

AGRICULTURE

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Conservation

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VOL. VI.

JANUARY, 1917

No. 1

Hydraulic Resources and Industry

Electro-Chemical Processes Applicable to Many Manufactures

In estimating the value of Canada's hydraulic resources and their importance with reference to future industrial development, the extent to which electro-chemical processes have entered into some phases, at least, of nearly every branch of our industrial life is not generally appreciated.

A small beginning in electroplating, two generations ago, has evolved until the great bulk of the copper output of the world is electrolytically refined. The electrolysis of common salt is the basis of the electrolytic alkali industry, the products of which are caustic soda, metallic sodium, chlorates, and hypochlorites. The electric industry has created a host of new industries, producing chiefly abrasives, graphite, silicon, ferro-alloys, lined steel, phosphorus and calcium carbide. It has also been studied experimentally as a constituent of the combustion furnace in the metallurgy of many metals.

Used as an electrolytic furnace, it has the very important application to the production of aluminum. The industrial use of electric discharges through gases is still in its infancy, but we have ozone and trichloric acid among the products, the former used for sterilization, and the latter as a basis for fertilizers and explosives.

Every one of these industries consumes large quantities of energy. Whereas the refining of lead requires only 120 k.w.h. per ton, we have consumptions as high as 4,000 w.h. per ton for other metals. An aluminum furnace requires 600 k.w.h. per ton of product.

The electro-chemical industries we grow to be of great value to countries which possess good opportunities in water power resources, as they have a fundamental interest in the development of cheap power.—L.G.D.

Some Fire Results

Fires in Different Classes of Buildings and Exposure Fires

A report of a committee of the National Board of Fire Underwriters, the recognized fire insurance organization of the United States, contains interesting and instructive information regarding fire losses in that country. As Canadian fire and building conditions are similar to those on the other side of the border, these figures would apply equally to Canada.

Returns of fire losses are given by 351 cities of 20,000 population

Dry Sprinklers

A Cheap and Effective Fire Protection for Basements

At the annual convention of the Dominion Fire Chiefs Association, held at Ottawa in 1915, a demonstration was given of a dry sprinkler system for basements. Under this system, the expense of installing a water supply is saved. The same water pipes with sprinkler heads are required as for an ordinary system, with the supply pipe leading to the outside of the building. On the occurrence of a fire in the cellar or basement, the

Utilization of Waste Lumber

Should be Made Available for Manual Training Graduates and Others

One of the serious wastes of saw and planing mills is the short lengths of lumber and narrow strips ripped from the edges of the larger material. It is customary to sell this for firewood, or burn it in refuse burners. This is only one side of the waste.

In practically all the cities and towns of Canada for some years manual training has been taught in the schools. Thus, thousands of former pupils, now with homes of their own, are more or less capable of following up the teaching of their youth by producing the numerous articles which help to give that homelike touch to homes, and which are useful as well as ornamental.

The manual training graduate has found, however, that his ambition to make things is seriously handicapped by the difficulty and cost of securing the necessary material. To obtain short pieces of different dimensions he must either buy the entire board of each size and have them delivered, or he must have the pieces cut to the sizes required and practically pay the price of the full length material.

This condition has discouraged the amateur cabinet-maker from applying his training. What would have developed into a hobby with many boys has been neglected, their instruction has been forgotten, the homes are bare of many novelties and much time which might be profitably employed is wasted.

Between the supply and the consumer of these short lengths of lumber is a gap which it is possible to bridge, and some means should be found by which the small pieces could be used and the consumer obtain them at a moderate price.

It is cheaper to be reasonably careful than to pay out hard-earned money in hospital and medical charges.

Annual Meetings

Commission of Conservation, Tuesday and Wednesday, January 16 and 17.

Canadian Society of Forest Engineers, Tuesday evening, January 16.

Canadian Forestry Association, Monday, January 15.

Civic Improvement League for Canada, Meeting of Dominion Council, Thursday, January 18.

and over. Of these, 86 cities separate their buildings into two classes: (1) brick and stone, and (2) frame. In these 86 cities there was a total of 708,922 brick and stone buildings, with 11,031 fires, a percentage of 1.556; the frame buildings numbered 1,302,707, with 16,250 fires, a percentage of 1.247.

The number of fires reported by the 351 cities was 101,629, with 3,556 communicated fires, 2,988 extending to adjoining buildings and 568 extending beyond. Of the fires 3.5 per cent spread beyond the building in which the fire originated.

The total fire loss of the 351 cities was \$74,143,166, and the reported loss by exposure fires \$2,989,509—or 4 per cent.

So intense is the New York city problem that Police Commissioner Woods proposes closing one hundred streets at certain hours of the day. In these improvised playgrounds the children can at least enjoy their games safe from the accidents and dangers of traffic.

sprinkler head is opened by the heat, the firemen connect a hose to the supply pipe and the seat of the fire is immediately reached. Fires in basements are usually hard to cope with, as the smoke renders it difficult for firemen to enter to locate the fire. In many cases, therefore, the firemen are compelled to fight it through holes cut in the floor, and much water damage results. Many recent fires might have been extinguished had cellar sprinklers been provided. The cost is reasonable and is soon repaid by the saving in insurance premiums.

PNEUMONIA

To guard against pneumonia, which is prevalent at this season of the year, keep yourself in the best physical condition, get all the fresh air you can, and keep your homes well ventilated. If you become overheated at your work, take ample time to cool off gradually before going out in severe weather. Be careful of contracting any chill, especially at this time of the year.

Farm and Dairy Ice Houses

Essential to Comfort and Health During the Summer

One of Canada's abundant natural resources is our annual crop of ice. The value of the ice harvest is not usually appreciated. This is probably due, largely, to the fact that at the time ice is plentiful it is not required for immediate needs. With many of those who should be most interested, it is the old story of letting the future take care of itself, with the result that in periods of excessive heat, such as were experienced last summer, large quantities of meats,

amidst of her household cares, endeavouring to make the farm home a real home for her family, the farmer's wife is entitled to this little attention on the part of those she is trying to make comfortable.

There are few localities in Canada where a supply of ice cannot be obtained during the winter months. In most cases, farmers, either by themselves or co-operatively, are able to harvest and store it. The wonder is, then, that any farmer or dairyman would be without a supply.

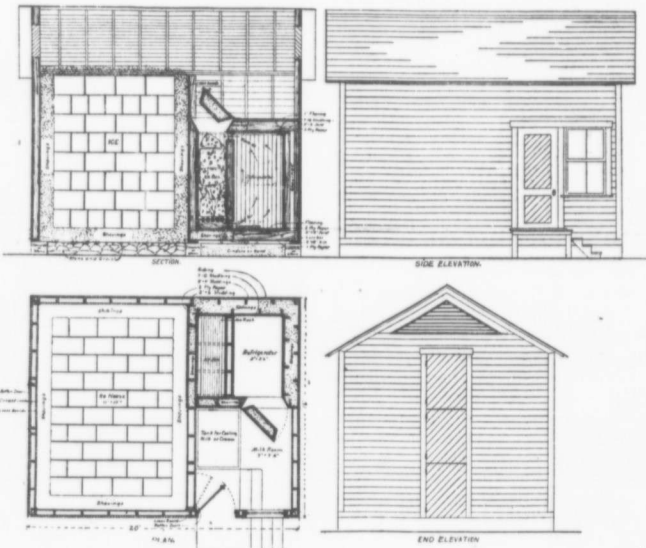
To preserve a domestic supply of ice is a simple matter. An unoccupied corner of an outbuilding may be utilized, by enclosing the necessary space with rough boards. About 40 cubic feet of space should be allowed per ton of ice. If the soil is porous, no provision need

fresh meat and other requirements at hand, when, without his ice supply, his family might be forced to depend upon the smoked and pickled varieties for the table during the hot weather.

Full particulars and details of construction of this ice house and others may be secured from Bulletin 35, Dairy and Cold Storage Series, Department of Agriculture, Ottawa. The Dairy and Cold Storage Commissioner will also supply blue prints free on application.

As an index to the amount of ice required, the following figures may be quoted:

A cubic foot of ice weighs 57½ pounds. One ton of solid ice measures, approximately, 35 cubic feet. A consumption of two cubic feet (115 pounds) per day for four months would amount to nearly



Cut No. 130

A well-built Ice House, combining ice storage, milk room and refrigerator

dairy products and other foods spoil for the want of ice.

To the farmer, ice is almost a necessity in the summer. Exposed in the fields, to the heat, he finds a cool drink invigorating and refreshing. To his horses, panting from exertion and heat, a piece of ice applied to the head not only revivifies them, but may be the means of saving their lives.

In the farm home there is nothing more invigorating than the cool dishes which may be provided with the assistance of an ice supply. One of the attractions of the city to the rural young in the warm weather is this ability to secure these cooling delicacies. In the

made for drainage. If it is impervious clay, it should be underdrained. The earth should be covered with six inches of broken stone, cinders or gravel, on which spread about a foot of planing-mill shavings. Between the walls and ice should be placed at least a foot of shavings or sawdust, and the ice should be covered with a foot of the same material.

The illustration shown herewith is of a more pretentious ice house, with built-in refrigerator and milk room. This has the advantage of providing every facility for the care of dairy products as well as the food supplies of the household, enabling the farmer to have his

seven tons. Allowing for the waste when such a comparatively small body of ice is stored, a building 10 feet square and 10 feet high will afford ample space for that quantity of ice if it is carefully packed.

Fifty pounds per day for four months would amount to three tons. Allowing for waste, a solid block of ice six feet square and six feet high should be sufficient if properly stored.

For the purpose of estimating the weight of ice roughly by the number of blocks, the following table will be found convenient:

12 blocks 18 x 36 inches, 8 inches thick—1 ton.

Protecting Our Community Watersheds

Water Supplies for Municipalities Must Be Kept Free of Pollution

Recently compiled statistics respecting Canadian waterworks show that many of our systems are supplied by gravity from distant sources, thus minimizing the danger of pollution. The number of such systems is rapidly growing, as well as their importance, over 100 of them are in use in the Dominion, including those of many large cities from Halifax to Vancouver. The necessity of properly protecting against both pollution and deforestation of the watersheds upon which these systems depend cannot be too strongly urged.

In this connection, the example of Newark, N.J., is unique. The city now owns in fee simple some 62 per cent of the 63 square miles of the watersheds from which its supply is drawn, and in the course of a few years will probably own the whole area. This case is hardly parallel to that of Seattle or other far western cities which own all or large portions of the watersheds of their municipal water supplies, for the impounding reservoirs of those cities are comparatively unpopulated areas while Newark's reservoirs are within a 30 mile radius of New York city.

Experience indicates the practical impossibility of enforcing legislation and regulations upon an indifferent public, and the only feasible method of protecting watersheds is complete control and exclusion from settlement. In Canada, most of these watersheds are yet unpopulated and immediate action would avoid future complication.

Scientific forestry has been conducted with great success on some of these reservations in the United States. With many municipalities waterworks departments, forest to the U.S. has become an important access while a private company, supplying water to Nashua, N.H., has demonstrated complete success on a 1,000-acre tract, which is a yielding considerable profits and will continue to do so indefinitely.—L.G.D.

10 blocks 18 x 36 inches, 10 inch thick—1 ton.
8 blocks 18 x 36 inches, 12 inch thick—1 ton.
7 blocks 18 x 36 inches, 14 inch thick—1 ton.
6 blocks 18 x 36 inches, 16 inch thick—1 ton.
5 blocks 18 x 36 inches, 20 inch thick—1 ton.

Our Commission of Conservation

CLIFFORD SIFTON, K.C.M.G.
Chairman
JAMES WHITE
Assistant to Chairman and Deputy Head

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, JANUARY, 1917

Drain on Our Pulpwood Supply

Prevent its Depletion, Protection from Fire and Re-planting are Necessary

The splendid progress that Canada is making toward becoming the world's centre for the manufacture of pulp and paper is indicated in figures recently published by the Department of Trade and Commerce. For the year ended July, 1916, the exports of paper amounted to \$21,678,868, of which 88 per cent went to the United States and 2 per cent to the United Kingdom. This total is an increase of 10 per cent over the figures for the previous year. The rate at which this business has grown in Canada will be appreciated when it is realized that the first export shipment of paper from Canada was made in 1852, amounting to a total of \$91,000 that year. The total exports in 1902 were but \$24,000, and for 1913 only \$6,327,000.

Of wood pulp, the exports for the year ended July 1916 were \$12,581,000, of which 87 per cent went to the United States and 7.2 per cent to the United Kingdom. The increase over 1915 was 40 per cent. In 1915, more than two-thirds of the pulp is exported by the United States is from Canada.

Similarly, the exports of pulp-wood amounted in the fiscal year ended July, 1916, to \$6,254,717, all of which went to the United States.

Taking the situation as a whole, the total exports of paper, pulp and wood for the fiscal year ended July, 1916, were \$40,865,266, of which the United States received 87 per cent and the United Kingdom 5 per cent. The increase over the previous year was 27 per cent. On the other hand, Canada imported, during the year ended July, 1916, \$6,327,298 worth of paper and manufactures of paper.

Of this, 69 per cent came from the United States and 12.4 per cent from the United Kingdom.

The foregoing facts, in conjunction with the use of Canadian pulp and paper mills of nearly \$9,500,000 worth of pulp wood, indicate the tremendous drain upon our pulp wood resources. This drain is likely to increase rather than diminish, in view of the rapid depletion of accessible supplies of timber suitable for pulp wood in the United States.

Canada has extensive resources of timber suitable for pulp wood, but they are by no means inexhaustible, and if this great source of national wealth is to be perpetuated, much more stringent measures than in the past must be taken to prevent destruction by fire and to ensure the restocking of valuable species of cut-over and burned-over areas.—C.L.

The Farmer's Home

Many Have not the Comforts the Occupants Could Provide

A letter from a farmer appeared in a recent issue of a farm paper. He asked whether farmers have not the right to remove to town to take life a little easier, and that their wives may have some of the conveniences and facilities that are not available on the farms. Surely, the farmer has as much right to all the modern household conveniences as has any person, and if his object in moving to town is to make life easy for his wife he is to be commended. But there are several phases of the subject that are not to be passed over so lightly, for the community has an interest in the matter that the retired farmer seems disposed to overlook entirely.

To begin at the beginning, the farmer has not made the most of his opportunities on his farm, or it would have all the facilities that are available to him in town. If he has reached the period of retirement with money enough to live on his income while availing himself of all the conveniences of the modern village or city, he surely has enough money to provide his farm house with heat, light, and water systems, to displace the old oil lamp, the woman-killing pump and the back-breaking coal stove and kitchen range. This would mean that in the kitchen would be found hot and cold water available at faucets, and a sink for dishwashing, and, in another part of the house or a detached building, laundry tubs, with power-operated washing machine, mangle and gas iron, power-operated cream separator and churn; and, in the house, a bathroom with lavatory and sanitary closet. All these he could place in the farm home for less cost than to buy or build and equip a home in the nearby village.—*American Lumberman.*

WEED ERADICATION

SOW THISTLE

In fighting sow thistle we must recognize that this weed spreads from both seeds and roots. We must, therefore, prevent the plant from producing seed, kill the perennial root stalk and sow absolutely clean seed grain if we are to control this terrible pest.

Various methods of attack have been advocated such as crowding out the weed by a persistent perennial, smothering the plant with tar paper, straw, manure, or by a



Cut No. 131
The Perennial Sow Thistle

quickly growing crop, and starving the plant by preventing it from forming green leaves. The crowding out method often fails because the thistle proves to be more persistent than the crop employed to displace it. The smothering plan succeeds on small patches, but is not practicable on large areas. Many authorities advocate the starvation plan or summer-fallow as, by far, the best for eradicating this troublesome weed.

Plough six to eight inches deep in the autumn, if possible, but if pressure of work prevents autumn ploughing, then plough the same depth about the middle of June. After a few days, begin the use of the duck-foot cultivator crosswise of the land and repeat whenever the tiniest shoots are ready to show, until the land freezes in autumn. Where the soil is a loose loam the land may not need plough-

ing and the cultivator can be used from the start.

Never allow the thistle to show even a leaf above the ground and by autumn it will be killed. The cultivation must be thorough.—F.C.N.

Canadian Fisheries

Food Production of and Need for Better Distribution Methods

The fish annually consumed in Canada is valued at approximately \$15,000,000 at points of production, but is estimated to cost the consuming public about \$45,000,000; in other words, the cost of distribution is twice as great as that of primary production. The foregoing is one of the most important conclusions resulting from a special investigation held last spring by the Marine and Fisheries Committee of the House of Commons into the discrepancy between the price of fish at the places of production and that charged on the interior markets.

It has long been recognized that Canada's fisheries are among the most fertile and extensive in the world. The per capita consumption of fish by Canadians, however, is extremely low, a fact which is explained by the failure, heretofore, to make the products of our fisheries available to the great centres of population at moderate cost. During the present century, there has been practically no increase in the actual food output of our fisheries, but in the same period the value of the annual production has advanced very rapidly. The increase in value from year to year has been commonly regarded as indicating increased production. In reality it has been almost, if not entirely, a matter of the rise in prices.

The committee which investigated the discrepancy of prices and the problem of securing better marketing facilities has emphasized, especially, the necessity for improved transportation service, and for education of the public with respect to the food values of fish. These steps are essential if the possession of fertile fisheries is to be of more substantial advantage to the Canadian people.

White Pine Blister Rust

Diagnosis of the Disease which Threatens our Pine Forests

During the last year those interested in the white pine of Canada and the United States have been greatly alarmed by the very serious outbreak of the white pine blister rust. This disease, which is due to a fungus similar to the wheat rust, has practically destroyed all the white pine and other five-leaved pines in Europe and is supposed to have been introduced into North America by the importation of infected nursery stock from Germany and Holland during the last six years.

For its full development and propagation, this fungus requires two hosts. The summer propagation takes place on the leaves of currants and gooseberries and the winter stage on the white pine. The currants and gooseberries are infected by spores produced on the white pine in the spring. The disease rapidly develops on the leaves of the currants, and, in about two weeks, the under sides of the leaves are covered with yellowish-orange pustules from which the summer spores are liberated. These spores are carried by the wind to other currant and gooseberry leaves and the repetition of this process several times during the summer results in the disease spreading rapidly over large areas. Toward autumn, slender hornlike growths in which a different kind of spore is produced appear on the under side of leaves. These spores are carried to the white pine where, upon germination, they penetrate the soft tissues at the base of the bundle of needles and develop in the inner bark of the branch. Here the fungus may grow for a year or more before showing any outward indication of its presence. Sooner or later, however, it produces a swelling in the infected parts, finally girdling the branches and causing all of the tree above the point of infection to die. Early in the spring, between the middle of April and the middle of June, small blisters appear on the swollen stems which, upon breaking, liberate the yellowish-orange spores enclosed. These infect the currants and gooseberries, but are incapable of transmitting the disease to other pines.

This habit of growth fortunately offers a means of combatting the disease through the elimination of the minor host. Although all the species of the currant family are subject to this disease, the black currant seems to be the most readily infected. The cost of destroying all plants of this family, aside from the loss to fruit-growers occasioned by this measure, would, of course, be large, but, in view of

Care of the Wood Lot

Its Proper Handling Would Provide a Permanent Fuel Supply for the Farm

Nearly ten per cent of the standing timber in the United States is included within farmers' woodlots, according to Government reports. While the percentage in Canada has not yet been determined, it is believed that it will fall below five per cent. Census statistics show that some 14,700,000 acres, or nearly six per cent of the farm lands of eastern Canada, are occupied by woodlots. According to the Dominion Forestry Branch, the average woodlot in Canada, under proper management, is capable of producing about three-quarters of a cord per acre per year. If they were all thus managed, the annual production of hardwood would be more than 10,000,000 cords, or over 5,000,000 feet board measure—a quantity twenty times as great as the whole hardwood cut in Canada in 1913.

Unfortunately the woodlot does not, as a rule, receive the attention to which its importance entitles it. Much preventable damage is caused by the grazing of live stock and by fires, both of which not only destroy young growth but injure the larger trees, in addition



Cut No. 132

An uncared for farm woodlot rapidly deteriorating. It is much too open and therefore grassy. The trees are decaying and dying long before they reach maturity

to causing deterioration of the soil, thus seriously reducing the productive capacity of the woodlot.

According to studies made by the Dominion Forestry Branch, the typical woodlot of to-day does not contain the quality of material that it might, had it not been neglected. The careless removal of the sound and vigorous trees of the better species, and the leaving of over-mature and decaying ones as well as the inferior kinds, has resulted in its present poor composition. Inferior species are occupying space that should be growing more desirable trees. Poplar, willow, hawthorn, ironwood, hemlock and juniper have taken the place of maple, ash, hickory, elm and pine. Old trees, long over-mature, have been left standing, though their wide-spreading tops shut out the light from younger trees and prevent their proper development.

Such undesirable conditions should be changed and all future cuttings should be directed with this object in view. Unsound, crooked, broken and dead trees should be removed. They are merely acting as a breeding place for the organisms of decay which from them may be transmitted to the sound trees. All inferior species which are acting as seed trees or interfering with the growth of better species, should be cut.

It is not advisable, however, to remove such "weed trees" where they are necessary for the protection of the soil and where their removal would permit grass and brambles to establish themselves. The appearance of grass is a sign that no more cutting should be done until it has been shaded out.

the value of the white pine in Canada, every effort should be exerted to save from destruction such a valuable asset as our white pine forests.

Unfortunately, the wild currant and the wild gooseberry act as minor hosts, hence the grave danger threatening our forests far

from settled regions where the cultivated varieties perform the part of middleman.

If our white pine is to be saved, prompt and vigorous measures must be adopted by the governments and the co-operation of lumbermen, horticulturists and foresters secured to combat this blight.

CLEAN SEED

Very few farmers put their through the fanning mill a time or two, but quite a number do once or twice. A great many do not clean their seed at all, not at all necessary to buy seed; in fact, it is more advisable for a farmer to use the seed dug on his own farm and properly clean the weed seeds out. New Brunswick, I was once going along the road close to where a man was sowing. I hid my hand first into a stream cloth and then into the bag of seed. When I took my hand out it was covered with weed seeds, showing that the man had not cleaned his seed at all. One of the best ways for preventing the spread of weed is to clean the seed thoroughly. F. C. Nunnick, at Seventh Annual Meeting of Commission of Conservation.

RUSSIAN FUR PRICES

The trade at the Nizhny Novgorod, Russia, fur fair, held November last, was not as extensive as usual, owing to war conditions. The offers of fur skins were reduced as the manufacturers were unable to secure sufficient men for dressing the skins. Consequently the furs offered at fair brought high prices.

Prices for fox skins (converted into Canadian money) were as follows: silver fox, \$155.00 to \$200.00; blue fox, \$26.75 to \$29.00; cross fox, \$15.50 to \$25.75.

The low prices offered for Russian lamb last year caused skins to sell well this year, as the stocks having become exhausted, prices were much higher. About 2,500 hales were sold, ranging from \$51.50 to \$97.85 per skins.

OUR NEED

What we chiefly need is to help the poor farmer, and the man who has the poor land, how he can treat that land to make it more productive and advance his own interests. If something could be done in the case of the poorer land, I am sure it would accomplish more good. I would like very much to see something in the line of experimental stations, applied to the poor land, to see what the result would be.—Hon. A. E. A. at Seventh Annual Meeting of Commission of Conservation.

Fire Commissioner Adams of New York city, in his annual report for 1915, says that the city continues to hold first place because of fires. Of a total of 11,000 fires in buildings, 8,960 were homes and 2,495 in other buildings. The remedy for this is obviously greater care in the home.