

features of the Chicago Sanitary Canal, with the construction of which he was connected, and spoke of the developments which are looked for in the United States from the extension of waterways. It was hoped that shortly after the Panama Canal was finished it would be possible to ship from Chicago to the Gulf of Mexico, and from there to all parts of the world. An interesting fact which he mentioned in connection with the Panama Canal was that at first President Roosevelt wanted a sea-level canal. When the Commission of Engineers, of whom five were foreigners, met there were some warm discussions. The five foreigners were unanimously in favor of a sea-level canal, and with them were three American engineers. The remaining five American engineers stood out for a lock canal, and the minority report was adopted. "The work at Panama," said Mr. Randolph, "is making remarkable progress. Indeed, never in the history of the world has so much work been done within the same period."

"Our City" furnished a text for Controllers F. S. Spence and Dr. Harrison.

"Sister Institutions" was responded to by the president of the Ontario Architects, the chairman of the Toronto Branch of Civil Engineers, Mr. C. H. Mitchell, and the president of the Engineering Society, Mr. R. J. Marshall.

#### Society of Arts, England.

At a meeting held on December 7th, Mr. Oscar Guttman delivered the third of his series of four Cantor lectures on "Twenty Years' Progress in Explosives."

The lecturer said that the investigation of the history of the subject showed that while the merits of making the first powder-like material from a nitro compound belonged to Hartig, and while Schultze made the first commercial powder, yet the invention of a gelatinized powder in the modern sense must be attributed to Friedrich Volkmann, although, quite independently, Reid discovered, twelve years later, a superficially gelatinized sporting powder, and Vieille, sixteen years later, a thoroughly gelatinized military powder. It would appear, therefore, that the Austrians were not only the first to experiment with gun-cotton in guns, but actually had the present-day rifle powder for years, only to crush it out of existence by their monopoly, and then to forget it. The course of industrial progress was thereby virtually put back fifteen years. Nitro-glycerine and nitro-cellulose powder was invented by Alfred Nobel in 1888, and he gave it the name of Ballistite. The British Government adopted the powder, which contained insoluble gun-cotton with nitro-glycerine and vaseline, the whole being dissolved in acetone. Ballistite was the service powder for Italy, and was much used for large guns. A conviction had grown up that, in addition to being smokeless, a powder should also be flameless, and the problem in this connection was somewhat similar to that presented by explosives in coal mines. One of the first patents in this connection was for the addition of sodium bicarbonate to the powder, a substance which had the effect of cooling the flame, by losing its water of crystallization and carbon dioxide. Other substances, like oils and soap, were employed, but the matter was not yet in a sufficiently advanced state to permit of an opinion being expressed. Various circumstances underlying the manufacture of smokeless powders combined to affect their quality. The manufacture of fulminate of mercury was performed in almost the same way as that adopted fifty years ago, but the increasing demand for ammonium nitrate safety explosives had resulted in the use of greater quantities of powerful detonators. Great progress had been made with electric detonators, the tendency being to employ low-tension fuses and magneto firing apparatus, thus greatly reducing the risk of firing the pit gases. Bickford's invention still held the field as regarded safety fuses, and it was curious that all attempts to make a safety fuse with a core of smokeless powder or some other nitro compound had so far proved unsatisfactory. The British Government had played a prominent part in the investigation of the causes of mine explosions. It had been known for a long time past that coal dust, as well as pit gas, was highly explosive, and it had been ascertained that two zones of stone dust on either side

of a zone of coal dust arrested the path of a flame. In this connection he ventured to make a suggestion. It appeared to him quite feasible to utilize certain lengths of tunnel in a mine for the construction of inverted absorption towers, and in that way to permeate an air zone with fine water mist. He believed that the existence of a number of such zones would absolutely prevent the ever-present danger of transmitting an isolated explosion to the whole of a mine.

### ORDERS OF THE RAILWAY COMMISSIONERS OF CANADA.

Copies of these orders may be secured from the Canadian Engineer for a small fee.

5587—November 12—Authorizing the Toronto Electric Light Company, Limited, to erect, place, and maintain twelve underground tile conduit ducts under the tracks of the C.P.R. at Christie Street, North Toronto, Ont.

5588—November 11—Authorizing the Manitoba Government Telephones to erect, place, and maintain its wires across the tracks of the C.N.R. at 1½ miles east of Lavenham, Man.

5589—November 11—5590—November 11—Authorizing the Bell Telephone Co. to erect, place, and maintain its wires across the tracks of the C.P.R. at The Main Road, Megantic, P.Q., and one half mile north of Labelle, P.Q.

5591—November 11—Authorizing the C.P.R. to open for traffic that portion of its Wolseley-Reston Branch from mileage 98.2 to Wolseley, Sask., a distance of 24 miles.

5592—November 11—Approving and sanctioning of the C.N.R. location through the Townships of Gurd and Patterson, Dist., of Parry Sound, Ont. Mileage 228.75 to 242.75, west from Ottawa, Ont.

5593—November 11—Authorizing the Water Commissioners of the City of Guelph, Ont., to lay and thereafter maintain a water main under the tracks of the G.T.R. where the same crosses under the East Leg of Long "Y" at Crimea Street, Guelph, Ont.

5594—November 11—Authorizing the New Brunswick Telephone Company, Ltd., to erect, place, and maintain its wires across the tracks of the C.P.R. at Perth, N.B.

5595—November 11—Approving the revised location of the Esquimalt & Nanaimo Railway Company's Wellington-Alberni extension from mileage 125 to a point south of Old Alberni, mileage 133.21, B.C.

5596—November 11—Authorizing the G.T.P. Ry. to cross road allowances in the Province of Saskatchewan, between mileage 100.298 and 153.60.

5597—November 7—Authorizing the G.T.R. to construct, maintain, and operate a branch line, or siding, and a spur therefrom, to the premises of Hiram Walker & Sons, Walkerville, Ont.

5598—November 12—Authorizing the Edmonton Railway Company, through application of the corporation of the City of Edmonton, to cross, at level, with its lines and the necessary poles to transmit power, the lines of the G.T.P. Ry. and the C.N.R. at the intersection of First Street and Namayo Avenue, Edmonton, Alta.

5599 to 5604—November 13—Authorizing the Bell Telephone Company to erect, place, and maintain its wires across the tracks of the W. E. & L. S. R. Railway Company, at 1½ miles east of Kingsville; cor. Division and Water Streets, Kingsville; one mile east of Kingsville; two miles south of Cottam; four miles south of Windsor; and cor. Howard Avenue and Tecumseh Road, Windsor, Ont.

5605—November 14—Authorizing the C.P.R. as lessees of the Ontario & Quebec Railway to change the location of its spur to the premises of the Sherwin-Williams Paint Company, Ltd., approved by Order 4857, dated 2nd June, 1908.

5606—September 14—Ordering the G.T.P. Ry. to treat the John Arbuthnot Company, Ltd., of Winnipeg, with respect to certain property in the City of Winnipeg, owned by the applicants, included in the location of the railway company's line approved by Order No. 3507, dated the 15th August, 1907.