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Making Rollways of Pine Logs.

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THE ART OF FORESTRY.

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Benin City, West Africa.

III. FOREST EXPLOITATION.

Giving the above its more appropriate name of forest utilization, one is led to the main object in Forestry i.e. of using *all* the woody growth in a forest.

In olden times in Europe just those trees which had any value were cut down and removed, leaving broken, decayed, diseased or at that time useless species of trees.

One of the best examples of this was the cutting, until recently (twenty years ago) of the largest spruce trees in the Bavarian Forest. Now this has consisted from time immemorial of silver fir (similar to balsam), spruce and beech; on the whole the beech and spruce predominating. Another well known fact is that fir wood is quite inferior to spruce for flooring or any purpose.

The result of this early method has been to reduce the number of spruce and, although the climatic conditions of growth are most favourable to its growth, it is suppressed by not being able to stand so much shade as either beech or fir.

With great labour and expense the old and rotten firs and beeches are gradually being got rid of and the spruce re-introduced.

If previously, as well as taking the spruce, some of the silver fir and beeches had been girdled and thus killed, the spruce could have held its place. The forest would have been much more valuable than it is at present and would also have saved the large yearly expense now entailed in clearing away the useless material in introducing the spruce on a large scale.

Of course it might be argued that it would not pay to do this girdling, but that is scarcely the case as the return proportionally is not very much greater now than it was then. Besides that it is much more expensive to do such extra work now than it was then.

In connection with the last named forest as soon as it was definitely worked (1870) it was found that locally very little timber was required, especially little or no fir timber. Sawmills were then started to make boards suitable for the Rhine Provinces, and this was done with such success that these supplies are now indispensible. The industries were thus permanently located in that forest, and their output is naturally limited by the permanent outturn of timber, which that forest is capable of yielding, and which is gradually increasing. The primeval forest by no means yields the maximum quantity of lumber per acre. In the above way lumberman and forester work together to mutual advantage.

A rather parallel process is at present going on in the mixed forests west of Ottawa. That is to say, where white pine is scattered in small groups or singly in large areas of hardwood, such as beech, maple, blue beech (hornbeam) and yellow birch. Of these at the present, the yellow birch is the only species of value or rather that it pays to bring out. The pine is taken, leaving little or none; its place is largely filled by poplar or hardwood. The pine by reason of its original small numbers has not the same chance of reseeding itself, hence such areas become practically valueless. It is of course rather presuming to say that beech, blue beech, etc., will have no value, but still the past seems to indicate that there is little hope of their value being so great as to justify their permanent production; at any rate on such areas as they at present occupy.

Even under a careful plan of artificially helping the pine to

keep its place always sufficient hardwood will remain to supply the very limited market. 85% of all timber used all over the civilized countries of the world is coniferous, and only 15% hardwood, consisting of over fully 200 species. Even in the tropics pitch pine of the Southern United States is largely used, local timber either being too hard or liable to attack by ants.

From the above it will be seen that where the pine is found singly or in small groups, removing it as soon as the old stand is cut, and then cutting the surrounding trees to give a start or clearing any existent growth of hardwood threatening to overgrow the seedlings, will be the only way to procure a future crop as good, and indeed in many respects, better, than the one before.

If a means were found to profitably carbonize or otherwise use the hardwoods the problem would at once become different, as the pine would then have an equal chance with the poplars, etc., of reseeding the areas thus cut over.

With the modern pulp mill as well as saw plant, a forest becomes much more valuable and capable of management with an eye to the future, as well as to the exploiting for present needs. Again this time element, such a potent and yet most essential factor in forestry, crops up and indeed in such a way that it cannot be denied.

The question arises whose business is it to look after a future lot of lumber, which the present man does not need, but which everyone sooner or later very much wants. Scarcely the present owner or user of the forest, he does not live long enough to reap all the benefits of his provident policy.

A corporation may, if it is organized with an idea of being carried on permanently or nearly so; nevertheless it has its shareholders to consider, and they want their dividend to be a large one, and they only hold the shares speculatively, or at most, until they see something still better to put their money into. It therefore devolves upon the representatives of the whole country *i.e.* the government, to safeguard these very vital interests.

In some countries, notably Russia, the government has car-

ried this a little too far, and become sawmiller and lumber manufacturer in general to the community. This is scarcely compatible with modern ideas of trade and is bad economically.

Under other countries, notably Germany, the forest department has become wood cutter and general producer of all forest products in the *rough*. This is admissible, but demands a very large organized staff going into details, with regard to felling, cutting into lengths and bringing to roads or other place of transport. The timber is what is known as " sold in the wood." This on the whole gives the best results. Another method is to sell on the stump, leaving felling, etc., to the buyer, an easy and yet poor method from the point of view of forest reproduction. On the whole the best method for all parties concerned is the second mentioned, though in some countries, namely India, the last named has worked admirably.

Each country thus adopts what most suits its needs, but the idea underlying that chosen method is the same, that of wisely constantly using the forest products as they financially gradually mature, only to be renewed again and again.

The growing trees of a forest are therefore not a fixed but a very slow movable capital.

A change has been made in the law of the Province of Quebec by which a free grant of 160 acres of land was made to the father of twelve children. It was found that these grants were being made use of by speculators who wished to obtain control of timber lands, and that the objects of the Act were not being served while the Province was losing the timber lands. In order to put an end to this speculation, the Act was changed last year, so as to offer a bonus of $50 in lieu of land. Nearly four thousand claims were made for this bonus, not only from farmers, but from residents of cities, towns and villages, who would never have thought of applying for the land if the Act had not been amended. A further amendment has therefore been made, providing that the bonus shall be paid to those whose claims have been recognized up to the date of the passing of the Act.

FOREST FIRES IN BRITISH COLUMBIA IN 1904.

Mr. J. R. Anderson, Deputy Minister of Agriculture for British Columbia, has kindly placed at the disposal of the Forestry Association, the reports received from the agents of that department, in regard to the forest fires throughout the Province generally during the year 1904. As has been made known through the medium of the press, the forest fires in British Columbia, during the past year, were of special severity owing to the dry season. Throughout most of the summer in some districts a pall of smoke hung over the country sufficient to obscure the view and prevent surveying operations. The direct loss to the Province was large, and the effect on the mining and other industries requiring wood supplies will soon make itself felt. The question of dealing with these fires is one of the most important ones which can be given consideration by the Province of British Columbia at the present time. The revenue derived by the Province from these forests during 1904 was $446,276, a substantial increase over the previous year's revenue, which amounted to $347,004. In regard to lumber supplies the future is in the hands of British Columbia, her forests of virgin timber are still great and valuable, the development of the western territories, and the industrial growth of the Dominion generally will make large and increasing demands upon them, and properly administered, they should make British Columbia the richest member of the confederation. At no distant day the public revenue from the forests may be expected to reach a million instead of half a million dollars, and will not then have reached the limit of the possibilities. Capitalize such a revenue and the Province might well spend a large sum in providing protection from fire without going beyond what would be a low rate of insurance. Experience has demonstrated that the forests can be protected and failure to take effective measures to do so can, in the light of present knowledge of the subject, be hardly less than criminal.

For the New Westminster District the report of the agent

states that the bush fires were the most destructive since the year 1893. The area burned has been very extensive and the value of timber destroyed is probably not less than half a million dollars. The worst fires were in the northern part and are believed to have been due to the carelessness of prospectors, particularly persons prospecting for coal. Some fires arose from want of care on the part of persons clearing land, but the damage done in these cases was comparatively small. Five persons were prosecuted under the Bush Fires Act, and three persons were obtained. This report urges the appointment of fire wardens and that no person should be allowed to set out a fire without permission of the warden.

In Southern Vancouver Island the fires were numerous during the month of August when high winds prevailed. In some cases a great deal of valuable timber was burnt and bridges and buildings were also destroyed. There seems to be considerable carelessness in the handling of fire and the railways are responsible for their share. One report states that the fires are mainly due to sparks from locomotives used for hauling out the timber from the logging camps, and along the line of the Esquimalt and Nanaimo Railway.

On the northern coast there were no fires at Port Simpson as the rainfall was heavy, but in the Atlin district there were several small fires due to prospectors. In regard to these the agent states that while these fires, as such, did not attain any great force or volume, a fire of any volume whatever is regrettable in such a sparsely timbered section and any damage whatever is serious.

In the Cariboo District, the central northern part of the Province, there were a number of small fires through the settled districts, and in nearly every case the fires originated from careless campers travelling; whites, Siwashes and Chinese are all alike and equally careless in regard to camp fires, and it is about impossible to get and convict the right party. Forest fires were observed to the north and east burning for days but their cause and extent could only be conjectured. "Bush Fires Act" notices are posted through all the settled district.

Coming south to the Lillooet District, the central district north of the railway, the reports show that this part of the country suffered severely. One agent states that this was the most deadly year since 1869, caused by an almost total absence of rain. A quotation may be made from his report. He says:—

"Bush fires commenced early on account of the extreme dryness of everything, and as a matter of fact I saw smouldering remains on Nov. 3rd, on my way to and from Lillooet the other day. Men—white, black, brown and yellow—are responsible for these fires, by the utter carelessness and want of thought that is inherent in nearly every human being. I tried for a conviction against three whites last August before two justices of the peace, but was met with the Scotch verdict "not proven" although they were the originators of a most dangerous fire without a doubt. High up in the mountains the Indian is responsible. He fires there for a crop of tender young grass in the fall for the deer. In the valley of the Fraser he fires, in accordance with the custom, to light the salmon on their way up the river. It does not appear that it has dawned on him to any extent that the paleface at the mouth of the river is responsible for their absence. With regard to the estimated destruction this year; that is simply beyond my power, to say nothing of the consequent destruction and loss, which may be approximately arrived at, in the event of a hard winter, next April by counting heads of dead and dying domestic animals on the various ranges which are already appallingly bare throughout the entire district."

The mountains round the town of Lillooet were burned, in several places from base to summit, extending over large areas. At other places forest fires raged for a long time travelling long distances.

In the northern part of Yale District, being the central tract immediately south of the railway, the fires were not of serious proportions, the persons located in that district having evidently been trained to carefulness.

In the southern part of Yale the report from Grand Forks, near the international boundary, states that a vast extent of the country was run over by fires during the past season, in fact at

one time the whole surrounding country appeared to be suffering, but how far the fires reached back it was impossible to say as no one seemed to know where they ended. In response to the request for an estimate of the destruction the agent states that this is fairly a poser, but there is no doubt that a great amount of destruction was done by the past summer's fires. To say nothing of the loss to miners and prospectors of their buildings, tools, &c., the destruction of timber and young forest was most deplorable.

A significant fact in view of the rapid railway development in Canada at the present time, is that given in the following paragraph:—

"The most serious of the three (fires) occurred near Ehott, and was supposed to be caused *by the fires getting away from the men clearing the right of way on the new railway line* of the Great Northern Railway Co. from Grand Forks to Phoenix. This fire burned for a considerable time among fallen timber, and though efforts were immediately made to check it, it was only after a rainfall that any successful stop was put to it."

The agent reporting from West Kootenay does not attempt to give any description of the fires or the loss, merely stating that it must have been considerable. He does not think that a fire warden service could be made large enough to be effective and winds up with the suggestion that "perhaps the most effective prevention would be a heavy and opportune rain." Whether this is a suggestion to the Government of British Columbia to go into the rain-making business is not clear, but it certainly sounds like the counsel of despair.

This is a general statement of the reports received and while the details are necessarily not definite, they show clearly that the loss to the Province has been large and point to the necessity of some more decisive action than has yet been taken.

WHITE PINE IN GERMANY.

Natural reproductions, from trees 120 years old, showing gradual removal of the old crop.

A diseased Red Oak—Fig. 1

DISEASES OF TIMBER.

J. Horace Faull, Ph. D., University of Toronto, Toronto.

Trees while living are subject to the attacks of various plant enemies, mainly fungi and bacteria, and when dead are immediately set upon by a legion of other members of the same groups. Biologically, the first set are parasites, for they derive their nourishment from the life streams or stores of their hosts, and the latter are saprophytes, for they obtain their livelihood from dead tissues and plant remains. The parasite is of interest to the biologist in that it presents a three-sided struggle in the fight for existence, the struggle between the parasite and the host on the one hand, and between the host and its uninfected fellows on the other. More than one termination is possible in such a struggle, but in most cases the greatest desideratum of the economist is the evolution of a form that is proof against attack. The saprophyte is of interest because it is a factor in the breaking up of complex organic compounds (incidentally ridding the earth of vegetable debris), and restoring again to soil and air the simple food materials essential to the existence of present and future generations. Without the restoration of these all life would soon cease to be, for the reserves of unused food substances in nature are too small to allow for a break in their circulation.

The forester, the lumberman, and the wood-consumer, look at these wood-attacking bacteria and fungi from a somewhat different standpoint. To them the parasites are the causes of the deformation, stunting, and death of greater or smaller quantities of timber, decreasing and depreciating the supply, and providing material for destructive fires; and the saprophytes are the cause of certain rots and discolorations, resulting frequently in the ruin of sawn but unused timber, and the necessity for the untimely renewal of such as has been put into use. There is hence a demand made by them of the economic botanist for two things, first, the prevention of further infection in the forests, and

second, the treatment of wood products to ensure reasonable service.

The parts of the trees attacked and the immediate effects produced are various. In some cases the disease works in the roots, rendering treatment extremely difficult. In other cases the fungus may grow in the soil at first, and then entering by the roots work its way up through the stem, its presence becoming apparent only when the tree begins to die or the fruiting bodies of the fungus are found at its surface. More frequently the spores of the parasite infect the host at some wounded spot or region of careless pruning, and as in the last instance may live in the host unsuspected for years. Such a case is represented in figures 1 and 2, in which the fruiting bodies of a polyporus are shown upon the surface of the trunk of a red oak. The removal of these plague spots should be attended to promptly when they make their appearance on trees in streets and parks. The carelessness displayed in the treatment of shade trees is lamentable, people and animals being allowed to wound and maltreat them, thereby exposing them to the almost certain entrance of destructive fungi. The smallness of the number of undiseased and undeformed trees along the streets of most cities is deplorable, and altogether inexcusable. Illustration 3 tells its own story.

Sometimes the disease reveals its presence by swellings, or other malformations. Even in the case of the red oak in Figure 1, it is observable that the base of the trunk is abnormally enlarged. This local stimulation to growth is not at all uncommon. A rather interesting example of deformity is to be seen in the so-called witches' brooms of the balsam fir (photograph 4), the cherry, alder, some of the birches, and a few others. Generally the infected area becomes swollen, and all of the buds, including the dormant ones, develop, forming a dense mass of distorted and stunted branchlets. Another manifestation of disease and its effects is represented in Figures 5, 6 and 7. The host in this particular example was black spruce, and the parasite a rust that attacked the leaves. In Figure 5 there is one uninfected leaf, and the spore cups of the rust are shown growing upon all of the rest. Nearly all of the leaves on the diseased trees, which

included most of the trees in the swamp, were attacked, the disease being evident at some distance away, because of the yellow color of the foliage. Early in September the leaves dropped, and the trees robbed of their foliar organs soon died. No sooner were they dead than various saprophytes began their work, a shelf-fungus, as in Figure 7, being one of the most frequent invaders.

The wide-spread occurrence of these diseases is probably greater than most people imagine. In the instance that I have cited as coming under my own observation a considerable portion of the swamp suffered. In Queen's Park, Toronto, few sound oaks are to be found, nearly all being sapped by a Polyporus. Recently a research, instituted by the United States Government in South Dakota, showed that half of the standing timber in the forests of that State, including the Black Hills Forest Reserve, had been killed by a certain disease, and that unless means were speedily taken to check the trouble, the remaining trees would go in the same way.

Happily the effects are not usually as dire as in the last instance mentioned, but even a casual observation of a forest shows that many branches die from one cause or another, and that here and there a tree has succumbed. The direct loss may not be great, but dry fuel is furnished for fires, the results of which may be disastrous. A safe remedy where it can be applied, is to remove mature timber, for it is most liable to disease, and all infected timber, no matter of what age. Unfortunately such a procedure has not yet been found practicable on the reserves in Ontario.

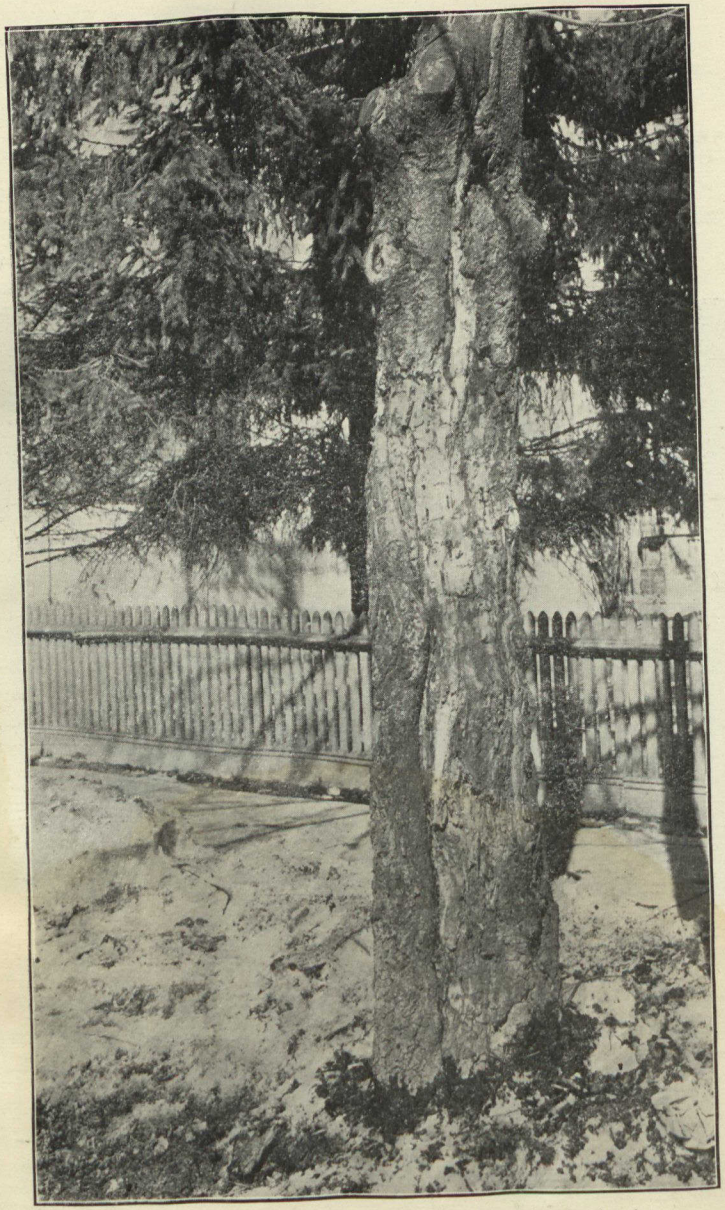
The successful treatment of cut and sawn timber for the prevention of disease, is one of the problems that bids fair to solution. Such timber is very liable to rot, especially if used in a moist place. This is true of wood covered wholly or in part by soil, as in the case of telegraph or telephone poles, fence posts, railroad ties, bridge and foundation timbers, planks for pavements and so on. Frequently, too, timber often discolors, thereby depreciating in market value. Thus "green" and "blue" wood not uncommonly occur, the color in each case being due to the presence of certain fungi, that either contain a pigment within

themselves or secrete a dye that stains the wood. Some woods are much more resistant to attack than others. One of the chief causes of this is the presence of an antiseptic substance in the tissues that was produced when the plant was in life.

The only thing needed to render all cut woods immune from attack is to treat them with some preservative that will mechanically prevent the entrance of fungi and bacteria, or that will act as an antiseptic. From the practical side, such treatment must not only effect that end, but to say the least, should not injure the physical properties of the wood essential to wear, and must be within a certain cost. A few experiments have been made, and with some success. Thus it has been found that the life of white oak may be lengthened out to about 15 years after treatment with creosote and other preservatives. Untreated, they last about 10 years. Similarly some of the softer woods have been treated with advantage; indeed, some otherwise quite unfit for railroad ties, have been made to take the place of the rapidly disappearing oak. These experiments are hopeful, and give promise of an economical production of serviceable woods in an age in which economy is absolutely necessary if the supply is to be maintained.

The subject (of forestry) is of importance far beyond the general understanding of the public. The growth of population in the United States has practically covered all the land which can be cultivated with a profit without artificial moisture. Irrigation and forestry are the two subjects which are to have a greater effect on the future prosperity of the United States than any other public questions either within or without Congress.—*Jas. J. Hill, President of the Great Northern Railway, in Report of American Forest Congress.*

Two Plague Spots.—Fig. 2



A tree which has received serious injury to the bark.
A type of many street trees—Fig. 3

THE GASPESIAN FOREST RESERVE.

The following report recommending the setting apart of a Timber Reserve, has been submitted by Mr. W. C. J. Hall, of the Crown Lands Department, Quebec, to the Commissioner of Lands:—

I would beg respectfully to represent to the Hon. Minister that in the Gaspe Peninsula there exists an opportunity of creating a forest reservation which would possess unrivalled advantageous features for the perpetuating of the forests therein comprised, and the maintenance for all time of the water supply of that region.

I question very much if on the continent of America a better site could be found for exploiting the system of Forest Reserves than in this locality, a system which the United States has adopted unreservedly, and which the Dominion of Canada is fast awakening to, *e.g.*, to-day in the Province of Ontario the Government has set aside territory unsuitable for profitable agriculture to the extent of no less than 5¾ millions of acres, and I have no doubt the intention is to keep on increasing the reserves.

In Germany the State forests comprise an area of thirty-five millions of acres, but they have been practising forestry for one hundred and fifty years.

By the term "Forest Reserve" I would point out that it is not the intention to prohibit the cutting of mature and ripe growth. This can be allowed in the ordinary way under "Timber License," as exists to-day. But by creating such reserves in suitable localities the Government is in a position to enact remedial legislation if it be found that removal of the mature growth is not succeeded by a crop of like species.

It is claimed by some that after cutting the mature coniferous growth the deciduous trees preponderate and snuff out the existence of the smaller coniferous growth existing under the canopy of the broad-leaved varieties.

Should this prove to be the case, then the Government could study the subject and adopt the best means for inducing a succession of the conifers, which varieties of timber are best adapted for the requirements of this country, being so easily floated to the manufacturing points.

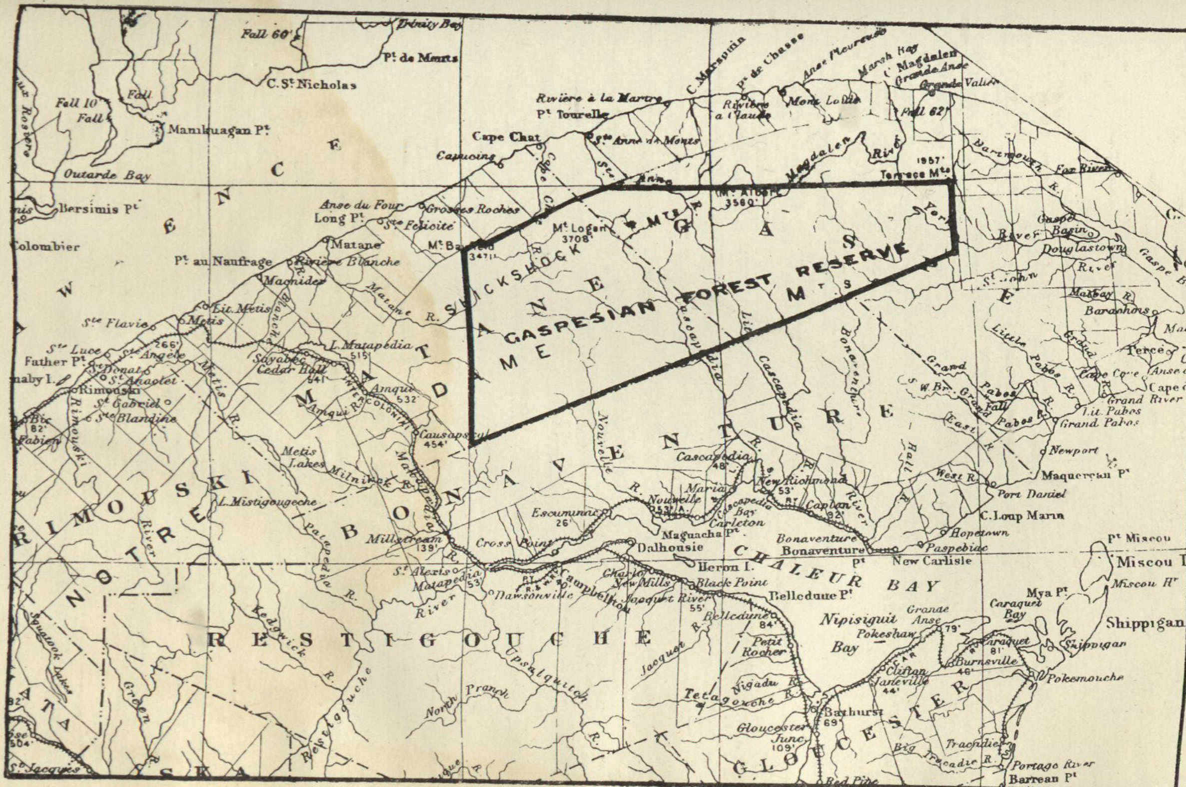
The White Spruce, the predominating variety of timber in this Province, is so prolific a seeder naturally, that many are of the opinion that, provided mature growth only be cut, crop after crop can be taken at intervals of the same variety off the same territory. If this be the true state of the case, then the perpetuating of our Spruce Forests is a forestry problem easily solved. We have only to exercise ordinary care and we will continue to maintain the position now held, viz., the most extensive spruce growing country.

I submit a district map of the Gaspe Peninsula with the territory outlined in green which I would suggest being created a reserve. A glance thereat will show how vitally important it is to this locality to have the sources of rivers left in forest. About a dozen large streams take their rise in the Shick-Shock Mountains which form, as it were, a backbone to the peninsula; these streams run in all directions from the main apex, *i.e.*, the said mountains.

We all know the character of the soil in this district, viz., sandy loam and friable, until one reaches the foothills of the mountains. Imagine the consequences if the sources of these rivers were denuded of forest growth—disastrous floods in the spring, the streams nearly dry in the summer time, the soil carried away from the declivities in immense quantities by the freshets, and finally the whole territory rendered, comparatively speaking, a desert and uninhabitable.

Should the projected railway from Casupscull to Gaspe Bay be completed there would be an additional reason for protecting lands to the north of same, as we have had experience of a bitter nature as to the forest fires by operation of railways.

At the present time it is quite true that there is no danger to be apprehended of lack of timber or water in the Gaspe Penin-


GASPESIAN FOREST RESERVE
CHALEUR BAY
RESTIGOUCHE
BONAVENTURE
GLOUCESTER
RIMOUSKI
MATANE
GASPE
Fall 60'
Trinity Bay
Pt. de Monts
C. St. Nicholas
Fall 10
Fall
Manikuagan Pt.
Outarde Bay
Bersimis Pt.
Colombier
Pt. au Naufrage
Anse du Four
Long Pt.
Grosses Roches
Ste. Felicite
Matane
Riviere Blanche
Mt. Logan 3708'
Mt. Albert 3560'
Terrace Mts
Cape Chat
Capucins
Rivière à la Martre
Pt. Tourelle
Ste. Anne des Monts
C. Marsouin
Pt. de Chasse
Anse Pleureuse
Mont Louis
Marsh Bay
C. Magdalen
Grande Anse
Grande Vallée
Fall 62'
Magdalen River
Dartmouth R.
York
Fox River
Gaspe Basin
Douglastown
St. John River
Malbay R.
Barachois
Percé
Cape Cove
Grand River
Lit. Pabos
Grand Pabos
Newport
Maquereau Pt.
Port Daniel
C. Loup Marin
Hopetown
Paspebiac
New Carlisle
Bonaventure
Cascapedia
New Richmond
Maria
Carleton
Maguacha Pt.
Dalhousie
Heron I.
Black Point
Belledune Pt.
Campbellton
Matapedia
Causapscal 454'
L. Matapedia 515'
Sayabec
Cedar Hall
Amqui 532'
Metis
Ste. Flavie
Ste. Luce
Father Pt.
Rimouski
St. Gabriel
Ste. Blandine
L. Mistigougeche
Millstream
Cross Point
Escuminac
Nouvelle
Restigouche
Kedgwick R.
Upsalquitch
Jacquet River
Nipisiguit Bay
Pokeshaw
Grande Anse
Caraquet
Bathurst
Gloucester Junc.
Tetagouche R.
Petit Rocher
Miscou I.
Pt. Miscou
Shippigan
Pokemouche
Tracadie
Portage River
Barreau Pt.
Squatook Lakes
Green R.

sula, but it is more prudent to take precautionary measures now before any particular locality suffers than to wait until matters are in the same condition as in the western part of the Eastern Townships, the Chaudiere River, the St. Francis and the small rivers flowing north into the St. Lawrence.

I myself have seen the old stumps of fifty or seventy-five years ago being exploited for firewood southwest of Montreal. I have met men who, visiting these places, which they were familiar with many years ago, were unable to find the brooks and streams they used to fish in, nothing being observable but dry beds partly grown with weeds.

The territory I should suggest being created a forest reserve can be described as follows:—

"Commencing at the intersection of the 67th meridian, thence along the rear line of Bonaventure County, thence on the same bearing to the 65th meridian at Lac Edouard; thence north along the 65th meridian to the 49th parallel; thence east along the 49th parallel to the intersection with rear line of Township Cap Chat, hence following rear line of Townships Romieu and Dalibaire and Cherbourg to the 67th meridian; thence south along the 67th meridian to the place of beginning, comprising an area of about 2,500 square miles, or say 1,500,000 acres, more or less."

Quite a large percentage of this territory is under license to cut timber, and if created a reserve these limits would immediately be enhanced in value by reason of such action; better bids woud be obtainable for the lands not already licensed when put up for sale,—any lumberman being willing to pay more for a limit in a reserve than an equally well timbered berth outside of it where there is danger of encroachment by settlers. And as regards settlers and colonization, such reservations of river sources and watersheds are directly in the true interests of such movements—at least the very best and most learned authorities are unanimous on this point.

The natural irrigation of the Gaspe Peninsula, as it exists to-day, is perfect. By all means let us maintain it.

To demonstrate the remarkable concentration of river sources

in the Gaspe Peninsula, I give herewith a list of the prominent streams which take their rise in the interior, viz., the Rivers Matane, Cap Chat, Ste. Anne, Magdalen, Dartmouth, York, St. John, Bonaventure, Little Cascapedia, Nouvelle Escuminac, Casupscull.

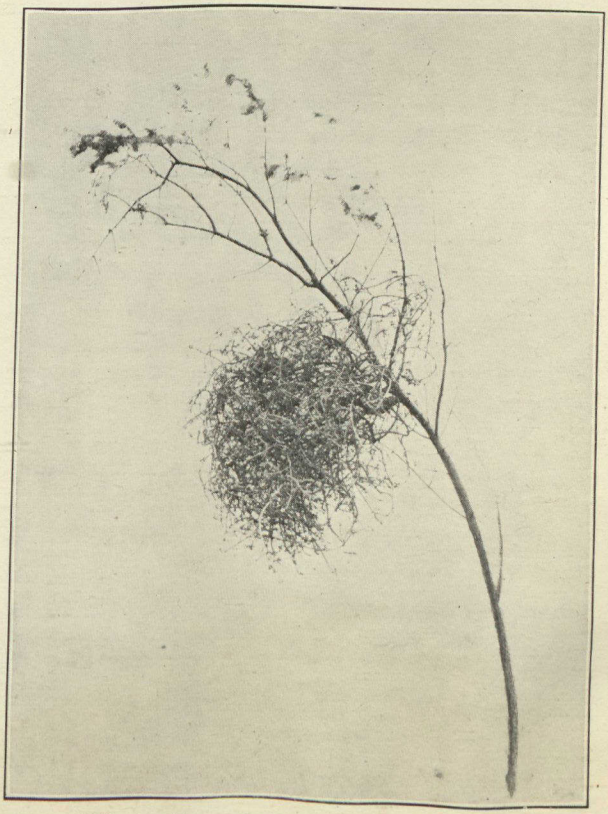
At the risk of repetition I would reiterate that it is highly important to preserve such a system as the above represents until at least the demands of colonization have entirely acquired and put to profitable use the lands lying outside of the boundaries of the suggested reserve.

As a matter of secondary importance only to the preservation of the forests and water supply, I would remark that the said territory furnishes a magnificent opportunity to create a hunting and fishing reserve, which would be of the greatest possible annual value to the residents. Were this tract properly protected I venture to say that in a comparatively short time it would become as well patronized by sportsmen as the northern part of the State of Maine is to-day—and we are all familiar with the statistics here alluded to, since they figure on more than six figures as direct and indirect revenue annually from this source.

An appropriate appellation for the Reserve would be, say, "The Gaspeian Forest Reserve."

I would remark that in other parts of the Province it would be well to create such reserves, but this can be gone into later.

In accordance with the recommendations made in the above quoted report an Order in Council was passed by the Government of the Province of Quebec on the 28th April, 1905, setting apart a Forest Reserve as described under the name of "The Gaspesian Forest Reserve." The Order states the objects of the reserve to be the preservation of the forests whilst permitting the cutting of timber as provided by the regulations now or hereafter in force, thus ensuring the maintenance of natural irrigation as exists at present and which is necessary for the most successful prosecution of the agricultural industry and for the protection and perpetuation of the fish and game in said region.



Witches' Broom of Balsam Fir—Fig. 4.

A Group of P. E. Island Birches.

THE GENERAL AWAKENING AS TO FORESTRY.

The *Farmer's Advocate* pertinently animadverts on the sad system of deforestation in full swing all over Canada, and, recalling some of the trite yet unanswerable arguments against such short-sightedness and neglect, suggests as an encouragement to tree culture and wood preservation, the passing of an act, in Ontario, to exempt woodland from taxation. We presume that the preserves of lumber kings or wood producers on a large scale, operating their limits on sane principles, and making abundant returns, would not be comprehended in this paternal legislation. There might be a difficulty in applying the fostering law with exactitude, but anything which may teach the unthinking the value of the wood area of the farm, to the farm itsef, must prove of incalculable benefit to the country. The state, too, should regulate as it does in older lands, this mania for clearance where clearance is not desirable; and where, by it, the water sources, health and protection of the community are seriously threatened. Wherever the lands are still vested in the Crown, it is criminal at this stage, and with the evil results of it plainly before us, to permit of greater denudation than has already taken place. There are certainly strong reasons, from the position of the General Government, for retaining the administration of the lands in the new provinces of Alberta and Saskatchewan, but none appeals to us more strongly than that advanced in favor of a retention and extension of the woodlands of the north. Federally, it would have been impossible to have left Prince Edward Island in the sad position she is in to-day for want of forest. The Local Administrations of the past without a formal bureau of agriculture, apparently without any knowledge of important conditions of, and requisites to sane living, with only a desire to bridge over the present difficulty by the sacrifice of everything within reach did not hesitate to lend itself here to a system of colonization which, as everyone knows, has jeopardized very largely provincial life and prosperity. The Government of the day if ever so well disposed, is practically impotent in the premises.

Only in the manner suggested by our Ontario confrere, can it now help us; and so far as we are concerned, we shall urge upon them and the public generally, the good sense and patriotism of such a move.

BUT THE FEDERAL GOVERNMENT

must find some means, even outside the regular way, of stimulating a return to proper methods here. The proportion of forest and field is impaired seriously, but under educative and paternal influences, can be practically restored in a short term of years. A land of rich and varied forest when the white man's foot first touched the soil of Isle St. John, there is a natural tendency to recover its place to an extent equal to all hygeinic, agronomic and economic needs quickly; and areas protected from the pasturing cattle, seeded from neighboring bearers, grow up thick with a mixed stand of beautiful trees. Let Ottawa only quietly insinuate its influence for good in this matter then, if the door is not open to authoritative action, and much good will be the result. This province could not resist a desire so beneficent; and the good once done, the asset is surely a national one.

SIR WILFRID, FORESTER.

We were delighted, in a conversation with the head of the Canadian Government the other day, to discover that Sir Wilfrid Laurier is a warm friend of systematic forestry and an enthusiastic lover of trees. In all his varied accomplishments, and admittedly he has many, there is none that does him more honor, nothing more becoming, nothing which bespeaks the warm heart and those gentle feelings which imperceptibly bind men together. He well remembers the calmer and more peaceful days of early manhood, when, in the quiet village which claimed his Quebec home, he planted, tended, and thoroughly enjoyed not only the fructifers of the orchard; but, also, the stately shade trees from the adjacent hillside. Everything grew he touched, and thus, his early enthusiasm absorbed by greater things for the moment, has never diminished in the slightest degree. In him the friends of forestry, and they are Canada's best friends, will ever find a sincere and generous patron. There is great need of a broad and

provident forest policy for this Dominion. We are going into the great northland forests now, and the mistakes of older Canada must not be repeated. To provide against this and to plan wisely for the future of this grand country a formal head in the departmental economy of the government is an urgent necessity. This will better advance the common weal. We know that Sir Wilfrid can be relied on to listen to any reasonable proposition for the betterment of our forestry relations,—aye, he will not only listen, but he will formulate himself, we trow, a new policy which will repress on the lips of future generations with regard to the beautiful forest, the sad avowal of so many in the older provinces, face to face with desolate waste—"too late! too late!"

FORESTRY CONGRESS.

There is to be a National Congress at Ottawa next November. Sir Wilfrid has already signified his sympathy with the movement. Not only that, he intends being in it and of it; and for this has the high precedent of President Roosevelt. We know that his influence, his example, his warm word, and above all, the cheerfulness with which he will give of the Nation's revenues to greatly increase them by wise forestry regulation, will quickly, if not completely retrieve the lost ground in this important interest, and thus permit him to earn a new title to every just man's gratitude.

EXEMPTION A DESIDERATUM.

The idea of exemption in the *Advocate's* mind should not in the meantime be lost sight of, in the provinces. Nowhere so urgently as here should our rulers act. The taxes are not exorbitant, but taxes are always unwelcome. The release of woodland under certain conditions, should be a good thing. The wood-lot might speedily come to be recognized as a public benefaction and the youth of the land, from advertising through the exemption, disposed to study the underlying principle. Then, unpastured woodlands, which alone deserve the special care of the Government, would be speedily increased in area, and agriculture, hygiene, esthetics, and general economics favored beyond dispute. Let us hear from our legislators then in some practical way along these lines.—*Father Burke, of P. E. I., in the Maritime Farmer.*

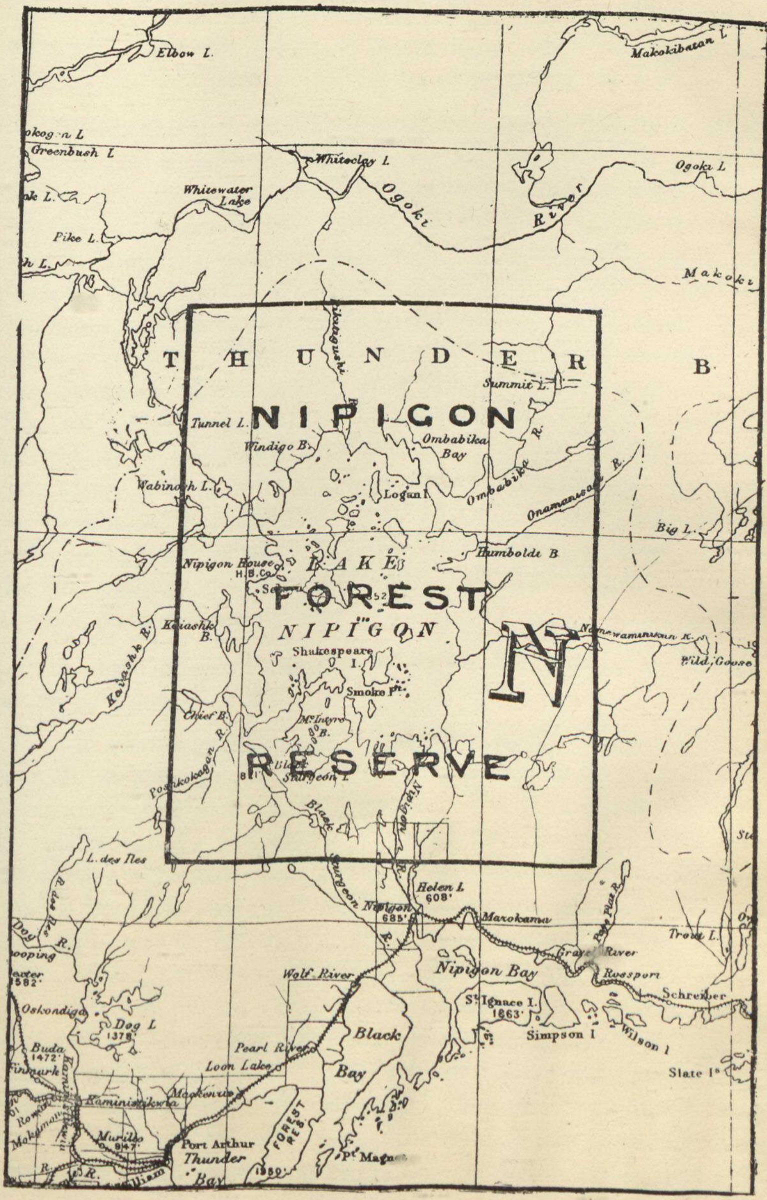
THE NIPIGON TIMBER RESERVE.

By Order in Council, dated the 7th June, 1905, the Government of the Province of Ontario, has set apart the Nipigon Timber Reserve, surrounding Lake Nipigon, north of Lake Superior, as shown on the sketch on another page and described as follows:—

"Commencing at the southeast angle of the Township of "Ledger, east of the Nipigon River in the District of Thunder "Bay, thence due east astronomically twenty-two miles, thence "due north astronomically ninety-eight miles, thence due west as- "tronomically seventy-three miles, thence due south astrono- "mically ninety-eight miles, thence due east astronomically to "the southwest angle of the Township of Purdom, thence due "east astronomically along the south boundary of the Township "of Purdom, and along the south boundary of the Township of "Ledger, a distance of fifty-one miles in all, to the place of be- "ginning, containing by admeasurement seven thousand one "hundred and fifty-four square miles."

There are of course the usual exceptions of lands already patented, Indian reserves, &c. The total area of the reserve, including water, is about four and a half million acres.

The country surrounding Lake Nipigon and now included in the reserve is mostly of Laurentian or Huronian rock formation and except in the western portion of the reserve, has but few tracts of good agricultural land, these, where they occur, being situated along the river valleys. It is not a district that can ever support an agricultural community in large numbers, although where the land is suitable it is possible to raise crops of some value. At the Hudson Bay posts and the missions, efforts in this direction have been made with success, and as the climate is stated to be similiar to that at Lake Temiscaming, there seems no reason for doubt on the question. Barley, potatoes and other vegetables and small fruits ripen readily at Nipigon House. The Nipigon district obtrudes on the line of the great northern clay



Elbow L.
Makokibatan L.
Greenbush L.
Whiteclay L.
Whitewater Lake
Ogoki River
Ogoki L.
Pike L.
Makoki
T H U N D E R B
NIPIGON
Summit L.
Tunnel L.
Windigo B.
Ombabika Bay
Ombabika R.
Onamanisagi R.
Wabinosh L.
Logan I.
Big L.
Nipigon House H.B.Co.
LAKE
Humboldt B.
FOREST
Kaiashk B.
Kaiashk R.
NIPIGON
Shakespeare I.
Wild Goose
Smoke Pt.
Chief B.
McIntyre B.
RESERVE
Sturgeon I.
Black
Nipigon
L. des Iles
Helen L. 608'
Sturgeon R.
Nipigon 685'
Marokama
Dog R.
Trout L.
Gravel River
Rossport
Nipigon Bay
Wolf River
Schreiber
St. Ignace I. 1863'
Oskondiga
Dog L. 1378'
Black
Simpson I
Wilson I
Buda 1472'
Pearl River
Loon Lake
Bay
Slate Is.
Finmark
Mackenzie
Kaministikwia
Murillo 947'
Port Arthur
Thunder
Bay
FOREST RES.
1380'
Pt. Magnet

belt, through which the new transcontinental railway line is to run and causes a deviation to the north. It is now accessible from the Canadian Pacific Railway by way of the Nipigon River, and is already a favourite resort of sportsmen. The Nipigon trout is famous and is a great attraction to all lovers of the rod.

While the agricultural value of most of the district is of little moment and its mineral resources are yet uncertain, the value as a timber preserve is unquestionable, although the pine is not now the characteristic tree in that region. The forest consists mainly of spruce, tamarac, jackpine and birch. Considerable areas have been burned over but are renewing the forest where second fires have not completed the work of destruction by sweeping away the new growth. There are still good timber areas, as that along the Ombabika River which enters the north-east corner of the lake, in which it is estimated that there are 1,484,000 acres of pulpwood aggregating 56,346,400 cords. With protection from fire it may be expected that this reserve will in time become again well timbered throughout its area, and will be of great value not only on account of the pulpwood but also for the supply of ties for the railway development which that district may expect in the not distant future.

A description of the district along the Ombabika River is given as follows:—

"In commencing our work we went up the Ombabika River and, as we ascended this river, as far as we could see from our canoe, both banks are well timbered. The land along the banks is mostly sandy; and about ten miles up this river from Lake Nipigon I was instructed to make my first exploration at right angles from the river, and in this trip for the first mile was rolling sandy soil timbered with white birch, spruce and poplar, and then a rocky country evidently an old *brulé*, as it is now grown up with small jack pine and scrub spruce, and the timber in this exploration would only cut out about ten cords of wood per acre. On the north-west side of the river, and some three or four miles farther up stream in this exploration the timber is much better and the land rolling, with some nice sandy loam flats broken by rocky ridges, and I put the pulpwood, jack pine and spruce only,

at about twenty cords per acre. The balance of timber is white birch, some poplar and balsam. Farther up the Ombabika River and south we found a splendid spruce and jack pine growth around Robinson Lake. This lake is about eight or nine miles south-east of the river and flows into the Ombabika River by a stream called Robinson River. This stream flows through a valley of low marshy land, with a rolling rocky country back from the river and well timbered. Two streams flowing from north-east are tributary to Robinson Lake, with splendid spruce along both streams as far as I saw them. The land in this exploration is not farming land. I put the cut of pulpwood at about thirty-five cords per acre. The balance of the timber is small tamarac and poplar. Ascending the river to Summit Lake and exploring both sides of the river, no farming land is found. There are some flats along the banks, but they are low and swampy and produce some fine large thrifty tamarac. Back from the river the land is rolling and rocky in the low places. We found splendid spruce, and some poplar, and on the slopes and tops of hills white birch and jack pine. From the forks, that is from the mouth of Robinson River, to Summit Lake, a cut of thirty-five to forty cords per acre is about what we would get there. Then we have a fine lot of good tamarac, the remainder of timber being balsam, poplar and white birch."

On the numerous rivers flowing into the lake and on the Nipigon River flowing from it are many water powers of good fall and volume, and which will be useful for manufacturing purposes, or in the time, which it is to be hoped for the sake of the forests is not too far distant, when steam power on railways will be succeeded by electricity. The preservation of the forest will mean the life of these waters.

In the district surrounding Lake Nipigon large game are not plentiful. Few moose or caribou are found, owing probably to the Indians hunting them recklessly and also to the burnt-over condition of much of the country. It is stated that a few years ago the caribou used to be plentiful, while moose were not to be found at all. Recently the moose have been growing more plentiful while the caribou have been disappearing. The country af-

fords splendid grazing ground for these large animals. Small shrubs are plentiful, while the moss for the caribou is found covering large areas.

The smaller fur-bearing animals, such as mink, otter, beaver, martin, muskrat and fox are plentiful, and are trapped in large numbers by the Indians for the Hudson Bay Company.

One curious fact in regard to the fauna of this region is given in the following extract from a report made in 1900:—

"Red deer and wolves first made their appearance near Port Arthur about three or four years ago. They are still very scarce but a number of them have been killed. Mr Hodder, Indian agent at Port Arthur, showed me the skin of the first wolf seen near that place. An Indian had killed the beast and had asked Mr. Hodder what kind of an animal it was. A number of men I met expressed the belief that the red deer had been driven into the district by the forest fires that had raged in the northern states, and the theory appears quite feasible as they were not found in the vicinity until after one of these great fires."

Considerable controversy has arisen in British Columbia over a lease of lands on the Coast and the North of Vancouver Island, which the Provincial Government proposes to grant to the Western Canada Pulp & Paper Co. The area concerned is some 163,000 acres, and a protest against the lease has been made by the B. C. Loggers' Association, on the ground that the timber in that district consists mainly of cedar, and that there is very little wood suitable for pulp making. The Pulp Company, on the other hand, contend that any of the trees, even cedar, can be used in the manufacture of pulp and paper, no matter what their size. Any wood can, of course, be used for pulp, but the question is as to the best and most economical use, and in as far as cedar is concerned, the large trees of British Columbia might profitably be put to other purposes.

THE POPLARS.

The poplars, generically known as *Populus,* are large fast-growing trees which are represented in Canada by several species, commonly occurring. The balsam and the aspen poplar are usually the most common, and are found in nearly all parts of the Dominion, the aspen especially springing up after fires. Besides their quick growth, a reason for their rapid spread is the nature of the seed envelope, which is of light cottony texture, and by which the seeds are carried for long distances on the wind. This habit has made these trees objectionable for street purposes, as when the seeds are falling the roads are covered with the white cotton. The habit of spreading by suckers, which is specially noticeable in the balsam poplar, also causes them to be looked on with disfavour. The poplars are subject to insect attack, and the wood is soft and easily broken, so that they have but few advantages to commend them for ornamntal purposes, the chief one being their fast growth.

The poplars are found in temperate or northern regions, but range as far south as Northern Mexico and Lower California. There are nine species in North America, but their main habitat is toward the north. The poplar is the oldest type of dicotyledonous plants yet identified, being common in North America in the cretaceous period.

Perhaps the best known species generally in Canada is the Aspen Poplar (*Populus tremuloides*), known in the west as the white poplar. It springs up everywhere, especially after fires, and with its white trunk and light green shimmering foliage forms a beautiful contrast to the dark coniferous trees amongst which it grows. The trembling of the leaves is one of the most noticeable characteristics of this tree, and has given it its specific name. The peculiar movement of the leaves is occasioned by the fact that the petioles or leaf stems are flattened laterally, and as a result the slightest motion of the air causes them to tremble violently. As this is more or less characteristic of the poplars it may have

given rise also to the generic name of *Populus,* or people, as representing the restless, moving, whispering crowd of the populace. Glancing in the bright sunlight, nothing could be more beautiful than the tremulous motion of the leaves of the aspen, but to a person unused to the sound, nothing is more weird than the continual rustling and whispering of the foliage when the silence of night has fallen. To the uninitiated it is continual presage of a rain shower, or, if he be of an imaginative temperament, he may endow the trees with life and hear strange mutterings in an unknown tongue. There is a tradition that the wood of the cross was taken from this tree, and that it is in consequence of this that it is always trembling with shame. Among the French Canadians the aspen is regarded with a superstitious reverence, and they do not care to use it for ordinary purposes.

Populas tremuloides is the most widely distributed tree of North America, springing up easily everywhere, but the north seems to be its natural habitat, for there it reaches its best development. In Eastern Canada and the north eastern states it rarely exceeds fifty feet in height. In the western prairie region it reaches a height of sometimes one hundred feet, with as great a diameter as three feet at the ground, although the average is not more than twelve to eighteen inches. The wood is close-grained but soft, and neither strong nor durable. In the east it is made into wood pulp for the manufacture of paper, and in the west is employed for general purposes. It forms the most convenient fuel for many of the northern districts and has an important place in the economy of nature. Germinating quickly and growing rapidly, it forms a cover for denuded soil, and gives protection to the young trees of longer-lived species.

The leaves are broadly ovate and abruptly pointed at the tips. The edges are serrate with small teeth. The foliage is dark green on the upper surface, and in the autumn changes to a golden yellow, which lights up the sombre northern landscapes in a most beautiful way. The flowers, as with other species of the poplar, appear in the spring in aments or catkins, the fertile and infertile flowers being separate. The light bark often makes it difficult at a distance to distinguish this tree from white birch.

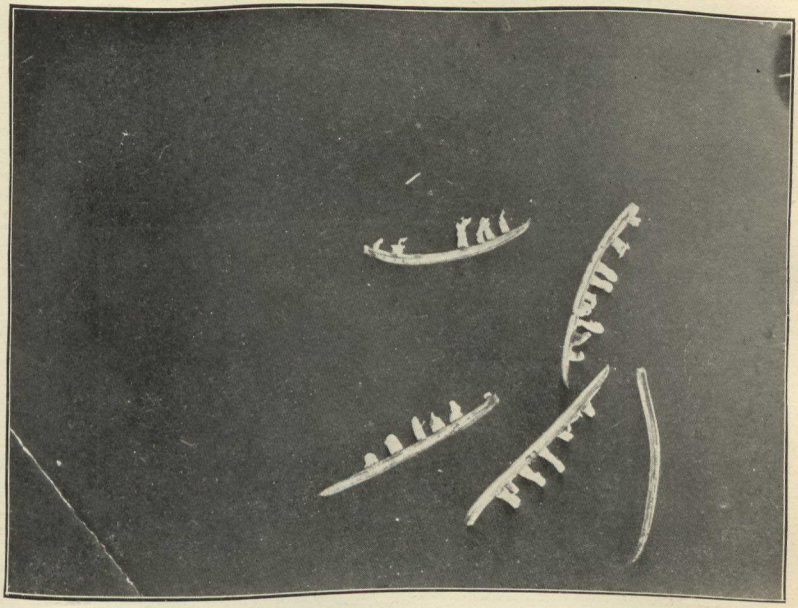
Growing commonly with the Aspen Poplar, but not so num-

erous, is the Large Toothed Poplar, *Populus grandidentata,* Michaux. This name suggests the most marked characteristic which distinguishes it from the aspen, namely the widely-spread teeth with which the edges of the leaves are prominently serrate. The bark is not as light in color, and the wood is light, soft and close-grained, but not strong. It is not considered as vauable a species as the first described, but is used for largely the same purposes.

In the Cottonwood (*Populus deltoidea,* Marshall; *Populus monilifera,* Aiton) the leaves resemble somewhat those already described. They are deltoid or broadly ovate, and the edges are coarsely crenate or bluntly toothed, being in this respect between the leaves of the aspen and the large-toothed poplars. The base is broad and usually truncate or straight, though sometimes heart shaped. The aments or catkins of the pistillate or fertile flower often reach a foot in length and their resemblance to a necklace has given occasion for the specific name, *monilifera* or necklace-bearing. This tree ranges from Quebec to the base of the Rocky Mountains, but it is on the western plains that it has been found most valuable. It was the chief dependence of the early settlers of the Western States, and is being found useful also in Western Canada. It has been distributed largely by the Forestry Branch of the Department of the Interior to farmers for setting out in shelter belts and woodlots. Good success has been had with it except in south-eastern Manitoba, where it has been found subject to rust. Growing naturally, it attains the best development in the river bottoms and moist, rather heavy soil is its favourite location. It is sometimes killed back by the frost, but this is probably the result of immature growth on account of wet seasons in the fall.

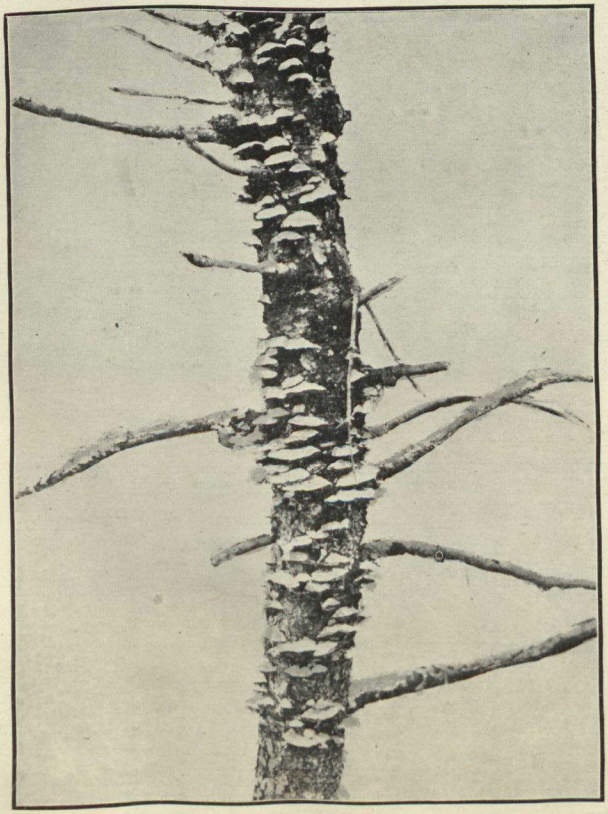
The cottonwood grows to one hundred feet in height and sometimes seven or eight in diameter. With its height and spreading head it makes a splendid shelter, and, as it grows rapidly, is soon sufficiently developed to make its effect felt. The wood is light, but it is useful for fuel and general purposes. The heartwood is dark brown and the sapwood nearly white.

Leaving the other native poplars for future consideration,



Needles of Black Spruce: four of them infected with rust.—Fig. 5

Black Spruce killed by rust —Fig. 6



"Shelf Fungi" on a dead Black Spruce.—Fig. 7

mention may be made of two introduced species which were at one time in great favour.

A row of Lombardy poplars (*Populus dilatata*) was a frequent feature of the agricultural landscape of Ontario and the Eastern States, and although it is practically useless for any purpose, the stiff, military appearance of a row of such trees made a striking and not unpleasing feature of the landscape. The Lombardy poplar, as its name indicates, was introduced from Italy, through France, was strongly advocated by Joseph Jefferson, and was soon distributed through the Eastern States and Canada. One reason for the favour it found was that its tall spire-like form was supposed to be a protection from lightning to the buildings in the vicinity, although the belief in its usefulness for this purpose has gone the way of the faith in the lightning rod. The characteristic upward growth of the branches gives this tree an unfailingly individual appearance which makes it easily distinguishable. They never spread, and a row of these trees requires only a narrow space. The leaf is rather broader than long, and tapers toward both ends, the point being long and sharp.

Another introduced tree is the White Poplar or abele. It was frequently planted as an ornamental tree and its foliage, dark green and shining on the upper surface and cottony underneath, gave it a very attractive appearance. But its persistent and troublesome habit of spreading by suckers, and the shower of down which covered the ground when the seeds were falling, has caused it to fall into disfavour The leaves are easily distinguished by their lobed shape, much resembling the leaves of the maple.

The present season has not so far been marked by any great number of forest fires. In Cape Breton a fire occurred in the spring which threatened to assume serious proportions. During June, New Brunswick was visited with a fire that destroyed considerable timber, including some on Mr. Gibson's limits. It is reported that extensive fires have occurred on the Yukon River and on Prince of Wales Island. A recent fire has also taken place in the Temagami Reserve in Ontario, along the line of the Government Railway.

NOTES.

The report of the Commissioner of Crown Lands for Ontario for the year 1904, shows a total revenue from Woods and Forests of $2,650,782; $1,664,268 being received on account of bonuses, $919,471 on account of timber dues and $64,997 on account of ground rent. There were 318 fire rangers on duty in the forest exclusive of those in Algonquin Park and the Forest Reserves. The cost of this service for the year was $82,589, of which the Department paid $42,989.

Of the 318 rangers 290 were distributed over licensed territory, 12 on the Temiscaming and Northern Ontario Railway and 16 elsewhere on lands of the Crown not under license. The rangers along the line of the Temiscaming and Northern Ontario Railway were under the supervision of a Chief Ranger, who was clothed with magisterial powers, so as to try promptly any offenders against the Fire Act. A ranger was also placed on the construction of the branch of the Canadian Pacific Railway between Romford Station and Byng Inlet on the unlicensed lands, and one was on the head waters of the Missanabie and Moose Rivers, so as to post up notices on the portages and have a general supervision of parties using these waterways.

No serious fires occurred on licensed lands. There were two fires in the Temagami region, one near Net Lake, which would certainly have developed into a very serious fire had it not been promptly suppressed by the rangers on the spot. The other was on Horse Island in Lake Temagami, which was suppressed by the rangers in the reserve, which would no doubt have assumed very serious proportions had it not been suppressed by the rangers.

The Superintendent of Algonquin National Park in Ontario reports that in 1904 the capercailzie introduced the previous year were seen in several places. They evidently made direct for the

heavy pine sections. Several of them were seen at different times during the summer by parties in different sections of the park. Two of the rangers reported seeing a mother with a very fine lot of chickens. They were enabled to examine them closely seeing them on two different occasions. The successful propagation of this famous Scotch grouse should be a great attraction to the park and will furnish a new and useful game bird in that district.

The quantities of wood cut in the Adirondack and Catskill forests during 1904 were 699,287,760 feet, spruce leading with 161 million feet, hemlock 69 million, white pine 36 million and hardwoods 68 million. In the Adirondacks 481,876 cords were used for pulpwood, four-fifths of which was spruce. The consumption of wood for pulp has increased from 5,835,844 feet in 1890 to 289,125,600 feet in 1904.

Of how much of the northern part of Canada can the same description be given as the following, from a report of the Geological Survey on a portion of the Rainy River district:—

"Comparatively a great part of the country embraced in the area mapped has been ravaged by fire within the last half century. These devastating fires, which do so much to mar the beauty of the scenery and destroy the timber, are too often caused by the carelessness of explorers, prospectors and hunters. The Indians are very careful to extinguish their fires during the dry season, but it is to be regretted that the fatal carelessness of others cannot be checked. The amount of valuable timber thus destroyed is mutely but strongly attested by the gigantic half-burned dead pines which, towering in the air, add so much to the wildness and desolateness of the scene. Where sufficient time has elapsed a dense second growth has sprung up, consisting, in places, almost entirely of jack pine, thickly clustered, sometimes of more thinly scattered birches and poplars, but generally of all three, with the addition of spruce. Frequent clumps of Norway pine often break the monotony of the burnt country. These trees remain unscathed, and where they are thickly clustered, have often arrested the progress of fires in that direction."

A deputation of holders of timber licenses waited upon the Ontario Government some time ago, to present certain suggestions regarding the protection and conservation of timber. One proposal was that the Government should appoint inspectors to report upon the adaptability of localities situated within districts under timber license, and unless at least ten per cent. of a township is suitable for cultivation, such lands should not be open for settlement under the Free Grant and Homestead Acts, and if already open, should be withdrawn. Instead of a location certificate being granted, the deputation suggested that the applicant should not be located, but should be allowed only to enter upon the lands for the purpose of cutting and clearing and putting under cultivation the two or more acres prescribed by the regulations, building the house and residing upon the lands according to the requirements of the Act, and then, after the expiration of six months, upon furnishing the department with valid proof of residence and improvement, and of his having complied with the provisions of the Act, he should receive the location. The further provision should be made that he is not to be allowed to cut timber except in the actual process of clearing for cultivation, prior to the issue of his patent. The request was also made that rights of licensees to cut timber other than pine, where it is included in the licenses, be not made to cease upon the location as at present, but be suspended from the time of the location, to be revived on abandonment or failure of the locatee to comply with the regulations. Attention was also called to the resolution passed by the Lumbermen's Association, urging that the newer and unexplored districts should be explored in advance of settlement.

Within the last two years a British Syndicate, in which the Harmsworths, who are among the leading newspaper publishers in England, are the prime movers, have been making enquiries with the object of acquiring control of pulpwood lands, and establishing a pulp and paper mill to supply their various enterprises in England. Having looked over the ground in all the eastern Provinces of the Dominion as far as Ontario, they finally came to the conclusion to locate in Newfoundland, the determin-

ing factors in the decision being apparently, in addition to an adequate supply of raw material, the advantage of having an ocean port free to navigation throughout the year, and the practical independence of railroad transportation. There may perhaps be the additional factor that it was possible to obtain a better bargain with the Government of Newfoundland than with the Governments of the eastern Provinces.

The Newfoundland Government has entered into an agreement with the Harmsworth Syndicate, the main provisions of which appear to be the following:—The corporation is permitted to secure a solid block of timbered land, containing 2,000 square miles, for 99 years without rental. The concession makes pulpwood free of dues, other timber being subject to a royalty of fifty cents per thousand feet. It also gives virtual ownership of the land with mineral rights. The company is required to spend a quarter of a million dollars during the first four years, and a million dollars during twenty years. Game and fish are reserved for the public, the natural migration of the caribou is to be left unrestrained and the right of way for roads, railways, telegraph and telephone lines is also reserved.

A strong agitation against the confirmation of this agreement arose in Newfoundland, and the bill has been fought at all stages, and appeal has even been made to the British Government for disallowance. The movement is strengthened by the fact that the bargain made in 1898 with the Reid syndicate, for the building of a railway across the island, gave away large public privileges, without the matter having been submitted to the people, and the feeling that the present agreement is a repetition of the same process.

One of the chief objections made to the bargain is that it does not specifically require the building and operation of a pulpmill within a fixed period, although the grantees are obliged to spend $250,000 in and about the providing of water powers, and the erection of a mill or mills within four years. The reply of the Syndicate to this argument is that many exhaustive investigations have yet to be made as to mechanical and engineering data, and to force their hand might be to cause them to erect a mill that

might be useless, as they say has already occurred in Canada when such a provision was put into force.

The lawyer for the Harmsworths claims that an equally satisfactory explanation exists with regard to every other clause in the bill. His clients, he says, only sought an area extensive enough, and contained within a suitable watershed, to enable the forest growth to be cut scientifically and then reproduced by the most advanced methods of modern arboriculture, while it could be properly policed and protected so that its one substantial asset, from their view point, its standing timber, might be safe-guarded from every vagrant wanderer whose camp fire might destroy it in a single night. The possession of such an area assured to them, and satisfactory legislation to prevent bush fires enacted, together with such concessions as will warrant them in embarking in so large an enterprise in a new and untried country, and they will at once launch out in the establishment of a plant and accessories, which will reach five million dollars in a few years. They have all their plans now perfected for opening up work—engineers and experts engaged to make investigations as to the water powers, flow, ice drift, mill sites, dams and factories; surveyors ready to begin the mapping of the entire watershed; forestry experts to undertake the scientific reforesting of the waste lands, where such can be done, and wood rangers to assume the task of patrolling the borders and seeing the region kept free from bush fires.

As the Newfoundland Government controls the customs as well as the land revenue, it may expect to obtain through the former source, consequent upon the trade development which the contract promises, a return for the concessions made, but it is hardly a wise Government measure to alienate large areas of the forest lands of the Colony, without at least a provision to ensure a direct revenue to the Crown. Stumpage dues would probably be the preferable method of such taxation, as it would thus only keep pace with the development. The future rights of the Colony should certainly be safeguarded in some way, the opportunity for development need not necssarily be set aside, and it is to be hoped that the statesmanship of the island colony will be strong and able enough to work out a solution that will make for its advancement and its future, as well as present, prosperity.

Mr. E. Stewart, Dominion Superintendent of Forestry, has just returned from a trip to Europe, which he made with the purpose of studying forest conditions and management in the more advanced countries of the old world. He visited the scientifically managed forests and the forest schools of France and Germany, and had the opportunity of meeting and discussing forestry questions with some of the leading foresters of those countries, and also Dr. Schlich and Sir Dietrich Brandis in England. The results of such observations will be of much advantage to Mr. Stewart in his administration of the Dominion forests.

The same careful and methodical policy is being introduced in our colonial dominions. There the difficulties are sometimes very great, because the havoc has been more complete. We try, for example, to reinduce trees to give back to Southern Tunis its pristine fertility. Most of it is now a sand desert. What it was in Roman times we know by the ruins and the inscriptions. The capital of the South, Suffetula, as it was called, consists now in scattered ruins in the midst of absolute desert. One of the inscriptions discovered contains a description given by an old Roman veteran of what his villa was. He had retired there after his campaigns, and describes the trees, the plots of grass, and the fluent waters, which adorn his retreat—now buried under the shroud of the desert sand.

The Arab conquest destroyed all the trees there and killed the forest. The punishment was not long to follow. No forest there. No men. Not long after the conquest, the mischief was already considerable, the land was desolate, and an Arab chronicler, seeing the havoc done, recalled in his book the former times of prosperity, adding: "But in those days one could walk from Tripoli to Tunis *in the shade.*"—*M. Jusserand, Ambassador from France, in Report of American Forest Congress.*

The following communication has been received from Mr. W. B. Hoyt, of N. B.:—

"In your annual report for 1904, in a discussion on the distribution of forest seeds, p. 51, Mr. Bertram makes a remark

relative to the distribution of white pine seed, and, incidentally to be applied to other forest seeds, which I think, is very wide of the mark. Mr. Bertram says: "The seeds of the white pine get blown out of those positions....and are carried far and near over the country.....That is the only way white pine seed can distribute itself."

Now there is no doubt that a considerable distribution takes place in this way to near points, but it would only be in an exceptional hurricane that these seeds would carry a mile, or even half that distance.

I think that there is a strong similarity in the methods by which the seeds of the coniferous trees are distributed, so that what will apply to spruce or fir will apply to pine. Now, in my opinion, one important source of distribution is by animals. We know that it is a common habit for squirrels to carry their food to a fallen tree for consumption. We see this done everywhere; it is very rarely that they eat sitting on the ground. Generally they perch on a fallen log or a branch. Now I have frequently noticed a dense growth of sapling spruce or fir in the immediate vicinity of a fallen tree—in many cases you can trace this clump for the full length of a fallen trunk, showing that it has at some time been the favourite feeding ground of a family of squirrels. These squirrels are in turn devoured by owls, foxes and other carnivora, and large quantities of undigested seeds are deposited in their excreta; and as many of them roam over a large field, this method becomes an important source of distribution.

But probably the most important source of distribution, and one, the study of which will lead to the most practical results, is that effected by the spring floods. The seeds dropping on the earth or on the snow, in the early part of the season, are carried by the rivulets which form in the melting of the snow, and are distributed along their entire course, many of them being carried into the larger streams and deposited over large submerged areas in the spring.

The consideration of this mode of distribution should be an important factor in the selection of forest reserves, as, in this way, areas selected on a watershed form not only a kind of re-

servoir for the more equal distribution of the rainfall throughout the year, but act, also, as a natural nursery, producing and distributing a form of flora naturally adapted to the locality.

The Annual Report for 1904 of the Department of Waters and Forests of France furnishes some interesting figures. The area of state forests is 1,169,820 hectares or 2,911,625 acres. The financial returns for 1903, the last available, were 29,373,903 francs or $5,874,780, an average of about $2.00 per acre. The product of the wood cut was 21,247,520 francs, and from other sources 8,126,383 francs. The value of the wood imported into France in 1904 was 167,400,000 francs and the export 53,900,000 francs, leaving an adverse balance of 113,500,000 francs.

The Moosomin, N.W.T. town council, wishing to encourage tree planting upon the streets by private citizens, has passed the following by-law:—"All property owners or tax-payers, who plant trees on the streets, not less than eight feet from the street line, good, healthy maples, ash, or elm, of a size at least two inches through in the trunk, and not less than twelve feet high,—for every one in every twelve and a half feet so planted shall be paid the sum of fifty cents each."

The conditions are that the trees are to be properly planted and staked, and to be to the satisfaction of an inspector appointed by the council. The inspection is to be made in July of the year following the planting of the trees. At the time of the inspection, if the trees are found in a healthy, growing state, the inspector shall issue to the property owner or taxpayer, a certificate of 50c. for each growing tree. This certificate is to be accepted in lieu of cash by the tax collector for the sum specified, when the property owner or tax-payer is paying his taxes for the year in which the inspection is made.

Nearly all the developed mines of the Black Hills are large deposits of comparatively low grade ore, either free milling or cyaniding in its character; frequently both processes are com-

bined in the extraction of the values from the ore. In the successful prosecution of the work required to make a mine productive and remunerative to the owners, the use of timber is an absolute necessity. Its uses are varied. It is required to timber the shafts through which the ore is drawn to the surface. Heavy timbers are also required to take the place of the ore mined, to hold up the roof of the workings, and sustain the sides of the stopes and drifts. The place of every supporting atom taken from the interior of a mine must be filled by some other material which can carry the burden with safety to the lives of the miners employed. This requires timber from the forest. No other material can be substituted for it. The use of iron or steel posts and beams is prohibited by their cost, to say nothing about their inadaptability to the work of underground mining.

It can be truly said that a veritable forest has been used underground in the mines of the Black Hills during the few years they have been in operation, that no more of the forest has been used in their development than has been absolutely necessary, is doubtless true. The grade of the ore, the high wages paid, and the satisfactory returns received in most cases on the investment, prove that the mines have been most economically managed, the timbering being one of the heaviest items of expense in their operation.—*Seth Bullock, Supervisor of the Black Hills Forest Reserve, at American Forest Congress.*

The report of the Swedish Forest Department, for the year 1903, gives the total area of the forests under charge of the department at the close of that year as 16,394,944 acres, or about half the area of England. Of this area, however, about 2,069,475 acres were woods in the hands of communes or other authorities who had the right to the revenue of these lands, so that only the proceeds of about 14,325,469 acres were paid in to the Department. From these 14,325,469 acres must also be deducted 862,023 acres, the revenues of which were handed over to the ecclesiastical authorities, leaving only 13,463,446 acres as the area of the State Forests proper. The latter gave a gross return of 8,673,224 kronor for the year 1903. The cost of management, which included the

making and improvement of roads and the clearing of waterways for floating, etc., amounted to 2,445,532 kronor, leaving a net profit of 6,228,002 kronor, or roughly $1,700,000, being about thirteen cents per acre. It must be borne in mind, however, that the great bulk of the Swedish State Forests are situated in the extreme north of the country where the growth of conifers is slow, and where there are large expanses made up of marsh and other non-forest-bearing ground. Allowance is evidently made for this in the estimate of the value of the Swedish Forests, which is placed at about $26,500,000, or $2.00 per acre, as in the southern part of Sweden which supplies the bulk of the contribution to Great Britain and that of the best quality, $25.00 an acre is not an uncommon price for denuded forest lands.

The following is a copy of a resolution adopted by the Central Farmers' Institute of the Province of British Columbia:—

"Whereas, the delegates of the Central Farmers' Institute in convention assembled are of the opinion that the conservation of the forest wealth of the Province, one of the principal sources of wealth and bearing as it does so intimately on the agricultural interests, is of the first importance,

Be it therefore resolved that the Government be asked to use all means in its power to prevent destruction of forests, whether by fire or by wasteful methods of lumbering,

And be it further resolved that the Government be asked to use its influence with the Dominion Government, or otherwise, to make a reserve of a tract of forest as a National Park to the end that at least a remnant of our original forest may be reserved for posterity,

Resolved, that in the best interests of the country, it is desirable that reserves should be made of forest lands."

Russia seems to find the forest a certain resource to fall back upon in time of financial stress, much in the same way as some of the Canadian provinces. It is stated in Russian newspapers that in view of the financial difficulties in which the Government is

situated, owing to the war and internal discord, the Forestry Department of the Ministry of State Domains has been authorized to sell large quantities of timber in the Province of Vologda, for shipment from the Petchora. At present, only two sawmills are said to be working there. It is expected that as a result of the financial burdens of the war, it will be necessary for Russia to exploit her forests to a large extent, and this may be expected in the forests of the White Sea district for the export trade.

The St. John River is the scene of a dispute which has assumed international proportions, inasmuch as it is based on an international agreement, that no obstruction should be allowed to the free navigation of the portion of the river which forms the boundary between the United States and Canada. A great many logs, cut on the upper part of the St. John River in Maine, are sawn at the mills in New Brunswick on the lower reaches, particularly at St. John. One of the firms operating on the Maine side where the river is the boundary, has built a dam so as to direct the logs into the pond for sorting, and, although the logs belonging to mills lower down are afterwards sent on, the owners object to the delay and consider the dam an interference with the stream in contravention of the international agreement. An effort has been made to include the difficulty in the disputed matters to be taken up by the International Waterways Commission.

REVIEWS.

Report of the Dominion Superintendent of Forestry, 1904. *pp.* 28.

The succeeding reports of the Dominion Forestry Branch tell a story of steady progress. The distribution of trees to farmers in the West reached the number of 1,800,000, bringing up the total distribution to 3,242,750, while the stock in the nurseries is 4,229,557. The satisfactory character of the work done in the setting out of these trees is shown in the fact that the percentage of success is from 80 to 95 per cent. Two special phases of forestry work of the utmost importance to Canada are emphasized by Mr. Stewart in the following paragraphs, which are well worthy of quotation:—

"The early history of Canada is much enlivened by the accounts of the journeys of the pioneer explorer into hitherto unknown regions. The explorer and the missonary during the French regime went hand in hand, and their names are written far beyond where the settler of to-day has yet gone, but private exploration is a thing of the past. Men to-day are too busily engaged in personal advancement to permit of the gratification of a spirit of adventure if such should exist, and the result is that we know practically as little of the heritage we possess beyond the settled districts as we do of Africa or Australia. It is true that the Geological Survey has done all that could be expected of it with the limited means at its disposal, but it seems to me that the day has now come when the people of the country should have the means of knowing the character and natural resources of their own unoccupied possessions. The government should know in advance of settlement the character of the unsettled districts, so as to direct immigration aright; so that mineral lands might be set aside as such; agricultural land devoted to the agriculturist, and land unsuited for agriculture but on which timber is growing reserved permanently for timber."

"The protection of our natural forests is a matter of supreme importance to the whole country, and one that has been almost neglected in the past. The spectacle witnessed by the traveller passing through our unsettled forest country is sad indeed. On every hand he beholds the charred remains of the old time forest. He sees this as he journeys through Nova Scotia, New Brunswick, Quebec, Ontario, the Northwest Territories, and, sad to say, this destruction is not least if not greatest in the giant woods of the Pacific slope. Everywhere this destruction of public property is before his eyes, and it is humiliating to confess, as we must do, that the fires which caused this great loss were not only permitted but in some cases caused by our own people. The settlers in these regions on the one hand laboured with all the energy characteristic of the backwoods pioneer to create wealth, while on the other hand they lighted the torch which resulted in greater loss to the country as a whole than was caused by all the conflagrations that have ever occurred in our settled districts."

The Forestry Branch has now secured land in the vicinity of Indian Head for the location of a forest nursery which will be entirely under its control. This is described in the report of Mr. Ross, the Assistant Superintendent. Mr. Ross also mentions the species of trees that have been found most successful as follows:

"On the whole the trees sent out have done exceedingly well, and with only a few exceptions are carefully attended to. In the reports of the inspectors a more detailed account will be given of the success of the different varieties in each district. The maple, elm, ash and willow seem to do well over the whole of the West. From recent reports the cottonwood in south-eastern Manitoba does not seem to be entirely satisfactory, but in other districts it appears to be the fastest-growing tree we have. The cottonwood is a tree which seems to thrive best on the heavier soils and in moist places. In south-eastern Manitoba, however, the main difficulty seems to be with a rust fungus which affects the foliage; but the district where this is prevalent seems at present to be very limited. The cottonwood too is looked upon with disfavour by many on account of its killing back in the winter. This, however, does not seem to affect the growth of the trees to any extent in the majority of cases. The wet falls

of recent years and the consequent late growth, which does not give the young shoots an opportunity to ripen before the heavy frosts, account no doubt for the rather large amount of killing back during the past seasons. After the trees are three or four years old the winters do not seem to have any effect on them, at least the older trees on the experimental farm here have shown no sign of killing back for several years.

"The Russian poplar we do not distribute very much, as it has been found that after they get to be a few years old they become subject to the attacks of borers and fungi. Mr. Mitchell reports that two-year old trees planted at Gleichen in Alberta and at other points are already being affected by this fungus. When the trees are young it seems to attack the stem at the point where the root commences, and rots the outer wood and the inner layer of bark, thus destroying the circulation of sap.

"The elm and ash, especially the latter, seem to be coming into more general favour. They are both very hardy and are longer lived and produce better timber than either the poplar or willow, although they are slower in growth. The ash is very readily raised from seed, the elm not quite so easily, the seed being scarcer, and, unless sown under proper conditions of soil and moisture, it does not seem to germinate at all evenly; hence we cannot distribute this variety in such large quantities as either the maple or ash, although it is without doubt the best broad leaf tree we have."

The reports of the Inspectors of Tree Planting and of the forest protection officials are appended and give much detailed information.

Forestry Affairs in New York, 1904. *Col. Wm. F. Fox, Superintendent of State Forests, Albany, N.Y.*, 28 *pp.*

The reports of the New York Forest Commission are always interesting on account of the material they contain and the close resemblance between the conditions there and in parts of Canada. New York State was fortunate in the little damage done by fires during 1904, the total loss to state timber being only

$81. One of the worst fires was started from a railway operated by a lumber company and resulted in a loss to the company of $5,000.

In reforestation work a hardwood plantation of some 70 acres was set out consisting of red and pin oak, chestnut, black locust and black walnut. The seedlings were planted seven feet each way instead of four feet as is usual with conifers. The scattering of the seeds of coniferous trees was also tried and the question is one of so much importance that the paragraphs in regard to it are worthy of quotation in full:—

"Another tract was sown with white pine by the seed-spot method. The land selected for this purpose is in Essex County, near the highway running from Lower Saranac Lake to Lake Placid. The growth on this site was so uneven, rough, and overgrown with scrubby brush that the planting of seedlings at regular intervals was not practicable. The seed-spot method consists in breaking up the ground in small circular spots, about two feet wide, and at intervals of eight feet each way, or as near that as the obstacles will permit. A few seeds, ten or twelve, are scattered on the freshly turned ground and lightly covered with earth. When the seedlings thus propagated are two years old they are taken up, with the exception of one which is allowed to remain; the others, so far as needed, are set out immediately in the intervening spaces close at hand, forming thereby a plantation with intervals of four feet each way between the plants. The seed-spot method, owing to its smaller expense, is used also on smooth, level ground, in which case the patches are made at the smaller intervals on the start, thus saving any subsequent transplanting into the spaces.

"Another small tract near the Lake Placid road was sown with white pine seed, scattered broadcast. This method is also preferable on ground where seedlings cannot be set out with advantage, and furthermore, it is the cheapest way to reforest denuded lands. But it has its disadvantages as well; the seeds are often eaten by birds or rodents; and, under the most favourable circumstances, the germination is very apt to be uneven, the sprouts coming up thickly in some places, and scarcely at all in others.

"Still, the broadcast sowing of native spruce, in 1902, under the poplar groves near Aiden Lair, in Essex county, was successful in every respect. Forester Knechtel, who did this sowing, was instructed to make a careful examination of this ground last spring, and make a report on the result. He found the surface under the young poplars—trees twenty-five feet high—thickly covered with little spruce seedlings, and his report was so encouraging that broadcast sowing will be undertaken on a large scale as soon as we can gather a supply of seed from our native spruce for that purpose. The experiment at Aiden Lair indicates that the numerous areas of poplar forest whch now cover many of the old burns can be successfully underplanted with red spruce."

The methods followed in obtaining a supply of seed also give useful data and are described as follows:—

"The year 1904 was a seed year for white pine in New York, and so arrangements were made for gathering a supply, as this species produces seed only at intervals of four or five years. An examination of the pines in Northern New York was made by our foresters last year, when it was found that the little cones which require two years maturing, were forming to an extent that indicated a seed year for 1904. As the native red spruce and Norway pine did not bear cones this year the work of seed gathering was confined to white pine.

"Work was commenced early in September, before the scales on the cones had opened, and a supply was gathered between the 6th and 18th of that month. The men and boys employed were paid 30 cents per bushel delivered in sacks at Willsboro, at which prices they made good wages. At the start only 25 cents was paid, but as other parties on the ground were offering 30 cents per bushel, Mr. Pettis was obliged to pay the same.

"The cones were threshed and dried in a barn near Willsboro, rented temporarily for this purpose, after which the seeds were cleaned and winnowed in a fanning mill of the kind used by farmers."

"A bushel of white pine cones yield on an average a little over one pound of clean seed, which contains about 29,500 grains.

As the foresters received 500 bushels of cones they secured over 500 pounds of clean seed. This supply cost 47½ cents per pound, not including the forester's expenses or the purchase of some material which was charged to the permanent plant, and is available for future work of this kind. As the market price of white pine seed runs from $2.50 to $4.50 per pound, according to the absence of a seed year and its scarcity, it will be seen that the work was timely and economical."

Proceedings of the American Forest Congress. H. M. Suter Publishing Co., Washington, D.C.—pp. 474.

The Report of the Proceedings of the American Forest Congress held in Washington, in January, has been issued. It includes the papers which were read at the Congress and impromptu addresses delivered in the course of the discussion, and altogether is the most complete exposition of the forest problem as it affects the United States, which has yet been placed before the public. The type is clear and easily readable, and the general appearance of the volume is creditable to the publishing firm. Elsewhere are quoted some extracts from a few of the papers.

A Primer of Forestry. Part II—Practical Forestry. By Gifford Pinchot. Bulletin No. 24 *of the U.S. Bureau of Forestry.*

The second volume of the Primer of Forestry, by Mr. Gifford Pinchot, Forester to the United States, has been received. In the first volume the subject was "The Forest." In the present volume the purpose of the work has been further developed in a discussion of "Practical Forestry," which the author defines as follows:—

"The object of practical forestry is precisely to make the forest render its best service to man, in such a way as to increase rather than diminish its usefulness in the future. Forest management and conservative lumbering are other names for practical forestry. Under whatever names it may be known, practical forestry means both the use and the preservation of the forest."

Mr. Pinchot first discusses the uses of the forest and the silvicultural systems at present in use in different countries, and then passes on to consider work in the woods under the divisions of Conservative Lumbering and Planting. The effects of the forests on climate and temperature are the subject of a separate chapter, and the concluding section gives a sketch of the history of forestry abroad and at home. The two volumes form a complete and simple exposition of forestry as it is advocated by its most reliable exponents at the present time.

Canadian National Park, Rocky Mountains.—pp. 63.

In the last number of the Forestry Journal was noted the issue by the Department of the Interior, of a pamphlet descriptive of the Canadian National Park in the Rocky Mountains and there were reproduced two of the colored illustrations therefrom. The Park is situated on the eastern slope of the Rocky Mountains, and comprises an area of 5,732 square miles or 3,668,480 acres. Within its bounds is found a great variety of grand and beautiful scenery of river, lake and mountain. It includes, also, the hot springs at Banff, which are a great attraction to tourists. A large part of the park is forest clad and is given efficient protection from fire by the authorities. Its chief objects, however, are as a pleasure resort, and as a protection to the watershed, and to fish and game. The pamphlet is fully illustrated and its make up is a credit to the Department and to the Rolla L. Crain Company, of Ottawa, from whose office it issued.

Report of the Michigan Forestry Commission, 1903-04.—*pp.* 200.

This report, in addition to the summary report of the Commission, contains a number of papers on special subjects relating to forestry by some of the leading supporters of the movement in the State of Michigan. There are also included the laws of the State concerning forests and forest fires, and the Forest Reserve Manual.

The Commission have charge of the State Forest Reserves, which comprise an area of 34,000 acres. These Reserves consist mainly of light sand lands, interspersed with swampy areas. All the lands were at one time heavily timbered and in the swamps there is still a good stand of cedar and tamarack, interspersed with spruce, pine and other trees. On the higher lands lumbering operations, with their usual debris of tops and branches, were followed by fires, recurring at intervals, which, in time, destroyed all the forest growth and left it to the tenacious shrubs, such as sweet fern, blackberry, etc. Oak sprouts are still, however, found coming up from the stumps and where a few fire-scarred pines remain there are some scattered pine seedlings. Jack pine and Norway, or red pine, are the characteristic trees of most of the area, although white pine also occurs. Protection against fire has been provided for and some fifty acres have been planted with white pine, Norway spruce and Scotch pine, purchased from dealers, and these show a good percentage of success. Provision has been made for a nursery on the reserve which will assist in cheapening the cost of the work to a great extent.

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