

consisting of gneiss on the east and flat-lying greywacke on the west, are 150 feet high. It is not easy to explain either the cleft or the sudden disappearance of the Laurentian gneiss west of it, except by considering it to coincide with a fault plane."

About 4½ miles to the north of the bay mentioned by Collins, the writer found the large fault described on page 18 cutting cherty tuffs. At its south end it passes out into the lake, apparently parallel with the axis of the lake, and on the north it swings to the northeast. At the point where the 90-chain portage leaves Mistinikon lake it is again visible, striking somewhat north of east, and apparently following a large valley. It could not be traced farther by direct means, but it is believed to continue eastwards into the lake at the other end of the 90-chain portage. This lake, whose trend is directly athwart the strike of the Cobalt series, lies in a narrow cleft, the sides of which rise almost perpendicularly for 100 to 150 feet. Such a cleft cannot be explained except by faulting, probably of comparatively recent date.

On the west shore of the narrows about half a mile north of Bell island another large fault cuts the volcanics (see page 18). As the Cobalt series to the south is not sheared, it is clear that the main faulting is of pre-Cobalt age. The channel on the west side of Bell island, however, is a narrow cleft with high walls vertical in places, and is best explained by recent movement along the old fault plane. Other faults, as shown on the map, are to be seen on the shores of Mistinikon lake to the north of this. Most of them have a strike in a general northward direction. It is clear, therefore, that the lake has been developed along the locus of an ancient fault or faults, established before the Cobalt series was deposited. It seems probable that stresses have been relieved in recent time by slight movement along these old zones of weakness; and it does not seem unlikely, therefore, that such slight movements may have taken place more than once since the deposition of the Cobalt series, with an accumulating displacement of the rocks on either side sufficient to satisfy the facts as described by Collins.

*Relations to Older Formations.* A study of the maps of the Matachewan and Gowganda areas shows the profound unconformity with which the Cobalt series rests on the older formations of the region. The base of the series rests in turn on the ancient deformed basalts and rhyolites, on the deformed Kiask series, and upon the granites which intrude them. No further proof of unconformity is necessary. A further examination of the map brings out the fact that there is rarely, if ever, any marked bend in the boundary of the Cobalt series at the lines of contact of one of the older formations with another, as for example where a granite is in contact with a greenstone. This indicates that the surface on which the Cobalt was laid down was a peneplained one, since otherwise the harder rock would have stood up as a ridge, on which the Cobalt series would be originally thinner than on the softer rock. The mapping would show this condition by a curve in the Cobalt contact at the crossing of the older contacts, as in Figure 1. The lack of such curves indicates the original peneplained nature of the surface. Peneplanation is also indicated by the numerous irregularly-shaped erosion remnants of Cobalt series, found especially in the Gowganda map-area to the south. As there is very little relief in the region, it is evident that over large areas it has not taken