Conservation

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Natural Gas

Its Fuel and Power Efficiency—Where it is Found in Canada—Lessons to be Learned from United States—Waste Should be Prevented by Legislation.

Natural gas has many advantages as fuel and as a source of power. It is cheap, efficient, clean, and it is easily transported for use in the vicinity of the fields. By reason of its unstable and fugitive nature however, it has frequently been recklessly wasted, both in Canada and the United States.

The most valuable uses for natural gas are for the development of power and for domestic purposes. It is estimated that with gas at 12 cents per thousand, electric power can be developed as cheaply as it can be generated by water power at Niagara. In Canada, the producing gas wells are situated in the counties of Welland, Haldimand, Norfolk, Kent, Essex, Bruce and Brant, in Ontario; at Moncton, N.B and at Medicine Hat and vicinity; in Alberta. The cost of this gas, as sold, varies from ten to forty cents per one thousand cubic feet in Ontario, to about five cents per one thousand cubic feet (in quantity) in Alberta. It follows, therefore, that electric power can be generated in a portion of Alberta at one-half the cost at Niagara.

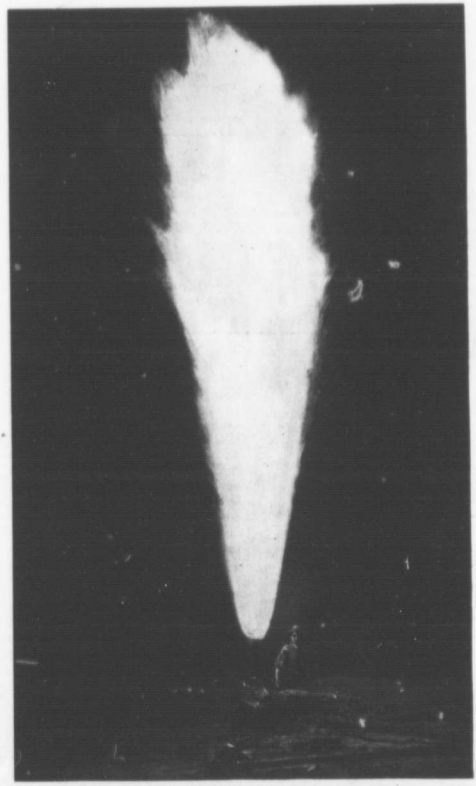
The history of the natural gas in Canada has been similar to that in the United States. In both countries, its discovery has, in nearly every case, been incidental to the search for oil and has been at first regarded as a nuisance by the oil driller. For many years in the exploitation of the great Appalachian oil fields in Pennsylvania and West Virginia, it was permitted to go to waste until its enormous industrial value was discovered. Now, however, the gas is used to furnish fuel and power to the many industrial establishments of Western Pennsylvania and Eastern Ohio. In 1885-6 the great gas fields of Ohio and Indiana were discovered, and the same disgraceful history was repeated. A few years later the Kansas-Oklahoma fields were discovered, and there the same history was, in a measure, repeated, although the value of the gas was more promptly appreciated and the industrial development was correspondingly more rapid.

Let us see what the history has been in Canada, and note what should be done in order to prevent the waste of such a valuable natural resource.

In the past, enormous quantities of natural gas have been wasted, both in Eastern and Western Canada. In a gas field, a careless driller may either lose control of the well through carelessness or ignorance, or abandon the same without plugging it. Not only is his own property destroyed in this way, but the surrounding area is also drained, thus injuring the entire community through the negligence of a single individual. His acts thus become a matter of public concern and a proper field for legislative control.

The Province of Ontario has reduced the waste of natural gas to a minimum by causing all abandoned wells to be plugged, and by levying a tax of two cents per thousand feet, with a rebate of 90 per cent. when the gas is used in Canada.

Large quantities of gas, with oil, have been "struck" in New Brunswick, and it is necessary also that this province make statutory provisions in order to prevent any waste of gas that may arise incident to oil production.



The photo shows a burning gas well at Pelican Portage, Alberta. This well has been burning and wasting gas for the last thirteen years. Although there is, at present, no market for this gas, the photograph demonstrates the possibilities of *waste under existing laws*. No one can doubt that, in the near future, there will be an enormous market for this valuable mineral resource.

Municipal Forestry in Ontario

Survey of Trent Watershed, during the Summer of 1912—A Report to be Issued.

Forestry is a comparatively new science. Municipal forestry, in so far as Canada is concerned, is newer still. It was only a year ago that the Ontario Government passed an Act which empowered municipalities to engage in forestry. As a result the county of Hastings has already taken steps to acquire waste lands for the purpose of reforesting them.

During the coming summer the Commission of Conservation will supervise a survey of the county of Haliburton and the northern portion of the county of Peterborough in Ontario. This survey is to furnish a detailed description of economic and natural conditions and resources of the watershed in Peterborough and Haliburton counties feeding the Trent canal waters, and to serve as a basis for a plan of management.

Economic Conditions

The area comprises about 1,500 square miles, of which as much as can be accomplished in one summer season is to be examined. A map on the scale of 2 inches to the mile on which 5-acre lots can still be conveniently designated, is to serve as basis for description.

The *economic conditions* to be ascertained will comprise:

(*a*) Ownership and status of timber limits;

(*b*) Municipal relations and tax conditions;

(*c*) Farm development, crops, character and quantities;

(*d*) Manufactures and mills in existence, and possibilities of local industrial development;

(*e*) Means of transportation and development of water-powers, so far as useful for developing local industries;

(*f*) Tourist traffic, game and fishing interests.

Natural Conditions

The *natural conditions* to be ascertained, and, as far as possible, to be mapped, are:

(*a*) Topography (in the rough) and delimitation of watersheds;

(*b*) Land classification by parcels, down to a minimum limit of 10 acres;

(*c*) Statements regarding character of climate and soil;

(*d*) Character and conditions of forest growth in connection with (*b*). This will include estimates of mer-

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Otter Beam Trawlers

Alleged waste where used—Agitation to prevent use of

Otter-trawlers have been introduced to the American North Atlantic waters. Four vessels fitted with beam trawls have been operating off the coast near Boston, for some time. In view of the results produced by this type of fishing gear in the North Sea and off the coast of Norway, it is perhaps not surprising that their use should cause uneasiness among American and Canadian deep sea fishermen. It has been asserted by old, experienced fishermen, that the heavy beam trawls as they are dragged over the bottom of the ocean, destroy large quantities of shell fish and other materials on which valuable fish feed. In this way the fish that are useful as food are driven to other waters. Then, too, the trawls catch not only the large marketable fish, but the immature fish that are of no immediate commercial value. This feature constitutes a very serious waste.

Again, where the beam trawls are used, it is impossible for the fishermen using the ordinary trawls to operate, for the beam trawls destroy the tackle.

The tendency where beam trawls are used seems to be for the fishing industry to pass from the hands of skilled fishermen, and to become controlled by wealthy corporations. More fish are caught, but it seems more than likely that the fisheries cannot survive many years of beam trawling.

At the present time otter-beam trawlers are not allowed to operate within the Canadian territorial waters. This, however, is not a serious check, for many of the most valuable deep sea fisheries are beyond the three-mile limit. The deep sea fishermen along the Atlantic coast are agitating for a law to prevent the sale of fish caught by otter-beam trawlers. It is a question of more than usual interest, and deserves the careful study of our legislators.

"Sky Scrapers"

"Sky scraper" buildings are peculiar to America. It is indeed strange that such "rank and weedy" species of buildings should find a place in roomy America. Such over-centralization means increased transportation problems in cities, poorer sanitary conditions, and less light and fresh air for the toilers in city offices. Canadian cities would do well to check such abnormal methods of building.

Many fires are started each year by the careless burning of the rubbish accumulated in yards and alleys during the winter. The burning of this rubbish is too often left to the children, which annually not only costs a large number of lives or serious injury, but results in the total destruction of many thousand dollars of property.

Municipal Forestry in Ontario

(Continued from page 1.)

chantable timber standing, and of young growth,

(c) Studies respecting rate of growth.

Plans for doing work

Procedure:

Secure maps and all existing information of region involved.

Collect by correspondence and personal interviews with officials and informed persons, other data of economic conditions.

Two experienced fieldmen, with one or two assistants and small camp outfit, will cruise (investigate) the watersheds to secure all data regarding natural conditions. The topography will be secured by aneroid, only roughly (elevations at given points). The cruising will be done by the strip system, as far as practicable one mile apart.

Farm areas in use will be noted with indications of the character of the soil; and farm soils found under forest cover will also be indicated. Barren areas will be designated and the character and cause of barrenness as far as possible stated.

Timber conditions will be classified into forest types: softwood, hardwood, mixed, stated in proportion of species; and into stand types: virgin, semi-virgin (largest sizes extracted) moderately culled, severely culled, entirely cut, young growth of different ages (differentiation by decades), recent burns, etc. Where merchantable timber occurs, rough estimates of amounts; where reproduction occurs, character and promise of future growth will be noted. Natural conditions favourable or unfavourable to reproduction will be noted.

Incidentally, growth rate studies will be made to secure an insight into the time element under various conditions.

As a result, a report will be compiled giving a clear picture of conditions which, as far as possible, will be indicated on a map. A plan of management, in which suppression of fire will be considered, will be evolved.

Consumption of Coal in Canada

In 1911, the total consumption of coal in Canada amounted to about 24,400,000 tons, made up as follows: 9,800,000 tons of coal produced in Canada and 14,600,000 tons of imported coal. According to the figures Canada produces only 40·2 per cent. of the coal which it consumes. It must be noted, however, that if all the coal mined in Canada had been used in the country, it would have constituted over 46·2 per cent. of the consumption.

The consumption of coal in Canada has increased from 3,480,111 tons in 1886, to 24,400,000 tons in 1910. During the same period the coal consumption per capita has increased from 0·758 tons to 3·389 tons.

A Commercial Basis for Peat Fuel

Canada's Extensive Peat Resources—Work of the Mines Branch—By-Products of Peat.

The manufacture of peat fuel on a commercial basis is of very great interest to the people of Ontario, Quebec and the provinces of the middle west where coal and wood are high in price. Each of these provinces has a large acreage of peat bogs. The following table shows the extent and distribution of peat areas in Canada, the figures for the country east of lake Superior being approximately correct and those west of it only estimates:

Province of	Square Miles	Average depth in feet
Nova Scotia	250	8 to 10
Prince Edward Island	10	"
New Brunswick	250	"
Quebec (in settled parts)	500	"
Ontario (in settled parts)	450	
Ontario (Moose River Basin, etc., 10,000	10,450	5 to 8
Manitoba	500	6 to 10
Alberta, Saskatchewan and Territories	25,000	5 to 10
British Columbia and Yukon Territory	no data	
Total in round numbers	37,000	

When it is known that two pounds of average peat are equal to one pound of good coal, the value of these peat resources at once becomes apparent.

Value of Experiments

Numerous attempts to utilize peat bogs in Canada have been made by private individuals, but heretofore these have proved failures. So much so is this the case that capital is very chary about investing in peat ventures. Most of these failures have been occasioned by ignorance. The properties of peat were not sufficiently known by those attempting to manufacture it and very often bogs were chosen that contained a quality of peat not suited to the purpose in view. One of the great hindrances to success has been the lack of careful investigation of bogs before expending money on development. The Department of Mines, under the direction of Dr. Eugene Haanel, has endeavored to remedy this situation. Numerous peat bogs have been explored and mapped, and the peat has been tested as to quality by peat experts from Europe. These careful, scientific efforts have been crowned with success.

Peat fuel is considerably more bulky than coal and it is not thought that it could be profitably transported long distances. The peat bogs in Ontario and Quebec, however, are very favourably distributed, and since a plant with a daily capacity of 30 tons can be erected for about $7,000 these could be profitably developed to supply local need.

Other Uses for Peat

Besides being used as a fuel, peat is used for various other purposes. Moss litter is made from sphagnum peat having a low degree of humification. It is used on account of its lightness and its absorbent qualities as a packing for fragile articles and as a bedding material for stables. A moss litter with a 20 per cent. moisture content can absorb ten times its own weight of moisture. The litter is a poor conductor of heat and is used largely as a packing for steam pipes and boilers and to keep water pipes from freezing. Alcohol is manufactured from moss litter and has been made in Europe at a cost of 47 cents per gallon.

Peat mull is a dry powder which is produced as a by-product in the manufacture of moss litter. It is an effective deodorizer and is largely used in Europe for sanitary purposes and as a filter for water. Fruit packed in boxes with peat mull is prevented from decaying for months.

A peat fuel plant equipped for making moss litter and peat mull has a decided advantage over a plant where fuel alone is made, because in the winter and during wet weather when the peat cannot be properly air-dried, the by-products may be manufactured.

Water Diversion at Chicago

What Canada and United States may divert from Great Lakes

The Sanitary District of Chicago has been endeavouring to secure permission to divert 10,000 cubic feet of water per second from lake Michigan. This water, instead of going by way of the St. Lawrence river, would reach the sea through the valley of the Mississippi. The water already diverted at Chicago has caused serious loss to navigation and other interests by virtue of the fact that the levels of the Great lakes have been lowered. There is, however, another aspect of the result which would follow if Chicago were granted its request to take 10,000 c.f.s. from waters which essentially belong to boundary waters. Some 160,000 horsepower is imported into the United States from Canada, under the Burton Act. This is equivalent to about 12,000 c.f.s. Consequently, Canada would only have the benefits from the 36,000 c.f.s. allotted her under the Boundary Waters Treaty, less the 12,000, or 24,000 c.f.s.; whereas the United States would have the benefits from the 20,000 c.f.s. under the Boundary Waters Treaty, the water equivalent of the imported power, viz., 12,000 c.f.s. and, if the United States obtained the additional 10,000 c.f.s., this would make about 42,000 c.f.s. as compared with the 24,000 above mentioned for Canada. *Let there be equality.*

Crop Rotation and Weed Control

General Methods that are helpful—Value of Cultivation.—Short Rotations a Great Advantage—Rotations Recommended.

Nearly every crop is accompanied by certain kinds of weeds. The weeds that thrive in a grain crop are usually quite different from those we find most plentiful in meadows. If small grain is grown continuously we will likely find the land becoming very weedy. These particular weeds are usually easily killed by cultivation. Some may be very bad in spring grain, but can be controlled by a hoe crop. The ox-eye daisy may be bad in hay land but will give little trouble in corn. The opposite is true of other weeds and will give less trouble in grain or hay. It is best, then, not to grow any crop continuously that is favourable to the growth of weeds.

The following is taken from Farm Weeds of Canada:

Short Rotation of Crops

"To keep farms free from weeds, few methods give such good results as a systematic short rotation of crops, with regular seeding down to grass or clover at short intervals."

"Weeds are most in evidence in districts where the production of cereal grains predominates and where the systematic alteration of crops is not generally practised. Many weeds ripen their seeds with cereal grains and the seeds are scattered during harvest. When a cereal crop is followed by early clover, the weeds in the clover may be cut before they are mature. The hay crop of the second year after seeding is not infested with weeds because a fresh supply of the seeds has not been brought to the surface by cultivation. The removal of the hay crop of the second year affords an opportunity for a summer-fallow, preparatory to the production of a hoed or some other cleaning crop."

The following short rotation is recommended for the Eastern provinces by J. H. Grisdale, Agriculturist of the Central Experimental Farm:

"To destroy weeds, probably the best rotation possible is one of three years' duration including clover and mixed hay, followed by roots or corn, the land shallow-plowed in fall and sown to grain the next spring with ten pounds of red clover and twelve pounds of timothy per acre. (When the land is heavy or clayey, the ten pounds of red clover may be replaced by six pounds of red clover and two of alsike.) If a portion of the arable land must be used for pasture, then the land might be allowed to remain under grass or hay for two years instead of one year, the second being used for pasture, thus extending the three-year into a four-year rotation. The pasture land in the four-year rotation, or the hay land in the three-year rotation, should be broken up early in August and cultivated at intervals to destroy the successive growths of weeds as they appear. The land should be again ploughed or preferably ridged in the fall. These rotations may be expected to give good results anywhere in Canada east of Manitoba."

Patience and care are factors

There are some general methods of keeping weeds under control that must always be borne in mind. The annuals may be subjected by preventing seed production. The seeds of many annuals retain their vitality for several years, so that if once abundant in the soil they are likely to germinate at irregular intervals and thus cause trouble for a long time even though no fresh seed is produced. In this case, patience and care in preventing seed production will gradually reduce the quantity and prevent further spreading.

Cultivation Valuable

With biennials, the cutting of the roots below the crown usually kills them. If the cutting of the main stem is too high it often induces a branching out and several stalks will be sent up in place of one. Biennial weeds are readily killed by cultivation such as is given to hoed crops. Where a systematic rotation of crops is followed they may be kept under control, but it must be remembered that waste places and places where the soil is seldom disturbed should be kept free from the weeds if the work on the cultivated fields is to be made effective.

Roots Must be Killed

In the case of perennials, seed production must be prevented and the underground portion must be killed. The methods for killing the roots will vary according to soil, climate, character of the weed, and the size of the patch or the quantity to be killed. If the patch is small it may be dug up and removed, or salt, coal oil, or acid may be applied to the root when the plant is freshly cut off. If the quantity is large it may be smothered by some dense sod-farming grass or by a crop like buckwheat, cowpeas, millet or rape that will exclude the light. Most roots are destroyed by exposing them to the direct action of the sun in dry summer weather, or to the direct action of frost in winter. Any cultivation which merely breaks up the rootstocks and leaves them in the ground, especially in wet weather, is worse than useless unless the cultivation is continued to prevent any growth above ground. Fitting the ground, planting a hoe crop, and then cultivating for only a short time only encourages many of the perennial weeds. The cultivation must be thorough and kept up throughout the season if the weed is to be smothered down and its vitality destroyed.

Milk as a Factor in Infant Mortality

Use of Modified Milk—Results in Rochester

Clean milk is a mighty factor in the conservation of infant life. Infantile mortality statistics for Canada are lamentably incomplete, yet it is known that thousands of Canadian infants die every summer as a result of being fed diseased, dirty, germ laden milk. This is a national loss of very serious magnitude, and one that demands the immediate application of preventive measures.

The greatest danger occurs during the hot summer months. Milk constitutes a most favourable medium for the development of germ life. Two main points, therefore, require special attention. (1) Absolute cleanliness should characterize every part of the process of producing and distributing milk. In this way germs may be *largely kept out* of the milk. (2) By holding the milk at low temperatures the germ life that does gain access to it *can be kept from developing.*

Modified Milk for Infants

The preparation of modified milk for infants in cities, is usually not a good commercial investment, although it has been produced at a profit in some large American cities. But the saving of child life is a matter of vital importance to the municipalities and to the country, and if private interests will not undertake this service, then the municipal authorities must, if they are to escape the ignominoty of posterity.

A number of Canadian cities are already partly supplied either by private citizens or by the direction of the Municipal Boards of Health. But there is need for a very much more general adoption of this principle. The cost need not be very heavy, as can be seen from the really excellent milk service provided the Board of Health of the city of Rochester, N. Y. The initial cost for their equipment was only about six hundred dollars, for a population of 200,000. Dr. Goler, who has had charge of this work, has made his city world-famous, on account of the results by these milk depots.

Results in Rochester

The following statement illustrating something of what has been accomplished by Dr. Goler in Rochester, is taken from Mr. John Spargo's work, "The Common Sense of the Milk Question": The Rochester depots were first established in 1897.

"During the nine years, 1888 to 1896 inclusive, there were 1,999 deaths of children under five years of age in the months of July and August (in Rochester); but during the period 1897 to 1905, the following nine years, distinguished by the work of the infants' milk depots, the number of deaths in the same months was only 1,000! *The number of deaths was just half, notwithstanding that the population had increased something like* 20 *per cent!* I know of nothing to equal this record in the history of any city in the world. And the cost of this great work to the city has been barely a thousand dollars a year; less than the salary of a good inspector."

Pollution of Domestic Water Supplies

"In a recent address before the Eastern Dairymen's Association, at Belleville, Ont., Dr. W. T. Connell, professor of bacteriology at Queen's University, pointed out the serious condition of many of the sources of water supply of factories and farms. In his address he said:

'Another subject to which considerable attention has again been given is that of water supplies at factories and at farms. During the past year, over two-thirds of such samples submitted have proven to be infected with dangerous forms of bacteria. I class as dangerous, forms which can be traced as originating from the intestinal discharges of animals or man, or, in the case of factories, as coming from factory drainage. Of course, it must be remembered that I am only sent samples which have fallen under suspicion, so that my figures do not represent the average condition of the farm and factory wells in Eastern Ontario. Still, I think I can state that quite one-third of the wells at farms and factories are so situated as to be open to pollution from surface drainage or from seepage from manure piles, stables or pig-pens, or from house wastes."

—From Commission of Conservation's Report on *The Water-Powers of Canada.*

Ground Waters

Underneath the surface of the earth is a vast body of water which may be likened to an underground lake, called the *ground-water.* It is into the upper surface, frequently termed *the water-table,* of this ground-water that wells are sunk for domestic and other water supply. It has been estimated that, if all the moisture resident in the upper 100 feet of the ground were collected, the amount would be the equivalent of a lake of water some 17 feet deep, i.e., the equivalent of about 7 years' rainfall. During periods of plant growth, this ground-water yields, chiefly by capillary action, part of its moisture to the plants; and then, during seasons of excessive rainfall, is again replenished from the rainfall. The annual fluctuation in level of the ground water-table under normal conditions is but a few inches.

The underground waters of Canada, in some places, are now being tapped and wasted. State after state, in the United States, has enacted laws designed to conserve the underground waters.—From *The Water-Powers of Canada.*

Locomotives For Burning Oil

Already Used by American Roads—Its Value in a Forest Country in Preventing Fires—Cost as Compared with Coal.

Oil burning locomotives are coming to stay. As a matter of fact, some of the American railroads are already using them exclusively on portions of their lines. The Atchison, Topeka and Santa Fe Railway Company use oil burning locomotives exclusively on several hundred miles of their lines in California, Arizona, Texas and Oklahoma. They also use oil locomotives for their passenger trains on portions of their lines in the State of Kansas. Similarly, the Great Northern Railway has adopted the oil locomotive on some of their lines in Western Washington and in South Western British Columbia. The New York Central and other eastern United States roads are also using oil on a number of their roads.

Advantages of Oil Fuel

What then are some of the advantages of using oil for fuel? In the first place, it is of great value on lines that pass through forest areas. Every year the burden of expense in connection with the fire ranging along lines of railway is becoming a more serious matter for the companies. The use of the oil locomotive makes this unnecessary. They lessen the danger of starting forest fires from locomotives by just 100 per cent.

In the second place, the oil locomotive is a great advantage in city railway yards. The average city railway terminal is made hideous by cinders, soot and coal bunkers. Such a condition depreciates the value of property in the vicinity and constitutes little more than a common nuisance. With the advent of oil burning locomotives, this can be reduced to a minimum.

Information obtained by the New York Public Service Commission from the Southern Pacific, shows that the cost of changing locomotives from coal to oil burners averages from $350 to $650 per engine, according to the size and capacity of oil tanks required. To change back to coal burning, with all the coal burning equipment at hand that had been displaced from the engine, would cost about $25 per engine. The time required for the first change to oil burning would be from three to seven days, while the change back from oil to coal, or vice versa, with equipment on hand, one and one half days.

Repairs to the fire box are usually greater in oil burning than in coal burning locomotives, but this expense is more than offset by the saving in attendance necessary.

Cost of Oil Versus Coal

The following table gives a summary of figures on the cost of operation of oil-burning as compared with coal burning locomotives; the figures of the New York Central and Hudson River Railway Company, and those estimated by the Forest; Fish and Game Commission are given in the first two columns, while the figures finally adopted by the Public Service Commission are given in the third column:

COMPARATIVE COSTS OF COAL AND OIL OPERATION

N.Y.C.& H.R.R.		Forest Fish and Game Com.	Public Service Com.
No. of locomotives	54	42	48
Tons of coal burned yearly	40,971	39,957	40,971
Cost of coal burned yearly	133,979	131,167	133,979
Fire cleaners, etc.		8,165	3,780
Total cost (on tender)	133,979	139,332	137,759
Total per locomotive	2,480	3,317	2,870
Gallons of oil to ton of coal	188	1544	168
Gallons of oil burned	7,702,548	6,173,355	6,883,128
Cost of oil burned (on tender)	245,210	175,846	196,633
Annual cost of changing locomotives	16,770	8,400	9,600
Increased boiler work (fireboxes)	7,875	3,150	0
Increased loss of service	12,960	2,496	2,608
Interest and depreciation on additional equipment of locomotives	4,590	2,331	2,464
Interest and depreciation on storage tanks	9,140	3,983	3,983
Handling oil and interest on stock	3,000	126	1,500
Total cost (oil plus incidentals)	$299,545	$196,332	$216,788
Total cost (per locomotive)	5,547	4,675	4,517

It is of interest to note that the Canadian Pacific Railway is equipping a number of their locomotives in use on their Western Section, to burn oil.

Keeping Cities Clean

Cost in Canadian Cities—Motor Experiments in Paris

Keeping cities and towns clean is a very important phase of modern civic life. In the case of a large city the disposal of sanitary and economic wastes requires a very complete and complex organization in order to be effective. Thus, in the city of New York some 6,500 men are employed at such work the year round, and the total cost for the removal of wastes, street cleanings and garbage amounts to about $7,500,000 annually.

In Canadian cities the streets and yards require extra attention in the spring time. The thawing of the snow reveals the dirt and refuse accumulations of months. In some of the larger cities of Canada the systematic removal of ashes, garbage and street dirt is done with fair efficiency. But the "town dump" is a relic of other days that should no longer be tolerated in a civilized community. By far the larger part of the make-up of such dumps could and should be destroyed by fire. Unless this is done, the "dump" districts become not only unsightly, but a menace to the health of the community.

Costs in Canada

As examples of the outlay necessary in order to keep some of our Canadian cities clean, the figures for the cities of Toronto and Ottawa for 1911 are given herewith: The population of Toronto (not including North Toronto) according to the census of 1911 is 376,538. The total cost for the removal of ashes, garbage, street refuse and snow during 1911, amounted to $475,508. This does not include the cost of the removal of 6,000 dead animals, 3,200 chickens, 150 barrels of fish and 100 boxes of eggs. The street cleaning department of Toronto, therefore, spends about half a million dollars annually. The removal of ashes and garbage involved an expenditure of $250,000, being an average of $2.94 a building for the year, or less than three cents a call, a very creditable showing. In all, 660 to 700 men were employed during the winter, and 900 during the summer.

The city of Ottawa which has a population exclusive of suburbs of about 87,000, expended $112,000 on its street cleaning service during 1911. Although a much smaller city, the cost of the removal of snow was nearly double what was paid in Toronto, or $22,000 as compared with $14,339.

Experiments in Paris

Such expenditures, while they may be carefully administered, are a very important item in a city's budget. It is not surprising, therefore, that various more or less elaborate attempts have been made to cut down the cost. At the present time, the city of Paris is experimenting with gasolene motor flushing and sweeping machines. Recently the municipal authorities received fifteen vehicles of various types designed respectively for street sweeping and street watering and washing. These will be put through severe tests before it will be finally decided whether or not to adopt them. Canadian city authorities will doubtlessly follow these experiments with interest and profit.

Value of Water Powers

Should be carefully guarded—Power possibilities in British Columbia

Water-powers are daily becoming of increasingly great economic importance. During the last few years there has been special effort made on the part of large interests, both in Canada and the United States, to secure control of water-powers in strategic positions. Mr. Gifford Pinchot has drawn special attention to the fact that, year after year, the paid attorneys of large corporations were appearing at the seats of the Federal and State governments endeavouring to have restrictions removed which would facilitate the easy acquisition of coveted water-power privileges. In the recently published report on "The Water-powers of Canada", the Commission of Conservation emphasises the fact that the number of water-powers desirable from an economic standpoint are much less than popularly supposed.

In view of the facts above mentioned, every community should be alive to the power question as affecting its particular locality. The Commission of Conservation is at present working upon a report which will deal with the water-powers of Western Canada. The province of British Columbia is especially rich in water-power possibilities, but, nevertheless even here great care requires to be exercised respecting the conservation of this resource. There may be many water-powers in a community but, amongst these only one or two may be suitable for development on a scale sufficiently large to keep the cost of the developed electrical energy reasonably low. For example, around the Shuswap Lake district, and the valley of the Thompson, with its North and South branches, the possibilities of the Adams river are of great economic importance to the welfare of the whole community. In such instances the authorities should not permit any development to take place except under terms and conditions respecting period of lease, and absolute provision for the regulating of the prices at which power shall be supplied within the territory that may be covered from such a development.

These questions are of very great moment and careful study of them will, no doubt, contribute much to the welfare of communities whose progress is, in any way, associated with the development of power.

Demonstration Farms

The Lands Committee of the Commission of Conservation will start a number of demonstration farms in Canada this year. One farm will be selected in each district where the Agricultural Survey work was conducted last year, for the purpose of putting into actual practice the best and most profitable farm methods for that locality. The farmers in the districts visited last year may look forward to a visit in the near future from Mr. F. C. Nunnick, Agriculturist to the Commission, and Mr. John Fixter, Agricultural Demonstrator, in connection with this work.