

Recovering Alcohol from Sulphite Waste

Ethyl Alcohol and "Coal" Produced from Sulphite Liqueur that Now Pollutes Streams

The weakest point in Canada's industrial position is her dependence on outside sources for a large proportion of her fuel. Any development which will reduce this dependence on imported fuel is of essential interest to Canadians.

In a recent number of the *Pulp and Paper Magazine*, an article by Mr. N. E. Clementson, of Sweden, describes a method of manufacturing alcohol and a fuel which he calls "coal" from the waste liquor of sulphite pulp mills. This process is being used commercially in forty-five plants, chiefly in Europe, but also in one plant at Mechanicville, N.Y.

The waste liquor, or sulphite lye, as discharged from the pulp mills, carries with it about 50 per cent of the wood substance, in the form of free and bound sulphurous acid, organic acids, fermentable and unfermentable sugars, organic sulphonates, etc.

The quantity of these dissolved organic substances in the lye varies considerably with the kind of wood used and the process followed in the pulp mill. Only about one-half can be secured in a sufficiently concentrated form to pay for treatment.

The first step in the process is to get rid of the acids. Fermentation, which changes the sugar into alcohol, is then induced by adding yeast and nourishment for the yeast. When the fermentation has proceeded far enough, the alcohol is distilled off and the residue is evaporated to obtain the "coal."

The alcohol so obtained is over 95 per cent pure ethyl alcohol, and is equal to that made from grain, potatoes or other materials, which can be used to better advantage as food.

Ethyl alcohol is valuable for many purposes. In the chemical industry, it is used in the manufacture of ether, acetic acid, chloroform, chloral, iodoform, etc., and in the preparation of aniline dyes, varnishes, etc. It is used also for heating and lighting purposes to some extent. The sphere in which it gives greatest promise, however, is as a substitute for gasoline. In Sweden during the war, the scarcity of gasoline necessitated increased use of alcohol for driving motors, and it was found that, by adding 10 to 15 per cent of benzol for carbureting and by making some minor changes in the carburetor alcohol could be used to advantage. If motors of high compression were used, it was found to last as long as gasoline. This field offers opportunities for alcohol, provided it can be produced at a cost that will enable it to compete with gasoline.

It is claimed, that in a pulp mill manufacturing 20,000 tons of

sulphite pulp per year, 320,100 gals. of 95 per cent ethyl alcohol can be produced, at an average cost of 21.4 cents per gallon, by this process.

It is claimed also that the "coal" derived from this process can be manufactured for \$3.00 per ton, which, on a calorific basis, is equivalent to \$5.13 per ton for the best steam coal. The quantity that can be recovered varies, but in a mill producing 21,000 tons of pulp, the equivalent of 7,200 tons of steam coal could be produced, which should be sufficient to run the mill. If by this process even the sulphite pulp mills can be made self-sustaining as far as fuel is concerned, it will represent a tremendous saving in our annual imports of coal.—*R. D. Craig.*

Electric Energy for Our Rural Districts

Assistance by Farmers During Slack Periods Would Reduce Costs

Generally speaking, it may be said that Canadian industrial centres are exceptionally well provided with cheap electrical power, mostly hydro-electric. As Canada's wealth and prosperity are due, in a large measure, to her agricultural development, it is highly desirable that electric service should be extended also to the farms to enable them to enjoy the full benefits of this service.

The *Electrical World* recently remarked editorially that rural electric service helps to solve national problems. Anything which encourages decentralization of the population, by making rural districts better places in which to live, ought to be supported by every available means. If electric light and power were generally available in the agricultural regions, there would be more encouragement for local industries and better opportunities for building up country districts.

Other provinces, including our Prairie Provinces, should work along the same lines as the Hydro-Electric Power Commission of Ontario. New legislation was obtained in this province last year to facilitate rural electric distribution. Men are engaged continually in making surveys in different parts of the province as to the kind of farms, and the market for power.

It has been suggested that their farms could help build the lines. During several months in the year the farmer's work is slack, and he could assist in constructing lines if it were to his own benefit to do so. There are several different suggestions, one, that all the lines be built by the government; another, that the farmers supply the labour and cartage at a certain rate; and third, that the commission supply a working superintendent who would show the farmers how to build the lines, haul poles, dig holes and string the wires, with the exception of tying-in, which would be done by the lineman.—*L. G. Denis.*

Berry-Pickers Start Destructive Fires

'Destruction of magnificent timber in a six-mile area, mountain slopes now blackened wastes, and thousands of dollars expended in wages to fire-fighters, are some of the results of Lynn Valley's greatest forest blaze. . . . And all due to the carelessness of a few berry-pickers.'—*Vancouver Province.*

In New Brunswick last year 60,000 acres of Crown lands were burned over. During the season 2,410 permits were issued for slash burning, and of these only 19 got beyond control. There were 57 convictions for infractions of the forest fire law.

British Columbia had 389,846 acres burned over, in 1920, the result of 1,251 fires, of which 246 were chargeable to campers and travellers.

In the Prairie Provinces, 1,313 fires burned over 5,491,215 acres. Campers and travellers were responsible for 152 of the fires.

Berry-pickers, camping parties, hunters and others who visit the woods for any purpose whatsoever, have a great responsibility for the care of the forests. The city resident looks forward to the time when he can get away to the woods, but he seldom gives a thought to the fact that only the strictest precautions in connection with the camp fire can preserve the forest which has such a fascination for him.

Conserving Labour in Handling Grain

The Pennsylvania railroad has recently installed at Baltimore four grain-car dumping machines. The grain-car is run on to the machine, end and side supports are automatically placed, the removable grain door is pushed in, and the car is then tipped, first sideways 30 degrees, then endwise to an angle of 45 degrees; the endwise tipping is then reversed, so that the grain is completely discharged from the car. The time occupied in emptying the car, including placing and removing, is seven minutes. Each loader replaces the labour of 16 men, and will more quickly release the cars for service.

Migratory Birds

Increased Penalty for Violations of the Convention Act

An amendment to the Migratory Birds Convention Act increases the penalty for violation of the act from \$100 to \$300. Section 12 now reads as follows: "Every person who violates any provision of this Act or any regulation shall, for each offence, be liable upon summary conviction, to a fine of not more than three hundred dollars and not less than ten dollars, or to imprisonment for a term not exceeding six months, or to both fine and imprisonment."

CANADA'S MINERAL PRODUCTION

The value of the mineral production of Canada, by provinces, in 1920 was: Nova Scotia, \$30,187,533; New Brunswick, \$2,225,261; Quebec, \$27,722,502, Ontario, \$27,749,178; Manitoba, \$3,900,207; Saskatchewan, \$1,711,580; Alberta, \$33,721,898; British Columbia, \$38,044,915; Yukon, \$1,512,006. Coal constituted by far the greater portion of the mineral production of Nova Scotia, Saskatchewan and Alberta.

Providing Power for Canadian Industry

Competition in Manufacturing Will Depend upon Supply of Cheap Power

Figures given by Henry Flood, Jr., in connection with the super-power survey of Eastern United States, illustrate the industrial importance of proper power supply. Based on past progress, it is evident that power requirements are due to increase with extraordinary rapidity in the very near future, and the value of hydro-electric energy will become more and more evident. Great as are the power requirements of to-day, they are small compared to those of to-morrow.

In the northeastern portion of the United States, considered in the above mentioned survey, the total power requirements have increased from 15 billion kilowatt-hours in 1910 to 27 billion in 1920, and it is estimated that they will reach 50 billion by 1930. If the predicted progress in electrification of the heavy traction railways of this region is achieved the present requirements of 500,000 k.w.h. per year will increase to about 6,000,000 k.w.h. by 1930.

In 1918 England undertook a study of its power conditions; a definite policy has been worked out, and the form of centralized control adopted will do much to secure an adequate and standardized power supply.

In Germany a system is actually under construction which provides for very large power plants, situated at coal mines, to supply cheap energy for manufacturing purposes. Switzerland, Holland, Italy and France are each taking active steps to make available more power for their industries.

Canada is possessed of exceptional advantages, with her bountiful latent power resources, but it is also evident that action for co-ordinated development and distribution is essential, in order to reap the maximum results.—*L. G. Denis.*

According to "The School," in a safety first crusade, carried out among the school children in Detroit last year, it was found that out of some 600 accidents classified by cause, 450 were associated with automobiles.