



Thomas F. Malone

1917–2013

BIOGRAPHICAL

Memoirs

*A Biographical Memoir by
David T. Malone*

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NATIONAL ACADEMY OF SCIENCES

THOMAS F. MALONE

May 3, 1917–July 6, 2013

Elected to the NAS, 1968

Thomas Malone was one of the prime movers in the revolution that catapulted weather and climate to a high position on the public agenda during the second half of the twentieth century. He was editor of the *Compendium of Meteorology* (1951)—a 1300-page assessment by 102 international authors of the current state of knowledge and research opportunities in that field—and a prominent member of the National Academy of Sciences' Committee on Meteorology that in 1957 proposed a major expansion of federal support for meteorological research and education. He was also an influential leader in implementing those recommendations by virtue of holding key positions in the public and private sectors. Continuing national and international activities broadened his interests to embrace fundamental challenges and opportunities in world society in the twenty-first century. He remained physically and intellectually active well into his nineties.



Tom

By David T. Malone

Malone was born on May 3, 1917 (his mother's thirty-third birthday) at the Saint Vincent Hospital in Sioux City, Iowa. He grew up with a brother and a sister on his parents' homestead in South Dakota during the period when ranches were being transformed into farms. The mid 1930s was a period of drought and depression in South Dakota. These problems interrupted his high school career for a couple of years, while giving him an opportunity to become adept in operating sophisticated farm machinery. He finally completed high school studies in 1936, excelling in journalism and debate, and earning his football "letter." He was elected to his high school's Hall of Fame in 1986.

Impressed with the impact of weather and climate on daily life and stimulated by his father's use of a barometer to interpret varying cloudiness and to anticipate weather changes in order to protect his herd of cattle (before the advent of radio), he wrote to officials in the United States Weather Bureau on career prospects in that field. They encouraged him, first, to obtain a solid grounding in mathematics and physics and sub-

sequently pursue graduate studies in meteorology. Accordingly, he enrolled in college at the South Dakota School of Mines and Technology in Rapid City, SD, from where he graduated with high honors in 1940, after serving as a student assistant in the Department of Physics; as president of the student honor society, Sigma Tau; and as editor of the *Black Hills Engineer*. He was awarded an Honorary Doctorate in Engineering at his *alma mater* in 1962. He was given its Guy March Medal in 1976 “for his efforts both at home and abroad to assure that benefits from science and technology are shared by all mankind.” In 1998, he received its Distinguished Alumni Award.



Awarded a graduate scholarship at MIT, Malone was soon selected to train Naval and Air Force officers in a special program of weather forecasting for military operations. Ultimately, he served as a special consultant to the 19th Weather Squadron at Payne Field in Cairo, Egypt, where he was charged with developing weather forecasts for an alternate route (the Red Ball Express) to military operations in the Pacific Theater. When the atom bomb abruptly ended World War II, he returned to MIT and completed his doctoral studies in 1946. That year, he was presented with a Special Citation by the War Department “in appreciation for patriotic service in a position of trust and responsibility.”

As an assistant professor at MIT, he was invited to edit the *Compendium of Meteorology*. This path-breaking endeavor, in turn, led to his appointment to the National

Academy of Sciences’ Committee on Meteorology, charged with framing national initiatives in meteorological research and education. One of these initiatives involved creating a major research center organized by a consortium of universities and to be funded by the National Science Foundation. Invited by a group of universities to prepare plans for what turned out to be the National Center for Atmospheric Research (NCAR) in Boulder, CO, Malone convened a series of planning conferences that produced the famous “Blue Book”—an agenda for NCAR. He joined NCAR’s Board of Trustees, subsequently serving as its chair, and was formally inducted into NCAR’s “Founders Circle” in 2000. By 2008, NCAR’s annual expenditure totaled \$181 million and involved 73 member universities, 21 affiliates, and 48 international affiliates. Its outreach is global.

Malone's overlapping presidency of the American Meteorological Society and the American Geophysical Union, and his chairing of the NAS Committee on Atmospheric Sciences, deepened his involvement in the international dimensions of these fields. He had already teamed with MIT's Jule Charney, Harvard's Richard Goody, and others to encourage President Kennedy in his UN Address to propose a global program to improve weather forecasting and study climate change. With Assistant Secretary of Commerce J. Herbert Hollomon, he laid the groundwork to ensure the creative participation of the non-governmental scientific community in the program proposed by the President.

With his role in the American Geophysical Union, Malone led the organizing committee for the General Assembly of the International Union of Geophysics and Geodesy in 1963, at the University of California, Berkeley. At a related meeting in Los Angeles celebrating the accomplishments of the International Geophysical Year, Malone outlined a program responsive to President Kennedy's proposal. The Berkeley meeting green-lighted the pursuit of governmental and non-governmental collaboration. A timely grant he obtained from the Ford Foundation made it possible to convene a series of meetings that led to the Global Atmospheric Research Program (GARP) and, ultimately, to the World Climate Research Program now actively underway.

These activities thrust Malone into a prominent role in the International Council of Scientific Unions (ICSU). He was elected founding Secretary General of the ICSU's Scientific Committee on Problems of the Environment (SCOPE) in 1970. In that role, and as a Dean of the Graduate School of the University of Connecticut, he was the first speaker in a conference on "Technological Changes and the Human Environment" at the California Institute of Technology in October that year, in preparation for the UN Conference on the Human Environment to be held in Stockholm in 1972. He called for a three-pronged effort to: (a) expand our knowledge base, (b) examine human values and attitudes, and (c) create new, flexible, and sophisticated institutions to ensure "the survival of the human species." He also warned, "Continued burning of fossil fuels will cause the earth's temperature to rise and create grave climate changes." He said, "The immediate future is fraught with dangers....today we are poised on the threshold of an era that is a threat to the human prospect. These threats demand intense study, if life, as we know it, is to continue" (reported in the *Los Angeles Herald-Examiner*, October 19, 1970, p. A-13).

This warning was repeated in the 1977 NAS report *Energy and Climate* by the Geophysics Research Board that Malone chaired. It warned that our industrial civili-

zation faces a “major decision... continued reliance on fossil fuel as principal sources of energy or invest research and engineering effort, and capital, that will make it possible to substitute other energy sources.” A *New York Times* editorial on July 28, 1977 commented on this report, “If industrialized nations continue to burn significant amounts of any fossil fuel for the next 200 years, the consequences could be catastrophic.” The editorial also cited “the lively sense of urgency” with which Malone had summarized the gist of the report in an interview with David Hartman on ABC’s *Good Morning America* TV program broadcast on July 25, 1977.

Seven years later, as chairman of the NAS Board on Atmospheric Sciences

and Climate, he testified on February 28, 1984 before the U.S. House of Representatives on the NAS report *Changing Climate* and called for “the existence of an international network of scientists conversant with the issues, and of broad international consensus on the facts and their reliability.” He maintained, “climate change could well be a divisive rather than a unifying actor in world affairs.” An Intergovernmental Panel on Climate Change was created in 1988 to develop that consensus.

In 2004, he organized a national symposium at Connecticut’s Wesleyan University to honor Maurice Strong, convener of both the 1972 UN Conference on the Human Environment in Stockholm and the 1992 UN Earth Summit in Rio de Janeiro. Malone had nominated Strong for the National Academy of Sciences’ Public Welfare Medal (the Academy’s highest honor), which was awarded to Strong in April 2004. One result of this symposium was a letter from speakers to President Bush pointing out that recent analyses of Arctic regions—on the impact of the release of greenhouse gases—carried global implications constituting a “smoking gun,” confirming the earlier global warming



President Jimmy Carter, left, with, from left to right, National Academy of Sciences Home Secretary David R. Goddard, NAS Foreign Secretary Thomas F. Malone, and NAS Treasurer E. R. Piore on April 30, 1979, during the Annual Meeting of the NAS.

(Photo courtesy of the family of Tom Malone.)

warnings. The letter was very much in the spirit of fostering a “consensus” on the facts and their reliability that he had urged on Congress in 1984.

Malone participated in the seminal UN Conference on the Human Environment in 1972. He and Soviet Professor Victor Kovda organized a scientific conference in Nairobi, Kenya in 1974 to explore the link between environmental quality and economic development. Over the next 30 years, SCOPE published a major series of scholarly reports on the environment and on economic development, including assessments of the hazards of global warming and of nuclear weaponry. As chair of the Academy’s Board on International Organizations and Programs and chair of the U.S. National Commission for UNESCO, Malone was selected to lead the NAS’s Steering Committee for the U.S. Bicentennial Symposium in 1976. The symposium was combined with a General Assembly of ICSU.

In the proceedings of that symposium, *Science: A Resource for Humankind*, Malone remarked “Much of the hope and a great deal of the apprehension over the prospects for world society during the next two centuries are rooted deeply in the interaction of science and societal affairs.” NAS President Handler’s expression of his hope in those Proceedings “...that some fraction of the scientific community will heed such a call...and work on these vital problems....” had a profound influence on Malone’s subsequent career.

Malone’s global activities led to his election as Foreign Secretary of the National Academy of Sciences in 1978. There his interests broadened to embrace issues such as nuclear warfare and the role of science and technology in alleviating poverty and distress in under-developed countries. He convened a symposium in Singapore to prepare for the 1979 UN Conference on Science and Technology for Economic Development in Vienna where he served on the US delegation. Malone was instrumental in the initiation of a grants program in the NAS’s Board on Science and Technology in Development and in creation of a Committee on International Security and Arms Control. He arranged for



Malone, seated at right at a joint US-Soviet conference on nuclear war hosted by the National Academy of Sciences.

(Photo courtesy of the family of Tom Malone.)

an exchange of views with a counterpart group in the Academy of Sciences in the Soviet Union. Malone later wrote:

As Foreign Secretary of the National Academy of Sciences from 1978–1982, I became convinced that a scientific dialogue on nuclear weapons between members of our Academy and members of the Soviet Academy would complement official channels of communication between the superpowers...I would like to believe these assessments contributed to the reluctance of the superpowers to start a nuclear war.

NAS President Philip Handler remarked on the significance of the initiative in his annual address to members in 1982:

Your foresighted action several years ago in turning the Academy's attention to the problem of avoiding a nuclear holocaust may in the long run be the achievement you find most satisfying.

Recent studies by Carl Sagan and others on nuclear winter generated a three-hour, satellite-based teleconference in 1983 between US scientists and those from the Soviet Union. Malone moderated the exchange of views in the US and Yevgeny Velikhov, Vice President of the Soviet Academy of Sciences, in Russia. Mikhail Gorbachev, the last general secretary of the Soviet Union, spoke about the work of U. S. and Soviet Scientists in an interview in September, 2000, available at <http://www.simulconference.com/clients/sowf/interviews/interview1.html>:

Models made by Russian and American scientists showed that a nuclear war would result in a nuclear winter that would be extremely destructive to all life on earth; the knowledge of that was a great stimulus to us, to people of honor and morality, to act in that situation.

On completing four years as Foreign Secretary of the U.S. National Academy of Sciences, Malone accepted the chairmanship of the International Committee of Sigma Xi, the Scientific Research [honor] Society. He continued his advocacy for the voice of science on issues of nuclear warfare. He persuaded the ICSU to establish a Steering Committee to organize an international study on the environmental impact of nuclear war. He enlisted UK's Sir Frederick Warner to chair the Committee and George Skryabin, Scientific Secretary of the Soviet Academy of Sciences, to participate in deliberations.

The committee's two major reports on the *Environmental Consequences of Nuclear War* contributed significantly to the restraint exercised by the nuclear powers. These reports also prompted the 1989 Study on the Climatic and Other Global Effects of Nuclear War by the Department of Disarmament Affairs in the United Nations. Malone and Soviet Academician George Golitsyn played major roles in conducting that study. In transmitting the report to the UN General Assembly, the UN Secretary-General remarked, "For the first time in the history of the human race, humanity is taking actions that, within the life-span of a single generation, are affecting the global environment in fundamental ways."

Meanwhile, with Malone's encouragement, Notre Dame President Theodore M. Hesburgh had begun to convene "scientific and religious leaders to make common cause against the nuclear threat to humanity." A meeting organized by Hesburgh and Malone at the Rockefeller Conference Center in Bellagio, Italy, in November 1985 brought together astronomer Carl Sagan; Nobel Laureates Charles Townes and Paul Crutzen; Soviet Academician George Skryabin; Director of the Soviet Space Agency Raold Sagdeev; Sir Frederick Wamer from the UK; Archbishop Kirill from Leningrad; Bishop (and now Cardinal) Roger Mahoney from California; and Muslim, Protestant, and Jewish religious leaders as well as scientists from around the world. Their unanimous statement concluded, "Science and religion can and must continue mutually to support the quest for a just and peaceful world. It is hard and necessary work to which we commit ourselves with conviction and hope."

Simultaneously, Malone persuaded ICSU to act on a suggestion by Canadian George Garland at the twenty fifth anniversary of the International Geophysical Year in 1982—that the interaction between the physical and biological world and humanity presented an attractive challenge to the world scientific community. At meetings Malone arranged in Beijing, Moscow, Paris, and at NAS's Conference Center in Woods Hole, Massachusetts, plans were made for a symposium in Ottawa in 1984, leading to the creation of the International Geosphere-Biosphere Program (IGBP) in 1986. It turned out to be a constructive and unifying endeavor of the world scientific community. As one of IGBP's offshoots, a workshop chaired by Malone was convened in Bellagio, Italy, in December 1990, to develop the concept of a global System of regional networks for Analysis, Research, and Training (START). It has been notably successful in bringing together activities on these topics in industrialized and developing countries. A parallel program, Human Dimensions of Global Change, now interacts productively with IGBP.



Malone, far left as the honorary guest at the first Earth Summit, 1992.

(Photo courtesy of the family of Tom Malone.)

Malone played a prominent part in Sigma Xi's Centennial Observance in 1986, and was elected national president in 1988. With a grant from the MacArthur Foundation, he convened representatives from several disciplines, drawn from both public and private sectors, to reflect on *Global Change and the Human Prospect: Issues in Population, Science, Technology, and Equity*. This effort was in support of the UN's Earth Summit held in Rio de Janeiro in 1992, to address the inter-related issues of *sustainable development* and *environmental quality*. His foreword to the proceedings of the symposium reflected his evolved thoughts on these issues:

The overarching need is to bring to bear on these [issues] the expanding storehouse of knowledge about the world in which we live and our role in that world. This requires a balance among the tasks of extending, integrating, disseminating and applying this knowledge. ... The world has not yet addressed the potential of knowledge ... as a vital contributor to enhancement of the human prospect.

He participated in the Rio meeting as a Special Honorary Guest and was then invited to prepare a white paper for the National Association of State Universities and Land Grant Colleges (NASULGC). In his paper at the Annual Meeting of NASULGC in Chicago in 1994, Malone proposed a *Century 21 World Forum on Knowledge and Sustainable Human Development* that would bring together educators and scholars in the physical, biological, mathematical, and social sciences; engineering; and the humanities to formulate a *Global Knowledge Strategy* for the twenty-first century.

This proposal was then repeated in an invited address at the Twentieth Anniversary Symposium of the Korea Science and Engineering Foundation in Seoul, June 1997.

Here, he set before the world a vision of

a world in which all of the basic human needs and an equitable share of life's amenities and human "wants" can be met by every individual in present and succeeding generations while maintaining a healthy, physically attractive, and biologically productive environment.

The strategy for the pursuit of this vision involves the discovery, integration, dissemination, and wise use of knowledge about matter, living organisms, energy, information, and human behavior—and their interaction. Malone called attention to the World Bank's proposal for "...partnerships of public and private organizations and individuals ...to build and mobilize knowledge capital...to achieve...sustained and equitable growth..." to be considered at a World Bank conference in Canada later in 1997. Such partnerships would be integral to a "Knowledge Strategy." Malone also advocated this approach in an invited address at a bilateral US/China symposium in Beijing in 1999. The forums on Knowledge Management that have emerged in recent years reflect the potential power of this approach.

In 2000, Malone proposed that Western Hemisphere Knowledge Partnerships (WHKP) could be a prototype for a global endeavor. With economist Gary Yohe, he outlined in a paper in the *Journal of Knowledge Management* in 2002, an agenda that put WHKP in the pursuit of a sustainable, equitable, and stable world society. Their paper concluded:

First, a comprehensive agenda must be addressed with vigor and a keen sense of urgency by an array of knowledge partnerships involving all disciplines and all sectors of society in both industrialized and developing nations. E. O. Wilson's prescriptions of 'unified learning, universally shared' and 'the fundamental principle that ethics is everything' are central to the activities of those partnerships. Coordinated regional programs, such as the proposed Western Hemisphere Knowledge Partnerships and similar initiatives in other parts of the world, offer attractive opportunities for creating pilot projects in an endeavor that ultimately must be global in scope.

Second, a new paradigm that frames the interactions between human and natural systems on planet Earth and within human systems is equally imperative. The principles included in the Earth Charter provide the bases for this paradigm by making it clear that a sustainable, prosperous and equitable

future will not be the product of business as usual. A fractious world is poised on the brink of an era of terrorism, so we have no time to lose.

Malone's professional career ranged from a tenured academic appointment at MIT, to a senior vice presidency at the Travelers Insurance Company in Connecticut, to dean of the graduate school at the University of Connecticut, to Director of the Holcomb Research Institute at Butler University in Indianapolis, Indiana, and on to a position as Scholar in Residence at North Carolina State University. It culminated with a position as Executive Scientist for the Connecticut Academy of Science and Engineering. His honors include: the Losey Award of the Institute of Aerospace Sciences; the Charles Franklin Brooks Award and the Cleveland Abbe Award of the American Meteorological Society; the International Meteorological Organization Prize of the World Meteorological Organization; the AAAS International Prize of the American Association for the Advancement of Science; the Waldo E. Smith Award of the American Geophysical Union; the International Saint Francis Prize for Environment (by a jury of 12 scientists from 8 countries, "for his role as initiator of major international and interdisciplinary environmental research programs"); election to South Dakota's Hall of Fame; the Living Legend Award of St. Joseph College in Connecticut; and a Lifetime Distinguished Service Award by the Connecticut Academy of Science and Engineering. In 1997 he was elected to the American Association of Political Science. His honors include four honorary doctorates, the culminating one in 2007 at the 175th Commencement of Connecticut's Wesleyan University for "making life on the planet sustainable for *all* people and *all* time.

SELECTED BIBLIOGRAPHY

A collection of Tom Malone's videotaped remarks, photos and select writings, are available at humanprospect.blogspot.com

- 1951 (Editor) *Compendium of Meteorology*, Boston: American Meteorological Society.
- 1955 Application of Statistical Methods in Weather Prediction. *Proc. Natl. Acad. Sci. U.S.A.* 41(11):806-815.
- 1958 A National Institute for Atmospheric Research, *Trans. American Geophys. Union*. 40(2):95-111.
- 1961 Progress, Purpose and Potential in the Atmospheric Sciences. *Trans. American Geophys. Union*. 43(6):229-335.
- 1964 International Cooperation in Meteorology. In *Research in Geophysics, Vol. 1, Sun, Atmosphere, and Space*. Ed. H. Odishaw. Cambridge, MA: MIT Press.
- 1967 New Dimensions of International Cooperation in Weather Analysis and Prediction. *Bulletin of the American Meteorological Society* 49:1134-1140.
- 1976 Science: A Resource for Humankind. In *Proceedings of the National Academy of Sciences Bicentennial Symposium*. Washington, DC: National Academy of Sciences.
- 1985 With J. Roederer (Eds.). *Global Change*. Cambridge UK: Cambridge University Press.
Mission to Planet Earth. *Environment* 28 (8):6-11.
- 1989 With R. Corell. Mission to Planet Earth Revisited. *Environment* 31(3):17-21.
- 1992 With G. Yohe. Towards a General Method for analyzing the Regional Impact of Global Change. *Global Environmental Change* 2(2):101-110.
- 1994 *Sustainable Human Development: a paradigm for the 21st century*. Paper developed for the National Association of State Universities and Land Grant Colleges. Research Triangle Park, NC: Sigma Xi.
- 1995 Global Change and the Human Prospect, *Science and Public Affairs* 6(2): 33-42
Reflections on the Human Prospect, Annual Review of Energy and the Environment 20:1-31.

- 1997 Building on the Legacies of the International Geophysical Year. *Eos Transactions* 78(18):187-191.
- 1998 A New Agenda for Science and Technology for the Twenty-First Century. In *Proceedings of the KOSEF's 20th Anniversary Symposium*. Seoul: KOSEF and East-West Center.
- 2000 Towards a Knowledge Society in the Americas. *Intersciencia* 25(2):111-112.
- 2002 With G. Yohe. Knowledge Partnership for a Sustainable, Equitable, and Stable Society. *Journal of Knowledge Management* 6(4):368-378.
- 2013 With David T. Malone. *Bin Laden's Plan Exposed: A Proposal for an Academy Peer Review of Three Statistical Trends in Al Qaeda Warfare*. Scottsdale, AZ: Blplan.org. http://www.binladensplan.com/uploads/Bin_Ladens_Plan_exposed.pdf (accessed March 28, 2014).

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