THE TECH

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Students and Instructors of the Mining Course

THE MINING COURSE

By PROF. CHARLES E. LOCKE.

The present Course III has three options. Option 1 is the general option which is designed for all men except those who have definitely planned that their future work shall be along metallurgical or geological lines. Option 2 is for men who plan to follow metallurgy and who, therefore, require more of the mechanical engineering which is useful around large plants. Option 3 is designed for men who desire positions on the U. S. Geological Survey or who have a similar geological position in view. Options 1 and 3 are identical up to the end of the third year. The differentiation in Option 2 begins in the second year.

Formerly several other options were offered, but these were given up as inexpedient because it was found that a man who had specialized in one direction was very liable to secure a position at graduation for which his special training was entirely unsuited.

As arranged at present the first two years are largely spent on fundamental subjects. The first year has mathematics, chemistry, drawing, language and English. The second year has chemistry, physics, mathematics, surveying and English. A start is made in geology and a short course in Elements of Mining Engineering introduces the men to the professional work of the course.

In the third year the work becomes more specialized. The professional work includes mining engineering and assaying. Geology and analytic chemistry are continued and courses are given in mineralogy and petrology. The balance of the time is devoted to applied mechanics, physics (heat), political economy and general studies.

The fourth year work is largely professional and includes lectures in ore dressing, metallurgy and metallography, work in the metallurgical laboratory and heat measurements, lectures and laboratory work in electricity, lectures in hydraulics, work in forgeing, lectures and field work in geology, and courses in memoirs, sanitary science, theoretical

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GEOLOGICAL RESEARCH

By PROF. R. A. DALY.

Dynamical geology represents the application of physics and chemistry to the problems of the earth's evolution. It is, therefore, highly appropriate that geological research should be and is, among our instructors and graduate students, an integral part of the Institute's work. Every year the principles of chemistry and physics are being enlarged or restated. Either of these sciences is in a state of flux. A great number of geological problems are being attacked with the new methods provided by physical chemistry. So rapid is the advance in all three of the basal sciences that revision of the principles of physical geology is a constant necessity. The geologist has an obvious advantage who has among his colleagues physicists and chemists, who will draw his attention to recent discoveries, or to improved statement of fundamental principles, and who will advise him where only the expert is a safe guide. Such is the opportunity of a geologist at a well equipped technical institution, or at an equally well equipped university. Research on the principles of physical geology is there more fittingly prosecuted than even in the government surveys.

Every advance made in general or dynamical geology is a direct or indirect gain to economic geology and, therefore, to the thoroughly trained, practical mining expert. A successful mining geologist has the research spirit. Routine and slavish adherence to text book, handbook, or lecture instruction are not for him. As millions of dollars may be interested in his report, he must go deeper into interpretation of local facts than anyone has ever done before. No two mining camps are alike, no two problems in finding or following an orebody are alike; each case requires a new and special application of geological principles, and these are tested with each application. A large part of the enormous financial waste in present-day mining could be saved if managers and "experts" were trained in the atmosphere and methods of geological in-

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ORE DRESSING

By PROF. R. H. RICHARDS.

The beneficiating of minerals, by which is meant the making of mineral substances most serviceable to men, is divided into three parts: (1) Mining takes the ore from the ground in the crude state; (2) Ore-Dressing separates the quartz or other waste materials from the valuable minerals by mechanical means; and (3) Metallurgy, which separates by chemical means, using fire or water, the remaining waste substances from the valuable metals, turning out the latter in condition for practical use.

Ore-Dressing uses the various breakers and crushers to sever the valuable minerals from the waste, and then the screens and classifiers, followed by the jigs, tables and vanners, to separate the good from the bad. While the above machines use water and specific gravity for separating the minerals, there are a number of other processes which help by separating the minerals which are of the same specific gravity and therefore cannot be separated by the above method; these are the magnet, which separates the magnetic minerals from the non-magnetic minerals; the static electrical machine, which separates the mineral conductors of electricity from the non-conductors; and the flotation methods, which separate the minerals that are held up by the surface tension of water from those minerals that are not.

The teaching of Ore-Dressing at the Institute is done by lectures illustrated by laboratory work, which is timed to come as nearly with the topics of the lectures as possible.

Ore-Dressing Laboratory.

The laboratory work is laid out for giving the students as much practical knowledge of ore-dressing as possible in the time allowed, and to furnish the tools and materials and guidance for investigation. The chief features of the work are: (1) A concentration of a lead ore. (2) A run on a gold ore in a California quartz mill. Each of these illustrates the method of grouping a set of machines together for the purpose of

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COURSE IN GEOLOGY

By PROF. T. A. JAGGAR, JR.

The Institute provides courses in what is known as "Option 3 in Mining," and Course XII, "Geology and Geodesy," designed to train men for professional life in geology and topography. Students planning to become geologists ought to take the mining engineering course, so as to get a solid foundation of work in chemistry, physics, mathematics, and engineering, subjects essential for a geologist's training. Few students at this institution train themselves to become topographers. This is unfortunate, as the science of making artistic and accurate maps ought to rank as high as any branch of learning in the humane professions. It is to the wonderful work of such men as F. Matthes, M. I. T., 1895, United States Geological Survey, topographer of the Grand Canons of the Colorado and the Yosemite, that we owe a debt of gratitude for bringing topographical science up to a standard comparable with the finest geological or astronomical work. Good maps are essential to the study of all engineering, hydrographic and geological problems, and the making of them deserves much more attention than is now given to it in the average engineering course. The work calls for a high artistic sense, like that of the architect, and also for endurance, administrative ability in the field, thorough knowledge of astronomy and geodesy, and a keen appreciation of the relations between geological structure and topographic form. I think that there is a field of growing importance for the man who will train himself to be an expert togoprapher. The large reclamation, mining, and power projects which are now engaging the attention of the world, as well as such novelties as automobiling and aviation, are bringing the forms of the land closer to mankind. In everyday life, men engaged in commerce, real estate, and transportation, feel the need and the lack of good maps. There is a bill now before the Massachusetts Legislature to provide for the preparation of a State geological and economic atlas, and an important part of the work provided for under this bill is the revision of all the topographic

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