

Conservation

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Permits for Settlers' Fires

Legislation Urgently Needed in Several Provinces

Every province of Canada has learned by bitter experience the enormous destruction of forest wealth that follows the unregulated burning of debris resulting from settlers' clearing operations. Owing to their proximity to the virgin forest, these clearing fires, when set out during dry times, or with insufficient supervision, spread in many cases beyond control, and have caused the destruction of millions of dollars worth of timber, which otherwise would have furnished employment for Canadians and raw material for Canadian industries.

In British Columbia, Quebec, New Brunswick and Nova Scotia, laws have been enacted for the control of this menace, by forbidding the setting out of clearing fires except on permit signed by a forest officer. A similar provision will no doubt be considered by the Ontario Government this winter. There still remain, for similar consideration, the prairie provinces, Alberta, Saskatchewan and Manitoba. The northern portions of these provinces are largely in forest, and vast areas must always remain unsuited to any other purpose than the growing of timber. The forest reserves already established in these provinces total some 33,226 square miles. Many times more timber has been uselessly destroyed by fire than has ever been cut. The remaining depleted resources are urgently needed for local consumption, with limited export possibilities. In addition, Forestry officers state that the greatest damage to the forest reserves is through fires which originated outside them, and that the most important single source of such fires is the unregulated clearing operations of settlers in the vicinity of the reserves.

This demonstrates that the provincial governments of Alberta, Saskatchewan and Manitoba should enact legislation providing for the control of settlers' burning operations, in forest sections, under the permit system, as has been done in other provinces. While general

legislation would be highly desirable, and amply justified, the most urgent immediate need would be met by making the permit system effective throughout a belt of from three to six miles wide, along the exterior boundaries of the forest reserves. It is already effective within the reserves, under Dominion legislation, but action by the provinces is needed to provide for the situation on the outside.—C.L.

Scientific Research

Application of Science to Industry—Co-operation Necessary for Best Results

Modern industry to be successful must be based on scientific research. In Canada practically no attention has been paid to the ad-

dentships and fellowships. A recent report published by this committee points out that the Government had already embarked upon an organized scheme for the scientific support of British trade and industries as early as 1900, when the National Physical Laboratory was established with the assistance of a Treasury grant. This institution was established to bring scientific knowledge to bear practically upon every-day industrial and commercial life. This initial step in the right direction was followed by grants to such bodies as the Engineering Standards Committee, the Imperial Institute and, more recently, the Imperial College of Science and Technology.

It is intended that the Advisory Council shall form a permanent organization to promote industrial and scientific research throughout the kingdom, and organize the weapons of industry just as the Government has already organized the weapons of warfare. The Council will undertake a campaign of education to impress on manufacturers the benefits to be derived from scientific research.

To secure the closer co-operation of manufacturers, but not overlooking the great importance of pure science in solving the practical problems of industry, the Council will attack first purely industrial problems, the practical bearing of which can be appreciated by all.—W. J. D.



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Settler clearing land near Nottaway in the Clay Belt of Northern Quebec. Both timber and soil are highly inflammable during periods of drought, and the greatest care must be exercised in the use of fire for clearing operations, to avoid the danger of such holocausts as occurred in July in similar territory in Northern Ontario. The permit system of regulating settlers' fires will, if properly enforced, furnish the necessary degree of protection.

THE FARM HOME

A time will come when enlightened farmers will realize that the farm household is the source of all energy, enterprise and intelligence that makes farming a success and life on the farm possible. It is the indefatigable farmer's wife that makes the farm home; altogether too often she makes it a real home in spite of her husband rather than as a result of his co-operation with her. He, to his shame be it said, too often has by far a greater appreciation for hogs, cattle, grain and hay and their proper housing and care than the equipment and environments that make practicable the proper rearing of his own children. Yet he will complain that the young people will not stay on the farm.—American Lumberman.

vantages of scientific research and many business men fail to appreciate its commercial advantages. Since the war, however, several of the largest corporations in Canada have taken up this work in their own interests. It is natural that some will be unwilling to disclose the results of their investigations, but to achieve the greatest success, such as Germany obtained before the war, there must be complete co-operation amongst all manufacturers and the Government so as to eliminate overlapping of effort and work for the benefit of the common good.

In 1915, Great Britain appointed an Advisory Council for the three-fold purpose of instituting scientific researches, establishing or developing institutions for the scientific study of industrial problems, and for the institution of research stu-

FIRE PAIL PROTECTION

Useful articles to have on the farm are buckets of water properly distributed around the barn. Fire buckets, with rounded bottoms, which, on account of their shape are inconvenient for general use, can be placed in a round hole cut in a shelf or bench; they should be covered and inspected regularly to assure their being kept full. To prevent freezing two pounds of fused calcium chloride per pail may be used. The buckets should be painted red so that they will be more conspicuous, a constant reminder of the danger of fire.

Hang up the lantern while working in barn or stable. Many barns are burned by lanterns being knocked over and starting fires.

Improvement of Game Laws

Prohibition of the Sale of Game by Several Provinces

That the trend of game protective legislation throughout Canada is distinctly toward restricting, and ultimately prohibiting the operations of market hunters, is clearly manifested by recent amendments to the game laws of Ontario, Manitoba and Saskatchewan. In Ontario the sale of water-fowl and of quail, partridge, woodcock and snipe is prohibited until the autumn of 1917. Manitoba and Saskatchewan have gone much farther and the effect of their present laws is to prohibit the open sale of practically all game in any season of the year.

The market hunter is the recognized guerrilla of destruction with regard to wild life, and the traffic in dead game is responsible for at least three-quarters of the slaughter that has reduced the game birds of North America to a mere remnant of their former abundance. Nearly all the provinces of Canada have placed restrictions upon the market gunner, by prohibiting the sale of game entirely, or during certain seasons. Unfortunately, in most instances, such laws have been enacted only as an extreme resort to protect depleted species from virtual extinction. In view of the disastrous and inevitable results of allowing the market hunter to carry on his destructive occupation, the logical procedure is to anticipate and prevent the result by prohibiting market gunning before it has succeeded in reducing our splendid resources of wild life to the verge of extinction.

New Brunswick Forest Survey

P. Z. Coverhill, who is in charge of the forest survey of New Brunswick Crown lands, reports that about 250,000 acres of forest land have been surveyed to date. In addition to a cruise of the timber, the soil is being classified, to facilitate the segregation and opening to settlement of areas chiefly valuable for agriculture. Tracts in the vicinity of existing settlements are being surveyed first, to expedite settlement as much as possible. While considerable areas suitable for farming have been examined, it has been found that the vast majority of the lands still remaining in the Crown are non-agricultural and chiefly valuable for the production of timber. Since the forest revenues of New Brunswick's Crown timber lands amount to an annual total to the province of about \$500,000, the importance of conserving this resource is becoming fully appreciated.—C.L.

Care of Garbage

Householders Can Materially Assist in Keeping Their Home Town Clean

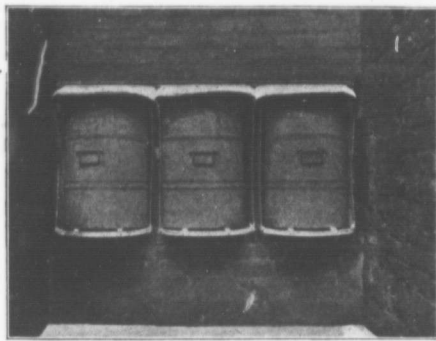
The care and disposal of waste and kitchen refuse is of the utmost importance in the general health policy of Canadian cities, at all seasons of the year, but winter conditions render the work more difficult than at other times. The

illustrations herewith present a vivid contrast in care of garbage cans. In the first picture neglect is supreme; collection of garbage has been delayed, cans are overflowing, and are in damaged condition, the absence of lids allowing dogs and other animals to scatter the refuse on the ground.

The second illustration shows an almost ideal condition. The cans are elevated from the ground, out of reach of dogs and cats; they are provided with a shelter roof to



Garbage cans in an insanitary condition and showing every indication of carelessness and neglect. Cut 145



Garbage cans in perfect condition. Elevated above rain splash, and animals. Can be operated in winter. Cut 146

periodical snowfall, by concealing all trace of scattered refuse, greatly assists the citizen of careless habit. When the warm sunshine of spring removes the covering of snow, and lays bare the accumulation of rubbish, we will have the usual demand for clean-up day that the surroundings may again be put in such condition as not to offend the senses—and a clean-up day wholly rendered necessary by the careless creation of insanitary conditions.

The householder can assist the municipal scavenging department greatly by burning dry refuse in the kitchen stove or furnace. A large portion of the refuse thrown into lanes or yards and scattered by the wind would be thus destroyed.

Garbage cans, and the condition in which they are kept, are a fruitful source of complaint. The

exclude rain and snow, and will in this way give much longer service. Kitchen waste should be thoroughly drained of liquid and be wrapped in paper before being deposited in the garbage can; otherwise it will freeze in a solid mass, requiring considerable force for its removal, greatly to the detriment of the can.

Farm implements should be placed under cover before the snow covers them. They are then ready to be overhauled and prepared for spring work during the winter months, when work on the farm is not pressing.

The land roller is very useful in winter for making roadways and paths through the snow.

Looking to the Future

Many Pulp and Paper Companies are Re-foresting Cut-over Lands

The Riordon Pulp and Paper Co. is making plans for forest planting on cut-over portions of its timber limits in the province of Quebec. During 1917, about 400,000 seedlings of forest species will be planted. A forest nursery is also to be developed, the capacity of which will be 1,000,000 small trees each year for planting on the holdings of the company. A. C. Volkmar is the forester in charge of this work, with headquarters at St. Jovite, P.Q. In addition to the nursery and planting work, information is being collected systematically with regard to the amount of growth which is taking place on the Company's property. It is obvious that this information is very important in connection with the preparation of plans for the permanent handling of a large area of forest land, on the basis of perpetual operation. The investment involved in the erection of a pulp and paper mill is so great that a company of this kind must look far into the future, in figuring on its sources of timber supplies.

The Laurentide Co. and the Pejepsoot Paper Co. have already made considerable progress in forest planting on their lands in Quebec, with a view to the future production of timber for the manufacture of pulp and paper. The Laurentide Co. is the pioneer in this direction, its forestry work having for years been managed by Ellwood Wilson. The forestry and planting work for the Pejepsoot Co. are being directed by J. E. Rothery.—C.L.

Barn Fires in Ontario

Heavy Losses to Farmers Due to Spontaneous Combustion

During the past few weeks, Ontario farmers have been seriously alarmed by the number of barn fires occurring throughout the Province. In the months of August and September, 124 such fires were reported, involving a loss estimated to exceed \$300,000. Many of the fires were reported to be due to spontaneous combustion, and to determine the exact circumstances surrounding these, the Provincial Fire Marshall undertook a special investigation in Lambton county, where many of the fires occurred.

As a result of inspections and investigations made by Deputy Fire Marshal S. H. Dickie, of Toronto, it was found that fully fifty per cent of the fires were due to spontaneous combustion, as a result of farmers putting hay and grain in the barns while wet and storing in such quantities that the excessive heat has resulted in fires.

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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OTTAWA, NOVEMBER, 1916

Aeroplanes in Forest Protection

The recent announcement that \$1,000,000 will be spent by the Dominion Government in the construction of an aeroplane factory, probably at Toronto, lends special interest to the report that the proposed aeroplane station to be established by the United States Government at Duluth, Minnesota, will be made the basis of an aero forest fire patrol system. The state forester of Wisconsin has already secured excellent results from the use of an aeroplane for the patrol of a large area of forest in the northern part of the state, and it is expected that similar good results will be secured in Minnesota, from the co-operative arrangement which has been approved by the commander of the Minnesota Naval Militia. The main object of this patrol will, of course, be the prompt discovery and location of forest fires. If a fire is discovered, the telephone system which has been installed will enable the forest rangers to be notified immediately and they can promptly take all necessary steps for its extinguishment. State Forester Cox of Minnesota estimates that the installation of an air patrol would save the state at least \$45,000 annually.

In view of the great importance of Ontario as a timber-producing province, and of the enormous damage that has resulted in the past from forest fires, it is to be hoped that some co-operative arrangement may be possible, in connection with the testing of machines and training of men, whereby a thorough test may be made of the practicability of using aeroplanes for forest fire patrol, under Canadian conditions. If such use is practicable in Wisconsin and Minnesota, it should be equally efficient and economical over very large areas in Canada.—C.L.

Bird Food Shelters

Their Provision Encourages the Birds to Remain With Us

In the cold and gloomy days of winter what is more cheering than watching the birds outside, as they flutter to and fro in search of food and shelter? Their presence is a distinct pleasure to humanity and should be reciprocated.

One of the best means of attracting birds about our homes in the winter is to furnish them with food, preferably in food shelters. If

Developments in Electric Heating

The use of hydro-electric energy for heating dwellings is progressing very rapidly, and its more universal use is destined to follow very closely the "cooking by wire." This seems particularly true for our two largest provinces, Ontario and Quebec, where nature has compensated the absence of coal with a most generous supply of water powers.

The latest development in connection with this mode of heating dwellings is not a new idea but

uniform temperature, and, for comfort, less heat is required with steady heat than with intermittent heat. Considerable economy of heat is gained by covering the basement pipes, and especially the storage tank, with heat insulation at least 2 inches thick.

The comparative cost of this method of heating is fairly well established, and, while it is only economically feasible where specially low rates are offered for limited hours service, there are probably many who are willing to pay the extra cost on account of the greater convenience, sanitation and cleanliness of electric heating.

While electric heat will probably never replace the more familiar forms entirely, there is no doubt there will be a great development in localities having good water powers.—L.G.D.

Railway Forest Protection

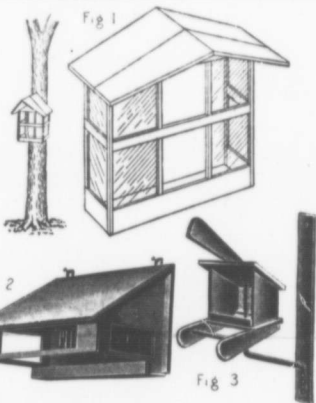
Extensive Equipment being Provided for Forest Fire Fighting

The use of mechanical equipment for the extinguishing of forest fires is steadily gaining ground, with correspondingly good results in both efficiency and economy. A recent development in this direction is the increased use by the Canadian Pacific railway of tank cars for the protection from forest fires of the territory immediately adjacent to its lines.

This company, having previously secured excellent results from the use of tank cars on its lines in Maine, has now extended this method of protection to include a portion of the Muskoka district in Ontario. Two tank cars, comprising a single unit, have recently been placed at MacTier, Ontario, for use between Pickering and Coldwater junction, a distance of 116 miles. On one of these cars is a pump and on the other a hose rack. Each car carries also a tank holding 7,000 gallons of water. The pump has a capacity of 400 gallons per minute. A total of 4,000 feet of 2½-inch hose is supplied, that fires may be reached at a considerable distance from the track, if necessary.

While the primary object of such equipment is the suppression of fires caused by the railways and for the protection of company property, great service has been rendered in controlling fires coming in from the outside.

Other Canadian lines making similar use of tank cars for fire-fighting purposes are the Grand Trunk, Timiskaming and Northern Ontario and the Canadian Government railways. It is reported that the use of one of the tank cars on the Timiskaming and Northern Ontario railway, during the great fire of July 29 and 30, was the direct means of saving the greater portion of the village of Porquus Junction from total destruction.—C.L.



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BIRD FEEDING SHELTERS

Three of many designs which may be made by amateurs for the use of birds during the winter months.

shelters cannot be provided, however, the food may be fastened to trees or scattered in sheltered places on the ground. The advantage of having shelters, aside from protecting the food from being blown away or covered with snow, is that they may be placed where the birds can be watched conveniently.

There are numerous designs of food shelters that will induce the birds to enter and that will protect the food from the weather. To overcome the natural suspicion of traps, it may be necessary to attach food to the outside of the closed-in shelters before they will enter. If the sides are made of glass, however, the food will be visible and the birds will enter to feed.

The accompanying illustrations show two designs of simple construction. In Figure 2 the food is protected in the bin by an overhanging roof. Figure 3 is made to revolve with the wind, so that the food is always protected. Figure 1 shows a more elaborate feeding box, closed in with glass, except for a panel on the back for attaching to a tree or post.

This provision of bird shelters

simply the application of the well known principle of using electric energy at times during the day when it is not required in large quantities for other purposes such as lighting, etc., in other words making it an "off peak" load, thus allowing a material reduction in the rates paid for the energy used.

To make electric heating an off-peak load, some heat storage is necessary. Electric heaters can be used with hot water, steam, hot-air, or direct heating, or with any combination of these methods.

Experiments were recently made in Seattle, Wash., to illustrate and test the possibilities of electric heating.

These experiments demonstrate that the hot-water heating system with ample storage tank presents the most advantages for use with electric heaters. This is due to the fact that the heat storage keeps a

gives an opportunity for boys in manual training classes or Boy Scouts to exercise their ingenuity, while at the same time "doing a good turn" for their feathered friends.

High Cost of Impure Water

Its Toll in Disease and Death Represents an Enormous Sum

A recent report by George A. Johnson, water supply expert, expounds some very interesting facts respecting water filtration. The great benefits and, in many cases, the urgent necessity of filtering the water supplied to communities is clearly recognized, but its vital importance can only be realized by a thorough investigation, supported by the convincing data contained in this paper.

The figures given are for the United States, but with due regard to proportion, apply with equal force to Canada.

Mr. Johnson states that if the urban population of the United States were supplied with filtered or equally pure water 3,000 lives would be saved annually and 45,000 cases of typhoid fever prevented, representing in vital capital some \$22,500,000 annually, or the interest on an investment of \$375,000,000. In the United States an urban population of 30,000,000 persons is still supplied with unfiltered water; the cost of supplying filtered water to these, including fixed charges and operation of plants, would not be more than \$12,000,000 per year, or about one-half the present annual loss in vital capital due to non-filtration.

Twenty-million people are now being supplied with filtered water at a cost not exceeding \$8,000,000 or 40 cents per capita per year, and the results of water purification always show a big balance on the right side of the ledger.

In the United States, 300,000 persons suffer annually from typhoid fever and 20,000 die of it. Valuing the human lives lost at \$3,600 each, and, allowing for lost wages and medical attention \$200 for each case of the disease, the annual toll from typhoid alone amounts to \$130,000,000.

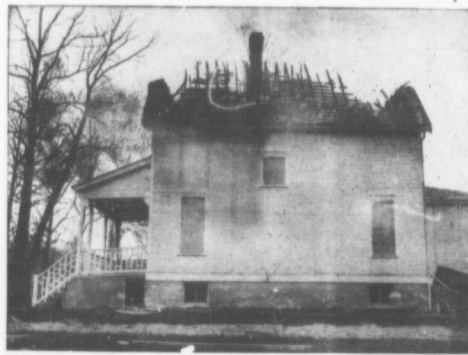
Woodpeckers as Insect Destroyers

A Canadian bank manager recently boasted that he had shot seven woodpeckers in succession in his orchard, evidently under the impression that he was performing an exceedingly meritorious service to the community. He was destroying one of our most active insectivorous birds and, though keenly interested in the conservation of his trees and of our forests, he was destroying a most useful ally in their preservation. Boring insects are deadly pests of trees and woodpeckers are their special

enemies, as they are able to reach these pests so secure from other enemies. No birds are more useful in the protection of our forests.

With the exception of the Sapsuckers, our woodpeckers rarely attack healthy trees and are among the most beneficial of our insect-destroying birds. The Yellow-bellied Sapsucker has a black patch on its breast, while the top of the head from the base of the bill is red. These marks distinguish it from all other woodpeckers. It girdles the trees with holes in securing the sap which forms part of its food.

The different species of woodpeckers are the most important enemies of the bark-beetles and timber-boring beetles, these being



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STARTED FROM THE CHIMNEY. IS YOUR HOME SAFE?

the chief enemies of our forest and other trees. About seventy-five per cent of their total food is animal food and this consists chiefly of insects, among which the wood-boring beetles predominate. The Common Flicker is a great destroyer of ants, particularly on lawns, as many as 5,000 ants having been found in the stomach of a single bird. The little Downy Woodpecker and Flicker should be encouraged to come into gardens. They will readily accept nesting-boxes and the encouragement of these birds is the best insurance policy that the tree-lover can take out.

For building bungalows and cabins in the woods, it is sometimes desirable to use logs with the bark attached. By cutting the logs in the fall or winter, they will be found to have the bark most closely adhered. Bark peels most readily during the spring and early summer season, when the trees make their most rapid growth. At that time the cambium, the soft, tender layer between the bark and the wood, is most active, and facilitates the separation of the bark from the wood.

Is Your Home Safe?

Many of Canada's Fires are in Dwelling Houses

The fire record for 1915 shows that of 1,625 fires reported, 676 were in the homes of our people. The great majority of these dwelling house fires occur at night, when the lives of the occupants are endangered.

From the 676 homes the greater portion of the families were turned out at night, in wintry weather. In these fires 141 lives were lost.

The chief causes of these home fires are: Carelessness in allowing defective chimneys to exist; carelessness in the overheating of stoves and furnaces; carelessness

in using; but a pail of sand, earth, ashes, or even coal, will be very helpful. If a fireplace connects with the chimney, the latter material is not desirable to use, since they are liable to scatter the burning soot into the room where the fireplace is located.

Cooking Vegetables

Loss of Valuable Ingredients Through Wrong Methods

While boiling vegetables the nutrients soluble in water may be dissolved out and lost. The nutrients liable to be lost include protein compounds, mineral constituents, and sugars. The Minnesota and Connecticut Experiment Stations have conducted interesting experiments in connection with this subject. The first experiments were made with potatoes, which were boiled under different conditions, and the loss determined. When the potatoes were peeled and soaked for several hours before boiling, the loss amounted to 52 per cent of the total nitrogenous matter and 38 per cent of the mineral substance; when the potatoes were peeled and put into cold water, which was then brought to the boiling point as soon as possible, the loss amounted to about 16 per cent of the nitrogenous matter or protein and 19 per cent of the mineral matter; potatoes peeled and placed at once into boiling water lost only about 8 per cent of the nitrogenous matter, although the loss of mineral matter was about the same as in the preceding case; when, however, potatoes were cooked with the skins on, there was but a trifling loss of matter, either nitrogenous or mineral. In the baking of potatoes there is practically no loss other than the very little which may escape in the moisture given off.

To obtain the highest food value, potatoes should not be peeled. When peeled, there is least loss by putting directly into hot water and boiling quickly. Even then the loss is considerable. When potatoes are peeled and soaked in cold water the loss is very great.

It has also been found that considerable losses occur in the boiling of other vegetables such as carrots, beets and parsnips. The loss in the mineral matter is serious, as vegetables furnish mineral materials from which teeth and bone are formed. Vegetables should be boiled in large pieces and in as small a quantity of water as possible.

To prevent the serious loss which occurs when the water in which vegetables have been boiled is thrown out, the water should be boiled down and used in the making of the sauces which are to be served with the vegetables.—F.C.N.

in the use of matches; carelessness in many other ways.

Before winter weather sets in, the householders should see that the heating equipment is fire-safe, that there are no cracks in the chimney to allow sparks to enter the attic; that furnace pipes are thoroughly clean and at a safe distance from woodwork; that stoves, ranges and stovepipes are in safe condition and all surrounding woodwork protected, and that lamps and lanterns are in good condition.

Carelessness with matches caused 69 fires last year; overheated stoves and furnaces, 51; defective and overheated chimneys, pipes, etc., 62; electrical defects, 55. These causes are all easily avoided and should be guarded against in future.

Homes should be made reasonably fireproof by taking the simplest necessary precautions. Safety First is as essential in the home as at work.

CHIMNEY FIRES

For a chimney fire a few pounds of salt thrown in at the top is probably the best handy ex-