

EXTENT OF GOLD ROCK.

three feet of broken, cleave, and slickensided slate, the surfaces coated with yellow sulphuret of iron in thin films. The under surface of the veins presents a flat mammillated appearance, and is divided by joints into large rhombic blocks. The joints in the quartz correspond in strike and dip with the divisional planes in the wall-rock due to cleavage and jointing. In the hanging-wall thin strings of quartz are seen in many of the joints, and the lines of the joints are marked by more or less prominent ridges, which correspond to the furrows in the main vein, and dip on the wall or plane of bedding at angles dependant on the difference between the strike of the latter and of the other divisional planes. Through the kindness of Mr. Crossland, the resident manager of the mine, I obtained some very interesting specimens from this lead, showing the occurrence of the gold in the fractured slate, in the quartz, and in the mispickel, which occurs in large quantities both in the veins and in their slaty walls.

Having shown what I believe to be the probable origin and character of the bedded gold-leads of Nova Scotia, we may now consider what is likely to be the effect of these on their extent and permanence in depth. If their origin and character is as suggested, it is hardly to be expected they will follow exactly the laws which are applicable in this respect to either true fissure-lodes, or to contemporaneous interstratified deposits. I have already alluded to this subject, (page 7), where it is stated that we might expect the leads to diminish gradually in number, and to be less permanent in depth the further they are removed from the axes of upheaval. I do not, however, think this, even if correct, is likely to affect injuriously the prospect of any of the leads now being worked.

PERMANENCE IN DEPTH.

The depth to which mining can be successfully carried is, under any circumstances, so infinitesimally small when compared with the distances through which the forces supposed to be the cause of the vein-fissures must have operated, that there need be no apprehension of the limit of the latter, in depth, being reached at distances less than those through which we know them, (from surface evidence) to extend horizontally in directions parallel and transverse to the anticlinal axes; and as these distances are reckoned by thousands of feet, it may very safely be conjectured that there is practically no limit to the depth to which the leads may be successfully followed. At the same time the facts observed would suggest the probability that the largest, best, and most permanent veins will, as a rule, be those which are nearest to the anticlinal axes; and, likewise, that veins of this character are not likely to occur either in synclinal outcrops, or where there are great thickness of strata nearly horizontal or uniformly inclined in one direction. But in such situations true fissure-veins and cross-lodes, either in dislocations or in shrinkage-cracks may be abundant, and of such a character as to be capable of being mined with profit. These are matters which can, however, only be determined by extended and careful exploration, and are alluded to only to show that however true the foregoing conclusions may be, they are not intended, and should not be permitted to discourage "prospecting" and intelligent exploration in all parts of the auriferous region.

The extent of the Atlantic coast series, of stratified gold-bearing slate and quartzite has been variously estimated at from 5,000 to 7,000 square miles. My observations during the past summer induce me to think that this estimate is very considerably too large. The mistake has probably arisen from defective information respecting the area occupied by the granitic rocks; which, as I have already pointed out, is very largely in excess of that assigned to it on published geological maps, from which the computations referred to have probably been made. The area represented on Sir W. E. Logan's large map of Canada as occupied by strata of Lower Silurian age on the Atlantic sea-board of Nova Scotia is about 5,400 square miles, and of this probably fully more than 1,400 square miles are occupied by granitoid rocks. Exclusive of Cape Breton Island, 3,500 square miles would, therefore, probably represent the total extent of the area over which the stratified slaty and quartzose auriferous rocks are distributed.

GEOLOGICAL AGE.—DAWSON AND HIND.

The geological position and the age of these rocks has been fully discussed by Dr. Dawson and by other of the authors whose observations I have alluded to, and all are agreed that they probably belong to the Lower Silurian period. Certain portions of them Mr. Hind has recently assigned to an older date; the possibility of which had already previously been suggested by Dr. Dawson, *Canadian Geology*, 2nd Edition, page 620.

CAMBRIAN AND LOWEST SILURIAN.

My first impression of them, formed after personal examination last summer, and based on mineralogical and stratigraphical considerations only, was what they represented the groups known in Britain as the Harlech grit or quartzite, and the Lingula-flag series; the former mapped as Cambrian by the British Survey, and the latter as the lowest member of the Silurian system.

FOSSILS, EOPHYTON.

In confirmation of this view I subsequently detected in the grey sandy and fluggy pyritous slates at the Oven's Bluffs, in Lunenburg County numerous specimens of the genus *Eophyton*, regarded by Mr. Billings as characteristic of the Primordial Silurian epoch. This genus is common in the sandy dark slates of the city of St. John, New Brunswick; in rocks hitherto referred to the Quebec group, on the Island of Orleans; and in Newfoundland. In all these localities it is accompanied by other well marked Primordial Silurian forms, which further diligent search will doubtless also disclose in Nova Scotia.

MR. BILLINGS.—DISTRIBUTION OF EOPHYTON.

Mr. Billings has supplied the following remarks on these fossils:—"The fossils discovered at the Oven's Bluffs are generically if not specifically identical with those described by the Swedish geologists, Torrel and Linarsson, under the name of *Eophyton Linnæarium*. They suppose them to be plants, but as none of the specimens exhibit any internal structure, this view does not meet

†*Canadian Geology*, 2nd Edition, pages 613 and 614.