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CONTENTS:

	Page.
Winnipeg Convention	49
Editorial Notes	50
Dominion Forest Service	51
Booth, Mr. John R.	53
Pulpwood Statistics for 1912	54
Riordon, Mr. Carl	55
British Columbia Regulations	55
Plantations in Foreign Countries.....	56
Dwight, Mr. T. W.	57
Work of a Forest Engineer	58
With the Forest Engineers	62

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WINNIPEG CONVENTION.

Arrangements are now rapidly progressing for the Winnipeg Convention within the days July 7 to 10. The exact apportionment of these days has not yet been decided, but it is possible that the Convention will open with addresses of welcome and replies on the evening of July 7, and that the business sessions will take place on July 8 and 9. In any event the meetings will lie within these four days.

Place of Meeting.

The sessions will be held in one of the halls of the Winnipeg Industrial Bureau in the heart of the city at the corner of Main and Water streets. This building, which covers the site of the famous Manitoba Hotel and Northern Pacific Railway Station, has two large assembly halls and a number of smaller rooms which may be used for committee rooms, etc.

Railway Arrangements.

Owing to the fact that this meeting will be held during the first days of the Winnipeg Exhibition, those attending from within the Winnipeg Fair territory will purchase the special rate tickets then in force, and will thus not be required to secure certificates. The Winnipeg Fair territory embraces all the country in Canada between Fort William and the Calgary Edmonton district. From all stations in Canada east of Port Arthur members attending as delegates can secure a round trip for a single fare (plus 25c) on the certificate plan, the particulars of which will be furnished on application to the Secretary. The

going dates for these tickets will be July 3 to 6 inclusive.

The certificates signed by the Secretary at Winnipeg will be honored up to and including July 24 for return.

These rates are for all rail trips. Where it is desired to make part of the trip by steamer across the Great Lakes the rates will be as follows:—

Going all-rail, returning lake and rail, \$9 additional

Going lake and rail, returning all-rail, \$4 additional.

Going lake and rail, returning same route, \$13 additional.

Convention rates have been secured for delegates from British Columbia points, particulars of which may be had upon application to the secretary.

Mr. R. S. Gourlay, President of the Canadian Manufacturers Association, in addressing the Canadian Club of Ottawa, on March 29, on 'Ontario Present and Future,' drew attention to some matters which are apt to be overlooked. People often spoke of wheat as king, yet timber, not wheat, was the largest single crop in Canada. The figures are: timber, \$166,000,000; wheat, \$121,000,000. Mr. Gourlay also drew attention to the value of the tourist or sporting value of fish in Ontario. Ontario was fitted to be the great holidaying ground of the continent, if not of the world, and it behooved her, therefore, to protect these game and recreation features by protecting her forests. Mr. Gourlay has long been a friend of forest conservation, and this is an aspect that is coming more and more to appeal to the business men of the country.

Those who do not believe forest conservation is making progress on this continent must keep their eyes closed to the fact. Even five or six years ago it was difficult to get material dealing with forest conservation. To-day it is impossible to take up a newspaper or magazine without finding articles on the subject.

Besides this on every hand organizations are springing up, or are being strengthened, to support the cause. There is much to be done. There is no time to lose for each year sees inroads made by fire into our forests, one hundred or two hundred years old. There is much avoidable waste. There is every need for all friends of conservation to work to have this progressive sentiment crystallize into action. But at the same time, while there is the need, there is also the encouragement that much has been accomplished and that ground is being gained every day. It is the aim of the *Canadian Forestry Journal* to give a bird's eye view of the field, and the result is that articles have to be shortened in order that even important happenings may be briefly chronicled. Our readers are sending in communications as never before, and as it will always be the aim to publish first those articles dealing with our own country and our own time, the Editor will appreciate the development of this feature.

The preservation of mine timbers by chemical treatment has not yet been adopted by the mining industries of Canada. In many localities, however, the distances required to transport mining timbers are becoming greater, poorer qualities of woods have to be used and the annual cost of the upkeep of mine timbering is becoming greater. In the United States much has been done in the treatment of mine timbers and it has been proved that a treatment of creosote or zinc chloride decreases the destruction due to decay, fire and insects. This increases the life of the timbers and decreases the annual cost of replacing mine timbers. Timber used in mines has, on the average, a shorter life than wood used for any other purpose. The surroundings in a mine are very conducive to rot, which, after a period of three to five years, causes the timber to break, crumble and become useless. Experiments have been conducted in United States mines with a row of untreated and treated mine props alternately placed. In one instance, after 18 months, every untreated stick was weakened by decay and broken, while the treated props were sound and useful. From various practical experiments of this kind with different species of wood important results have been obtained.

Dominion Forest Service

Outline of Present Organization and Projected Lines of Work.

T. W. Dwight, Assistant Director of Forestry.

The Dominion Forestry Branch has, during the past three months, been directing its best energies to a comprehensive consideration of the possible means of taking, during the coming season, a big step forward in the direction of putting its organization into definite form. It has been for some time apparent that radical changes and elaborations in the general structure of the organization and in the methods of handling business were required. The urgent necessity for this has been brought about by large increases in the area of the forest reserves that followed the careful examination of the mountain regions in Alberta and British Columbia. These reconnaissances have been continued in the newly surveyed districts lying in the wooded belt of country extending to the north of the prairie regions of the Provinces of Manitoba, Saskatchewan and Alberta. They have revealed the fact that there, too, are extensive areas that will be great sources of wealth and benefit to the rapidly growing population of the unbroken agricultural regions to the south, if they are managed scientifically with a view to continuing permanently on them the production of wood. With this situation prominently in their minds, the chief thoughts of the Director of Forestry and his chief lieutenants have been directed towards taking the steps necessary to enable the Forestry Branch to cope with problems that will be thrust upon them at a rate all too fast to enable it to keep pace. There has been, too, the feeling of the responsibility of the Dominion organization to take the leadership in efficient and progressive administration, so that their action might serve as a stimulus to the provincial organizations in making similar progress towards placing under wise and provident care the valuable resources entrusted to them.

The Framework.

A tentative framework for the organization was outlined at the beginning of the season of 1912, and preliminary steps were taken to carry on the work in accordance with it. The practical problems immediately encountered when the actual operation was in effect showed, in innum-

erable instances, the necessity of rapidly developing the organization along the general lines laid down. The most pressing details requiring attention were brought prominently into view, and, with the purpose of considering these, a meeting was arranged at Ottawa of the Inspectors having charge of the different divisions of the work in the field. For the space of a month there were taken into consideration such problems as the general revision of the regulations governing forest reserves, the construction of fresh outlines to indicate the methods by which the business of the Forestry Branch should be handled, and the delineation of the present and future steps necessary to the developing of an efficient and well-trained personnel. The management of forest reserves for the fullest benefit of the public involves many problems. There is not only the control in a scientific manner of the disposal of the timber grown on them, but also the making available of the grazing lands in many places intermingled with, and inseparable from, the timberland. The disposal of the mining rights, which in the Rocky Mountain coal areas are enormous in extent and value, must be provided for. The regulation of the use of land for railways, summer resorts, towns and other numerous purposes is a many-sided problem. Fish and game must also be protected, so that the forest reserves may remain a permanent asset to the general public, not only on a material basis, but also from the standpoint of health and recreation. When this is realized, the extent of the problems to be met may be comprehended.

The subdivision of the organization into distinct branches to handle the various lines of work was an initial step. The duties of the Head Office at Ottawa were first outlined. Here the general plans must be submitted and considered, and the control and co-ordination of the work secured. Detailed records of all work must also be kept here, in order that information in regard to it may be put before the public through the agencies of the press and of government publications, and directly before the representatives of the people, the ministers of the Crown and the

members of parliament. To cope adequately with the demands of this work, the need of a large increase in the staff at this point was apparent.

In the field the work has been placed under the supervision of Inspectors. For the administration of forest reserves, districts have been outlined in accordance with provincial boundaries. In each of them, the staffs in charge of the forest reserves are to be under the direction of a single field-officer. For these positions men have been selected who possessed large ability in administrative matters, and the highest qualifications for forest administration, and who were calculated to be fitted for developing the work along the best and most efficient lines.

Protection Work.

The duties of the Forestry Branch include the protection of the timber on all lands under the control of the Dominion government, no matter whether or not it is included in forest reserves. For the protection of the lands outside of the forest reserves, a special staff has been maintained. The work has been put, during the past year, under the supervision of an Inspector. A staff of Chief Fire Rangers have recently been permanently appointed, and they will be engaged throughout the year, in familiarizing themselves with, and planning for, the solution of the problems to be met in their respective districts. The advances made in this department of the work have been greater than in almost any other. The inauguration, through the Board of Railway Commissioners, of a patrol by the railway companies of the lines passing through timbered districts has enabled the Forestry Branch, which heretofore carried out this work, to extend the protection given by its staff to many new areas removed from the present railway lines. The attention of the Inspector of Fire Ranging during the present summer is to be devoted, for a considerable time, to the further extension of the fire patrols in regions hitherto untouched. A trip has been planned which will enable him to secure a first-hand knowledge of the vast needs of the timbered area draining into, and lying along, the lower reaches of the Mackenzie river and probably also of the Yukon Territory.

The increase of the area included in the forest reserves to take in the non-agricultural areas at present lying in the van of the rapidly extending settlement is a problem that is an ever-pressing one. Before any land is recommended to be included in a forest reserve a careful examination is made of it. Not only must the timber resources that may be comprised in it be determined, but there must also be investigated the nature and agricultural possibilities of the soil and the relation of the for-

est cover to the maintenance and regulation of the water-flow of the region. The information furnished in the preliminary reports made by the Dominion Land Surveyors is made available to the men carrying on these examinations. The decision as to the ultimate disposal of the land can then be based on a broad consideration of the best permanent use that the land can serve for the community. It is keenly felt that this examination should be made, and the decision reached, well in advance of any settlement in the region, in order that new settlers may be guided into the best agricultural regions and may be protected from attempting settlement on lands where agriculture cannot thrive. In all parts of the Dominion, and particularly in the Western Provinces, where settlement of new lands has of late progressed so rapidly, many unfortunate instances have come under observation of settlers locating, through ignorance, on lands unsuited to their occupation. The result has been a later abandonment of the land with a great loss to the individual and with a greater waste of capital and energy to the country. It may be seen, therefore, that this work of the Forestry Branch has a much broader scope than that connected with the mere management and protection of forest lands, as it includes the wise regulation of settlement. This last is one of the most important duties of the government.

As the areas to be examined are in most cases removed from the existing centres of forest reserve management or of fire patrol, this work is organized as a separate division. Men with technical training in forest and soil conditions and in the methods of forest reconnaissance are employed to carry on the field work. An agricultural expert with special training in regard to soils has recently been engaged to insure the bringing to bear of the most advanced knowledge on this phase of the problem. The results of the investigations are made available to the public in the form of government bulletins whenever new conditions and new problems are met.

The areas to receive special attention during the coming summer are the Peace River district, the mountainous regions of the Railway Belt in British Columbia, some of the areas of sandy, stony and swamp soils in the northern portion of Saskatchewan, and in Manitoba the area lying between Lakes Winnipeg and Manitoba.

Tree Planting.

Another important division of the work of the Forestry Branch is the extension of tree-growth in the treeless settled regions of the prairie Provinces. This is done by the encouragement of private planting. Seedlings of hardwood species

are distributed to settlers free of cost, and seedlings of coniferous species are furnished at the cost of growing them in the nurseries. This work, inaugurated about a dozen years ago, has met with great success from the start. The purpose held in view was the furnishing of a supply of fuel, fence posts, etc., to the settlers, the protection from storms of their dwellings and the beautification of the general landscape. The best index of the success of

this work is the appreciation shown by the people receiving the benefit from it. This has expressed itself in a continually growing demand for the nursery stock. The extent of this demand led the department last year to decide on the establishment of a nursery at Saskatoon to supplement that now established at Indian Head. The work of putting the nursery under way is being undertaken this year.

Statistics and Laboratory.

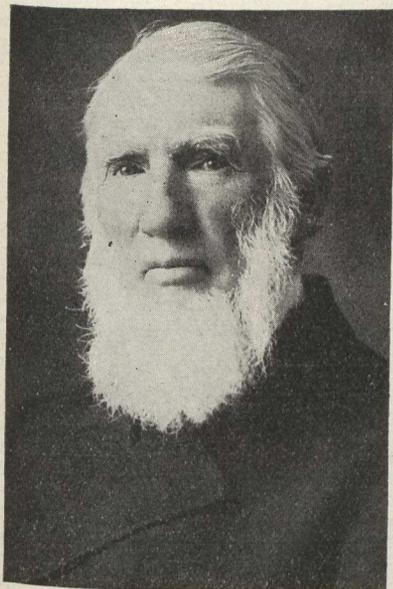
In connection with the head office at Ottawa, various lines of work are being undertaken and developed, with the idea of bringing the general problem of forestry before the public and of increasing the knowledge of those directly using forest products in regard to the material they are handling.

A technical forester will from now on devote his whole time to the gathering and preparing for publication of the existing knowledge in regard to the forest resources of the country. This information will also be made available for use in the public lectures given at frequent intervals by officers of the department. The information used in the past as a basis for these lectures has, to too great an extent, been based on the experience and data of other countries. It is intended in future to use to a much larger extent the knowledge acquired in this country itself.

For the benefit of the industries using wood in various forms, statistics of the quantity and value of the wood so used are compiled annually. The most detailed work in this connection is in regard to the use of wood in its highest manufactured form by factories of various sorts. This work is being undertaken by Provinces. A report will shortly be published, giving the data gathered in Ontario in 1912, and a report with regard to the Maritime Provinces is in an advanced state of preparation. The Province of Quebec will next receive attention, and later the western Provinces.

A most important development of this work has been the establishment, through the co-operation of McGill University, of a wood-products laboratory. In this laboratory there will be investigated the strength and other properties of the various woods of industrial importance. One of the large problems that will engage its early attention will be the methods of manufacturing wood-pulp for paper and the suitability of various species of wood for such manufacture.

Another department recently inaugurated is the making of studies and the giving of assistance in relation to the management of privately owned woodlands, especially the smaller areas in settled districts. The Forestry Branch is continually in receipt of requests from the owners of such



MR. JOHN R. BOOTH.

On Saturday, April 5, Mr. John R. Booth, of Ottawa, celebrated his eighty-sixth birthday, in good health and in active control of his great lumber, paper and other interests. Mr. Booth was one of the charter members of the Canadian Forestry Association, and was for some years a director, which office is now filled by his son, Mr. C. Jackson Booth. At the 1906 Convention in Ottawa, Mr. Booth put at the disposal of the committee of arrangements a special train which took the delegates out over the Canada Atlantic Railway (Mr. Booth's line) to see the operations on one of his limits in the Madawaska district. Mr. Booth has always been a strong supporter of forest conservation.

tracts for information and advice. The supervision of the management of a small tract owned by the Y.M.C.A. near Lake Couchiching (Ontario) has been undertaken by the Forestry Branch. It will be the object of this management to maintain the permanent continuity of forest cover, and at the same time procure for the owners of the tract the greatest possible benefit and revenue. In connection with this work studies will be made of the rate of growth and suitability for importation into this country of various exotic trees that might prove of value to the owners of small tracts of woodlands who desire to make the most of their woodlots and plantations.

The outline given of these lines of work (still merely in their infancy) will make clear the necessity for large increases in staff. An especial difficulty has been experienced in securing the services of men properly trained for the duties of planning and supervising the various activities. The forestry schools of the country are developing men of the right caliber and abilities, but at a rate altogether inadequate. A considerable number of acquisitions of technical men has, however, been made recently, which will allow important development.

Canadian Pulpwood Statistics for 1912.

Figures from the Forthcoming Bulletin of the Dominion Forestry Branch.

A total of 1,846,910 cords of pulpwood were cut in Canada during 1912; of this 866,042 cords were manufactured into pulp in Canadian mills while 980,868 cords were exported in the raw or unmanufactured state. This is an increase of 21.5 per cent over the total cut of 1911—an increase of 28.8 per cent in manufacture of pulp and an increase of 16.6 per cent in export of raw pulpwood.

The average value per cord of pulpwood consumed by Canada's pulp mills decreased from \$6.45 to \$6.02. The total value of pulpwood used in the industry in 1912 was \$5,215,582.

Quebec, Ontario and New Brunswick still head the list of provinces in consumption of pulpwood. British Columbia, however, has increased its consumption by some thirty-four thousand cords bringing it up to fourth place ahead of Nova Scotia. A decrease of 18.6 per cent in consumption is noticed in Ontario during 1912; all other provinces having increased during the year.

The use of balsam fir for pulp manufacture has increased from 17.5 per cent in 1911 to 19 per cent in 1912, and with this there is a decrease in the proportion of spruce from 81.6 per cent to 78.2 per cent. An increase in the proportion of hemlock used is due to the consumption in British Columbia where over seventeen thousand cords of this material were used in 1912. Western larch was reported for the first time from this Province.

The mechanical and sulphite processes still head the list, but the sulphate process used practically for the first time in 1912, was employed in manufacturing over sixty-six thousand cords of pulpwood, putting this process third on the list. This

replaces the soda process, the use of which decreased by 72.9 per cent.

The export of the finished product, wood-pulp, has increased by 34.1 per cent. The proportions of ground wood and chemical pulp remained practically stationary at about 85 and 15 per cent. respectively. In 1911 over 99 per cent. of the export went to the United States. In 1912 only about 63 per cent. was exported to that country, while Great Britain imported almost 37 per cent and Japan entered the market purchasing 1,046 tons of pulp, mostly chemically prepared. China and New Zealand also imported small quantities of Canadian wood-pulp.

Wood-pulp was imported into Canada from the United States, Sweden, Great Britain, Germany and Austria-Hungary in 1912, indicating that in some cases these countries can manufacture pulp cheaper than Canada or that they produce some special grade of material desired by Canadian paper makers. The total value of imports of pulp increased by 83.7 per cent in 1912.

Canada still exports over half the pulpwood produced in the country. In fact, the proportion of wood exported in the raw state increased from 55.8 per cent in 1911 to 56.1 per cent in 1912.

New Brunswick and Nova Scotia manufactured less of their pulpwood in 1912 than in 1911, while the proportions in Ontario remained the same. British Columbia was the only Province which reported having manufactured all its pulpwood into pulp in the Province. The effects of legislation restricting the export of raw pulpwood are most evident in Quebec, where 43.5 per cent of the cut of pulpwood was manufactured within the Province in 1912 as opposed to only 38.0 per cent in 1911.

Regulating Cutting in British Columbia

A. V. Gilbert, B. C. Forest Service, Tête Jaune Cache, B.C.

It has occurred to me that some of the readers of the Canadian Forestry Journal would be interested to hear of the success which has attended the efforts of the recently organized Forest Branch of British Columbia with regard to the regulation of the cutting of timber on Crown



MR. CARL RIORDON.

Mr. Carl Riordon, Vice-President and Managing Director of the Riordon Pulp and Paper Co., has been elected President of the newly formed Canadian Pulp and Paper Association. Mr. Riordon has been for many years a member of the Canadian Forestry Association, and up till this year was a Director when he resigned, feeling that some person who could give more time should be elected. Mr. Riordon has taken a deep interest in the cause of forest conservation. He read a valuable paper at the 1909 Convention, and it is confidently expected that the Association will have the advantage of his counsel on future occasions.

lands for construction purposes being carried on by the Grand Trunk Pacific Railway Company.

The proper clearing and burning of debris on the rightofway, which is under the supervision of the divisional fire-warden of each district, has been carefully looked after, but as this has always been insisted upon there is little difficulty in having it carried out. On the other hand an innovation, which proved a slight stumbling-block at first, was the demand of the Forest Branch that where any timber for construction purposes is being taken out the tops shall be lopped and all brush shall be piled according to the directions of the local forest officer, who will also supervise the burning of this debris at the proper time, this latter expense to be borne by the Government. This is, I believe, the first instance in Canada, where railway contractors have been required to adopt such measures.

The most extensive cutting being done in any localized centres is in connection with the taking out of ties and bridge timber. The fact that this work is let by contract would explain why some slight difficulty was encountered at first by the forest officers.

When the railway company wishes to cut on any certain piece of land they must first apply to the local forest officer who examines this land and reports to the head office at Victoria, where the application is finally passed upon, and if accepted a permit to cut is granted. On each permit the following instructions are given special emphasis: 'All tops shall be lopped and piled with all other slash and debris resulting from logging operations in compact piles, and shall be so piled that when burned no damage will result to the remaining standing timber.' The railway company did not mention this specifically in the contracts which they let but the contracts stated that all cutting be done according to the directions of the forest officers. Naturally any of the contractors who did not inform themselves as to the regulations of the British Columbia Forest Branch were a little loath to undertake work which meant a direct loss to their profits. As the contractor usually sub-lets the contract and probably the sub-contractor in turn sub-lets it again, it gave more opportunity for misunderstandings to occur and in this way some delay occurred in the starting of the brush piling. However on the matter being taken up with the rail-

way company by the Minister of Lands, the Hon. W. R. Ross, who is actively interested in carrying out the policy of the Forest Branch, the contractors were instructed to see that all demands of the forest officers were carried out, and at the present time the work of piling the brush is being carried on by all the contractors, without exception, in this district.

The contractors endeavoured to get the tie-makers to pile the brush and offered them one cent a tie more than they were getting, but they would not accept this, and consequently a special crew had to be engaged to do the work. Of course the work can be done cheapest by the tie-maker, and the statement has often been advanced that the brush can be piled for

one cent a tie if done by the tie-maker, but a great deal depends on the nature of the timber and the country. It is very doubtful if the work can be done for that figure in this valley where the timber is mostly spruce and runs very much to brush. On one permit the brush has been piled for one and a half cents a tie, but in this case four tie-makers took the contract in partnership and they are doing most of the brush piling themselves, which fact would lead one to believe that they can do the work much cheaper than it can be done by a contractor who is hiring day labor. As a matter of fact, it is very difficult to secure laborers for this work at all because it is rather unpleasant when there is much snow in the bush and the men who do take it up seem rather inefficient.

Records and Care of Plantations in Foreign Countries.

Geo. H. Retan, Forester, Pennsylvania Dept. of Forestry, Mont Alto, Penn.

The following notes of an address by Mr. Retan before a gathering of Pennsylvania foresters were sent by him at the request of the Editor of the Canadian Forestry Journal. It is hoped to have other articles from the pen of Mr. Retan in the near future.

Records of plantations, as plantations, do not exist. On the contrary records are continuous for every unit of management. They not only cover the present plantations on the ground but give the complete history of the last stand occupying the site. These records are complete in every feature, typical of the scientific German character.

Records are of two kinds, written and cartographical. The two show practically the same thing, the written covering a longer period of time. One map may show geological characteristics and quality of the soil, age and species of the stand, units of management and even sylvicultural plans. The written record adds as to the plantation in particular, a minute history of every expense, loss, treatment and results. There is never a second failure from the same reason.

Protection in Germany is the result of several co-operating forces. The chief of these in their order of importance seem to be:

- Continued period of high relative humidity.
- An adequate force.
- A large permanent labor force.
- A completely developed transportation system.

The sense of individual ownership.

The utilization of the litter.

In the Black forest, Odenwald, Bavarian Highlands, and Rhine, there were few days during the whole fall when a fire would have been possible. From what I could learn it was not an exceptional fall, nor was the actual rainfall heavy. The air seemed always damp and foggy or actually misty. To this cause may be attributed the success of the plantations of the Pacific Coast species in Germany.

Then we have the important fact that every inhabitant, peasant or prince, has a more or less concrete sense of ownership in the forest. Whether he is merely entitled to a yearly amount of firewood free or whether he is in a community whose taxes are greatly lessened because of the communal forest, he has the individual sense of 'pocketbook' interest which impels him to protect his own property. What a difference this alone would make in Pennsylvania!

As to the roads, praise cannot be too great. Whether on the sands of the Rhine Valley where roads cost little or in the Saxon Erzgebirge, fully as rocky as the mountains of Central Pennsylvania, there is present the same intensity of the road system. At Tharandt where Cotta in 1811

made the first scientific German working plans, they are now revising these plans in entirety in order to develop a more economic road system. Consciously or unconsciously German protection is about summarized in the one word Roads.

Plantations are universally protected against man. These are the only woods that the tourist is not allowed to enter. Everywhere is the sign 'walking forbidden.'

Protection from erosion is provided for in plantations on steep hillsides by terraces. These may be only a single or double furrow made with a plow or the more elaborate terraces of the French reforestation work.

In the shore plantations generally windbreaks are erected or grasses planted until the trees are well started. In the Rhine valley small cutting areas guard against the drifting sand.

Sufficient shade for plantations is provided for in the manner of cutting. This may be the strip system, a strip of plantation alternating with a strip of highwood or in groups of various sizes adapted to the species planted. One form of light protection was most interesting to us here in Pennsylvania. This was in the transformation of coppice into highforest. In this all the stump sprouts but one were cut and the one left was the strongest. This one sprout absorbs the whole energy of the stump to prevent more suckers and at the same time protects the plantation. After the plantation is once established these single sprouts are cut out. This method proved far superior to clear cutting where the sprouts must be cut back once or twice at an expense equalling the first cost of the plantation. This method is especially to be recommended in frosty situations with species sensitive to late or early frosts.

Protection against wild animals proves a considerable source of expense, due especially to their hunting laws and game protection. Against the deer fencing, either wooden or wire, is used. In spruce plantations the terminal shoots of every tree are tarred in some sections. White pine seedlings at Brettan were bound with lead strips to prevent barking by rodents.

Protection against insects and fungi is too large a subject to speak of specifically. There is a careful watch kept for the diseased tree and it is removed at once and precautions taken where an epidemic is feared. Whole plantations are sometimes sprayed with Bordeaux mixture where shedding disease of the Scotch pine is present. Careful watch is kept in spruce and pine plantations for the honey fungus, etc. Plantations are left sheltered for five years before the adjoining overwood is cut out. It is claimed that after a five

year interval the usual crop of 'children's diseases' has been run through with and an adjoining plantation will not be infected.

But the one measure that is claimed to be most effective for protection is bird protection. Birds are offered every inducement to remain in the woods as bird houses, concrete watering and bathing tubs, feed huts for winter, feed when the snow makes their living precarious, etc.



MR. T. W. DWIGHT, B. Sc.F.
Assistant Director of Forestry.

DURABILITY OF TIES.

The average life of untreated ties as reported by the steam roads is as follows: cedar, nine years; tamarack, eight years; hemlock, seven years; Douglas fir, seven years; jack pine, six years; spruce, six years. As recent statistics bear evidence, cedar is the species principally used, because of its durability, but the supply of cedar is rapidly becoming exhausted. Unless preservative treatment of ties is introduced, the short-lived species will have to be used untreated, which, on account of the necessary frequent renewal, will increase the cost of mileage maintenance. If treated ties were used, which would cost thirty cents extra per tie for creosoting and equipping with tie plates, the inferior species, which are very plentiful and cheap in Canada, could be used with economy. With such a treatment these woods would last at least fifteen years, and if protected from wear would probably last much longer.

The Work of a Forest Engineer.

By A. H. D. Ross, M.A., M.F., Lecturer in Forestry, University of Toronto.

In the present stage of our civilization, wood, in one form or another, is an absolute necessity. Our people use enormous quantities of it for all sorts of purposes.

During the present century Canada's population is sure to reach the eighty million mark. Meanwhile enormous quantities of wood will be required for the construction of the railways needed to open up the country in advance of settlement and to build homes for the people. The myth that Canada possesses inexhaustible supplies of timber is now pretty well exploded. The fact of the matter is that there is far less timber in Canada than many Canadians are willing to admit, and much of it is of an inferior quality. The growing scarcity of timber has led to a steady rise in prices during the last fifteen years, and the end is not yet. In eastern Canada the wholesale prices of pine and spruce lumber have advanced between fifty and sixty per cent. This is partly due to the growing scarcity of timber and the increased cost of logging, and partly to the enormous quantities of timber exported to other countries, but mainly to a knowledge of the limited quantity still available.

The growing scarcity of timber in other countries than this and the constantly improving transportation between the different countries of the whole civilized world warrant us in predicting the establishment of world prices for timber.

Thus, if Canadians are to avert the evils which have overtaken other lands where the forest resources have been allowed to diminish or approach the vanishing point, they must adopt a general and far-reaching policy for the management of their timber lands. Such a policy must be based upon an adequate, scientific and practical grasp of the whole situation. Hence there has arisen the necessity for a class of men with both a training of a highly technical nature and a clear conception of things which at first sight do not seem to be related, even in the remotest degree. These men must clearly understand the relationships that exist between the different parts of their work. Otherwise, they will make many serious blunders and bring their profession into disrepute.

A forester is not a mere botanist let loose to air his theories at the expense of others; neither is he a mere 'lumber-

jack', fire-ranger, sportsman, entomologist, pathologist, dendrologist, silviculturist, or any other kind of 'ist'. He should be all of these rolled into one and must clearly understand all these phases of the general problem of preserving his property and increasing its productive capacity. The profession of forestry touches life at many points, and cannot safely be entrusted to half-educated men. It has constantly to deal with questions of tremendous magnitude and importance, and its devotees are engaged in a profession of which they may well be proud.

The professional forester does not aim to oppose Nature, but to assist her—to make use of the naturally favourable conditions existing in any given locality and to hold in check the unfavourable ones. He exercises his skill in encouraging the growth of the most suitable species, and modifies their growth so as to produce the most valuable timber in the shortest space of time. All this must be done without diminishing the value of the soil for the production of future crops.

Just as the agriculturist is engaged in the production of food crops, so the forester is engaged in the production of wood crops. Each carries on his business for the practical purpose of producing a revenue. Each must protect his crop from insect ravages, fungus diseases, fire, trespass, etc. Each of them should guard against the impoverishment of the soil, and constantly aim to increase its value. In each case, the land is the principal capital, and any part of it either wholly non-productive or turned to a less profitable use than it might be represents so much wasted capital.

Twenty years ago, the science of forestry was regarded as an abstract and debatable theory, and all knowledge of it was confined to a few experts and enthusiasts whose views were regarded as of doubtful value. Today the most intelligent and public-spirited members of the community regard the treatment of forest resources according to well established forestry principles as a vital and urgent economic problem. From what has already been said, it is surely evident that the professional forester should be thoroughly trained in all the branches of his work if he is to be of the highest service to the state.

Forestry Schools.

The recognition of this fact has led to the establishment of a number of forestry schools at leading educational centres on this continent. In Canada alone we now have three such schools. In October, 1907, the Faculty of Forestry in the University of Toronto was established with two instructors in forestry and eight students. The number of students is now 47 and the teaching staff in forestry subjects has been increased to four. In the University of New Brunswick, a Department of Forestry was established in October, 1908 with one professor and ten students, and at Laval University, Quebec, a Department of Forestry was established in 1910 with two professors and fifteen students.

Preliminary Training.

The preliminary training for this profession consists of a four year undergraduate course, supplemented with considerable practical experience in the field. A brief outline of the course at the University of Toronto may be of interest. The first two years work are mainly along the line of an Arts course with Science options, the last two years being almost entirely devoted to technical forestry subjects. There is also a six year combination course, whereby a man gets both his Arts and his Forestry degree. There are now six students taking this course, and it is expected that the proportion of men taking it will increase as time goes on.

In what may be described as the technical part of the regular four-year undergraduate and the six-year combination courses, the students get a thorough drill in elementary phanerogamic and cryptogamic botany, vegetable physiology, physics, chemistry, mineralogy, geology and soil physics. More specialized courses are given in forest botany, biological dendrology, economic forest entomology, and the fungus diseases of trees. The synoptical course takes a general survey of the whole field of forestry science; after which forest geography and the history of forestry are dealt with for the express purpose of letting the men know what is going on in different parts of the forestry world and enlarging their outlook.

Then comes a very complete course in silviculture, or the art of growing wood crops to the best advantage; followed by briefer courses in forest protection, forest surveying, forest mensuration, forest valuation, forest utilization, timber physics and wood technology, forest regulation, forest finance, forest management and the preparation of working plans.

Some of the special lecture courses are on prairie planting and farm forestry, the administration of Canadian timber limits, business methods of the lumber trade, for-

est law, wood preservation, fish culture and game preservation.

From this outline of his academic training, it is evident that the young man who completes his course will have a pretty clear view of the whole field of forestry science.

As regards the field training, there is only one way to acquire it, namely, by experience in the woods. No amount of reading or theorizing will give this experience. It must be learned at first hand, but there can be scarcely any doubt that the men who go into the woods with the broad general outlook that a thorough



MR. A. H. D. ROSS, M.F.

academic training gives them will acquire this kind of knowledge very quickly, and, what is of more importance, know how to apply it in cases where men without similar training would utterly fail, and thus prove themselves thoroughly unpractical.

Before being granted the degree of Forest Engineer, candidates must give at least three years' satisfactory service in the field and present a thesis upon some practical subject prescribed by the Faculty.

The Forest Engineer's Problems.

It will therefore be in order for us to examine some of the problems that constantly present themselves to the men in the field, and how they grapple with them.

In a young and undeveloped country like this, a considerable portion of the forester's time is taken up with surveying and mapping. At times a rough reconnaissance survey is all that is needed. At others it is necessary to make a topographic map of the region, showing by what routes the timber can be most easily removed. If the property is to be placed under permanent management, it will be necessary to make a complete forest survey of it. This will include (1) A more or less accurate plane and topographic survey, (2) An estimate of the amount

of timber, (3) A determination of the rate of growth of the timber, (4) A study of the conditions of light, moisture, soil and other factors influencing the present and future conditions of the forest crop and (5) The location of permanent roads, dams, bridges and other structures needed for the removal of the timber.

In a rough way, every logger is his own topographer, and has acquired his knowledge by cruising, but unfortunately it is often very inaccurate, is easily forgotten, and cannot be transferred to his successor, who has to acquire his knowledge of the locality all over again. With a good topographic and timber map of the tract, all this information can be kept in the head office, where it is of very great value. In most cases contours can be obtained with sufficient accuracy by the use of an aneroid barometer. A glance at the contour map will show the probable location of roads needed, and thus save much time in the field. On the timber map will be shown the location and extent of the fellings and the progress of the work as the tract is brought under management. In short, the maps represent in miniature the lay of the land and the woods operations being carried on from one year to another.

In regions where the commercial timbers are good floaters, horse lumbering and the driving of streams in flood time will be largely employed and the young forester will have ample scope for his engineering skill in the laying out of iced roads, the building of dams, slides, tugs, alligators, etc., for the movement of the timber.

The Building of Roads.

When it is pointed out that about seventy per cent of the cost of producing lumber is spent in the woods, it will at once be seen that the first duty of the forester is to provide cheap and efficient means for the removal of his crop. This crop is both bulky and heavy, and gives him ample scope for the exercise of his ingenuity in adapting means to ends. Very frequently he cannot secure the services of civil or mechanical engineers and has to work out his own problems on the spot. His ability to do so at once makes him a valuable man to his employers.

The object of any road is to provide a means of transportation from one point to another with the least expenditure of power and money. The main principles governing the location and construction of the road are: (1) To secure as easy grades as possible, (2) have direct routes, (3) avoid all unnecessary ascents and descents, (4) place the centre line so the cost of construction will be a minimum, (5) cross obstacles like ravines, etc., as

nearly at right angles as possible, (6) cross ridges through the lowest pass to be found.

When good maps can be had of the district, the task of locating the road is a comparatively simple one. Usually, however, no map at all is to be had, in which case the forester must make a reconnaissance survey of the whole belt of country between the controlling points, to discover the best route. Mountainous country often appears much worse than it really is for the building of a road, and rolling country often appears better than it afterwards proves to be. The main thing is to have 'an eye for country' and not waste time over an unnecessary degree of accuracy in the preliminary work. Usually the general location of a large part of a route is self-evident, or may be determined after a very brief examination. In most cases direction is determined with sufficient accuracy by means of a small magnetic compass, distance by pacing, and differences in elevation by means of an aneroid barometer. A good pair of field glasses will save much unnecessary travel.

The first steam logging railroad was built in Michigan, in 1876, by Mr. W. S. Gerrish, who was called a hare-brained enthusiast for proposing such a scheme. It proved such a success that a few years later there were 720 miles of such roads in the state. Now the mileage of logging railroads in North America is computed at over 25,000 miles. Their general use has led to the designing of locomotives and cars most suitable for that class of work. To secure cheap construction, cuts and fills are avoided as much as possible and the engines must be able to climb heavy grades and round sharp curves. This has led to the construction of shay-gear and other types.

The difficulty of location and the amount of care demanded will depend altogether upon the character of the country and the grades required. If in the same valley, or along the bank of a river or lake too large to be bridged, the location is self-evident. If the river is smaller, has sharp bends and variable banks, and is easily bridged, both banks should be carefully examined to determine the best location and crossing points. The proper choice of bridge sites is an important matter. Where possible, the bridge should be placed at right angles to the current, be as short as possible, have good foundations, avoid bends in the stream and be placed between stable banks so as to secure a permanent concentration of the waters in the same bed. Frequently this means the subordination of the line of the road to the most suitable crossing point. When the controlling points lie in

different valleys the location of the line is often a very difficult matter, especially when there are two or more possible routes. Usually, however, the location will include the lowest summits and highest low points, such as river-crossings, etc. Hence the elevations of summits and sags and the distances between them, together with the constructive character of the country, must be determined. Low ruling grades are always desirable, whether the road is to be for sleighs, wagons, traction engines or locomotives. Where there is a prospect of the road being sold later on as a link in a railway system, it is well to spend considerable time and money in securing the best possible location. A few hundred dollars spent on preliminary surveys will in such cases be repaid an hundredfold. For such work as this it will, of course, be necessary to use transit, level and stadia rod.

Logging by Cable.

In the large timber of the Pacific coast and the cypress swamps of the South the long logs are hauled in to the railway or other landing place by bull donkey engines. A light line pulls out the heavy cable to be attached to the log, or string of logs, which are then drawn in by the winding-in of the heavy cable. Often each log is capped by a steel cone so it will come more easily around obstructions and through soft mud. In the case of cypress, the logs are generally snaked out to canals along which they are then rafted — the bull donkey being mounted on a scow which is anchored or snubbed at convenient points along the canal. Where a cableway skidder is used, the head spar is the mast of the scow and the tail tree off in the swamp a convenient distance.

In the more mountainous districts, the cableway skidder is an exceedingly useful device for the bringing in of logs, pulpwood, tan bark, etc., to the railway or other road at a minimum cost. In many cases it is the only practical method of yarding the timber at all; as for example, where it is in 'pot holes', across deep ravines, or up slopes where the construction or cost of roads or slides would be prohibitive. Even in country where it is easy to construct railways, the cableway skidder is coming largely into use. The principal objection to it, from the forester's standpoint, is the damage done to the young trees by the swaying and dragging of the logs as they are being hauled in; but it is an open question whether the extra growing space due to the non-construction of roads and the saving in cost of building and maintaining them do not balance the injury done to the young crop.

Loaders.

For the loading of logs on cars, several devices are in use. The Barnhart loader moves on a pivot in all directions and will load from 600 to 800 logs a day, provided they are within 100 feet of the track. As each car is loaded, the machine pulls itself along rails laid on the cars and loads the next one. In the Decker Loader, the empty cars are pulled forward beneath the loader. In other cases a turn of cable round the log on a raised platform rolls it onto the car as the cable is tightened up by means of a drum or 'spool.'

From what has been said, it will be seen that every forester should be a first-class logger and be constantly on the alert to utilize the engineering skill which has been developed in the logging business. Not only this, but he should be on the lookout for new methods, which usually means the adaptation of old ones to new problems.

Other Problems.

Besides removing the timber in as cheap a manner as possible, the forester must also consider the future condition of the property. The ordinary logger is a mere exploiter, who has no concern whatever for the future, and is generally frank enough to tell you so. The forester, on the other hand, is very much concerned with the problem of leaving the tract in the best possible condition for the growth of the timber left standing and for its removal when mature. This generally means the laying out of a permanent system of roads, the disposal of the debris incident to lumbering and the suppression of undesirable trees. In other words, he must practice silviculture, if he is to increase the amount and quality of the timber grown. Herein lies the most important part of his work—work calling for a full knowledge of his subject and the exercise of rare judgment and skill.

Another phase of the forest engineer's work is to be met with in the management of protection forests, which do so much to equalize the stream-flow. With the transformation of waterpower into electric energy all over this continent it will at once be recognized that the maintenance of as even a flow as possible is a matter of very great importance.

In southern Alberta there is also a field for the forester with some knowledge of irrigation engineering problems. In my opinion, every forester should know how to gage a stream quite as well as the ordinary civil engineer. This knowledge would enable him to bring in accurate information long before it would be obtained in the ordinary course of events.

With the Forest Engineers.

(Contributed by the Canadian Society of Forest Engineers.)

FORESTRY BRANCH STAFF.

Elsewhere in this issue is given an outline of the work being undertaken by the Forestry Branch of the Department of the Interior. The men on whom rests the responsibility for carrying out this work are mostly forest engineers who have received technical training in the various forest schools. The positions assigned to these men, both old and new appointees, with the forest school and year of graduation of the new men, are given hereunder:—

Head Office (Ottawa).

Director of Forestry—R. H. Campbell.

Assistant Director—T. W. Dwight.

In charge of Statistics—R. G. Lewis.

In charge of Surveys—H. Claughton Wallin.

In charge of Woodlots—B. R. Morton.

In charge of Information—G. E. Bothwell (Tor., '13).

In charge of Library and Publications—F. W. H. Jacombe.

Forest Reserve Administration.

B. C. Inspection District, Headquarters, Kamloops, B.C.

District Inspector—D. R. Cameron.

Assistant Inspector—W. L. Scandrett.

Forest Assistants—A. C. Parlow (Toronto, '13) and K. G. Wallenstein.

Alberta Inspection District, Headquarters, Calgary, Alta.

District Inspector—W. N. Millar.

Supervisor Crownsnest Forest—R. M. Brown.

Supervisor Bow River Forest—F. G. Edgar.

Supervisor Brazeau Forest—L. C. Tilt.

Supervisor Cypress Hills Reserve—F. McVickar.

Forest Assistants—S. H. Clark (Toronto, '13), J. P. Alexander (Tor., '13), C. H. Nye (Biltmore, '13), E. C. Bleeker (Harvard, '13).

Saskatchewan Inspection District, Headquarters, Prince Albert, Sask.

District Inspector—G. A. Gutes.

Forest Assistants—E. H. Roberts (formerly with the Laurentide Co.), L. Stevenson (O.A.C.), R. L. Shives (U.N.B., '13).

Manitoba Inspection District, Headquarters, Winnipeg, Man.

District Inspector—F. K. Herchmer.

Forest Assistants—J. R. Dickson, C. Musante (Biltmore, '12), F. S. Newman (Tor., '13), F. D. Brown (from D. & H. R. R. forest department), G. Tunstell (Tor., '13).

Inspection of Fire Ranging.

Inspector—E. H. Finlayson, headquarters, Ottawa.

The appointment of seven permanent Chief Fire Rangers has recently been secured, and this will put the work on a much more permanent basis than heretofore.

Division of Tree Planting.

Chief—N. M. Ross, headquarters, Indian Head, Sask.

Assistant—S. S. Sadler.

A considerable number of men will be employed temporarily in connection with all these departments of the work.

RETURNS TO CANADA.

Many old friends in the Forestry Branch and elsewhere in Canada will welcome the return to this country of G. A. Gutes, who has recently been appointed District Inspector of Forest Reserves for Saskatchewan. Mr. Gutes returns to the Canadian service after several years spent as Inspector in the Forest Service of the U. S. Indian Department, where he has had charge of the forests belonging to that department in six of the southwestern states of the Union. After such training, great things are expected of him in his new capacity.

WHAT THE ASSOCIATION STANDS FOR.

Mr. R. H. Campbell, Dominion Director of Forestry, was present at the inaugural meeting of the Canadian Pulp and Paper Association in Toronto recently, and besides dealing with the work in his own Branch, spoke by request on the objects of the Canadian Forestry Association, of which he was for eight years Secretary. In this part of his address he said that two of the things for which the Association stood were: First, the protection of

the forests from fire by providing a fire patrol of efficient men, well organized and well equipped; and, second, the inspection of the public lands and the separation of the agricultural from the non-agricultural lands, the latter being included in reservations and kept permanently for the production of timber. These two objects the Association has kept before the public by all the means of education which are available. It has also made representations to the Government for the improvement of fire legislation, which has done considerable towards perfecting the statutory authority for the protection of the forests. No matter how efficient the legislation is, however, it needs to be backed up by a strong public opinion, and the Association, which is not a Government institution, but a voluntary institution to whose membership all the members of the Pulp and Paper Association will be welcome, is doing a great deal to educate the public and form such a necessary background of public support.

Paper journals continue to announce experiments to find materials for paper-making to take the place of wood. Straw, bamboo, sugar cane waste, cornstalks are all considered, but in every case they are less economical than wood. These things point to the importance of preserving our forests which are daily growing more valuable.

Teacher: Johnny, name the most useful trees.

Johnny: 'Walnut tree, apple tree and axle-tree.'

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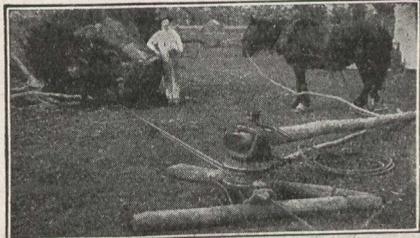
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