find it almost impossible to understand the physical difficulties involved in geologic work. In the early days, traverses were made on foot or in canoes along the principal streams, and mental vigor had to be maintained in the face of constant hard labor. The work in Alaska yielded 12 reports and short papers. In his summary of geologic work in Alaska in 1906, Alfred H. Brooks, then chief of the Alaskan Branch, pays tribute to Mendenhall's work.

His next assignment was the study of ground-water conditions and problems in southern California, first in the basins south of the San Gabriel and San Bernardino Mountains, then in the Mojave Desert, and then in the San Joaquin Valley. This work continued from 1903 to 1909 and yielded 12 reports and related papers. The records of this work are still essential background in the present water problems in those regions.

From 1908 until his retirement in 1943, Mendenhall held administrative assignments in Washington headquarters, first in charge of ground-water investigations, then as chairman of the Land Classification Board (later the Conservation Branch), which must classify all public lands and approve assignment of those lands to private owners. This extended from 1911 until 1922, when he was appointed chief geologist, to succeed David White. When George Otis Smith, the director of the survey, was appointed to the Federal Power Commission in 1930, Mendenhall became acting director, until 1931, when he was confirmed as director. He retired in March 1943 at the age of 72. For the next 15 years he lived quietly at his home in Chevy Chase, Maryland, playing golf, reading, and seeing his friends. In 1926 the honorary degree of Sc.D. was conferred on him by the Colorado School of Mines; in 1932 the same degree was conferred on him by the University of Wisconsin, and in 1944 he was awarded the Penrose medal of the Society of Economic Geologists.

Most of those who have served in scientific bureaus in the Government think that those who are appointed to high administrative status should have demonstrated capacity in scientific work. It is natural, therefore, that his superiors should have turned to Mendenhall, with his early splendid record in geologic field work and his demonstrated capacity as an adviser and critic in field problems, for administrative duties. That he continued in this work for the rest of his life may be explained by his high sense of duty in the execution of assigned tasks and by his feeling of loyalty to the organization. In the great growth of the survey during the war years, it was Mendenhall's chief concern that standards in men and workmanship be maintained at high level.

It may be possible to understand much of Mendenhall's life by recalling some of the influences of his ancestry, youth, and early environment. He was born in Ohio of Quaker parents in 1871, and, until he went to college, he lived on a farm under the influence of the simple forms of Quaker life. Even though in his later life he ceased to maintain contacts with the sect, much of their attitude toward life and daily demeanor had been impressed upon him. With his mother, as long as she lived, he used the forms of speech of the Quakers. In his contacts during his mature life he was friendly but reticent, more inclined to listen than to speak, and rarely speaking of his inner thoughts. Even as chief geologist and director he disliked speaking in public. In the science of geology, where progress depends on myriad observations and on thought and discussion, Mendenhall approved of discussion but disliked arguments. Quite unemotional himself, he was suspicious of fervor. Many who knew him well agree that one of his outstanding qualities was integrity in thought and action, and none who knew him ever suspected him of having a selfish purpose.

"His was a proud spirit but proud of simplicity, proud of integrity, proud of genuineness and independence and tolerance, never of place or power or trappings; and proud of reputation only as evidence that his own well-based but unassertive self-respect found support in the opinions of men." These words were written by Mendenhall in 1935 in the memorial that he prepared on the life and work of David White. The ways in which men describe their associates also reveal much of their own aspirations, understanding, and sense of values. Those who knew Mendenhall intimately agree that this description of David White reveals much of his own character, motives, and demeanor.

D. F. HEWETT
U.S. Geological Survey, Menlo Park, California

R. S. Lull, Vertebrate Paleontologist

For many years, one of the most popular lecturers in science at Yale University was Richard Swann Lull, who is remembered with respect and affection by the thousands of students who took his course on organic evolution. Tall, straight, impressive in appearance, he was a gifted speaker, with unusual ability to dramatize his subject.

Lull was born at Annapolis, Maryland, on 6 November 1867, the son of Captain Edward Phelps Lull of the United States Navy, one of the original explorers of the interoceanic canal routes in Central America, and Elisabeth Burton Lull. Since his youthful ambition to follow a naval career was thwarted by deafness, he entered Rutgers University, in 1888, where he played rugby football, set a record with the 16-pound shot, and won the Suydam national science prize and sophomore oratory medal. In 1893 he received his B.S. degree in zoology and, in 1895, the M.S. degree. He accepted an assistant professorship in zoology at Massachusetts State Agricultural College (Amherst) in 1893 and there commenced his studies of the Triassic reptile footprints in the collection of nearby Amherst College. In 1903 he received his Ph.D. from Columbia University and, in 1906, came to Yale as assistant professor of paleontology and associate curator of the Peabody Museum of Natural History. He was Sterling professor of vertebrate paleontology from 1922 until his retirement, in 1936. From 1922 until 1938 he was director of the Peabody Museum and, from 1933 until 1949, editor of the *American Journal of Science*.

Dinosaurs constituted Lull's main scientific interest. He completed the monograph on the Ceratopsia, or horned dinosaurs, which had been commenced by O. C. Marsh and J. B. Hatcher, and later published a revision. He monographed the duck-billed dinosaurs and wrote many shorter reports on dinosaurs. Other large vertebrates also claimed his attention—elephants and mammoths, whose evolution he summar-

ized in detail, and whales, whose adaptation to aquatic life formed a major chapter in his text on evolution. The evolution of the horse and of ancient man were also the subjects of important books and papers from his pen.

Fossil footprints were of particular interest to him because they were records of living animals. His dissertation on Triassic footprints was expanded into a comprehensive study of the Triassic life of the Connecticut Valley, which was revised and republished shortly before his death.

In his later years, some of his most popular lectures were accounts of experiences on the American Museum of Natural History expeditions to Wyoming, in 1899, and to Montana, in 1902; on these he helped collect the *Brontosaurus* skeleton that is now mounted in New York and various *Triceratops* skulls. Fossil collecting in those days involved slow travel, by horse team, and camping in remote spots for weeks at a time, quite unlike conditions under which paleontologists work today. After coming to Yale, Lull organized collecting expeditions to Nebraska, Wyoming, and Texas, which brought back a variety of fossil mammals to enrich the collections of the Peabody Museum.

His carefully organized lectures on organic evolution were published in 1917 in a textbook of that title, which was widely used for many years. He wrote many popular articles about evolution, paleontology, and fossil collecting, contributing toward understanding of science.

Rutgers conferred an honorary D.Sc. degree upon him in 1915. In 1933 he received the Daniel Giraud Elliot medal of the National Academy of Sciences for his memoir on Ceratopsia. Lull belonged to many scientific and honor societies; in 1925 he was president of the Paleontological Society.

Failing eyesight compelled him to relinquish his research in 1955, and he died on 22 April 1957, in his 90th year.

JOSEPH T. GREGORY
Peabody Museum, Yale University, New Haven, Connecticut

News of Science

Trough in Ocean Bottom

The Coast and Geodetic Survey has announced the discovery of a deep, long crack in the bottom of the Gulf of Alaska that may cause major tidal waves.

The crack, which is 500 to 700 feet below the ocean floor and probably 2 to 3 miles wide, stretches in a southwesterly direction across much of the gulf below southern Alaska. It is known to be at least 250 miles long, and may possibly be 400.

The existence of the trough has been suspected for many years as a result of scattered depth soundings in the area. Its presence has now been confirmed by soundings obtained by survey ships as they crisscrossed the gulf between the Bering Sea and the Aleutian Islands.

In the last 40 years, 37 seismic sea waves have been recorded in the Pacific, 16 of them since 1950. One of the most destructive hit the Hawaiian Islands in 1946. The discovery of the trough may help the Coast and Geodetic Survey to improve its detection and warning system for tidal waves in the Pacific Ocean.

Revised Curriculum at Harvard

Approximately 230 first- and second-year students in the Harvard Medical School, and 29 students in the Harvard School of Dental Medicine, will this year start upon a revised curriculum in the preclinical sciences. The new curriculum stresses interdepartmental teaching, broadens the tutorial system, and increases the amount of unscheduled time available to the students. It retains the current emphasis on the study of the normal body and biological processes in the first year, then shifts to studies of disease states in the second year. The program also preserves the research time available to members of the faculty of medicine. Much of the revised preclinical curriculum derives from observations of the operation of a unified teaching program in the basic medical sciences that was established in 1952 in the Division of Medical Sciences of the Graduate School of Arts and Sciences.

Idaho Reactor

The Atomic Energy Commission will conduct an industrial preview 2–3 Oct. of its Engineering Test Reactor (ETR) at the National Reactor Testing Station, Idaho Falls, Idaho. The program will include a day-long symposium on the reactor's design, construction costs, experimental facilities, and operation. Approximately 250 representatives of U.S. industries concerned with building and employing nuclear test and research reactors for civilian and industrial use have been invited to participate. They will be joined by members of Congress, the Atomic Energy Commission, and the press.

The ETR will provide the highest neutron flux of any known reactor and the largest spaces within an enriched uranium core for determining the effects of intense neutron and gamma-ray bombardment on engineered components and materials to be used in nuclear power plants and nuclear propulsion units for aircraft and ships.

The primary ETR facilities were designed and constructed by Kaiser Engineers Division of Henry J. Kaiser Company; they will be operated for the commission by Phillips Petroleum Company. General Electric Company designed the reactor, the core, and the controls. The cost of the reactor is about $14 million. Other experimental facilities and equipment associated with the reactor will cost an additional $2 million.

USDA Research Facilities for Conservation

The U.S. Department of Agriculture has announced that funds have been made available by the Congress to provide new Federal research facilities in various areas of the country for work on problems of soil and water conservation and for pilot-plant study of new wool-processing methods. New laboratories for soil and water conservation research will be located at Oxford, Miss.; Watkinsville, Ga.; Phoenix, Ariz.; and Morris, Minn. A pilot plant for wool research will be established at Albany, Calif. The facilities for soils research will be operated by the Soil and Water Conservation Research Division, and the wool pilot plant will be operated by the Western Utilization Research and Development Division, both of USDA's Agricultural Research Service.