

When this shortage equals the excess strength given to the dam, then the safety factor will be eliminated. In the case of a vertical-faced dam the safety-factor would be eliminated much sooner, viz.; when the increase in pressure from flood equalled the excess strength.

Now, if the length of base of such a dam exceeds the height in the proportion of 100 to 65, then the increase in the adhesion will equal the increase in horizontal pressure from flood, of any height.

Such a dam would have a base 1.538 times the height, giving an angle of inclination of $49^{\circ}-5'$ for angle dac, Fig. 25.

We could then assume 100 feet of flood over a 20-foot dam, and would have as follows, viz.:-

$$\text{Horizontal pressure} = (120^2 - 100^2) \frac{31.25}{120 + 100} = 137,500 \text{ lbs.}$$

$$\text{Vertical pressure} = \frac{120 + 100}{2} \times 62.5 (20 \times 1.538) = 211,475 \text{ lbs.}$$

$$\text{Adhesion} = \frac{65}{100} \times \text{vertical pressure} = 137,500 \text{ lbs.}$$

Figures have been given for a vertical-faced dam on page 90, showing floods of 2.80 ft., 4.50 ft., and 8.28 ft., eliminating safety-factors (S. S F.) of 1.3, 1.5, and 2.0 respectively, so that this analysis shows Fig. 25 to have a decided advantage in this respect also.

(To be Continued).

THE BELLECHASSE TELEPHONE COMPANY.

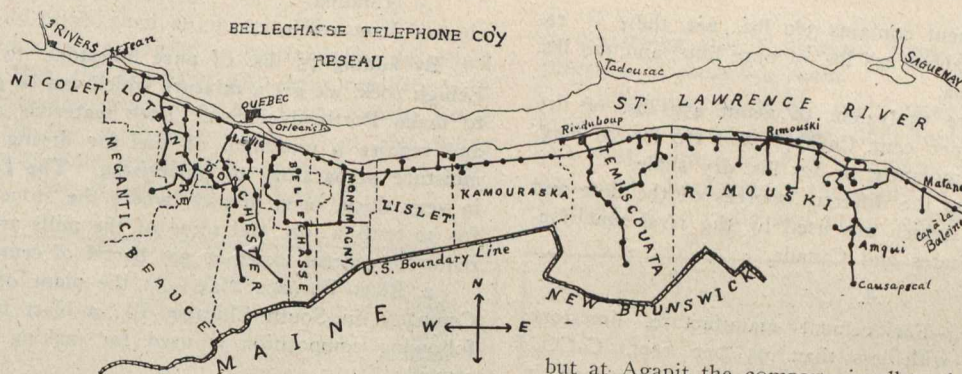
Seven years ago, Dr. J. F. Demers was practising medicine in Ste. Octave de Metis, in Matane County, Quebec. In connection with his professional duties he found that he needed telephone communication with a neighboring parish, and so he built a private line. The same year he wanted connection with a fellow-practitioner who lived in Ste. Flavie, and he and some others got together and organized a company to construct the line. They obtained incorporation with an authorized capital of \$2,500, the corporation being known as the Metis Telephone Co. By the end of the first year, it was found that the money was all spent, but the company was doing a nice business, so the capital was increased to \$7,500, and lines were built to Matane and Rimouski. At Rimouski there was a local exchange of 33 subscribers, operated by the Bell Telephone Co., which was bought by the Metis Co. for \$2,000. About the same time the company built from Rimouski to Bic, a distance of ten miles, and they had thoughts of extending to Levis, but the necessary capital was not to hand. They discovered, however, that there was a company in Bellechasse County which had all the powers and authorized capital desired, but a poor equipment, so they were approached and their charter purchased, the name, Bellechasse Telephone Co., being now assumed by

throughout the county. The business among farmers was started just last year, but it is expected that within three or four years 50 per cent. of the farmers will take telephones at this rate. The other rates are arranged according to the privileges afforded. Thus, \$20 is charged in towns where the instruments are of long-distance construction and the service is continuous, \$25 is the rate for a large concern which would call for frequent service.

The lines are constructed of copper, 346 pounds to the mile. The instruments are purchased in the United States, none suitable being manufactured in Canada. Exchanges are manual. There are between 65 and 70 switchboards, the largest accommodating 200 subscribers. The attendants are paid on a co-operative plan, receiving 10 per cent. on subscribers and 20 per cent. on tolls.

Long-distance rates are very low compared with Bell standards. For instance, between Levis and Rivière du Loup the Bell rate is 60 cents for three minutes' conversation, while the Bellechasse rate is 25 cents for five minutes.

Connection is had with the stations of the Intercolonial Railway and with those of the Quebec Central. The Grand Trunk refused to allow a telephone in their station at Levis,



Dr. Demers' corporation. This was in 1900, and was about the time that the enterprising manager retired from the medical profession to devote himself exclusively to the telephone business. The company extended the fifty miles of single wire which comprised the old company's line, and connections were extended to Levis and the surrounding country, as well as eastward to the lines of the original Metis Co.

From these beginnings has sprung the system shown in the accompanying map. The main trunk line extends from Cap à la Baleine, in Matane County, on the east of St. Jean des Chailons, in Lotbinière County, on the west. Lateral lines run southerly, as shown, towards the New Brunswick and Maine boundaries, the total length of pole line being about 1,200 miles. There are at present 1,300 subscribers in the system, and the subscribers' directory shows telephones in eighty-eight localities. Excepting Levis, Montmagny, Rivière du Loup, and Rimouski, the system is practically rural. The population of the territory covered is about 350,000. Rates are from \$12 to \$25. Farmers' telephones are constructed along the pole line in four party groups at an annual rental of \$12, this giving connections

but at Agapit the company is allowed to instal a telephone on sufferance, it being agreed that the telephone is to be removed whenever the Grand Trunk so orders, which, it is understood, means whenever the Bell Company so orders. No attempt has been made to get business connections with the Bell lines, though an offer was made by the Bell Company in 1900, which the company could not entertain.

The company has been so successful in its operations that a seven per cent. dividend has been paid every year since its inception, and this year fourteen per cent. is anticipated. The charter authorizes a capital of \$1,000,000, of which \$200,000 is paid up. The company has no debts and no bonds.

The officers of the company are: Georges Demers, president; A. B. Depuis, vice-president; Dr. J. F. Demers, secretary-treasurer and general manager. The other directors are: Georges Tanguay, M.P.P.; Rev. J. H. Frechette, Narcisse Rioux, John McWilliams, J. H. Ross, M.D.; Edouard Couture, and Etienne Dussault.

Dr. Demers says the telephone business is more profitable than medicine, and the fact that he is connected with not only one, but four, telephone companies, seems to indicate that he has gone into his new line in earnest. Besides being manager of the Bellechasse Co., he holds a similar position in the St.