

Conservation

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Forest Pests in British Columbia

The stately forest giants of British Columbia are exposed to the attacks of various minute but dangerous foes, which are receiving much attention at present from the Division of Entomology of the Dominion Department of Agriculture and the Provincial Forest Branch. The enemies in question are, chiefly, certain scolytid beetles of the genus *Dendroctonus*, commonly called bark beetles. They burrow under the bark of the trees and there deposit their eggs, which hatch into grubs that eat the sappy layer between the wood and the bark, driving tunnels in all directions, and finally so interfering with the circulation of the sap as to cause the death of the tree. An area affected by them will be indicated by a clump of withered trees, known as "red tops," conspicuous among the surrounding evergreens. Another danger signal is tubes of pitch surmounting holes through the bark, bored by the adult insects.

The bark beetle attacks many kinds of trees. The western white or mountain pine, *Pinus monticola*, is attacked by *Dendroctonus monticolae*, which is giving great trouble in Washington and Oregon as well as in British Columbia. A large body of fine timber has been killed in the Sugar Lake and Mabel Lake regions in the Shuswap valley, B.C., and outbreaks have been discovered near Cowichan lake and Campbell river in Vancouver Island. Other species attack the Sitka spruce, the bull pine, the lodgepole pine, the Douglas fir, and the balsam fir.

The only remedy against these ravages is to cut down the infected trees and strip off and burn the bark. Up to date, the foresters and entomologists in Canada have devoted themselves rather to survey work, locating infected areas and preparing a report, which will shortly be published, on the remedial measures proposed.

Besides the bark beetles, other seriously destructive pests may be mentioned, such as the ambrosia beetles that attack dying trees and freshly cut logs, and caterpillars that infest the cones of the Douglas fir and the bull pine, eating the seeds and preventing reproduction, while spruce gall insects of the genus *Chermes* are seriously de-

Tunnels Made by Bark Beetles



(Cut No. 23)

A bull pine killed by bark beetles. Part of the bark has been removed, showing the tunnels of the Western Pine Bark-beetle on the surface of the wood.

The new Chinese republic has established a department of agriculture and forestry. For a long time China had been pointed out as the most backward nation in forest work.

structive to the Sitka spruce in Stanley Park, Vancouver, and in the parks of other towns and cities. —Summarized from a report by J. M. Swaine, M.Sc., Asst. Entomologist, Dept. of Agriculture.

Smoke Consumers on Grand Trunk Railway

Yard Locomotives to be Equipped
with New Device which Ensures
Complete Combustion

The Grand Trunk railway has been experimenting for some time with smoke consumers for application to locomotives, and has so far met with sufficient success to warrant equipping all the yard locomotives at Windsor, Ont., as well as a few others at different points on the system. The type used is very similar to those in use by railways in Chicago, where an anti-smoke campaign has compelled them to use some device that will materially reduce the smoke. Along the side of the firebox, from 16 to 18 ins. above the fire, there are eight tube openings. On the outside are small steam jets, so placed that the jet at the point of entering the tube creates a strong draught and carries in a volume of air over the top of the fire. The air brought in through these side openings mixes thoroughly with the smoke in the firebox immediately after it is given off from the bed of coals, and with a bright fire burning the smoke is almost completely consumed. In a demonstration several shovels of coal were thrown on a bright fire, resulting in dense smoke being given off. Turning on the steam through these side jets reduced the smoke almost instantaneously, so that the vapour given off at the stack was just slightly coloured. The results of the experiments have been so successful that it is not at all unlikely the yard locomotives all over the system will be so equipped. The road locomotives may likewise be so equipped, but the advantages accruing are not considered to be as great as in yard locomotives, where the question of smoke in the atmosphere is of considerable importance to the community.

TO NEWSPAPERMEN

"Conservation" is a press bulletin for newspapers to clip from, and for that reason is printed on one side of the page only. To further public interest in conservation subjects, our cuts will gladly be loaned to Canadian journals. It is requested that orders be by number, stating the date when the cut is required to be used, and that a copy of the publication in which the illustration appears be sent to our office.

Huge Consumption of Spruce for Pulp

Limit of Production Reached in United States—Tremendous Increase in Canada—Experiments with Possible Substitutes

The abundance and cheapness of newspapers and other printed matter is one of the most salient features of our modern life. We take a complacent pride in comparing our one-cent 12-page productions with the insignificant six-penny "Times" of a hundred years ago. We seldom give it a thought that all this wealth of morning and evening editions, sporting extras, magazine sections and comic supplements, is making a tremendous drain on our forests of spruce.

One large daily paper in New York consumes in the course of a year as much spruce as can be cut from four to five thousand acres. If the proprietors of this newspaper maintained a forest, sufficiently large for the annual growth to supply them with all the pulp necessary for a year's consumption of paper, they would require a tract about 14 miles square.

The demand for spruce is not only large but rapidly increasing. In the United States, the cut of 1909 was double that of 1899 and six times that of 1889. It is not surprising, therefore, to learn that Mr. Pinchot has estimated that there is only from 10 to 30 years' cut in sight in the various states. Already, the production of pulpwood south of the border seems to have reached a maximum, having decreased from 1,786,000 cords in 1906 to 1,474,000 cords in 1910. This decreasing supply, operating in conjunction with the increasing demand, has led to a great augmentation in the imports from Canada.

At the present time, pulpwood is made almost entirely from spruce and principally by the mechanical process. In Canada, in 1912, the aggregate of wood used was 866,042 cords, and of this 677,747 cords were spruce. The aggregate of pulp manufactured was 682,632 tons, of which amount 499,226 tons were made mechanically. These figures represent an increase of about 44 per cent. over 1910. Canada has by no means yet reached the limit of her production, but it can only be a question of time till the operation of the same forces brings about the same situation as in the United States.

In the circumstances, the question of finding substitutes for spruce becomes of peculiar interest and it is interesting to learn that, assisted by a grant of \$30,000 from Congress, experiments are now being carried on in Wisconsin with a view to testing the efficacy of such woods as hemlock and jackpine as substitutes for spruce in the manufacture of paper-pulp.

With regard to jackpine, it may be said that if it could be utilized in the making of paper, we might turn to profitable account a tree which, at present, has very little commercial value.

Public Ownership of Timber Lands

Advantages Accruing to United States from Federal Administration of National Forests

The Dominion Government now has under its control in the Rocky Mountains region some 25,600 square miles of forest lands, and there is some likelihood of extensive forest reserves, either under Provincial or Federal management, being established in other parts of Canada in the near future. This being the case, it should be of interest to consider what we may expect to gain from the public ownership of large timber resources. For an answer to this question we may turn to the National Forests of the United States and see what advantages have accrued from the administration by the Forest Service of a vast estate, ten times larger than the present Reserves under Dominion control.

Briefly enumerated, these advantages are:

1. The value of the forests is now increasing with use instead of depreciating.
2. More wood is grown per annum than is lost through cutting, fire, disease and decay.
3. Whenever timber is cut, the operation is so conducted that young growth will not be destroyed, thereby assuring a new crop in the future.
4. The opening of roads, fire lines and trails, and the construction of telephones, lookout stations and rangers' houses, is making an effective system of fire patrol possible.
5. Operators of small lumber mills are encouraged, except in accessible areas whose development involves a heavy outlay of capital.
6. Speculation in, and monopoly of, public timber are prevented.
7. Abuse of homestead and prospectors' privileges is prevented.
8. Settlement is encouraged on lands of the right character, but prohibited on non-agricultural areas.
9. Settlers get wood and timber for their own use, free of charge.
10. Every settler's clearing is an aid in fighting fire.
11. Agricultural lands covered with heavy timber are quickly cleared—not held for speculation—and thrown open for settlement.
12. Sheep, cattle and hogs are pastured in suitable openings in the woods.

13. The old warfare between sheep and cattle ranchers is put a stop to.

14. Erosion, caused by removal of surface cover, is checked.

15. Water supply is conserved for irrigation and waterpower projects.

16. Pests—insects, rodents and beasts of prey—are more effectively combated.

Prevention of Accidents in Textile Mills

Leeds Operatives Draw Up Recommendations Designed to Protect Workers

The superintending inspector of factories for the Leeds district has presented an agreement between representatives of employers and employees and the inspectors concerning the fencing of machinery and the prevention of accidents in woollen and worsted mills. . . .

The report sets out in detail the points of agreement, and they include the following general provisions:

1. On new machinery all projecting setersaws on continuously revolving parts shall either be countersunk or be otherwise efficiently protected; where projecting setersaws are placed inside box-pulleys they shall be deemed to be efficiently protected. Projecting setersaws on existing machinery to be fenced unless safe by position.
2. Ladders, other than step-ladders, shall be fitted with hooks or other nonskid device; provided that in mule spinning rooms, or in rooms where persons work with bare feet, ladders shall not be fitted at the bottom with spikes.
3. Heavy overhead main driving belts shall be guarded underneath in all cases where there is liability of persons having to pass under them.
4. Fencing for all toothed wheels shall, as far as practicable, completely surround the wheel, so that there is no danger of any accident between the wheel and the guard itself.
5. All representatives present were of opinion that it was most desirable that women and girls working amongst machinery should have their hair put up, or otherwise confined in a net, and all agreed to use their best endeavors to see that this is done.
6. All firms are to be urged to keep a supply of sterilized dressings which shall be kept available for first aid for any operative who receives a cut or wound.
7. Cleaning machinery in motion was considered by all to be a dangerous practice, and should be avoided.
8. Floors of machine rooms and stairs to be kept clean and free from grease as far as practicable.
9. Periodical examination of machinery. Some person in each mill to be told off to examine, at least once a month, fencing of ma-

chinery and mill gearing, maintenance of proper temperature and ventilation, compliance with special rules and regulations, means of escape in case of fire, fire-extinguishing appliances, and condition of the sanitary conveniences.

10. Lifting of heavy weights. Children and young persons should not be required to lift weights which exceed for: Girls under 13 years, 16 pounds; between 13 and 14, 20 pounds; between 14 and 16, 25 pounds; boys under 13, 24 pounds; between 13 and 14, 30 pounds; between 14 and 15, 40 pounds; between 15 and 16, 50 pounds.—U. S. Consular and Trade Reports.

Accident Prevention in Railway Shops

The matter of the prevention of accidents in roundhouses and railroad shops has received considerable attention from railroad authorities. It is recognized that while the training of the human element is as important in shops as elsewhere, yet at the same time physical conditions also merit consideration.

There are four main sources of accidents in shops: First, unguarded machinery; second, insufficient light; third, flying particles, and fourth, obstruction of passageways. These things can be properly attended to and increased safety can be obtained. Safety devices can be installed for the safeguarding of machinery; sufficient light can be provided and windows and electric lamps can be kept clean; the employees can be equipped with goggles to prevent injury of the eyes by flying particles; and passageways can in a majority of cases be kept clear of obstructions.

The matter of oversight also enters largely into the prevention of accidents. If the foreman or superintendent in charge of the shop is thoroughly impressed with the necessity of accident prevention, he will find numerous ways of preventing injuries that might otherwise occur.

The following are some of the precautions which employees in shops and roundhouses should observe:

Don't wear loose, baggy clothing in working around moving machinery.

Don't walk on railroad tracks and before crossing any track "Stop, Look, Listen."

Report all unsafe conditions and practices to the foreman or other person in charge.

Explain fully to your helper the proper methods of work. A little time spent by a mechanic in imparting instructions to his helper may save one or both an injury.

Never jump on moving cars or engines. This is a risk which no shopman is required to take and which he cannot afford to take.

Never strike tempered steel with hammer or other metal objects.

Stop machine before oiling, wiping or repairing.—W. L. C.

Fire Fighting in Rocky Mountains Forest Reserve

The Rocky Mountains Forest Reserve lies just north of the international line in the Province of Alberta and embraces an area of about 18,750 sq. miles of timber land, in which lie the sources of most of the streams flowing through Alberta and Saskatchewan. Since the reserve was established in 1910, there has been an organized effort to check the forest waste by fire, which is said to have been out of all proportion to that suffered by other forest areas in the West. Early explorers found heavy timber over hundreds of miles of country on the east slope of the mountains, which is now practically denuded, and it has been found (states Mr. W. N. Millar, district inspector of forest reserves) that at least 90 per cent. of the forests in this section are not one hundred years old, while probably 75 per cent. are not over fifty years old. In other words, evidence points to a surprisingly heavy and widespread destruction of the forests within the last fifty years, during which time travel in these mountains has been a factor of importance.

In providing for fire protection the Rocky Mountains Forest Reserve has been divided into five sections, each of which is under the control of a forest supervisor. These divisions run from 1,000,000 to 3,000,000 acres in area, and are laid out on topographical lines, so that they can be administered practically independent of each other. Each supervisor further subdivides the district under his charge into ranger districts, which average roughly about 200,000 acres each. The ranger districts are also bounded by mountain ranges or other topographical lines, and the ranger in charge of each is made responsible for all work within the district. Besides fire protection duties he is charged with the administration of timber, the construction of trails and bridges, and other supervisory work. It is thus possible to provide year-round employment, which is said to secure a better type of ranger and keep men in the service who are familiar with the districts and the work involved.

The success of the fire-prevention work, Mr. Millar points out, has been largely due to developing the lookout system and perfecting arrangements for despatching help in emergencies. The patrol system would be wholly inadequate under the conditions in the reserve, but the plan of locating fires by triangulation from lookout peaks and by communicating by wireless or telephone has made it possible to secure adequate protection. Mr. Millar states, at a cost of from 1 to 2 cents per acre.

Coal Reserves of the World

The chief topic of discussion at the Twelfth Session of the International Geological Congress, held in Toronto this summer, was the Coal Resources of the World. As a basis for the discussion, a monograph on this subject, edited by Wm. McInnes, D. B. Dowling and W. W. Leach, was prepared by the

Geological Survey of Canada. Assistance was also given by Geological Surveys and Mining Geologists of different countries. The reports obtained dealt with a large variety of coals, but in the following tables they are grouped in only three divisions, anthracite, bituminous, and the less-altered coals:—

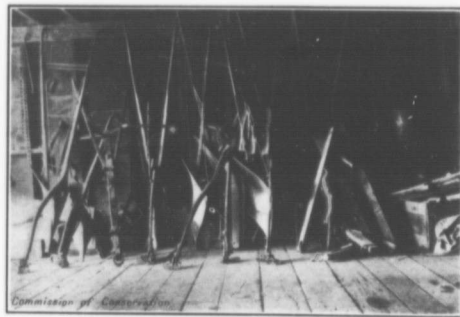
Estimate of the Coal Reserves of the World

In million tons.

	CLASS A	CLASSES B & C	CLASS D	TOTALS
	Anthracite Coals, including some Dry Coals	Bituminous Coals	Sub-bituminous Coals, Brown-coals and Lignites	
Oceania	659	133,481	36,270	170,410
Asia	407,637	760,098	111,851	1,279,586
Africa	11,662	45,123	1,054	57,839
America	22,542	2,271,080	2,811,906	5,105,528
Europe	54,346	693,162	36,682	784,190
	496,846	3,902,944	2,997,763	7,397,553

The report states, "In considering the amount of the reserve relative to the duration of the supply it should be borne in mind that in this estimate no deduction is made for coal not at present

mineable nor for loss of coal in mining. A large part of the coal included in the estimate will be very difficult to mine and generally the loss in mining will be great." —W. J. D.



(Cut No. 23)

Implements cost money. Put them under cover—NOW.

Farm Machinery—Its Care and Abuse

While it is true that many farms are not equipped as they should be with proper machinery, it is also true that hundreds of dollars are lost in unnecessary outlay, and thousands in unnecessary depreciation.

During the Agricultural Survey work conducted by the Lands Committee in 1913, some interesting facts in this connection were revealed. A farmer near Moosomin, Sask., who after twelve years, was giving up farming, held an auction sale. His binder brought \$80 and his other machinery sold proportionately high. If had all been well housed each year and the

necessary repairing and painting had been done. On a neighbouring farm a binder which had been used for only three years, but left out of doors and neglected during that time, went to the scrap heap and a new one was purchased. Conditions similar to the latter obtain over the whole of Canada, but more frequently in Western Canada. An implement house costs money, but if the depreciation on housed and well-cared-for machinery is only one-third or less of that on machinery left out of doors, it is good business to put a roof over the implements.—F. C. N.

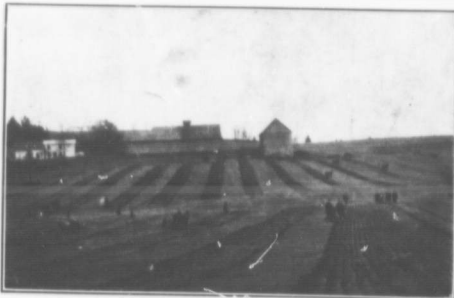
New Brunswick Forest Survey

The provincial parliament of New Brunswick, at its session last winter, provided for a survey, examination and classification of the Crown Land areas of the Province. The report, as provided in the Act, is to cover the following points: the character and quality of the timber; the quantity of timber and the reproductive capabilities of the various areas, estimating as accurately as may be the annual growth of the timber upon each area or tract; the accessibility of the timber in each section; the cost of logging the different areas; the cost of stream-driving to the point of manufacture; and the location of the lands deemed suitable for agricultural purposes. Owing to financial considerations, it was not considered practicable to create a separate organization and provide for the collection at first hand of this very important information on an intensive scale.

The existing staff of cruisers and sealers has therefore been charged with the duty of collecting and compiling, under the supervision of Mr. W. H. Berry, Superintendent of Sealers, all available information along the above lines. The provincial government feels that, in this way, at least the great bulk of the above information can be collected to an extent sufficient for present needs, and consistent with financial considerations.

It is, however, obvious that the required study of reproduction and rate of growth must be handled in an entirely different way, since information of this kind can be secured only as a result of close and detailed study by men who have been especially trained for this class of work. It is expected that the necessity for securing this class of information, as well as for supplementing the estimates made by the staff of cruisers and sealers, will result in the establishment of a Forestry Branch in the Crown Lands Department, with a technically trained forester in charge. This action is not only logical but will prove necessary, since the Crown Lands of the province return an annual revenue of over half a million dollars to the provincial treasury, and the absolute necessity of providing adequately for the perpetuation of this important resource can not long be avoided. The Crown Lands comprise an area of over ten thousand square miles, or approximately one-third the total area of the province.—C. L.

Unquestionably it will take more labour to produce fifty bushels of wheat from an acre than to produce ten bushels from the same acre—but will it take more labour to produce fifty bushels from one acre than from five?—Abraham Lincoln.



(Cont. No. 23)

Successful Ploughing Match at Lennoxville, Que.

Encouragement of Ploughing Matches

Educational Importance of these Contests—How their Scope may be Widened and Usefulness Increased

Ploughs have been modified to suit modern ideas of cultivation, but the change has been more towards speed in turning over the soil than in better methods of doing this. May it not be that speed in ploughing has been gained at the expense of efficiency in the work done?

Good ploughing is not so much a question of good ploughs as good ploughmen. Of late years we have depended more upon the plough itself than upon the man between the handles. Improvement in ploughing can be brought about by training men and boys to do better work.

In Ontario and Quebec there was a time when the annual ploughing match was an event of unusual importance in many localities. Interest in these competitions seems, unfortunately, to have died out, particularly among the younger men. While they may not have been all that could be wished for from an educational standpoint, they were certainly an incentive to good ploughing. The scope of such matches could be widened to include contests in soil cultivation on stubble land and testing the different kinds of implements for cultivating the soil. Usually there are prizes given for the best plough-team and equipment. Why not extend this valuable feature by giving several prizes for teams and also for colts, thereby encouraging the raising of good horses? A few pithy addresses on farm topics would make the occasion still more instructive and interesting.

To get the best results from a ploughing match, it should be managed by the local Farmers' Institute or some kindred organization. Municipal Councils might very properly be urged to contribute, because undoubtedly the money so spent would assist greatly in improving the crops and stock of the neighbourhood.—J. F.

Meeting to Discuss Forest Protection

Western Forestry and Conservation Association will Assemble in Vancouver—Topics of Discussion

This year, for the first time, the annual meeting of the Western Forestry and Conservation Association will be held in Canada. This Association is made up of the various forest fire organizations on the Pacific Coast of the United States, and represents the combined efforts of private owners of timber lands, various Western States, and the Federal Government, in the prevention and control of forest fires.

This meeting—the most important yearly gathering of timber owners in the United States or Canada—will be held at Vancouver, B.C., December 15 and 16. At the meeting in Seattle last year one-third of the standing timber of the United States was represented and there were present over thirty men prominent in Western Canada forest affairs. It is not a public meeting to discuss forestry generalities nor is the time taken up by representative papers. In the presence of representatives of the lumber trade, railroads and other interests involved, the practical men who are actually doing the private, state and government protective work describe and debate their field methods and adjust their differences.

One of the most interesting features at Vancouver will be a frank debate between British Columbia lumbermen and the government over the merits and demerits of that province's forest policy and methods. Other topics will be: experiments in state co-operation and compulsory patrol; logging camp rules and precautions; slash and right-of-way burning; forecasting hot, dry winds; supply, report and payroll systems; lookout, map and signal systems; forest telephone building; wireless auxiliaries, and railroad regulation and co-operation. An unusual attraction will be an exhibit of all devices and instruments used in American forest protection.—C. L.

FALL PLOUGHING

Experience each year demonstrates to the observant farmer the wisdom of ploughing his land in the fall for certain crops.

It subjects the soil to the pulverizing effects of the frost.

It helps the two layers of earth to settle well together.

It conserves more moisture than spring-ploughed land, and thus bears better the dry weather in the growing season.

It helps greatly to destroy the larvae of the wire worm, cut worm, and the red-headed white grub.

It relieves the press and hurry of the spring work, and enables him to work the land much earlier the spring following.

PEAT POWDER AS LOCOMOTIVE FUEL

Peat powder has been successfully applied as a locomotive fuel on one of the private railroads in Sweden. In steam raising value about 1½ tons of peat powder is equivalent to one ton of coal. Peat powder is used with a mixture of about 5 per cent. of coal, and is fed into the furnace by an automatic stoker. No change need be made in the boiler end in the fire-box, except for the mounting and application of the automatic stoker. An incidental advantage of the use of the peat powder is that no cold air can get into the fire-box and no smoke or sparks escape from the smoke-stack. As Sweden is very rich in peat bogs, and has practically no coal deposits, the success of the apparatus, which has been worked upon for years by eminent engineers, is of considerable importance. It has been estimated that the cost of peat powder would be only about one-half that of coal.—Machinery.

TWO NEW REPORTS

Two new reports are being issued this month by the Commission of Conservation. The first, entitled "Forest Protection in Canada," by Clyde Leavitt, Forester to the Commission, is divided into six parts, dealing, in order, with the following topics: (1) Protection from Railway Fires; (2) Forest Fires and the Brush Disposal Problem; (3) The Top-logging Law in the Adirondacks; (4) The Use of Oil as Locomotive Fuel from a fire-protective point of view; (5) Forest Planting in Canada; (6) Report of the Committee on Forests, Commission of Conservation, 1912. In addition there are three appendices, the subjects of which are respectively: (1) Dominion Forest Reserve Extension; (2) a Memorandum regarding the country between Sudbury and Port Arthur (by J. H. White); (3) Opinions on Oil Fuel.

The subject matter of the other report, "The Canadian Oyster, its Development, Environment, and Culture," is sufficiently expressed in its title. The work embodies the results of the investigations of Dr. Joseph Stafford, Lecturer in Zoology at McGill University.

There are about 37 pines native to the United States, of which 25 are western species, and 12 eastern.

For some time past the C. P. R. has been equipping all its switching locomotives with fire fighting apparatus, and in addition to this being ordered on all new switching equipment, orders have been issued to add it to all of that class as they come in for shopping. At the end of last year there were on all parts of the system 162 locomotives so equipped.—Canadian Railway and Marine World, October, 1913.



(Cont. No. 27)

A Good Road in Compton County, Que.

The above illustration shows what can be accomplished by men who can always find time for improvements, even on the roads which adjoin or pass their premises. Once the road is put in good order it takes but little time to keep it up. The split-log drag is kept in a convenient place, and at such times as is found necessary is run over the road, filling up ruts

or any depressions. Each farmer takes his turn with the drag. Should extra labour be required it is mutually agreed upon.

If more farmers would be as public spirited there would be better roads and the cost and time to the farmer would scarcely be missed, and much good would be accomplished.