clinics, wherein he sees just such cases as he is likely to meet, treated by skilful men who may even give him bedside practice.

We mining people have to deal with cases of abnormal conditions in mother earth. We have to treat stoppages of circulation and their results, strongly analogous to varicose veins in the suman subject. We must now and then solve compound fractures and dislocations, not of a half an inch, as in bones, whose sundered ends cannot slip very far past each other, but of tens or hundreds of feet into the unknown. Comparing our work with the surgeon's, we have the one comfort that only in our imaginations do we have to put the broken parts back in their old, united positions. We may have only a little stringer to guide us, or the "trail" of the fault in a fault zone, or a slickensides, or a gouge of clay. In treating these difficult cases we must call to our aid all the lore or ore deposits. You remember how those old German mining geologists centering about Freiberg and Clausthal have written of the "Lehre der Erzlagerstatten," of the "Lore or Ore Deposits," and how we English-speaking peoples from the days of the old workers in Cornwall to the present have passed along with successive additions the accumulating experience of the past. Always in the back of our minds, for the ordinary run of orebodies we have the belief that some sort of solution has found a line of circulation and has brought in the useful minerals. We try to reproduce in our minds the way the old solutions behaved and to explain why they followed the special channels that guided them. We constantly seek the cause or conditions that made them drop their burdens of dissolved minerals at some places and not others. Sometimes an intersection of fissures may have led solution and precipitant to mingle. Sometimes an open-textured, relatively soluble rock may have itself served as precipitant. Sometimes loss of heat and waning pressure seem to have influenced uprising heated solutions, which Agricola nearly four centuries ago called the "juice of the earth," and which we often call to-day the "juice of the magma." These or similar questions are in our minds when one orebody is exhausted and we have to look for others.

Some orebodies resemble troubles in the human system for which the physician prescribes in the ordinary run of practice. But there are other cases which call for the surgeon. Let us suppose that our orebody is cut off by a fault; we need then to know how faults customarily move and how we may decide where to look for the lost continuation. What are the trail, the drag, the slickensides, the gouge, the fault breccia and what do they mean? What do our old-time authorities tell us—Schmidt, the Swede, and Zimmerman and V. Carnal, the Germans, and in recent years Freeland, our fellow countryman? We must not be too much taken up by the machinery used in mining and its enormous development in later years, and be unmindful of the old accumulated experience of the fathers gained in many years of laborious underground work. Hoover's translation of Agricola's Metallic Wealth has placed at the command of all English-speaking peoples a wealth of ancient learning brought together by Agricola about three hundred and sixty-five years ago. You would be surprised, if you have not read the book, to note on looking it through how much the ancients were like the moderns, and how very acute they were in their observations and inferences. Even our devices for hoisting, pumping and ore dressing are foreshadowed in Agricola's pictures. The miners and metallurgists of his day had no steam power, nor did they understand chemistry as based on the atomic theory, much less the doctrine of ions; but they utilized the forces at their command with rare skill and they usually left singularly clean slags, when they had reasonably simple ores to smelt.

But I did not mean to digress too far in speaking of our predecessors nor to do more than to urge you to hold them in grateful and appreciative remembrance. We are living in the present and after the preparation in the professional schools we each have a man's work to do in the world.

In all our schools we have professors of the various sciences and of the arts involved in mining and smelting, and yet there is one professorship which we do not have, despite the fact that we might almost think it the chief chair of all. I have in mind a chair of that indefinite thing or body of personal experience or attitude of mind towards one's fellows and associates which we sum up in the term "Life." You see we are not machines whose horse-power can be calculated and which run on their monotonous round until they wear out. Back in the late eighties I passed five very happy years in the faculty at Cornell. My old friend and older colleague, Professor R. H. Thurston, the director of Sibley College in those days, used to rather enjoy defining a man as an engine who could consume a certain amount of fuel under his boiler and deliver a certain amount of work from his muscles and brain. But we know very well that this is only a half-truth. A man has a personality, a spirit, a disposition, a character, a sphere of influence, that are quite distinct from the number of shovelfuls of ore that he can heave into a car if he is mucking, or the numbers of traverses he can turn off if he is surveying. It makes no difference to an engine whether its nearest neighbor is ten horsepower or ten thousand, or whether it has a cut-off or a simple slide valve, or whether it was built by Nordberg or Leavitt or Lidgerwood. But it makes a world of difference in a community of people whether a man in power is considerate, just and sympathetic; or whether he is unscrupulous, selfish and faithless. Or whether again he who is a leader is easily discouraged, or is disposed to lie down on the job, shirk responsibilities and take duties lightly. All these matters are of exceptional importance to a mining engineer, who may as he gets on in the profession be not only in charge of the technical work, but if he is in a remote community, may be mayor, board of aldermen, school commissioner and provider of food and clothing.

In the summer of 1910 the eleventh International Geological Congress was held in Stockholm, Sweden. Our good friends in Sweden planned an excursion for the visiting delegates, which would take them northward through the most interesting of the pre-Cambrian exposures and would let them see the great iron mines at Kiruna, then under full headway, although about one hundred miles north of the Polar Circle in Lapland. You may not all know that you can travel every day of the year in a good standard gauge train, with sleepers and diner, from Stockholm north to far within the Polar Circle, and come out at Narvik on the coast of Norway, where the harbor never freezes. We delegates to the Congress found ourselves one day in Kiruna. We were conducted along several miles of outcrop of a great sheet of extremely pure magnetic iron ore with a general average of one hundred and fifty feet in thickness. The ore forms the backbone of a high ridge, but it is fully six hundred feet from wall to wall, where the ridge falls away to a cross