

Conservation

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Forest Fire Fighting

Prompt Action Necessary to Prevent Rapid Spread of Fire When Started

In a recent report, Mr. Page S. Bunker, formerly of the U. S. Forest Service and now Forest Warden and City Forester for Fitchburg, Mass., calls attention to some popular misconceptions relative to the control of the forest fire menace. Mr. Bunker's statements are equally applicable to conditions in Canada.

Certain didactic statements, made early in the development of American forestry, have unquestionably, according to Mr. Bunker, acted in the past to the detriment of forest protection. One of these fallacies is found in the general impression that the best time to fight a forest fire is at night. It is well to correct this belief by stating that the best time to fight a forest fire is all the time that it is burning. This principle should be taken in its literal sense which is also its broadest sense.

Another erroneous belief, early expressed, is evidenced by the statement that the use of water is of little aid in combating fires in the woods. As a matter of fact, the use of water intelligently applied, even in small amounts, is one of the most practicable and effective means of checking a fire. Still another erroneous belief which, while not as generally accepted as the others, nevertheless needs correction, is that the point of attack should be along the flanks of a fire, working toward its head. In practically every case, the logical point from which to attack the fire is in front of it, checking its head and later working down the flanks.

Perhaps the greatest fallacy of all is the belief accepted in many quarters that the extinction of a forest fire can best be attempted through the indiscriminate employment of a large mass of unskilled labour. As compared with no protective measures whatever, mere mass methods may retard the rate of destruction but at a cumulative annual cost which, combined with the cumulative annual damage, may amount to an enormous expenditure in money and forest resources, even approaching a total loss of each to the full extent that

Canada's Timber Industries

Their Permanency Cannot be Assured Unless the Growth of Another Crop of Timber is Provided for

In a recent address before the Commission of Conservation at Ottawa, Mr. H. R. MacMillan emphasized the importance of timber industries to Canada. Mr. MacMillan is chief of the British Columbia Forest Branch and is now under temporary appointment as Dominion Trade Commissioner to Australia and other countries. His opinion is accordingly entitled to the thoughtful consideration of all Canadians.

Mr. MacMillan forcibly brought out the fact that timber industries cannot be permanent unless the growth of another crop of timber is assured, and that thus the practice of forestry is imperative as an economic measure. Every section of the Canadian public is interested. Roughly, the proportion of non-agricultural land in Canada south of the 60th parallel is: Nova Scotia, 81 per cent; New Brunswick, 72 per cent; Quebec, 76 per cent; Ontario, 64 per cent; Dominion Lands, 51 per cent; British Columbia, 85 per cent. Some of these Governments already have forestry departments; none can afford to be without some forestry organization, charged with the study, protection and administration of timbered and non-agricultural Crown lands. Such lands should be studied, in order that the protective and administrative measures adopted may be decided with a full knowledge of the value of the products to be expected from the land. In this way expenditure is avoided on inaccessible and non-productive land which will not yield returns, and the investment is made on those lands where quality and situation guarantee a profitable crop. In each province the area of timber-land is very great. The conditions of forest growth, of fire hazard, of utilization, are so variable that no rule of thumb methods may be safely adopted. The Forest Branch must include men trained to, and free to study, each of these problems, in order that loss of revenue may be prevented, and the most economical possible scheme of administration and protection worked out for each section of the country. In no case are these matters being handled as yet on a really adequate basis. In particular, there is everywhere needed closer attention to organization, coupled with larger appropriations. The latter are necessary in order that adequate protection may be afforded the vast areas of young growth which in many cases are now without protection of any kind.—C.L.

they are involved. One expert fire fighter, furnished with specialized equipment, develops efficiency equal to that of fifteen or twenty unskilled labourers.

Another lay impression, which has resulted in much loss, is that a fire which is not spreading at the moment is under "control." This term has little practical significance, especially in the case of large fires. Theoretically, it applies to that condition of a fire which obtains when an immediate increase of the hazard to its maximum limit will not enable the fire to extend beyond its existing bounds. Since such a condition seldom obtains before

the extinction of the fire, it readily will be appreciated that the term "control" has small place in the lexicon of the forest conservator. The complacency with which the temporary checking of a fire by natural or artificial means has been regarded by untrained fire fighters has caused the loss of millions of dollars in damage and expenditures.

Campers and others are apt to be careless regarding the wearing of damp or wet clothing. This practice is conducive to rheumatism and other ills. Care should be taken to have clothing and beds thoroughly dry and well aired.

Value of Liquid Manure

Great Waste Results from Loss of the Most Valuable Portion of the Manure

One of the most serious sources of loss of farm manure is the practice of allowing the liquid portion to drain away and be lost. On many farms there are stables with cracks in the floors through which the liquid escapes, and even today some farmers are guilty of boring holes in the floor to get rid of the urine from the farm animals. By so doing they are facilitating the loss of the most valuable and quickly available fertilizing portion of the manure.

While the analyses by various investigators do not exactly agree regarding the relative amounts of fertilizing constituents contained in the solids and liquids, all agree that the fertilizing elements contained in the urine of farm livestock is much greater than that in the solid dung. The serious nature of the loss which the farmer must suffer when he allows any portion of the urine of his domestic animals to be lost, or permits the natural drainage from the manure to escape, will be made very apparent by examination of the figures in the table here given showing the composition of these different classes of material. These figures are taken from an article by W. P. Brooks in *Cyclopedia of American Agriculture* by Bailey:—

COMPOSITION OF FRESH EXCREMENT

One thousand pounds of fresh dung contain:

	Water	Nitrogen	Phosphoric Acid	Alkalies
	Pounds	Pounds	Pounds	Pounds
Horse	760	5.0	3.5	3.0
Cow	840	3.0	4.5	1.0
Pig	800	6.0	4.5	5.0
Sheep	580	7.5	6.0	3.0

One thousand pounds of fresh urine contain:

	Water	Nitrogen	Phosphoric Acid	Alkalies
	Pounds	Pounds	Pounds	Pounds
Horse	890	12.0	0.0	13.0
Cow	920	8.0	0.0	14.0
Pig	975	3.0	1.25	2.0
Sheep	865	14.0	0.5	20.0

(Continued on Page 30)



Cat No. 105

Forest plantation of Jack and Scotch pine, made by the provincial Forestry Branch in 1909, on a ridge in southern Ontario, where sand was blowing across the township road. The trees have stopped the sand from shifting, allowing a permanent road-bed. There are large areas of non-agricultural lands in every province of Canada, now devastated by repeated fires, but which would return large revenues, employ local labour and mean the establishment of local industries, if reforested, either naturally or by planting, and protected from destruction by fire.

Weed Education and Extermination

Systematic Action Being Taken in the West to Eradicate Sow Thistle

The Department of Agriculture of Saskatchewan is making systematic efforts to exterminate the sow thistle, which has been making great headway in that province. The railways and municipalities are co-operating, the railways are supplying track motors while the government's experts direct the work. The *Regina Leader*, in commenting on the war against the sow thistle, said:

"The C. P. R., having the greatest mileage in the province, is doing the great share of the work in exterminating the weed on their right-of-way throughout the province. Every patch of sow thistle is charted, and the company has promised to report on it to the department from time to time, showing the means taken to eradicate it. "The thistle is dug, and when the green plants have been dried they are burned.

"To show just what little attention is paid to the weed, on the division Moose Jaw to Broadview, even the roadmaster did not know what a sow thistle was, and only one of his section foremen knew. They know it now, however. On the Kirkella division, which has been covered during this week, only two foremen knew anything about sow thistle. Mr. Pawley, who has charge of the work for the department, is taking pains to instruct the foremen in order that they may be capable of totally exterminating the very bad and undesirable weed from their sections.

"The C. P. R. officials are in thorough sympathy with the crusade of the department, and have promised to do everything they can to assist in the destruction of one of the worst weeds there is in Canada."

For the Sake of the Trees

1. Don't throw your match away until you are sure it is out.
2. Don't drop cigarette or cigar butts until the glow is extinguished.
3. Don't knock out your pipe ashes while hot or where they will fall into dry leaves or other inflammable material.
4. Don't build a camp fire any larger than is absolutely necessary.
5. Don't build a fire against a tree, a log, or a stump, or anywhere but on bare soil.
6. Don't leave a fire until you are sure it is out; if necessary smother it with earth or water.
7. Don't burn brush or refuse in or near the woods if there is any chance that the fire may spread beyond your control, or that the wind may carry sparks where they would start a new fire.
8. Don't be any more careless with fire in the woods than you are with fire in your own home.
9. Don't be idle when you discover a fire in the woods. If you can't put it out yourself, get help. Where a forest guard or fire ranger can be reached, call him up on the nearest telephone you can find.
10. Don't forget that human thoughtlessness and negligence are the causes of more than half of the forest fires in this country, and that the smallest spark may start a conflagration that will result in loss of life and destruction of timber and young growth valuable not only for lumber but for their influence in helping to prevent flood, erosion, and drought.

Value of Liquid Manure

(Continued)

COMPOSITION OF DRAINAGE LIQUORS

One thousand pounds contain:

	Water	Nitro- gen	Phos- phoric Acid	Potash
	Pounds	Pounds	Pounds	Pounds
Drainage from utter behind milk cows.	932	9.8	2.4	8.8
Drainage from manure heap	820	15.0	1.0	49.0

Under average conditions the weight of urine from the cow will be about double that of the solid dung. With horses and sheep the

solid and liquid are about equal, while, with hogs, the amount of urine varies much according to the feed but is usually very abundant. Applying these facts to the above table, it will be seen that the nitrogen in the total urine of the cow would amount to over five times the nitrogen in the total solid dung, while, with horses and sheep, there would be about double the amount of nitrogen in the urine as in the solids. There is also much more potash contained in the urine of these animals than in the solids as is shown in the table.

Since nitrogen and potash are both expensive if the farmer has to buy them, it would be wise and profitable for every farmer to prevent their loss through the escape of the liquid manure. Straw is a good absorbent but if the crop is short, leaves, sawdust or air-dried muck may be used to advantage.

F.C.N.

Selecting Seed Potatoes

Largely Increased Yield Results From Individual Hill Selection

For many years farmers have given attention to the planting, manuring and cultivation of their potato crop, but generally neglected the methods of seed selection or breeding. Regarding live stock it is universally recognized that it pays to put forth every effort toward improving the strain by careful selection and breeding. The field of plant breeding and selection offers to every farmer an interesting and profitable diversion, and it should become the farmer's hobby.

Experiments have shown that potatoes grown from hill-selected seed will give an increase of from 30 to 50 per cent over the average yield. The hill selection method consists in making individual hill selections in the field at digging time, selecting, of course, for uniformity in size and a maximum number of merchantable tubers. Each hill may be given a number and kept and planted separately the next year to permit comparison when the progeny is harvested. Another good plan is to go through the field in autumn just before the tops die down and mark by a twig or stake, the hills showing most vigor and resistance to disease. When harvest comes the marked hills may be saved for seed, discarding the hills which do not come up to standard. Enough may be selected in this way each year to plant a plot sufficiently large to supply the seed for the whole crop the following year.

No farmer is too poor to have his own breeding patch of grain or potatoes. Indeed, if they but knew, farmers can ill afford to be without the breeding plot to supply seed for their own planting.—F.C.N.

To encourage the use of electricity, the Municipal Electricity Department of Shanghai, China, advertises "Motors for hire."

Care with fire in the woods is the greatest precaution required of campers and sportsmen. Before leaving fires, campers should assure themselves that no live sparks are left to scatter with a favorable wind.

See to it that your own home is rendered free from fire danger. Examine the condition of your kitchen stoves, furnaces, fireplaces, etc., and see that the flues are properly protected. See that chimneys do not run through portions of the building in such a manner as to cause ignition of the wood-work. Go into the cellar, clothes closets, cupboards, etc., and see that no rubbish is allowed to accumulate which may cause fire.

RAT ELIMINATION IN GERMANY

Owing to the very efficient method adopted for their destruction, few rats exist in Germany. As soon as they appear in a dwelling or other place if ordinary methods fail, the police are notified of their existence, and at once an official is detailed to exterminate the rodents. So closely is the matter followed until the effort is successful that rats are seldom seen. No charge is made for the services of the official rat catcher.—United States Commerce Report.

Commission of Conservation

CANADA

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CONSERVATION is published the first of each month. Its object is the dissemination of information relative to the natural resources of Canada, their development and the proper conservation of the same, together with timely articles covering town-planning and public health.

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CONSERVATION is mailed free to those interested in the subjects covered by the work of the Commission.

OTTAWA, AUGUST, 1915

The many drowning accidents emphasize the necessity for teaching the young to swim. The supplying of swimming instructors in connection with public playgrounds has been undertaken by one of the eastern cities, and the results abundantly prove the wisdom of their action.

The rank growth of weeds on vacant lots is frequently a cause of fire. When the weeds become dry a lighted match or burning cigarette thrown into them will cause a fire to start and run rapidly, until it comes in contact with a wooden fence or frame building, when, unless promptly extinguished, great damage may result.

The question of fire waste is becoming one of national interest. During the past winter bills were introduced in many legislatures throughout the United States for the purpose of fixing personal liability in cases of careless or preventable fires, whereby adjoining parties who suffer from such fires may recover damages sustained through such carelessness.

The conversion of one-family homes into apartment houses has reached such a stage in some cities as to produce a menace to the health and lives of the occupants. Houses which have become obsolete or unfit for habitation are renovated and, owing to their lower cost, are rented at a smaller rate than apartment houses which are constructed for the purpose. Consequently these houses are nearly always occupied by families too large for the accommodation provided but whose circumstances would not allow of their paying the larger rentals for better housing.

International Conservation

In promoting amity and intimacy between Canada and the United States, few movements are likely to prove of greater influence than that for the conservation of natural resources. In the few years during which these owners of the greater portion of North America have been endeavoring to minimize national waste, they have already found several instances where efficient use and permanent possession of natural resources can be secured only through co-operation. The International Joint Commission, founded on common interest, is the most tangible evidence of the strength of the co-operative spirit. It arose from mutual recognition of joint responsibility for the preservation of the utility of boundary waters, whether for domestic, navigation, irrigation or power purposes. The wisdom of creating the Commission is beyond question.

About one year and a half ago, the problem of protecting migratory birds again raised the question of international action. A treaty arrangement between the United States and Canada has been suggested as the only effective method of conserving the bird life of the North American continent. Mutual interest and welfare are quite as strong and evident in this case as in that of boundary waters.

Still more recently it has become apparent that threatened depletion of fisheries may very soon furnish a third case for joint policy. The question has already arisen in connection with both Pacific and Atlantic fisheries. The salmon fishery of British Columbia is seriously menaced, and faces destruction unless an agreement can be arrived at between Canadian and American fishermen. Regarding Atlantic fisheries, a recent report to the United States Bureau of Fisheries points out the desirability of international limitation of the operation of steam trawlers. These fisheries are chiefly in extra-territorial waters but economically, if not legally, they comprise part of the natural wealth of North America. The main point is that in these and other instances, where common material interests are at stake, the spirit of conservation, which has gained such headway, has paved the road for international understanding in no way based upon or connected with political motives.

A building for the College of Forestry is to be erected at Los Banos, Philippine Islands, the funds having been appropriated by the last legislature.

Kill! Kill!

Disappearance of Wild Life in America a Destructive National Spirit

"Today this country of ours is the theatre of a remarkable struggle between the great small forces of destruction and the great small forces of protection and preservation. In every township throughout the whole United States the destroyers of wild life either are active in slaughter or are ready to become active the moment they are left free to do so. Every beast, bird, fish and creeping thing has its human enemy. Americans are notoriously enterprising, restless and prone to venture. It is that restless activity and indomitable nervous energy that is manfully attempting "dry-farming" in the West, desert-farming in the South-west, and the drainage of the Florida Everglades. Often the joy of the conquest of nature outruns the love of cash returns. Apply that spirit to forests, and it quickly becomes devastation. Apply it to wild life, and it quickly becomes extermination.

"Our conquering and pulverizing national spirit is a curse to all our wild life. The native of India permits the black buck, the sand grouse and the saras crane to roam over his fields unmolested for two thousand years. The American, and the Englishman also, at once proceeds to shoot all of that wild life that he can approach within range. In America, the national spirit may truthfully be expressed in the cry of the crazed Malay: "Amok! Amok!" "Kill! Kill!" This is why the conservation of valuable wild life is in our country a fearfully difficult task, from which most people shrink and seek something either more pleasant or personally profitable."—William T. Hornaday in "Wild Life Conservation."

Prevent Fires in the Home

Simple Precautions May Save Lives and Property

Fires in the home are easier to prevent than to extinguish.

Practically every fire originating in a dwelling house is due to carelessness or neglect.

The attic, cellar and all clothes closets should be cleaned at least once a year and all useless material and rubbish removed and burned.

In storing clothing, remove all matches and other material from

the pockets. Do not hang clothes near hot chimneys.

Do not go into clothes closets with lighted matches or candles.

Use only safety matches and keep them away from children. Never throw burned matches on the floor or into waste baskets.

Do not use inflammable shades on lamps, candles or electric light bulbs.

Coal oil lamps should always be filled by daylight. They should be kept clean and properly trimmed. A dirty lamp is unsafe.

Never allow little children to carry lamps, and never set lamps on a table cover. Children may pull them over.

A fuse is the "safety valve" of an electric system, and should never be replaced by one of larger size or of any other material.

Do not allow paper or rubbish to accumulate behind steam coils or radiators.

Gas stoves should never be connected up with rubber tubing. Gas pipe, rigid and secure, is the only safe connection.

Rags and cloths saturated with cleaning and polishing oils may ignite spontaneously in a few hours. Burn them at once.

Be careful of ashes. Do not deposit them against wooden buildings or fences. See that there are no live coals. Far better to pour a pail of water over them than to take the risk of a strong wind carrying live coals and starting fires.

Especial care should be taken in the home to prevent fires from starting, because when they do start there is seldom a man about to extinguish them. Where women and children are housed, the utmost vigilance is necessary on the part of those responsible for their welfare.

Forests as Tax-Payers

Municipal Forests are Switzerland's Revenue Producers

The Sihlwald, or city forest of Zurich, Switzerland, adds to the town's revenues \$7.20 per acre a year, reducing the amount needed to be raised through taxation by more than \$32,000.

In Canada, there are as yet no municipal forests, though the forests on Crown lands are a source of large revenue, particularly to the provincial governments. Too frequently, however, they have been regarded merely as a source of immediate revenue, without sufficient provision for making the revenue perpetual through adequate fire protection and the control of methods of cutting calculated to restore the forest after cutting.—C.L.

TO NEWSPAPERS

To further public interest in conservation subjects, the Commission will lend to Canadian journals the cuts used in this bulletin. It is requested that cuts be made use of at the earliest possible date, and returned promptly, enclosing note showing by whom returned.

As the Post Office Department will not permit the franking of cuts, the Commission of Conservation will pay the postage on out-going packages on the understanding that publications requesting the use of cuts prepay return postage.

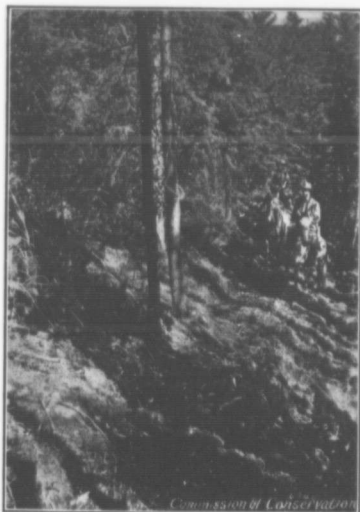
Importance of Water Storage

Increased Power and Steady Flow Secured by Storage During High Water Periods

The problem of properly conserving and utilizing the water resources of a country is neither new nor novel. The great hydro-electric development in Canada requires strict control and present conditions cannot be adequately dealt with by the legislation and the ideas of twenty years ago. The water-power wealth of Canada is one of the principal assets of the country and it is most urgent that not only the governments but also individuals interested in water-power schemes should recognize the importance of expert regulation and control of our streams. Water conservation and storage has ceased to be looked upon as a sentimental idea only, and its immediate economic value has become clearly recognized.

Every cubic foot of water as it passes over falls and rapids in large and small streams on its journey to the sea, has an element of power which is lost forever if not used at the time of its passage. All have noted the difference between the enormous volume of water rushing down our streams during the spring floods and the much diminished flow at the end of summer, which in the majority of our streams, is further reduced during the winter months. Most water-power enterprises have been planned to utilize only this low, winter flow and allow the large additional volume available at other times to pass without obtaining a single horse-power of useful work from it, thus utilizing the full amount of power only during four months in the year. For comparison and to furnish an idea of the amount of power going to waste during the remaining eight months, it may be stated that one cubic foot of water per second passing over a ten-foot fall during the remaining period represents 14 tons of coal during that period.

A similar illustration is given by considering the waste at points where water-power is being used. With the exception of Niagara and the St. Lawrence river, whose flow is exceptionally well regulated by nature, the average yearly flow of our streams is from two to ten times their minimum flow. As, in most cases, developments provide only for the minimum flow of streams, it follows that the water wasted is from one to nine times that used. Taking the lowest figure, that is, assuming that the power wasted is equal to the power used, and taking the total power developed in Canada exclusive of Niagara and the St. Lawrence as 1,000,000 h. p., we find a yearly non-use of water-power in Canada equivalent to 12,000,000 tons of



TRAIL, CONSTRUCTED BY DOMINION FORESTRY BRANCH, BOW RIVER FOREST, ALBERTA
The construction of trails greatly facilitates communication and thus assists materially in forest fire protection.

coal due to non-storage of water. In our present stage of development we, of course, cannot utilize this vast power but the figures demonstrate its enormous value of this natural resource.—L.G.D.

Past Neglect of Forests

Many Eastern Settlements are Lagging due to Loss of Forest Resources

The future forest industries, which are almost the only industries possible on three-fifths of the area of Eastern Canada, must be supported by the timber grown on the logged-over and burned-over non-agricultural lands. Looking at these lands we should see, not wastes, holding no promise for the future, but productive lands, needing only protection from fire to enable them to support logging camps, pulp mills, rural and industrial communities of a type which has done much for Canada. If the young forest growth on the non-agricultural lands of Eastern Canada had been protected from fire during the past twenty years, railways would not now be importing railway ties, and saw-mills in Western Ontario, each the centre of a thriving community, would now be supplying the markets with lumber, which, because of lack of forest protection in the past, is being supplied from British Columbia and the United States.—H.R.M.

Forest Destruction Due to Carelessness

Grand Jury Recommendation Takes Cognizance of Forest Fires

At the Summer Assizes, recently concluded at Parry Sound, Ont., two suits were entered against railway companies for damage to standing timber from fires caused by sparks from locomotives. At the conclusion of the session, the Grand Jury of the District Court for the district of Parry Sound took the opportunity in making its presentment to the presiding judge, to protest against the negligence of the officers, appointed for the purpose of preserving forests from fire, in bringing guilty parties to justice. The necessity of checking the enormous fire wastes of Canada was pointed out in very forcible manner, and the action of the Grand Jury in taking this method of arousing public opinion on the subject, merits the highest commendation. The following quotation is taken from the text of the presentment:

"One of the important matters taken into consideration by the Grand Jury at this session was the awful destruction of our timber wealth by fire.

"Your Grand Jury, which is mostly composed of yeoman of the district, has come to the conclusion that unless the present laws enacted are enforced, and enforced with vigor, in the course of a few years the uncultivated portion of our district will be one vast brûlé.

"We are of the opinion that the laws governing the preservation of the timber are adequate if enforced and we will advise those in authority to see that in future this shall be done.

"We have made enquiry regarding prosecutions and find that not a single criminal case has been instituted and the settler as a rule is not in a position financially to proceed in the civil courts.

"The blame of forest fire may be attached to careless settlers, careless tourists, careless bushmen and careless brushmen and careless railwaymen, but in our opinion this carelessness will continue till the officers appointed for the purpose of preserving the forests from fire wake up to their responsibilities and bring the delinquent parties to justice by criminal proceedings."

To the foregoing indictment, a word should be added respecting the great improvement of recent years in the railway fire situation. As a result of the thorough system of fire prevention measures required of the railway by the Railway Commission, and of the effective co-operation of the railways themselves, the latter can no longer be singled out as the arch offenders in connection with our annual forest fire record.

Spraying With Poison Solutions

When using paris green, keep the solution off your hands and entire person. A break in the skin, such as a scratch, pimple, or sore may permit it to enter the blood and cause a severe sore or even blood poisoning. When paris green is used in the dry form, be careful to get it only on the plant for which it is intended. Consider the direction of the wind when going the kind of work.

In spraying with paris green of Bordeaux mixture it is advisable to protect the face. A veil or face piece is often used for this purpose.

In spraying with lime-sulphur rubber gloves should be used. This solution is very corrosive and may cause very painful sores on the fingers where exposed for some length of time. It takes over two months for these sores to heal. Vessels that have been used to contain these poisons should not again be used for any other purpose.

FORESTRY BRANCH ACTIVE

The Dominion Forestry Branch has seven parties in the field this summer, in various portions of Alberta, Saskatchewan and Manitoba, engaged in forest exploration work. These parties will determine the timber resources of the sections in which they operate and will endeavor to locate all large bodies of strictly non-agricultural land in those sections, in order that such areas may serve their best permanent use to the country by being devoted to the continuous production of wood crops.—C.L.