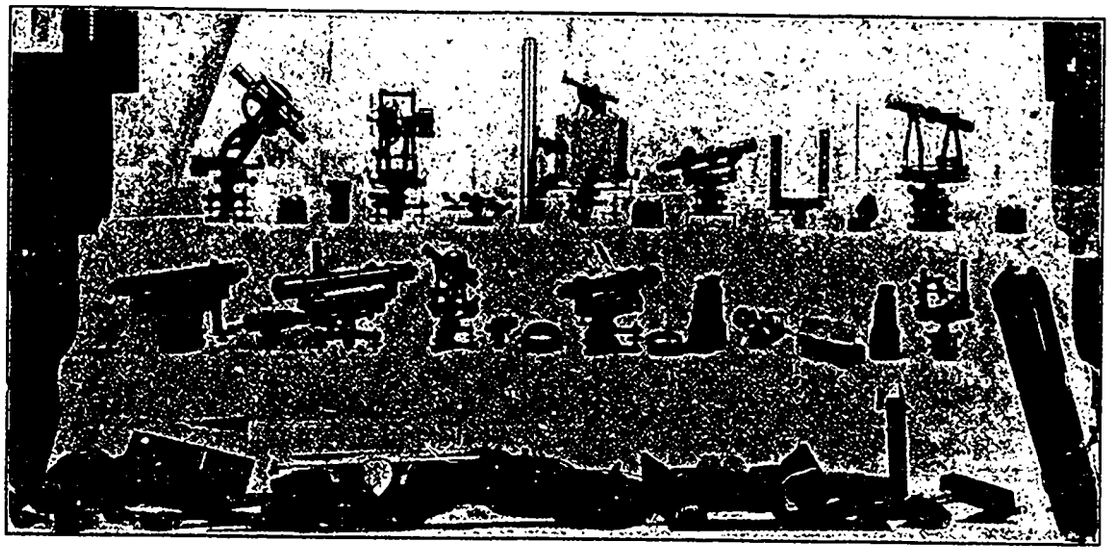
every student. In order to give the students full time to profit by this addition the session has been lengthened by one month in all the departments taking the surveying course, and the entire month of September has been set aside for field work. Some time in addition to this is given to underground surveying during the spring mining excursion. The course in full is designed to give the student all the technical knowledge necessary in order to qualify as a Dominion Topographical Surveyor in addition to the regular methods of practice in railroad hydrographic and topographical surveying. The instruction is given by field work, lectures and plotting, and office work; the work in these latter being based upon the notes taken by the students in the field work. The field work will be given this year in and around the village of St. Andrews, Que., and will commence with preliminary practice in the use and adjustment of the instruments to be followed by the carrying out of the following surveys by the several years:



INSTRUMENTS IN THE SURVEYING DEPARTMENT OF M'GILL UNIVERSITY.

Fourth Year Work.—Base line measurement, triangulation by geodetic methods, precise levelling, magnetic observations, and the determination of latitude, longitude, azimuth and time both in the day time and at night.

Third Year Work.—Topographical surveys of selected areas by plane table stadia and photo theodolite, a hydrographic survey of part of the Ottawa river, including the determination of its discharge, a location survey for a railroad between Carillon and St. Andrews.

Second Year Work.—Chain Survey of part of the village, compass and chain survey of farm lands, micrometer surveys.

In the making of these surveys the years are divided into small parties not larger in number than would be employed in practice, and each party carries out its complete set of surveys independently, each student being required to have a full set of notes of the work done by his party. The students are thus compelled to learn to carry out the duties which will be given them in practical work, and the necessity of full and accurate notes is impressed upon them in the plotting of their own surveys, which is done in the winter months after field work has become impossible. From the plans thus made quantities and estimates are calculated.

The field work and mapping has been organized in this manner so that the students may fully appreciate the practical importance of the facts concerning theoretical and practical surveying that they hear in the course of lectures upon this subject, and will learn to depend upon their own judgment and to understand that an acquaintance with the literature of a subject does not qualify a man completely for the practice of it. The organization and conduct of the surveying department is under the charge of Prof. C. H. McLeod and his assistant, J. G. G. Kerry.

W. W. Ogilvie is building what will be the largest grain elevator in Montreal. The plans are already completed for its construction, and it will have a capacity of 2,000,000 bushels. It will have a frontage of 240 feet and a depth of 290 feet.

RECENT METHODS OF SEWAGE DISPOSAL.

BY CHARLES G. HORETZKY, C. E., OF THE ONTARIO PUBLIC WORKS DEPARTMENT, TORONTO.

The following paper on the most recent methods of sewage disposal now in operation in the United States, being to some extent the outcome of experiments made by the Massachusetts State Board of Health, with remarks upon their adaptability (in whole or in part) to cities in Canada, was read before the Association of Executive Health Officers of Ontario during the meeting in Ottawa in September, and also at the meeting of the American Public Health Association.

At the tenth annual meeting of the Association of Executive Health Officers of Ontario held at Belleville, Ont., in 1896, I read a paper upon Methods of Sewage Disposal then used in some of the Provincial Institutions of Ontario. In December, 1895, I was one of the consulting engineers with reference to the disposal of the sewage of the city of London, Ont., and then recommended a system of land disposal or filtration; my recommendation being largely based upon the successful working of the Brockton, Mass., plant then in operation, and upon the very doubtful success of several chemical systems visited upon a tour of inspection through the United States in October of that year. Since 1893, further, and most important discoveries in this direction have been made by the Massachusetts State Board of Health at their Experimental Station at Lawrence, Mass., where the last few years have been devoted to researches upon the capabilities of gravel and coke filters aided by forced aeration. A description of these experiments would be interesting, but out of place here, and can be seen in the different annual reports. It will suffice to say that the conclusions arrived at offer a great incentive to the practical ingenuity of all those interested in the construction and maintenance of sewage disposal plants.

It has been demonstrated that filters of gravel of an effective size * of 5.40 MM. can produce a most satisfactory effluent, and remove from 60 to 85 per cent. of the organic matter of strong city sewage, at the rate of 400,000 gallons daily per acre. Coke breeze (screenings from commercial coke) has also been found of immense value as a filtering and straining medium, and possesses the advantage of being fully as valuable for purposes of combustion after its use as a sewage strainer and sludge retainer, as before. This will be discussed further on. As regards the forced aeration applied to these experimental filters, pipes were passed through, and within 6 inches of the bottom. A fan blower driven by electricity was attached, and, while the fan made 3,600 revolutions per minute, an air current capable of sustaining 3 inches of mercury was forced through the filters. By frictional loss the force of the current was reduced fully one-third.

In the experiments with the coke filters up to January 1st, 1895, the average rate of filtration was 260,000 gallons per acre

*(Note: In a sample of sand or gravel, the effective size is the maximum diameter in millimeters of the finer ten per cent of the sand grains, or gravel).