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THE BOW RIVER VALLEY, FROM THE HOT SPRINGS

Canadian Forestry Journal.

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SIXTH ANNUAL MEETING OF THE CANADIAN FORESTRY ASSOCIATION.

THE Sixth Annual Meeting of the Canadian Forestry Association was held in the city of Quebec, on the 9th and 10th March, 1905, and was one of the best attended and most successful meetings yet held. Among those present were Aubrey White, Assistant Commissioner of Crown Lands, Dr. Judson F. Clark, W. H. F. Addison, E. B. Biggar, Editor Pulp and Paper Magazine, H. R. Muir, Canada Lumberman, Toronto; Hon. H. Bostock, F. W. Jones, R. Jardine, Jas. Leamy, of British Columbia; E. Stewart, Dominion Superintendent of Forestry, Dr. Robert Bell, Director of the Geological Survey, Gordon C. Edwards, Norman M. Ross, Roland D. Craig, H. C. Wallin, R. H. Campbell, Ottawa; E. G. Joly de Lotbiniere, H. M. Price, W. C. J. Hall, Monseigneur Laflamme, Hon. P. E. Leblanc, Hon. R. Turner, E. Baillarge, J. C. Langelier, Revd. T. W. Fyles, H. O'Sullivan and others, Quebec; Wm. Little, Hon. Recorder Weir, Douglas Weir, Thos. Walklate, Montreal; J. T. Bertrand, Isle Verte; Col. T. G. Loggie, Fredericton; A. E. Alexander, Campbellton; E. J. Zavitz, Ontario Agricultural College; Professor Filibert Roth, University of Michigan; Dr. C. A. Schenck, Biltmore, N.C.; A. Knechtel, L. S. Emmons, Albany, N.Y.; Angus McLean, Buffalo; W. G. Power, St. Pacome; S. P. Grogan, Batiscan; Mossom M. Boyd, Bobcaygeon; W. C. Wilgress, Huntsville.

Most of the sessions were held in the Council Chamber of the City Hall, which had kindly been placed at the disposal of the Forestry Association by the Mayor and Council of the city of Quebec. The meeting was called to order by the President, Mr.

Aubrey White, and after preliminary business the report of the Board of Directors was read by the Secretary.

The report referred to the kindness of the Dominion Bureau of Forestry in having provided for the publication of the Annual Report, an important contribution to the work of the Association, and which took a heavy financial burden from its somewhat inadequate resources.

During the past year the Association lost several of its members by death, prominent among whom were Mr. John Bertram, Chairman of the Dominion Transportation Commission, Dr. W. H. Muldrew, Dean of the Macdonald Institute, Mr. W. C. Caldwell, M.P.P., of Lanark, and Col. Thos. Higginson, of Vankleek Hill. Feeling reference was also made to the loss sustained by the honored first President of the Association, His Honour Sir Henri Joly de Lotbiniere, and the Vice-President, Mr. E. G. Joly de Lotbiniere, in the death of Lady Joly de Lotbiniere, which had occurred during the year. The Secretary was instructed to convey the sympathies of the Association to the bereaved relatives.

A special effort had been made in the year 1904 to increase the membership by the sending out of circulars and by other means. The results were on the whole satisfactory, and resulted in a good addition to the membership, making the total 562 as against 479 reported at the previous annual meeting. Increases were made in all of the Provinces except Manitoba and Alberta, where there was a slight falling off. Outside of Canada, the United States heads the list with thirty-nine members, and the remainder are scattered among England, Ireland, Newfoundland, India, Honolulu, Germany, Denmark and Austria.

The receipts for 1904 were $1,845.77, and the expenditure $930.66, leaving a balance of $915.11. The Association has again to thank the Governments of the Provinces of Quebec, Ontario and British Columbia, for the generous grants made by them to assist its work.

The Forestry and Colonization Commission of the Province of Quebec, and the Forestry Commission of Prince Edward Island, presented their reports to their respective Governments

in 1904. The Quebec Commission found that there is no antagonism between the holders of timber licenses and real settlers, but that difficulties have been created mainly by those desiring to take up land to speculate in the timber. They therefore urged the division of the public domain into settlement lands and merchantable timber lands, and the setting apart of non-agricultural lands in forest reserves. An extension and improvement of the fire preventive service was also considered by the Commission as a prime necessity.

In Prince Edward Island, the area of public land being but small, the Commission recommended that efforts should be made to encourage private enterprise in the planting of trees for the protection of agriculture and for ornamental purposes. The desirability of education on this subject was urged on the attention of the authorities.

Forest fires as usual caused destruction throughout the Dominion, but had been largely controlled by the fire rangers except in British Columbia where, outside of the Railway Belt, which is protected by Dominion rangers, no fire preventive service exists and the fires were numerous and practically uncontrolled.

The tree planting scheme under Dominion management continues to develop. During the year 1904, 1,800,000 trees were distributed to 1027 settlers, an average to each of 1752 trees. In 1905, the distribution will be 2,000,000 trees to 1120 settlers. The total distribution to 1905 will be 5,000,000 trees. At the Ontario Agricultural College provision for similar work for the Province of Ontario is being made.

A committee of the Board waited upon His Excellency the Governor General to ask him to be kind enough to act as Patron of the Canadian Forestry Association. His Excellency received the Committee most graciously, and was pleased not only to give his patronage, but far exceeded their expectations by stating that he would be pleased to do anything further in his power to assist the work of the Association, and suggested that, in the event of a meeting being held in Ottawa during the present season, he would be pleased to attend and might even arrange to have it held at Government House. This kindly action of His Excellency and the evidence of his sympathy with movements af-

fecting the well being of the Dominion should give him a high place in the respect and affection of Canadians, and especially of the members of the Forestry Association.

The President, in his address, referred to the pleasure it gave him to preside over the deliberations of the Canadian Forestry Association at its first meeting in the Ancient Capital. Here was the nursery of all the developments that have taken place in every direction throughout the Dominion. Under the French regime the first Crown Timber regulations were promulgated, and some of the problems which confronted the framers of the early laws have come down to the present day. The rights of the settlers and kindred matters are just as live subjects as they were two or three hundred years ago. Mr. White sketched the growth of the forestry movement from the Forest Congress, held in Montreal in 1882, to the meeting of the American Forestry Association in Quebec in 1890, and the establishment of the Canadian Forestry Association in 1900. He impressed the two great features of present importance in forestry as the provision for a proper fire preventive service and a division between the agricultural lands and those suited only for the growth of timber.

The first paper submitted was one on "Forest Fires in British Columbia," prepared by Professor R. W. Brock, of Queen's University. Anyone travelling through the Province is at once struck by the beauty and value of the timber and no less by the terrible havoc wrought upon it by forest fires. British Columbia, as a whole, may be said to be forest-clad, but the growth of trees is more luxuriant on the western slopes of the mountain ranges and the interior plateau contains wide stretches of open grass-covered hills and valleys. The higher mountain ranges rise above the tree line, and merchantable timber is confined to the valleys and to the mountain sides to a limited height. While British Columbia has in the aggregate a vast supply of timber, the only timber that has an immediate market value is that which is near transportation. The percentage of this lost by fire must be appallingly large and unless active steps are taken to prevent this destruction, only a relatively small amount of the timber now standing will ever reach the market. So numerous are the fires in a dry season that the whole country side may be

CEDAR TREES (*Thuya gigantea*) IN STANLEY PARK, VANCOUVER, B.C.

buried under a dense pall of smoke. In a dry season like last year the fire is apt to consume everything. Last summer Professor Brock climbed up a hillside through fine green timber and about a week later came down the same place wading knee-deep in ashes. Not a vestige of anything combustible in the soil had been left, the hillside was as bare as the bottom of an alkali pond. Lightning, camp fires, smudges, sparks from locomotives, fires started for clearing land, cause forest fires, and some are set deliberately to clear the land for prospecting. At present one of the most serious handicaps in combatting the fires is lack of organization. It seems to be nobody's business to put out fires. The cost of protective measures should not be excessive nor should it be any barrier where so much is at stake.

Mr. Jas. Leamy, Dominion Crown Timber Agent at New Westminster, described the fire ranging system in operation in the Railway Belt in British Columbia under Dominion jurisdiction, which has resulted in the saving of a great deal of valuable timber. Even during the dry season of last year the loss was comparatively small. This was accomplished by the work of only eight rangers over an area five hundred miles in length and forty miles wide. There is need for a larger number of rangers to adequately supervise this large tract. Hon. Hewitt Bostock, R. Jardine, of the British Columbia Mills Timber & Trading Co'y., and F. W. Jones, of the Columbia River Lumber Co'y., spoke in the highest terms of the work accomplished under Mr. Leamy, and expressed their readiness, as holders of timber lands in the Railway Belt, to pay their share of an increased expenditure for a protective service.

Dr. C. A. Schenck, of Biltmore, North Carolina, urged the necessity for basing forestry on business principles, and expressed his pleasure at seeing that in Canada the movement was backed by the business men. He was glad to see that they realized the importance and value of the question. Dr. Schenck also impressed the desirability of delimiting the forest and agricultural lands and the reservation of forest land by the Government.

The paper on "Forest Insects," presented by Revd. Thos. W. Fyles, of Levis, on Thursday afternoon, was exceedingly in-

teresting, and was well illustrated by a number of colored drawings of the insects described. Dr. Fyles' attention was first drawn to the subject of forest insects by their depredations in the woods of the parish in Quebec, where he was first settled. The careless tapping of the maple trees by a former proprietor of his land had made them the abode of horntails and beetles, while the brush and fallen trees of the surrounding woods were infested with many varieties of destructive insects.

Dr. Fyles divided the insects under two great heads, namely: biting insects, Mandibulata, and sucking insects, Haustellata. To the former class belong the borers in the tree trunks, the twig girdlers and the leaf devourers; to the latter, the cicadas, the scale insects and the plant lice. It is difficult to tell which of the two orders is more hurtful to vegetation. The insects which have come from foreign sources are the most to be dreaded. The larch sawfly that destroyed the tamarack of our northern forests is an example of this. The Gypsy Moth in Massachusetts caused an expenditure by the Legislature, in four years, of $275,000 in the effort to exterminate it. The Tent Caterpillars and Tussock Moths are well known insects, destructive to the leaves of trees. The white grub and the cicadas feed upon the roots of plants. The cicada is an interesting insect from its long sojourn underground, lasting from three to seventeen years according to the species, feeding upon the roots of trees. Its loud stridulations are one of the most characteristic sounds of the summer.

The borers do a great deal of damage to timber and as an evidence of the manner in which they may be transported from place to place, Dr. Fyles related the case of one which dropped from the frame of a door in his own house, after having survived all the processes of finishing the wood. It must not be supposed that nature has left these borers to multiply and work their will without a check. There are a number of ichneumon flies engaged in reducing their numbers. Insectivorous birds and predaceous insects under ordinary circumstances keep the spoilers within bounds. And man may give his assistance to the same end by, for instance, preserving the insectivorous birds.

Professor Roth emphasized the importance of a study of for

est insects, from the experience of the United States in the Black Hills Forest Reserve. There the trees were dying mysteriously. An investigation by the Government entomologist established that it was the work of an insect, and from his knowledge of its life history, he was able to suggest remedial measures, which have resulted in checking the destruction and saving a great deal of valuable timber.

Col. T. G. Loggie, of the Crown Lands Department, Fredericton, submitted a paper on "New Brunswick's Forests," which contained a great deal of interesting information about that province. The area of New Brunswick is 17¾ million acres, of which 7¼ are Crown Lands. The settled portions of the province are principally along the river valleys and coast line; the interior forming one vast timber preserve and embracing a territory eighty miles wide and one hundred miles long, without habitation of any kind save the lumberman's or trapper's shanty, and no sound except the ring of the woodman's axe or the call of the hunter. Here is a domain fairly free from the ravages of fire, and timbered with many kinds of valuable timber. The greater part of this territory is unfit for cultivation, lying mainly on the granite and boulder formation. Everywhere over this belt both black and white spruce abound, with some pine and vast quantities of hardwoods, that have scarcely been touched, also large quantities of the largest and finest cedars in Eastern Canada. In the district to the south and extending to the Bay of Fundy, the cut has been heavy and fires have done serious damage. In the effort to check forest fires, an Act was passed in 1885, but as the expenditure on a protective service is limited to $2,000 a year it has been impossible to do effective work.

One of the difficulties of administration has been settling or squatting on timber lands by persons who have no intention to make a permanent residence, but merely wish to obtain timber. One of the greatest needs is the separation of purely agricultural lands from those fitted only for timber growth. In this connection Col. Loggie indicated on a map of New Brunswick the district which it was desirable to immediately include in such a reserve.

Col. Loggie summed up his suggestions in regard to the for-

est policy of New Brunswick, under the following heads: (1) more effectual means for protection from fires; (2) the separation of timber lands from agricultural lands; (3) a carefully selected corps of foresters, permanently employed; (4) restrictions as to the cutting of undersized timber, and concluded as follows:—

"New Brunswick has yet a noble heritage in her forests. Let us then work together to preserve this heritage so that we ourselves and future generations may reap the benefits which nature has so lavishly bestowed. In conclusion let us not forget the old Scotch saying:—

"Be aye stickin' in a tree, it'll be growin' when ye're sleepin'."

Great interest was excited by the reading of a telegram received by the President from Hon. W. C. Edwards, in which it was stated that Sir Wilfrid Laurier wished to have a Forestry Convention in Ottawa, during the coming summer or autumn. A resolution expressing the gratification of the Association at this announcement, and its readiness to assist in the proposed convention was unanimously adopted.

The banquet tendered to the visiting delegates at the Chateau Frontenac on Thursday evening, by the members of the Association in Quebec, was an unqualified success, and hearty thanks were tendered to the hosts for their splendid reception. Excellent speeches were made in response to the toasts by representatives of the Dominion, the different Provinces and the United States. Perhaps the brightest remark was made by Monseigneur Laflamme when, referring to the paper on Forest Insects read earlier in the day, he stated that three very destructive bugs had not been mentioned, namely *Ignoratio communis, Indifferentia generalis and Influentia politica.* For the two former, education and public discussion are the remedies. For the last the Reverend Abbe had no specific to offer.

On Friday morning a paper on Forestry in Nova Scotia, prepared by Hon. J. W. Longley, Commissioner of Crown Lands, was, in the absence of Dr. Longley, read by the Secretary. The quantity of land available

for lumbering purposes in Nova Scotia has never been, and is not now, large. The Province itself is small and a considerable portion of it has been cultivated and improved. In years gone by the Government was in the habit of granting land for lumbering purposes outright to lumbermen at 40 cents an acre, and the grant was absolute and conveyed the fee simple of the land to the grantee. Most of the large lumbering concerns hold their lands in this way. In 1899 a system of leases was adopted, the term being twenty years, and the dues 40 cents per acre where the timber to be cut was restricted to a minimum of ten inches in diameter, and 50 cents where a minimum of six inches was fixed. These fees were doubled in 1904. Conservative lumbering has given good results in Nova Scotia, where the growth of spruce appears to be rapid, but forest fires have caused great destruction. A Fire Act was passed in 1883, but was ineffective until a Fire Warden Service was established last year. The Act has been brought into effect in nine counties and in these municipalities no fire of any consequence occurred during the last season though it was an uncommonly dry one. The Act provides that no bush fire shall be set without previous notice to the Chief Ranger and with his consent, and this part of the Act is being cheerfully complied with by all persons clearing lands in these municipalities. The question of the possibility of special work in reforestation and the setting apart of forest reserves are two matters which are receiving consideration at present. The extent of ungranted forest land in Nova Scotia is 1,516,631 acres.

Mr. J. C. Langelier's review of the "Forest Wealth of the Province of Quebec," was an able and exhaustive one, to which no summary can do justice. Mr. Langelier divided the forest region into the northern district, lying north of the 48th parallel and the St. Lawrence and forming the most important forest area, the home of the spruce; the central district lying to the north of the St. Lawrence River, in which the white pine ranks first in importance; and the southern district, south of the River. Calculating the revenue from the timber on Government lands in these districts at $420,000,000 at the regular rates of dues, Mr. Langelier gave a possible revenue of $4,200,000 for one hundred years. All the forests of Quebec are accessible by water except

those in the Abittibbi and Mistassini districts, and even for these Mr. Langelier sees an outlet by way of Hudson Bay to the prairies of the Northwest. The opinions of leading lumbermen were quoted to show the increasing value of all species of timber trees and particularly spruce. This is due partly to the demand from the United States, which is increasing and will undoubtedly continue to do so despite all calculations to prove the contrary. As to the time for which the present forests will last, a calculation is made which ranges from 25 years for hardwoods to 82 years for pine and 334 years for pulpwood. This does not take account of destructive or reproductive forces that may affect the consumption. Fire, indiscriminate settlement, unwise or unlawful cutting, waste in lumbering operations, the power of self-reproduction, and the extension of railways through the forest are in this respect factors of potent efficacy and deserving of the most serious consideration. If fire is allowed to continue its work of destruction, it will not be safe to extend the period for the duration of pine beyond fifty years. The spruce might last indefinitely if unfortunately the results that might be expected are not nullified by an irrational system of colonization, allowing settlement to take place in and destroy what are purely timber lands. The forest policy for Quebec Province at the present moment, as outlined by Mr. Langelier, is to protect the forests from fire and the inroads of timber pirates raiding the forest under the pretense of promoting colonization. All efforts should tend to organization against fire and the classification of our public domain into woodlands and farming lands with the view of securing free access to the latter by bona fide settlers. In the Province of Quebec in 1903 $50,000 was spent to protect from fire public buildings worth $3,000,000; $20,000 was spent to protect fish and game, which yield a revenue of $63,119; while only $17,000, part of which was paid by the lumbermen, was expended to protect the forests yielding a revenue of $1,241,814.

On Friday afternoon a trip was made to the Montmorency Falls and was much enjoyed. Here, as elsewhere, the visitors were impressed with the fact that the ability to entertain is one for which the good old city of Quebec can still well sustain its old time high reputation.

In the evening, an illustrated lecture by Dr. Judson F. Clark, Forester to the Ontario Bureau of Forestry, on "The Forest as a National Resource," and a talk by W. H. F. Addison, of Yale Forest School, on "A Forest School," were given in Morrin College Hall, before a good audience. Mr. Addison gave an interesting sketch of the work done in a forest school. Dr. Clark's lecture was an able presentation of the influence and place of the forest in the national life, and the appropriate illustrations made still clearer his well-sustained argument for dealing with it on large and broad lines.

The election of officers resulted as follows:—Patron, His Excellency the Governor General; Honorary President, Aubrey White; President, E. G. Joly de Lotbiniere; Vice-President, E. Stewart; Provincial Vice-Presidents, Prince Edward Island, Revd. A. E. Burke; Nova Scotia, Hon. J. W. Longley; New Brunswick, His Honour Lieutenant-Governor Snowball; Quebec, Hon. S. N. Parent; Ontario, The Commissioner of Crown Lands; Manitoba, Hon. J. H. Agnew; Assiniboia, His Honour Lieutenant-Governor Forget; Alberta, Wm. Pearce; Athabaska, F. D. Wilson; British Columbia, Hon. H. Bostock; Secretary-Treasurer, R. H. Campbell; Board of Directors, J. R. Booth, Hiram Robinson, H. M. Price, Monseigneur Laflamme, Dr. Robert Bell, Dr. Wm. Saunders, Thos. Southworth.

Thos. Conant, of Oshawa, Ont., an active member of the Canadian Forestry Association, died at his home on the 14th March last. Mr. Conant was well known as a writer, having published several works on pioneer life in Canada. He had done considerable experimentation in walnut tree culture on his property, and always took a warm interest in the work of the Forestry Association.

FORESTRY IN RELATION TO MINING.

By Professor J. C. Gwillim, School of Mining,
Kingston. Ont.

THE forests of the present and future are likely to be found in the rough places of the earth, such places as mountainous districts and the rocky thin-soiled regions, which at least afford refuge and nourishment for the hardy conifers.

It is in such districts that mines are largely found. A natural condition, not a coincidence, associates metallic minerals with rocky and mountainous places. In such districts, often inaccessible and undesirable from other points of view, the mines alone make a demand upon the forests. As time goes on the more accessible forests will be cut out and replaced by permanent industries. The land so won will seldom revert to forest, or be planted with trees. The last resource of the lumberman will be in the awkward places, such as surround mining districts. Here the axe and fire of the mining industry will have largely forestalled him.

The mining operations spare nothing above a few inches in diameter up to two feet; they lay tribute to the surrounding hillsides for lagging, stulls and sawn timbers. These are placed in the mines to support operations temporarily; they quickly rot, collapse, and are of no more use. The mine itself on the average is of only a few years' duration. The miner having robbed the forests above and the mineral below passes on leaving the wilderness to mend his destruction.

The nomadic tribes of Siberia are reported to consider mining a sacrilege and insult to the earth. To hoist its mineral treasures to the light of day, while casting its green trees into the dark passages of a mine, does seem a violence to nature.

Considering for a moment the demands of a large mine, producing say 100,000 tons of ore per annum. The cost in timbers is from 5 cents to 30 cents per ton of ore in Canada, or about one to two lineal feet of 12 inch timber per ton. At one lineal foot per ton this would be one million two hundred thousand feet board measure. This demand soon denudes the adjacent forests and calls

for importation. The Rossland Mines of British Columbia, for instance, bring in Douglas Fir from the adjacent State of Washington, at a cost of about eight cents per lineal foot for suitable timbers.

The addition of a mining town, lumber for flumes, ties for railways and tramways, considerably increases the draft upon the forest; for the mining industry is in its nature seldom permanent; hence wood is used for almost all structures. The careless fires of the associated prospector consume large areas of the forest. This burnt and standing timber for a time is well adapted to mining purposes, being seasoned and light, but who can time forest fires to meet the demands of the mines? Thousands of miles of half-standing, half-fallen trees may be seen in British Columbia. This burnt-over ground is recognized as helping the prospector to find minerals by reason of the bareness left by such fires. The exceeding dryness of last summer in British Columbia added greatly to the burnt areas, the forests burning from the valleys up to the timber line.

A tax of even five cents per ton for timber is more than many of the great mines can afford, the margin of profit being so small. Many expedients are used to avoid timbering; the excavations are allowed to cave in, or are filled with waste rock, at less expense. Amongst the woods best fitted to withstand the rapid deterioration in mines are the conifers, especially the Douglas Fir of the Pacific Slope, the Spruce, Hemlock and Mountain Tamarac (*Larix occidentalis*). These are the principal timbers of the Canadian mountains and some of the Western States. The last is a very fine tree, often two feet in diameter, without limbs for fifty feet. It appears to reach its best westwards of the East Kootenay Valley.

The Douglas Fir of the Pacific Coast is exported to the South African mines, as also the Eucalyptus or gum tree of Australia, and the Kauri Pine of New Zealand. All of these mentioned are resinous trees, best suited for the short life and duty of mine timbers; artificial preservatives are rarely used. Peeling some months before use is sometimes done with good results, as at the Le Roi Mine.

The main supply of props used in the Bankhead coal mines, Alberta, is derived from burnt standing spruce and Banksian pine. This still affords good material after over twenty years without life, but much is fallen and completely rotten.

The Crow's Nest Collieries, B.C., are using up their burnt timber with economy, endeavouring as much as possible, to take the earliest burnt first, and use up each generation before it decays.

It is commonly stated that timber at the upper altitudes is apt to break short, to be brashy. This may be due to the less regular grain and growth at these places. Mr. E. R. Noakes, a mining engineer, at one time in charge of the Espirituo Santo Mine at Darien, gives countenance to the prevailing opinion in that country that the phase of the moon at time of cutting affects the rotting of mine timbers. The waning moon was considered most preservative.

The conifers are naturally found in places where mining is also found. They furnish light, easily-worked material, and last as well as any need.

In the annual address of Mr. F. C. Whitman, the President of the Board of Trade of Annapolis Royal, the following statement is made in regard to the protection of the forests from fire:

"There is now a well established body of men under the supervision of a chief fire ranger in Western Nova Scotia; and the loss by forest fires this past year has practically been nil, as compared with an actual loss in our County of Annapolis in the previous year of $150,000, and proportionate losses in other counties. There is to-day a marked increase in the values of timber lands, in part at least caused by the better protection now afforded."

Canyon on Pelly River. Poplar and spruce on slopes and benches.

Pelly River. Groves of White spruce on Alluvial Flats.

FORESTS OF THE YUKON TERRITORY.

By J. Keele, Geological Survey,
Ottawa.

THE following note refers to that portion of the Yukon Territory, situated between the Pelly River on the south, and northward to the McQuestion River.

The forests of this district consist of only about eleven species which attain the dimensions of trees. These are the white spruce (*Picea alba*), the black spruce (*Picea nigra*), the balsam fir (*Abies subalpina*), the balsam poplar (*Populus balsamifera*), the aspen (*Populus tremuloides*), the black pine (*Pinus murrayana*), three species of birch and some species of willow. The varying conditions under which these trees grow greatly affect their size and distribution.

The white spruce is the most widely distributed and the most useful tree in the Yukon Territory. It makes a fair quality of lumber, which is used for various purposes by miners and prospectors. Huge quantities of white spruce are made into cordwood and piled at intervals on the banks of navigable rivers as fuel for steamboats. Thousands of cords in sixteen-foot lengths are floated down the Yukon, Stewart and Klondike rivers every autumn to Dawson to be used as firewood. The white spruce is seen at its best on the islands and alluvial flats of the main rivers, where they form fine groves of merchantable timber, easy of access to the lumberman. The size of its general growth on these flats is from eight to twenty-four inches, and individuals frequently attain a size of thirty inches in diameter at the butt, and logs sixty feet long, with a diameter of one foot at the smaller end, can be obtained. Up the slopes of the valleys, the white spruce, under favourable conditions, will continue to be a very fine forest tree. These conditions are, a sufficient depth of finely-divided loose material, and gentle slopes facing the direction which will allow the trees to receive the maximum amount of sunlight.

During the months of June and July the length of the day

over the district referred to, is from twenty to twenty-two hours, and the spruce in favoured situations, attain a considerable size, even at altitudes of 2,000 feet above the valley.

On slopes facing north and in the smaller and shaded creek-valleys and gulches, the spruce forest consists of poles from four to eight inches thick.

The black spruce is abundant on the swampy portions of the valley bottoms, and on moss-covered slopes facing northward. This tree has a tendency to fork at the top, and seldom grows to a large size.

At the headwaters of streams, i.e. the low broad divides, which are characteristic of portions of the district, the black spruce often forms large groves. This upland plateau country generally contains a few small lakes which are kept full by rills formed by the constant thawing of the ground during the summer months.

The pine of the district is not an important forest tree; it has a limited range and is much smaller than the white spruce, the general size being from four to six inches; it is seldom seen larger than nine inches in diameter.

It grows in thin groves upon the dry benches which border the Lewis, Pelly and MacMillan rivers, at a height of from forty to 300 feet above the streams.

The northern limit of the pine in the Yukon valley is at the mouth of the Pelly river, but in the country to the east of the Yukon, it extends farther north. From the McMillan river it extends by way of Kalzas Valley northward towards the Stewart. North of the Stewart, small groves of pines were seen by the writer in the valley of Mayo river above Minto creek and on the shore of Mayo lake. This is the most northern occurrence that has been observed. The eastern limit of the pine was observed on the MacMillan river, about fifty miles up the south fork.

Next in importance to the spruce is the balsam; this tree is never seen on the river flats of low elevation, but occurs on high valley bottoms and on the mountain slopes. It seems to thrive best at an elevation of about 1,200 feet above the valley; it occasionally grows as large as eighteen inches in diameter. It de-

creases in size below and above this elevation, and becomes distorted and scrubby at tree line.

Between the Pelly river and the north fork of the McQuestion the timber line has been variously estimated at from 4,200 to 4,700 feet above sea level. In these localities the only tree represented was the balsam, the spruce generally disappearing a few hundred feet below.

In the Klondike district, timber line only reaches an elevation of 3,500 feet above sea level. The last tree seen here is the spruce, balsam being altogther absent.

The poplar (*Populus balsamifera*) grows on the islands and alluvial flats of the main rivers; it occurs mixed with the spruce, or in thin fringes along the gravel bars, and in small forest groves. It is seen in all stages of growth from a small shrub to a considerable forest tree. It gives out an agreeable and refreshing odour during the early summer; it is also known as the "balm of Gilead."

The aspen is specially characteristic of dry, open grassy hillsides facing southward, of which there is a great extent on the Yukon, Pelly and Stewart valleys.

The birch in the Yukon Territory never forms extensive groves, but grows singly or in small groups with the black and white spruce. Most of the birch is small, being mere poles, but one species (*Betula resinifera*) sometimes attains a diameter of eight or even ten inches and is valuable for stove wood.

The willow, being the principal food of the moose, rarely attains the size of a forest tree, but occasionally willow trees are seen in the neighborhood of old Indian villages.

In the spruce forests of the valleys, dry willow trees are found entangled in the living spruce in great quantity. These willows are often three or four inches in diameter and ten to twenty feet high. They evidently protected the spruce seedlings but were finally overshadowed by them. This supply of dry wood is of great benefit to the voyageur as it ensures a good camp fire in wet weather and during winter travel.

The most widely distributed shrub is the dwarf birch (*Betula glandulosa*), it grows densely on portions of the mountainous

slopes, and reaches above timber line. The miners call this shrub "buckbrush." The moose sometimes eat it when they cannot obtain willows.

Along the river banks the alder, willow and brier-rose are abundant.

Generally speaking, travelling on foot is easy through the forests of the Yukon. There is not the dense growth so often encountered in the north and east.

The thin growth is probably due to the permanently frozen ground just below the forest floor. The tree roots are unable to strike down, and the trees, as they grow taller, are compelled to buttress themselves against wind pressure by the spread of their roots. As the roots spread over the surface, only a limited number of trees can exist on a given area, and the weaker trees decay for lack of sufficient nourishment.

In the Klondike district, Professor Macoun has observed that trees on southward-facing slopes, at a height of 1,500 to 2,000 feet above Dawson, are not only better grown and larger but also have roots which strike deeper than trees of the valley flats. He explains that this is due to the sunshine not being cut off from this elevation by the hills on the opposite side of the valley as it often is on the valley bottom, and as a result of this a deeper layer of loose material is thawed out on the higher elevations.

Considerable forest fires occurred immediately after the influx of gold seekers in 1897 and '98, and since then fires have been frequent every summer. Most of the fires were due to careless and inexperienced campers; many are due lately to miners who take no precaution against the spreading of fire when clearing their claims.

A serious disadvantage on many gold-bearing creeks is the scarcity of water for mining operations. This is sometimes the result of burning the forest covering and moss on the headwaters and slopes above the stream, so that the moisture is no longer conserved and sent down the hillsides in a steady supply during the summer. Landslides sometimes occur on hillsides as a result of forest denudation, especially on slopes where the rock waste

or gravel has a matrix of clay. This material thaws out rapidly when deprived of its covering of moss and trees. When thawed to a certain depth, masses of the loose material are apt to slip into the creek bottom and interfere with mining operations.

Indians were apparently quite numerous in this district long before the coming of the white man. Vestiges of ancient camps are often met with in various parts of the district where there is not one recent sign. It is probable that the Indians burned large areas of forest for hunting purposes, for in the clearings thus made the moose is easily seen and stalked. The Indians are now few in number and hunt over very limited portions of the districts.

Early in September, the leaves of the poplar, birch and willow turn to an almost uniform tone of golden yellow, and a simple colour scheme of green and gold continues for a few weeks.

Mr. J. C. Hallman, of New Dundee, Ontario, writes urging that action should be taken by the Canadian Forestry Association to elaborate some system for remedying the evils of overclearing, which he states are so plain in Western Ontario, that people are getting alarmed at the situation, and are asking for remedies. Mr. Hallman has taken this for a subject at Farmers' Institutes for some years, and finds that a great deal of interest is taken in it and that it raises a great deal of discussion. He considers it the greatest question that older Ontario has to solve in the near future.

The Ontario Government, through the Agricultural College, are taking steps to meet this issue, but it is to be regretted that the larger problem of the lumber industry, has somewhat overshadowed this equally important one in the deliberations of the Canadian Forestry Association.

CARE OF STREET TREES.

Roland D. Craig, F.E., Dominion Forestry Branch.

THE attractiveness of a town or city depends very largely upon the trees planted along its streets. They are among the first things which a stranger notices in formulating his impressions as to whether it is a good place to live in or not. One does not need to be a lover of nature to appreciate the refreshing shade of a row of trees along the sidewalk on a hot summer day, or the protection afforded from the cold winds in winter. What a relief and rest the weary eyes find in the verdure of a plantation of trees after the glaring pavements and shining windows of a bare street. Trees, by transpiring through their leaves large quantities of moisture and by the coolness of their own bodies, exert an important influence in reducing the temperature in summer. They also exert a beneficial influence by absorbing poisonous carbonic acid gas from the air, and giving in return pure oxygen for the use of man.

Though one of the most important factors in making the life of urban populations healthy and happy, the trees of our streets, as a rule receive very little consideration on the part of municipal authorities. In many cases the planting and care of the trees is left to the individual citizens, in front of whose property the streets run, and in few places are men trained in tree culture employed to look after this important work, and for this reason many well meant efforts result in failure. It is the object of the writer to point out briefly a few of the mistakes commonly made in the management of street trees, and to make some suggestions which may be of use to those who are interested in this work.

Lack of Uniformity.

The appearance of many of our streets is spoiled by a lack of uniformity in planting, especially where it is left to the individual property owners. One man plants elms, the next maples, the next horse chestnuts and probably the next two none at all, so that all order and harmony is lost and it results very frequently in the slower-growing trees being suppressed by their neighbors

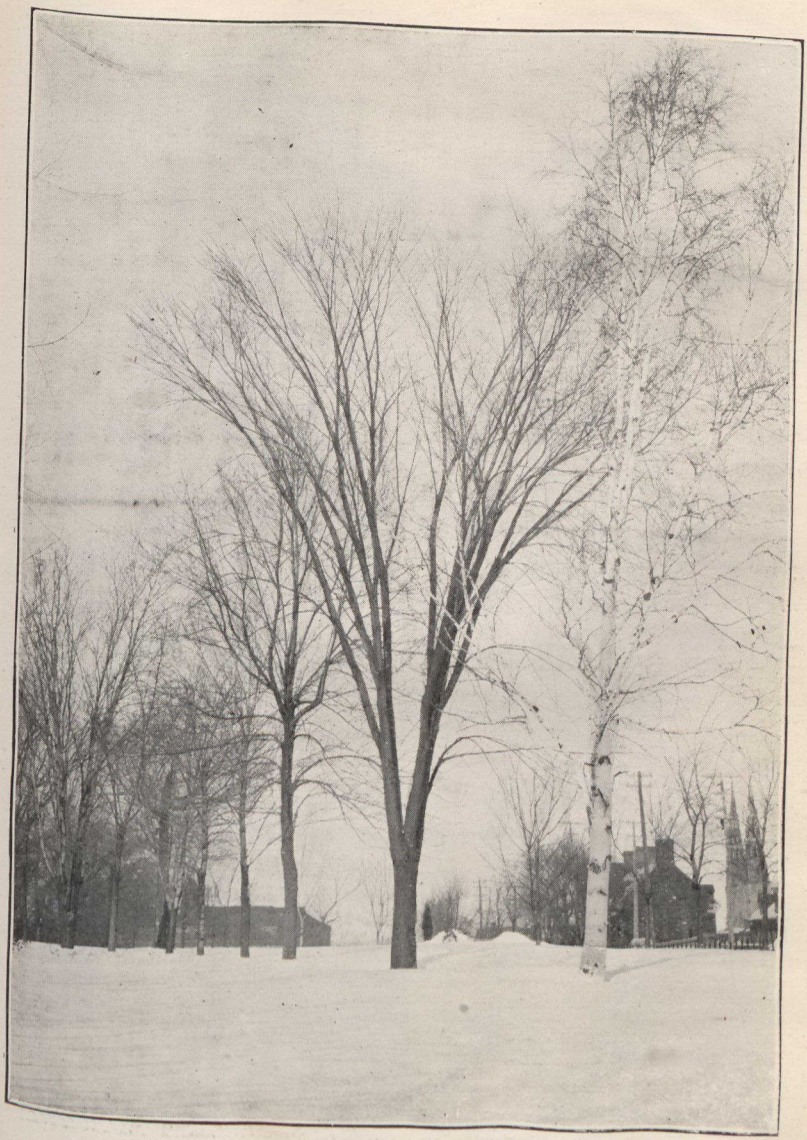


FIG. 1—A Mixed Row, showing different habits of growth of Birch, Elm, Ash and Maple.

At tree line on hills near Stewart River.

overtopping them. For the best landscape effect and for the best development of the trees themselves it is advisable to use only one species on a street.

Uniformity should also be secured in the distance apart at which trees are planted, and they should be as nearly as possible even sized. In Washington, they keep in the city nursery trees of all sizes, so that when one dies on the street it is replaced by one of equal size. This practice can be followed profitably only while the trees are comparatively small, as the transplanting of large trees is very expensive.

Selection of Species.

In selecting species of trees for street planting regard should be given to their different habits of growth, light, air and water requirements. Where the streets are narrow, smaller more upright trees, such as the Norway maple or cottonwood should be selected; on wide streets, the tall elm, with its spreading crown, the sugar maple or the linden are better adapted. On high, dry situations species which require less water, such as the scarlet oak or horse chestnut, thrive better than elms or maples. The horse chestnut seems to withstand smoke and other injurious gases better than other species.

Selection of Planting Stock.

It is of the greatest importance to secure thrifty well-developed stock for planting. Too frequently the young saplings are just dug from the woods, their roots chopped down to a convenient size, and the top cut back, so that the shape of the tree is spoiled for a time. Every tree which is to be planted on the street should be grown in a nursery and transplanted several times, so that the roots will be trained to grow in a compact form, before being finally placed on the street. In the nursery too, by judicious crowding, straight, tall and clean trunks can be developed, thereby lessening the amount of pruning necessary in after life.

Too Close Planting.

One of the most common mistakes made in street planting is placing the trees too close together, so that their crowns do

not develop symetrically and the vigor of the trees is impaired. Thirty to thirty-five feet is close enough to plant large trees, like the elm, hard maples and lindens; horse chestnuts, cottonwoods and box elders, may be grown closer together. It is sometimes advisable to plant quick-growing trees, such as the cottonwood or box elder, between the elms or maples, in order to fill up the spaces while these trees are young, and to secure the benefit of the shade as soon as possible. These trees should, however, be removed before they interfere with the permanent trees.

On paved streets the trees suffer greatly from lack of air and water, and it is advisable to leave at least three feet all around the base of the tree unpaved, so that air and water may reach the roots. Another thing to bear in mind when planting is to place the trees out of reach of horses standing at the curb. A great many of our trees are injured by horses biting off the bark or rubbing against the tree. It is better not only on this account, but on account of the larger feeding surface the roots are able to reach if the trees are set between the sidewalk and the private grounds rather than outside the sidewalk. Until the trees are 8 to 10 inches in diameter, they should be protected by wire tree guards.

Pruning.

Pruning is a necessary evil in the care of street trees. On the street trees are in an unnatural environment, and with the abundance of light and air tend to develop too much crown for the usually scant plant food supply. The liability of these more or less isolated trees to injury from snow and ice pressure and from wind, also makes it advisable to so guide the growth of the crown that there will be as little danger from these sources as possible. With this in view it is wise to preserve well defined central axes in trees like the birch, maple and ash, which naturally possess such and in the elms, which normally assume a vase form, large horizontal branches should be prevented from developing and the crown should be supported by three or four main branches grown as nearly vertical as possible.

Start Pruning Early.

Pruning should be commenced when the tree is young and the branches small, so that the necessary amputations will be small.

Heavy pruning, such as shown in Figs 2 and 3, seldom results in anything but a brush-heap of a top or a stunted and weakened tree.

Leaving Stubs.

The most pernicious practice in pruning as it is usually done is the leaving of short stubs of branches, which, deprived of communication with the leaves, die and remain as decaying plugs of wood in the trunk, from which rot soon spreads to the heart of the tree, and not infrequently results in the death of the tree. All amputations should be made flush with the wood of the stem so that the wound can be readily grown over with new wood, and the surface should be perfectly smooth to prevent water carrying disease germs from lodging in the irregularities and starting decay. The danger from decay may be almost entirely eliminated by applying a coat of coal tar on the wound immediately after the cutting. This disinfects the surface and prevents water from soaking into the wood. Other substances, such as white lead or ordinary paint may be used, but coal tar is much the best.

When heavy pruning is necessary and it is desirable to guide the branching by leaving short branches, as in Fig 3, small leaf bearing branches, called sap-lifters, should be left at the end of the stub to keep up the circulation of sap and thereby prevent the death of the stub.

Time for Pruning.

Pruning, if carefully conducted, may be done at any time of the year, but in the fall after the leaves have fallen is the best time as a rule. At that time it is easier to see the arrangement of the branches. You secure also the full season's work of the leaves in storing up food material, and all the benefit of the rapid spring growth in healing over the wounds and in the production of desirable branches.

Treatment of Decayed Spots in the Trunk.

The life of a tree may often be saved even when decay is quite well advanced by first removing carefully all decayed wood, then painting the surface with coal tar to disinfect it, and if there is a cavity it should be filled up with cement, much as a dentist

would fill a tooth. The wound will as a rule heal over, enclosing the filling, and the tree will be practically as healthy as ever. This practice is followed in treating the live-oaks in California with great success.

Cleaning.

All dead branches should be removed without delay for, if left on the tree, they act as centers from which decay will spread.

To recapitulate what has already been said—plant uniformly with good thrifty nursery stock of the species best adapted to the situation; plant the trees far enough apart to enable each tree to reach its highest development ; prune systematically and carefully, paying particular attention to the removal of all stubs and dead branches which are liable to act as starting points for decay; disinfect all wounds with coal tar.

The following note is from the American Forestry Quarterly:—

Austria's total forest area is about 24,000,000 acres, of which hardly eight per cent belong to the State, but altogether over 10 per cent. are under State administration. Private forests comprise over 14 million acres, and the remainder is owned by communities and institutes. The proportion of coniferous, deciduous and mixed forest, is about as 6 to 2 to 1.8. The average annual accretion is 46 cubic feet per acre for the timber forest, with 20 per cent. work wood. 3,571 foresters and 27,000 rangers are employed. Day wages for men at planting work vary from 24 cents to 80 cents in one region, from 65 cents to $1.25 in another region. In Austria, besides a great variety of wood consuming factories, there are over 61,000 sawmills and 253 pulp mills, the latter using over 400,000 cords of wood.

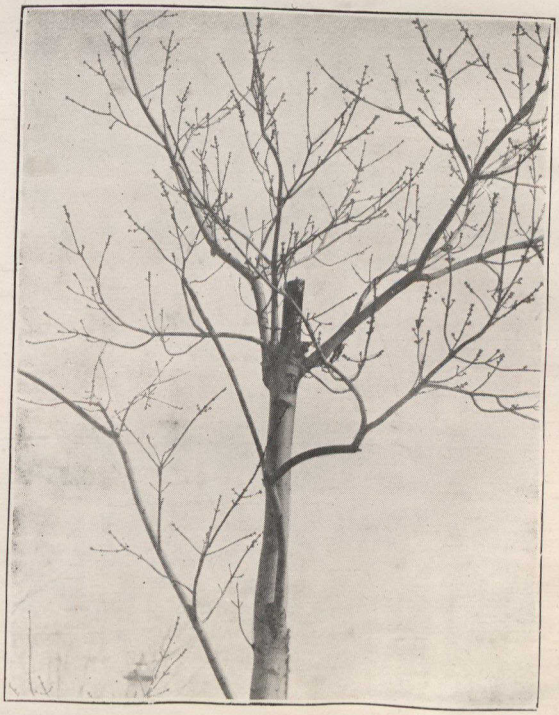


FIG. 2—A Young Maple. The form has been spoiled and the life blighted by careless cutting of the main stem.

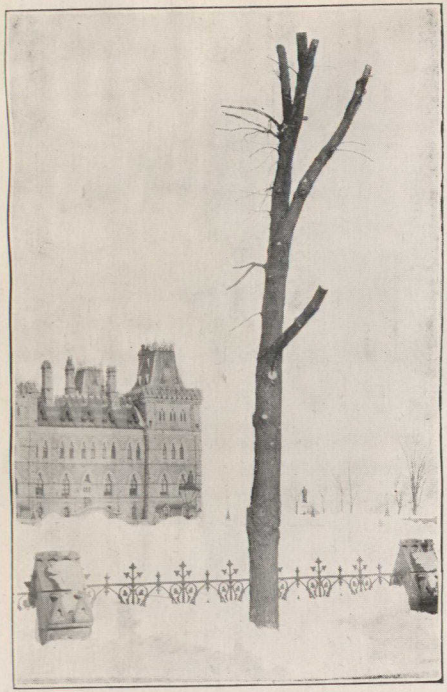


FIG. 3—Elm pruned too severely. The life is endangered by leaving stubs of branches.

FIG. 4—Elm pruned too severely. The form is permanently spoiled.

THE AMERICAN FOREST CONGRESS.

THE Forest Congress held at Washington, 2nd to 6th January, 1905, is one of the most important steps in the history of the forestry movement in the United States which has been taken in recent years, and its significance is well summed up in the following paragraph from the address of the President of the United States, at the session held in the National Theatre, on Thursday afternoon :—

"The great significance of this congress comes from the fact that henceforth the movement for the conservative use of the forest is to come mainly from within not from without; from the men who are actively interested in the use of the forest in one way or another, even more than from those whose interest is philanthropic and general. The difference means to a large extent the difference between mere agitation and actual execution, between the hope of accomplishment and the thing done. We believe that at last forces have been set in motion which will convert the once distant prospect of the conservation of the forest by wise use into the practical accomplishment of that great end; and of this most hopeful and significant fact the coming together of this congress is the sufficient proof."

The delegates, to the number of about four hundred, came from all parts of the United States and Canada also had a good representation. There were present scientific and literary men, business and professional men, those interested practically and those whose interest was theoretical, and ladies also were noticeable in goodly numbers.

The attendance at the sessions of the Congress was well sustained throughout, the hall of the Armories, which will seat an audience of four hundred, being filled on all occasions. The special features of the programme, which illustrate the above quoted statement from the President, were the addresses and papers from leading lumbermen, railroad representatives, mining engineers and other prominent business men.

The opening Session was presided over by Hon. Jas. Wilson,

Secretary of Agriculture, in whose Department the Bureau of Forestry is located. Mr. Wilson, as President of the American Forestry Association, by which the Congress was convoked, gave the delegates a hearty welcome, and pointed out the great significance of the Congress, a body of men representing great and varied interests, gathered together to discuss temperately and farsightedly the policy and the methods under which the highest permanent usefulness of the forest can be maintained. As Mr. Wilson pointed out: the extension of railroads, the settlement of the public domain, the building of cities, towns and villages, the use of wood in paper making and the opening of the mines call for more wood every year, and the forests respond to the demand. There are only a few large reserves left from which to draw supplies. The extreme east, the extreme west, and the Gulf coast are now the sources of commercial supply. The industries of the country will be carried on at greater expense as wood becomes scarcer, and the substitutes become dearer. Agriculture, commerce and mining will greatly miss the cheap supply of wood to which they have been accustomed.

The Report of the Board of Directors of the American Forestry Association, presented at this Session, gave a resume of the present position of forest legislation in the United States, and some points may be noticed particularly with such additional explanations as may be necessary to make the subject clearer to Canadians.

The Forest Reserves of the United States now number sixty-one, and embrace a total area of 63,348,656 acres. The policy of selling the mature, dead and down timber in the reserves, has been adopted, and during the past year 377 sales were held, realizing $58,000. These sales, combined with the privilege allowed settlers to take without cost, for their individual use, timber from the Forest Reserves for domestic purposes, have resulted in clearing the reserves of much dead and down timber, and in every way improved their condition. The forest rangers in the reserves have done excellent work in preventing fires. The grazing privileges in the Forest Reserves are of special value in the west, especially where sheep are grazed, and where the highlands included in the reserve are required for summer range. Excessive

numbers of sheep and careless methods of herding had done much injury to the forest lands, and the matter is now controlled by permit, no stock being allowed to graze in the reserves except by special authority from the General Land Office. Last year 843 permits for 1,806,722 sheep were granted on twenty reservations, and 5,822 permits to graze 610,091 cattle and horses in 48 reserves.

A peculiar feature of the administration of the reserves is that the survey work is carried out by the Geological Survey, the control of the lands is in the General Land Office, while the forest experts are in the Bureau of Forestry. The latter Bureau can assist in the management of the reserves only as called on by the Land Office. Consolidation of the administration is therefore urged, and a resolution supporting it was passed by the Forest Congress. This has since been carried into effect by Congress.

The administration by the Federal Government of forest lands which have not been included in reservations has never been placed on any logical or sound basis. In 1831 Congress made it a felony to cut or remove timber from public lands without due permission, but homesteaders had the right to use the timber on their land for domestic purposes, and miners had the same right for individual necessities. Timber dealers who trespassed were required, if detected, to pay stumpage or the timber was seized. In 1878 came the much-quoted Timber and Stone Act, by which timber land unfit for cultivation or land valuable for stone only, in California, Oregon, Nevada and Washington, might be sold to citizens at $2.50 per acre, but not more than 160 acres to one individual or company. It was also provided that timber or mineral lands might be taken for domestic purposes by residents in Colorado, Nevada, New Mexico, Arizona, Utah, Wyoming, Dakota, Idaho or Montana. The Homestead Act provides for a free grant of 160 acres after five years' residence, but this may be commuted at the end of six months on proof of residence and cultivation and the land purchased at the legal rate. There being no direct method for the lumberman to obtain the timber the two acts mentioned were used for this purpose, and of necessity resulted in fraudulent methods, the employees of the lumber firms and others being used as dummies.

The report urged the consolidation of the forestry work in the Bureau of Forestry, and the repeal of the Timber and Stone Act, with the substitution of an Act providing for the sale of timber by public competition.

After the preliminary business of the first morning's session was disposed of the Congress took up the consideration of the Importance of the Public Forest Lands to Irrigation. In the Western States, as in part of Western Canada, there are large tracts of land that depend for their agricultural possibilities on a supply of water for irrigation, and the sources of supply in the Sierras and the Rocky Mountains are largely controlled and regulated by the forests growing upon them. This intimate relation is felt by the people of the West, and the subject was introduced by the Secretary of the National Irrigation Association, who voiced an urgent demand that the wholesale destruction of timbered watersheds should be prevented, and that action should be taken to reforest lands where the value of the water supply would warrant such a step. Another question of interest to the West was grazing in relation to the forest reserves which was dealt with by representatives of the Stock Association. Cattle and sheep are allowed to graze in the forest reserves under permit and special instructions. Investigation of the ranges has shown that damage caused by live stock is usually due to over-stocking, grazing too early in the season, or the manner in which the stock is handled, all of which can be directly charged to the previous lack of any system of management rather than to the sheep and cattle.

The Lumber Industry and the Forest, the next subject brought before the convention, was given over into the hands of the lumbermen and the Lumber Associations. Three lumber companies were represented by their Presidents or Vice-Presidents in the list of papers presented, and as many of the Lumber Manufacturers' Associations were also heard. This session was presided over by Mr. N. W. McLeod, President of the National Lumber Manufacturers' Association. From all came a strong declaration of the interest of the lumbermen in forestry, and at the same time a statement that this had not always been their attitude. The change has been due to two causes specially. First, to a clearer understanding by the advocates of forestry

methods of the elements, and especially the economic element, involved in forest management and consequently a more sympathetic attitude toward the lumberman. And, second, the increased value of forest products and timber stumpage, impressing upon the lumbermen that all the value of his timber holding does not rest in the present, but that it is to his advantage to take measures to preserve and perpetuate the forest. The lumbermen are therefore desirous of obtaining all possible information which will assist them in attaining this end, and are prepared to receive light from foresters or from any other source. The supply of hardwoods for manufacturing purposes is also giving the manufacturing establishments concern and they too added their voice in urging consideration of the future resources.

The Railway Companies had the floor on Thursday morning under the Chairmanship of Mr. Howard Elliott, President of the Northern Pacific Railway Company, and three of the papers were by representatives of other railway companies. The railways use large quantities of timber in connection with the equipment of their lines, their total annual consumption for the United States being probably three billion feet, which would mean the denuding of about one million acres or the annual product of fifty million acres. Ninety million ties are required annually. The railways see the sources of supply steadily diminishing, while the prices and their requirements are as steadily increasing. They therefore ask the question: How can the demand be met? The Pennsylvania Railroad has made an attempt to answer it by planting trees along their right of way and other lands held by them. The situation may also be helped by preservative treatment to increase the life of the timbers used. This may mean a doubling or quadrupling of the period of use of a tie, while the addition to the cost is small. A red oak tie lasting five years and costing forty cents, may be treated at a cost of sixteen cents, so as to double its life and make it equal to a white oak tie, costing, untreated, eighty-five cents. Experimental work in this line is being done by the Bureau of Forestry.

In addition, the Relation of Forestry to Mining was considered, and thus the practical and business aspects of forestry and its relation to other great industries were discussed and empha-

sized by the representatives of these industries. It was a significant fact of the Congress that leading men in railway organization, in lumbering and manufacturing enterprises, were prepared to come to such a meeting and give time and thought to the consideration of the forest supply, and showed more clearly than anything else could do the demand and the reason for the movement which the Congress represented.

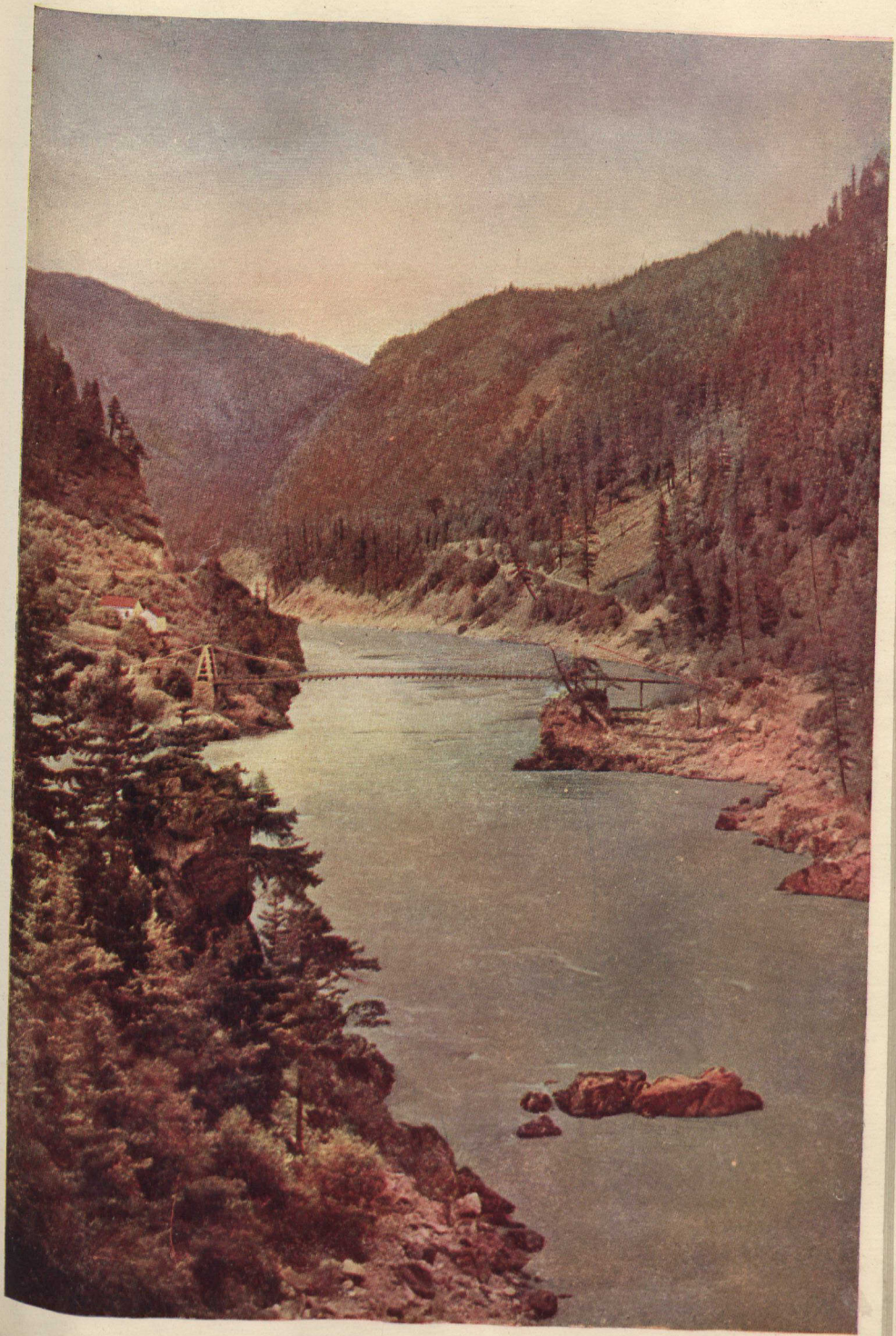
The meeting held in the National Theatre, which was presided over by Hon. Jas.Wilson, was an effort to reach a wider constituency than could be influenced by the regular meetings of the Forest Congress. An address by President Roosevelt was sufficient to attract an audience that filled the theatre. The President is not an orator, but he is a clear, forcible speaker, evidently earnestly seized with the importance of the question with which he is for the moment dealing and desirous of driving its truth home to the minds of his hearers.

"The producers, the manufacturers, and the great common carriers of the nation had long failed to realize their true and vital relation to the great forests of the United States, and forests and industries both suffered from that failure. But the time of indifference and misunderstanding has gone by."

"No man is a true lover of his country whose confidence in its progress and greatness is limited to the period of his own life, and we cannot afford, for one instant, to forget that our country is only at the beginning of its growth. Unless the forests of the United States can be made ready to meet the vast demands which this growth will inevitably bring, commercial disaster is inevitable."

"If the present rate of forest destruction is allowed to continue a timber famine is obviously inevitable. Fire, wasteful and destructive forms of lumbering and legitimate use, are together destroying our forest resources far more rapidly than they are being replaced."

Such were some of the statements in which the President expressed his views of the situation. But the anomaly, at least to those used to a British form of government, is that, no matter how strongly the executive may consider a certain course advis-



THE FRASER RIVER B. C.

able, it does not necessarily follow that that will have any effect on legislation, and in fact in regard to the defects in the organization of the forest service and in the forest laws that urgently require remedy, the government is helpless until Congress is prepared to act.

M. Jusserand, the French Ambassador, at this meeting, gave one of the best addresses of the Congress. He described the forest as the great friend which supplied the early wants of mankind, giving the first fuel, helping to the rearing of the first real house. And, now, after the lapse of thousands of years, the forest continues the great friend, so adequate is it to our wants. The forest has proved itself a friend to France in reclothing the bared and wasted mountain sides and rescuing the fertile lands of the valleys from destruction, in restraining the destructive power of the winds, in stopping the advancing flow of that great sea of sand from the ocean, which engulfed farms and towns and threatened to make the country a desert. To quote M. Jusserand's own words:—

"The importance of such plantations (i.e. forest plantations on mountain slopes) is more and more apparent. We see destruction and poverty invade the parts where they have not been observed; wealth and comfort grow in those where the rules have been observed. Where there is a just proportion of forest ground, the temperature is more equal, the yielding of water springs more regular, and observations in the south of France have shown that, since the Esteral has been reforested the destruction caused by that terrible wind, called the Mistral, has diminished. The sea coasts of France were being gradually invaded by the sand, and the wind carried the death powder farther inland as years passed on. In 1810 we tried forestry, and the forest showed itself, as usual, the friend of man; the sand country has entirely disappeared, as well on the ocean as on the channel, and the desolate regions of yore are now wealthy, pleasant ones, where people even flock for their recreation and their health."

The size of the Congress resulted in one defect, that it was difficult to carry out a discussion of practical problems. This was partly met by a series of lectures to forestry students, follow-

ing the week of the Congress, and by other smaller conferences, two of which were held at the Shoreham, the headquarters of the Canadian delegates. The disposal of slash after lumbering operations, was one of the questions discussed. Mr. Pinchot stated that from investigations made in the Cache Lake Reserve the Bureau of Forestry had found that the burning of slash could be done at 25c. a thousand. Dr. Schenck, however, pointed out that with a stand of 5,000 feet to the acre, this meant for an area of 200,000 acres an expenditure of $250,000. which was equal to an annual expenditure of $14,000, and he therefore concluded that it would be better to put the money into providing a fire preventive service. The expense and the danger from careless handling of the fire seemed, in the general opinion, to render this method of disposing of the slash inadvisable, though the question was still left an open one. In California slash burning is viewed with favor. A delegate from that State mentioned, that on one tract of 30,000 acres, where cutting had been carried on for eight years, the slash had been burned along the road, or on about 1,000 acres, at the rate of 12 cents per acre.

Canada was well represented at the Congress, those present being Dr. Robt. Bell, Professor John Macoun, Dr. Jas. Fletcher, E. Stewart, Norman M. Ross and R. H. Campbell, Ottawa; Aubrey White, Dr. Judson F. Clark, Dr. A. T. Drummond, J. H. Faull, Toronto; G. Y. Chown, Kingston. Professor W. N. Hutt, now of Maryland Agricultural College, formerly of Toronto, was also present. Mr. White addressed the Congress at the opening session, giving greetings from Canada, and explaining the methods of timber administration in the Dominion. Mr. Stewart also spoke of the forestry work in the West and invited members of the Congress to attend the annual meeting of the Canadian Forestry Association to be held in Quebec.

GROWING DEMAND FOR FOREST TREE SEEDS.

THE Forestry Branch of the Department of the Interior has frequently been asked by nurserymen, both in America and Europe, and also by private individuals, as to where various forest tree seeds can be purchased in quantity in Canada.

The Canadian white pine is becoming more and more widely planted in European forests, greatly increasing the demand for this kind of seed. The quality of the American seed seems better than of that gathered in Europe and is claimed to produce stronger and healthier stock. The jack pine (*Pinus banksiana*) also seems to be in great demand during recent years, the seed in Europe selling for a very high price compared to that of other conifers.

The seeds of both these varieties can be secured with little trouble, and the demand seems to be rapidly increasing, both at home and abroad. One German firm writes that they require annually from one to two thousand pounds of white pine seed, the price paid per pound, cleaned, being generally 50c. An American nurseryman also makes enquiry for 200 pounds of the same seed.

The usual method of obtaining seed from the thinner-scaled cones such as white pine and white spruce, is to gather the cones just as soon as the seed is ripe which can be determined by cutting open the cones. If ripe, the seeds will be filled with firm, white meat. The seed is generally ripe some weeks before the cones appear to be so, and if left too long is liable to be lost, as on hot days the scales open as soon as they become dry and allow the seed to drop out.

After the cones are picked they should be spread out in the sun, when they will gradually open. This process is hastened if the cones are put under glass frames similar to those used on hot beds. The seed is easily extracted by vigorously agitating the cones for a few minutes. The seed is finally cleaned by separating it from the wings by passing it through a kind of fanning mill.

The cones of Banksian and other thick-scaled pines require a considerable amount of heat before they will open sufficiently to permit the escape of the seed. The jack pine cones have to be subjected to a heat of from 120° to 140° Far. for from two to four hours, when the seed can be easily shaken out.

There seems to be an increasing interest throughout Canada and the United States in the matter of forest plantations, which is bound to create a market in the near future for all classes of seedling forest trees. There is no better source from which a supply of these seeds can be obtained than Canada. All the varieties which are of most economic value are native here, and from the geographical situation of the forests, Canadian seed should produce a much more desirable quality of stock than can be raised from that collected farther south.

It will without doubt pay our Canadian seedsmen to devote some attention to this branch of the seed business, which if carried on under a proper system, should develop very rapidly, especially in connection with supplying the demand in European countries.

This season an important extension is being made to the work of the Forestry Branch, by commencing a systematic study of the forests in the Dominion Forest Reserves. This summer a field party, under the supervision of Mr. R. D. Craig, will be at work in the Turtle Mountain Forest Reserve, and probably later in the season in the Moose Mountain or Riding Mountain Reserve. The object is to ascertain the extent of forested and burned areas, the quantity of standing timber, and the silvicultural characteristics of the various species of trees found there. This latter will include a study of the rate of growth by stem analyses, and a study of the reproduction under different conditions of soil, exposure, seed trees. It is expected from the data collected to be able to establish regulations for cutting so that the forests may be improved rather than destroyed by use.

NOTES.

Mr. Geo. D. Mendell, of Victoria, Australia, writing in the Bendigo Independent, makes an urgent appeal to the Australians to take up the question of forest preservation. Mr. Mendell visited Canada recently and evidently has a high appreciation for what has been done here, as he holds Canada up to the admiration of Australia as a shining example of progress and intelligent foresight. As it is rather pleasant to be represented in this role and it may strengthen the interest in the question of forestry to know how others look upon what we are doing, a few sentences from the article may be uoted. Mr. Mendell says:—

"It is only about six years since the Canadian Government woke to the fact that one of its most valuable assets, its timber, was being prodigally wasted. Ever alert to the possibilities and future of trade, in which respect Canada imitates America and supplies Australia, and especially Victoria, with an admirable object lesson, the Government established a Forestry Department and passed laws to make its work effective. The Canadians regard forestry as the foster mother rather than the handmaiden of agriculture, and the puzzle to the observer, unconnected with either science, at first sight is that forestry is not considered the equal, the peer of agriculture, and just as carefully studied in an agricultural community like Victoria."

Mr. Mendell also refers to the Canadian Forestry Association, and urges the organization of a similar society in Victoria.

"There are, as you know full well, two great classes of forests and no more. There is the wild forest and there is the civilized forest. People who know forests only through books, I mean through bad books, not the books written by members of this assembly, fancy that the wild forest is the thing. A time was too when people thought that the wild man, the man in a state of nature, was a nest of virtue and that, leading a kind of simple life, he led also, of necessity, a model life. The truth is quite

different; virtue, like all plants of price, needs cultivation; forests need the eye, the mind and the heart of man. Instead of being full of the most beautiful and useful trees the wild forest offers a prodigiously small quantity of good trees; many have outlived their period of use and they prevent the growth of others; many have grown crooked; wicked ones have injured the righteous."—*M. Jusserand, at the American Forest Congress.*

At a meeting of the Western Horticultural Society, held at Winnipeg, on the 24th January last, the following resolution was passed:—

Resolved that this Society desires to express to the Honourable the Minister of the Interior its approbation of his work as shown in the creation of a Forestry Branch in connection with his Department.

Also desires to express its conviction that the educational work carried on in the encouraging of tree planting has been of great value in helping the settlers to build for themselves comfortable homes.

And further, that the demonstrations made by his officers of the possibilities of tree culture on the great plains of Western Canada will render even more inviting to the prospective settler the fertility of the soil and also convince him of the healthfulness of the climate.

The Canada Lumberman has reached its twenty-fifth anniversary and celebrated the event by the issue of a special number, giving a history of the development of The Lumberman and the lumber industry since it began its career. In its initial number in 1880 it stated its objects, in addition to the furnishing of trade information, to be as set out in the following quotation:—

"Canada is indeed a wooden country, but its woods are fast disappearing, and one of the prime elements of its early growth is being ruthlessly destroyed by the old style of management on the part of the Government and the reckless indifference of the people. It will be the duty of The Lumberman to point out the

injuries annually inflicted on the wooden wealth of Canada by reckless tree felling, and the still more reckless starting of forest fires, whether by sportsmen or settlers. Even in the latter particular our journal may, by assisting in arousing public opinion, be the means of saving millions of dollars to the country in a single year."

The Lumberman has lived to see and assist in the formation of a better public sentiment on this question, and great improvement in the methods of administration. The Lumberman has shown itself progresive and broad-spirited and that it has the support generally of those interested in forestry and the lumber industry is shown in the assistance given by those who prepared the many able articles that appear in the special issue. The Canadian Forestry Association is indebted to The Lumberman for support and interest in the forestry movement and may well offer all good wishes for continued prosperity and expanding usefulness.

"*Canada First,*" is the name of a new magazine representing the Canadian Preference League, which began publication with the present year. The objects of the League are to give practical preference to Canadian goods and Canadian institutions, to foster the growth of Canadian sentiment, and to educate public opinion in this direction in every legitimate way. Naturally the Canadian forest is a subject of premier interest to a league formed with such objects, and it is considered in a well-written article on "Canada's Forest Wealth." The subject is dealt with in a sane and discriminating manner, and in this and other respects the magazine is a credit to and should be of great assistance in the advancement of the objects of the league.

Following is an extract from an article on "The Climate of Manitoba and the Northwest Territories," by R. F. Stupart, Director of the Dominion Meteorlogical Survey:—

"In Manitoba the rainfall is greater than in any portion of the Northwest Territories. The normal annual precipitation for the Province is approximately 22 inches, and the May and August

rainfall 11.5 inches; drought is therefore not much to be feared here but westward the danger increases. From Regina westward to Medicine Hat and northward to Saskatoon, there are very few rainfall records of over a few years, but there is fair evidence that the average annual precipitation over this area nowhere exceeds 15 inches, and at many points is less than that amount. By reference to the table it will be seen that the records of 18 years indicate an average rainfall of 11 inches in Saskatchewan, and 12 inches in Alberta, which, with a snowfall of about 55 inches, gives a total precipitation of 16 or 17 inches over the larger part of Saskatchewan, and 17 or 18 inches in Alberta. But it is to be remembered that the seasonal precipitation in the far west is very variable. At Calgary in 1892, the total precipitation of the year was but 7.91 inches, while last year it was 34 inches. For five years the rainfall has been ample in this region, but for many years prior to 1897, it was scant, and in several of the years irrigation appeared necessary for successful crops. We may fairly assume that there will be a return to the dry conditions, and that the Government is acting in a most judicious manner in providing for irrigation in parts of Alberta.

"The writer is of the opinion that the Chinook has played an important role in producing a treeless prairie land in Southern Alberta and Assiniboia, and that the tendency for wooded lands in Northern Alberta, and northward, is largely due to the dimishing frequency of the Chinook with increasing latitude. The effect of the Chinook in Southern Alberta and Assiniboia is to keep the prairies almost bare of snow during the winter, and to leave it quite bare during the early spring, while farther north, as the Chinook is less frequent, the snow lies deep in winter, melts and waters the ground in early spring, providing moisture for trees at a time when moisture is most beneficial. Observation appears to warrant the statement that rainfall is much more variable near the mountains than it is farther east, also in southern portions of the Territories than in northern portions. In the Territories north of Edmonton, values of rain and snow have been deduced from between 6 and 10 years observations, and from these it appears probable that the normal precipitation throughout Alberta and northward into the Mackenzie River basin is not very differ-

ent except that in the higher latitudes the proportion of snow is greater."

The following extract from the report on the Botanical and Afforestation Department of Hong Kong is of particular interest, as showing the value of a systematic policy in the matter of reforestation:—

The time has now arrived for the colony to profit to the full extent by the foresight of the Government of a former generation.

In the late seventies tree planting was seriously undertaken, and from the year 1882 to 1885 the annual expenditure of $12,000 was expressly sanctioned for afforestation, and from 200,000 to 300,000 young pines were planted each year. As the island became more completely covered with plantations, the operations and annual votes gradually diminished, until the present time, when the planting of a few thousand trees can be covered by a small portion of the tree-planting vote of $3,450. As a result of this policy there are now nearly 5,000 acres of pine upon the island, and the oldest plantations, now between twenty and thirty years old, are ready to fell and replant.

The pine plantations are of very various ages and sizes and much time has been devoted during the year to a careful examination of them and subsequently to delineating them on maps and schedules so that a systematic working plan can be drawn up to ensure, as far as possible, a uniform annual outturn of timber. The surface of the island has been divided for this purpose into seven main divisions, and each of these into six to eight blocks, containing from 50 to 300 acres of pine plantations each. The primary object of this preliminary inspection of the plantations was to obtain statistics upon which to found a working plan for the future, but the results have a further interest as showing what return the Government have for their outlay of former years.—*Agricultural News, Barbadoes.*

Hon. A. B. Warburton in a letter to the Charlottetown Patriot, writes in regard to the failure of the hay and straw crops

in 1904, and ascribes the failure mainly to the bare, unprotected state of the meadows and grain fields. The woods have been cut away to such an extent that the fields are exposed to the full force of the sun and of every wind that blows, and the question is asked whether or not the failure of the past year is not in the main to be found in this very fact, that the unprotected lands were dried by the spring and early summer winds. One farmer told Mr. Warburton that the only good field of hay he had was one at the back of his farm which was well sheltered by woods and that those not sheltered had been almost complete failures.

Though the subject requires fuller investigation the influence of sheltering trees on moisture conditions are very noticeable. To quote but one instance of many recently cited in Forestry and Irrigation, from the results of experiments made by the Agricultural Experimental Stations in Wisconsin in 1894: to the leeward of a piece of black oak woods, of an average height of 15 to 25 feet, the results showed an evaporation at one foot above the surface of the ground varying from 11.1 cubic centimetres at twenty feet from the grove to 18.5 cubic centimetres at 300 feet, beyond which distance the amount remained constant. The observations were made during an hour of sunshine in the middle of the day. Thus at 300 feet the evaporation was 66 per cent. greater than at 20 feet.

Mr. T. M. Robinson writes from Gravenhurst, Ontario, as follows:—

"There are millions of acres in Muskoka and this back country that are useless for agriculture, over which second growth timber is asserting itself, and which would in a few years, if suitably protected, prove to be of great value to the country. The protection of the new growth of trees is a duty devolving upon not only the legislators of Canada, but also upon the present generation of Canadians, who have reaped such a large harvest from the woods of their country.

"It is safe to say that in the forty years that I have known Muskoka, the white pine has receded two hundred miles, with practically no effort to protect the second growth. I am pleased to

be able to say however that there appears to be a gradual awakening to the importance of this question, even when least expected, for recently in a gathering of ordinary settlers, the conversation turned to the growth of white pine over burned land, and it was of great interest to listen to the testimony of those present, who had begun to observe the rapid growth made after the first ten years. I consider the outlook more hopeful and every effort should be made to spread the knowledge of the subject of forestry."

Copies of the proceedings of the American Forestry Congress, held at Washington, during the first week of January, may be obtained from H. M. Suter, the Secretary of the American Forestry Association, whose address is 500 Twelfth St., N.W., Washington, D.C. The price of the report, bound in cloth, is $1.25, and five or more copies will be sent to one address for $1.00 each.

Among the recommendations of the American Forest Congress, was one suggesting an amendment to the Homestead law, requiring the planting under the supervision of the Forestry Bureau of at least five per cent. of the area of the homestead before final title is acquired.

In Bavaria, the statistice for the years 1899 to 1901, show a total forest area of 6,500,000 acres, of which 36% is State land, and 50% in private hands. The total income was $10,000,000 and the expenditure $4,560,000 leaving a net return of $2.35 per acre. In 1901, the cut in the State forests was at the rate of 106 cubic feet per acre, and the net result per acre over $4.00.

In Prussia the financial result for last year of the forest administration makes an excellent showing and together with the railroad administration has averted, not only the expected necessity of a loan of $17,000,000, but left a surplus. Prussia in its government railroads, forests, mines, farms, &c., possesses an active investment, which is worth twice the Government debt.

The forest budget for 1903, closed with a surplus of over $12,000,000, an increase of about $2,500,000 above the preceding year.

For 1904 the income from the seven million acres of State forest is estimated at twelve million dollars, of which $70,000 was expended for educational and scientific purposes, and $1,300,000 for purchase of lands and special improvements.

Since 1883 the waste area in the hands of the State increased by 34,000 acres, the total acquired in the twenty years being about 215,000 acres, of which 85,000 acres or 1.43% of the Prussian forest domain remain in waste condition, the reforestation having proceeded at the rate of about 9,000 acres per year for the twenty years.

In Russia the income from the State forests in the middle of last century amounted to about $500,000, in 1892 it was $10,000,000, and in 1901 over $28,000,000, in addition to $10,000,000 worth of free wood. The net income was $23,000,000. a remarkable increase due to a number of causes, but largely to better management. Of the 650,000,000 acres of forest controlled by the State, only about ten per cent. are worked under working plans. Only $50,000 or one-half of one per cent. goes to planting, as against 7.5 per cent. in Prussia.—*American Forestry Quarterly.*

The colored illustrations in this issue of the Forestry Journal are from a pamphlet descriptive of the Rocky Mountains Park of Canada, which has been issued by the Department of the Interior, and are used by kind permission of the Department. The Canadian National Park, which is unsurpassed in the beauty and boldness of its scenery, is becoming a favorite resort for pleasure seekers.

REVIEWS.

Report of the Forester for 1904—*U. S. Bureau of Forestry,* 38 *pages.*

This is a general report of the work carried on by the Bureau in its various divisions during the year ending June 30, 1904, with an outline of what it is proposed to undertake during the present year. A considerable amount of work was done in surveying new Forest Reserves, making studies of forest conditions in various states, running valuation surveys over several thousands of acres, etc. In co-operation with private holders of timber lands working plans for 1,068,000 acres were made. Planting was begun on the Dismal River Reserve, in Nebraska, a sandy, treeless tract unfit for agriculture, by setting out 100,000 young pines. Next spring about 1,500,000 seedlings are to be set out.

A great deal of attention has been given to the study of timber preservation principally in connection with railway ties and piling, made of various kinds of pine, fir and spruce. Timber tests have also been completed, from which a large number of data concerning the strength of structural timbers have been obtained.

Up to the present the work of the Bureau has been confined largely to investigation work, and the collection of information relative to forest growth throughout the States. Now that the reserves have been handed over from the Interior Department, solving the questions involved in their management will probably be the chief occupation of the foresters of the Bureau in the future.

The Luquillo Forest Reserve, Porto Rico U. S. Forestry Bureau. Bul. No. 54. *By John Gifford, D. Oec. Contains* 33 *pages, descriptive text, map showing situation of reserve,* 7 *plates and an appendix of* 12 *pages, giving text and short description of the trees of Port Rico.*

The bulletin is the report of a preliminary examination of the Luquillo Forest Reserve, situated at the east end of the island of Porto Rico, and set aside in January, 1903. The reserve is supposed to contain 65,950 acres, of which only about 20,000 acres is Federal forest land. The highest mountains on the island are within the boundaries of the reserve, which is evidently intended primarily to protect the water supply for the surrounding districts. From a general description of the forest 10,000 acres are estimated as timber lands, said to contain 25,000,000 board feet, the remaining 10,000 acres consisting of mountain peaks and palm lands. Very little lumbering so far has been done in the district, most of the wood used in the island being pine imported from the United States. The principal forest tree of economic importance seems to be the Tabanuco (*Dacryodes hexandra*, Griseb), the wood of which is somewhat similar to that of yellow poplar or tulip tree of the Eastern States.

The report enumerates the general industries of the district, discusses transportation facilities and necessity for good roads, concluding with recommendations for the management of the reserve.

Progress Report on the Strength of Structural Timber. By W. Kendrick Hatt, Ph.D. Bureau of Forestry Circular No. 32; 28 pages.

This is a partial report of the results of some of the tests at present being carried on by the Bureau to determine the mechanical properties of various commercial timbers of the United States. Another publication will be brought out shortly giving detailed descriptions of methods used in making the tests, with a more complete report of all the results obtained. The tests have been limited to: (1) Species that promise to be on the market for an indefinite time: (2) Actual market products: and (3) Such purely scientific work as forms the basis for correct methods of test. The species undergoing investigation are: The Pacific Coast Red Fir (*Pseudotsuga taxifolia*); Western Hemlock (*Tsuga heterophylla*); Red Gum (*Liquidambur styraciflua*); and Loblolly Pine (*Pinus taeda*). The loblolly pine and Pacific Coast timbers are tested in the form of large sticks. such as bridge stringers. These are subjected to the various

strains which they would be called upon to resist if placed in actual construction works.

Short descriptions of the woods of the various species under test are given with the investigations made in each case. A number of tables show in figures the actual results obtained.

The Forests of the Hawaiian Islands; Wm. L. Hall, U. S. Bureau of Forestry.

In Hawaii the best timber tree is the Koa, a highly prized cabinet wood, with a color varying through rich shades of red and brown and with a fine and distinct grain, but the forests are of as much importance on account of their influence on other industries as for their direct products. Those business interests which, like rice and sugar production, are largely dependent upon the mountains for a supply of irrigation water, naturally in most cases strongly favor preserving the mountain forests. So strong has been the interest of some of the sugar companies in the preservation of the forests that they of their own account have maintained large forest reserves above their plantations. Since 1882, the Government has undertaken work in the planting of denuded tracts.

Chestnut in Southern Maryland; Raphael Zon, United States Bureau of Forestry.

Chestnut occurs in Canada only in Western Ontario, so that this bulletin is somewhat narrowed in interest for the Dominion. In Maryland the chestnut has been saved from extinction largely from its sprouting capacity. The conditions for the reproduction of chestnut from seed are unfavorable, owing to the demand for the nuts. The capacity to produce sprouts from the stump or from the roots is possessed almost exclusively by hardwoods, and sprouting from the stump or stool, generally known as the "coppice" method of management, is that by which the chestnut is generally reproduced. Stumps one foot high show the best results, and winter or early spring is probably the best time for cutting. Coppice chestnut furnishes better timber for working than chestnut from the seed: it is heavier, less spongy, and

straighter grained, is easier split and stands exposure to the air longer. Chestnut commences to bear seed when eight to ten years old, and continues to do so to a very old age, but regular and plentiful crops begin only after the twentieth year. The yield per tree averages between 1½ and 3 bushels or even more. The chestnut is a long-lived tree, attaining an age of 400 to 600 years.

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