

## RAILROAD ENGINEERING IN THE EARLY DAYS IN CANADA.

By George Hawkesworth Armstrong.

In June, 1851, I left school, being then fourteen years of age, and one day while taking a walk found myself near the spot where the Hamilton Stuart Street Station of the Grand Trunk Railway now stands. At that time the contour of the ground was undulating. The Great Western Railway had made a commencement near Burlington Heights, and the navvies were engaged in cutting rock of the nature of concrete. A party of engineers (most of them were from the United States, with a sprinkling of Canadians) were engaged with the transit, level, rod, and chain in the survey. The resident engineer, with whom I was well acquainted, asked me to join the crew, and I took the chain. The work seemed suited to me, and on my arriving home I importuned my father to allow me to become a regular member of the survey party. He was well acquainted with Mr. Benedict, the chief engineer (from New York), and that gentleman very readily gave me a situation as chain-man at a salary of \$32 a month.

A party of engineers had in the meantime surveyed the road to Toronto, and had placed stakes every hundred feet. Marcus Smith, lately deceased, was a Government engineer at Ottawa, and along with the writer was ordered to follow those gone before and take a topographical description of the line. We started by the steamer "Magnet" (Capt. Sutherland) for Burlington, our starting point being there, he having in the meantime taken the topographic description of the country between Hamilton and Burlington. We landed at the pier, and trudged our way through the deep sands to Burlington village. Having had dinner at a tavern there, we settled down to our work, and the axeman and I took many measurements, both sides of the line, Smith mapping them down. The country then was a magnificent sight, and I have seen acres of the noblest trees of all varieties burned so as to clear the land. The same trees to-day would be worth a fortune. What we require in Canada now is more planting of trees, and I hope the Dominion Government, in conjunction with Provincial Governments, will press that home to our people in the strongest way.

From Bronte to Oakville the contour of the country was of a rolling nature, and the creeks we passed over were deep and transparent streams, not as they are now, with their fountain heads all cut away by the avarice of the husbandman. Before we reached Port Credit a cedar wood full of swamp had to be passed through, and to this day I am at a loss to know how we ever managed to come out. The densest of shade, miry water, and the climbing over of decayed and mossy cedar logs taxed me to the utmost, so much so that on arriving at our hotel in Port Credit I was stricken down with an attack of fever and ague, compelling me to leave for home and recuperate. My eldest brother had for some time been an engineer in a surveying party at Ekfrid, near Delaware. The resident engineer was a Boston man named Pettingell, his brother Andrew being leveller, and my brother rodman. I was ordered to join the party, going from Hamilton by stage. The country at that time was very wild, indeed, and the work in that locality was attended with much difficulty, due to the swampy nature of the land. Not far off was the battlefield of the Thames, where the gallant Indian chief, Tecumseh, was killed.

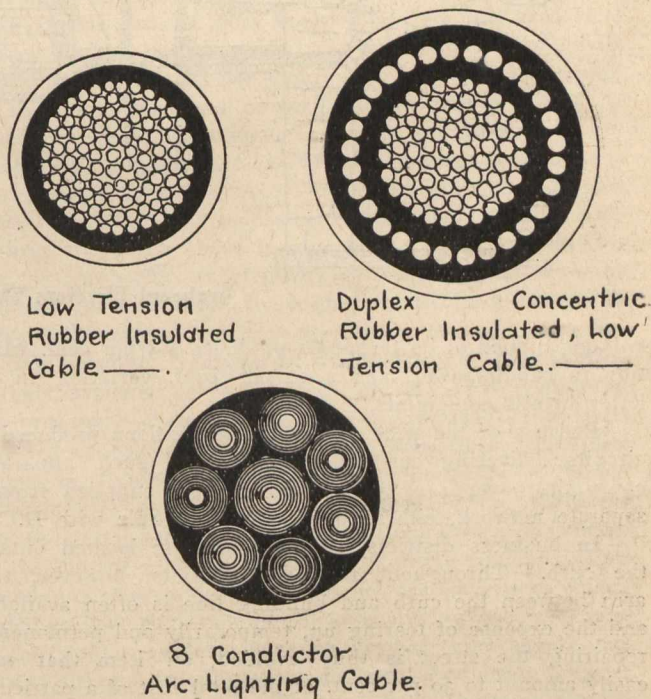
My health having suffered from so much exposure, I, after a six months' sojourn, returned home, and upon recuperating was ordered to join a party of engineers at Paris, Ont. The resident engineer was Charles L. McAlpine, from Newburgh, N.Y. Including myself, there were seven in the party, as he had charge of the section from Paris to Woodstock. The work there was splendid to me; and I really feel sure that it was more efficiently done than such work is done to-day. I know that the cross-sectioning, the measurements of cubic yards, and the surveys made, including the laying of the track, was perfect in every

detail. A piece of work we had to perform near Mudge Hollow, some four miles west of Paris, was an extremely difficult one to perform. We had to use the trees of over a hundred acres of wood, 150,000 cubic yards or more, to fill up the peat bog there, which was bottomless. Mr. Finkham, one of our assistants, and I had to survey a large hill, using a spirit or level-board. That hill furnished nearly 100,000 cubic feet of earth in addition, and was used in this sinkhole as well. In track-laying we took the levels every five or eight feet, and the line from Paris by that operation was at that time the best on the road. The road being finished about January, 1854, the celebration of its completion was fully carried out. A great many Toronto and Hamilton people attended the celebration, while others came from Detroit. There are very few alive now who were present, and I know full well that a very few of the engineers are. After the road was completed I returned home.

## UNDERGROUND DISTRIBUTION OF LIGHT AND POWER.

By E. D. Tillson.

In general, lighting and power companies keep all lines overhead until compelled to change, when the "underground ordinance," if it comes (and, incidentally, it is quite sure to come), entails a more or less complete redesign of their entire distribution system—certainly complete within the "underground district" specified in the ordinance. A map is first drawn of the district, and to sufficiently large scale to show every individual piece of property in it. A complete canvass is then made of the area to determine



accurately the present, and, if possible, the immediate future current consumption on each of the premises. This, with the class of receiving apparatus, whether incandescent or arc lights, elevators or small motors, etc., is now marked on the map opposite each property.

Hence, distribution areas, with their centres of distribution, equivalent current consumption and power factor of, and voltage to be applied to each one of these centres, may be determined, and finally, feeder routes and location of distributing mains and service connections. These locations are marked on a series of detail sheets, each sheet taking in only one or two blocks of the district. In addition to the above, they have noted upon them the kind of pavement, location and sizes of manholes and service boxes, position of foreign pipes in street, as far as known, etc. These sheets are primarily contractors' drawings, and upon them the contract price of the work is figured. They may