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## Some Opportunities for Industrial Research

**CHEAP Fertilizers are Needed by the Farmers — Value of Wood Waste — Utilization of Waste at the Pit Head—Can Sulphur be Eliminated from Magnetic Iron Ores?**

By A. T. DRUMMOND, LL.D.

**W**HILST the scientific division of industrial research is now represented by the newly appointed Advisory Council and by the chemical, electrical, forest and other laboratories which will investigate the problems furnished by the vast resources of the country, our manufacturers, miners and agriculturists should remember that they represent the important business division which must show initiative in seeking improvements and economies in their various lines of work, and active co-operation with the scientific division in perfecting these improvements and economies.

Probably among the greatest needs of the Canadian farmers are cheap fertilizers. Something must be done to increase the production per acre more nearly to the level of that of Great Britain, or, better still, to that of Germany. Distances are so vast in this country that in order to reduce transportation charges, fertilizers must be as free as practicable from all associated minerals which are of no value to the soil. Potash feldspars are available in quantity, but their cheap reduction, whether by fusing or by volatilization, to some concentrated form of potash, ready for the soil, seems still open to discovery. In the matter of cost, a somewhat similar remark might apply to phosphates and to nitrates from the air. The great plant and the high power needed in producing calcium carbide and uniting it with nitrogen from the air, increase largely the price of the fertilizer. From the peat bogs, we may, however, be able to economically obtain ammonia sulphate and have by-products as well, or, suggestively, we might chemically treat the dried peat itself—with radiophosphate of potash, one English scientist proposes—and apply it directly to the land. Cost of production and transportation charges are the factors. We have in Canada many millions of acres of peat awaiting use for fertilizing purposes, or for the production of alcohol. But agriculture has many other associations with research. In the Northwest provinces, there has in the past been enormous waste in the fields through the straw, after thrashing, being so frequently burned. At one time, newsprint was made from straw, and now, with wood pulp soaring in price, and with new methods which improvements in color and texture, at the mills, suggest, it might be possible to revive its use. Experiments might also be made with the flax straw, so largely regarded as waste

in the same provinces, as to whether under the climatic conditions there, it could not be economically prepared for use as fibre in the manufacture of linen.

In the past, our saw-mill owners have not realized the great possibilities of wealth in the many thousands of tons of sawdust and wood waste they have been annually consigning to the rivers, or burning in cupolas under the law which the wisdom of parliament enacted. The production of alcohol from this waste may yet be placed on such a commercial basis that this product will supplement, or possibly supplant, the use of gasoline as a motive power, and still leave a by-product which may be, suggestively, useful as a fertilizer. One authority asserts that twenty-seven years will exhaust the crude oil supply of the United States, and that 25 per cent. of this supply is required for the production of gasoline. Thus, as a fuel, alcohol may become very important, if it can be produced sufficiently cheaply. There is a wide range of subjects for experiment in ascertaining relative values for this purpose, in not only such substances as wood waste, the waste liquors of the sulphite mills, and molasses, but in various garden vegetables and even in corn stalks. Unpromising as it outwardly appears, wood can also enter into the manufacture of the finer articles of wearing apparel. The use of cellulose from wood for the manufacture of vegetable silks has opened a wide field for applications where the more expensive silk worm products are now used. The scarcity of cotton in Germany has led to attempts to replace it by wood pulp in the manufacture of explosives, but whilst scientific authorities doubt its success, it suggests commercial applications for which wood pulp may be serviceable. In wood preservatives, further investigation is needed. For railway ties, telegraph and telephone poles and fencing, and for woodwork in house construction exposed to soil or weather, creosote is expensive, and does not extend its service long enough. Probably the composition of the wood of the strong and lasting Greenheart of British Guiana may afford suggestions of importance. The procuring of dyes from certain woods, under chemical treatment, is also among the possibilities, just as it is among some herbaceous and lower forms of plant life. There are likewise native plants as well as common weeds which suggest fibres that might prove useful for manufacturing purposes.