided, that notice of applications for private timber reserves under this section shall be printed in a newspaper published and circulating in the county (or if none, then in a newspaper published and circulating in an adjoining county) within thirty days after the application is made and again within sixty days of the expiration of the year aforesaid, which notice shall describe the land and give the name and residence of the applicant and date of application and such other facts as are material; and provided further, that no person other than one who has at the time of application been an actual resident of the township at least six months shall be entitled to apply for or take up a private timber reserve under this section, and that not more than 160 acres shall be taken up under this section by any one person; and provided further, that the applicant under this section shall make proof, satisfactory to the commission having charge of the State forest reserves, of actual residence in the township as required above, and of ability and intention to guard, protect and preserve the land applied for as a private timber reserve as required herein and by a contract which shall embody the terms and provisions of this section and bind the purchaser, his heirs and assigns and the said land thereto in such form and with such further provisions as the commission having charge of the State forest reserves shall deem necessary in order to fully protect the interest of the State; and the said contract shall among other things bind the purchaser and his assigns to keep and

preserve the said private timber reserve as such and in forest growth for not less than twenty-five years; not to start fires or to permit them to be started for the purpose of burning over such land or land adjoining, or for any purpose or at any time forbidden by law, and to use due care and diligence to keep out and prevent the spread of fires upon said reserve; not to use or permit the use of said reserve during such period, not exceeding fifteen years, as the commission shall deem necessary, for any purpose destructive of the young forest growth and that in their judgment will materially interfere with natural reforestation; that live trees and forest growth shall not be cut or removed within fifteen years and that matured trees may thereafter be cut, only provided all tops, limbs and brush be gathered, piled and burned by the holder of the reserve and provided that notice shall first be given to, and the cutting be done under the direction of the said commission and that the young trees and forest cover be saved so far as reasonably possible and that all work to the end aforesaid be done in accordance with any general rules and regulations prescribed therefor by the said commission.

At the expiration of the said twenty-five years, the purchaser, his heirs or assigns shall be entitled, in case of full performance of the contract, payment of the acreage fee aforesaid and production of a certificate as aforesaid, to a deed, the same to be executed and have effect as provided in section nine, and the entire purchase price of the land embraced in the said timber reserve and the amount appraised as the value of timber, forest and wood products shall be remitted.

In case of violation going to the essence of the said contract under which any private timber reserve is taken up under this section, or in case of the destruction by fire, act of God or otherwise of the forest growth on the same, all interest and right of the holder or owner of the reserve shall thereupon absolutely cease and terminate without judicial or other proceedings being taken; but if the said destruction shall have been wilful or voluntary or by the act or procurement of the holder or owner of the reserve, or any other person it shall constitute trespass and the liability therefor, both civil and criminal, and the rights of the State as respects the same and as respects the timber, forest or wood products, cut or removed, shall be the same as in case of a wilful trespass committed without color of title.

Section 11. All laws for the regulation of the conduct of persons or corporations in order to preserve or protect State forest reserves from fire, trespass or other injury, and all laws for perfecting the title of the State of any lands within the operation of this act, shall apply to the private timber reserves taken up under this act so far as the same are applicable and not inconsistent with the terms hereof.

Suit in chancery for an injunction to compel performance or to prevent breach of the terms of the contract or of any law or lawful rule or regulation for the protection and preservation of the said private timber reserve of the forest growth thereon and of the rights and interest of the State therein may be maintained by the commission having charge of the State forest reserves in the county of Ingham or in the county in which the land is situated of which suit said courts are hereby given jurisdiction; and the aforesaid contract shall include a provision consenting hereto and binding said land and the purchaser or holder and

his heirs and assigns, and shall authorize a decree pro confesso in such suit in case appearance therein is not entered.

Payment of the same sum annually per acre as section eight provides shall be paid by the State upon the State forest reserves and production of a certificate from the commission showing that a private timber reserve is still kept as such and in forest growth and that the terms of the said contract affecting said reserve have been duly kept and performed without breach of any material stipulation going to the essence of the said contract, shall entitle the holder of such private timber reserve to a receipt in full for all taxes thereon for the preceding year.

Section 12. Every grant, conveyance or transfer of the title of the State to, and every contract made by it affecting any land within the operation and effect of section one which lies upon, includes or is bounded or crossed by any lake, river or stream or which is located within the flowage area thereof hereinafter mentioned, shall be subject to the following stipulation binding upon the land and upon all grantees and assigns thereof as follows, to-wit:

All such parts of the land included in such grant, conveyance, transfer or contract as will be flowed by any present or future work, dam, or operation for impounding, diverting or controlling the waters of any lake, river or stream in order to develop water power or to furnish water supply, or to regulate stream flow or for any other purpose are conveyed by the State, only to the extent that the grantee and his successors in title may use, possess and enjoy the same for all purposes except for the purpose of flowage as aforesaid, the right of flowage being reserved to the State; subject, however, to the agreement that such right of flowage shall not be used by the State or conveyed or granted to any person except either with the consent of said grantee of the land or his successor in title then owning the same, or upon condition that compensation by the grantee of such easement or reserved right shall be made to the said then owner of said land in the same way as though he were the absolute owner thereof without restriction or reserved right aforesaid; and provided further, that any grant or conveyance by the State of the easement or right of flowage shall be held and deemed to be subject to the reservation and agreement that the same is and shall forever remain subject to such rules, regulations, restrictions and requirements as the State may at any time see fit to impose for the protection and betterment of public welfare.

Section 13. Whenever land returned delinquent to the Auditor General has been sold at tax sale and bid in to the State, the bid, interest, title or right of the State shall not be sold or disposed of to any person, but the Auditor General shall, prior to the time for redemption allowed by law, receive from any person claiming to be the owner by the original title, the full amount of all unpaid taxes thereon, together with all interest, expenses and charges, and shall execute and deliver to the person making such payment a full discharge and acquittance of the said land from the lien of such taxes and a release and cancellation of the right, title or interest of the State by virtue of the tax proceedings: but neither this provision nor the certificate of the Auditor General shall be held or deemed to vest in the owner of the original title any right, nor shall the payment aforesaid or the certificate of the Audi-

tor General vest in any person any title, right or interest based on the tax proceedings.

PROPOSED FOREST FIRE LAW.

Section 1. The State Game, Fish and Forest Warden shall have charge of the prevention and suppression of fires and shall direct and have general control of all officials and employes herein provided for. He shall hereafter be known and designated as State Forest Warden.

Section 2. The State Forest Warden shall divide those portions of the State to which this act applies and which he shall deem to require forest fire protection, into districts as he may deem advisable but not exceeding twenty-five in number, and shall appoint for each of such districts a deputy, who shall receive a salary to be fixed by the State Forest Warden, but not exceeding one thousand dollars a year and his necessary expenses, payable monthly. Such deputies and all wardens and employes shall be subject to the orders and direction of, and to removal by the State Forest Warden, and shall hold office during his pleasure: provided, that such Forest Warden as well as all deputies, wardens and employes shall be under the final control and direction of any commission or other authority that shall by law be vested with jurisdiction and control over the forest, game and fish interests of the State and the public domain. All deputies and appointees of the State Forest Warden shall have full power as, and be subject to the performance of the duties of fire wardens under this act.

The State Forest Warden shall also be State trespass agent, and his deputies shall be assistant State trespass agents. The State Forest Warden may make use of fire wardens as trespass agents as he may deem expedient; and they shall, subject to his control, have the same powers and duties as under the laws now in force. All powers and duties vested by law in the Commissioner of the State Land Office for the protection of State lands from trespass and other depredations, are hereby transferred to the State Forest Warden. It shall be the duty of such deputy forest wardens to familiarize themselves by personal investigation with the locality and condition of the cut-over lands, prairie lands and other lands in their respective districts where fires are most likely to start and spread, and to take such precautions as they shall deem reasonable and proper to prevent the starting or spreading of fires in such districts, and in doing so, may enter upon lands and remove or destroy brush, rubbish and other dangerous combustible material, wherever necessary. It shall be the duty of such deputy forest warden to caution all sportsmen, settlers and others of the danger from fires in the woods, to extinguish all fires left burning by any one, if within their power; and to give notice to any and all parties interested, when possible, of fires raging and beyond their control, to the end that the same may be controlled and extinguished. In case of fire such deputy forest wardens shall have the power to employ assistance in emergencies to extinguish or control fires. It shall be the duty of said deputy forest wardens, whenever possible, to go to the place of fire, take personal charge of and direct all efforts to extinguish and control the same. Each deputy forest warden shall have general charge of all fire wardens in his district, and shall have authority to mass such fire warden force as may be available, at any

special point in his district, to suppress fire. He shall make annual report to the State Forest Warden and such other written and verbal reports as he may require, which annual report shall show in detail each fire occurring in such district, stating the cause of the same, the method used to control or extinguish such fire, amount of property destroyed and the number of lives lost, and such other facts as the State Forest Warden may require.

Section 3. In any district or locality where he deems it necessary, the State Forest Warden may maintain a service for watching for, reporting the outbreak of, and checking, incipient or other forest fires, which service may, in the discretion of the State Forest Warden, be by patrol during times of danger, by observation or watch towers, or otherwise, as is deemed most effective and economical; and for this purpose the State Forest Warden may, with the approval of the commission having charge of State forest reserves, appoint at such compensation as he shall fix, local fire wardens to serve temporarily in times of danger, in any district where he deems that they are needed for preventive measures to guard against the starting or spreading of forest fires. He shall have authority to mass such fire warden force as may be available at any special point to suppress fires. 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, or cause to be investigated by said deputy game, fish and forest wardens, the damages done from time to time by forest fires, and the causes of such fires, and include the same in the annual report to be made by him to the Governor.

The State Forest Warden may at times or seasons deemed especially dangerous, designate the supervisor of any township, and the sheriff, under sheriff and deputy sheriffs, or any of them, fire wardens within their respective township or bailiwick. It shall be the duty of any supervisor, sheriff, under sheriff, deputy sheriff or other person designated or appointed fire warden, to promptly report any and all fires in clearings, fields, forests, brush, cut-over or waste land to the State Forest Warden or his deputy in charge of the district, and to take prompt and effective measures to suppress the same and to promptly obey the orders and directions of the State Forest Warden or his said deputy respecting his course and proceedings in reference to any such fire. In default thereof he shall be subject to removal from office by the Governor of the State and be subject to prosecution for a misdemeanor and on conviction thereof shall forfeit his office and be liable to a fine of not less than twenty-five nor more than one hundred dollars.

Section 4. The State Forest Warden 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 March of each year he shall forward as many copies as he considers needful to the several deputies and fire wardens in the State and to all railroad companies, and it shall be the duty of said deputies and fire wardens to post up such abstract as warning placards in twelve conspicuous places in their respective districts, and of said railroad companies to post up the same in a conspicuous place in each station in the portion of the State within the operation of this act.

Section 5. During a dry and dangerous season, when forest fires are prevailing or are liable to break out, the State Forest Warden shall use such additional means under his command as he may deem necessary to prevent or suppress fires, and the expenses thus incurred shall be paid by the State, which expenditures for such emergency in any fiscal year shall not exceed twenty-five thousand dollars, to be paid out of the general fund upon the order of the State Forest Warden.

Section 6. It shall be the duty of each deputy and fire warden to take precautions to prevent the setting of forest fires, and when his district is suffering or threatened with fire, to go to the place of danger to control such fires, and each deputy and fire warden 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, such person shall be deemed guilty of a misdemeanor, and shall, upon conviction thereof, be punished by a fine of not more than one hundred dollars or imprisonment in the county jail not to exceed three months.

Section 7. The State Forest Warden, his deputies and the several fire wardens created by this act shall have authority, and it shall be their duty to enforce the provisions of this act, and to arrest, without warrant, every person found violating its provisions, and to take the offender before a magistrate and make complaint against him. Any person who hinders, obstructs or interferes with, or attempts to hinder, obstruct or interfere with any fire warden or other officer in the discharge of any of the duties required of him or them by this law shall be deemed guilty of a misdemeanor, and upon conviction therefor, shall be fined not less than ten nor more than fifty dollars, together with costs of suit, and in default of payment therefor shall be confined in the county jail until said fine and costs are paid, provided that said imprisonment shall not exceed thirty days. It shall be the duty of the deputy and fire wardens of any district to co-operate with the deputy and fire wardens of any adjoining district, and in the absence of the deputy of that district, the deputy of the adjoining district shall direct the work of control and extinguishment of fires.

Section 8. Each employee not serving under a contract for compensation fixed by the State Fire Warden shall receive for his actual services rendered under this act two dollars per day: 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 certified by the deputy in charge of the district and approved by the State Forest Warden, and when so certified and approved shall be forwarded with the original oath to the Auditor General, who shall audit the same and issue his warrant for payment thereof by the State Treasurer from the general or other proper fund available therefor.

Section 9. Any person who wilfully, negligently or carelessly sets on fire, or causes to be set on fire, any woods, grass lands 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 wilfully, 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 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, grass lands or other combustible material whereby the property of another is destroyed or life is endangered, shall be punished with a fine of not over five hundred dollars, or be imprisoned in the State prison for a term of not over ten years, or both such fine and imprisonment.

Section 10. Any person who shall kindle a fire on or dangerously near to forest, brush or grass lands, and leave it unquenched, or who shall fail to extinguish a camp fire before leaving it, 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, causing risk of accidental fire, shall be punished by a fine not exceeding one hundred dollars or imprisonment in the county jail not exceeding three months.

Fires for the purpose of clearing lands, disposing of brush, waste materials and the like, shall not be started or allowed to burn on any woodland territory within the operation of this act except with the consent of the fire warden or his deputy, in any year between the first day of April and the first day of July, nor between the first day of September and the first day of November; and during any other dry and dangerous season when forest fires are prevailing, or are liable to break out, the starting or maintenance of such fires shall be unlawful within such other dates as the Governor, on request of the State Forest Warden, shall officially proclaim or give public notice of. Any person who shall set, start or maintain any fire during a closed season in violation of the foregoing shall be deemed guilty of a misdemeanor and on conviction be fined not less than ten nor more than one hundred dollars, or imprisonment in the county jail not less than twenty nor more than sixty days, or both, in the discretion of the court. Any person who, between April 1 and December 1, shall set, start or maintain fires on his own or other lands for the above or other purposes, except for cooking food or warming the person, shall, before so doing, give one day's previous notice of intention thereof to the nearest fire warden or to the deputy in charge of the district, and of the exact place and time when such fires will be set or started, and in default shall be liable to arrest for failure to give such notice and shall be subject to a fine of five dollars or ten days in the county jail, or both for each offense; and also shall be liable, in case such fire shall be or spread beyond his own premises, to a fine of fifty dollars or to imprisonment in the county jail for thirty days or both; and in case of damage done to the property of another, shall be liable in a civil action for treble damages, in which suit, failure or omission to give notice as aforesaid shall be deemed to be negligence and sufficient basis for damages.

Section 11. Every person who shall wilfully deface, destroy or remove any warning placard posted under the requirements of this act shall be liable to a fine not exceeding one hundred dollars for each offense, or imprisonment in the county jail not exceeding three months.

Section 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 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 forest or other fires or 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 pass, and the operator shall by wire or telephone immediately notify the nearest fire warden or the deputy in charge of the district, or the State Forest Warden. 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 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 wilfully violating the requirements of this act shall be deemed guilty of a misdemeanor and be punished by a fine not exceeding one hundred dollars for each such offense, and railroad employes wilfully violating the requirements of this section shall be guilty of a misdemeanor and be punished by a fine of not less than five dollars nor more than fifty 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.

Section 13. It shall be the duty of each and every owner of threshing or other portable steam engine to have efficient spark arresters on such engine at all times when in use; and no person in charge of such 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 of not less than five dollars nor more than fifty dollars.

Section 14. Nothing in this act shall be construed as affecting any right of action for damages existing independently of this act. In addition to any penalties provided by the United States or the State, any person whose property is injured or destroyed by such fires, may recover, in a civil action, double the amount or damages suffered, if the fires occurred through wilfulness, malice or negligence. Persons or corporations causing fires in violation of this act shall be liable to the State in an action of assumpsit to the full amount of all damages done to State land and for all expenses incurred by the State fighting such fires.

Section 15. Woodland territory within the terms of this act shall be construed to mean forest, swamp, marsh, cut-over and brush land, and the term forest fire shall be deemed to extend to and include fires thereon.

Section 16. All monies received as penalties for violating the provisions of this act shall be paid into the State treasury and be credited to the general fund.

Section 17. The State Forest Warden shall annually, on or before

the first day of December, make a written report to the Governor, 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 deputies and wardens of the State, and from other sources, together with his suggestions relative to the preservation of the forests of the State and the prevention and extinguishment of forest fires.

Section 18. This act shall apply and be in force only within the territory within this State lying north of the north line of township twenty north.

Section 19. All acts and parts of acts inconsistent with this act are hereby repealed.

Proposed statute for concentrating the State's business and administrative interests connected with the public domain, forests, game and fish, and with the furnishing of protection from forest fire and trespass.

Section 1. There shall be a commission, to be known as the Public Domain Commission, to consist of five members, none of whom shall hold any other State office; two of the members to be appointed by the Governor from a list for each appointment of not less than five persons, to be submitted by the Board of Regents of the State University; two members to be selected in the same manner from a like list to be submitted by the State Board of Agriculture; and the other member to be selected and appointed by the Governor. The term of office of the members of the said commission shall be as follows: The term of office of the members first appointed on nomination of the said Board of Regents shall be one and three years, respectively; and that of the members first appointed on nomination of the State Board of Agriculture shall be two years and four years, respectively; and that of the member first selected and appointed by the Governor shall be five years; and the term of office of the successors, of all the said members, except when appointed to fill unexpired terms, shall be five years. Appointments to fill vacancies shall be for the unexpired term and all appointment of successors or to fill vacancies shall be made in manner above provided.

Section 2. Said commission shall have power and jurisdiction over, and have the management, control and disposition according to law of, the public lands; of forest reserves and forest interests; of all the interests of the State in connection with stream protection and control; of the protection of game and fish; and of forest fire protection. All matters within the jurisdiction, custody and control of the Commissioner of the State Land Office, of the State Game, Fish and Forestry Warden, and of the Michigan Forestry Commission, and all authority, power and discretion vested in either by law, are hereby transferred to, and vested in, the commission aforesaid, which is hereby created a body corporate. The members shall be reimbursed all their expenses, but shall not receive any compensation for time or services.

Section 3. The affairs of the State under control of the commission shall be managed through sub-departments under administrative heads, who shall be chosen by the commission, and perform such duties as shall be prescribed by law or by the commission. The duties and terms of

service of all officers and employes of the commission, or of any sub-department, and all salaries and compensation of employes and officers shall (except as prescribed by law) be subject to the direction of the commission.

Section 4. The State Game, Fish and Forestry Warden now in office shall continue therein and serve out the term for which he was appointed unless removed by the commission; but said office shall be a departmental office and under the commission as hereinbefore set forth, and its incumbent shall be designated State Forest Warden.

Section 5. The duties of the Commissioner of the State Land Office shall be as under the laws now or hereafter in force, but subject to the supervision, control and direction of the said commission, and such other duties as said commission shall from time to time require.

If the proposed new Constitution is adopted, substitute as section 5 the following:

The office of Commissioner of the State Land Office is hereby abolished upon the termination of the term of office of the present incumbent; but the commissioner now in office shall perform the duties of his office but as a sub-department head under the supervision, control and direction of the said commission. The duties of said commissioner shall, on the termination of the office, be performed by the chief clerk of the commission, to be appointed by the commission.

PROPOSED STATUTE FOR TEMPORARY WITHDRAWAL OF TAX HOMESTEAD AND STATE TAX LANDS WHILE THE RECOMMENDATIONS OF THE COMMISSION OF INQUIRY ARE UNDER CONSIDERATION BY THE LEGISLATURE.

All tax homestead land not heretofore disposed of is hereby withdrawn and reserved temporarily, until further direction, from entry, sale or disposition, except in fulfillment of existing contracts.

All State tax land is hereby reserved temporarily as aforesaid from sale or disposition; provided, however, any person claiming to be the owner of any such land by the original title, may pay the full amount of all delinquent taxes, together with all interest, charges and expenses, and on payment thereof receive from the Auditor General a discharge and acquittance of the land from the lien of the said taxes, and a release and cancellation of the right, title and interest of the State by virtue of the tax proceedings, but neither this provision nor the certificate of the Auditor General shall be held or deemed to vest in the owner of the original title any right, nor shall the payment aforesaid or the certificate of the Auditor General vest in any person, any title, right or interest based on the tax proceedings.

The Auditor General and Commissioner of the Land Office shall prepare forthwith a list or lists of the lands withdrawn and reserved as aforesaid and forthwith cause the same to be platted on a map or maps and submit the same for the information of the legislature .

