Walter Orr Roberts, President-Elect

William T. Golden

In the spirit of Shakespeare's stage direction in act II of *The Tempest*, "Enter Ariel, invisible," one might imagine an invisible inscription over the entrance to the superb new lab building of the National Center for Atmospheric Research on Table Mesa above Boulder, Colorado. Inscribed would be the words of Spinoza which, unconsciously, energize Walter Orr Roberts and his colleagues: *Omnis praeclara tam difficilia tam rara sunt*—"All things excellent are as difficult as they are rare."

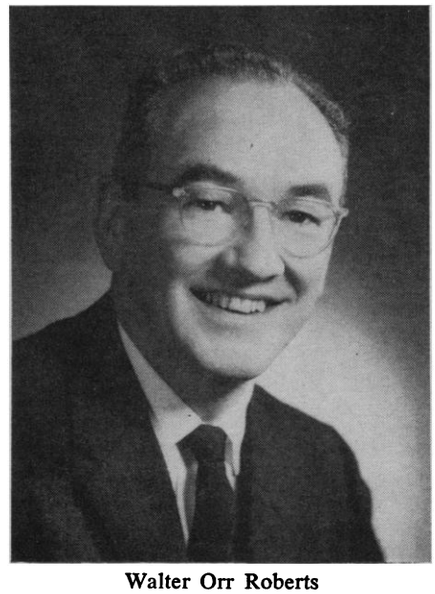
Poetic vision, scientific rigor, unswerving targetry, extraordinary energy, limitless loyalty, and indomitable persistence mark his career; and these elements of his character are suffused by his soul's motivation to improve the lot of man and by his supreme quality of kindness to all who work with him.

Walter Orr Roberts was born in West Bridgewater, Massachusetts, in 1915. He adored his mother, a warm and kindly woman, and was equally devoted to his father, Ernest Marion Roberts, an Amherst graduate, who had been an outstanding football player, an Olympic runner, and the holder of several national track records. Ernest Roberts supported his family, which included another son and a daughter, both younger than Walter, by doubling as a farmer (corn and apples) and as a teacher and athletic coach at nearby Brockton High School; there his football teams, year after year, achieved an extraordinary record of victories.

Walter was named for his maternal uncle, Walter Orr, a prominent New York lawyer, whom he came to revere. He had a very happy childhood on the farm, attended Brockton public schools, and in 1938 was graduated from Amherst College, of which he is now a trustee. He went on to Harvard, achieving his M.A. in 1940 and his Ph.D. in 1943. Subsequently he was awarded honorary Doctorates of Science by Ripon, Amherst, Colorado College, C. W. Post College of Long Island University, and Carleton College.

The Gamow "big bang" in Roberts' life occurred in February 1939. In that month he met Harlow Shapley and Donald Menzel and decided to become an astronomer; encountered the coronagraph, which led him to Colorado; and, thanks to his mother, met Janet Smock, a Wheaton College senior, to whom he was married a year later.

Harlow Shapley still has an occasional twinge of remorse over a canny economy he negotiated for the Harvard Observatory at this time. In mid-1940 he offered Roberts a $100 Graham-Paige in lieu of a railroad ticket to Colorado, where he was to complete his graduate work and prepare his doctoral dissertation. Roberts, delighted, agreed to maintain the car. Thus began his education in finance, contract law, and automobile mechanics. With his bride of a few weeks and a good deal of the coronagraph, he headed west. The first in a memorable concatenation of breakdowns occurred in Rochester, New York (where he had worked in the summers of 1938 and 1939 at Eastman Kodak, under C. E. K. Mees). Finally, funds ran out at Hastings, Nebraska, necessitating a telegraphed appeal to the Harvard Observatory for a loan—a loan, mind you—to enable them to reach Climax, Colorado.



Walter Orr Roberts

There at Climax, Roberts put together the coronagraph, largely with his own hands. And there, at 11,500 feet, in a home literally astride the Continental Divide, he and Janet lived for 7 years. In that house his interest in practical meteorology began, for there, depending on his appraisal of the relative needs of the Atlantic and Pacific watersheds, he daily decreed whether the dishwater should be cast from the east or the west window of the kitchen. And there, three of their children were born: David, now 23, a graduate student in English at Denver University; Alan, 22, a graduate student in chemistry at Santa Barbara, California; and Jennifer, 20, living in Albuquerque with her husband, Dan L. McCarthy. Their fourth child, Jonathan, 15, born in Boulder, attends Boulder High School.

At Climax, Roberts eventually became director of what came to be known as the High Altitude Observatory (HAO) of Harvard University and the University of Colorado, now a research laboratory of the National Center for Atmospheric Research. His association continues to this day, for when, through the efforts of Henry Houghton, Tom Malone, Lloyd Berkner, Paul Klopsteg, and others, NCAR was established in 1960 as a national laboratory under the sponsorship of the National Science Foundation, Roberts was chosen as its first director. He is also president of its parent body, the University Corporation for Atmospheric Research. UCAR, whose trustees are responsible for the operating of NCAR, is a consortium of 23 universities with departments of atmospheric science: University of Alaska, University of Arizona, University of California, University of Chicago, Colorado State University, University of Colorado, Cornell, University of Denver, Florida State University, University of Hawaii, Johns Hopkins, Massachusetts Institute of Technology, University of Michigan, University of Minnesota, New York University, University of Oklahoma, Pennsylvania State University, Saint Louis University, Texas A & M, University of Texas, University of Utah, University of Washington, and University of Wisconsin.

Roberts struggled successfully to keep the High Altitude Observatory alive in the years around 1950, when new financing was necessary. Through

The author, as special consultant to President Truman at the inception of the Korean War, was instrumental in the creation of the President's Science Advisory Committee. He is a corporate director and a trustee of several not-for-profit organizations, including the University Corporation for Atmospheric Research.

Menzel at Harvard he met Joseph W. Barker, who recalls with gratification that Research Corporation, of which he was then president, was so impressed by Roberts that it awarded him the second-largest grant in its history, the only larger one having been to Ernest Lawrence for his cyclotron. This incident has also been commented on by J. William Hinkley III, the current president, who describes Roberts as "one of the most valued members of our Advisory Committee, a tremendous help and a source of inspiration to all of us."

Through Barker, Roberts met Alfred Loomis, who helped him then and who continues to be one of his wisest, most devoted counselors. Roberts' softly impressive arguments and irresistible enthusiasm won support from many sources in those lean years of the early 1950's. His economy and the devotion of his fellow workers kept the lab going. Frequently pay checks were late, and on one occasion the entire staff agreed to work for a month without pay if need be. John Firor recalls that this proved unnecessary since, fortunately, just at this time Roberts was asked to undertake a Sigma Xi lectureship series and the proceeds proved a lifesaver to the Observatory till several contracts and grants arrived. Incidentally, Larry Gould recalls Roberts' Sigma Xi lecture on the sun, delivered at Carleton College when Gould was president, as "one of the most brilliant and inspiring statements I have ever heard."

Roberts is proudest of the work he did to photograph, identify, and describe, in 1943, solar spicules, relatively small jets of gas that shoot out from the edge of the sun. Later he became interested in the effects of the changing activity of the sun on terrestrial weather and climate. His studies of the influence of the sun's corona and solar flares on ionospheric disturbances and radio communication proved of practical importance in World War II. Intrinsic to all his activities has been a concern for the social consequences of science.

In 1954 he decided to switch the emphasis of his work from astronomy to meteorology because of his great interest in a series of historical changes in climate and his recognition of the importance of the weather to the future of man, from the standpoint of food and survival. Earl Droessler emphasizes how influential Roberts has been in gaining acceptance for the concept of the atmospheric sciences as an integrated, interdisciplinary field attracting the efforts of physicists, chemists, and engineers as well as meteorologists. The *Journal of Meteorology* is now called the *Journal of Atmospheric Sciences.*

Roberts is an unpretentious man of simple tastes, a man of warmth, kindness, enthusiasm, loyalty, and persistence. He loves science, his family, music, and nature. He is a devoted amateur student of the flora of Colorado, particularly of its wildflowers. He enjoys trout fishing in the Rockies, watching football anywhere, and reminiscing about skiing.

He makes quick, rational decisions on major issues. His mind made up, he melds patience and tenacity into a base of ruthlessness sweetened by genuine, unremitting kindness. This rare compound has repeatedly yielded success in his objectives while attracting a superb group of scientists and administrators to HAO and NCAR and maintaining their loyalty, devotion, and unrivaled team spirit.

One of his colleagues has remarked, "Walter never joins the camp of those who think that there is a constant amount of anything—resources, money, prestige, glory—to be divided up or fought over. He's a believer in 'the constantly expanding pie.' "

Others have observed that "what Walter sets out after, he invariably gets, sooner or later." When asked to become director of NCAR in 1960, he wanted to accept, but he also knew that he did not want to disassociate himself from HAO or move from Boulder. (He did not have to.) He wanted the lab to be built on Table Mesa. (It was, after his subtle, patient statesmanship persuaded the state of Colorado to donate the land.) He insisted on the preservation of the flora of the mesa and he had clear ideas about the architecture of the building (internally irregular, "one you could get lost in"; externally suited in form and color to the Rocky Mountain backdrop; economical). The building, designed by I. M. Pei, working closely with Roberts, meets all these desiderata. Already in use, and to be dedicated this spring, it is a distinguished creation of American architecture and in harmony with its surroundings, effectively functional.

Always mindful of responsibility in local civic affairs, he was fortunate when his wife, overcoming strong native shyness, ran for the City Council of Boulder some 10 years ago and was elected with the highest vote of 14 candidates. Seemingly a most unlikely politician, Janet's intelligence, crusading spirit, and charm won her reelection, and she is now senior councilman in years of service.

Roberts has traveled widely in Europe, including Eastern Europe—in Bulgaria, Hungary, Yugoslavia, Czechoslovakia, and the Soviet Union—and he spent a memorable month in Japan. As cause and consequence of these trips, he enjoys worldwide professional acquaintanceships.

He is a trustee of the Mitre Corporation and of the Charles F. Kettering Foundation; a member of many committees and boards, including the Pacific Science Board of the National Academy of Sciences; and a past member of the councils of the American Meteorological Society and the American Astronomical Society. He was chairman of the Solar Technical Panel of the U.S. National Committee for IGY. He is a member of many learned societies and a Fellow of the American Academy of Arts and Sciences, of the Aspen Institute, and of the Royal Astronomical Society. He has been honored for activity with the American Geophysical Union and the International Astronomical Union. He is a member of the nominating committee of Phi Beta Kappa. Prior to becoming president-elect of AAAS, he has been a Fellow of AAAS, a member of its board of directors, and a vice president. He is chairman of its Committee for the Public Understanding of Science, a subject which interests him deeply. He has contributed scientific papers to many professional journals.

In conclusion, it will be well to let Walter Roberts speak for himself. The following remarks from his Sigma Xi-Phi Beta Kappa address at the AAAS meeting in Washington suggest his values, his objectives, and his hopes.

> It is here, this Age of Science! And with it comes its promise of what the life of man can be, with food for all, with education, with human freedom, with a stable population.
>
> There will always be dangers. But I hold with Thornton Wilder, who said, "Every good and excellent thing stands moment by moment at the razor edge of danger, and must be fought for." To be what we can be, we must be unafraid to place ourselves, our ways of life, our economic systems, in the microscope of science—and we must have the courage to put to practice the findings that come out, no matter how hard they hit at the patterns of our folkways. To be what we can be, we must first and foremost know what we want to be.