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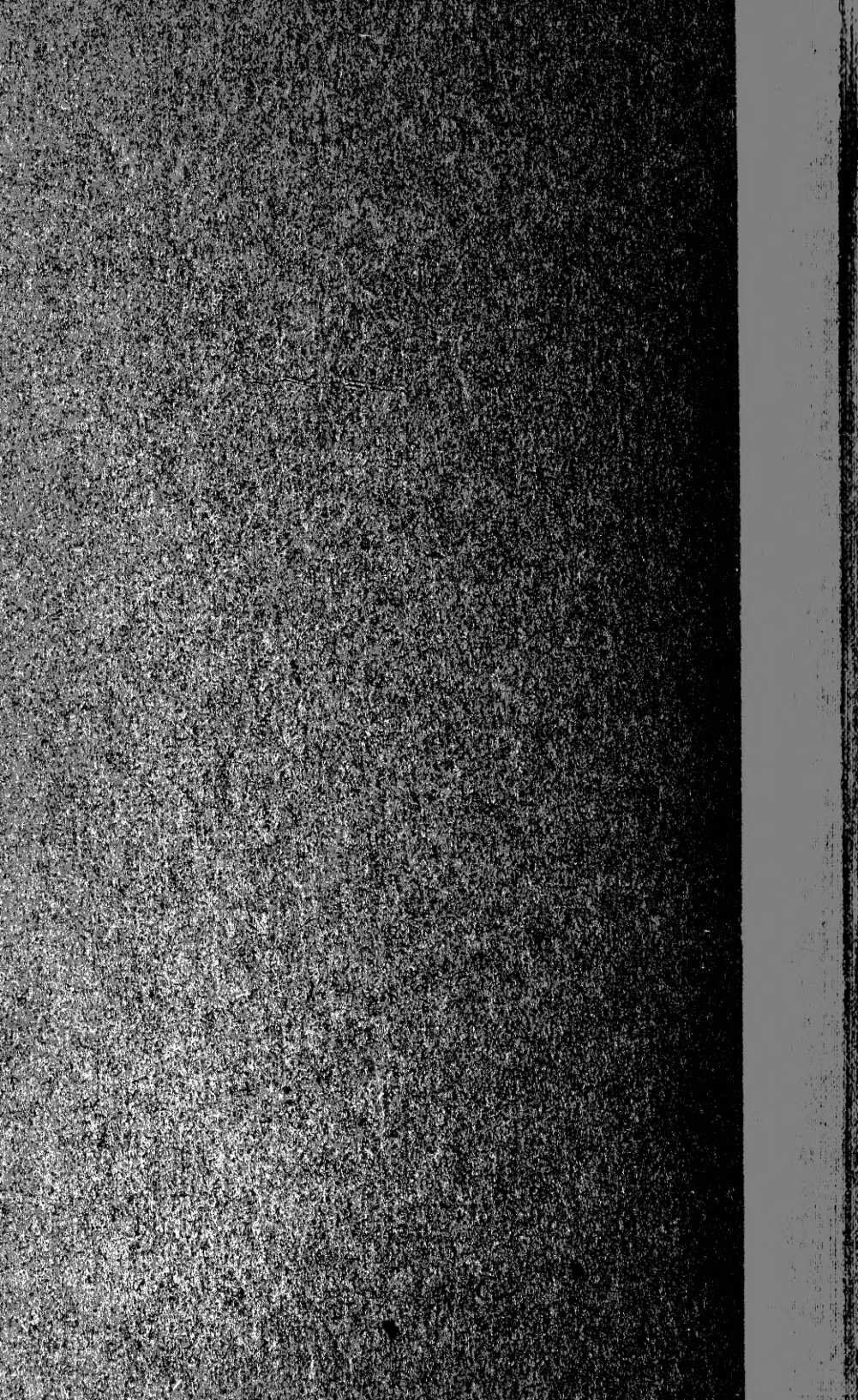
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REPORT

OF THE

Forestry Commission

OF THE

STATE OF WISCONSIN.

PUBLISHED BY AUTHORITY,



MADISON
DEMOCRAT PRINTING COMPANY, STATE PRINTER
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THE UNIVERSITY OF CHICAGO

PHYSICS DEPARTMENT

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REPORT OF THE FORESTRY COMMISSION.

To the Honorable, the Legislature of the State of Wisconsin:

The commission which was appointed by the governor, pursuant to chapter 229 of the laws of 1897, for the purposes defined in said statute, and which is composed of Geo. B. Burrows, H. C. Putnam and Ernest Bruncken, respectfully submit the following report:

The commission was organized on June 15, 1897, by the election of George B. Burrows as chairman and Ernest Bruncken as secretary. As it seemed imperative to the proper fulfillment of the objects of the commission to have a more definite knowledge than was then obtainable of the actual, present condition of the Wisconsin forests, an arrangement was made with the State Geological and Natural History Survey and the Forestry Division of the U. S. Department of Agriculture, for the making of such an inquiry. The result of that investigation may be found in the bulletin of the Geological Survey on "The Forest Resources of Northern Wisconsin," by Filibert Roth. The thanks of this commission are due to the gentlemen connected with the two institutions named, and particularly to Prof. Birge of the Geological Survey; Dr. B. E. Fernow, late chief of the U. S. Forestry Division; Prof. Filibert Roth, now of Cornell University, and Prof. L. S. Cheney of the State University, for the invaluable assistance thus rendered. The following report is in no small measure based on the data so ascertained.

GENERAL INTRODUCTION.

The meaning of the word forestry is still somewhat unfamiliar to many people in the United States, and to a misapprehension of its meaning may be ascribed a good deal of opposition encountered by the advocates of improved forestry methods. Many persons imagine it to be synonymous with arboriculture, or the planting and care of trees. In reality that is but a branch of the subject, and as far as Wisconsin is concerned, by no means one of the most important. Forestry is simply the management of lands grown with forests. Its object is to derive from such lands

the greatest possible profit for the owner. The interest of the state in forestry lies in part in the direct financial return it may obtain from forests owned by it; and in part in certain indirect benefits conferred on its people by the existence and rational exploitation of forests. Every owner of timber lands who carries on logging operations, or sells firewood or railway ties, is engaged in forestry. It is clear, therefore, that the introduction of improved forestry methods is of the greatest importance to the lumber industry and every other industry which gets its raw material from the forests, as well as to the people of the state at large. The plan advocated in the past, with more or less success, by well-meaning people, of reserving certain portions of natural forest as so-called "parks" and allowing them to remain unutilized wildernesses cannot be dignified by the name of rational forestry. The reasons which have most commonly been given for that policy have been of a sentimental nature. Its advocates have spoken of the beauty of the primeval woods and the good influence a temporary return to nature must have on persons overwrought by the extreme stress of modern civilization. But these benefits can be obtained equally well if not better by a forest which is made to serve the needs of the people in the way of lumber and other sylvatic products. Moreover, an uncared-for forest surrounded by a populous community is sure to fall a victim to fire and become practically a desert in the course of a few decades. The reservation plan, therefore, is inefficient and wasteful. It must give way to a more economical and business-like policy.

Forestry is merely a particular form of agriculture. Where one has the choice of growing on a given tract of land grain and the ordinary farm products, or timber of any kind, the principal question should be simply: Which will pay best, considering all the circumstances of the case? Where a state has large tracts of forest land, which may either be converted into agricultural land or remain forest, it also should propound to itself the question: How can the greatest possible amount of wealth be derived from these lands, having regard to long periods of time and all the surrounding conditions? If the answer is: By turning these lands into farms, then the policy of the state should be to encourage that result. If the answer is: By preserving and properly managing the forests growing on them, then the state should pass such laws as will help to accomplish that object.

Wisconsin has in its unsettled portions many thousand acres of fertile lands which can without doubt be put to no better use than to get them into the possession of industrious settlers under as easy conditions as possible, who will soon make for them-

selves farms and become a prosperous, intelligent and contented community. They may be safely trusted to retain on their homesteads enough of the forest now covering the land, for the purposes of a farming region, just as the farmers of the southern part of the state are doing. But there are also in this state large tracts where the returns which could fairly be expected from farming operations are disproportionate to the labor and capital required to wring a crop from the inferior soil. Yet these same lands, so uninviting to the husbandman, have in the past borne magnificent crops of pine and other timber, and there is no reason to doubt that they would, under proper care, produce in the future other crops of timber still more magnificent. It will be the part of wisdom, therefore, for the state to adopt a policy which will encourage the use of such lands for the purpose of raising timber crops rather than agricultural crops proper.

There are other reasons which should prompt a wise government to take steps looking towards the maintenance and management of an adequate area as forest. In the first place, the various industries deriving their raw material from the existing forests are by far the most important economic interest of Wisconsin, except agriculture. According to the state census of 1895, the aggregate value of the lumber and wood manufacturing industries of Wisconsin was \$58,971,000. This does not include the value of the pulpwood used in our paper mills; of charcoal and allied materials; of the enormous number of railroad ties, telegraph poles, fence posts and similar products of the forest; nor the value of the tanbark derived from our hemlock groves, or any of the minor products of our forest industries. If this vast industry should disappear on account of the disappearance of the forests, it would work nothing short of an economic revolution in the state. Many thousands of men who now derive their support from work in the mills and factories would find their occupation gone, and while a few would undoubtedly become farmers, the great majority of them would leave for other states. What effect such a loss of population would have on the prosperity of the whole state it is needless to picture.

Again, the influence of the removal of forests on water-flow and climate is one of the most important reasons why the state should pass laws calculated to preserve a reasonable area of land under forest cover. This phase of the subject is adequately treated in the report on the forest conditions of Northern Wisconsin, mentioned above, and it is superfluous to dwell again on the subject in this place.

An economic consideration of no small importance is the effect

a destruction of forests will have on the steadily growing business of entertaining summer residents and tourists. Hundreds of thousands of dollars are now spent every year in this state by travelers from other sections. But what attracts these people is our lakes and forests. The former are to no small degree dependent for their beauty and their very existence on the latter. With the removal of the forest, this source of income, which ought to grow from year to year, would be lost to our people.

Finally, it should not be forgotten that the question of forest preservation is one of guarding our people against a heavy burden of taxation. The sale of forest lands has in the past produced a large revenue to the state treasury. That source of revenue must, in the nature of things, soon disappear. But the experience of other countries has shown that forests, owned and managed by the state, can be made to contribute greatly to the public revenues. Ought not a wise legislation to consider whether Wisconsin cannot in the future derive such a revenue from its forests in order to help to bear the necessary expenses of the government, which will otherwise have to be met by taxing the people?

Taking it for admitted that it is worth while to pass laws on the subject of forestry, we will now discuss the question as to what measures should be taken by the state in this matter. The first question to be considered will be that of fire protection; then will come the question of the relative advantages of public and private ownership of forests; and finally the consideration of practicable steps for the fostering of either system of management.

FOREST FIRES.

Without some effective system of protection against forest fires, there is no hope of placing the forest industries of Wisconsin on a stable basis. This matter is of more urgent necessity than anything else connected with the subject. The enormous injury done to the forests of the state by fire is fully set forth in the report on Forest Conditions. But the tale there told refers only to the material in the forests themselves. It says nothing of the homesteads, villages and cities destroyed, nor of the untold misery caused by the destruction of human life in such appalling disasters as the Phillips fire, which is still fresh in the memory of the people, or the horrible occurrences at Turtle Lake, Cumberland and elsewhere, during the fall of 1898.

The prevention of forest fires is clearly as much a duty of the public authorities as the prevention and extinguishment of fires in cities. If the expenditure of money for that purpose is necessary, the people will not grudge it any more than they refuse to be taxed for the maintenance of fire departments in cities. If it is found that the expense of guarding against fires is too great for the slender means of the towns and counties in the forest districts, it is but fair that the state at large should contribute, for the whole state will be benefited by the result.

For some years there has been on our statute books a law designed to establish a forest and marsh fire police, and there is no doubt that much good has been accomplished by its administration. The way in which it has worked, together with many wise suggestions as to its improvement, will be found in the biennial report of the state forest warden, Mr. Egbert Wyman. There is consequently no need, in further legislation, to depart from the direction already taken. All that is required is a further development of the measures already adopted.

The amendments so required, in the opinion of this commission, are as follows:

1. There should be an adequate machinery for the supervision of the local fire wardens. This supervision is now entrusted to the chief clerk of the land office, who may appoint one clerk in said office as his deputy. These two officials have important other duties to perform which keep them in Madison. They cannot possibly devote much of their time to work in the field. There is consequently no means of seeing to it that the local wardens do their duty. It stands to reason that a warden who through incapacity or negligence fails to see that fires in his district are prevented or extinguished as far as possible, is as bad if not worse than no warden at all.

2. The officials appointed to supervise the local wardens should have power themselves to begin proceedings against violators of the fire laws, and it should be the duty of the district attorneys to prosecute such cases whenever called upon. At present is left to the discretion of district attorneys whether they will prosecute or not.

3. Local wardens should be encouraged to enforce the penal clauses of the fire law by being given one-half of the fines imposed after conviction through their instrumentality.

4. It is not fair that the towns in which fires occur should bear the whole expense of the fire police. The prevention of forest fires is a matter which is of the utmost importance to the whole state, as well as to the immediate neighborhood. The

towns in which forest fires are most likely to do damage are mostly among those least able to expend money for their prevention and extinguishment. It would be both fair and prudent, if the state cares to have forest fires prevented, to have the towns reimbursed by the state for one-half of all expenses incurred under the forest fire law. The fact that all such bills must first be audited and allowed by the town boards will be a guarantee against excessive and fraudulent claims, as the town supervisors will presumably have means of ascertaining the facts which state officials at a distance might often lack.

The exact manner in which these improvements of the fire law can be effected will be discussed below in the detailed comment on the bill accompanying this report. But a few words should be added here as to what may and what may not be reasonably expected in the way of preventing this arch-enemy of Wisconsin forests. It would be too much to hope for an entire disappearance of destructive forest fires in the near future. That goal cannot approximately be reached until the entire forest area of the state has been brought into a condition of cultivation such as is known in the forests of Prussia and Saxony. As long as lumbering operations leave a mass of uncared for debris; as long as there are hundreds of square miles with practically no roads; and as long as hunters and woodsmen are careless in leaving camp fires unguarded at a distance of miles from the nearest settlement, so long there will be forest fires. On the other hand, it is unworthy of the prudence and energy of the American people to submit to the annual infliction of such a calamity with the stolidity of Turks, as if they were unavoidable like earthquakes. It should not be forgotten that practically every forest fire is the result of the culpable negligence, or worse, of some individual. Moreover, every forest fire has a very small beginning and can at first easily be put out. A community which allows the smoke of small fires to arise for days at a time, during a dry season, without taking steps to extinguish them, has only itself to blame if finally it is overtaken by such frightful disasters as the Phillips fire of 1894, or the fires of the fall of 1898.

The occurrences in Barron County during the latter season, when hundreds of settlers lost all they had, and still greater calamities were with difficulty averted, has called public attention to this matter of forest fires with renewed force. The charity of the people of the state has not failed to attempt an alleviation of the suffering. The power of the state has been called in for the same purpose, and properly so. But would it not be more humane, more prudent, and at the same time more economical, if

the state took the necessary steps to prevent the recurrence of such things? Even when one looks at the matter simply from the lowest standpoint of dollars and cents, it is plain that the people of the stricken community as well as the state at large would be much better off if they spent a few hundred dollars annually for the proper policing of the threatened districts. The damage done by the fires of last autumn is not confined to the immediate destruction of property and the injury done to the soil. Far more serious is the injury arising from the set-back which the settlement and development of every locality must receive in which such disasters threaten the new-comer. To fail in doing everything possible to remedy this evil, even at much greater expense than will actually be necessary, would justly expose the representatives of the people to the charge of having flagrantly neglected the duties with which they are entrusted.

The ultimate object of every effective fire law must be to make it impossible for any fire to get a start anywhere without coming at once under the observation of some one who will make it his business to put it out or to notify immediately the nearest fire warden who will attend to its extinguishment. To accomplish this end it is necessary not only to appoint a large number of local fire wardens, but above all to foster the development of a public opinion among the people of the forest districts, which will frown upon negligence in the handling of fire in the woods as a disgraceful crime. Every means should be used to create such a public opinion where it does not now exist, and to this end the school, the press, the pulpit and every other possible agency should be used.

With these principles firmly held in view there is every reason to believe that legislation can be so shaped that forest fires will soon be a rare event among the mature timber, and will be the exception and not as now the rule, in areas of new growth. With such a condition of things, any money or effort spent on the permanent cultivation of forests will be a business-like proposition, sure to benefit the people by feeding its industries, and reasonably certain to yield a direct pecuniary return upon the investment.

PRIVATE AND PUBLIC MANAGEMENT OF FORESTS.

Apart from questions of climate and water flow the interest which the state has in the forests contained within its area is of

a twofold nature. In the first place, they may be considered as a source of public revenue; in the second place, they are of importance as one of the most important sources of the wealth of the people. A revenue may be obtained from the forests by taxing them as other property is taxed. Or the state may own forests and manage them for profit as a private owner of forest lands would. Important as forests are considered as sources of revenue to the state, this consideration is greatly overshadowed in the case of Wisconsin, by their importance as the foundation of industries and the producers of certain necessities of civilized life.

From whichever side, however, the question is approached, the state, in framing its policy, must solve the question whether it is of greater advantage if the forests are owned by the state and its subdivisions; or by private corporations and individuals, or whether a mixed system is the best. It has not, heretofore, been the policy of the state to hold forest lands permanently, let alone to go into the business of managing them for profit. Any departure from the present policy must justify itself by showing that the permanent maintenance of forests is not likely to be accomplished if left entirely to private interests. To show merely that state ownership would produce a revenue is not sufficient. For there might be many reasons why one would rather raise such revenues in a different manner. But the protection of the wealth and industry of the people is the foremost consideration, and if that can be assured only by state management, then state management should be adopted, no matter how radical a departure from precedent such a policy might appear.

PRIVATE OWNERSHIP.

Forests will be maintained by private individuals and associations on one condition only. They must see a fair prospect for a reasonable profit on the capital invested in them. It is true that a few scattered tracts may be kept here and there by wealthy persons or clubs for the purposes of pleasure grounds or game preserves. But such tracts would be too small in their aggregate extent to rely upon for the forests of which the people of the state stand in need. The main question, then, to be considered in this connection is: Have we any assurance that forestry in Wisconsin, aside from lumbering in the manner now prevailing, will be so profitable in the near future as to attract investors?

Wood crops are of slow growth; the age at which it is most profitable to cut down a tract of forest is under ordinary circumstances the time when the value of the annual increase of timber equals the interest on the investment, together with the cost of management. If the cutting is delayed longer, the progressive decay of the trees which have gone beyond their full maturity decreases the value of the annual increase to a figure below the annual cost, and the owners lose instead of gaining every year. If the cutting takes place earlier, the full amount of timber which might be realized from the tract is not harvested. Now this age, for white pine, is in the neighborhood of a hundred years, for most of the other valuable timber trees, a similarly high one, and only a few species of inferior quality have a materially shorter period within which to reach maturity. It is true that the final cut is not the only revenue which the forest yields. At intervals during the period of growth, much valuable material may be removed from it by thinnings and improvement cuttings, and under favorable conditions there may be a revenue from certain by-products, as berries, game, etc. But all this will never amount to a very considerable pecuniary yield.

Under these conditions a forest owner cannot expect a regular annual profit out of his investment, unless he has tracts of timber in all stages of maturity, from the seedling to the tree ripe for the axe, so that he may cut and market sufficient material every year to yield a profit on the whole investment. It is clear therefore that forestry, as a business by itself, must be conducted on a very large scale in order to be profitable. In Wisconsin, where there are now practically no cultivated forests, a private owner would have to possess so large an amount of land covered with the original forest, that he could divide it up into a hundred lots, each large enough to yield timber sufficient to pay a profit on the whole investment, less so much material as could be culled from the other lots, and yet leave their yield large enough when their respective time for cutting arrived.

Such ideal conditions are unattainable. In the vast majority of cases a private owner in Wisconsin, who wishes to make his forests permanently profitable, will find himself obliged, after he has removed the merchantable timber originally found, to wait a more or less prolonged period before he can expect additional revenue. If he owns, as most men do, lands which are entirely denuded of timber, only his children or grandchildren will see a new final harvest. The final yield may be amply sufficient to pay for the costs of management, together with the accrued interest on the capital invested. But a man cannot live

on profits which will not flow into his pockets until fifty or a hundred years from now. It is very unlikely, therefore, that any investors will undertake the task of caring for the denuded lands in Wisconsin, while the tedious process of restocking them is going on. Here and there a large corporation may see its way clear to take up such an enterprise, and occasionally an individual man of wealth may sink some of his fortune in restocking limited areas for the benefit of his descendants. But the greater portion of denuded lands will no doubt be left by their owners to grow up into useless brushlands, as has been the custom heretofore.

Nor is there any reason to believe that the pine lands still stocked with merchantable timber, as far as they are in private hands, will be treated differently, in the future, from the methods now prevailing. The dread of destruction by fire, as well as the growing scarcity of pine, and the burden of taxation, will cause lumbermen to cut trees of every size that will make a merchantable log, long before they have reached their maturity. The exigencies of the lumber business, as now conducted everywhere in this country, demand that the largest possible amount of cash be realized immediately from any given tract of timber land. Wisconsin lumber concerns would be quite unable to compete with those of other states if they pursued a different policy.

Even in those countries where lumbering is usually done with due regard to the reproduction of the crop, private owners constantly succumb to the temptation of converting growing forests into cash by premature cutting. Financial embarrassments or the hope of investing the proceeds in enterprises which promise higher profits than forestry, are sufficient to make them forget the interests of the community or future generations. It is therefore the policy of most of these countries, notably the German states and France, to gradually do away with private forests, and large sums are annually expended by these governments to add by the purchase of private lands to the already extensive area of state forests.

There is one class of forest lands to which the considerations above detailed do not apply. Farmers in all parts of the state follow the wise custom of maintaining "timber lots" for the supply of firewood, fencing materials, and similar uses. Unfortunately these tracts are often treated in so unskillful a manner that they constantly deteriorate. The best trees are culled out year after year, and no care is taken for their reproduction, so that after a while only runts and worthless species remain.

Moreover, very often no regard is had for the maintenance of a proper soil cover and windmantle, so that the soil becomes progressively less fertile. It is clearly the duty of the state to aid farmers in obtaining the necessary information for the management of these valuable portions of agricultural holdings, just as information on other subjects is spread by means of the Agricultural Experiment Station, Farmers' Institutes, etc. Furthermore, large quantities of excellent hardwood lumber, suitable for manufacturing purposes, are annually wasted as firewood for the lack of a market. The few trees of this kind, annually cut in a given farming region, are not in the aggregate sufficient to warrant the erection of a saw mill in the neighborhood. If there were a sufficient tract of forest land, apart from the farm timber lots, in the vicinity to supply the required amount of material to a mill, the farmers would share in the market so provided, and be able to dispose of some of their timber at profitable prices. So it appears that even aside from climatic considerations the settlers who are now turning a portion of the forest lands in the northern part of the state into farms are directly interested in keeping another portion permanently under forest cover.

Leaving out of account these farm timber lots, which by themselves are utterly inadequate to provide the extent of forest needed in Wisconsin, there is very little prospect of private capital being attracted into forestry as a business. If the state is to possess forests and lumber industries in the future, it must rely principally on public action. The state must gradually and with as little of a burden on the taxpayers as possible acquire a sufficient extent of forest area. Next it must establish the necessary machinery to protect, supervise and manage these forests on business principles. This machinery should be very simple in its incipiency, but so arranged that it can easily be extended as the need for it arises and the financial condition of the department warrants. In this way the state will be enabled to furnish to the lumbering and other industries which draw their raw material from forests a permanent supply. Private capital will feel secure in investing in enterprises which need not be afraid of having their raw material run out, while the people will find their taxes materially reduced by the revenues the state will derive from its forests. This is the condition of things existing in most countries of Europe, as well as in British India and other lands where a business-like forestry policy has been adopted.

This leads us naturally to a consideration of the public lands still existing in the state of Wisconsin.

PUBLIC LANDS.

According to the data furnished this commission by the land office there were on the 1st day of September, 1898, 364,000 acres of state land remaining unsold. Nearly all of this land is covered with forest and but a small proportion is reasonably fit for agriculture, although a considerable amount might be made so by proper drainage. Most of these tracts are rather scattered, it being a comparatively rare thing to find a considerable number of forties in a contiguous tract.

By far the greater part of these lands were obtained by the state under the swamp land act of 1850 and much of it is actual swamp. There are some school lands left, but very little university and agricultural college land. There is also a moderate amount of indemnity land. In addition there are in the state, outside of Indian reservations, nearly 500,000 acres of government land, subject to entry under the homestead law.

Heretofore it has been the policy of the state to dispose of its lands as fast as possible. As long as there was no provision made for the proper care of the forests covering most of these tracts, that was undoubtedly the wisest plan, for without such care the standing timber was sure to become a prey to fire and windfalls, without any benefit to the state. But if it is decided that there shall be in the future state forests properly cared for and protected, it would evidently be absurd to sell the small remnant of forest land still belonging to the people and afterwards purchasing new lands which have already been deprived of their merchantable timber and cannot furnish a revenue for a long series of years. Very little of these state lands will be purchased by actual settlers for agricultural purposes. The buyers will be lumbermen who will remove the merchantable timber and leave the denuded lands to become useless wastes, as so many thousands of acres of similar land have already been left. The proceeds of the sale of these lands are paid to the school and normal funds, and in part to the counties within the limits of which they are situated. Over the school lands the legislature has no control. The land commissioners, however, may withhold such lands from sale whenever they shall deem it expedient. (Const., Art. X, Sec. 8.) Over the lands granted by the act of 1850, the legislature has practically unlimited control. This has been established by a long line of decisions in both the state and federal courts. The legislature has acted accordingly by devoting one-half of these lands to the support of the normal

schools, while the other half is given to the respective counties. It would be obviously unwise to deprive these beneficiaries of the revenues to be derived from these lands. But if one considers that most of them are now sold for less than their fair value, and certainly for much less than they will be worth in the future, it is evident that the beneficiaries would be the gainers if the sale were stopped entirely for the present. The pine and other merchantable timber on these lands is in such condition that good business policy demands its removal just as soon as feasible with due regard to transportation and marketing facilities. In all the mature woods the annual increase of material is about balanced by the annual decay. But under the conditions now prevailing in the state, fire, windfalls and the consequent damage by insects, destroy so much good timber every year that the loss cannot be approximately made up by the annual increase through natural growth. Consequently the state forests are suffering a constant deterioration. This process can be stopped in no way save by the removal, as soon as practicable, of the dead and down timber and such standing pine, at least, as is in danger of destruction. The rational and business-like way of procedure would be to sell the timber which is to be removed without parting with the land. The logging should be done by the purchasers under the supervision of the state and with due regard to the reproduction of the timber by leaving a sufficient number of seed trees and guarding against fire. The proceeds of the timber sales should be paid over to the proper beneficiaries, and it is not unreasonable to expect that the latter would realize in this manner as large amounts as they now obtain from the sale of the fee. The lands, however, would remain the property of the state, and if properly cared for would in time produce a new revenue, far greater than the first.

The objection is sometimes raised to the maintenance of large tracts of public lands within a county that the development of the region is thereby retarded, and that the county loses the taxes which the land would yield if held by private parties. It needs no very complicated chain of reasoning to show that these objections are ill-founded and short-sighted. The development of all our northern counties has heretofore been based far more on the lumber industry than on farming. In all those districts where the soil is inferior this will continue to be the case. Even in the hardwood districts, where the soil is well adapted to agriculture, the disappearance of the forest industries would be a serious calamity. There are now dozens of cities and villages where the inhabitants have begun to wonder what will become of

them when the timber is gone and the mills close down. Everybody has seen settlements very prosperous ten years ago, which are now abandoned by almost all their former inhabitants. The lands which it is proposed to keep permanently in the hands of the state are of the kind which do not attract the agricultural settler. After the timber growing on them has been cut they will, if left to themselves, become wastes, and what will then be the fate of the villages situated in their midst? They will have neither the industries depending on the forests, nor the trade derived from a prospering farming country. Real estate and improvements will lose their value, and the inhabitants will have to move to regions where the people have better business sense. So it is clear that every measure which tends to put the forest industries on a permanent footing is of the highest benefit and absolutely essential to the continuous development of every county which has within it tracts of non-agricultural lands.

The objection based upon the supposed necessity of taxing these lands is equally short-sighted. Pine lands are productive of taxes only as long as merchantable timber is standing on them. Experience has shown that many owners of pine lands will not pay taxes on them after the timber is cut. Even if they did, the value of cut-over lands is so small that the revenue produced is hardly worth counting. On the other hand, a considerable tract of land, held by the state, properly guarded and managed as a forest should be, will produce a continuous revenue, part of which will in many cases go directly to the county. In addition the forest will, directly and indirectly, give employment to a large number of people who will pay taxes on property accumulated by them, so that in the end the county and town treasuries will receive much larger sums than they ever will under the present system.

If the sale of state lands is stopped entirely for the present it follows by no means that not another forty of state land should ever be sold. After a proper forestry administration has been established, one of its first duties will naturally be to examine the precise conditions of every part of the public domain. If it be found that any particular tract by reason of soil, condition or location, would be more economically used as a farm than as a forest, there is no reason why it should not be sold by the state.

The lands owned by the government are somewhat larger in extent than those of the state. They are substantially of the same character as the state lands. The greater portion of them will never be required by actual settlers for farming purposes. In the meantime the timber growing on them is liable to the

same process of deterioration and destruction as that on the state lands. It would obviously be desirable that the state obtain title to these lands so that they could be treated in the same manner as the state lands now owned by it. It seems reasonable to hope that Congress, if it sees that the state is prepared to manage these lands in a way which will preserve and improve the forests growing thereon, will prefer to cede them rather than have them remain useless. Every effort should therefore be made by the people of the state and its representatives at the seat of the federal government, to obtain for the state title to the government lands within her borders.

The combined areas of the government and present state lands would be a sufficient nucleus for a system of state forests. They would by no means be large enough for all future times, but they would be a good beginning.

THE DENUDED LANDS.

By far the most difficult part of the forest problem in Wisconsin is the question as to what shall be done with those large tracts now existing which have been denuded of the pine formerly growing on them, and now lie idle, subject to the ravages of the fire. The present condition of these tracts and their prospects for the future are ably treated in the Report on Forest Conditions. It appears that in their present uncared-for situation they are liable to a progressive deterioration of the soil. That most of them are capable, however, of restocking themselves with pine without expensive silvicultural operations, provided fires are kept out, is just as certain. Some parts of these lands, of considerable extent in the aggregate, but small in proportion to the whole area, have already begun to restock themselves in this manner. The opinion which formerly widely prevailed, that white pine did not reproduce itself on areas where it has been cut off, but gave way to poplar and other inferior species, has been proven erroneous by observations both in this state and elsewhere.

While it is perfectly feasible to restock these lands with pine, it is quite as undeniably true that the bulk of them will not be so restocked as long as they are left to themselves. If no steps are taken towards a proper care these millions of acres will become wildernesses of scrub, covered according to circumstances with crippled aspen, runts of jack pine, dwarf oak, or even merely coarse grass and sweet fern. That condition they will remain in

for an indefinite period. This is no mere assumption, but precisely what has happened in other states where similar conditions have prevailed. In all parts of the East, from Massachusetts to the Carolinas, immense tracts exist which formerly were covered with heavy timber. The forests were cut and the lands left to themselves in the same improvident manner which we have heretofore followed. Now these tracts, although they are still called woodlands, do not produce a single stick of saw timber, nor even firewood, that could be sold at a reasonable price per cord. This condition has existed in some cases for a hundred years and there is not the slightest prospect for improvement. These lands might as well not exist as far as the prosperity of the community is concerned in which they are situated. Similar tracts can be seen within ten miles of Chicago.

Some people may think that these cut-over lands will in time become of agricultural importance. They cite the fact that here and there a settler makes his home in such places, because he can buy the land for almost nothing, or because he has been misled by ignorance and inexperience. By taking advantage of every depression, where the wash from the adjacent slopes may have improved the soil a little, he manages to raise a pitiable crop. But what can such isolated attempts amount to when the entire area of this character comes into play? On other tracts with slightly better soil it may be possible to raise potatoes with profit. But the prosperity of a whole community cannot be based on a single crop. If lands of this character had any prospects of agricultural use one would think that the large sandy tracts along the Wisconsin river, in Adams and other counties which have long been settled, would not remain idle as they do. Moreover, the settlers on such lands, as far as there are any, are usually immigrants who bring from their native countries very low standards of living. By dint of having very few needs as compared with farmers of native American, German, British or Scandinavian nationality, they manage to make a living where those others would starve. But they remain miserably poor all their lives, ignorant and unambitious. It certainly cannot be in the interest of the state of Wisconsin to people large portions of its territory with "crackers."

There is consequently no prospect that our denuded lands will be put to agricultural uses. The only way, therefore, in which they can be made useful is to restock them with the timber which formerly covered them and for which they are peculiarly adapted. But we have already seen that it is improbable that any considerable number of private parties will find it profitable to take the steps which are necessary to reach this end. Yet most

of these lands are owned by private parties, principally the lumbering concerns which have cut the pine. It seems therefore that it would be necessary for the state to first obtain title to these lands.

Other states, notably New York and Pennsylvania, have within a few years appropriated very large amounts of money for the purchase of lands on which state forests are to be maintained. Wisconsin is hardly in a position, at present, to take a similar step. As these lands may, with proper management, be made to pay some revenue in thirty years, it would be simplest to purchase them with scrip payable after thirty years. The lands would then practically pay for themselves. Unfortunately the state constitution prohibits the incurring of a state debt for such a purpose. It might be feasible, however, to authorize the counties to purchase lands for scrip of this character. The lands so purchased by the counties might be managed under the supervision of the state and the net revenues credited to the counties. The commission has not deemed it expedient to insert in the bill submitted provisions for dealing with this branch of the subject. It has been thought better to establish at first the necessary machinery to begin a systematic protection and management of the forests. The disposition to be made of the cut-over lands may be left to a succeeding legislature. There are many different interests to be consulted, and a few years of actual experience in state forestry management may suggest a better plan of handling the subject than could now be devised.

At the same time, some portions of the cut-over lands are in such condition as to be dealt with more easily. Over 250,000 acres are held by counties on tax deeds; considerably more than this is incumbered with outstanding tax certificates held by the counties. There is no reason to expect that any appreciable amount of these certificates will ever be redeemed. The owners have simply abandoned these lands as worthless after taking off the pine timber. The present policy of the counties is to rid themselves of the lands so held at any price whatsoever. Large tracts are often sold at a nominal price. The revenue so obtained is so exceedingly small, that it need hardly be taken into consideration. Even after the lands are sold the assessed value is so low that the annual tax derived from them is almost nothing. If these tracts, on the other hand, were held permanently by the counties and properly cared for they would soon become of value. After twenty-five or thirty years they would be productive of some revenue, enough to make up for the small loss in taxes, and after a somewhat longer period they might in some cases be sufficient to pay from their annual revenue the greater

part of the county expenses. In the meantime they would furnish employment to numerous people and greatly enhance the prosperity of the whole community. It is therefore eminently proper to authorize counties to hold such lands permanently and provide for their management in conjunction with the state forests.

It has been intimated to the commissioners by several large owners of cut-over pine lands that they would be willing to cede considerable tracts of this character to the state provided the latter would take steps to restock them. The state ought certainly not to refuse such generous offers, and provision is made in the bill herewith submitted for the acceptance of such gifts.

METHODS OF MANAGEMENT.

It will be a long time before the forests of Wisconsin will be in the high state of productiveness which prevails in the forests of Germany or France. This is not so much, as is imagined by some people, on account of lower cost of production or higher prices of lumber in the old countries. The lower wages of Europe are about counterbalanced by the greater effectiveness of American, highly paid labor, aided by improved tools and implements which Yankee ingenuity never fails to devise. On the other hand the prices of lumber are pretty nearly the same in this country and Europe. There is no reason why an American forest could not with profit to the owner be brought into as high a state of cultivation, produce as much lumber to the acre and be as thoroughly protected as a Prussian state forest. It is all a question of time and the judicious application of capital. If this state had unlimited funds at its disposal every acre of forest land could at once be treated in such a way that there would be no question of the final profitableness of the enterprise. But it would require time to do so. Roads would have to be built; working plans made; large tracts would have to be planted with seedlings, and elsewhere the natural growth of trees would have to be supplemented by planting and seeding. As funds to undertake such wholesale operations are not to be had, the state must do the best it can with the means available. It will simply depend on the amount of capital which you may be willing to invest in the enterprise, how long it will take until the natural forest, with its low productiveness, shall everywhere be replaced by the cultivated forest which yields an incomparably larger amount of lumber to the acre.

As this subject is still a new one to the people and there will

be a natural reluctance to expend large amounts of money on what to many may seem an experiment, the commission has thought best to recommend a very small beginning. It would obviously be uneconomical to do less than is required to prevent a further loss to the state by fire and other deteriorating influences. Moreover it will be necessary, under any system of management, to first of all obtain the necessary data regarding the natural and economic conditions of each future forest tract, so that an intelligent and business-like plan for its treatment can be devised. It will also be necessary to institute a series of investigations and experiments with regard to the life conditions of forest trees, for the experiences had in foreign countries or other states of the Union do not invariably admit of direct application under our conditions. Finally it would be desirable for some time to come to devote some effort to the spread of information regarding forestry matters among the people.

After a beginning has been made in this way, the time will come for more detailed treatment of the various portions of the forest area. It will very likely be found expedient to divide the whole into districts and place a forester at the head of each. The duty of such an official it will then be first of all to make a plan for the manner of work in his territory. This plan must be based on the most careful consideration of the topographical and soil conditions of the district; on the nature of the trees which it is intended to grow thereon; the cost of the various operations required; the facilities for the transportation of the forest products; the circumstances of the markets; and a multitude of other things which will have a bearing on the success of the undertaking as a business enterprise. This making of a working plan is the most difficult and important part of the whole forestry business. As it requires a long period of years before the produce of a forest can be marketed a mistake made at the beginning can in many cases never be rectified and may doom a whole district to unprofitableness.

The ideal goal to be reached in all forestry enterprises is to make every part of the forest area yield a profit, without reducing the capacity for repeating the operation. The profit must be computed on the whole investment, in which is to be included: The rental value of the land; the interest on capital invested in permanent plant; cost of supplies and labor, together with interest on the capital expended for these purposes; charges of depreciation in permanent plant; cost of administration; and possibly other items dependent on the particular circumstances of each case. (In the case of private ownership taxes must be added.)

Where very large tracts of forest are managed together, as

will be the case in the future state forests of Wisconsin, it will undoubtedly be found that there are some parts of the entire system which cannot be made to yield a profit, on account of poor natural conditions or bad marketing facilities. In such cases it is sufficient if the entire system is made to show a profit. The unprofitable tracts must be carried along with as little outlay as possible, and may at least be made to yield some revenue. It would be good policy for the state to maintain a system of forests even if it had to run every part of it at a loss. For it needs forests in order to keep its climate from deteriorating and to maintain the prosperity of its people. But there is no reason to doubt that forest management in Wisconsin will yield a reasonable profit.

After the making of the working plan for each district will come the actual work of improving the forest. The natural growth of the trees which it is decided to raise is fostered by all the means of the forester's art, while the undesirable species are gradually got rid of and their new growth prevented. Wherever advisable, the natural re-forestation is aided by planting or seeding; as time progresses, improvement cuttings are made, and a partial revenue obtained. In the meantime roads are built, and gradually everything is brought into readiness for the final harvest. This takes place at different times in different portions of the district, so that after a while the district will contain lots stocked with trees of all stages of growth and a portion become ripe for marketing every year.

These stages in the development of a forestry system cannot be reached in Wisconsin for many years, and it is not necessary to provide the needed administrative machinery at the present time. For the tasks which will be the first to be performed and which have been enumerated above, the bill submitted by the commission contains the following plan:

THE FORESTRY DEPARTMENT.

There is no reason why the number of administrative boards should be increased. The attorney general, state treasurer and secretary of state, who now perform the same functions for the land office, may just as well constitute the supervising and auditing authorities of the forestry department. This will save the expense connected with the work even of unpaid commissions. The bill, therefore, provides for the appointment of a Superintendent of Forests by the officials named, who shall be the responsible head of the department, subject, however, to the finan-

cial control of the board composed of those officers. The success and efficiency of the department will depend principally on the qualifications of the superintendent, who should be a man of executive ability, and sufficiently interested in the work to familiarize himself with all its details as they gradually develop. In order to obtain such a man it is necessary to offer a fair salary, and to make the incumbent feel secure enough in his position to make it worth his while to put in his best efforts. For this reason the bill makes the term of the superintendent a long one, and one that overlaps with the terms of the elective state officers. A change in the office of superintendent every two years, according to the exigencies of party politics, would be fatal to the whole enterprise. Such a system may do well enough in offices the routine of which is established and has only to be followed by the new incumbent. But in the proposed forestry department everything must first be created. Methods, routine, precedents; and this formative period will extend over a long series of years.

The subordinate officials ought to be appointed by the head of the department. There need be but few of these at the start. A deputy and a clerk or two is all that will be required at first, in addition to the local fire wardens and such temporary help in the field as may be from time to time required. The increase of the permanent department staff ought, of course, not to be left to the arbitrary judgment of the superintendent. The bill lodges this duty with the supervising board. With this board is also left the authority to decide on the selection of lands for the permanent forest reserve, the making of contracts for the cutting, etc., of timber on state lands, the duty of auditing the accounts of the department, etc.

The duties of the superintendent and his assistants cannot be defined in detail, as much regarding the methods to be pursued must necessarily depend on circumstances as they arise from time to time. The amount and kind of work done by the department will depend in no small degree upon the size of the appropriation which each succeeding legislature will make for the purpose. The larger the appropriations, the more speedily can the forest system be brought into such shape that it will first pay for its own support and after a while become a source of profit. But under any circumstances will a certain period elapse before this can be done.

The first task to be done is, of course, the selection of the land, which must be made, evidently, in conjunction with the present land office. Even if no more state lands are to be sold, the work of the latter department will continue for a long while, to wind

up the transactions now pending with purchasers of land. But its work will contract considerably, and some of the expense incurred for the forest department will be saved on the score of the land office. After the new department has obtained the lands which it is to manage, it must find out what they are like. For the purpose of forest management this must of course be done much more thoroughly than has been done as to a part of the state domain by the land office. This part of the work will take, therefore, years to accomplish, and this survey of the land, together with the supervision of the local fire wardens, will take a large portion of the time of the superintendent and his assistant.

The supervision of the local fire police should be of such a character that not only should the department receive regular reports from the local wardens, but the latter should be liable, at any unforeseen moment, to receive a visit from the superintendent, who should have authority to call upon them for explanation in cases of neglect of duty, to remove them when found guilty, and in flagrant cases of negligence to enforce a penalty by prosecution in court.

A number of experiment stations, which should at the same time serve as model forests, should be established by the department at the earliest possible moment. The experiments to be conducted should be of a twofold nature: Partly sylvicultural, partly of a more strictly biological sort, and for this purpose the department ought to have a right to count on the assistance of other scientific agents of the state, notably members of the Geological Survey and the State University. Experiments, of course, are a source of expense, and the value of these stations as model forests will necessarily be impaired by the outlay for experimentation. But means will probably be found to keep the two objects of these stations as much apart as possible. Regarding the expense of this part of the work, it should again be remembered that much or little can be accomplished with them according to the amount of money available. Even a small appropriation, however, should be fruitful of some good. It would be superfluous to enter upon the detail of the work to be done at these stations. It will be of a more or less technical character, and will be useful in proportion to the skill of the persons in charge of it.

Much importance ought to be attached, especially during the infancy of the system, to the educational work of the department. The superintendent and his assistant should be men competent to deliver popular lectures on forestry subjects, and should do so whenever opportunity arises in schools, colleges, farmers' institutes, etc. They should also, from time to time, publish bulle-

tins containing information regarding forestry affairs, and use all other available means to instruct the people in their speciality. The forest system of the state cannot be successful unless it has that energetic and sympathetic support of the people which its importance for the public welfare so richly deserves.

The provisions of the bill submitted herewith, which have not been touched upon above, easily explain themselves. They are of an administrative nature, designed to bring the proposed new department into harmony with the general scheme of the state administration.

RECAPITULATION.

In conclusion, this commission wishes to emphasize once more the following points:

1. The establishment of a system of state forests is a necessity, not only for the protection of the climate and waterflow of the state, but for the purpose of providing a sufficient supply of raw material to the various lumber and wood industries of the state. The necessary steps toward this end cannot be delayed any longer with safety to the public welfare.

2. The establishment of such a system is entirely feasible. There are no obstacles of a physical, economic or financial nature which cannot with moderate effort be overcome.

3. It will take a series of years and some initiatory outlay to fairly establish such a system. However, the money so expended at first will after a reasonable time return into the state treasury, and the system, once fairly established, will yield a large annual income that will to a proportionate extent do away with the necessity of taxation.

4. The idea of managing forests by the state so as to obtain an annual revenue and yet not destroy the forests themselves is not the project of a dreaming idealist, nor an experiment which may or may not succeed, but has long been an accomplished fact in nearly every highly civilized community outside of the United States, including countries of such widely different conditions as Germany, France, Russia and British India.

Respectfully submitted,

GEO. B. BURROWS.
H. C. PUTNAM.
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State Forestry Commission.

APPENDIX.

FORESTRY REFORM MEASURES ADOPTED BY
OTHER STATES.

By Ernest Bruncken, Secy. State Forestry Commission.

The states of the union in which more substantial progress has been made towards a business-like treatment of forestry resources than in any other are New York and Pennsylvania. The secretary of the commission was sent to acquaint himself personally with the conditions existing and measures adopted in those states, and found that while in many details the steps there taken cannot be imitated under Wisconsin conditions, in the main the circumstances of those states are the same as here, and substantially the same remedies which have served there will be useful to correct existing evils in Wisconsin. The secretary takes this opportunity to express his thanks to the state officials and other gentlemen in the states visited by him, for the many courtesies extended to him during his investigations.

The state of New York is distinguished above many others for the comparatively small loss it has, of late years, suffered from forest fires. This is due in part to natural conditions, in part to adequate and well-enforced legislation. The forests of New York, as is well known, are practically all located in the region of the Adirondack Mountains. They are prevailingly composed of broad-leaved species, especially birches and maple, but there is a very considerable amount of spruce and fir intermingled with the hardwood trees. The spruce is the principal tree furnishing commercial timber. Of white pine there is practically no merchantable supply left; but in many places young pine was observed growing up vigorously. It is said that pine comes up on abandoned farm clearings, while in places where the original growth was destroyed by fire white birch and aspen are the successors. To what extent this observation is correct, we are unable to judge. Certain it is that many tracts were observed covered with aspen of sufficient size to serve for pulpwood if a market could be found for them. In other places the aspen

serves as a nurse tree for spruce, which kills them off when it is of sufficient size to overshadow them. This is illustrated by numerous photographs in the office of the superintendent of forests in Albany. On the higher mountain slopes the trees of all kinds become very scrubby and quite valueless for lumbering purposes. Some of the highest peaks, such as Mount Marcy, are entirely devoid of forest growth for a considerable distance from their tops down. In fact there are very large tracts of land in this region which on account of their mountainous character and consequent inaccessibility will never be made to yield a profit, or even a considerable revenue, even with the most careful methods of management.

Agriculture in the New York forest region plays a very subordinate part and is confined chiefly to the broader valleys. Lumbering operations are now carried on principally on the western side of the mountain complex, while little is done in the northern and eastern portions. The logging is confined largely to spruce timber, which is cut both for lumber and pulp. Little hardwood is utilized in any way, and there are very few factories located in the region, such as are now established in so many places in Wisconsin for the purpose of converting the hardwood timber into furniture and other wood articles. This is no doubt due largely to the lack of proper transportation facilities. In many parts of the region the native population seems to be dependent for their support chiefly on the large number of summer residents and tourists whom they serve as hotel keepers, guides, etc. Considerable tracts of land are owned by clubs and associations, who maintain them as pleasure reserves. These clubs usually take fairly good care of their holdings, build and maintain roads, prevent fires, the cutting of timber, undue fishing and hunting, and in many ways improve the land for the purposes of a summer resort. These private reserves are usually located in the most picturesque regions, where on account of the mountainous topography and the remoteness from railways logging would be unprofitable. It is customary for these associations to allow the legitimate use of their lands by tourists and pleasure seekers, under reasonable regulations and the payment of a fair toll. On the whole the system works to the advantage both of the permanent residents of the neighborhood, and of the tourist and summer guests. It would seem to be highly desirable that some of the hundreds of beautiful lakes and other interesting places in Wisconsin, which more and more attract pleasure seekers, to the benefit of the entire state, were in similar manner improved by voluntary associations, and forests, game and fish protected against wanton and negligent destruction.

When lumbering operations have ceased in a forest region the danger of fire becomes much diminished. At least in Wisconsin it is well known that fires are most likely to take their start from the dry rubbish on places where trees have been recently felled. Similarly, in New York it is found that of the comparatively few fires occurring most are met within the western part of the district where logging is now actively pursued. Even there it is rare for a fire to do much damage, as it is almost immediately discovered and extinguished. Since the present system of fire police has come into existence, it has been found that the educational effect upon the people is even of more importance than the direct results of the law. Public opinion in the Adirondacks now severely condemns all manner of carelessness in the handling of fire in the woods, and people no longer consider destructive forest fires as inevitable calamities like earthquakes and tornadoes, as is still so widely the case in Wisconsin.

The machinery by which these and other desirable results are obtained in the state of New York may be briefly described as follows:

There is a board of five Commissioners of Fisheries, Game and Forests, the members of which receive an annual salary of \$2,500 each, with an additional amount of \$800 per annum each for expenses. The president of the board receives \$3,000 per annum and expenses. The staff of employes at the headquarters consists of a superintendent and eight other employes of various grades, with salaries ranging from \$2,500 for the superintendent down to \$1,200 each for two stenographers. In addition to this, there are two assistant chief protectors, with \$1,500 a year, and thirty-eight protectors who receive \$500 a year as salaries, with expenses to the amount of \$450 per annum. The assistant chief protectors and protectors are required to spend all their time in the woods and make daily reports as to their doings to the office at Albany. Finally there are large numbers of special protectors, appointed from the residents of the forest districts, who receive \$1.50 per day for work actually done. In addition, both protectors and special protectors receive one-half of all fines and judgments recovered through their efforts. The per-diem of the special protectors is paid by the local authorities, but one-half of it is returned to the latter from the state treasury.

It will be seen that the duties of the protectors are purely of a police nature, as no forestry work proper is as yet done by the state. They see to the enforcement of the game and fish laws, the fire protection, and guard against trespasses on the state land. The policy of the department is to appoint so many special protectors that no fire can get a start anywhere without coming at

once under the notice of a protector. It should be remembered that an important part of the department's work is the care of the oyster beds in the waters of the state. Three of the protectors are specially detailed for this duty. All officers and employes are in constant communication with the headquarters, and convenient blanks of various kinds are provided on which they can make their reports and accounts.

There is a special body appointed from the members of the department, known as the Forest Preserve Board. This body has the duty of purchasing lands within the Adirondack district, to be added to the forest reserve of the state. Until a few years ago the state lands, like those of Wisconsin, consisted of badly scattered tracts. The state intends to purchase sufficient land to create a continuous forest area belonging to the people. A million dollars has already been appropriated for this purpose, and additional sums will undoubtedly be provided in the future. Unfortunately the state constitution prohibits all cutting of timber on state land. Such wastefulness can be but temporary and must soon give way to the adoption of real forestry methods.

There are many other provisions on the statute book of New York which are very instructive. For instance, a farmer who wishes to burn brush on his land must give notice to the town supervisor, whose duty it then becomes to be present and superintend such burning. The state lands within any township are assessed for local taxes, the same as private lands, and the taxes paid to the local authorities out of the state treasury. This overcomes the frequent objection of the local population to have large tracts of public lands within their limits.

While the duties of the Forestry Department of New York are at present confined rather to the protection of forests as they now are, and do not extend to their management for revenue and possible profit, the state has of late taken a first step in that direction also. It has endowed a School of Forestry, to be a part and under the management of Cornell University. The object of the school is a double one: First, to train students in the whole science and art of forestry so as to fit them for the independent management of forest estates, either private or public. For this purpose a four years' course of study is provided. The entrance requirements for this course are substantially the same as those for other under-graduate departments of the university, including a fair amount of mathematics, Latin, German, French, etc. The first two years of study are devoted to a thorough grounding in the various auxiliary sciences of forestry, such as mathematics, geology, botany, political economy. Not until the junior year will technical studies in forestry begin. These will

include, among other things, silviculture, dendrology, the physical and commercial qualities of woods and timbers, methods of logging and manufacturing lumber, and other forest products, political economy with special reference to the transportation and marketing of forest products, forest mensuration and valuation (that is, the computing of the prospective annual increase of wood in a growing forest, and the profit or revenue that may be expected from it at any given period, with similar and allied subjects), and the history of forestry. During the summer months, and the whole of the fourth year, the student will be expected to put in most of his time in practical work in the woods and particularly the demonstration forest which it is contemplated the school shall possess.

The second object of the school is to furnish to such students as do not intend to become professional foresters, but who desire an acquaintance with forestry matters as a help in their future business as lumbermen, manufacturers, farmers, and so forth, a comprehensive insight into the subject. For this purpose, elective courses are offered on silviculture, forest economy and similar subjects.

The trustees of Cornell University have selected as the dean and head professor of the new school Dr. B. E. Fernow, well known as one of the foremost authorities in this country in all matters pertaining to forestry and for twelve years chief of the Forestry Division of the United States. One of his assistants is Mr. Filibert Roth, formerly of Wisconsin, who is the author of the report on the forest resources of this state, just published by the Geological Survey.

The demonstration forest mentioned above is to be one of the most important branches of the new forestry school. It is to contain about 30,000 acres of wood land. The intention of the dean and faculty is not only to use this area for the purpose of giving the students opportunities in practical work, but to demonstrate by it how a forest estate can be managed so as to yield a regular revenue and profit, instead of giving a revenue once and thereafter remaining a worthless waste. Furthermore, it is to be used as an experiment station, where questions regarding silviculture, timber physics, and allied matters are to be investigated. As was stated to the secretary of this commission by Dr. Fernow, the two last named objects are somewhat inconsistent. Experiments always cost money, and the profitableness of the enterprise will thereby to some extent be jeopardized. But it is intended to keep the books of the department in such a way that the extra expense caused by the experiments can be separated at

a glance, so as to allow a computation regarding the actual profits if no such expenses had been incurred.

The question now arises: What lessons can Wisconsin derive from the experience of New York? The most obvious one is evidently the possibility of keeping in check the ravages of fire. While with our large areas of pine slashings and half-dried tamarack swamps we may not be able, for some time, to control fire so completely as is being done in New York, we can certainly do far more than has been accomplished heretofore. The existing fire laws should be improved in all details in which they may have proven ineffectual; there should be a more effective machinery for the supervision and control of the local fire wardens; above all, every possible means should be used to create a public sentiment which will regard negligence in the handling of fire in the woods or marshes as a crime, to be met not only with legal punishment, but with the severest reprobation by all respectable persons. It seems that not only the newspapers, but also the public schools, farmers' institutes and similar organizations, could do very much in this direction.

Another thought which suggests itself by the example of New York is that the State University might well do its share both in the training of professional foresters and the instruction of non-professional students in forestry matters. Finally, it would seem that Wisconsin ought to imitate New York in the establishment of one or more experiment stations for the investigation of matters relating to the subject, for the conditions under which forests must be managed in Wisconsin are by no means the same as those in New York.

PENNSYLVANIA.

In the state of Pennsylvania the forestry problem has in many respects a different aspect from what it has in New York. The evil which there first led to the appropriation of money by the state for forestry purposes was the rapid washing away of the soil from mountain sides denuded of tree growth, the consequent sanding up of the rivers of the state, and the pernicious alternation of very low stages of water with the most violent and destructive freshets. In consequence an effort is now being made to acquire on the part of the state all lands located on the head waters of rivers, and to keep them under a permanent forest cover. The state forests which Pennsylvania will possess in the future will therefore be mostly in the nature of protective forests, as are so many forests in Switzerland and other Alpine coun-

tries. The question of making the capital invested in these lands yield a profit, or even any kind of revenue to partially reimburse the state for the necessary annual administrative expenses, seems to have been entirely left out of view, for the present at least. Yet the people of Pennsylvania are willing to be taxed heavily for this purpose because they understand that they gain a hundredfold indirectly by the protection which the forests afford to the agricultural and industrial lands of the commonwealth.

Pennsylvania has not yet been so successful in the prevention of forest fires as New York. On the contrary, its loss from this source during the last few years has been enormous. This may be due, in part, to more disadvantageous natural conditions; but probably the principal reason is that the fire police system of the state is far less effective than that of New York, and that public opinion has not yet been sufficiently educated to appreciate the criminality of negligence. There are no special fire wardens, but it is made the duty of constables and county commissioners to extinguish forest fires. For this purpose they may call out the posse comitatus. The compensation of persons officially engaged in fighting fire is \$1.50 per day, which is paid in equal shares by the county and the state. It is clear that, however effective such a system may be for extinguishing fires, it fails entirely to provide for the quick detection of fires just starting. This, however, is the most important part of the task, for only by not allowing fires to get headway can great damage be prevented.

The forestry administration of Pennsylvania at present forms a division of the state Department of Agriculture. It has at its disposal a fund of \$15,000 for all contingent expenses for the period of two years, besides the salaries of its employes. In addition to this, there is an unlimited appropriation for the payment of fire fighters and the purchase of land at the river sources.

The work of the division has so far been principally one of investigation and education. The conditions of water flow in the rivers have been thoroughly investigated by a capable engineer, while the bulletins and reports issued contain much valuable information regarding the forest conditions of the state. One of the principal duties of the commissioner is to assist in the purchase, on behalf of the state, of forest preserve lands. Three great preserves, neither to be less than 40,000 acres in extent, are to be established around the upper portions of the Delaware, Susquehanna and Ohio rivers. Besides, the law provides, that the state may acquire all lands on which taxes remain unpaid. There are considerable tracts in Pennsylvania, as there are in

Wisconsin, from which the timber of merchantable species and size has been cut and for which the proprietors do not care to pay taxes. These lands are often of great value as protective forests, and unless the state acquired and policed them, the remaining wood growth would be destroyed and the soil washed into the rivers. When the secretary of this commission was at Harrisburg, he learned of a company operating an oil well located in the midst of a large timber tract, which had just offered to convey this tract to the state on condition that they might continue to work the oil well. The hope of the company was simply that the state would maintain a sufficient fire police in the forest to render the oil property more secure.

A solution of the question of the taxation of forest property has been attempted in Pennsylvania by the passage of a law allowing a rebate of taxes on lands with growing timber, under certain conditions. The tax question in Pennsylvania seems to be simpler than in Wisconsin for this reason: A very large proportion of timber lands is owned by mining companies. The population of these districts is often in its majority composed of employes of these companies. It is easy, therefore, for these corporations to obtain the election of local officials who will not only not assess their lands exorbitantly, but on the contrary sometimes give them an unfair advantage over other property.

On the whole it may be said that the conditions in Pennsylvania are so different from those prevailing in Wisconsin, that few of the details of forestry administration are directly applicable to our state. We are fortunately so situated that the question of maintaining forests merely for the protection of our streams in places where we would rather see farms is of minor importance. We have no appreciable extent of land which is in danger of being turned into desert by the washing away of soil unless forests are maintained thereon. No doubt the quantity and regularity of water flow in many of our rivers will be benefited by the maintaining of forests about their sources. But this benefit will as a general rule be gained incidentally, if we select our future forest areas from other points of view. On the other hand, there is probably in all Wisconsin no forty-acre lot of woodland which under proper management cannot be made to yield a profit. It follows that this state need spend no money, either in the way of land purchases or administrative expenses, for purely protective forests, without expectation of pecuniary reimbursement. All properly expended funds in Wisconsin forest management may be expected to sooner or later return to the state treasury. How fortunate our state is situated in this respect will be understood when it is considered that even with

the excellent methods of management prevailing in Prussia, Bavaria or Saxony, there are large tracts of forests in those states from which no financial return is expected either at present or in the future. There is one valuable lesson to be derived from Pennsylvania, however, and that is the intelligence of the people of that state, who are willing to sink large amounts of money without hope of return simply because they appreciate the immense indirect advantages they will derive from a proper care of their forests.

ONTARIO.

The province of Ontario has for some years maintained a Bureau of Forestry, which is a subordinate branch of the Crown Lands Department. This bureau has published a number of interesting reports containing much valuable information. No steps looking towards a more profitable management of public lands have as yet been taken by the government of the province, except that a commission was recently appointed charged with investigating the question of reproducing forests on the cut-over timber lands. This commission has visited all parts of the forest area of the province, and will soon make its final report. Like the Geological Survey report on the forest resources of Wisconsin, the Ontario commissioners have come to the conclusion that practically the only obstacle to the natural reproduction of pine forests is the fire. They laugh at the notion still entertained by some Wisconsin lumbermen that there must be a "rotation of crops" and that white pine will not grow again in places where it has been cut down.

The fire laws of Ontario are fairly effective. The timber lands belonging to the crown are not sold, but lumbermen can purchase the right to cut timber on these lands, under certain restrictions and regulations. One of these regulations requires that "fire rangers" must be employed on each timber berth, as a district on which logging privileges have been sold is called. The commission will advise the Parliament to add to this requirement the employment of a similar system of fire rangers on the lands not comprised in any timber berth. The commissioners also favor the permanent reservation and management, by the government itself, of all timber lands not fit for agricultural purposes. Another recommendation will be to prohibit the cutting of trees less than twelve inches in diameter two feet from the ground by any holder of a logging license.

The most important thing to be learned from the experience of Ontario seems to be the unwisdom of selling the fee of public lands of a non-agricultural character. Such lands are too apt to be despoiled of their present timber supply and allowed to lie waste ever after, as the example of so many tracts in Wisconsin shows. Ontario, on the other hand, after having received quite as high a revenue from the sale of logging licenses as Wisconsin received from the disposal of the land itself, still retains the land and may proceed to care for them so that in due time they may again become a source of revenue to the public treasury.

A BILL

TO ESTABLISH A SYSTEM OF STATE FORESTS AND
PROVIDE FOR THE MANAGEMENT OF
THE SAME.

The People of the State of Wisconsin, Represented in Senate and Assembly, Do Enact as Follows:

Section 1. There is hereby established a Department of State Forests, to be organized and to perform such duties as herein provided. The secretary of state, the state treasurer and the attorney general shall constitute *ex officio* the Board of State Forest Commissioners, and as such shall perform such duties and exercise such authority as may be conferred upon them by law. Any two members of said board shall constitute a quorum for the transaction of all business.

Section 2. As soon as may be after this law shall have gone into effect the said board shall appoint some competent person as superintendent of State Forests. Such superintendent shall hold office for the term of five years, and shall receive a salary of three thousand dollars per annum, payable out of the state treasury in the same manner as the salaries of other state officers are paid. It shall be the duty of the Superintendent of State Forests, to keep in his office all necessary records concerning the lands under his care as provided herein; to manage such lands according to the most approved principles of the art of forestry; and to perform such other duties as may be prescribed by law. The said superintendent shall appoint an assistant who shall hold office during good behavior and shall receive a salary of two thousand dollars per annum, payable out of the state treasury in the same manner as the salaries of other state officers are paid. The Superintendent of State Forests may also appoint such clerks, district foresters and other subordinate officials as the said Board of State Forest Commissioners may authorize, and may engage such temporary help and services as may from time to time become necessary. All permanent employes of the department shall hold office during good behavior, unless otherwise provided by law. Their salaries shall be fixed by the Board of State Forest Commissioners, and shall be paid

from the state treasury in the same manner as the salaries of other state employes are paid. The said Board may, with the advice of the Superintendent, adopt and from time to time amend regulations for the examination, competitive or otherwise, of all applicants for positions in the employ of the department, and if such regulations shall be adopted all appointments shall thereafter be made by the superintendent in accordance with them. The superintendent and assistant superintendent shall each annually receive the sum of five hundred dollars for expenses of travel. Other officers and employes of the Department of State Forests who may be obliged to travel on business of the department shall be allowed their actual expenses.

Section 3. The said Board of State Forest Commissioners shall audit all the accounts of the Superintendent of State Forests and other officers and employes of the department, and no claim of any kind against the state, on account of the department of state forests, shall be paid without first being allowed by the said Board.

Section 4. The department of state forests shall be provided with convenient office accommodation at the city of Madison, and shall be furnished with all necessary stationery and other office supplies in the same manner as other departments are furnished.

Section 5. The sale of all lands belonging to the state, except such as are commonly denominated school and university lands, shall cease after this act shall have gone into effect, and no such land shall thereafter be sold except according to the provisions of this act; provided, however, that this act shall not be so construed as to affect in any manner the rights or interest of any person or persons to or in any of the lands belonging to the state which such person may have acquired previously to the day on which this act shall go into effect.

Section 6. All public lands so withdrawn from sale, and such other lands as the state may hereafter acquire for that purpose shall constitute the state forest reserve. As soon as practicable after this act shall go into effect the superintendent of state forests shall make a detailed inquiry into the character and condition of each parcel of land contained in said state forest reserve and acquire all information concerning the same which may be necessary for the purpose of proper forestry management. For this purpose he may engage all necessary help, and may use the records, maps, plats and other documents of the land office. All information so obtained shall be properly recorded and preserved in the office of said superintendent. If in the course of such investigation the said superintendent shall

come to the conclusion that it shall be for the best interest of the state that any particular parcel or parcels of the public lands be not reserved as a part of the state forest he shall so notify the Board of Public Land Commissioners, who may thereupon in their discretion proceed to sell such parcel or parcels of land in the manner provided by law. If at any time hereafter the Commissioners of Public Lands shall withdraw any school or university lands from sale they may authorize the superintendent of forests to manage such lands as a part of the state forests, and the superintendent shall thereupon have the same authority and the same duties regarding such lands as he has regarding other lands in the state forest reserve.

Section 7. The said Board of State Forest Commissioners are hereby authorized to accept on behalf of the state of Wisconsin any grant or grants of any lands within this state for forestry purposes. No such grant shall be accepted unless the attorney general shall first certify that he has investigated the title to such lands and that the proposed grantor has title to such lands, free from incumbrance.

Section 8. Any county which may now own or hereafter acquire any land suitable for forest growth by virtue of any tax deed or the foreclosure of any tax certificate is hereby authorized to maintain such land as a county forest reserve. Whenever the Board of Supervisors of any county shall by resolution decide to maintain such county forest reserve, they shall notify the superintendent of state forests, whose duty it shall thereupon become to supervise the management of such county forest. The board of supervisors of such county may annually appropriate a sum of money sufficient for the management of such county forest until the revenue derived therefrom shall be sufficient to pay for the expenses of the management of the same. All revenue derived from such county forest over and above the necessary expenses of the management of the same shall be paid into the county treasury. No expense of any kind shall be incurred by and become chargeable to the state on account of such county forests. The county board of supervisors may make all necessary rules and regulations concerning such county forest, subject, however, to the approval of the state forest superintendent.

Section 9. The superintendent of state forests shall as soon as practicable, with a view to the best possible financial return to the state, remove from the lands under his control all dead and down timber and such other timber as he may deem expedient, and sell the same at the best advantage in such a manner as the Board of State Forest Commissioners may prescribe. All con-

tracts for the cutting, logging, or sale of any timber in the state forests shall be signed, on behalf of the state, by the superintendent of forests, or in his absence by the assistant superintendent; provided that no such contract shall be of effect until it shall have been approved by the Board of State Forest Commissioners. All funds received from the sale of any timber, wood or other product of the state forests which shall be derived from any land known as School, University, Agricultural College, Normal School, Marathon County, Drainage or Indemnity land shall be paid into the respective fund into which the proceeds of the sale of such land may now be payable. The revenues from all other lands in the state forest reserve shall be paid into the general fund of the state.

Section 10. The superintendent of state forests shall have authority to build roads upon the lands in the state forest reserve; to cut and sell timber growing on and other products of such forests; erect all necessary buildings, fences or other structures; plant or sow trees; make all necessary rules and regulations for the maintenance and government of such forests, and do all other acts which may be necessary or expedient for the protection and rational management of said forests. Provided, however, that no improvement shall be made or other measure adopted involving an expense of more than one hundred dollars without having first been approved by the Board of State Forest Commissioners.

Section 11. The superintendent of state forests may from time to time purchase, in such manner as shall be prescribed by the Board of State Forest Commissioners, all supplies necessary for the proper conduct of work in the state forests.

Section 12. The superintendent of state forests shall as soon as practicable after this law shall have gone into effect, with the approval of the Board of State Forest Commissioners, establish one or more Forest Experiment Stations, on the lands belonging to the state forest reserve, for the purpose of conducting researches into the best methods of forest management under the conditions prevailing in the various portions of Wisconsin. For the purpose of making such researches the superintendent may co-operate whenever expedient with the State University, the State Geological and Natural History Survey, the various scientific bureaus of the government of the United States, and other institutions of a like character. The results of such investigation shall from time to time be printed and published in the same manner as other public documents are published, and distributed in such manner as the Board of State Forest Commissioners shall determine. They shall as far as possible be written

in non-technical language, so as to be easily understood by the general public.

Section 13. It shall be the duty of the superintendent and the assistant superintendent, whenever possible without interference with their other duties, to respond to invitations to deliver lectures on subjects regarding the value and nature of sound forestry methods, by Farmers' Institutes, colleges, schools and similar institutions, and they shall in every other available form seek to spread information concerning forestry matters among the public.

Section 14. The offices of state forest warden and deputy forest warden as defined in section 1636b of the Wisconsin Statutes of 1898 are hereby abolished. Their duties are transferred to the superintendent of state forests except as modified by this act. It shall be the duty of the said state superintendent to see that the provisions of law for the prevention or extinguishment of forest and marsh fires are faithfully executed, and for that purpose to formulate all necessary and proper regulations for the government of the several fire wardens, and to supervise them in the performance of their duties. Whenever the superintendent of state forests or any officer of the department of state forests, or any fire warden shall have good reason to believe that an offense has been committed by any person or persons against any of such provisions, it shall be his duty to cause the arrest of the party suspected of such offense, and he shall immediately notify the district attorney of the proper county, whose duty it shall be to prosecute such person or persons. Every fire warden who shall bring about the conviction of any person or persons of violation of any law designed for protection against forest and marsh fires, shall receive one-half of the fine imposed upon such party.

Section 15. The superintendent of state forests shall appoint one or more fire wardens in each organized township, and shall keep a register of the name and postoffice address of each. Provided that if he shall be of the opinion that no useful purpose could be served by the appointment of a fire warden in any particular town he may omit such an appointment, unless the town board of supervisors of such town shall request him to make such an appointment. Every fire warden shall before entering upon the duties of his office take and subscribe the usual oath of office and file the same with the superintendent. He shall take all necessary precaution to prevent the improper setting or progress of fire in his or adjoining towns within eighty rods of the line of his town whenever the fire warden of the adjoining town is unable or unwilling to do so, and shall, when credibly informed

that a fire has been improperly set or allowed to burn in any territory within his jurisdiction take such steps as shall be necessary to prevent and in all proper cases to extinguish the fire. The fire wardens shall perform such further duties and receive such compensation as is now provided by law. Any fire warden may be removed from office by the superintendent of state forests for incompetence or neglect of duty.

Section 20. Section 1636e of the Wisconsin Statutes of 1898 is hereby repealed. It shall be the duty of the superintendent of forests or such other officer of the department of forests as he may designate, as far as practicable, from time to time to visit each fire warden and ascertain the manner in which he discharges the duties of his office.

Section 21. On or before the first day of December in each year the clerk of each town in which any money has been expended for the payment of any fire warden or the extinguishment of any forest or marsh fire in pursuance of section 19 of this act shall certify to the secretary of state the amount of money so expended. The secretary of state shall thereupon cause one-half of the sum so expended by such town to be paid out of the state treasury to the treasurer of such town.

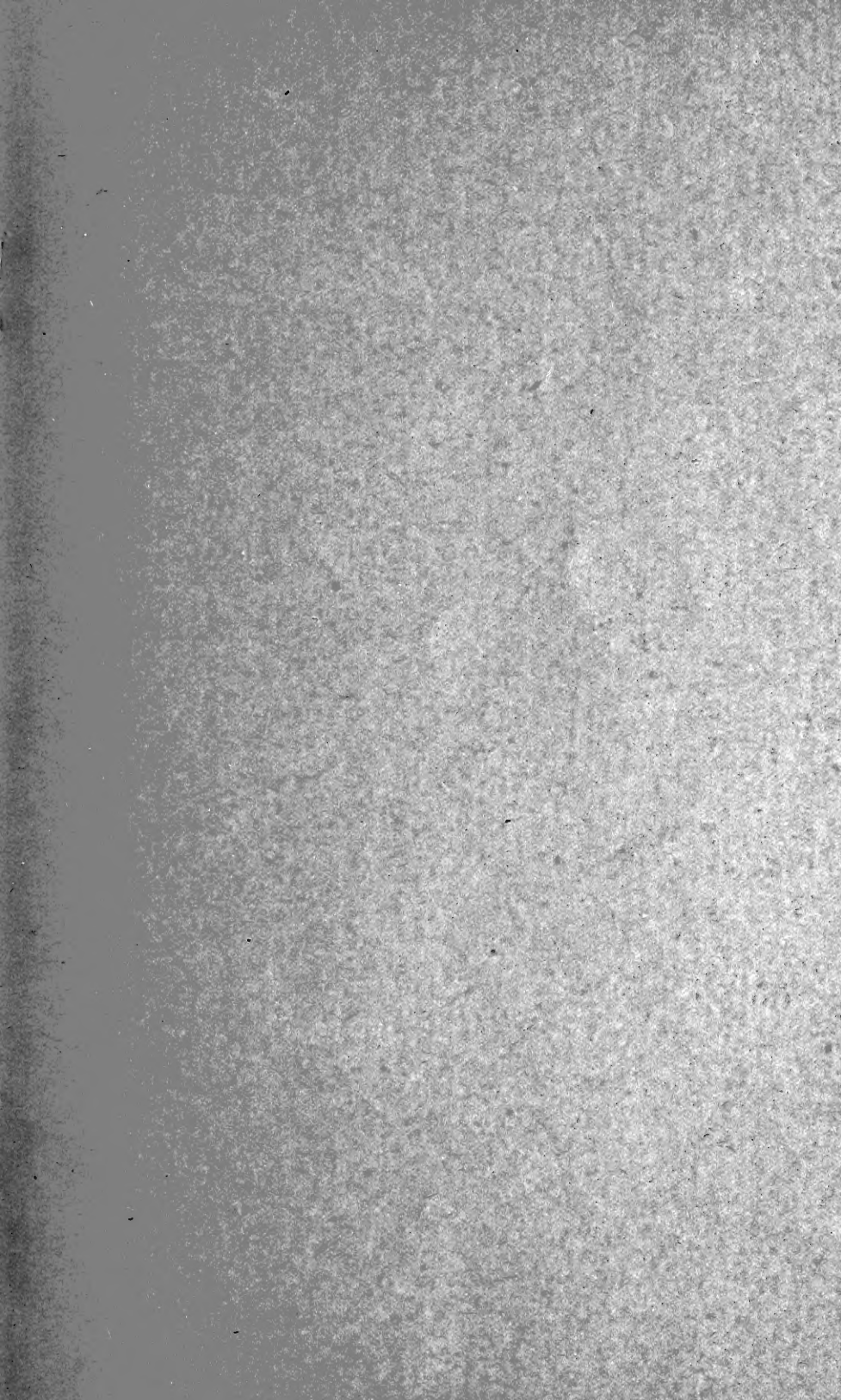
Section 22. The superintendent of forests shall biennially make a report to the governor, showing the condition of the state forests, the revenues derived therefrom, the expenses incurred, and such other matters as he may deem proper. Such report shall be printed, published and distributed in so many copies and such manner as the governor may direct. The superintendent shall also submit to the legislature at its regular session, within ten days from the convening thereof, an itemized estimate of the expenditures which in his opinion will be necessary on behalf of the department of forests, during each of the ensuing two years.

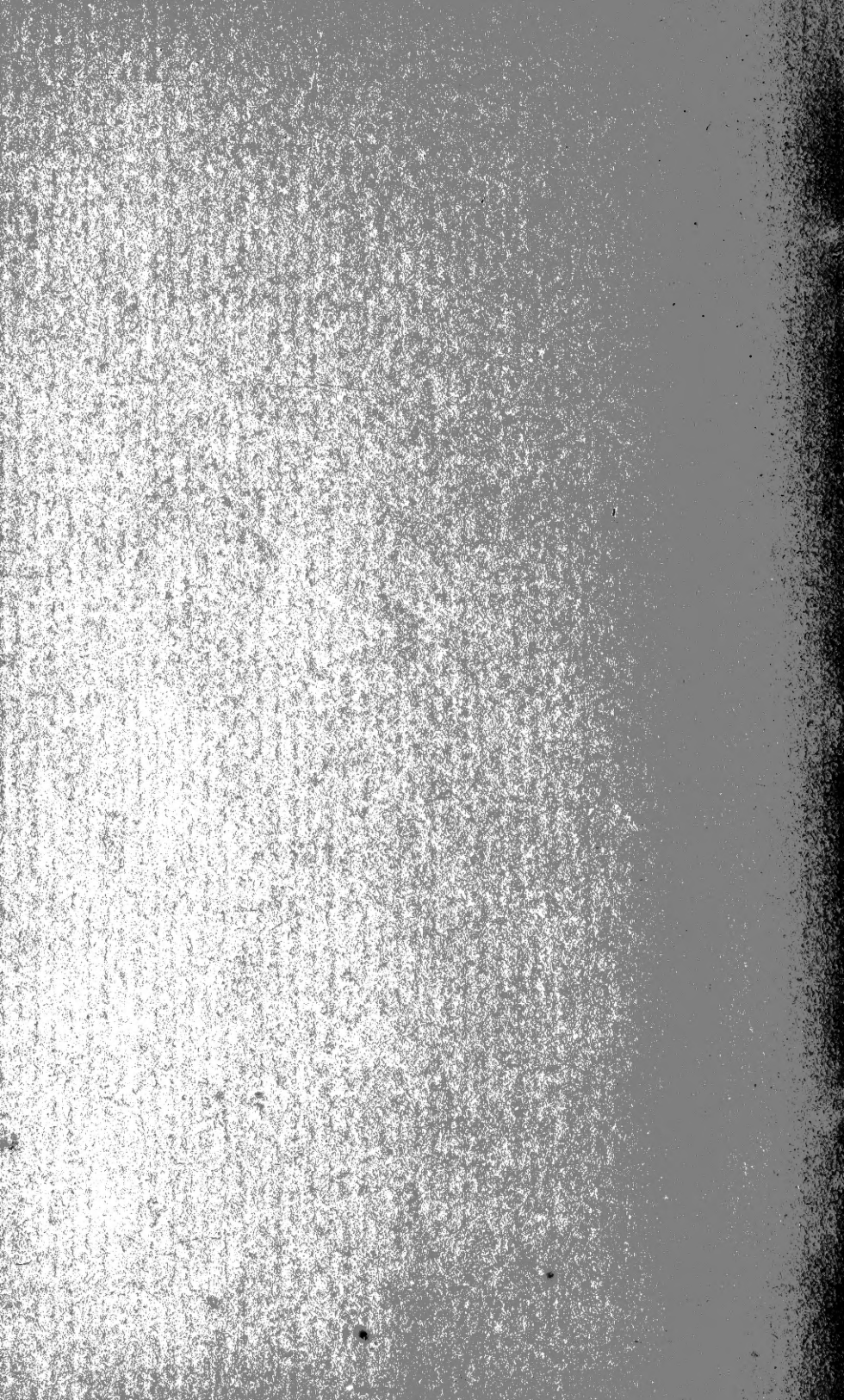
Section 23. The expenses of the department of forests exclusive of any sums which may be paid to any town for money expended for the prevention or extinguishment of forest fires, during any one year, and exclusive of any money spent for the proper furnishing of the office of the department, and its supply with the necessary stationery and other office supplies, shall not exceed the sum of \$. per annum. No liability shall be incurred by said department in excess of such sum. A sufficient sum to defray all expenses authorized by this act is hereby annually appropriated.

Section 24. All acts and parts of acts conflicting with any of the provisions of this act are hereby repealed.

Section 25. This act shall be in effect from and after its passage and publication.









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