The Minerals of Ontario.

AN ADDRESS BY MR. A. BLUE, DIRECTOR OF MINES, TORONTO, TO THE STUDENTS OF UPPER CANADA COLLEGE, MAY 6, 1892.

It is about thirty years, since, in a country school section in one of the Lake Erie counties, I gave my last talk to boys and girls. Never much gifted in that way, I feared to trust myself to make an oral address in a room of College boys; and especially upon a subject that demands care in the statement of facts. Therefore, I have thought it wise to speak to you from paper.

Thirty years is a long time in the life of a man, as the life of man goes; a long time to be spent in well or ill doing. In that school section where I taught a generation ago, I am reminded that there were forty-eight or fifty persons each of whom had then reached my present time of life, or over. They were men and women in the vigor of their days and strength, who had cut for themselves homes out of forests of oak and maple, and walnut and chestnut, and a hardier or healthier lot of men and women you could not find in the whole of broad America. Where are they to-day? The answer is the old, old story. Of all but two of their number it has now to be said that there are other toiling hands where theirs have ceased from their labors, and there are other weary feet where theirs have completed their journey. It is the old, old story. "One generation goeth and another generation cometh; and the earth abideth forever."

You have read of Waterloo, an event of seventy-seven years ago. You recall the brilliant cavalry attacks of Marshal Ney upon Wellington's Fifth Brigade, and Wellington's unleashing order at sunset when arose that stern and appalling shout which the British soldier is wont to give upon the edge of battle, and which no enemy ever heard unmoved. In that Fifth Brigade which withstood and repulsed the charges of Marshal Ney's horse, and joined in the shout when the order to advance was given, was an Irish soldier, Maurice Shea, one of the 24,000 of English, Irish and Scotch who shared in the glory of that fateful day. Maurice Shea was the last survivor of the 24,000, and his death at the age of 97 took place a few weeks ago in the town of Sherbrooke, in the Province of Quebec.* A few days later there died in France the last survivor of the marines who fought and lost under Villeneuve off Cape Trafalgar. Eighty-seven years—nay seventy-seven years—is a long time in the life of a man, and such last survivors as those of Waterloo and Trafalgar are not often met with in human annals, so fleeting is our stay upon this world's stage.

In his book on Nineveh and its Remains, Layard observes that a deep mystery hangs over Assyria, Babylonia and Chaldea. With these names, he says, are linked great nations and great cities dimly shadowed forth in history; mighty ruins in the midst of deserts, defying by their very desolation and lack of definite form the description of the traveller; the remnants of mighty races still roving over the land; the fulfilling and fulfilment of prophecies; the plains to which the Jew and the Gentile alike look as the cradle of their race. For six centuries Nineveh was one of the great cities of the East, or perhaps it might more accurately be described as a group of cities. It was the capital of a great empire, in which a series of palaces surrounded by great and high walls had been built by successive kings. It was a city of about three days' journey, according to the prophet Jonah, or of sixty miles circumference, according to the old geographer Diodorus; and it had a population computed to be not less than 600,000. Nineveh perished with the last Assyrian king 2,500 years ago, and from that time until the explorations of Botta and Layard were commenced, fifty years ago, its place on the world's map was blotted out. Having been abandoned by man, its palaces and walls were gradually buried under the fine yellow dust which in the course of centuries the wind had drifted over them. Xenophon, who commanded the retreat of the Ten Thousand, encamped upon the site of the city without knowing its name. When the battle between the Romans and the Persians was fought within sight of the mounds in the seventh century of our era, "the city, and even the ruins of the city had long since disappeared," as we are told by Gibbon. And about 125 years ago the traveller Niebuhr, father of the historian, passed over Nineveh without perceiving it; he mistook for a ridge of hills the dust-covered rampart of brick and earth.

Then there is Troy, the old Troy of your Homer, if you read old Homer here. That city was taken and burnt by the Greeks more than 3,000 years ago, and its place on the map has been a subject of contention with scholars down to a period of less than ten years ago. "The question is now decided for ever," Dr. Schuchhardt tells us. "On the hill of Hissarlik Dr. Schliemann has uncovered the ancient palaces of Troy, has laid bare its colossal fortifications, and brought to light its treasures of gold and silver. Moreover, in the country round about, his unwearying exertions have proved the accuracy of many details, which show a coincidence, astonishing even to the most credulous, between the picture unfolded in Homer and the one preserved to this day."† The mound of Hissarlik is shown by Dr. Schliemann to be the remains of seven successive cities, one built over the ruins of another, and the second of which was the Troy of Homer. The first lies on the virgin rock, 115 feet above the sea, while the full height of the hill at the beginning of the excavations was 162 feet. The second is separated from the first by a layer of debris eight feet in thickness, covered by a layer of oil nearly two feet in depth, which proves that the site had been deserted and not built upon for a long time. The walls, the towers, the palaces, the pottery, and the gold and silver cups and bowls and vases and ornaments uncovered in the second city are remarkable evidences of its strength and civilization, and fully justify the observation of Dr. Schliemann in his last report that only after he had cleared the walls and excavated beneath them was he able to fully understand how long the duration of this settlement had been, and for what centuries its golden era must have lasted. He was able to verify in many particulars the accounts of Troy given by Homer, as traced in the records of the ruins, not the least important of which is the fact so curtly told in our primers that "Troy was burnt," the proof of which he found in the charred beams and the vitrified brick of its walls. And he was able also to establish this further fact, to quote Schuchhardt again, that "there existed on the site of Hissarlik, at a period far anterior to any we know of on Greek soil, a proud and royal city, mistress of sea and land; and the singers of the Trojan war, just as they were familiar with Ida and Skamander, with the Hellespont and the Isle of Tenedos, knew also of this city, knew of its golden age and of its mighty downfall."‡

I have said this much by way of preface in the hope of giving you some idea of the lapse of time as we find it in the annals of human events. What it means when we come to consider the history of the earth itself, how we measure the time of geologic events, we can hardly conceive, much less determine. The brick in the walls of this building was made out of the brown clay of the Drift age, Saugeen clay of the geologists, which you find extending over a wide area of the province, underlying the humus or vegetable mould and perhaps a few feet of gravel or sand. It is as old as the glacial era, or the closing period of that era, and doubtless older than our great lakes as they now exist, and very much older than our forests. But after all it is only the product of older rocks, of the granites and clay slates of the Huronian and Laurentian areas, ground to clay by glaciers, or decomposed by the action of water and weather, or dissolved by carbonic acid in a moist atmosphere. Much older is the lime in the plaster of the walls, the material of which we get at the nearest point from the Niagara group of rocks, whose aggregate thickness in places is not less than 150 feet. Whether built up of the encrinites whose forms are so plentiful in the upper beds, or by the deposition of calcareous matter chemically separated from the primary rocks in the ancient seas, or as seems most likely, by both these agencies working together, the process must have occupied thousands of years. Still more ancient is the brown sandstone used in the foundation of your building, taken from the upper beds of the Medina formation, near the base of the Niagara escarpment. Where this stone is quarried at the Forks of the Credit the Niagara limestones overlie it to a height of nearly 200 feet: and this sandstone, like the limestone and the clay, is material reworked from the primaries. Very much older than the clay or lime or sandstone are the slates on the roof. The slates we use here are obtained for the most part from the Province of Quebec or the State of Vermont, where they occur in the so-called Quebec group of rocks in the Lower Silurian system, but which is probably of pre-Cambrian or Huronian age. We know that the best slates are found among ancient lavas and rocks which have been faulted and tilted, and we have reason to believe that they have been formed under the influence of great pressure and heat. In this Province if slates of good quality and cleavage exist at all they will no doubt be found in the Archæan formations of the north, and explorers report their discovery there. On Temagami lake and the Matabeechiawan river there is said to be enough to supply the continent—but the stories of explorers must be received with a grain of salt."

But if the sandstones, limestones, and clays of which the walls of this college building have been constructed are old, what is to be thought of the age of those primary rocks out of whose ruins they were brought, and worked over grain by grain, and slowly laid down again by the waters of the sea in new beds removed by hundreds of miles in distance and by eons of years in time from the parent bodies? And what is the life of man compared

To be continued.

*Since this was written, I have seen a letter by A. R. Powell, in the London *Free Press*, which tells of another last survivor of Waterloo—William Chambers, of Dresden, in the County of Kent,—who not only fought at Waterloo, but went through the whole of the Peninsular war. Mr. Powell says that Mr. Chambers was born in the County of Antrim, Ireland, on the 12th of September, 1787, and is, therefore, in the 105th year of his age. "He can carry on a conversation with much strength and intelligence, and gives a most vivid description of his life in the army." He came to Canada in 1811.

†Schliemann's Excavations, an Archæological and Historical Study, by Dr. C. Schuchhardt, p. 18.

‡*Ib* p. 92.

*This reminds me that after the Mining Commission had taken the evidence of Sir James Grant at Ottawa, the witness volunteered a piece of wholesome advice. "You must be very careful, Mr. B.," Sir James said *in his* deliberate Scotch way, "of what these mining men tell you; they are so prone to exaggerate." "Yes," I said, "I have no doubt David had them in his mind's eye when he made that hasty remark. You know David prepared a hundred thousand talents of gold, and a thousand thousand talents of silver, and brass and iron without weight, for the building of the temple; and when he said in his haste, that all men are liars, I sometimes suspect that he had before him his experience with the mining men of his day." Sir James thought so too.