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Aerial View of the Great Fertilizer Works at Trail, B.C.  
On the extreme left are the electrolytic hydrogen units, in the centre is the nitrogen and ammonia plant, in the right centre is the phosphate plant, and in the right background are the storage plants. Approximately \$10-million was spent to bring these great plants into existence.

## Developing a Great Fertilizer Industry\*

The Story of the Chemical and Fertilizer Plants at Trail, B.C., of the Consolidated Mining & Smelting Co. of Canada, Ltd., first Operated in 1931

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THE chemical and fertilizer plants of the Consolidated Mining & Smelting Co. of Canada, Ltd., at Trail, are of particular interest because of the great influence that this new industry will ultimately have on agriculture in the Canadian prairie provinces.

These developments are the result of the 26 per cent sulphur content of the ore of the Sullivan Mine at Kimberley. During ore dressing operations at Kimberley, there is produced an iron tailing carrying 75-80 per cent of this sulphur as iron sulphide. The remaining sulphur is contained in the lead and zinc concentrate minerals. These concentrate products, when shipped to Trail, constitute the principal feeds for the lead smelter and zinc plant, where the first step in both treatments is to eliminate the sulphur. This is done in furnaces

\*Summary of an article which appeared in "The McGill News" for March, 1934, entitled, "An Interesting Link Between Mining and Agriculture in Canada."

from which, in the past, the sulphur escaped largely to the atmosphere as sulphur dioxide gas. In spite of its great dilution with air, and discharge from stacks at high elevations above the plant, some damage to vegetation close to the plant was experienced.

It had always been apparent that the sulphur from these gases should be recovered and utilized if possible, at the same time relieving or curing the smoke nuisance, and constant studies with this end in view had therefore been maintained. One of the early conclusions reached was that the Canadian prairies would ultimately require large quantities of phosphate fertilizers, as had been the experience of older countries, and that these fertilizers would constitute a large outlet for sulphuric acid, which could be made from smoke, and had been made in a small way at Trail for years past. This conclusion prompted a widespread search for phosphate rock, particularly in British Columbia and western Alberta,

with the result that low-grade beds were discovered in the Crownsnest district of southern British Columbia, and to the north therefrom through extensive areas.

Following these discoveries, an experimental plant was built at Trail for the production of triple-superphosphate for facilitating prairie field-tests. The results of these tests on wheat lands were very encouraging, showing increased yields and earlier maturity as the outstanding advantages, and that the prairie soils were not only seriously deficient in phosphorus, but that they also needed some nitrogen.

Some time before this, nitrogen fixation processes had been studied as a possible outlet for some of the excess power available from the large developments controlled by the Consolidated on the Kootenay River. These investigations indicated, however, that the costs of production in a location such as Trail, at that time, would not be sufficiently low, to

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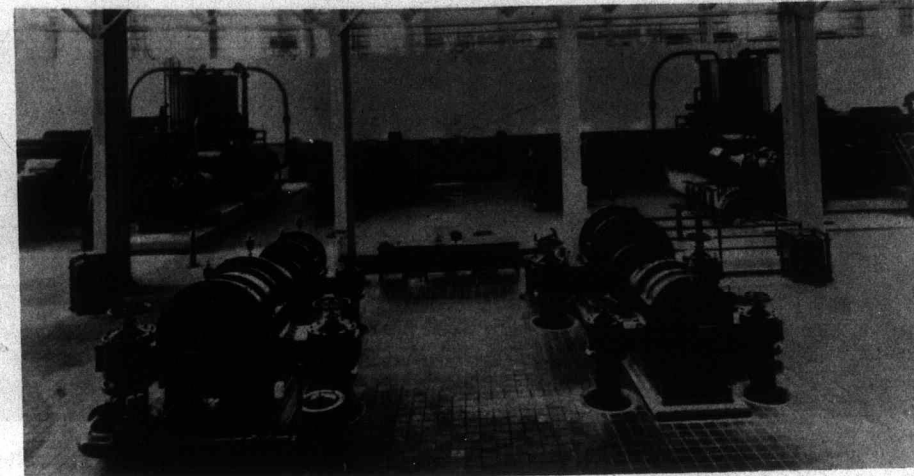
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promise continued satisfactory competition in the world markets with other sources of nitrogen. Developments in these processes were, however, rapid, particularly along the line of the direct synthetic process for ammonia production. This fact, together with the realization of the need of some nitrogen fertilizer on the prairie, soon convinced the Consolidated that their fertilizer plans should include both nitrogen and phosphorus products.

About this time a situation developed, largely because of enlarged metallurgical operation, which spurred on fertilizer production considerations. Trail is located only twelve miles up the Columbia River from the international boundary, and during certain wind conditions in that direction, smoke drifted across the border and damage was claimed by near-by residents of the State of Washington, with the result that international complications developed. After extensive studies and negotiations, the Consolidated undertook to speed up their development programme for sulphur control and recovery, and to fix more of the sulphur dioxide of the smoke as sulphuric acid.

Active construction of the acid and fertilizer plants at Trail commenced in the spring of 1930, and the various operations commenced in 1931. A total of approximately \$10,000,000 was spent on construction.

The operations fall naturally into six groups:



The Ammonia Plant.

In the foreground are the gas mixers; to the left and right centre are six-stage Canadian Ingersoll-Rand compressors; in the centre are circulating pumps, and in the background are control panels and synthesis columns.

1. The Sulphuric Acid Plants
2. The Nitrogen, Hydrogen and Ammonia Group or the Nitrogen Fixation Group
3. The Phosphoric Acid Plant
4. The Plant for Phosphate and Ammonium Phosphate Fertilizers
5. The Ammonium Sulphate Plant
6. The Storage and Shipping Plant

Since the plant is more or less a pioneer of its kind in Western Canada, it is evident that for some time to come outlets for the major part of its production will have to be found in foreign markets.

The use of chemical fertilizers in

Canada is of relatively recent date, and still unusual except in certain parts of the East. This is of course because of its being a new country. In the older countries, such as those of western Europe and the southern States, the farmers have been forced into the use of chemical fertilizers because of the depletion of the natural fertility of the soil. There is certain to be a similar development throughout Canada.

### Variety of Fertilizers

The great number of chemical fertilizers on the market is always confusing to the layman, and while their numbers are undoubtedly greater than necessary, it is apparent that a large variety is required because of varying soil, moisture, temperature, and crop conditions. In these days of over-production and of low prices for agricultural products, the wisdom of fertilization is often questioned. The answer is evident and convincing—If farmers are to prosper, they must farm a smaller acreage of better lands more intensively, and secure lower unit production costs.

### Largest Tinplate Order Ever Obtained for Wales

Industrial Britain states that Sir William Firth, Chairman of Richard Thomas & Co. Ltd., the South Wales tinplate manufacturers, has returned from the United States with the biggest single order for tinplate ever obtained for Wales. The contract, which is for 1,250,000 boxes, has been placed by an American concern, but the tinplates are for shipment to Canada. Although the contract is in the nature of a repeat order, it is 25 per cent bigger than that placed last year, when the same firm requisitioned 1,000,000 boxes of tinplates for the Canadian market, to be delivered over 1934.



An Interior View of the Hydrogen Plant.

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