

valley of the Black river, re-enters Canada at the lower end of Lake Ontario, along which these limestones extend in a broad band, and crossing to Lake Huron stretch along the chain of the Manitoulin Islands, and then run again to the southward along the west side of Lake Michigan. There are also in Canada outlying patches on the Ottawa and Lake St. John. Throughout all these regions the gray crystalline beds are more or less represented; though in the State of New York they appear to be in the upper part of the formation, and to thin out and disappear toward the South.\* Specimens from Chateau Richer below Quebec, from Ottawa, from the La Cloche mountains, and from great Manitoulin Island, exhibit very nearly the same microscopic characters with those of the Montreal quarries. In the stone of Chateau Richer crinoids predominate. In that of Ottawa there is a greater prevalence of fragments of shells. In that of La Cloche and Manitoulin the materials are much the same as at Montreal.

The conditions of the accumulation of this great and extended mass of animal fragments, it is not difficult to understand. An ocean area, probably not of great depth, the growth of multitudes of branching corals and crinoids, the destruction of these by the waves and by the death of successive generations, the drifting of their remains by currents over the bottom, the occasional invasion of the clear water by muddy sediment—these are the conditions which must have prevailed when the gray Trenton limestones were formed. Professor Hall and Mr. Billings have remarked that the Brachiopod shell-fish of the Chazy and Trenton are usually of smaller size than that which they attain in overlying formations. This may have been due to the conditions so favorable to the spreading of organic fragments over the sea bottom.

In the Island of Montreal the Black river and Chazy limestones crop out from beneath the Trenton. The quarries at Pointe Claire, worked for the Victoria Bridge, are believed by Sir W. E. Logan to represent principally the former. The western or back quarries on the Mile End road and those of Isle Jesus belong to the latter. The stone worked for the piers of the Victoria Bridge presents several varieties in alternate layers. One of these has the coarse crystalline aspect of the gray Trenton, but it consists principally of fragments of Brachiopodous shells; masses of coral however occurring in some layers. A finer variety which constitutes a large proportion of the stone, is made up of rounded and comminuted

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\* See Geological Surveys of Canada and New York.