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# THE NEW FRONTIER

By C. V. Spangler, '30

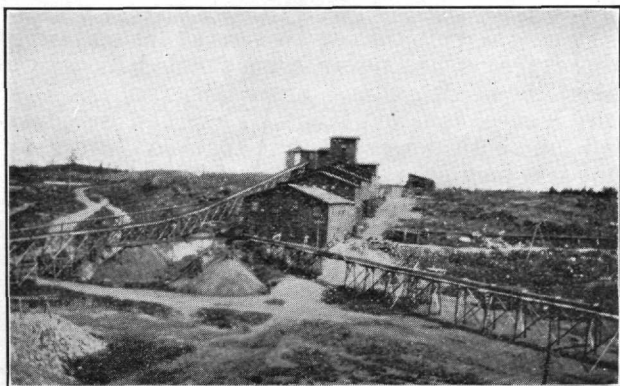
The romance of the frontier has not vanished even though the people of today rarely see any evidence of it. The two American continents are far from being completely explored and surveyed; men are today overcoming the hardships that were the lot of their ancestors during the last two centuries. Our southern neighbor, Mexico, is rich in undeveloped natural resources, and Canada, on the north, with a vast area of little known resources, is being rapidly developed by modern methods.

The prospectors and cruisers that invade this northern limit of settled communities to exploit its natural resources are by no means free from the economic ties of society. Prospectors are "grub staked" today on the same basis that was common throughout the American west during its development. A larger scale method of prospecting is now common. A company will hire a group of men, transport them and the necessary supplies, often by aeroplane, to a promising but unproved mineralized area where the prospectors receive a bonus if any important finds are discovered.

## THE PLACE OF THE ENGINEER

The profitable operation of large properties and marketing and transporting the product call for management that understands the difficulties encountered and the methods involved. Large mining companies of today are often capitalized at several millions of dollars and invest heavily in buildings and equipment with the intention of operating their properties over a long period of years. They must gain a profit from their products, taking into account the various costs of production and marketing, and balance it against a fluctuating market. The complexity of the situation is apparent when it is known that a railroad must be built before a mill can be constructed, and that it may be a period of years before actual production is reached.

Semi-trained men, prospectors in the common term, have, in the past, been directly or indirectly responsible for nearly all the more famous mineral finds, but they are rapidly being supplanted by trained men with a knowledge of the more theoretical as well as the practical aspects of the field.



FLIN FLON MILL, MANITOBA, CANADA

NOVEMBER, 1928



ROCK CUT ON HUDSON BAY RAILROAD

Large low-grade ore bodies, now profitable to work by modern methods, are being located by the geophysicist who has discarded the prospector's hammer for the scientist's magnetic line of force.

## TRANSPORTATION

Few of us realize the tremendous expenditure that is made when a mining or oil company examines a property previously to operating it. Practically always, the scene of the test operation is far from a railroad or any other convenient means of transportation. The company must build and maintain their own transportation system at a great expense. Traffic by water routes has been frequently resorted to in the Canadian north during the short open-water season, due to the great number of lakes and streams available. The Imperial Oil Company has drilled test wells in the Mackenzie River Valley, North-West Territories, inside the Arctic Circle, transporting all equipment and supplies a distance of nearly a thousand miles by boats over lakes and rivers.

During the long winter season a tremendous amount of freight is hauled long distances on sleds. The dog team is, of course, a common sight, but the greater part of all material and supplies for use on engineering projects is hauled on sleds, in four- to seven-ton loads, drawn by caterpillar tractors. The ice on the lakes and streams affords the best routes for this kind of freighting. Where trips are made over rough territory, roads are built to accommodate the heavy loads. This method of freighting is the best when transporting heavy or bulky pieces of machinery.

Canoes equipped with outboard motors afford the most common method of passenger travel; however, the aeroplane is now extensively used. Indeed, the aeroplane, as a commercial enterprise, was first profitably operated as a common carrier in Canada. It is extensively used the year round except for a few weeks in the freeze-up and break-up periods. Traffic by air has created a vast change in the methods of prospecting and has opened up previously unknown areas for more careful prospecting. Aerial mapping and survey-

(Continued on Page 28)

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### THE NEW FRONTIER

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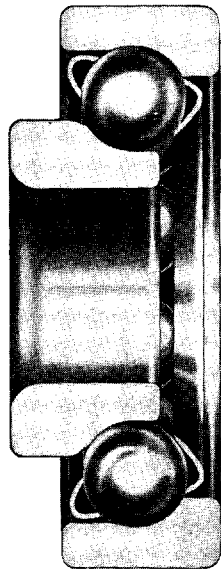
ing has made possible accurate information, by economical methods, of districts that up to the present time were practically unknown. The mileage flown each year is steadily increasing.

#### FRONTIER CONSTRUCTION WORK

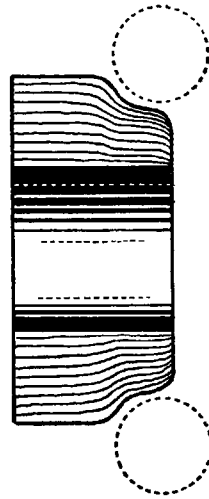
If a mine were always conveniently situated at the end of a railroad track, the qualities required of the engineer in charge could be largely cut down. Resourcefulness alone can combat the difficulties of adverse climate, poor working conditions, lack of materials and facilities and the other kindred obstacles that may defeat his purpose. The Flin Flon mining development in Manitoba is a notable example of a frontier mining operation. Here the company has opened their mine, built a mill, a power house, and has cleared and surveyed a town site that will be occupied by a population of five thousand people within three years. All the mill and power machinery has been brought in by boats in summer through hazardous channels, or by sleds in winter over rough territory. A large number of teams and caterpillar tractors have kept up the work in the worst winter weather. All the building construction has been done with the material at hand. The mill and power house are constructed of milled lumber, but the rest of the camp is of log cabin construction. No coal is available, and so the only fuel used is wood.

The Hudson Bay Railway, it has been said, was built on "soup beans and sow-belly." That the best food cannot be obtained is always to be expected in frontier construction camps. The flat swamp country, with its accompanying swarms of flies and mosquitoes, helps to increase the general unhealthfulness of the region. In the winter the temperature drops to forty and sixty degrees below zero, Fahrenheit: even in such extreme cold, track is laid on the ice and snow only to sink down to the muskeg swamps and boulders with the spring thaw. Before traffic can run over it in the spring a roadbed must be built under it, the swamps sufficiently filled with gravel and the rock blasted out for a graded road. It has been in the face of such difficulties that the Hudson Bay Railway has been built from Le Pas, Manitoba, to Ft. Churchill on Hudson Bay, a distance of 550 miles, through a country that formerly had no transportation system except lakes and rivers. The road will lower the marketing cost of mid-west Canadian wheat by shortening the land haul from central Saskatchewan to England about 1200 miles. It will cost, with several bridges, port and terminal facilities, about 44 millions of dollars.

This construction and development work requires other than engineering talent. The chemist, the assayer and the various allied professions all have their place. The combination of the old spirit required to develop a frontier country, and the modern methods used, open a field that calls for varied technical talent and experience, but the engineer that is endowed with ingenuity and the spirit of adventure can make a place for himself in the world on our present frontier.



Half-section of New Departure Ball Bearing showing the contact between the balls and raceways.



Sketch of inner race after upset forging process. Note direction of fibre flow. Actual specimen does not show flow sufficiently clear to be properly reproduced.

## “Control of Fibre”

### How it Builds Endurance in New Departures

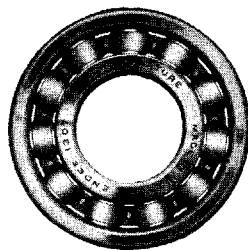
**T**HE exceptional endurance of New Departure Ball Bearings is explained in part by the control of the unseen in steel.

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