

island-like area upon the granite, which probably underlies most of the area. The presence of feldspar, tourmaline and scheelite in the quartz of the gold veins suggests a close connection between the veins and the granite intrusions.

"It is of interest to note that, at least, most of the silver at Cobalt and most of the gold at Porcupine was deposited in the veins after the latter had been fractured and disturbed. At Cobalt, the vein filling before the disturbance took place, consisted essentially of cobalt-nickel minerals and dolomite, and at Porcupine of quartz."

The greater part of the paper is devoted to a discussion of the several series of rocks occurring in the three districts. The Sudbury norite and the Cobalt diabase masses are compared, and age relationships of the several rock groups are stated.

"Although the triangle-shaped region that includes the three areas is 8,000 square miles in extent, there is a close resemblance of the rocks of one area to those of the others. Broadly speaking, there are five or six great groups of pre-Cambrian rocks in the region. Insofar as it is possible to correlate them, each of these groups, with the possible exception of the Animikie, of Sudbury, is present in each of the mining areas, although some are more prominent in one area than in the others, and vice versa."

In order of age the groups referred to are Keewatin, Laurentian granite and gneiss, Timiskaming series, Lorrain granite, Cobalt series, Nipissing diabase, dikes of aplite, diabase, etc. It is suggested by the authors that part of the rocks classed as Keewatin may be of the same age as the Grenville series of Eastern Ontario.

The authors suggest that the dual system of classification of the pre-Cambrian be discarded, because of the thickness of the Grenville series in Eastern Ontario.

The classification of the pre-Cambrian rocks of the Lake Superior states into Huronian and Archean was at one time understood to imply for each district a separation of sedimentary from igneous formations. By several members of the United States Geological Survey it was thought that this was the case; but it has now long been known by these same men that this view was erroneous. The Huronian in some of the iron mining districts is largely sedimentary; but in others it is largely igneous. It is none the less true, however, that there is a remarkable difference between the older or Archean group, including Keewatin and Laurentian, and the younger group known as the Huronian. The Huronian group has suffered much less deformation than the Archean. The Lake Superior geologists have not discarded the classification of the pre-Cambrian which has been long in use; but they no longer consider that the Archean is wholly igneous or the Huronian sedimentary. In some districts the Keewatin is largely sedimentary and in a few the Huronian is largely igneous. The three Ontario districts discussed by Dr. Miller and Mr. Knight are not unlike some in Michigan.

ROYAL ONTARIO MUSEUM OF MINERALOGY

The Province of Ontario and the University of Toronto have had until recently no adequate quarters for the display of minerals. A splendid new building has been constructed and the collections are now being arranged. The systematic collection of minerals is one of the most complete, so far as the number of species is concerned, on the continent. The Director of the Museum, Dr. T. L. Walker, is endeavouring to make the collection of Ontario minerals a very extensive one. Circulars have been sent out announcing the occupancy of new quarters and asking for donations of specimens. Large pieces of ore can be used to advantage. The specimens when exhibited will in all instances be credited to the donor. The fact that the Geological Congress meets in Toronto this summer makes it specially desirable that the material be received at an early date.

It is to be hoped that the request will meet with a liberal response so that it will be possible to make a display that will be a credit to the Province.

VALUATION OF IRON MINES

The paper by Mr. J. R. Finlay on this subject presented at the New York meeting, February, 1912, of the A.I.M.E. has provoked considerable discussion and brought out interesting statements from some of the members of the Institute. Mr. Finlay's method is to determine mine valuation upon an apparent profit per ton based upon the difference between the selling price of ore and the expense of mining and marketing it for a term of years or for the expected life of the mine. Mr. E. E. White, however, considers that the factors assumed in applying this method are not justified. Of the five factors necessary to apply the method to any mine (1) the average cost per ton, (2) the ore reserves, (3) the production per year, (4) the average selling price, (5) the present value of a \$1 per year dividend, Mr. White considers that (1) and (2) may be determined with fair accuracy, although in many cases the ore reserves are only estimates based on drilling, and although the average cost may only be determined by past experience, and may be different in the future, due to varying costs of labour, increasing cost and poorer quality of timber, and the possibility of even greater taxation. The production per year is a known factor. The last two factors Mr. White considers to be purely matters of personal opinion. He believes Mr. Finlay's method may be successfully used, but that the five factors for operating iron mines in Michigan should be determined as follows: (1) The average cost of production at lower lake ports for five years, plus or minus the difference in cost per ton of taxes due to such revaluation; (2) the estimated ore reserves: ore based on diamond drilling to be estimated very conservatively; (3) the average production per year for the last five years, if the mine has been equipped