

Conservation

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

VOL. VI.

JUNE, 1917

No. 6

Heavy Losses from Barn Fires

Hay, Improperly Cured, May
Cause Spontaneous Combustion

During the years 1912-1916 inclusive, no less than 5,200 barns were destroyed in Canada, with an aggregate loss of over \$7,850,000. These, like the majority of fires, might have been avoided by the exercise of intelligent forethought and proper care. Investigation shows that the most prolific sources of barn fires are lightning and spontaneous combustion. Evidence gathered from all-parts of Canada and the United States proves that rick buildings are practically immune from lightning damage, the cost being a mere fraction of the possible loss in case of fire, it is of economic importance to the farmer that every barn should be efficiently protected by lightning rods.

While it is more difficult to arrive at conclusions with regard to fires caused by spontaneous combustion, it is generally held that such fires are of frequent occurrence. Owing to the excessive number of barns burned in Ontario during the summer of 1916, an investigation was undertaken by Prof. W. H. Day, Professor of Physics, Ontario Agricultural College, in a view to discovering the exact conditions favourable to spontaneous combustion in stored grasses. It was proved that large quantities of imperfectly cured hay were frequently stored in barns with little air ventilation, and that the high temperatures reached during fermentation resulted in a number of fires. Farmers are not generally aware that the cells in hay continue their existence for some time after being cut and, when the moist compressed mass is housed in close bins, a temperature of 132 deg. F. is quickly reached. Added to this, the heat from microscopic spores, germinating seeds and the heat of sun upon the roof may raise the temperature of the mow to 212 deg. when charring commences. The carbon thus formed absorbs oxygen and the mass grows hotter, until, at 265 deg. F., visible combustion begins to place. Bran, grain and sil-

Canada's Woodpulp Resources

Commission of Conservation Undertakes a Study of
Conditions Looking to Perpetuation of Supply

Canada is undoubtedly to become one of the world's greatest sources for the supply of woodpulp and paper. This industry has grown by leaps and bounds during recent years, and further large developments are to be anticipated, both in the east and the west. This will mean a constantly increasing strain upon our forest resources, and must result in careful consideration as to whether very large areas, in which the heaviest cutting is being done or is to be done, are not in danger of depletion.

The ravages of fire have been very serious in our pulpwood forests, and the question arises also as to whether present methods of cutting are sufficiently controlled to ensure the reproduction of another forest on cut-over lands. The area of pulpwood lands in Canada is so great that, if fire can be kept out and the reproduction of the forest secured through proper regulation of the cutting methods, the annual growth will provide the basis for an enormous development of the pulp and paper industry for all time to come. This means the practice of forestry, of which we have as yet in Canada only the beginnings.

The Commission of Conservation has started a study of these fundamental problems. This investigation will have for its objects the determination of the extent to which cut-over pulpwood lands are reproducing valuable species in potentially commercial quantities; the effect of fire on reproduction, and the rate of growth of the reproduction present, to determine how long after cutting one may reasonably expect another crop. The answer to these questions should go far in determining what additional measures are necessary to place the business of pulpwood production upon a thoroughly permanent basis.

The work for this season will be under the direction of Dr. C. D. Howe, of the Faculty of Forestry of Toronto University. A co-operative arrangement has been made, under which the first part of the study will be made upon the limits of the Laurentide Company, whose forester, Mr. Ellwood Wilson, will co-operate in the field investigations. It is expected that similar studies will be made in other sections of the pulpwood forests of Canada during succeeding years. The results will undoubtedly be of the greatest interest to all who are directly or indirectly concerned in the perpetuation of this great industry.—C.L.

age may also ignite spontaneously under similar conditions. The remedy for spontaneous combustion is simple and easily applied. All hay should be perfectly dry before storage. In mixed grasses, special care should be given to the clover. Timothy may appear perfectly dry while the heavy stalks of clover may retain a large percentage of moisture. All barns should be provided with ample top ventilation. If these simple matters are

given the attention they deserve, spontaneous combustion will cease to figure as a cause of barn fires in Canada.

Until recently, British Columbia herring was little used except as bait for halibut fishing. During the past season, after experiments, 22,000 cases of herring were packed in various ways, such as kippers and in tomato sauce and oil.

Get Ready the Machinery

Time May be Saved at Harvest
by Being Prepared

Time is money on the farm at harvest time. Now is the time to repair the mowers, binders and rakes which will very shortly be required for service. All machines should be inspected now and, if any parts are broken or missing, they should be obtained immediately. It is much better to secure what is needed now than to risk having to make a special trip to town during the busy season, thus causing a serious delay and, possibly, extending the harvesting of the hay or grain crop into wet weather. It is also an excellent plan to keep on hand a few extra pieces or parts which need frequent renewing, such as knife sections, canvas slats, reel slats and braces, rivets, etc. These are convenient to have and will often save time and annoyance.

Clean out the oil cups and oil all running parts of the machinery a few days before it is to be used. This will allow the oil to penetrate to the bearings, and permit the machine to quickly get into smooth running order.

The knives should all be sharpened and in readiness. These things should be particularly attended to this year. Help is scarce, production is needed, and if crops are to be saved with as little loss as possible good management must prevail. It is good business to be ready for the harvest season. Do it now.—F.C.N.

RECLAIMING WASTE PAPER

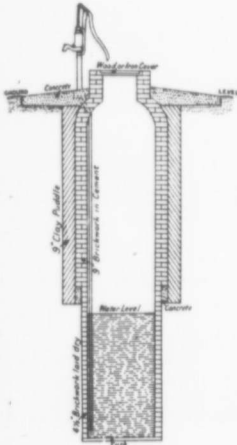
A process, known as the Jasper-son de-inking process, by which the printing ink is removed, has been developed for the reclamation of printed papers. This will permit of old newspapers, magazines, etc., being utilized for the making of newsprint. Previously, this material could be used only for the making of the rougher grades of paper, where the ink content was not a drawback. The application of this process should be a further incentive to the saving of waste paper.

Wells and their Construction

The Home Water Supply Must be Safe from Pollution

Apart from municipal water works, our water supply is secured almost entirely from wells. Especially is this true on the farms and in the smaller villages. It is of primary importance that the well be properly constructed, that it be situated far from any source of possible pollution, and that the water be of satisfactory quality.

The safest form of well is the deep, or bored, well, carried down



through earth and rock beyond any danger of surface water and tightly and securely lined with piping. The piping is carried up to a tight-joint with a pump or other elevating means at the top. Around this well, a concrete platform should be laid of at least eight feet diameter, sloping away from the well, to prevent surplus water, or water from melting snow, working down alongside the pipe.

The shallow, or dug, well is much more common. This type is usually the most carelessly constructed and the source of much danger to health. Such a well, however, may be constructed in a manner as to be safe, insofar as the collecting and containing of the water supply is concerned. It must be understood that *no well can possibly be satisfactory if the source of the water supply is polluted.*

The illustration herewith shows a well which is as safe as possible. For the upper nine feet the well is water-tight, the sloping platform diverts the surplus water from the well, and the top of the well is

carried above the level and provided with an absolutely tight cover.

The pump has been placed on the concrete platform, on the ground level, the pipe is embedded in the concrete and carried to the bottom of the well where the water is coldest. There is considerable advantage in not having the pump at the top of the well. Surplus water is continually spilled, and, as more or less mud, barnyard manure, etc., is carried on the boots of those using the well, this water becomes polluted and seeps through the cover.

In many summer resorts, defective wells are the cause of much sickness, and many cases of typhoid among urban residents have been traced to this source. Too much care cannot be exercised in seeing that drinking water—one of the essentials of life—is thoroughly protected.

Electric Plants for the Farm

Small Equipments Save Much Labour on the Farm and in the Farm Home

One of the recognized necessities in connection with our increased agricultural production is better and more attractive conditions on the farm, and among the many suggestions the use of electricity should be considered. Electric power is a great convenience in the farm home, and saves much time to the farm help. The farm or country home situated within the area of an electric system of transmission or distribution is fortunate, but the vast majority must look to the small isolated plant.

This alternative, however, is now much more promising than a few

Saving of Waste Material

Paper, Rags and Rubber and Sources of Revenue when Saved by Householders

It is an old axiom that "the people grow rich on what others throw away." This is especially true in regard to waste paper, rags and old rubbers.

In the past year much progress has been made in the saving of waste paper, but as yet a very small proportion of this material is available for reclamation.

Many reports of success in the work and of extensions of the waste paper collection movement have reached CONSERVATION, and we doubt it only requires initiative on the part of a few public-spirited citizens to promote a proper collecting scheme in many of our municipalities.

The old fashioned rag-bag, almost a thing of the past in Canada. True, the incentive collecting rags, in the remunerative received for them, was not such to induce activity in that direction but under present conditions we find that a considerable economic loss has been sustained by its discontinuance. Rags, after thorough disinfection, are used for many purposes. The cotton rags are used mostly in the making of better grades of paper; the woollen stockings, after being macerated are used for colouring the grades of paper known as granite. Woolen rags are mainly used for the making of shoddy, a common ingredient in woollen goods. It is first disintegrated; the short fibre is mixed with new wool of longer fibre and again spun into yarn. Much of the greater portion of our woollen rags was imported prior to the war but with the embargo on exports the supply was cut off; prices of woollen goods have, therefore, greatly advanced.

Another discard is old rubber material. This is valuable, also, by means of collecting boxes, and is usually placed at its door a box to receive old rubbers, and was surprised to find how soon it earned ten dollars by this means.

If Canadians were more particular in saving the cents, represented by waste, many millions of dollars would be available for loans and the cost of living would also be materially reduced.

Experiments in the use of laboratory grass pulp have been successfully carried out in Australia. There are millions of tons of waste grass growing in Queensland, and it produces three crops a year, and is considered a curse to the country. It resembles esparto grass, which, when dried, yields as high as 50 per cent of first-class paper-making pulp.

THE HOME WATER SUPPLY

Water in the house, to use lavishly for all wholesome conveniences, seems at first thought beyond the means of frugal people, who have earned by hard labour all they have to spend. To many, who have not closely considered the costs and the benefits, it appears an extravagance. Instead of that it is one of the greatest of house economies. Almost every farmer could afford the luxury of all water conveniences in his home. Like their fellows, sunshine, wholesome food and fresh air, they do not weaken the muscular, mental or moral fibres of life. When one has been compelled to use any of these debased for a time how satisfying is the pleasure of purity and abundance.

As an investment for the home I know of nothing likely to yield so much in return in saving women's strength, in increasing house comforts, in preserving health, in imparting satisfaction in housework and in elevating the general tone of the material side of living.—DR. J. W. ROBERTSON, in "HOME WATERWORKS."

Protecting the Water Supply

Catchment Areas Being Re-forested to Conserve the Run-off

The beneficial effect of proper supervision, and particularly of maintaining forest growth, in water-works catchment areas, is being more fully recognized. A recent example is in the state of Pennsylvania, where the Commission of Forestry urged the planting of trees on those portions of their water-works catchment areas not useful for agriculture.

Favourable replies were received from one-half and, of the remainder, over 100 had no land requiring planting. To those who replied favourably, all planting facilities were afforded, including the services of a forester, and seedlings were offered at bare cost of packing and shipping, about 50 cents per 1,000 seedlings delivered. Applications were made for a total of 446,100 young trees for use on about 230 acres.—L.G.D.

years ago. Many factories manufacture this type of equipment, the operation of the plants has been simplified and cost has been much reduced.

These small plants may be advantageously used for many domestic purposes in addition to lighting, such as ironing, washing, toasting, pumping water, etc.; and also for the very important use of charging storage batteries.

There are a number of these small plants now on the Canadian market, ranging in size from 175 watts, and costing from \$300 upward. Six different types were described in a recent electrical magazine, some using storage batteries in conjunction, and generally using a gasoline engine as a prime mover. They are usually operated at a very low voltage. These small plants are perfectly safe, so far as the handling of the electric energy is concerned.—L.G.D.

Use all the cereal foods possible. Their protein is quite as valuable as animal food protein, and cheaper.

Commission of Conservation

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

CONSERVATION is published the first of each month. Its object is the dissemination of information relative to the natural resources of Canada, their development and the proper conservation of the same, together with timely articles covering town-planning and public health.

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

OTTAWA, JUNE, 1917

We recognize as natural resources all materials available for the use of man as means of life and welfare, including those on the surface of the earth, like the soil and the waters; those below the surface, like the minerals; and those above the surface, like the forests. We agree that those resources should be developed, used and employed for the future, in the interests of mankind, whose rights and duties to guard and control the natural sources of life and welfare are inherent, perpetual and inalienable. We agree that those resources which are necessities of life should be regarded as public utilities, that their ownership entails specific duties to the public, and that, as far as possible, effective measures should be adopted to guard against monopoly. — *Declaration of Principles of North American Conservation Conference.*

People with a garden, and the necessary time, can greatly lessen the food cost by canning their own fruits and vegetables.

Home-grown fruit is cheaper than any other. A small garden may be made to yield a great variety.

Keep down the weeds in the garden. They take proportionately as much nourishment from the soil as the vegetables.

Piles of trash and rubbish in alleys, corners and in out-of-the-way places around the yard, or in the fire or cellar, are inanimate "fire traps" waiting only for the opportunity or the slower process of spontaneous combustion to burst into flame.

Fighting the Pine Blister

Co-operation Between Government Departments to Eradicate the Disease

Arrangements have been completed for thorough co-operation between the Dominion Department of Agriculture and the provinces of Ontario and Quebec, in the investigation, location and eradication of the white pine blister disease in those provinces. The Department of Agriculture will also conduct investigations in Nova Scotia, New Brunswick and British Columbia, where the disease is not yet known to exist. Should it be found in those provinces, co-operative arrangements will no doubt be made, and vigorous action will be taken to combat its spread.

The pine blister disease has gained a strong foothold in the north-eastern United States, and has been discovered also in Ontario and in Quebec. In the former province, the situation is most serious in the Niagara peninsula. The white pine forests of Canada are valued at \$200,000,000, so that the most thorough measures are justified for the protection of this great asset. The young forest growth suffers most severely from this disease, and it is of the greatest importance that the large area of white pine reproduction in eastern Canada receive protection, in order that they may reach maturity and add their quota to the wealth of the country.

Subject to the general supervision of Dr. J. H. Grisdale, Director of Experimental Farms and Acting Dominion Botanist, the field work will be in charge of W. A. McCubbin of the Field Laboratory of Plant Pathology at St. Catharines, Ont. A senior and two junior assistants are provided, who will specialize in research work calculated to determine the best methods of control of the disease in question.

The actual work of scouting for the disease and eradicating it when found will be performed by men provided by the forest services of Ontario and Quebec respectively. The salaries of these men will be paid by the provinces and their travelling expenses by the Dominion. Twenty such inspectors are now at work in Ontario, and twenty in Quebec. In the latter province, the scouting will be under the direction of Chas. C. Gosselin and Henry Roy, of the Quebec forest service, on the north and south shores of the St. Lawrence, respectively.

Until June 10 the work of location and eradication will be confined to white pine. After that date similar work will be in hand on the currants and gooseberries, which are alternate hosts of the pine blister disease.

Work is now under way, in connection with clearing currants and gooseberries, both wild and cultivated, from a strip one mile wide, along the bank of the Niagara river, from Niagara-on-the-Lake to Fort Erie, to form a safety belt which will prevent the disease from passing over the river into New York state. On the New York side of the river, similar work will be done by the state, for the protection of Ontario. Pines in this strip on both sides of the river will be dealt with later if necessary.

In connection with the location of the disease on currants, it is proposed to utilize the services of public school pupils. The currant stage of the disease is readily recognized and the pupils will be able to render a valuable public service by reporting any outbreaks found. Literature and coloured illustrations will be furnished, and instructions given through the teachers.—C.L.

Saving the Surplus

Home Canning of Vegetables is Practicable and Necessary

The shortage of labour and the scarcity and high price of tin cans has very materially reduced the output and increased the cost of canned vegetables; so much so, in fact, as to make some lines almost prohibitive to the average family.

There is little reason, however, for any Canadian family not providing a sufficient supply for next winter. Home canning of vegetables is a simple matter; when put up in ordinary glass jars, securely sealed, they are equal if not superior to the factory brand, and the cost is much lower.

Peas, string beans, sweet corn, pumpkins, beets, tomatoes and all vegetables which will not keep without cooking, may be canned.

After cleaning and preparing the vegetables to be preserved, they are enclosed in a cheesecloth bag and parboiled for five minutes. They are then dipped in cold water, packed in glass jars, boiling water poured over them to fill up all crevices, and the lids loosely adjusted. The jars are then placed in an ordinary boiler filled with water, with plates or dish covers to prevent the jars touching the bottom of the boiler, and are allowed to boil steadily for 3½ hours. When lifted from the boiler, the lids must be screwed down tight, and the jars allowed to gradually cool, care being taken that they are not exposed to drafts, as a sudden cooling may crack the glass.

Vegetables thus canned will keep and be a welcome addition to the table in lieu of the high-priced canned goods, and the surplus supply of vegetables, which otherwise might be wasted, will be conserved.

Infant Welfare

Sanitary Conditions Largely Responsible for High Death Rate

If insanitation is without influence on the rate at which children die, how comes it that towns notoriously insanitary have an infant death rate four or five times that of clean well-governed cities, that in the certain overcrowded slum areas the children die six times as rapidly as those in better class residential districts, that among 1,000 infants born to unskilled labourers only 700 survive the first year of life, while out of the same number of births 960 babies of professional men reach their first birthday?

If the causative organism of diarrhoea and enteritis is to be found in decomposing filth, particularly that of human origin, why does the death rate from these diseases suddenly increase during the third quarter of the year? The answer has been supplied by the investigations of Niven and other workers in the field of preventive medicine, who have shown that a prevalence of flies is closely followed by an increase in the number of deaths from summer diarrhoea, and that as the flies disappear, or become inactive, the epidemic passes away.—*Dr. Joseph Cates in Journal of the Royal Sanitary Institute.*

Utilisation of Waste Materials

Britain is finding herself in many ways owing to the war. One source of much revenue, as well as of a requisite in the preparation of explosives, is found in the camp refuse. The *Yorkshire Post*, in describing the results secured under a process for utilizing the camp refuse by the Quartermaster-General's Department, says:

"While the English-made glycerine was \$290 per ton, the United States fixed their figure at \$120 per ton. During the first month the scheme was put into operation, a weekly return to the Army for camp refuse was made of \$9,000. In January of this year, the weekly amount increased to \$47,500, representing approximately \$2,500,000 annually returned to the Army for waste rations. The production of glycerine from these waste camp products enabled the Ministry of Munitions to dispense with over 1,000 tons of foreign glycerine at a saving in cost of \$900,000." (Forecasting figures on basis of \$5.00 equivalent of £1.)

Health, civic beauty and safety from fire are all promoted by every effort put forth toward cleaning up.

Sewage Disposal

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

The disposal of sewage is a continual source of trouble about the farm home and in scattered settlements. The use of privy pits or cesspools has proven ineffective and in many cases a source of disease. They hold the wastes in a state of putrefaction, which gives off foul gases, and the liquid leachings become a source of contamination for 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.

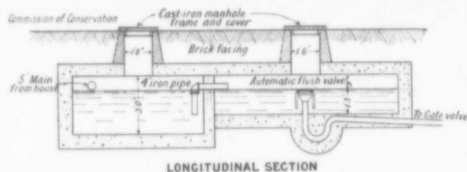
A water supply is necessary for the collection of the material, and this can be obtained and piped into the house by means of a hydraulic ram operated by a small stream of potable water or by means of a deep well fitted with windmill or force pump.

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

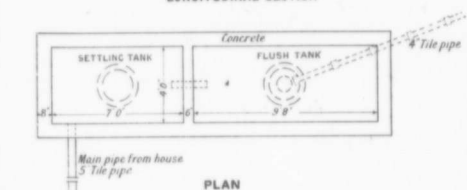
Illustration No. 1 shows a good type of tank for handling the sewage for a family of five and having a capacity of 350 gallons per day.

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 prevent 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 at once.

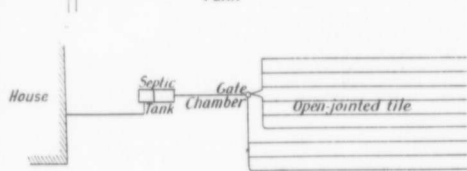
The cost of a tank built of concrete, such as the one shown, will



LONGITUDINAL SECTION



PLAN



Subsurface irrigation for level ground

City No. 92

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. One of these septic tanks was constructed at Aymer, Que., at a total cost of \$53.00.

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 subsurface 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 porosity 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.

Plan for Next Year's Seed

Select the Best Part of the Field and Give it Special Attention

Of 400 farmers visited in Dundas County, Ontario, during the summer of 1916, only three were found to be following a really systematic selection of their seed grain; only 23 per cent were saving the best part or parts of their fields for seed. Practically all of the farmers visited stated that they cleaned their grain for seed, but it was found that 74 per cent cleaned it only once through the fanning mill. It is quite plain that sufficient attention is not being paid to the seed grain. It has, been shown, time after time, that, other things being equal, the best seed will produce the best crops. It is, therefore, surprising that not more than 23 per cent of the farmers were found to be keeping their best grain for seed, and that 74 per cent cleaned it only once through the mill. If the grain from the best part or parts of the fields is stored and then graded or fanned until all the small and inferior kernels are removed, the quality will be greatly improved. By improving the seed the net profit on a grain crop can be greatly increased, such action increasing the yield a little without increasing the cost of production.

It is not much trouble to keep apart the best portion of the crop

Extension of Co-operation

Forest Protection Makes Rapid Strides by Formation of New Associations

A new link has recently been forged in the chain of co-operative forest fire protective associations which are rendering such valuable service in protecting the forests of Quebec from destruction fire. The new organization is the Laurentian Forest Protective Association, of which R. L. Seabrook, formerly an inspector in the Maurice Forest Protective Association, is manager, and Paul Owen is secretary-treasurer, with headquarters at Quebec.

The territory which will be protected by the Laurentian Association comprises some 15,000 square miles in the Lake St. John Saguenay district, joining on southwest the boundary of the Maurice Association and extending northeasterly to the watershed between the Sault au Cochon and Bersimis rivers. The western boundary is a line extending in a northeasterly and southwesterly direction about half way between the St. John and Lake Mistassini. To the east, the association territory extends to the St. Lawrence river. The greater portion of the Laurentian park is included within the exterior boundaries of the territory enclosed by these boundaries.

This makes a total of some 700 square miles in the province of Quebec now under the protection of the St. Maurice, Ottawa River and Southern St. Lawrence and Laurentian Forest Protective Associations. A very large percentage of the licensed Crown timber land of the province is thus brought under improved methods of fire protection. The Provincial Government is partner in this arrangement, such cases, in consideration of the protection afforded unless Crown lands.—C.L.

for seed. It would even pay to give special care to a special small field from which to obtain seed for the following season's crop. There is, perhaps, nothing on a farm that will give a more profitable return than the time spent securing a supply of good seed. Plan now to save the choicest of this year's crop for next spring's seed.—F.C.N.

Thousands of persons every year are crippled or killed because they fail to place a value upon their own safety.

A one to two-year old soil, well ploughed under, will enrich the soil as much as would manure applied at the rate of 10 to 12 tons per acre.