STUDYING MINES WITH A MICROSCOPE

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(Abstract)

The address by President Bayley was on the modern methods of studying mines with the microscope to determine the way in which their ores have been formed, and thereby to learn something as to their expectancy of life. The lantern pictures of extremely thin sections of rocks, disclosing the minerals composing them, were graphic and beautiful.

The speaker introduced his subject by explaining briefly how pieces of rock are ground so thin that they are transparent, and how in these transparent sections the character of the different minerals present and their relations to one another may be discovered by allowing polarized light to pass through them and noting the effects. Photographs of thin sections of granites, hornblende-schists and other rocks were thrown on the screen and the methods by which the minerals in them were recognized were explained briefly. After giving a general view of the differences between some of the commoner rocks and the changes that take place when one type is changed into another, the speaker threw on the screen a number of photographs of the ore and associated rocks from some of the iron mines in North Carolina and showed that the ore was derived from deep-seated sources. It was inferred therefore that the ore body was persistent downward as far as mining is profitable. Incidentally, the minute character of the ore was observed and a method for concentrating it was suggested. It was seen from the photographs that the ore consists of magnetite and hornblende so inextricately mixed that it is hopeless to attempt to separate them. It was seen, however, that these two minerals are also mixed with quartz, which is an objectionable component, but in such a way that it can be separated from the magnetite and hornblende by crushing and treatment with a magnet. The hornblende is not injurious to the ore and consequently its presence in the concentrate does not injure it.

Another kind of iron ore is abundant in the south and elsewhere but it is not mined because it contains titanium. It is of some importance to know the form in which this objectionable constituent occurs in the ore mineral, as the titaniferous ores will probably be needed at some time in the not very distant future and it is desirable to know whether the titanium can be removed from the ore without reducing its iron content. Photographs of sections of some of the ores were thrown on the screen and it was seen readily that the titanium is present as little particles of the mineral rutile imbedded in the magnetite which is the ironbearer. The rutile is not magnetic; consequently if the ore is ground to the fineness of the grains of rutile in it, all the magnetite, which is magnetic, may be withdrawn from the powder by electro-magnets and may be used as an iron ore.

Incidentally a number of veins in the mountains in the vicinity of the mines in North Carolina and Tennessee, and a number of sections of the iron ores of the Lake Superior region were shown on the screen.