

## Fish Poisoned by Industrial Wastes

**Pollution of Streams is Double Waste**  
—Loss of By-products and Injury to Aquatic Life

Dr. Victor E. Shelford, of the University of Illinois, has conducted a series of experiments to determine the effect upon fishes of various pollutions. His researches indicate the following conclusions:

(1) Pollution is likely to be most injurious during periods of low water or during winter when ice prevents aeration.

(2) The most sensitive period of a fish's life is probably just after hatching.

(3) The effect of poisons on the minute animals which form the food supply of fishes is as important as the effect upon the fishes themselves.

(4) Many wastes, e.g., sawdust, sewage, etc., cover the river bottom and make conditions unfavorable for eggs.

(5) Fish will turn back from acid effluents and from sulphuretted hydrogen, but they sometimes show a preference for water polluted by tarry wastes and, of course, succumb.

(6) If, through extensive pollution, a river is depleted of its fish life, natural recovery will only be very slow even though the pollution is stopped. To re-stock with the fish only is not sufficient. The entire association of plants and animals must be revived.

Many of these effluents which destroy fish life could not only be rendered innocuous, but could actually be made beneficial, through the extraction of by-products. Yet, if it is suggested that this be done, one is frequently met with the objection that the by-products recoverable are not sufficiently valuable to cover the cost of installing and operating the necessary plant. But the real value of the by-products is their market value plus the value of the fish catch and other savings effected through the neutralization of the pollutions.

The principal wastes discharged into our streams are: Sewage and the wastes from gas plants, oil refineries, textile factories, paper mills, tanneries, chemical industries, etc.

Now sewage, for instance, can be made to yield considerable quantities of fertilizer and grease, as well as moderate amounts of ammonia and glycerine and, if the residual effluents be aerated, the danger to fishes would not be great, whereas untreated sewage gives rise to large quantities of carbon dioxide and ammonia, which are injurious to fish life. As sewage should be treated in any case, out of consideration for public health, the question of extracting by-products is not one of profit, but of greater or less expense as compared with other methods of treatment.

The wastes from gasworks are especially important, including such substances as creosote, naphthalene, carbolic acid, benzene and ammonia. From these, again, are derived many valuable dyes, drugs, explosives, antiseptics, etc.

## PROS AND CONS OF SWEET CLOVER



**SWEET CLOVER TEST ON AN ILLUSTRATION FARM IN DUNDAS CO., ONT.**  
In this picture the man is shown standing in the seedling of common red and timothy.

Although opinions differ widely regarding the usefulness of sweet clover, its utilization as a feed for all classes of live stock has increased rapidly in many parts of the country. Some of its advantages are:

- (1) It is rich in protein;
- (2) Does not bloat cattle as readily as other clovers;
- (3) Is an excellent milk producer;
- (4) Furnishes pasture early in spring;
- (5) Is a nitrogen gatherer;
- (6) Is a valuable crop for honey bees;
- (7) Is a splendid green manure crop;
- (8) Grows in many places where alfalfa or red clover fail;
- (9) Prevents erosion of the soil.

Some of its disadvantages are:

- (1) If allowed to grow too large the stems become hard and bitter;
- (2) It is harder to cure into hay than ordinary clovers;
- (3) Stock must become accustomed to it before they will eat it readily.

Sweet clover has been grown by a number of farmers in Dundas county, Ont., where illustration work is being conducted by the Commission of Conservation. One man writes: "I have had it one year as



**SWEET CLOVER TEST ON AN ILLUSTRATION FARM IN DUNDAS COUNTY, ONT.**  
In this picture, the man is standing in the sweet clover, which came through the winter in much better condition than the clover and grass, though both seedings were sown under the same conditions and with the same nurse crop.

pasture. After the cattle learned to eat it they stayed right on it and it furnished a lot of good pasture." Another says: "It has been very successful on gravel but hard to get a stand in sand. The cattle like it as both pasture and hay and do well on it. I find it extra good for milk production and it will grow where other hay will not grow at all." Another states: "The growing of sweet clover has been a benefit to me. It grows on soil where I cannot grow any other hay or pasture crop. I like it as well as any of the other clovers for hay for cows. It grows a bountiful crop but is hard to cure as it has to be cut before the hottest weather comes. As a pasture, it produces more milk than any of the clovers I have tried. I had 400 lbs. of seed from three-quarters of an acre. I have not had any winter-killing yet."

When common red clover or alfalfa can be grown easily on all parts of the farm it may not be advisable to sow sweet clover. There are, however, many places in Canada where clover and alfalfa will not grow well but where sweet clover will yield good crops. The accompanying illustrations demonstrate this fact very clearly. Prejudice should not prevent the use of a crop that would be profitable under such circumstances.—F. C. Nunnick

## Canadian Dairying Faces Big Problem

**High Prices of Feed and Labour Great Difficulty—Situation—Our Cheese in High Esteem in British Market**

Co-operation has been the chief factor in the success that has been attained by the Canadian dairy industry. It was not until the development of co-operative cheese factories and creameries within the past 30 years that the markets for Canadian butter and cheese became more than a local importance. But for twenty years at least Canadian cheddar cheese has held a premier place on the British market, the most important and exacting in the world. Canadian dairy butter has never been held in high repute by the export trade and a distinct prejudice had to be overcome by the creameries. Consequently, butter has not attained the status of cheese in the markets of Great Britain, where both Dutch and Irish butter normally command slightly higher prices.

In 1917, there were 3,418 factories in Canada producing cheese, butter and condensed milk. These factories handled nearly 3,000,000,000 pounds of milk in that year.

The value of the products marketed was more than \$41,000,000. Ontario and Quebec, combined, produced 97 per cent of the factory-made cheese and nearly 74 per cent of the creamery butter. But the western provinces are steadily increasing their output, especially of butter. As the need for restoring the fertility of the soil of the prairies becomes more urgent, dairying is certain to develop rapidly, for no other branch of farming is so useful for maintaining the productivity of the soil. The exceptionally high prices of feed and labour during the recent years have given a temporary set-back to the industry. The

labour problem is, perhaps, especially difficult, for dairy farming demands skilled labour throughout the year. Even with the assistance of milking machines, cream separators, testers and other modern equipment the human element still remains the crucial factor, for the industry is to be successful. The Dominion and Provincial Departments of Agriculture, the Agricultural Colleges and the leading dairymen of the country have been occupied with the solution of these problems. They are also taking active means to banish scrub stock and to find better methods of utilizing such by-products as skim milk and whey. Under such leadership the solution of these and kindred problems may well be hoped for and Canadian dairying will continue to be one of our greatest national industries.—Donnell

Canada probably has in use a greater proportion of aluminium transmission lines than any other country. A recent survey by the Commission of Conservation shows that on all lines in the Dominion operating at 10,000 volts and over there are 13,000 wire-miles of aluminium and 8,000 wire-miles of copper.