

that the latter belong to the same series as the Maimauso, Michipicoten and Keweenaw copper-bearing groups. My explorations also enabled me to ascertain the true position of the trap of Thunder Cape, one of the most conspicuous headlands on Lake Superior. Even from the deck of the steamer on passing it, this promontory may be observed to consist of almost horizontal grey flags and shales, surmounted by a covering of columnar rock. On closer examination, the latter rock is found to overlie unconformably not only the grey flags but also the conglomerate and sandstones which succeed them to the east. Instead therefore of being a member of the Upper copper-bearing series, the trap or hyperite of Thunder Cape is newer than any part of that group, and has formed an overflow of immense area extending south-westward to and beyond Pigeon River.

From my observations on Lake Superior I would argue the existence of three separate formations there, besides the Laurentian and Huronian series. These formations mentioned in the order of their antiquity are as follows:

I. Conglomerates, breccias, sandstones, melaphyres, porphyrites, amygdaloids and aphanites of Michipicoten, Maimauso, Isle Royale and Point Keweenaw.

II. Conglomerates, gray red and white sandstones, indurated marls, angitic porphyries, melaphyres, trachytes and basalts of Kaministiquia river, Point Porphyry, Isle St. Ignace, &c.

III. Hyperite overflow of Thunder Cape and of the region south-west from Fort William.

In thus distinguishing three different ages among the Upper Copper bearing rocks of Lake Superior, I have, of course, been much influenced by the fact of their unconformability, just as in the case of the Quebec group and Champlain rocks. It thus follows that these Lake Superior rocks cannot be wholly of Permian age even if part of them should be judged to belong to that formation. For the reasons given in the paper above cited,* I am still inclined to regard Group I of these rocks as identical with certain Permian strata in Europe; Group II would seem to belong to the Triassic system, as it overlies unconformably Group I, and exhibits many of the petrological characters possessed by the variegated sandstone (*Bunt sandstein*) or upper new red sandstone of Europe. These resemblances are to be observed among

* Canadian Naturalist, III, p. 256.