

Management Opportunities for Women Meteorologists

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Although an increasing number of women have achieved good positions and recognition as atmospheric scientists in research, and more recently in operations, LeMone's survey (still in progress) shows that few have attained high-level management positions, despite strong effort.

In order for the American Meteorological Society to work constructively to help those motivated women members to better achieve the experience, contacts, and opportunities needed to move ahead in management, a "strawman" manuscript on the subject was developed. Its objective was to serve as a focus for a meeting to initiate a continuing effort. During 1980, the manuscript was reviewed successively by the AMS Board on Women and Minorities, the Executive Committee, and the Council, undergoing revisions at each stage. Reception was generally enthusiastic; the Board on Women and Minorities developed plans to devote an entire half-day session to the topic of women meteorologists in management at the 1981 Annual Meeting.

A summary of the final draft of the manuscript (dated October 1980) used as a handout for the meeting follows.

What the AMS Can and Should Do to Advance Equal Opportunities for Women Meteorologists

Summary

A start into management is usually necessary at a fairly early career stage in order for someone to progress to top-level positions. Women meteorologists in the 30–45 age bracket commonly face particular difficulties owing to one or more of the following: a) young children; b) spouse's career, also at a critical stage; c) reduced mobility and credibility relative to males; d) isolation from "networks"; e) nepotism restrictions remaining in some organizations; and f) conscious or unconscious sex discrimination by men and/or women.

The Society's Board on Women and Minorities has been immensely valuable in providing encouragement, visibility, and communications channels. The Board has been particularly active in an effort to attract young women (and minorities) to begin careers in atmospheric sciences. However, statistics from the Soviet Union, and other U.S. sciences in which there are both larger percentages and numbers of women, show that increased participation by women in no

way assures attainment of high-level positions, status, or pay in comparable percentages to men. In fact, the science with the largest pool of women Ph.D.s in the United States, biology, is also the field in which the largest number of women are unemployed. In addition, it is in that field that the greatest inequity exists between men's and women's salaries and job levels.

In addressing the question concerning what the AMS can do to help remedy the problem, note should be taken of the fine record the Society has already achieved in its internal affairs, namely the appointments of four women Fellows; four Councilors (three on the Executive Committee); a Commissioner; and many women on technical committees, with several as Chair. Unfortunately, women generally have succeeded relatively better in volunteer than in paid positions; so the question now is how the Society can help equip its women members to gain improved opportunities in the job market, particularly in the high-level management positions. Two related recommendations were offered to start, namely 1) that senior AMS members already in high-level management positions advise and provide communications and contacts to women members desiring this help; and 2) that a session of the Board on Women and Minorities bring together interested women in the crucial age bracket and leading meteorologists to address this problem and its potential amelioration.

The meeting was held in San Diego as a special session of the Board on the afternoon of 19 January 1981. The interest in the topic was manifested by the attendance (see Appendix). In addition to the Board members, 11 professional women meteorologists in the 30–45 age bracket participated.

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Some aid for their travel was generously provided by the Society and from individual member contributions. When informally polled, 85% of these participants expressed a desire to enter management. Also present were three women who have been working as meteorologists since World War II; two of us are involved in middle-level management, virtually full-time. Vitally important to the intent of the session was the active participation of several men who hold top-level management positions in meteorology. These included the past and current Presidents of the Society, the past and new Chair of the Education and Manpower Commission, and the Head of the Atmospheric Sciences of the National Science Foundation.

J. Simpson introduced the session with a supplement to the written handout, which was designed to raise explicit topics for the ensuing discussion. She said it is necessary to acknowledge the vast progress made by women in meteorology since World War II, which is demonstrated by the growing numbers of women in graduate schools and entry-level jobs in all areas (with the possible exception of private industry). She referred to the Kennedy Bill, the "Women in Science and Technology Equal Opportunity Act, 1980" (S-568), that was up before the second session of the 96th Congress. Hearing reports established that there is a small fraction of women employed in U.S. science, their advancement is relatively poor and their pay and status low, even in beginning positions. Proposed remedies included reentry scholarships, visiting professorships, and a center for communications, job counseling, etc.

Simpson noted that the so-far unbroken barrier preventing women meteorologists from advancing into managerial or other high-level positions has occurred, and is continuing, because of the fact that suitable candidates have to be able to manage people in various disciplines within the field of meteorology, and in addition, possess the right contacts outside the field. Heretofore, opportunities for women to establish these crucial contacts, as well as gain credibility among the predominantly male profession, have not been readily available. Several of us repeatedly have been rejected for cross-disciplinary higher management jobs, such as university dean, because of perceived lack of contacts and credibility in the wider scientific and business communities. For a woman wishing to advance to a high-level position, exclusion from the normal male contact circles, such as the Rotary Club, is a greater handicap to overcome than for a woman who seeks only a goal of academic or research management.

Within the immediate meteorological community, a few of us have gained enough credibility by years of hard work to be promoted to science or science education managers of sub-organizations comprising meteorological personnel. In operations, a few relatively young women have been made meteorologists in charge (MIC) of Weather Service Forecast Offices (WSFCs). At present, the highest position held by a woman in NWS operations is the MIC position at a Weather Service Office (WSO). The test for the women MICs, when it comes to a promotion, will be whether they can muster the combined visibility, clout, and mobility to make it into a high-level headquarters job or to MIC of a major field center.

The fact that there have been women mayors, Congress members, and Cabinet officers suggests there must be ways for women meteorologists to build contacts. The difficulty is

that the contact-building must be added on top of superior job productivity (whether original research or weather forecasts) and family obligations, in the same critical age bracket.

The discussion that followed Simpson's introduction pointed out that there are two types of managers—the first type treads the "corridors of power," influencing public policy; the second type directs others to do scientific, scholarly, or professional work. Bob White's cogent discussion made it clear that an early conscious effort is probably highly desirable, if not essential, in order for a meteorologist to get into the first type of management position, in which it is possible to influence public policy. He pointed out that this is a complicated and difficult process, even for men, in a male-dominated profession. The crucial factor is that the meteorologist, whether a woman or a man, must be in a position to be recognized in those forums where decisions are made. These forums include membership on and leadership of panels, boards, and committees (presumably involving the liaison between science and public policy). Bernice Ackerman spoke for several of us when she reported that she moved into management prompted by self-determination—it was the only way she could do the research she wanted to do. She also aptly pointed out that the career stage in which one decides to enter management varies widely.

Bob then recommended working as a special assistant to a person in a senior management position as a viable route for women meteorologists. Positions as special assistants depend greatly upon the two persons involved, but if the situation works, this route can be one of the most effective. Bob urged that the Board notify new administrators in the Reagan administration that we have access to the names of women who would be appropriate for such positions. In addition, women meteorologists with this type of aspiration should search for and contact persons in such positions, or those who are clearly on their way toward them.

Lena Loman is one of the few women meteorologists who has achieved a special assistant position. Hers is to Dick Hallgren, Director of the NWS. Lena discussed upward mobility programs actively sponsored and used by NOAA management. Lena herself recently went through a NOAA middle management, long-term training program, and has highly encouraged women to seek out and apply for managerial training programs. Many of us that completed regular agency management programs, however, have not found them as helpful as the NOAA program has been for selected minority women (most of whom have gone into operations). Operations management was not covered adequately at this meeting.

In a different context, the importance of the "sponsor" was discussed in light of the earlier Simpson/LeMone survey. The survey clearly demonstrated that most women Ph.D.s were found to have graduated from relatively few universities, namely those at which certain senior faculty encouragers (whose names were mentioned repeatedly), were teaching and conducting research.

Finally, Gene Bierly described the two parts of the Kennedy Bill that will be funded (at a low level) and administered by the National Science Foundation, despite the bill's failure to pass Congress. There is a visiting professorship and a research grant program for women; the latter applies only to those who have interrupted their careers or who have

completed the Ph.D. within five years. Since the foundation will have to subtract these funds from its research program, Gene pointed out that women meteorologists presented a lesser "problem" than the much greater number of women biologists or chemists! He also urged that we write our senators to support the bill, which will be resubmitted to Congress. The probable outcome is suggested by an April 1981 multiagency analysis³ of the 1982 federal budget, which quotes the Reagan administration as follows: "The nation's research effort would not suffer if the science agencies allowed market forces to determine who, where, and how many people entered scientific careers."

Since it is clear that equal opportunity for women will not be an administration priority in the years immediately ahead, the professional societies' dedication to this goal becomes even more important in providing contacts, communications, registers, and sponsors. Equally important is the dedication of women themselves, to their own careers, and to helping the careers of other women.

The most recent major step in the Society's fine effort to provide visibility, opportunities, and encouragement for its women members was the holding of an open session on Women and Minorities at the 1982 AMS Annual Meeting in San Antonio, where survey results were summarized, and a panel discussion on management opportunities for women in operations was held. The next step the Society will be taking will be the forthcoming publication of the LeMone survey.

Persons wishing further information regarding the activities of the Board on Women and Minorities are welcome to contact the Board Chair.

³ Richard Speier, 1980: General science, space and technology. In *Agenda for Progress*, edited by Eugene J. McAllister, The Heritage Foundation, Washington, D.C., p. 74.

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United States in 1964 at 2.96% and steadily declined through the 1970s. It began rising again in 1979 and was expected to reach 2.37% in 1981.

Japan and West Germany continued to increase R&D spending faster than their economies were growing through the mid-1970s -- even though these two countries have experienced rapid real GNP growth. In addition, if only civilian R&D is considered, over the past two decades Japan and West Germany have had the highest proportions of national R&D expenditures to GNP.

The report states that the United States has a strong competitive advantage in technological products and information; it licenses nine times more technology to other countries than it buys. The U.S. trade balance in R&D intensive manufactured products has been positive over the last two decades, increasing dramatically since 1972 from \$11.0 billion to a level of \$39.3 billion in 1979. The report states, however, that there is some erosion in that position. The U.S. share of world exports of R&D intensive products has decreased, and the United States has a trade deficit in such products with Japan and West Germany.

Other findings of the report are:

Funds committed to R&D in the United States are at the highest levels in history, amounting to an estimated \$69 billion in 1981.

Appendix—Attendees at meeting on 19 January 1981

Dr. Bernice Ackerman, Illinois State Water Survey
 Dr. Susan K. Avery, University of Illinois
 Ms. June Bacon-Bercey, NOAA
 Ms. Beverly Barnhart, Analytic Services
 Dr. Eugene Bierly, NSF
 Mr. James Caskey, AMS
 Dr. Catherine M. M. Felton, San Francisco State University
 Dr. Robert Fleagle, University of Washington
 Dr. Gerry Grams, Georgia Institute of Technology
 Ms. Cecilia G. Griffith, NOAA
 Dr. Harry Hamilton, SUNY-Albany
 Ms. Claudia Johnson, Max Planck Institut für Meteorologie
 Dr. Keith Johnson, Jackson State University
 Dr. Kristina Katsaros, University of Washington
 Dr. Sharon LeDuc, NOAA
 Dr. Margaret LeMone, NCAR
 Ms. Lena Loman, NOAA
 Ms. Harriet Newton, Boulder, Colo.
 Dr. Sharon Nicholson, Clark University
 Dr. Richard Orville, SUNY-Albany
 Dr. Bette Otto-Bliesner, University of Wisconsin
 Dr. Julia Paegle, University of Utah
 Dr. Mary Alice Rennick, Humboldt State University
 Dr. Joanne Simpson, NASA
 Ms. Pamela Stephens, NSF
 Ms. Lesley Tarleton, University of Colorado
 Dr. Owen Thompson, University of Maryland
 Dr. Robert White, UCAR
 Dr. Clarice Yentsch, Bigelow Laboratory for Ocean Sciences

However, inflation has affected the availability of funds for scientific and technological activity, so this represents a buying power of about \$35 billion in 1972 dollars.

The industrial sector performs about 70% of the R&D done in the United States as measured by either dollars or personnel. R&D is a significant expense for industry, about the same as for a new plant and equipment. In current-dollar terms, R&D funding has increased every year since the 1950s. When allowance is made for inflation, however, industrial R&D funding reached a recent low point in 1975; annual increases since that time have fluctuated, but currently seem to be about 4½% per year.

There are concerns about declining employment opportunities for young doctorate holders in academia and the possible implications these declines may have on research vitality.

Investments in R&D and technological innovation have positive long-term effects on productivity and economic growth. Over the past decade, the United States has experienced slower growth rates in manufacturing productivity than have most industrialized countries.

Capital expenditures often embody new technologies and R&D advances, and low rates of capital investment are seen as a factor in the U.S. productivity slowdown. Since 1960, capital investment

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