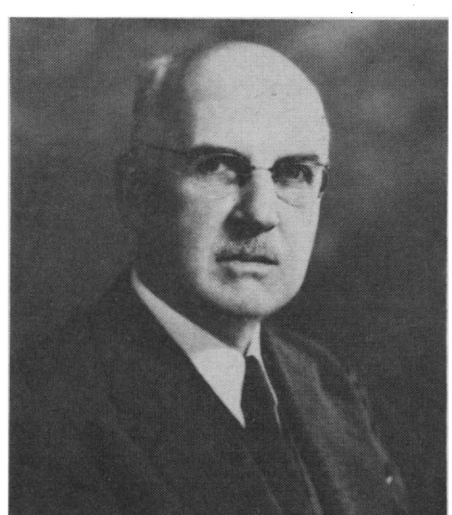
W. J. Mead, Experimental Geologist

Warren Judson Mead, who died on 16 January 1960 in his 77th year, was a distinguished geologist known for his achievements as teacher, author, and administrator; a research scientist; an engineering geologist and expert on structures, dam sites, and the behavior of natural materials; an imaginative and creative experimentalist; and the inventor and builder of numerous devices for laboratory instruction and research. Although he is probably most widely known for his consulting work on bauxite, dam sites, and mineral exploration, his most fundamental contributions to geology lay in the areas of the chemistry of mineral and rock changes and of the physical behavior of granular and solid materials under deforming stresses.

As the 20th century dawned, geology was full of problems in need of quantitative and experimental treatment. Descriptive and analytical data had been gathered in great amount during the preceding century and were being brought together in comprehensive works—annual reports, bulletins, monographs, professional papers, special reports, reference and text books, and so on—by federal and state bureaus and surveys, by college and university departments of geology, and by privately supported journals and publishers. Large accumulations of similar data were locked away in the confidential files of the great mineral exploration and mining companies. The time was ripe for young analytical minds, appropriately trained and oriented toward quantitative and experimental inquiry, to address themselves to some of these challenging problems. Such a mind was that of W. J. Mead, native son of northeastern Wisconsin, graduate of the University of Wisconsin (A.B., 1906; A.M., 1908; Ph.D., 1926) and longtime member of its faculty (1908–1934), and, after 1934, chairman of the Massachusetts Institute of Technology's department of geology, which he headed until his retirement in 1949.

Born in 1883 of a lawyer-politician father and a mother who loved gadgets and machines, and encouraged by a resourceful and imaginative high-school teacher of mathematics and science, the youthful Mead was deeply influenced by what was happening to his surroundings in a small country town north of Milwaukee as the 19th century was coming to an end. The Age of Electricity was beginning, and the old patterns of life were changing rapidly, with the introduction of electric lights, motors, bells, and trolleys. Little wonder that the imaginative youth from Plymouth registered for electrical engineering when he entered the university in the autumn of 1902. Soon, however, his interests turned to geology, and inspired by the teaching of N. M. Fenneman, he planned to do his senior thesis with that outstanding geomorphologist. This was not to be, however, for in his senior year he came under the influence of those two great Wisconsin geologists C. R. Van Hise and C. K. Leith, and thenceforth his geological career was shaped and guided by these two masters.

Skilled in observation, both by eye and with a camera; possessed of unusual ability to visualize lines, planes, and curved surfaces in three dimensions, thanks to superb training in geometry; master of the slide rule and possessing the engineer's knowledge of the mechanics of solids; of original bent and adept in the use of machine tools; and keenly interested in determining the how and why of natural phenomena and in developing ways and means of demonstrating and applying these phenomena, Warren Mead was exceptionally well equipped to attack both quantitatively and experimentally the whole broad front of physical geology as he entered Wisconsin's graduate school in 1906.



Warren J. Mead

Under the stern and demanding but nonetheless friendly guidance of Leith, then head of Wisconsin's department of geology, and with inspiring encouragement from Wisconsin's great geologist president, Charles R. Van Hise, Mead's abilities and energies were immediately put to the fullest test. From his fertile imagination and ingenious experimentation during the next two decades came an array of ideas, instruments, and devices that have had a profound effect on geology through the first half of this century. Not the least of Mead's contributions to geology were his lectures to geologists and civil engineers, numbered in the thousands, during more than four decades of teaching.

He taught structural geology for more than 45 years and to many hundreds of students, at Wisconsin (1908–34), the University of California at Berkeley (1926–27), and Massachusetts Institute of Technology (1934–49). In 1916 he organized one of the earliest courses in engineering geology for civil engineers and for the next 38 years taught the subject to many engineering students. His last formal lecture at Massachusetts Institute of Technology, delivered as honorary lecturer in June 1954, was to an enthusiastic class of civil engineers who warmly applauded him as he finished. To his teaching effort he brought carefully prepared lectures, memorable laboratory demonstrations made especially effective by his own original models and devices, and countless stories and episodes drawn from his widely varied academic and consulting experiences.

As a geological consultant and engineering geologist Mead gave advice and service on a wide variety of problems to many different clients, of which the following are some of the more important: Aluminum Company of America, 1912–50 (bauxite exploration and other problems); Panama Canal Commission, 1916 (earth slides); Colorado River Board, 1928 (Boulder dam); U.S. Army Corps of Engineers, 1932–37 (Garrison dam; Fort Peck dam; some 35 other dam sites); and Reynolds Metals Company, 1941–60 (bauxite and fluorspar exploration).

Whether as teacher, consultant, or administrator, Mead was quick to see how new principles, methods, techniques, and instruments could be applied to geological problems. When no device or instrument existed for some desired use, he frequently designed and made one. These inventions were quickly taken up and applied by others. His students will recall his novel method for making isometric block diagrams; his framed screen to illustrate the deformation of a circle; his clasp of thin flexible plates, unsupported at the two ends, to illustrate the ellipsoid of strain; his ingenious nomograph for graphically reducing great masses of physical measurements to simple cubic-feet-per-ton estimates of ore; his original three-dimensional model developed for his senior thesis to relate chemical data so as to establish the limits within which shale-sandstone-limestone ratios must fall; the circular slide rule he developed to accelerate the conversion of chemical data to mineral compositions; the numerous multicolored and multi-layered sand and plaster of Paris models for illustrating folding and faulting; and last but certainly not least, the intriguing rubber bags, half-filled with sand, with which he successively demonstrated how the principle of dilatancy could be applied to the deformation of granular and solid materials (geology), the production of a soft molding device to help the prosthetics doctor, and the production of a soft but firm pillow for the radiotherapist. Regardless of the field of human problems or human endeavor into which his restless and inquiring mind wandered, he always found much of interest to challenge him. In his last years, with eyes dimmed after surgery, he still found the motivation and summoned the skill to design and make several ingenious devices for one of his sons to use in research on the physiology of respiration in Harvard's School of Public Health.

He was a member of the National Academy of Sciences, American Academy of Arts and Sciences, Geological Society of America (vice president in 1938), Society of Economic Geologists (president in 1942), American Institute of Mining and Metallurgical Engineers, and American Society of Civil Engineers. He is now remembered best by those he taught, but in the years to come it will be his original contributions in quantitative and experimental geology that will continue to be remembered and to have their influence on the science he served so well.

ROBERT R. SHROCK
Department of Geology and Geophysics, Massachusetts Institute of Technology, Cambridge

Science in the News

Political Scientists and the Working Politician: Notes on the Campaign and the Take-Over

The Brookings Institution, a public affairs research institute, is working with representatives of the two presidential candidates on the problems surrounding the transfer of power to the new administration that will take office on 20 January. The project has a small staff of political scientists who are serving more or less as a secretariat for the project. Using past studies, conferences with men experienced at the top levels of government, particularly those familiar with the experience of the Truman-to-Eisenhower transition, and contacts with members of the present White House staff, the Brookings group is preparing a series of memoranda to be privately circulated among the staffs of the candidates.

It is too early to gauge the importance or the usefulness of the project, which will depend on how much influence the memoranda have on the thinking of the winning candidate. The project is indicative, in any case, of the growing interest of the politicians in the work of the academic political scientists. As government and the problems it must deal with have grown more complex, the mechanisms for making decisions have become more involved, and seeing that the decisions are carried out has become more and more difficult. The political scientist finds the politician interested in what can be learned from studies of past experience and analyses of what has worked well and what has led to trouble.

The transition period begins the day after the election and continues through the first months of the new administration. Neither candidate, of course, has dealt with any such problem before. Nixon has the advantage that he watched the Eisenhower take-over in 1952 from the inside and has close relations with a number of key Eisenhower appointees whom he would be glad to carry over into his own administration. Depending on how sharp a break he is anxious to make with the Eisenhower policies, it might be possible for him to move cautiously during the take-over.

Kennedy has no such choice. He is wholly committed to a sharp break with the Eisenhower policies, and it is necessary for him to move quickly to assert control of the bureaucracy. He must be ready to begin presenting specific proposals to Congress and the public immediately after his inauguration. When he made a speech a month ago talking of all the things he would do in the first 90 days if he is elected it sounded a little grandiose. But that was only a measure of the task he faces if he is elected, for everyone agrees that he will seriously, perhaps irretrievably, weaken his chances for making the major break with the Eisenhower policies he has in mind unless he succeeds in seizing the initiative and beginning to move very quickly immediately after his inauguration.

The role of the political scientist in this is to gather and analyze the experience of the past in the hope that it will offer the new President and his staff some useful insight about what