

# The Canadian Engineer

*A weekly paper for Canadian civil engineers and contractors*

## ENGINEERING APPLICATIONS OF GEOLOGY

Foundation Conditions in Canadian Cities—Geologists Useful in Construction of Catskill Aqueduct—The Loetschberg Tragedy—Paper Read Last Thursday Before Ottawa Branch, Can.Soc.C.E.

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THE engineer has to do with the design, erection, construction and operation of engineering works which are constructed in or on the surface of the earth. Therefore, geology, a science which treats of the history of the earth, is of great importance to the engineer. In fact, geology is often of real practical value, from the simple (apparently) task of sinking a well for water to the driving of long tunnels through great mountain ranges. The application of geology to engineering work is, therefore, so wide and diversified that it is not possible to deal with all the underlying principles within the time allotted to this paper.

In Canada we have engineers who are thoroughly competent to deal with all kinds of engineering work. Similarly, we have engineering geologists who are thoroughly qualified to apply this branch of science to engineering.

This paper deals principally with Pleistocene geology as applied to engineering, and, as the deposits of this period and later are more or less unconsolidated, the problems presented have to do with the soil, subsoil and unconsolidated material resting on the solid rock. A knowledge of the geology of these deposits can be applied



Ice-moulded Face of Escarpment, Excavation for New Customs Building, Sussex Street, Ottawa

practically in connection with the following classes of engineering work: Dam construction, foundations, railway construction, canals, water supply and materials of construction.

Structural geology, or that which deals with the rocks themselves, their kind and relation to each other, is not discussed in this paper. It is of equal importance to the civil engineer, and is of practical value in connection with

the following: Railway construction and maintenance, artesian wells for water supply, tunnels of all kinds, canals and materials of construction.

The object of the paper is to point out the necessity for the collection and interpretation of geological data



Showing the Intimate Association of Stratified and Unstratified Drift Within Short Distances

with reference to engineering and to give a few examples illustrating its practical value.

### Glacial Deposits

Glaciers are not of great importance to the engineer, even though they may be of considerable scientific interest, but the work which they have performed in the past, and the deposits which they have built up, are matters of considerable value to him, and often present interesting problems in connection with various subsurface operations, such as tunnelling, dam foundations, aqueduct construction, underground water supply, etc. Glacial deposits sometimes serve also as a source of materials of economic importance.

All Canada and the northern portion of the United States were formerly covered by a vast continental glacier. As a result of this the engineer at the present day finds himself confronted with a number of phenomena, which sometimes seem very perplexing, but whose understanding is often of vital importance from the financial standpoint.

The glaciated area in Canada is covered with a more or less continuous mantle of drift of variable thickness. Over