

Automatic and Multiplex Telegraphy.

The following extract from a paper read before the Royal Society of Canada by F. N. Gibb, C.E., M.I.E.E., on the above subject will interest some of our readers:

In a former paper upon "The Inception of Electrical Science and the Evolution of Telegraphy" read in Section III of the Royal Society of Canada, and subsequently revised and published by the Canadian Society of Civil Engineers, the concluding paragraph reads as follows:

"That the most successful and profitable telegraph companies of the future will abandon the present system of a multiplicity of wires for the transmission of intelligence, and at business centres and important stations, will employ female labor for perforating and comparing with the original manuscript despatches, to be forwarded by automatic transmitters; an additional wire being operated by Morse sounders for the correction of errors, and also for the requirements of intermediate local business, such additional wire being available for duplex, quadruplex or multiplex instruments."

The foregoing conviction has been confirmed by late improvements both in automatic and multiplex apparatus, whereby telegraphy can now compete profitably with the postal systems in such long distance countries as Canada and the United States.

Twenty-five cents for a ten-word message, exclusive of address and signature, does not appear to be an excessive charge when the time saved is material, and when business men have learned by experience how much information can be conveyed within such limited number of words; but to the uninitiated general public 100 words at this same tariff rate would be a great boon, and add materially to the volume of both commercial and social inter-communication.

The practical means by which such desirable result can be accomplished with profit to investors may now be considered.

Thousands of miles of poles and wires at a primary cost of millions of dollars for construction and a vast outlay for maintenance and renewals can be dispensed with by the adoption of automatic and multiplex telegraphy. By the former 1,000 words per minute have been correctly transmitted, during stormy weather, between cities 1,000 miles apart; and by the latter one wire is utilized for a dozen distinct and parallel circuits.

A skilful Morse operator transmits during a day of eight or nine working hours an average of twenty-five words a minute, and by a Wheatstone automatic repeater 300 to 400 words can be sent over moderately long circuits; but the latter apparatus requires considerable auxiliary labor, as every dot and dash in each alphabetical letter has to be stamped out separately prior to transmission per wire.

Duplex, quadruplex and multiplex instruments require separate skilled operators for each and every circuit utilized in such systems, so that the economy is limited to the reduced number of wires, etc., between stations.

With the foregoing perfected apparatus at command, the cost and capabilities of the combined systems may now be considered.

A first class telegraph line, constructed with cedar poles 30 feet in length and 6 inches diameter at top, with cross-arm and oak pins 1½ inches diameter, improved porcelain insulators, one No. 4 hard drawn copper wire and one No. 6 galvanized iron wire, fully equipped with instruments, etc., would cost between \$400 an

\$500 a mile, or say for a through main line between New York and Chicago, or from Quebec via Montreal, Ottawa and Toronto to the United States frontier 1,000 miles, \$500,000 maximum.

Such class of line would remain in good working condition for over thirty years, and could be permanently maintained at an annual cost of not exceeding \$15,000 per annum for repair and renewals.

The minimum capacity of transmission of intelligence during eight hours out of the twenty-four would exceed 50,000,000 words=500,000 messages of 100 words each per annum.

To conduct such amount of business the salaries of operators, perforators and copyists would not exceed \$25,000 per annum; rentals, management and incidentals, \$20,000; to which add maintenance and renewals, \$15,000=in all \$60,000 per annum maximum.

The revenue from 500,000 messages at 25 cents for 100 words, minus 3 cents for delivery, would be \$110,000, plus press news income; thus the minimum net profit would be \$50,000=10 per cent. upon the capital expended, and this upon an estimate of 500,000 messages per annum only, whereas the certainty is that they would exceed 1,000,000, and thus yield over 30 per cent. dividends.

The foregoing estimates are based upon the knowledge acquired after forty years' experience in practical telegraphy, and can be relied upon as substantially correct.

The only question remaining for consideration is the present and prospective amount of business available for the foregoing results.

Between New York and Chicago over 2,500,000 telegrams and 10,000,000 letters now are annually interchanged. At least one-eighth of the latter would, under a 25-cent tariff for 100 words, be transmitted by wire; thus any company conveying one-third of the telegraph and one-eighth of the postal business would have four times the estimated minimum number of 500,000 messages at immediate command.

Again, the dozen commercial through main wires between Quebec and the United States frontier, via Montreal, Ottawa and Toronto, convey 1,000,000 telegrams per annum, and the postal service over 6,000,000 letters; thus, with one-third of the telegraph and one-eighth of the postal business at command, more than double the estimated number of 500,000 messages are immediately available.

The argument thus confirms the correctness of the quotation at the commencement of this paper, namely, "That the most successful telegraph companies of the future will abandon the present system of a multiplicity of wires in favor of automatic and multiplex apparatus."

Sub-Arctic Farming.

The following letter which appeared in the January number of the *American Agriculturist* will interest Canadian readers:

"This is, so far as I am aware, the most northern farming community on the American continent. We are situated in latitude 58° 45', and longitude 114° W. I hope none of your eastern readers will shiver at this mention of the Far North. I came from the east in 1879, having spent my early winters between the River St. Lawrence and Connecticut, and I can

say, after twelve years experience here, that, by far, my hardest shivering was done in the east. When the winter sets in, which it usually does about the middle of November, it seldom thaws sufficient to melt the snow until the last of March, so that it lies as soft as feathers on the ground, and seldom exceeds two feet in depth and is frequently less than one foot. Horses graze the year round and do wonderfully well. Cattle, as a rule, require to be fed for three or four months. The country is in the hands of the Indians, who are peaceable, and some of whom we have induced to give up their roaming life, and take to a less precarious way of obtaining subsistence than by the chase, as game of nearly every kind seems to be getting scarce. The children readily take to domestic life, and are as apt to learn as the average white children. Spring usually opens about the first of April. Last year I began seeding April 27th. August 1st I began cutting the barley, and the wheat was ready toward the end of the month. None of the wheat from last year's crop yielded less than forty pounds of flour per bushel of sixty pounds. In addition to these crops, I have successfully raised nearly all the common varieties of garden vegetables, sometimes including tomatoes, beans, and cucumbers."

E. J. LAWRENCE, Peace River, Canada.

An Anti-Treating Circular.

The following circular has been sent out: The Travellers' Circle of Canada wish to call your attention to the system of treating and being treated to intoxicating liquors when transacting business. We are pleased to note that this custom is now by many entirely avoided; yet some are led to continue it, perhaps fearing that to discontinue a practice they have followed for some time might affect the success of their business. We believe no merchant will allow himself to be biased in the placing of an order by a treat from the traveller who visits him; but we feel the practice in the past has sometimes been adopted in the hope of so influencing the customer, and some travellers who have practiced it have been gradually led into the use of intoxicants to such an extent as to injure themselves, while in some cases it has resulted in the loss of their situations and suffering to their families.

In these days of keen competition a traveller sometimes finds his sales not equal to his anticipation, a spirit of despondency is apt to take possession of him, and if he is susceptible to the influence of alcohol, has taken some with his customers during the day, he is likely to indulge further at night, when he meets his fellow-traveller, after his customers have gone home.

We ask retail merchants to give this matter their careful consideration, remembering that many of these young men have come from homes where parents, sisters and brothers are anxious about their welfare, or perhaps a young wife, who has confided her all in him, has high hopes of his success on the road, trusting he may soon secure promotion or establish a business for himself and continue for her a comfortable and happy home. Kindly abstain from being a party to any course which, if indulged in, will wreck all these high hopes, and leave the victim a nuisance to society.