case of need; but above all the student must acquire the power to think independently, to record accurately and to draw reasonable conclusions.

To this end the Institute has held the forefront among technical schools of the world in giving its students an opportunity to experiment practically upon a variety of subjects during their course and with a variety of different experimenters as their instructors. What they fail to get from one instructor they are pretty sure to pick up from another.

The special laboratories of the mining engineering and metallurgical department have been evolved out of a very small germ since the year 1870. At that time the Ecole des Mines of Paris, the Royal School of Mines in London, and one or more German schools as well as the two or three leading American schools had what were called metallurgical laboratories. They were rooms with little crucible and muffle furnaces such as we now have in our assaying room. In these crucibles the students made a great variety of small melting tests. This ended the practical course.

The Institute took the ground that a mining and metallurgical laboratory should contain apparatus for experimental work in concentrating, amalgamating, and lixiviating ores, as well as smelting and refining metals.

The difficulty which a student finds who goes to take a practical course in a mill or smelting works, is that the chances are the works will be in perfect running order all the time he is there. He does not have a chance to see the engineering qualities exercised which brought the works into smooth running condition, and he does not appreciate the engineering qualities that are being exercised to keep the establishment running smoothly, in other words he cannot break down and mend up. By having a laboratory with small sized tools in it, we can give him a chance to get them into running order, and to keep them running smoothly for a time, sufficiently long for the purpose. If they run too smoothly we can easily cause a catastrophe to happen which must be overcome, in order to continue the operation.

These operations take place on a scale varying from two pounds to two tons. The quantity is made as large as is practicable in every instance, the limit being such a weight that the labor of doing the work begins to interfere with the quality of scientific work that the student can put upon the subject, and at the same time the quantity is large enough so that the qualities of the work and the difficulties attending it are well illustrated. We believe we have chosen limits in these respects more successfully than any school in this country or abroad.

The recent further specialization of the courses in mining, engineering, and metallurgy has been made with a view to add one new introductory subject to the course namely, machinery. In Pennsylvania the large Anthracite mines with hoists and pumps and the large iron industries with their blowing engines, rolling mills, etc., must require many men versed in machinery. The first option is directed to the mines, the third option to the rolling mills. These fields have not been occupied at all as yet by M. I. T. students. In Michigan, Wisconsin, and Minnesota, all the great iron regions are still developing and will want men. Scarcely any M. I. T. men are to be found in these regions yet, none in the machinery departments. Further West in the mines and works of Colorado, Montana, California, etc., our men find employment when they seek it.

In reply to some questions as to the outlook in the mining profession in the West, a graduate of the Institute says that while mining takes a man away from civilization, it offers certain compensations, namely, a larger salary and less temptation to spend it than would be the case in the East.

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