

# Conservation

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## Disposal of Refuse In Towns and Cities

### Burning or Burying of Garbage and Other Waste the Only Sanitary Means

Refuse disposal is usually a serious problem for the small city or town to solve. In such cases public incinerators are not always economical and the ordinary dump needs careful regulation to prevent it becoming a nuisance.

Burning or burying is the most desirable method of disposing of ashes, rubbish, manure and garbage in cities. Of these, burning is the most sanitary, and no other means should be used in cities having a population of, say, 20,000, or more. Refuse incinerators are of two main types (1) the coal fired or, "low temperature," and (2) the high temperature. The latter is designed to handle mixed garbage without the use of coal. Very few of these have as yet been installed, and their advantages have not been entirely proven. For the coal-fired incinerator a long-flaming coal of good quality is essential. This, of course, makes the cost of operation all but prohibitive for most small cities and towns.

In such cases, other means of refuse disposal must be obtained. To simply dump garbage in an unrestricted manner on some vacant lot should be classed as a criminal offence, and punished accordingly. The practice of burying refuse, where it is carefully carried out, is usually found to be cheap and at the same time effective.

The principle upon which refuse burial rests, especially as applied to garbage, is, primarily, a bacteriological one. The action of the soil bacteria is to mineralize the organic matter in the refuse. In order to prevent the occurrence of putrefactive or other objectionable odours the mineralizing process must be carried out in the presence of sufficient oxygen or air. To secure these conditions the following points should be observed: (1) The garbage should not be buried too deep, nor should it be spread in too thick a layer on the ground. (2) The ground used should be sufficiently porous and well drained to admit the air readily. (3) The garbage should be mixed with enough other refuse to prevent overloading the soil.

These conditions are obtained in different ways. In some cities the refuse is spread on the ground and

then ploughed under. Another method is that of digging a trench, covering each day's collection of refuse with the soil, removed for the next day's supply. In any case, refuse that can be burned should be so treated and garbage and other organic waste can be more effectively handled by mixing it with other waste such as ashes, street sweepings, etc. It is claimed that 1.5 acres are necessary to handle each daily ton of garbage permanently. The soil can be re-used at the end of two years.

## Lignite for Power Purposes

### Possible Advantages of Central Power Plants at Lignite Fields —Overcoming Loss Due to Fuel Transportation

Lignite coal disintegrates rapidly and does not possess a very high calorific value. Consequently, it is seldom economically possible to ship it for long distances, to be used for developing power. At the same time, there are excellent reasons for believing that central power plants, situated at the lignite areas in different parts of Western Canada, could economically generate and transmit power to towns and cities within a considerable radius of the fields.

The following table gives a comparison of fixed charges involved in power transmission and fixed charges on fuel transportation. The information has been largely obtained from a paper by Mr. J. V. Hunter given before the American Institute of Electrical Engineers in December, 1911. The figures relative to freight rates on coal from the mines to the point of consumption have been calculated from Canadian freight tariffs. In Western Canada, the average freight rate on coal per ton-mile for a 100-mile haul is a trifle over 15 mills.

It will be noted from the table, that the annual loss by transportation of fuel from the mines to the point of consumption (100 miles) varies from \$61,945 for a plant of 5000 k.w. capacity, to \$346,674 for one of 20,000 k. w. capacity. The conditions assumed in this table, however, are for a constant power load for 24 hours a day, and the comparison would not be as favourable if the load was only on for a portion of the day.

In any case, the figures are sufficiently startling to warrant an investigation being made as to the possibilities of central power plants at the lignite fields in Saskatchewan as compared with the present method of hauling bituminous coal long distances by rail to the markets in central Alberta and Saskatchewan.

### COMPARISON OF FIXED CHARGES INVOLVED IN POWER TRANSMISSION AND FREIGHT CHARGES OF FUEL TRANSPORTATION.

POWER STATION AT MINES. DISTANCE, 100 MILES  
FIXED CHARGE OF CONSUMPTION. FREIGHT,  
\$0.015 PER TON MILE. COAL. 6.0 LBS.  
PER KW. HR.

Details of Construction and Losses	Central Station capacity		
	5,000 kw.	10,000 kw.	20,000 kw.
Right of way:	\$60,000	\$60,000	\$60,000
Cost per 100 miles:	at 5% . . . . .	at 5% . . . . .	at 5% . . . . .
50 feet wide.	\$3,000	\$3,000	\$3,000
Steel tower cost:			
Cost per 100 miles:	\$322,200	\$322,200	\$322,200
Two circuit towers:	at 5% . . . . .	at 5% . . . . .	at 5% . . . . .
Not including copper	\$29,808	\$29,808	\$29,808
Conductor, Cost for most economic line, Copper at 14c. lb.	\$70,000	\$140,000	\$280,000
Kw-hr. loss on line	at 5% . . . . .	at 5% . . . . .	at 5% . . . . .
Cost of \$0.003 per kw-hr.	\$1,200	\$8,400	\$16,800
Transformers:			
Equal capacity at each end of line (to carry load):	\$150,000	\$300,000	\$600,000
at 15% . . . . .	\$22,500	\$45,000	\$90,000
Total of fixed charges and losses	\$61,945	\$95,912	\$159,126
Freight charges, one year's coal supply . . . . .	\$126,450	\$252,900	\$505,800
Loss by transportation of fuel . . . . .	\$61,945	\$316,788	\$346,674

W. J. D.

## About the Pulmotor

This little device, which is so simple in operation, but is actually the result of years of research, has given results that are almost unbelievable in reviving persons apparently dead. There are many places where the necessity for such a device is felt much more often than at the ordinary coal mine. Many men have died, steel works, electrical plants, steel works, and gas works, who could have been revived by timely use of this invention. The Commission of Conservation could not go far wrong in recommending the provision of a "pulmotor" for every city hospital, every large fire brigade, and in connection with all works where men run the risk of suffocation by gases or death from electrical shock.—F. W. Gray, in *Canadian Mining Journal*.

## Causes of Failures in Power Projects

### Insufficient Data Frequently Leads to Wrong Conclusions— Mistakes of Other Countries Should Be Avoided

That Canada has had so few failures in water-power undertakings is explained in large part by the fact that only the best power sites have, as yet, been taken up. The rapid industrial development throughout the country, combined with the steady increase in the use of coal for power purposes, is creating an ever-growing demand for electrical energy. As a consequence, the next few years will undoubtedly see many inferior power propositions developed. This work, unless carefully handled, is more likely to meet with failure, than were the projects undertaken in the past. The causes leading to such failure in other countries should, therefore, be of more than ordinary interest.

Assuming that a project has a sound and sufficient financial backing and that the promoter has not taken a too optimistic view of the expected market, the remaining possible causes of failure may be classed as purely engineering. Structural failure, although most disastrous when it does occur, does not happen very frequently and may almost be said to be accidental or uncontrollable. There remains two great causes of failure, first, where the cost of development has been under-estimated and, second, where the power available has been over-estimated.

A well-known engineer, now at the head of one of the largest power organizations in the United States was given the following rule by one of his bankers:

"We will not consider a water-power project unless, after doubling the cost, cutting the available power in two, and reducing the market price by 40 per cent., it will still show interest on the bonds necessary to issue."

Over-estimating the power available almost invariably comes from the lack of sufficient data on the flow of the stream considered; in the absence of actual gaugings of a river, it is almost impossible to estimate accurately the low-water flow, especially that of a small stream. In the absence of continuous gaugings, a fairly reliable

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## Rocky Mountains Forest Reserve

Bulletin Issued by the Department of the Interior on Forest Conditions

"Forest conditions in the Rocky Mountains Forest Reserve" is the title of a recent bulletin by T. W. Dwight, of the Forestry Branch, Department of the Interior, Ottawa. In this bulletin, forest conditions are described, and conclusions are drawn as to what method should be followed in the cutting of timber, to ensure satisfactory reproduction of the best species.

The necessity of adequate fire protection is emphasized. Fires have raged over so much of this Reserve in the past that only one-fourth of the timber is of mature size, the balance being second-growth, mostly under 50 years of age, and therefore too small to be merchantable. However the potential value of this young growth is very great and will well repay all possible care in protecting it.

Over 90 per cent. of the second-growth stands are lodgepole pine. An extensive fire occurred in the Ghost River valley one hundred and eighty-three years previous to the study, and the resulting stand is now being lumbered. Evidences of fires much earlier than this exist, but the number of fires has increased greatly within the past sixty years. Recurrent fires at short intervals tend strongly toward a scattering tree growth and the covering of the ground with a poor quality of grass.

Changes in present methods of cutting are necessary to the proper protection and reproduction of the forest.—C. L.

## INOCULATION FOR TYPHOID

Typhoid inoculation is apparently justifying the claims made for it by its advocates. A recent report of the United States War Department shows that, in the last ten months, there have been only twelve cases of typhoid and two deaths among the 57,000 men composing the army. These deaths, as well as most of the cases of sickness, were of men who had not been inoculated. The typhoid rate in the army in 1906, was 5.66 a thousand; in 1907, 3.55; in 1910, 2.32; in 1911, 0.80 and in 1912, 0.18. It is pointed out that conditions of service, though they may have been changed, are such as would, a few years ago, have produced 150 cases and 25 deaths. Such results naturally inspire confidence in the method, and attention is again called to the matter, as it was several months ago, not only because of its interest to sanitarians, but also because inoculation might be very advantageously adopted by railway and other contractors having many men in more or less permanent camps.—Ex.

## CAUSES OF FAILURES IN POWER PROJECTS

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estimate of the flow of a stream during other than low-water months can usually be made if undertaken in the right way.

### GAUGING RECORDS ESSENTIAL.

Such an estimate may be based on rainfall data alone—in conjunction with a knowledge of the physiographic and cultural conditions—but should preferably be based also on long gauging records of adjacent or similar streams, or of the same streams at another situation.

The failure of many engineers in making proper estimates is apparently due to three causes:

- (a) They consider the problem simpler and easier than it really is.
- (b) They have not the necessary data.

(c) Lacking these, they have failed to acquire properly experienced judgment in such matters.

When we consider that, for a given rainfall, there are some forty or fifty factors which affect or co-operate to determine the amount and character of the run-off which that rainfall will produce, the complexity of the problem and the difficulty of making reliable estimates from rainfall alone becomes at once apparent. In general "an ounce of gaugings is worth a pound of estimates"; and in this respect Canada is placed at a great disadvantage as compared with the United States and other countries. The United States Geological Survey, and in some cases state governments have done much to provide records of the flow of streams. Between \$300,000 and \$400,000 are spent annually for the continuance of this work, the importance of which is well recognized.

The engineer, whose problem relates to the utilization of run-off waters cannot at a moment's notice go afield and gather adequate reliable facts by an examination of the stream, but has to search records as far back as they go.—L. G. D.

## Fire Protection on Railway Lines

### Systematic Work being Undertaken on Railways in All Parts of Canada

The provisions of the Fire Regulations of the Railway Commission, which were in effect only in the West during the summer of 1912, have now been extended to the East through the completion of co-operative arrangements with the Provincial Governments of Ontario, Quebec, and New Brunswick, for handling the details of local inspection of the work of the railway companies. John McGillibon has recently been appointed Provincial Fire Inspector for New Brunswick. The appointments of W. C. J. Hall and E. J. Zavitz as Provincial Fire Inspectors for Quebec and Ontario respectively, were made during the winter. The Government of Nova Scotia has definitely

agreed to co-operate with the Board and the appointment of a provincial fire inspector to supervise this work in the Province is expected to take place in the near future. The forest fire situation is especially serious along railway lines in New Brunswick and an intensive system of fire patrols has been agreed upon, to be established along the line of the Canadian Pacific Railway. Similar plans are in course of preparation covering other lines in the Province.

Serious fire danger exists along the lines of the Intercolonial and National Transcontinental Railways in Nova Scotia and New Brunswick, and the establishment of a fire protective system along these lines, similar to that required of privately-owned railways by Order 16570 of the Board of Railway Commissioners, is under consideration by the Minister of Railways and Canals. Action along these lines is essential in order to prevent the occurrence of numerous and destructive fires during the summer. The large amount of timber along the N. T. R. between Moncton and Edmundston is particularly in need of efficient protection.

The work in the Western Provinces under Order 16570 is now well organized under a plan of co-operation with the Forestry and Parks Branches, Department of the Interior and with the Forest Branch of the B. C. Department of Lands.

Under Order 16570 of the Railway Commission, special patrols are being prescribed by the Chief Fire Inspector along portions of the lines where the fire danger is serious. In sections where special patrols are not considered necessary, the issuance of special instructions to all regular employees with regard to reporting and extinguishing fires, as required by Order 16570, should furnish very efficient protection.—C. L.

## How to Prevent Needless Fire Waste

Pass ordinances making the fire department a department for the prevention of fires as well as the extinguishment of fires.

Give the police department authority to prevent fires, and make each man responsible for the proper enforcement of preventive measures.

Institute in the public schools a course of regular weekly instruction in the economic significance of fire waste.

Investigate the cause of every fire, and punish the person or persons responsible for the conditions causing the fire, whether the fire was incendiary or from carelessness or indifference.

Popularize individual responsibility.

Educate the public; have a "Fire Prevention" day.

By carrying out these recommendations a material reduction in Canada's \$2,000,000 a month fire waste would be brought about.—The Bulletin.

## Electric Locomotives

### Marked Efficiency Shown on Mountain Grades—Railway Electrification in United States

Within the next few years hundreds of miles of railway in the northwestern United States will be operated by means of electric locomotives. Already arrangements have been completed for electrifying some 450 miles of the Chicago, St. Paul and Puget Sound railway, and it is stated that the company has appropriated \$7,500,000 for this work.

The electric locomotive has already shown marked efficiency on the mountain railways. As a matter of fact the limit of capacity of a number of American lines has long been determined in large measure by their ability to get trains over some of the excessive grades on their mountain sections. From two to five steam locomotives of the heaviest type are required to haul trains over these grades, and a speed of seven or eight miles an hour is seldom exceeded. Where such grades pass through tunnels the difficulty is increased, for the steam and smoke from the locomotives coats the rails with a greasy soot, which makes the wheels slip, and the heavy fumes from the coal or oil fuel make operation a matter of real danger to the train crews.

With the installation of electric locomotives all the difficulties and dangers arising from soot have been overcome and trains are hauled over these portions of the road at double the best speed possible for steam. The 100-ton electric locomotive is suitable for the heaviest railway traffic, and one of them will "back" the heaviest steam locomotive.

For the handling of freight trains there are electric locomotives that weigh 180 tons and which have a traction power of 80,000 pounds starting. The motors are built in two sections, each of which weighs 90 tons. By placing together a pair of these 90-ton electric, both under the control of one man, the engine-power is control 3,500 horse-power or a maximum tractive force of 90,000 pounds. One of the huge Mallet steam locomotives weighs 239 tons but of this weight only 167 tons is on the drivers, and the engine is therefore capable of only 71,000 pounds tractive effort.

The electric locomotive has undoubtedly proved its worth, and a few years will see them largely used not only on the mountain roads of the United States but of Canada as well. This constitutes still another reason for the people retaining control of hydro-electric development.

The Harbour Commission of Toronto, created during 1911 by an Act of the Dominion Parliament, proposes to spend \$19,000,000 on the improvement of the harbour and water front during the next eight years.

## Soiling Crops Versus Pasture

Every year, the farmer loses much money on account of the scarcity of grass. As a result, he has to use an excessively large area of land in order to insure good pasture during the months of July and August. Cows receiving insufficient food during those two months naturally decrease very rapidly in milk flow. Once the milk flow is decreased for any considerable length of time it cannot, during that season, be brought up to what it might otherwise have been. The cheapest, easiest and most certain plan of insuring an abundance of feed during the months of July and August is to make use of soiling crops. The dairy farmer who has 40 cows is recommended to prepare and feed somewhat as follows: Clover, 4 acres, sown the previous year. This will supply excellent succulent food from June 20th to July 15th; 2 acres mixed crop, oats 2 bushels, and peas 1 bushel, per acre. Also sow at the same time 10 lbs. common Red and 2 lbs. Alsike clovers. Sow as early in spring as the soil will allow. Three weeks later, sow the same mixture on the same amount of land. The first sowing should be ready to feed off from July 15th to 31st. The second sowing should be ready for feeding July 31st to August 15th. It is an excellent plan to sow in between the two former dates, about three acres of a mixture of: peas, 4 bushels, oats 14 bushels and barley 1 bushel—making 3 bushels per acre. Should this mixture not be required for feeding, it will give a good yield if left to ripen. For corn, sow 4 acres of an early maturing variety, say Longfellow or Compton's Early. This will come in to be fed from August 15th to the time the field corn is harvested. Every farmer and dairyman should plant a very large block of corn. A good large silo, or two, full of ensilage for either summer or winter feeding cannot be surpassed, and should replace much of the unprofitable pasturing.—J. F.

### "SAFETY FIRST" RAILWAYS

In the belief that very many railway accidents are caused by the "chance taker" and are, therefore, preventable, the Canadian Pacific Railway recently completed the organization on all its lines of "safety first" committees. These committees are made up of conductors, road masters, trainmen, engineers, shopmen, car repairers and representatives from all the departments. The members of these committees are expected to discourage in every way possible the taking of unnecessary risks by fellow employees. "Safety first" is the ideal aimed at. That such organizations can be of great assistance in preventing accidents has been shown by statistics of railway accidents in the United States. Forty-four American railways have thoroughly organized safety first

committees, and have demonstrated that accidents can be materially decreased thereby.

As indicating the lines of work to be by the committee members are given herewith:

! will not take chances. I believe that safety first is simply a habit and I will try to cultivate the habit.

The prevention of accidents is a duty I owe myself, my family and my fellow employees.

I will take out immediately, sufficient accident and life insurance to protect myself and those dependent upon me.

I will remember that it is better to let a train wait than to cause an accident.

I will not stand in front of a moving car or engine to board same.

I will not adjust a coupler, turn an angle cock or untemple hose bags when cars are in motion.

I will not kick cars into sidings, where boarding cars, or cars being loaded or unloaded are standing.

## Interest in Jackpine

The greatest interest is being taken by paper manufacturers throughout the province of Quebec in the experiments which have been conducted by the United States Forest Products Laboratory in Wisconsin in the production of paper from jackpine. There are huge areas of jackpine throughout Eastern Canada, and now that spruce is increasing rapidly in value, it would add immensely to the present resources to be able to utilize jackpine. In many regions, while the spruce has all been cut, the jackpine has been left standing, so that there is a big supply available even in the older districts.—Ez.

## Origins of The People

The statistics on origins, obtained by the last census, and made public a few weeks ago, contain much striking information. Thus, of the foreign-born population of Canada, the province of Ontario has 25.2 per cent of the Bulgarians, 9.9 per cent of the Chinese, 63.6 per cent of the Dutch, 36.2 per cent of the Greeks, 46.8 per cent of the Italians, 31.7 per cent of the Poles and 35.6 per cent of the Jews. The Negroes and the Indians were the only races showing a decline in numbers during the census period. The German population in Ontario declined by 10,999, but the increase for the Dominion amounted to 82,219.

Again, while the British increased for Quebec was only eight per cent, and the French 21 per cent, the Jewish increase was at the rate of 306 per cent. In Ontario, the British increase was at the rate of 11 per cent, the French, 27 per cent and the Jews 406 per cent.

The Canadian Pacific Railway will expend \$46,000,000 in Western Canada this year.

## Experiments in the Use of Wood Waste

Recent experiments demonstrate the complete practicability of utilizing wood waste from lumbering and saw-mill or other wood-working industries in the manufacture of paper pulp. Where the wood is resinous in character, it has been demonstrated that, in the case of certain pines and firs, by-products of great value may, in addition to paper pulp, be secured from this source, in the form of turpentine, rosin oils, pine oils, creosote, charcoal, wood alcohol, etc.

A cord of waste wood costing from \$2.00 to \$4.00 delivered at the works, may yield products worth nearly fifty dollars. The waste material so utilized comes from the wood left in the forest from lumbering, dead and fallen timber, stumps of cut-over lands, and slabs and edgings from the mills. Pine and fir stumps have been profitably utilized in this connection, especially where the removal of stumps is desirable in order that the land may be devoted to farming purposes.

Under the usual methods of utilization, not less than 60 per cent of the volume of the tree as it stands in the woods is wasted in converting it into lumber. This waste material is now becoming recognized as a potential source of great revenue, through the establishment of properly located plants for the manufacture of some or all of the above by-products. This tendency will become increasingly strong with the inevitable decrease in the extent of virgin forests.—C.L.

## Protection from Forest Fires in Maine

Maine, by its own policy and method, has solved in great measure the problem of forest preservation—to the end that there shall be a perpetual timber supply for the State, while in the same process the sources of water flow in the rivers and smaller streams shall be conserved. An efficient fire warden service has accomplished much in the prevention of destructive fires, so that the annual loss on that account is almost a negligible quantity. The management of this service is under control of the State, though the expense thereof is provided for by an annual tax of \$70,000, assessed on timber lands.

A noteworthy consideration is that the once paramount lumber state of the Union has reached such a satisfactory result in respect to forest perpetuation and conservation of water and power supply. New York, in the Adirondack region, is carrying forward measures in a like direction. Michigan, Wisconsin and Minnesota are doing something with the same end in view, but private ownership interests, and the continued activity in the cutting of the remaining timber to meet an insatiable demand, at profitable prices, threaten the cutting away of so much timber as to render future forestry work to a large extent nugatory.—Ez.

## Conservation vs. Monopoly

"Then there is the question of conservation. What is our fear about conservation? The lands that are being stretched out to monopolize our forests, to prevent the use of our great power-producing streams, the lands that are being stretched into the bowels of the earth to take possession of the great riches that lie hidden in Alaska and elsewhere in the incomparable domain of the United States, are the hands of monopoly. Are these men to continue to stand at the elbow of government and tell us how we are to save ourselves—from themselves? You cannot settle the question of conservation while monopoly is close to the ears of those who govern. And the question of conservation is a great deal bigger than the question of saving our forests and our mineral resources and our waters; it is as big as our life and happiness and strength and elasticity and hope of our people."—President Woodrow Wilson, in *The World's Work*.

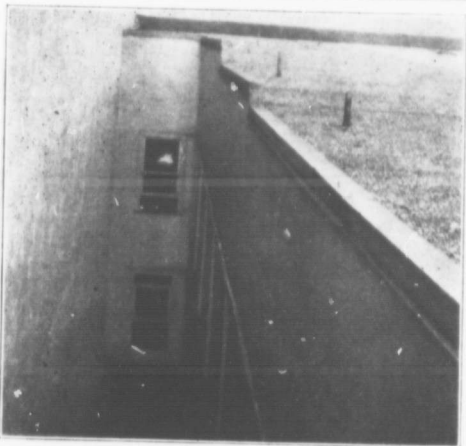
## Mr. W. J. Bryan on States Rights

"My observation is that you very seldom have a conflict between the state and the nation unless some private interest is attempting to ignore the rights of both state and nation," said Colonel Bryan in a conservation speech at Kansas City. "Back of this controversy which we have suggested between the state and the nation you will find the interest of the predatory corporation, that is as much an enemy to the people of the state as to the people of the nation."

Colonel Bryan was speaking particularly of water-power and the national forests. Upon no other topic could his remarks have been more cogent. The national forest policy is open to criticism because it fails to market the ripe timber rapidly enough; but the policy should be amended—not abandoned.

Probably an attempt will be made after March fourth to dismember the national forests and turn them over to the various states within whose borders they happen to be situated.

No greater menace to genuine conservation of national resources has arisen in recent years. Private interests that want the timber and waterpower for their own profit would like to see the attempt succeed. A good many honest Democrats will further it out of foolish loyalty to the traditional but outworn and disastrous state-rights tenet of their party. If a bill to dismember the national forests should unfortunately pass we believe Mr. Wilson would veto it. He certainly knows that a party which would deliberately jeopard twentieth-century national assets out of deference to an eighteenth-century theory of its founder is unfit to govern.—*The Saturday Evening Post*.



The light well of a lodging house in a large city of Western Canada. It is 5 feet 6 inches wide and lights and ventilates 18 bedrooms and 12 lavatories. Many similar wells are only 4 feet wide.

## Housing Tendencies in Canada

### Need for Better Building Regulations in Order to Promote Health

Fresh air and sunlight are factors of prime importance in the solution of the city slum problem. Without these, disease, and degeneracy are certain to abound. Yet such is the premium placed on land values, that the civic authorities of even some of the newest Canadian cities fail to make adequate provision for the proper lighting and ventilation of buildings.

In a progressive city in Western Canada, under the building by-laws a building may occupy nine-tenths of the lot, or, if the ground floor is used for business purposes, that portion of the structure may cover the whole lot. The upper portion of such buildings, consisting of two, three or four storeys, may be partitioned into small rooms to be rented to lodgers. The windows of these rooms open on a court or courts, which extend from the roof of the first floor to the roof of the building, and if the total ground area of the court or courts equals one-tenth of the lot required by law, it fulfills the requirements of the law respecting tenement and lodging houses.

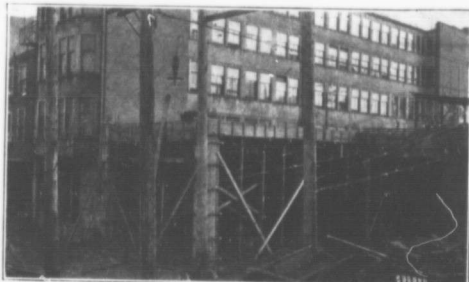
These great "dumb-bell" barracks furnish poor enough housing accommodations when they stand alone, but when two are constructed on adjoining lots, a well is formed by their courts, and all the windows opening on these courts are darkened and shut off from fresh air. If one of the buildings is a warehouse, it may occupy the entire lot and the width of the well is halved, making the rooms darker still.

In a lodging-house of 48 rooms on the principal business street, 36 rooms have practically no light or ventilation. Nor is this all.

The building has been so constructed that the lavatories ventilate into the court from which a score of bed-rooms derive their supply of air. Surely it is not surprising that one ward—the lodging-house district—should furnish a death-rate from tuberculosis, on the basis of reported deaths, at least twice that of any other ward in the city.

Nor is the "dumb-bell" type of construction confined to the downtown districts. West-end apartment houses are being built on the same plan. As the city grows, these will become the tenements of to-morrow. There can be nothing but uncompromising condemnation for the construction of such ill-ventilated, dark-roomed apartments and lodging houses, either in this or in any other Canadian city. They are synonymous with infant mortality, disease and iniquity.

At the last census of the Union of South Africa, there were 3,000,000 more natives than Europeans.



A lodging-house in the same city, the court of which is becoming a well through the erection of a building on the adjoining lot.

## Good Roads Problem

### Something about its Solution in Saskatchewan

The improvement and maintenance of good roads in the rural districts is a vital problem in all parts of Canada. Inevitably, perhaps, the phenomenal development of railway and waterway navigation has largely overshadowed the necessity that exists for properly built wagon roads. However, it is steadily being more fully realized that the absence of such roads causes an economic loss of great importance to every citizen, and especially those of the rural districts.

It is very gratifying to find that scientific progress is being made in many parts of Canada. The government of Ontario is spending large sums on roads in New Ontario. New Brunswick is enacting "good roads" legislation; and Saskatchewan, where railway development during the past few years has been phenomenal, is carrying out a comprehensive "good roads" policy.

Saskatchewan has appropriated \$1,200,000 for highway improvement work during 1913. This is merely a continuation of the work commenced in 1905, and each year since then the government has expended from \$200,000 to \$700,000 a year on roads and bridges. The work has been carried out under the supervision of a board of highway commissioners, and assistance is granted through them to municipalities under certain carefully defined conditions. This assistance is confined to the building of bridges and trunk roads. The old statute labour system is discouraged as being uneconomical and inefficient.

In view of the scarcity of gravel and stone in many parts of Saskatchewan, extensive experiments have been carried out at provincial expense to ascertain the best means of constructing clay roads. It has been found that Saskatchewan clays burned at comparatively low temperatures produce an excellent surfacing material for graded roads. Owing to the reddish colour of this burned clay these roads are known as "the red roads of Saskatchewan". Their cost, where underdrainage is not necessary, has been found to be from \$2,000 to

\$2,500 a mile. This includes the cost of burning the surface clay. Where tile drainage of the grade is essential, the cost is increased by from \$1,000 to \$1,500 a mile. It is claimed that these roads stand up well under prairie conditions.

Another class of road that is being experimented with in Saskatchewan consists of a specially prepared clay grade covered with asphalt. If suitable to the conditions, such a road should prove popular in the smaller towns and villages.

## Flood Prevention and River Regulation

Floods, like many other natural phenomena may not be preventable, but they can be, in large measure, controlled. This has been demonstrated in many of the countries of Western Europe. For many years, the governments of France, Germany, Austria and Switzerland have had competent engineers supervising the improvement of their river systems. In fact, so important has this work become that it is regarded as a well established branch of engineering. It was early realized that such work cannot safely be left to riparian owners, whether they are individuals or municipalities. Consequently, the governments assumed control and carried out the work on a comprehensive basis.

European engineers usually provide a fixed and suitable channel for the ordinary flow of the rivers, as well as a definite channel to take care of extreme floods. Permanent bridges, harbours, locks and roads are built so as to meet flood conditions. Obstruction of the river beds, or of the flood plains in any way that would injure the general welfare, is forbidden.

In Canada and the United States, on the other hand, no comprehensive plan of flood prevention has, as yet, been evolved. That the problem is becoming urgent was shown by the recent disastrous floods in different parts of the United States. For a century or more the physical conditions along Canadian rivers have been steadily changing. Forests have been cleared, swamps drained, and land turned into farms. The result has been that, for a few days in the spring of each year, many of the rivers become raging torrents, and, for the rest of the year, are comparatively insignificant streams. More or less spasmodic local efforts have been made in certain instances, to cope with this situation. These efforts have been inadequate however and, in some cases, have caused further serious injury to other riparian owners.

What is needed are provincial and Federal systems of river regulation under the direction of competent engineers. The latter should be given authority to prevent encroachment upon river channels and they should be required to make a careful preliminary study of the river systems so as to ascertain with some degree of accuracy the proper methods of preventing, or at least, of regulating floods.