

# Conservation

A monthly bulletin published by the  
Commission of Conservation, Ottawa, Canada.

VOL. IV

APRIL, 1915

NO. 4

## Sewage Disposal

### The Installation and Use of Septic Tanks for Sewage Treatment by Isolated Homes

In small towns and on the farm, the common system of sewage disposal is that of privy pits or cesspools. This method fouls the ground and air, holds the wastes in a state of putrefaction which gives off foul gases, and the liquid leachings are liable to injure the quality of wells and springs.

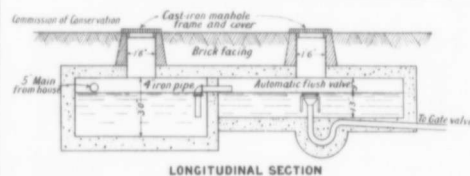
During recent years, many investigations of sanitary methods for the disposal of sewage of isolated houses have been made. The principle upon which the successful treatment of sewage depends is briefly as follows: When the air contained in the soil is brought in contact with dead organic matter in a finely divided state, a complete transformation takes place by the natural processes of oxidation and nitrification. As air is necessary for this purpose, it is essential that the waste be deposited on or near the surface. If the ground is saturated for a long time, purification of the liquid ceases; consequently the principle of intermittent operation of the disposal plant is necessary. The process of applying this principle involves the collection of the material away from the house, the settling out of as much of the solids as possible aided by anaerobic action, and the intermittent application of the effluent to the natural soil by surface or sub-surface irrigation, or to a specially prepared soil, as a filter bed.

A water supply is necessary for the collection of the material and this can be obtained and piped into the house by means of a hydraulic ram operated by a small stream of potable water or by means of a deep well fitted with windmill or pump force.

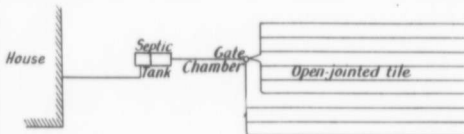
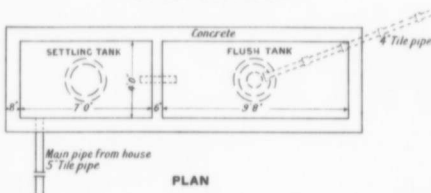
It will usually be necessary to dispose of the effluent from the settling chamber or septic tank by means of sub-surface drainage.

Illustration No. 1 shows a good type of tank for handling the sewage for a family of five and having a capacity of 350 gallons per day.

All sewage coming from the house passes into the settling chamber, where the solid matter to a greater or less extent is deposited. Owing to the character of the sewage, the decomposition of the solids is so active as to pre-



LONGITUDINAL SECTION



Subsurface irrigation for level ground

Cut No. 92 Design for Concrete Septic Tank

vent any serious accumulation in the bottom of the settling chamber. It is necessary to inspect the chamber from time to time, and, if undissolved solids accumulate, to have them removed, probably about once a year. This accumulation should then be carried to the field and spaded into the soil on end.

The cost of a tank built of concrete, such as the one shown, will depend on cost of cement, wood for forms, etc., but the cost of all the material including siphon and cast-iron manhole covers will be, approximately, \$60.00.

To secure subsurface disposal, 3-inch agricultural drain-tile are laid with open joints, the bottom of the tile coming within 12 inches of the surface of the ground. These drains should be laid with a slight fall, say two inches per 100 feet. The ground should be naturally or artificially so well drained that water will descend through it readily.

In a country with as severe a climate as parts of Canada, where frost will affect the ground to a depth of four or five feet, it would

be necessary to cover the surface of the ground above the tile with straw, leaves, or other kinds of mulch in order to prevent the frost affecting it. The superficial area of the disposal plant outlined above would not be greater than 40 feet by 100 feet.

Illustration No. 2 shows a sub-surface system adapted to level ground. The tile lines are divided into three series leading from the gate chamber, so that the ground utilized by two lines is given a complete rest while the other is in use. The length of tile required will depend upon the proximity of the soil. For a porous soil, one foot of tile for each gallon of sewage should dispose of the liquid; for clay there should be at least three feet of tile per gallon.—*W. J. D.*

The daily press state that the province of New Brunswick will undertake a scientific survey, extending over a period of three or four years, of its seven million acres of Crown lands. The survey will lead to a reclassification of these lands.

## Electric Cooking

### Comparative Tests Demonstrate its Advantages in Economy and Convenience

Electricity is rapidly replacing gas and other fuels for cooking purposes. Thus, the electric iron, which a short time ago was considered a luxury, has become a necessity and a money saver in the most humble household.

For cooking, electricity has long been known to be superior to older methods, but, in the past, the price of both the energy consumed and the necessary appliances has been so high as to prevent its general use.

Of late, electric central stations have become aware that it is to their advantage to offer a very low rate for this use, and prices ranging from 1c. to 3c. per k.w.h. are now quite common. As a result, more appliances are being used and, as the consumption increases, the manufacturer lowers his price. As an example: two or three years ago, a 5 lbs. electric iron cost \$5.00; to-day, a better quality can be obtained for one half that price.

Apparently the science of electric cookery is to-day (speaking from an economic standpoint) just at end where electric street railway operation was twenty-five or thirty years ago, *viz.* a recognized possibility, of which those familiar with results already obtained were most sanguine for the future, but which the public at large regarded skeptically as an interesting experiment for which the manufacturer—not they—must foot the bills.

Fortunately, the development of electric cookery methods has been more gradual and based on more carefully and broadly obtained data than was the case in electric railroading. At the present time its assured place in household and civic economies is mainly a question of publicity and of the minor improvements inevitable in the evolution of any line of apparatus intended for general use.

One peculiar feature of electric cookery, aside from safety, (no matches, no leaky pipes, no open but unlit valve cocks) is that in cooking meats, fish, fowl, etc., whether baked or broiled, the actual loss in weight or "shrinkage" is much less than when the

cooking is done by coal, charcoal, or gas.

As figures constitute the most convincing argument, the following table is taken from a paper read before the Canadian Electrical Association last year. It shows the comparative cost of cooking various articles on the electric range and gas range, electricity being taken at 2 cents per kilowatt-hour and gas at \$1.00 per thousand cubic feet.

ARTICLE	Quantity	ELECTRIC RANGE		GAS RANGE	
		Minutes	Cost (Cents)	Minutes	Cost (Cents)
Roast Beef	3 lbs.	109	2.6	70	3.9
Steamed Potatoes	14 lbs.	87	0.34	45	0.5
Onions	7 lbs.	145	0.7	65	1.2
Broiled Steak	Oven	25	0.9	..	..
Bread	Toll	77	2.5	55	2.7
Apple Pies	2	60	1.5	70	3.0
Stuffed Pies	2	58	1.9	70	3.0
Roiled Chicken	3 lbs.	96	1.3	101	1.4

In many localities, particularly in Ontario, the rate for electricity is as low as 1c. per kw. hr. and the cost given under electric range will be just one-half that shown in the table.

As a further confirmation of the low cost of electric baking, we may take the figures obtained in a test carried out in a western city where batches of three ordinary domestic loaves of bread were baked, one batch in a modern gas range and the other in an electric range. Taking the same comparative rates, that is, electricity at 2 cents per kw. hr. and gas at \$1 per thousand cubic feet, the cost with gas was 6.0c. as compared with only 2.8 cents with electricity.

In general the experience of those who have tried electric cooking has brought out the following facts:

(1) Joints of meat and steak are cooked better and lose less in weight than by other means, the electric method requiring also a shorter period of training to enable the attendant to secure good results.

(2) The certainty that, if the same time is given for the same operation, exactly the same result will be produced.

(3) The convenience and cleanliness and the avoidance of an unhealthy atmosphere in the kitchen.

(4) Where rates for electricity are reasonably low a saving is effected.—L. G. D.

If the clothes make the man, let Canadians see it that the clothes are "made in Canada."

## Smoke and Fume Nuisance

May be Eliminated by Process of Electrical Precipitation of Suspended Particles

Owing to the conservation movement in the United States and to the agitation of farmers against the smelter smoke nuisance, an efficient process of electrical precipita-

tioned to a suitable source of high electric potential. To keep the current flowing between the electrodes through the gases, unidirectional direct current is used. The gases passing between the electrodes become ionized and the suspended particles removed by the forces acting between the electrodes.

The process has been used successfully for precipitating smoke, cement dust, fumes from acid plants, chlorine gas from electro-

## Educating Fishermen

Modern Methods of Handling Necessary to Increase the Use of Fish

Fish is certain to become a much more important supplement to the meat diet of Canadians than it is at present. It can be produced more cheaply; it possesses splendid nourishing qualities, and, when properly cooked, is a most palatable food.

Unfortunately, much of the fish offered for sale is not of a high quality. This may, in part, be traced to the crude, careless and often wasteful methods that are used by the fishermen in taking and handling fish, and the fact that such methods are used demonstrates the need for providing technical education for fishermen.

While Canada possesses one of the richest and most varied fisheries in the world, they are, in most instances, being exploited by men who have little or no technical knowledge of the natural history of fish, the proper methods of preparing fish for market, as well as of other aspects of the fisheries industry. Tradition plays a large part in the lives of many fishermen. It is extremely difficult for them to shake off the obsolete practices of their fathers and adopt those that experience in other countries has shown to be superior.

During the present winter the Canadian Fisheries Association was organized under very favourable auspices. It is gratifying to note that the new association was formed for the "development of the fishing industry on commercial, scientific and educational lines." The basic problem to be solved in building up the fishing industry and in popularizing the consumption of fish is the education of the fishermen.

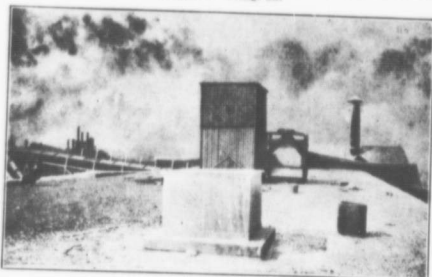
Schools for fishermen exist in practically every European maritime nation. It is in Japan, however, that fishery instruction is being carried to the greatest perfection.

Fish is a delicate food product, the handling of which requires a great deal of scientific knowledge and technical skill. This applies especially to the first stages of taking the fish and preparing them for market. Consequently, unless improvement can be brought about in the methods of the fishermen, the development of the fisheries industry will be needlessly slow and wasteful. The educational branch of the Canadian Fisheries Association has a splendid opportunity for useful work.—A. D.

At a recent meeting of the National Housing and Town Planning Council in Birmingham, the secretary, Mr. H. R. Aldridge, asserted that, since 1900, from 60,000 to 70,000 houses at a rental of less than £20 (\$97.33) per annum have been added to the existing housing accommodation of Great Britain.



Cut No. 93  
Exhaust Flue from the Treater at the Hooker Electro-chemical Company's Plant at Niagara Falls, N. Y.—Voltage Off.



Cut No. 94  
Exhaust Flue from the Treater at the Hooker Electro-chemical Company's Plant at Niagara Falls, N. Y.—Voltage Applied.

tion has been developed. The comparatively small cost of the installation, and the small amount of electric energy necessary for its operation, put it within the reach of almost any plant where its installation is desired or where a nuisance exists.

The process is used for removing either solid or liquid particles carried in suspension in air or other gases. This is done by submitting the gases and suspended particles to the action of a strong electric field maintained between so-called "collecting electrodes" and "discharge electrodes," the latter being insulated from the former and con-

### REASONS FOR TOWN PLANNING

The need for town planning in Canada is greater to-day than ever before because of the: (1) General tendency to urban growth; (2) Growing size of large cities; (3) Separation of intimate connection between manufacturer and worker; (4) Increased rates of cost of shelter to income, due to hap-

azard growth; (5) Changing methods and increased use of means of transportation; (6) Need for better arterial roads; (7) Danger of congestion and unhealthy density of building.

The employer's interest in safety is rapidly transmitted to the workman to the advantage of both.

It is not improbable that this process could be successfully used for collecting the "mist" from sulphite pulp plants and for overcoming the round-house smoke nuisance.

As an example of the power used, the plant shown in the illustration treats 30,000 cubic feet of gas per minute with a power consumption of from 3 to 5 kws., voltage 50,000.—W. J. D.

hazard growth; (5) Changing methods and increased use of means of transportation; (6) Need for better arterial roads; (7) Danger of congestion and unhealthy density of building.

## Commission of Conservation

CANADA

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Assistant to Chairman and Deputy Head

CONSERVATION is published about the first of each month. Its 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.

The newspaper edition of CONSERVATION is printed on one side of the paper only, for convenience in clipping for reproduction.

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

OTTAWA, APRIL, 1915

The increasing industrial use of wood alcohol has created conditions of carelessness in the handling of it. Wood alcohol is an active poison, and all bottles, cans or other containers of this liquid should be plainly and conspicuously marked "Poison."

Mr. Thomas Hoskin, of Grafton, president of the Mutual Fire Underwriters' Association of Ontario, at its annual meeting, said: "The fire waste in Canada recently is the worst in the whole world. The loss in Canada would pay off the national debt in twenty years. It is seven times as great per capita as it is in Great Britain, and we are paying five times as much for our insurance as they are in Europe."

The thoughtlessness of employees, and their willingness to "take a chance," even when the possibility of accident is well understood, are two of the greatest obstacles in the way of efforts to secure safety to workmen. Employees should be made to understand that, even under compensation acts, the employers pay for accidents with dollars, while the workers pay for them with eyes and hands, and even with life itself.

At the conclusion of an address by Dr. C. C. James, Commissioner of Agriculture under the Agriculture Instruction Act, 1913, at the sixth annual meeting of the Commission of Conservation, Sir Clifford Sifton placed the position of the Commission on record as follows: "I want to say to him (Dr. James) that whoever may or may not support him in the work which he is doing, so far as the Commission of Conservation is concerned, its members, its staff, and its officers, he can rely on our unwavering and constant support and that of all those whom we influence or control, in the work which he is doing."

### DESTRUCTION OF SHADE TREES

That the value of trees is not appreciated is an oft repeated statement, but there is an ever-widening circle of our citizens who recognize their value and are prepared to defend them.

In Toronto, Mr. Justice Middleton recently allowed judgment of \$500.00 for sixteen willow trees which had been cut on private property on Toronto island, by corporation labourers.

While trees are, to a great extent, private property, there is also associated with them a corporate interest, in that the general effect of their presence adds materially to the comfort of the people and to the beauty of their surroundings. It may be too much to expect that all owners of property containing trees will recognize their value from this standpoint. There is no authority to protect trees from wanton destruction by their owners, but education on the subject may secure the results aimed at. Horticultural societies should include the protection of trees in their spheres of activity, though, unfortunately, municipalities can not prohibit, by by-law, the removal of trees from private property. To maintain a nuisance on private property is a contravention of the law and the destruction of trees, with their beauty, shade and comfort, though legally permissible is not less blameworthy.

### FEDERAL AUTHORITY OVER FISHERIES

Representative Linthicum, of Baltimore, has introduced into the United States Congress a measure to deprive several states of their present control of their fisheries, and to vest this authority in the federal government. The bill has not, yet, been passed but its ultimate enactment is foreshadowed by the issuance of an executive order which secures, temporarily, its main objects. The proposed legislation is not general in scope, its specific aim being to correct abuses connected with the Chesapeake Bay fisheries. Hitherto, the individual states have had control, but have failed to exert it with any degree of uniformity or efficiency. The natural result has been a rapid decrease in the productivity of these fishing waters.

The situation is one of interest to Canadians. The experience of both Canada and the United States proves that, if natural resources are to be wisely administered, the limits of federal and provincial or state jurisdiction must first be clearly defined. In both countries this has been strikingly exemplified by difficulties which have cropped up in connection with the control of fisheries and, in Canada, the subject has caused long and tedious litigation. Mr. Linthicum's bill forms part of the wider movement to secure for the United States what Canada already has, viz., sufficient federal authority to safeguard fisheries and other resources from depletion.

## Co-operative Fire Protection

Forestry Associations, by United Efforts, have Secured Some Excellent Results

The co-operative idea in forest fire protection has gained real headway in eastern Canada during the past year. Not only have the two existing forest protection associations in Quebec made satisfactory records, and increased in scope and stability, but there is a movement in favor of organizing a third association, which will probably materialize for the season of 1916. The territory embraced within the latter includes the upper head-waters of the Ottawa river in the province of Quebec, and the new organization will be known as the Upper Ottawa Forest Protection Association.

The neighbour of the proposed new association on the east is the Lower Ottawa Forest Protection Association, which was organized in the spring of 1914. The territory patrolled in 1914 comprised 11,812 square miles, or 7,559,680 acres, on the watersheds of the Gatineau, Lievre, Rouge, Nation and Coulonge rivers. The staff consisted of a chief inspector, three inspectors, and 52 rangers. Although the severest drought of many years occurred during May, June and July, the fire loss did not exceed eight-tenths of one per cent of the amount of timber protected. The total number of fires extinguished was 154, of which 72 were caused by settlers, 15 by fishermen and sportsmen, 17 by lightning, 12 by drivers and woodsmen, 4 by railroads, 9 by trappers and Indians, and 25 of unknown origin. The total cost of the patrol and fire-fighting work was \$1.91 per square mile, or less than three-tenths of one cent per acre.

The territory of the St. Maurice Forest Protection Association lies next on the east of that of the Lower Ottawa Association, and comprises 12,707 square miles, or 8,132,416 acres. This represents an increase of 853,363 acres over the previous year. This association is the pioneer of its kind in Canada, having been three years in existence. Its staff during 1914 consisted of a manager, clerk, six inspectors, and 54 rangers. Two hundred and thirty-one fires were reported, of which 22 were set by river drivers, 10 by fishermen, 56 unknown. The balance were due to miscellaneous known causes. The total cost of patrol and fire-fighting was \$2.25 per square mile, or about one-third of a cent per acre. The cost of fire fighting was unusually high, on account of the extreme drought of the spring and midsummer.

The prosecution of offenders against the fire law has greatly lessened the fire evil, as has also the issuing of burning permits during the prohibited season. In District No. 1, where there were 105 fires in 1913, only four were

## Arbour Day in Canada

It should be a General Public Holiday, for Arboreal and Clean-up Purposes

In Canadian schools it has been the custom for years to observe Arbour Day in a greater or less degree. This custom should receive increased attention from educational bodies and the general public, for the country has a great need for the planting of more trees and shrubs, both in school and residential grounds. Canada is so dependent upon her forests that any measures which may be taken to extend the knowledge of the pupils respecting trees and the need for their protection will serve a useful purpose.

In each of the provinces, with the exception of British Columbia, provision is made for the celebration of Arbour Day. In most provinces it is a public school celebration only, the regulations requiring its observance by the planting of trees and shrubs in school grounds. It should be made a public holiday, instead of being confined to the schools, and include the annual clean-up, particularly as it is usually celebrated early in May. In this way, more general interest would be aroused in the work, and greater results secured, from an arboreal as well as an artistic and sanitary standpoint.

reported in 1914. The provincial government has vigorously prosecuted offenders against the fire law.

Of portages and trails, 514 miles were cut and cleaned, and six lookout stations were erected. Leaflets on forest fires have been issued to school children by the Association in co-operation with the provincial Department of Lands and Forests and the Department of Public Instruction. Also twenty-one thousand fire posters and one thousand pamphlets were distributed throughout the various territories under the supervision of the association.

There can be no doubt that through co-operation, much better results in fire protection can be secured at a smaller expenditure than under the old plan of individual effort. Not only do the limit-holders combine their efforts, but the provincial government co-operates actively also. It seems natural that the co-operative idea of fire protection should spread rapidly wherever the burden of fire protection is placed primarily upon the limit holders, as is the case in both Quebec and Ontario.—C. L.

For the year 1913, there were 291 deaths by accident in Toronto, while in 1914, the first year of the Ontario Safety League's work, there were 241.

## Back Yard Gardens

Simple Instructions for Those Interested in Doing Their Part to Increase Production

The accompanying plan for a small garden is intended as a guide to those desiring to make a beginning but who do not know quite how to go about it. It is not expected that the plan will be followed absolutely, as some may not wish to grow everything mentioned here, while others may desire to add some vegetables which are not included in this plan. The endeavour has been to make the

into the best physical condition possible,\* that is, have it finely pulverized before planting the seeds. Free the soil from rocks, sticks, large clods, straw matter, etc. If the soil is heavy clay it will be improved by adding a little sand and some well rotted manure. It is better that the soil be ploughed or spaded in the fall. If, however, it has not been previously worked up, apply rotted manure if available and turn the soil well over in the spring, and, if in sod, turn the sod well under and pack down. Then prepare a fine seed bed on the surface.

**Sowing**—The harder seeds such as peas, spinach, radishes, lettuce, carrots and onions may be sown as early as the ground is ready.

three inches apart, beans to four inches and peas to one inch apart. Corn may be planted in hills about three feet apart and thinned to three or four good plants to a hill. Cucumbers may be planted in the south row of corn between the hills and thinned to two or three plants in each space.

The crops here mentioned are likely to be successful with the amateur gardener, and as he gains experience he will be able to plan and manage a garden which will more fully suit his location and the requirements of his table.

A border of flowers will add much to the attractiveness of the back-yard and may be arranged according to individual taste. A garden the size of the one here shown, if on good soil and properly cared for, will yield an abundant supply of fresh vegetables for the table of an average family during the entire growing season.

Residents of cities, towns and municipalities going in for vegetable culture should send to the Publications Branch, Department of Agriculture, Ottawa, for one or more of these publications:

No. 49—The Potato and Its Culture, by W. T. Macoun.

No. 5—Asparagus, Celery and Onion Culture, by W. T. Macoun.

No. 10—Tomato Culture, by W. T. Macoun.

No. 11—Cabbage and Cauliflower Culture, by W. T. Macoun.

Nos. 7 and 8, Profitable Field Root Varieties, by F. G. Brown.

Also the bulletin entitled The Vegetable Garden, dealing with the cultivation of tomatoes, onions, cabbage, cauliflower, celery, melons, watermelons, cucumbers, beets, squash, pumpkins, carrots, parsnips, turnips, salsify (or oyster plant), radishes, peas, beans, corn, eggplant, peppers, spinach, lettuce, parsley, sweet herbs, asparagus and rhubarb.—F. C. N.

## Selection of Seed Potatoes

Of all the factors in potato growing, selection of seed is by far the most important. Had we bred our Shorthorn cattle as many of us have been in the habit of selecting and breeding our seed potatoes, we would now have no breed of Shorthorns. If we used only the culls and scrubs to breed from, our breeds of stock would soon run out. It has been careful selection and the application of scientific principles of breeding that has brought our pure bred live stock up to the present high standard. One reason why potatoes on many farms in this country have degenerated is that culls, screenings and small potatoes have been planted.

If no method of selection has hitherto been followed, the seed for this year's crop will have to be taken from the bin. Potatoes which are of medium size, smooth, free from disease and true to the type of the variety being sown, should be selected. During the

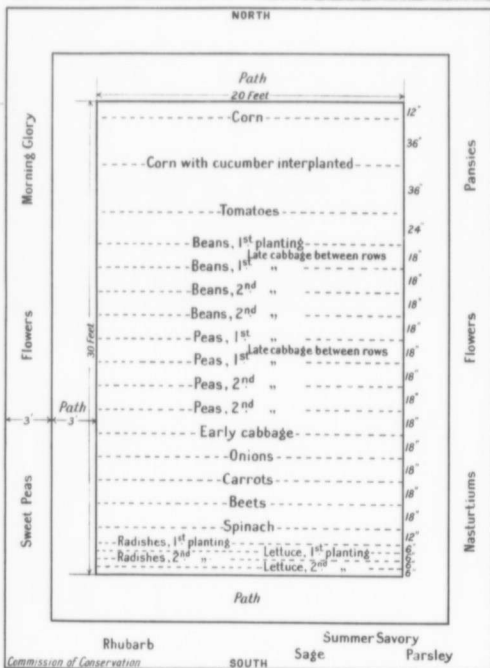
late summer or early autumn when the vines are beginning to die down, the best and most vigorous hills should be marked by putting down a small stake or twig. The hills showing most vigour of vegetation will usually give the best yield of tubers. When the crop is harvested, any poor hills among those marked should be discarded and the rest saved for next year's planting. One farmer doing illustration work for the Commission of Conservation planted potatoes thus selected and ordinary potatoes side by side. When harvested four rows from the selected seed yielded ten bushels per row, while the four rows on either side of the ordinary seed yielded seven and one half bushels per row. This was a gain in yield of 33 per cent.

This method of selection does not take much time and, as repeated experiments have shown it to be the means of substantial increases in yield, it should be more generally practised.—F. C. N.

## Canada's Fire Losses

With a fire loss averaging over two million dollars per month, or sixty-seven thousand dollars per day, the fire situation in Canada has reached the stage where some steps must be taken toward discovering the cause and evolving some means for a large reduction of this annual toll. Fire commissioners agree that a large proportion of fires are of deliberately incendiary origin, that a still larger percentage are of unconsciously incendiary, and that a not inconsiderable number are the result of carelessness or neglect. The number of fires resulting from causes beyond human control constitutes almost a negligible quantity in the year's total. How this situation should be handled is a difficult question. The law prescribes punishment for arson, but, under present conditions and with the machinery available, it is exceedingly difficult to secure convicting evidence. The insurance companies, being private corporations, cannot be expected to prosecute; unless the amount at issue is sufficiently large and the evidence is conclusive, it is cheaper for them to pay the loss than to contest it.

The police departments of our cities are not interested in fires unless it be shown that there are suspicious circumstances surrounding the occurrence. Even should this be demonstrated, there are no trained men connected with the police forces qualified to thoroughly investigate the circumstances. The Ontario legislature at its session in 1914 passed an Act to appoint a fire marshal, whose duty it would be to study the question of the annual fire loss. He would also have power to investigate fires which were deemed of suspicious nature and to prosecute where necessary. No further action has yet been taken under this legislation, and the appointment of a fire marshal is still in abeyance.



design simple and with few paths. This plan is made for a lot 33 feet wide and of sufficient depth back of the house to allow about 40 feet of land for garden purposes. Larger lots can be arranged according to the space available and size of garden required.

The crops should be arranged to have the slope, as pertains to height of crop, towards the south. That is, the tall vegetables, as corn, should be at the north, while the low-growing plants should be at the south, to allow as much sunlight as possible to enter.

**Seeds**—It always pays to get the best seed. Buy from a reliable firm.

**Soil Preparation**—Put the soil

The tender seeds such as corn, cucumbers and beans should not be planted until the ground is warm and the danger from frost is past. When planting, cover seeds uniformly and then firm the soil over them. This hastens germination. Lettuce, spinach, radishes, carrots and onions may be covered one-half inch in depth, beets one inch; while corn, beans, peas and cucumbers may be sown from one and one-half to two inches deep. Sow plenty of seed and thin out after the plants are up.

**Thinning**—Spinach need not be thinned. Beets may be thinned to about three inches apart, and those thinned out used as greens. Carrots may be thinned to two or