

Interesting Problems in Geology



Mr. H. M. Ami.

I NTERESTING problems in Canadian Geology," may suggest to the lay mind that such would perhaps be entertaining to the geological scientist or to those desirous of the development of our mineral resources for dividend or other financial reasons of profit, but such ideas would have been agreeably broadened and enlarged at the close of the lecture delivered recently before the Canadian Institute, Toronto, by Henry M. Ami, M.A., D.Sc., F.G.S. To this able exponent of the earth's crust, its history and formation there would appear to be few facts hidden as he seemed to present to his audience the various strata in the testimony of the ages, like the leaves of a book with the wonderful facts plainly printed thereon, so easily decipherable although in the language of the aeons that "he who runs may read." It may have frequently been a matter of conjecture and marvel how geologists have arrived at a knowledge and determination of the age of formation of any particular stratum of rock how they have decided that one was of the earliest age, and another of comparatively recent formation, but the learned professor made it so plain and undisputable that the hearer at once wondered—as he likely had often done previously in having other perplexing questions made clear why he had never thought of that before. There are probably a dozen different periods of formation, periods of the earth's crust known and classified by the geologist from the early Cambrian to the late Pliocene in all of which are to be found imbedded in their own particular habitat of rock, the imprint or mould of organisms which as surely indicate the period in which they lived as do the nests of last summer's birds. We do not look for hickory nuts in a bear's den, nor for picked bones in the nest of a squirrel, neither will there be found organisms of the Permian age in the rocks of the post tertiary, nor the imprints of reptiles of the carboniferous period in the oolitic or jurassic strata with a bridge of a million years between. Each represents a period of the earth's formation as distinct and defined as do the rings of growth on the end of a pine log to the tree's age and existence. In many minds the questions may arise: to what end does this great knowledge tend? Of what economic value to the people of the present and to posterity are these researches which lay bare the old earth's past? The answers are many, but a few will suffice. In Canada we have to assist us the object lessons in the shape of recently discovered fields of great mineral wealth. In

the Cobalt silver and the Yukon gold we are beginning to realise that beneath the surface so rich in agricultural and other wealth-producing possibilities lie hidden treasures which if discovered and brought to the light of twentieth century employment and utility, would cause the mythical jewels and glitter of the Arabian Nights to pale into insignificance. Professor Ami declared that no part of the world presents such large areas of crystalline rocks as the Dominion of Canada, and these, he said, are the best mineral repositories on earth. Gold and silver are not the only pebbles on the shore of Time; there are other minerals yet, but barely discovered, that will perhaps add as largely to our national assets as the two premier metals. But how to discover them? How to know they are really with us in any form, and if so perhaps beyond our reach? The science of geology here steps in and takes us by the hand as a little toddling child, and leads us to our destiny. Whenever any mineral is found a certain kind of rock is its natural home. It is as little to be expected out of its own formation as a sea-fish at the head of a fresh water river. As previously stated, every formation has the remains of its own peculiar organisms, and when a geologist finds those organisms belonging to gold bearing country he correctly assumes the precious metal is not very far away, and when he comes across those natural to country in which any particular mineral is found he knows it is in the immediate vicinity.

Professor Ami gave two instances where a proof of this deduction has been demonstrated. Some years ago when in Cornwall where tin has abounded and been a source of wealth since before the invasion of Julius Caesar, he made particular study of the organisms peculiar to the strata where that mineral obtains. Some time after in Nova Scotia he came upon the same kind of organisms in similar formation. At the time, he stated tin should as a matter of sequence be in the neighbourhood and only the other day tin has been discovered near where he was pursuing his researches.

In another example, with a lantern slide, he showed the audience a picture of a spot in the Eastern provinces where coal was discovered through the professor having indicated its proximity by the imprints of ferns, and other marks of the igneous period of the carboniferous age. The land and rock slides which occurred at Quebec City in 1841 and 1889 with the attendant loss of life and destruction of property could have been in a large measure prevented or minimised had the authorities and people but possessed a working knowledge of rudimentary geology. Examples like the foregoing could be multiplied to illustrate the practical uses of geology in connection with our everyday wants.

Professor Ami, by a map, showed that North America had in the ages of the earth's formation and changes been the scene of two vast dislocations. The one which perhaps most concerns us was that which ran with a southward trend from the head of the St. Lawrence valley through the Eastern and Southern States and terminated at the extremity of Florida, although perhaps continued under the sea to the West India Islands. This dislocation was caused by a succession of volcanoes travelling southward as one after the other became filled up and extinct, and it is not improbable, said he, that their latest development has found expression in the recent upheavals and seismic disturbances at Jamaica.

The other dislocation can be fairly traced in the route taken by the Rocky Mountains, which is continued almost to the extremity of the continent.

These convulsions of the past, doubtless caused by a weakness of the crust, were so great as to disclose an earlier strata, which in its lapse of formation would perhaps represent a period of time as great as that from the earliest Cambrian to the present. The axis each dislocation formed, the overfolding of the old with the new, the intermingling of the co-relative with the older foreign element have created problems of study which when solved will throw a flood of increased light on the history of our globe, whose existence reaches back far beyond a measurement of time conceivable by finite understanding.