

A Special Issue of *Engineering and Science* Devoted to GEOLOGY AT CALTECH

Nearly 20 years ago *Engineering and Science* (February 1948) published an issue devoted solely to articles by the staff of the Caltech geology division. Those 11 articles by 9 authors provided a representative cross section of interests and activities within the geology division in the late 1940's. The issue in hand, comprising 12-13 articles, presents a sampling of divisional interests in the late 1960's. These two issues of *Engineering and Science* constitute an interesting historical record of evolution in geological activities over two decades. Even to those involved, the changes in personnel and orientation have been surprisingly great. Professional appointments of all ranks numbered 14 in 1948 and 23 in 1967. Of the nine authors contributing to *E&S* in 1948, only two (Charles Richter and Robert Sharp) are on the staff now. John Buwalda, Beno Gutenberg, and Chester Stock are deceased; Hugo Benioff and James Noble are retired; Richard Jahns is a dean at Stanford; and Ian Campbell is director of the State of California Division of Mines and Geology.

The articles of 1948 focused on gems, fossils, ore minerals, faulting, earthquakes, the earth's interior, rock study, seismometers, and surface features. Some of these same topics are treated in the current edition, but in addition there are articles on meteorites, geochemistry, geochronology, the microprobe, and planetary science.

Geology at Caltech has undergone much change in the last two decades. Since 1948, a major operation in geochemistry has been initiated and now permeates all parts of the division. Seismology remains a major endeavor, just as it was in 1948, but geophysics is being broadened and strengthened. Recently, major efforts have gone to build a staff, research competence, and a graduate student program in planetary science. The division has become a user of sophisticated laboratory procedures and complex pieces of apparatus such as mass spectrometers, an electron microprobe, and an infrared telescope. Some of the finest chemical laboratories on campus, and by necessity probably the cleanest,

are in the geology division. The horizons and scope of geology have so broadened that at times the name hardly seems inclusive enough. Geologists, geochemists, and geophysicists are now joining divisional planetary scientists in probing the origin, composition, and history of the moon and other planets.

In spite of all this, a common basis of geology or earth science underlies the activities of the division, integrating them into a meaningful whole. We still practice field geology and insist on extensive student training therein. The Caltech field training program extending through the junior and senior years and involving part of the intervening summer is probably one of the most thorough in North America. Some of the staff remain primarily field men, and many others rely upon field work to define problems, provide materials for laboratory analyses, and test theories and hypotheses.

Work in other classical geological subjects is still carried on, in different ways to be sure, but the objective is the same—namely, to learn all we can about the earth, its origin, constitution, and evolutionary history, as well as its current and future behavior.

The scope is now being broadened to include the moon and other planets. Field work in these environments is not yet possible, but the earth scientist who has done his field work on earth and his homework in the fundamental aspects of geology, geochemistry, and geophysics is going to be in a position to contribute significantly to the rapid developments in planetary exploration coming up over the horizon.

Any educational and research organization that remains unchanged is dead. This issue of *Engineering and Science* provides testimony to the continuing viability of the Caltech geology division. It will be interesting to see what another issue looks like 20 years hence.

—ROBERT P. SHARP
professor of geology and chairman of the
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