Rock Stars

Bernard of Chartres, an 11th-12th century philosopher and teacher, said that we are like dwarfs on the shoulders of giants, so that we can see more than they and for a greater distance, not by any virtue of our own but because we are carried high and raised aloft by their stature.

All of us have our geological heroes, those giants on whose shoulders we stand. To encourage recognition of these luminaries and to provide inspiration for students and young professionals, the GSA History of Geology Division presents Rock Stars, brief profiles of our geological giants. If you have any comments on this or any of the other profiles, please contact Robert N. Ginsburg, University of Miami, RSMAS/MGG, 4600 Rickenbacker Causeway, Miami, FL 33149-1098, E-mail: rginsburg@rsmas.miami.edu.

—Robert N. Ginsburg, Past Chair, History of Geology Division

Mather in his Harvard office in the 1950s. This photo was used in the valedictory volume of book reviews that Mather wrote for *American Scientist*.

A Scientist Concerned About Society: Kirtley F. Mather (1888–1978)

Kennard B. Bork, Denison University

INTRODUCTION

It was a hot week in July of 1925 when the famous trial of John T. Scopes took place in Dayton, Tennessee. At issue was whether the theory of evolution should be taught in public schools. William Jennings Bryan and the prosecution said no, defenders of Scopes said yes. One of the expert witnesses working for Clarence Darrow's defense team was the chairman of the Department of Geology at Harvard University. Still relatively young, at 37, Kirtley Fletcher Mather was just beginning his long career in the spotlight of the national media.

In the 1930s he fought against teachers' oaths, argued for supporting the anti-Fascist forces struggling against Franco in the Spanish Civil War, coauthored a classic book on adult education, and pioneered the use of educational radio and motion pictures. During the McCarthy era of the early 1950s, Mather became known as one of the country's most outspoken scientists, counseling that witch hunts and thought control were themselves un-American.

Mather in the field (1912) during his research association with W. W. Atwood, in the San Juan Mountains of Colorado. Field work in the high Rockies before World War I often involved long days on horseback.

The scientific community responded by electing him president of the American Association for the Advancement of Science and four-term president of the American Academy of Arts and Sciences.

Despite his fame, or notoriety, as a politically and socially active scientist, Mather at heart was a geologist with wide-ranging interests in the history and workings of Earth. His doctoral dissertation concerned invertebrate paleontology; his summer work during and immediately after graduate school involved the glacial geology and geomorphology of the high Rockies; and his early years as a professor included leaves devoted to petroleum exploration in the mountains and jungles of Bolivia. Throughout his career, Mather retained active interests in many phases of geology, even though his energies were concentrated on teaching and communicating with the public about science, religion, and politics.

It was in his role as a teacher and communicator that many people came to appreciate Mather's eloquent style of speaking, his dry wit combined with warm humor, and his deep belief in the mutual powers of the scientific endeavor and religious faith. For three decades (1924–1954) he taught generations of Harvard students, many of whom went on to become well-known geologists. He also lectured to audiences, ranging from college students to retired senior citizens, about the messages to be gained from the Scopes trial, contemporary science, and the Judeo-Christian world view.

What motivates such productive people? How do they get started in their life's work? Are there lessons we can take from the lives of individuals such as Kirtley Mather, well known in their time, but no longer part of popular culture?

A BIT OF BIOGRAPHY

One key to Mather's drive was a burning curiosity and a deep interest in communicating, both fostered by his parents. Although not college educated, Kirtley's mother and railroad employee father supported his quest for learning. When he did a grade-school project on insects, they made him a capture net; in an era before Parent-Teacher Association groups, they visited school to discuss his progress with teachers; and they scrimped and saved to make college education a reality for their children. They also asked each child to take a few moments at dinnertime to report on all that happened during their day. Thus, even before going to college, Mather had an appreciation of the value of knowledge and communicating about that knowledge.

A second important facet of Mather's intellectual evolution was his more formal education, exemplified by three pivotal teachers. Students may sometimes wonder about the motives of demanding teachers, and teachers occasionally may question their own mission, when students seem less than receptive. The chemistry of good teaching, however, is explosive in its liberating power. Mather profited from such intellectual catalysts in the persons of Jane Perry Cook in the Chicago public schools, Frank Carney at Denison University, and Thomas C. Chamberlin in the rigorous graduate-school environment of the University of Chicago. Jane Cook introduced a city boy to the joys and mysteries of geological field work. Frank Carney served as a model of the dedicated teacher of undergraduates—full of information to impart but especially concerned with his students' finding their own knowledge, both of their discipline and of themselves. And T. C. Chamberlin, known to many for his concept of "multiple working hypotheses," helped Mather understand the merits of research and communicating about deep ideas.

For many field-oriented geologists, the greatest rewards come from the numerous joys and occasional rigors of doing hands-on field work. Mather tackled two very challenging areas, the San Juan Mountains of Colorado and the largely unexplored terrain of Bolivia. While in his twenties, he worked with Wallace W. Atwood to decipher the glacial history and geomorphology of the Rockies (see Atwood and Mather, 1932). As a first-year graduate student, Mather was already thinking of a career in teaching, and he realized the great value of seeing geology in the field. In the summer of 1910 he wrote to a friend, "I can see how my summer's work here will make me a whole lot better teacher of geology."

The adventures in Bolivia centered on the quest for oil. From the high Andes to the steaming jungles of Brazil, Mather and Kenneth Heald traveled by mule and canoe and on foot in their successful efforts to recognize sources of petroleum that had a surface expression as oil seeps (see Mather, 1922; Heald and Mather, 1922). A crack shot, Mather often supplied meat for the field team. His one dangerous encounter with wildlife did not involve jaguars or poisonous snakes, but a tiny insect. When an insect bite on his leg became infected, the local medico suggested amputation. Realizing how dangerous that could be in the jungle, Mather and his Yurucare Indian guide voted no, depending on hot compresses to finally relieve the swelling.

The Bolivian work generated an unanticipated response—a search committee from Harvard University was sufficiently impressed by Mather's presentation at the 1923 meeting of the Geological Society of America that he was invited to join the Harvard faculty. No doubt it also helped to have a good word from Wallace Atwood, his professor at Chicago, who had moved to Harvard prior to becoming president of Clark University. Mather thus filled the position in physiography once held by William Morris Davis and then Atwood.

Teaching and administrative duties took him away from active research, but he enjoyed engaging students in discussion about current geological topics and about important issues in politics, religion, and life in general. Undergraduates appreciated the style and substance of Mather's teaching. One student noted that "because of the sympathy and vision with which you presented the course, geology and intellectual curiosity became one." Mather also demonstrated his strong belief in the merit of offering women equal treatment in education and in all facets of life. Radcliffe students recognized that commitment and were vocal in their appreciation of his efforts. An alumna commented that he really seemed to listen to her questions, rather than appearing, as some faculty members did, to be "trying to think of footnotes for their next research paper." Combining his interest in teaching with his administrative flair, Mather headed the Harvard Summer School from 1934 through 1942.

Recognizing that only a small number of people could attend Ivy League schools, Mather moved beyond Harvard to make contact with a wider audience. During the Depression of the 1930s he became a leader of the adult education movement (see Hewitt and Mather, 1937). He stressed that democracy depended upon a well-informed public. Part of his motivation was political, deriving from his strong belief in furthering causes for the general good, and part of it seems to have stemmed from a religious upbringing akin to the Social Gospel movement, which argued that educating the public about social responsibility and Judeo-Christian virtues would pay dividends for society at large. In 1934 he lectured students from Hitler's Germany about the evils of Nazism and anti-Semitism, reflecting his belief that dictators and demagogues profit from thought control, intolerance, and information manipulation.

Those exact concerns fueled his fights against


Dr. Mather Will Refuse To Take Teachers' Oath

In 1936 Mather led the dissidents who argued against signing the loyalty oath proposed by the Massachusetts legislature. Mather was happy to pledge allegiance to the federal government when he was inducted into the U.S. Army, but he rebelled against state fealty oaths for faculty members at private universities.

Mather

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WASHINGTON REPORT

Bruce F. Molnia

Washington Report provides the GSA membership with a window on the activities of the federal agencies, Congress and the legislative process, and international interactions that could impact the geoscience community. In future issues, Washington Report will present summaries of agency and interagency programs, track legislation, and present insights into Washington, D.C., geopolitics as they pertain to the geosciences.

Working with Congress

"All too often we hear scientists and engineers bemoaning the lack of scientific and technical understanding in Congress. If we, as scientists and engineers, expect Congress to understand us, it is essential that we make more of an effort to understand and work with them.... To ignore Congress or to remain aloof is to forego the chance to influence policy and to abdicate one's responsibility to the science and engineering communities—and to the nation."

William G. Wells, Jr.—AAAS

The American Association for the Advancement of Science (AAAS) recently released the second edition of "Working with Congress—A Practical Guide for Scientists and Engineers," prepared by William G. Wells, Jr., head of the AAAS Office of Public Sector Programs, for the AAAS and the Carnegie Commission on Science, Technology, and Government. In its foreword, written by AAAS staffers Bonnie Cassidy and Albert Teich, "Working with Congress" is described as presenting "the constitutional basis of Congress, its culture and traditions, its power structure and organization, and its principal activities." They characterize "Working with Congress"as containing clear, concise advice on how to communicate with lawmakers and their staffs with respect to science and technology issues and as being a practical manual to assist scientists and engineers in "Working with Congress," be it through personal visits, telephone, fax, E-mail, regular mail, or participation in hearings. One of the most significant messages that "Working with Congress" presents is that although Congress's agenda is characterized by numerous science and technology issues, very few members of Congress or members of their staff have training, experience, or background in science and technology. Therefore, if Congress is going to make knowledgeable decisions about such issues, then the science and technology communities must develop a beneficial interaction with Congress and provide them the necessary information for educated decision making.

"Working with Congress" makes a strong plea to members of the science and technology communities to become proactive and involved in interacting with Congress. Considering that during the present Congress, the Bureau of Mines has been eliminated and the U.S. Geological Survey was almost eliminated, this message is especially pertinent to members of the Geological Society of America community.

Earth science and geology are disciplines that are apparently absent from the education and experience background of

Congress *continued on p. 11*

Mather *continued from p. 9*

McCarthyism in the 1950s. Anyone who differed with Senator Joseph McCarthy (R—Wisconsin) was branded a Communist, and many scientists and artists feared for their jobs and reputations. A few brave voices spoke out, attempting to highlight the inherent problems of politicians wielding excessive power. Thus, education meant more to Mather than memorizing facts; it represented the key to operating optimally in a complex society.

In order for the public to appreciate science, history, and philosophy, difficult topics often need to be "popularized." Mather's commitment to sharing ideas led him to write some 1500 book reviews on topics ranging from geology to religion. Committed to the value of history as an enlightening agent, he edited two important Source Books on the history of geology (see Mather and Mason, 1939; Mather, 1967). Kirtley Mather just loved to talk about ideas, and even his casual conversations included questions about the best books you had recently read or exciting events in current affairs. In his 70s, Mather traveled across the country as a Phi Beta Kappa and Danforth visiting lecturer. At 87, he revised his well-received book, *The Earth Beneath Us*, incorporating the exciting new concept of plate tectonics.

LEGACY

The life of someone like Kirtley Mather illustrates that education can be liberating, and its power should be available to everyone in a democracy. True education transcends performance on tests; it represents the empowering potential of a lifelong interaction with ideas. We also see that the impact of gifted teachers can extend for generations. Mather integrated what he learned from his teachers and experiences, then passed along factual information, a thirst for learning, and a message of political sensitivity to a radiating network of students and audiences.

Observing Mather's battles along the interfaces of politics and science, it is evident that scientists need to raise their voices on matters of importance to society. Whether at the Scopes trial or during the McCarthy era, Mather followed his own advice that informed dialog is mandatory if light is to be shed in dark corners. He felt strongly that an informed and educated public is the best defense against the dual evils of misunderstood science and technology or the negative intrusion of self-serving politicians.

FURTHER READING

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