

quite impossible to arrive at any reliable or conclusive opinion on this matter without much more extended and careful research and exploration than has hitherto been made, but which I hope to be able to carry out on some future occasion.

#### NOVA SCOTIA.

From Fredericton I proceeded to St. John, and crossing the Bay of Fundy, arrived in Nova Scotia on the 5th August. I was then continuously engaged till the 13th September, visiting and examining various gold districts in the counties of Halifax, Hants, Colchester, and Guysborough; including Waverley, Oldham, Montague, Lawrencetown, Tangier, Mooseland, Musquodoboit, Mount Uniacke, Renfrew, Gay's River, Wine Harbor, Sherbrooke, and Isaac's Harbor.

On the 7th of October I was again in Nova Scotia, and was occupied till the 4th November, examining the southwestern portions of the Province, the route followed being from Digby, via Weymouth, to Yarmouth, Tusket, Barrington, Shelburne, Liverpool, Lunenburg, and the Ovens, Gold River, and Chester. From Chester, via New Ross, to Dalhousie Settlement, thence down the Lallave River to Bridgewater, returning, via Liverpool, to Annapolis. Thus, so far as observations over so large an extent of country made in but little more than two months can enable one to do so, I have endeavoured to gain a general knowledge of the leading features of the geology, and of those affecting the economics of the gold-fields of Nova Scotia, which will enable me to compare them with the gold-fields of other countries, and which will also be extremely useful in conducting a detailed geological survey, such as is essential for the right comprehension of the geological structure of the Province, and by which alone, geology can be made to afford valuable assistance to the practical miner in developing its mineral resources.

#### ACKNOWLEDGMENTS.

Before proceeding with the general and special remarks suggested by the facts to which my attention has been directed in the localities I have visited, I desire to tender my acknowledgments and thanks to the Hon. Robert Robertson, Commissioner of Mines, for his kindness in placing the resources of his department at my disposal. To Mr. John Rutherford, Inspector of Mines, and to Mr. John Kelly, Deputy Commissioner of Mines, my sincere thanks are due for much valuable and interesting local information, as likewise for the very cordial manner in which they gave effect to the instructions of the Commissioner.

The valuable information, and the kind attention which I received from Mr. H. Y. Hind have been most useful; and I am also much indebted to the various managers and agents of the mines which I visited, for the readiness with which they afforded me all the information and assistance in their power.

#### PREVIOUS REPORTS.

The reports on the Waverley and Sherbrooke gold districts, in 1869, which have recently been published by Mr. Hind, under the authority of

the Department of Mines; the report in connection with the Geological Survey of Canada, "On the Gold Region of Nova Scotia," by Dr. T. Sterry Hunt; the "Acadian Geology," by Dr. Dawson; the "Mineralogy of Nova Scotia," by Prof. How; Mr. Heatherington's excellent "Guide to the Gold Fields of Nova Scotia," all published in 1868; together with the various reports by Messrs. Campbell, Silliman, Poole, and others, leave but little to be said either on the geology, or on the economics of the eastern gold-fields of the Dominion, which has not already been referred to, and ably discussed by one or other of these authors.

#### VEINSTONES.

In Canada, as in Britain, and in Australia, the known gold-bearing veinstone is confined to strata of cozoic, or palaeozoic age; chiefly Silurian, but it is also occasionally found in crystalline rocks of later date, associated with them in the form of dykes, veins, or masses. It consists commonly of vitreous, white opaque or milky quartz; but presents great variety in color, structure, and external appearance, dependant on its more or less ferruginous character, and on other circumstances connected with its position and mode of occurrence. It is almost without exception accompanied by mispickel, or by common pyrites; the sulphurets of lead, zinc, copper, antimony, and rarely bismuth are likewise characteristic accompaniments of many of the veins, as well as bitter-spar, calc-spar, sulphate of baryta, and other minerals, none of which, however, often occur in sufficient quantity to be of much importance.

The palaeozoic strata in the gold districts with which I am acquainted, are always more or less intimately associated with divers kinds of crystalline (igneous?) rocks. In Victoria and Nova Scotia these are chiefly granitic and gneissic; while in the province of Quebec, and in Britain, serpentinic, dioritic and feldspathic forms are more prevalent. As above stated, they occur as beds, dykes, veins, or masses, sometimes parallel with, but often intersecting the stratification. I am not aware that any of these crystalline rocks have ever yielded gold either in Britain or in Nova Scotia; and the instances of their having done so in Australia are not numerous; the most noted and remarkable being that of the dioritic dykes with horizontal richly auriferous quartz veins intersecting them, numbers of which were found in the gold district of Wood's Point, Victoria, traversing slates and sandstones, probably of Upper Silurian age. An accurate sectional view of one of them is given in my Notes on the Geology and Physical Geography of Victoria, Plate IV.

#### DR. GENTH.

In this connection Dr. F. A. Genth, of Philadelphia, states, [American Journal of Science, 2nd Series, vol. xxviii, page 253, 1859.] "Gold is frequently found in diorite (in smaller quantities in syenite and granite) and although it is only rarely observed in the massive rocks, I have seen specimens from Honduras, C. A., where it was imbedded in the diorite without any other association. The result of the complete decomposition of the diorite is a red