

volume a complete description of the plant which is being constructed in California under Dr. Heroult's auspices, by Mr. Turnbull, and which, it is explained, will be in operation about two months hence. We have this week arranged for a quantity of ore from Cobalt containing high-grade percentages of arsenic and a low percentage of silver to be electrically smelted, and the results will, no doubt, be set forth in Dr. Stansfield's pages. A proposal was made to republish Dr. Stansfield's articles by an eminent English house, but the arrangement to issue from this office was already concluded. Letters given elsewhere show that the book is likely to be used very widely as a text book in universities and technical schools. The articles that have already appeared will be re-set, so as to be more readable and permanently agreeable. A large demand is expected for the volume.

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Tribute was paid at the banquet given to Mr. Mackenzie and Mr. Mann by the Toronto Board of Trade to the skill of the engineers who have contributed to the wizard-like upbuilding of the Canadian Northern Railroad. Indeed, the progress of that system is probably even more interesting to engineers than to financiers. The facts given on this page as to its mileage, the amount of money invested, and the expectation of growth in the immediate future, are one of those rare combinations of commerce and romance to which Canada is becoming accustomed. Perhaps the practical experience of Mr. Mackenzie and Mr. Mann in building wooden bridges in the Rocky Mountains for the Canadian Pacific Railroad in the early eighties had a great deal to do with giving them the resourceful courage, in the face of apparently insurmountable obstacles, which has been the predominating feature of their remarkable rise to the position of the foremost developers of new territory which this continent has produced during the present generation. It is an interesting experience to come in contact with some of the men who worked with Mr. Mackenzie and Mr. Mann in those not-so-far-off days; and who, at nightfall, reposed with them in tents on the mountain-side. There has been an almost strange absence of publicity from the careers of Mr. Mackenzie and Mr. Mann. You cannot hide a railroad system under a bushel, and the Canadian Northern and its subsidiary enterprises have had much written about them. But the partners have kept out of sight. There has been so much to do, that they have had little time to be seen and heard of the multitude. The characteristic of reticence also applies to some of their leading helpers. There is no more modest, unassuming man in the profession than Mr. M. H. McLeod, the son of the Hebrides, who is the chief engineer of the Canadian Northern, who is in and out of Winnipeg a hundred times a year. Mr. McLeod has traversed the northern prairies possibly more than any other living man. He has become so accustomed to laying out main lines and branch lines, and planning viaducts and bridges, that what to most of us would be a leviathan undertaking, is to him a mere matter of course. The Canadian Northern has more long steel bridges in the prairie country than any other railroad. It has been a point with the company to purchase material made in Canada. Though the demand upon the capacity of various works has occasionally caused delay in crossing great rivers, there has been a cheerful sacrifice of time so long as Canadian industry might be served.

CANADIAN NORTHERN HISTORY.

Summary of a Chapter of Romance Given at the Toronto Banquet.

The proceedings at the Toronto Board of Trade banquet last month to Messrs. Mackenzie and Mann would have been incomplete without some reference to the rapid growth of the Canadian Northern Railroads. The two guests of the evening were naturally too modest to speak upon this point, but Mr. Z. A. Lash, K.C., gallantly assumed the role of historian and carried his listeners back to the time when the Canadian Northern was but a little baby road of 125 miles in length.

There was a general knowledge among the people of Canada, said Mr. Lash, that Messrs. Mackenzie and Mann were great railway builders, and there was an erroneous impression that they had been so largely bonused and subsidized by public lands and money that they did not deserve much credit for what they had done. But the two gentlemen deserved the respect and admiration of their fellow-Canadians for their accomplishments, and their future assistance. The first line of the great system was the Lake Manitoba Railway and Canal Company, 125 miles in length. In ten years a system which extended, with few interruptions, from Quebec City to the foothills of the Rockies, comprising, with its branches, 3,400 miles, had grown, and this was the work of Mackenzie and Mann, with small aid from the Governments. No land grants had been made to the lines which were built since the charter was granted. The Lake Manitoba Railway and Canal Company was formed in 1899, with the usual statutory land grant. Not till some years later did Mackenzie and Mann get control of it, build it, and earn the lands.

Old Charters Revivified.

The Winnipeg and Hudson's Bay Railway was founded in 1882. Its owners borrowed \$256,000 on the 256,000 acres of lands granted. The company failed, and Mackenzie and Mann took it over, and finally paid over the \$256,000. A similar history was that of the Manitoba and South-eastern Railway, chartered in 1889. The lands later became valuable, and had been of real assistance in the building of the Transcontinental. So far the proceeds had gone to the Canadian Northern, and not a penny had gone to the two guests of the evening, who paid for the lands they owned out of their own resources. The Manitoba and South-eastern was purchased. Then the Ontario and Rainy River Company's charter was acquired, authorizing a line from Port Arthur into Minnesota. This process went on until the whole system, from Quebec to Edmonton, was made up of twenty-seven different concerns now included in the three corporations—The Canadian Northern, the Canadian Northern Ontario, and Canadian Northern Quebec. All this had been accomplished by these two men, whom, Mr. Lash thought, could be called the greatest railway builders the Dominion of Canada had ever known.

During the ten years the two gentlemen had not drawn one dollar of salaries or travelling expenses, and had risked millions of money. The Governments of Manitoba, Ontario and the Dominion had guaranteed the bonds of a number of the company's lines. Mr. Lash had heard criticism of the railway builders for retaining the control of the system, continuing the existence of a small board of five directors, and not permitting the public to acquire an interest in the road. He took the responsibility for this phenomenon, which he had advised on the ground that it avoided the inconvenience and delay of large meetings. Moreover, undue publicity had been prevented. As an instance of the prompt and confidential action, Mr. Lash said that the purchase of the Quebec and Qu'Appelle road was first discussed at 11 o'clock in the morning and the bargain was closed at 4 in the afternoon.

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At a meeting of the C. S. C. E. held on Thursday, December 13th, the following papers were read:—"The Distribution of Stress in Rivetted Connections," by C. R. Young, and "An Investigation on the Value of the Indentation Test for Steel Rail," by H. K. Dutcher.