

of minerals and ores and the reactions which take place during metallurgical operations. He must have studied physics and mechanics in order that he may know the laws of light, heat, sound, magnetism and electricity, also mineralogy, essential in order that the crystalline form, color, hardness and specific gravity of mineral substances may be mastered. A mining engineer must be a geologist and be familiar with the principles of petrology, geology, including palæontology, stratigraphical geology and a certain amount of geological surveying in order that he may recognize the structural form of the earth's surface with which he will have so much to do. After an acquaintance with the composition of the minerals going to make up rocks and ores, and some of the infinite variety of forms and conditions in which these rocks occur, the next step is the science of mining, under which are studied the various kinds of deposits of economic minerals, the modes of prospecting for them and the usual plans of opening them up and extracting them from their resting places in the crust of the earth. Every competent mining engineer must be acquainted with the methods in vogue for treating the various kinds of ores so that the metals which they contain may be extracted. This is the science of metallurgy.

Mr. Willet G. Miller, B.A., lecturer in Geology and Petrography, delivered an address on the benefits to be derived from a study of Geology. A knowledge of Geology was shown to be of great practical benefit to the mining man and prospector. Instances were cited to show that in many cases great losses are incurred in mining ventures through a lack of scientific knowledge. Gold, coal and other minerals are looked for in districts where the rock formation precludes their occurrence. Thousands of dollars are often wasted in attempting to work deposits in formations where minerals are not to be found in paying quantities. In some cases costly buildings are erected and machinery is got in to work deposits of ore, which, while it may be of a very high grade, occurs only in so called pockets which are soon exhausted. A knowledge of the subject of ore deposits in such cases would make it known whether these minerals occurred in veins which were likely to yield a large amount of ore, or whether they occurred only in lenticular masses which would soon be exhausted on working.

The subject of Petrography, a branch of Geology, to which it is intended to pay especial attention in the school, has an important bearing on the occurrence of minerals of economic value. It deals largely with the minute structure of rocks, and through its study many facts have been discovered which tend to explain the relations existing between rocks and the minerals which accompany them. Through the study of this subject many laws are

being found out which relate to the separation of rocks from their original molten masses, and as the science advances many facts will be discovered which will solve problems concerning the occurrence of minerals and the nature of ore deposits.

The civil engineer can often make great use of a knowledge of Geology. The nature and composition of strata determine the direction of tunnels, railroads and canals. By taking advantage of the nature of rocks and their plications engineering works may be proceeded with much more quickly and at far less expense than when they are carried on as it were by chance.

In agriculture a knowledge of the chemical composition of rocks and the way in which they decompose to form soil, is often of great service in pointing out the best modes of cultivation in different districts. Courses of lectures and practical work, dealing with the relations of Geology to the science and art of farming, will be pursued in this school.

The importance of some knowledge of Geology to the sculptor and the architect is readily understood. On the purity of marble and its non-liability to decompose depends the success of works of art. Many fine buildings are built of stone which soon begins to decay, and the building, if not becoming quite unsafe, at least becomes very unsightly. The painter of landscape can make as much use of the study of the physical features of a country as a painter of animal forms makes of anatomy. As the latter subject is regularly taught to students who intend to devote themselves to particular branches of painting, why should he who intends to become a landscape painter not be taught something of Geology?

Even in Theology a practical use can often be made of Geology. Many men at the present time, after completing their theological courses, take up their work in mining districts; and I have been told by several clergymen that they find their knowledge of Geology and Mineralogy of great service to them in their pastoral work. They are able to make blow-pipe examinations of minerals for the miners, and to advise them concerning their "finds," and thus immediately get on friendly terms with the men and have much more influence with them for good than they would have had did they not possess this practical knowledge.

Would not a person possessing some knowledge of Geology be afforded more pleasure in visiting the Alps, Mt. Vesuvius or the Falls of the Niagara than would the ordinary tourist? Let us take the case of a summer tourist on a boating trip through the Georgian Bay. To one having some knowledge of the structure of the earth the hills near Collingwood would be something more than the "Blue Mountains." He would ask himself: To what geological age do these rocks belong, what was the mode of