THE TELEPHONE IN CANADA.

There are several respects in which the modernness and enterprise of Canada have proved a surprise to old-world visitors. They find here, in a little known "colony," great railways and canals, swift steamers, great banks, fine hotels; they see every modern appliance that the scientific mind can devise promptly laid under tribute for facilitating commerce; they find the small community that dares to occupy this large land just as "live" and smart and up to the times as any land the world over. Nothing astonishes them more, perhaps, than the extensive use of the telephone in our towns and cities. And it is indeed a marvellous, an almost mysterious machine, and the extent of its development in very few years is one of the remarkable things about Canada. Our readers will be interested in some particulars about the progress of our leading Canadian enterprise of the kind, the Bell Company.

The Bell Telephone Company has invested over $2,000,000 in trunk lines and exchange services. They have kept abreast of the progress of discovery, constantly improving their instruments, the office appliances, and their mode of construction.

The telephone system operated by the company now reaches 350 cities, towns and villages in Canada, stretching from Quebec in the east to as far as Calgary in the west, while British Columbia and the Maritime Provinces are operated by sub-companies with whom the Bell Company have connection. It is proposed shortly to have telephone communication between Toronto or Montreal and New York or Boston.

The Bell Company have built in Ontario during the year 1890 new lines from Hamilton to Guelph: from St. Thomas to Port Stanley; from Walkerton to Teeswater; from Norwich to Brantford. Equal attention has been given to other provinces. A metallic circuit has been constructed from Quebec to Montreal and from Montreal to Ottawa—which means that one can now talk from Ottawa to Quebec, 350 miles; a metallic from Montreal to Sherbrooke, with cables across the St. Lawrence and Richelieu Rivers; metallic from Montreal to St. Johns. In addition single wires have been put up between the following points: Cornwall to Morrisburg, Three Rivers to Quebec; Hawkesbury to L'Orignal and Vankleek Hill, and from Knowlton to Bolton Centre. All the above wires are copper.

There has been begun on Temperance street in this city a fire-proof building for the chief city exchange. This building will contain an operating room 46 x 85 feet. All the wires coming into it will be underground, and all circuits will be metallic. That is, there will be a return wire from each subscriber's instrument, so that when the system is complete no disturbing sounds will be heard to interfere with conversations. This building will be fitted up for the accommodation of 5,000 subscribers, and will have the best arrangements possible to be obtained. Besides this the Company has leased from the Imperial Bank the two top flats of their building, corner Yonge and Bloor streets, and are fitting them up for at least 2,500 subscribers. All wires into this building will also be underground. Then we have our Parkdale Exchange in full running order, having all wires west of Bathurst street terminating there. This office will accommodate 1,000 more.

The territory which the Bell people are supplying with the underground system is one mile long and a half-mile wide; stretching from the bay to Shuter street, and from Spadina avenue to George street. The cable used contains one hundred wires. At present the expense of laying underground conduit for what is a small route of subscribers, say 300, and connecting them with the necessary cables, is about $48,000 a mile, and the cost of heavier work for a large number of subscribers in one direction runs up as high as $86,000 a mile. This means, in addition to the outlay, an abandonment of all existing plant not only on the streets but in our central offices, as the whole switching apparatus for the new system will necessarily be new and of later pattern. We are making unceasing investigations in this direction with the hope of discovering some cheaper system. A solution will certainly be discovered, and in anticipation of this all our new offices are being equipped for underground work. We are putting down an underground cable to the Board of Trade building. According to Mr. Hugh C. Baker, the Ontario Manager, the Company's staff in Toronto consists of one hundred operators and seventy-five other employees. The calls will average about 50,000 a day, or about twelve per subscriber.

In Hamilton the Bell Company are putting up a new fireproof building with all the latest improvements, including provision for underground work in future.

But it is not alone in the West that the extensions and improvements are being made. In Montreal the company's business requires four exchanges, and in that city the company has completed a fine building on St. Catharine street, for an uptown exchange, at a cost of $56,000. They are also erecting a factory in Montreal which, with equipment, will cost $150,000, and expect to have it completed in May.

A statement of the financial operations of the Bell Telephone Company for seven years shows that they have paid dividends averaging a little less than 5½ per cent. per annum, and also, according to Mr. P. S. Ross, the auditor, the stock has never been watered or distributed as a bonus.

As to the competition with the Federal Telephone Company in Montreal, Mr. Sise, the president of the Bell Company, says: "We have now about 4,800 subscribers. Of course the business in that city is being operated at a loss, but we are already doing five-sixths of the telephone business there. . . At Peterborough we are now supplying instruments free of charge to kill opposition. Our position, in short, is this, that as the shareholders of the company have invested their capital and educated the people in the use of the telephone, supplying the public demand at the lowest possible rate, they will protect their property at any cost."

Comparing Canadian rates with those in other countries, Mr. Baker makes the claim that his company has supplied the cheapest telephone service in the world. The charge at other places in America is: Baltimore, $100; Boston, $120; Buffalo, $70 and upwards; Chicago, $125; Cleveland, $180; Rochester, $64; Washington, $100; Brooklyn, $120; Cincinnati, $100; Kansas City, $72; Louisville, $72 to $96; Milwaukee, $60 to $100; New Orleans, $96; Philadelphia, $120; Pittsburg, $84 and over; St. Louis, $100; Toronto, $30 to $50. Not many of these places have more subscribers than Toronto, and many of them fewer. His opinion is that no opposing telephone company could establish a business in this city with any outlay of less than half a million dollars. Indeed the work which the Bell company has now laid out for execution in Toronto will cost probably $300,000.

MODERN FIRE APPARATUS.

In the pictures of fires of olden times the firemen were invariably represented as standing in the streets at a comfortable distance from the fire and directing the streams of water through the upper-story windows. They do not fight fire in that way nowadays. Ladders are reared to the upper windows, and the hose is carried right up to the floor that is on fire. But sometimes the fire gets going so fiercely before they arrive that even trained firemen cannot face it, and it is when the flames are blazing through the upper windows of a tall building that the value of what is called a *water-tower* is apparent. New York got its first water-tower about ten years ago. Its last was but recently purchased.

In principle these towers are very simple. There is an iron tube so pivoted over one end of a truck that its top may be raised to a height of sixty feet above the street pavement. The upper end terminates in a nozzle. Connected with the bottom of the pipe is a very large hose. From two to four engines may be coupled to this hose, and their united streams forced up through the pipe and out of the nozzle. The nozzle is controlled by a man on the truck, so that a solid two-and-one-quarter-inch stream may be directed through the top windows of a six-story building with ease and certainty. The newest tower in the department differs from the older ones in several important details. The old tower had to be raised by hand-power, and it was a slow and tiresome job. Moreover, the old tower was made in sections that had to be screwed together by the men. The new tower has a twenty-eight-foot pipe suspended inside of a slender steel derrick that is twenty-two feet high. The derrick is pivoted over the forward wheels of the truck, and, when not in use, it, with the pipe inside, lies prone upon the truck. At a fire the derrick is erected by means of what may be called engine-power—the piston-rods of two cylinders, which are very like steam-engine cylinders, connect with the bottom of the derrick. Instead of steam, however, carbonic acid gas, which is generated in a retort suspended near the rear axle of the truck, is used. This retort is partly filled with soda and water, and when the time comes for raising the tower a small quantity of vitriol is spilled into this mixture. The gas is generated in sufficient quantity to create a pressure in the cylinders of above one hundred pounds to the square inch, and it is this power, exerted through the cylinders, that raises the derrick. The pipe is elevated above the derrick by means of a stout metal rope working over pulleys and a hand-winch. The stream from the tower can be swung around in any direction, and thrown up or down through a wide arc.

Wonderful as are the results obtained by the engines used exclusively on shore, their streams sink almost into insignificance when compared with the volume and power of those thrown from the greatest of all fire extinguishers, the floating fire-engine, or, as it is commonly called, *the fire-boat*.

Like the water-tower and a majority of other kinds of apparatus used in extinguishing fires, the floating engine is a modern device. The first one ever built was the "Havemeyer," launched in 1875 for New York City. She is still doing good service. There were, however, a number of boats built for other purposes, which were in use as fire-boats before that date.

It seems a little singular to the ordinary observer, but it is nevertheless a fact, that the hardest fire to fight is one alongshore, where there is no end to the water to throw on it. But a moment's consideration shows that while water may be abundant, the opportunity to throw it is scant. If the building be on the water's edge, or on a pier, there is at least one side on which it cannot be approached by the shore extinguishers. While the firemen may deluge the shore portions of a building, or the shore end of a pier, the fire may eat away the water-side portion, and so destroy the whole. The greatest fire in New York during the year 1889 was a fire of this kind. It involved piers, elevators, and other buildings alongshore, in the yard of the Hudson River Railroad, for some blocks above the foot of West Fifty-ninth street, and the loss was a million and a half of dollars. This and other like fires have proved very destructive because the city lacked adequate apparatus for fighting a fire from the water. A description of the last floating engine built for the New York Fire Department will serve very well to show what the requirements of such a boat are.

She is called the "New Yorker," and her owners think that, because she is great and powerful—well-nigh irresistible—she has been very well named. To an ordinary observer she looks very much like a handsome tug. She is 125 feet long, 27 wide, and 14 deep. She draws something over 9 feet of water, and her displacement is 351 tons. She is built of steel. There is the usual structure on deck, with the pilot-house on top, at the forward end; but here the resemblance to a tug practically ceases. She has two boilers, each powerful enough for a great cargo-ship, and triple expansion engines. Instead of one propeller-wheel, she has two, one of them being connected with the rudder and the wheel-shaft in such a way that it swings with the rudder, and so aids in steering her—makes her handy as nothing else could do.

The chief feature of the boat is, of course, her pumps. She has four sets (or eight in all) of vertical, double-acting steam-pumps. The steam-cylinders are sixteen inches in diameter and the pumps ten. The stroke is eleven inches. From the pumps the water is forced into an air-chamber, and thence it is driven through four standing pipes which rise through the deck-house—two forward by the pilot-house, and two well aft, as the picture very well shows. The ends of these pipes terminate in nozzles, which can be turned about and elevated and depressed through ample arcs for every need. For ordinary fires these nozzles have a diameter of from three and a half to four inches. But the power of all the pumps may be concentrated on one or two