session summary

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Role of Women in the Atmospheric Sciences

Held as part of the 55th Annual Meeting of the American Meteorological Society

January 20–23, 1975

1. The present situation: accomplishments and problems

What ARE women in meteorology doing today? How many are there? What is their impact on the field? What are some of the forces influencing their entrance into the field, and their performance once they get there? These were the topics discussed and animated through talks, skits, and probing comments and questions from both the audience and the speakers.

The occurrence of such a conference—the first of its kind in the history of the American Meteorological Society, indicates recognition of the problems encountered by women in entering and working in the field, and the first step toward solutions to some of these problems.

These problems as well as the accomplishments of women in atmospheric sciences were summarized by Margaret LeMone, convenor of the conference, borrowing her material from a survey she took with Joanne Simpson of women in the field, which was summarized in the AMS BULLETIN (Simpson and LeMone, 1974). There are about 250 women in the atmospheric sciences, as compared to an estimated total number of somewhere between 5500 and 9000 in the atmospheric sciences. Of these 250, 32 have doctorates, 76 are terminal masters, and 84 are working in jobs requiring a Bachelors Degree or equivalent experience. Twenty-five are either bona-fide Ph.D. candidates while 30 others are working on their Master's degree. The number 250 did not include the 80 currently working on their Bachelor's. Based on their curriculum vitae, high percentages of all these women were working either part or full-time (100% of the Ph.D.'s, 72% of the total).

The accomplishments of the women are impressive. In the Ph.D. group, accounting for part time work, the average woman published 1.5 papers per year, with the top two women publishing 86 and 65 papers. One woman has won the AMS Meisinger Award, and several have been awarded fellowships such as Woodrow Wilson, NASA, and NSF. One woman runs her own company and is recognized in Who's Who in America. In the Armed Services, one woman has made Captain in the Navy, and there is a female Lt. Colonel and a Major in the Air Force.

Women with the M.S. and Ph.D. in meteorology, like their sisters in other fields, find employment primarily in teaching and research. Three are heads or assistant heads of their departments, and three have attained

the position of full professor. Although some women have made it into middle management, few have made it into the top positions.

Difficulties related to being female were reported by 73% of the working women, with 31% considering these difficulties "severe." Often, these difficulties were related to marriage: the difficulty of finding a job in the same place as a husband being compounded by anti-nepotism rules and finding adequate care for the children. Only two of the Ph.D. women managed to work full time while their children were at home, and one of these spent much of this time outside of the United States, where she found it a bit easier than in this country. Other problems seemed related to prejudice. Often the most productive women reported the worst sex impact, undoubtedly related to their trying to strike out in new areas, as yet uninhabited by women. Women with little ambition, who remained in jobs for which they were, in Simpson's and LeMone's opinion, over-qualified, reported little sex impact.

Women in the other "hard sciences," like women in meteorology, tend to be poorly represented. Joanne Simpson in her talk "The Position of Women in Other Sciences, in Other Nations," cited a RAND study entitled, "Women in Science and Technology: US-USSR Comparisons," to show women in the fields including earth and marine sciences (3.6%), economics (6.1%), physics and mathematics (6.8%), chemistry (7.1%) and astronomy (7.9%). They fared a bit better, however, in statistics (11.1%), biological sciences (12.9%), linguistics (23.5%), and psychology (24.2%).

With relation to the rest of the world, Simpson considered the position of women in the United States about average. The most favorable climate for women, in Simpson's opinion, is in the Soviet Union and the eastern European countries. There, women have obtained much higher administrative posts: the director of the Weather Service in Soviet Armenia is a woman. And 38.8% of the scientists in the Soviet Union are women, as opposed to 9.4% in the United States.

Latin American women in the Simpson and LeMone survey reported much easier acceptance in their country, and less difficulty in finding household help. However, Simpson reported having the impression of fewer women in science in the British Commonwealth nations, Japan, Greece, Italy, and Scandinavia.

The root causes of the small numbers of women in the sciences—indeed in any profession—were discussed in a witty and convincing talk entitled, "When You're Down So Long, Down Looks Like Up" by Dianne John-

¹ The National Center for Atmospheric Research is sponsored by the National Science Foundation.

son, Information Officer at the National Center for Atmospheric Research (NCAR). The woman has been downgraded in western society from the early Hebrews, Greeks, and Romans, to the present; and the woman finds it hard to fight this. Recent psychological studies, cited by Johnson, show a tendency of women to degrade other women and themselves, and to fear success as well as failure.

The problems summarized above were brought into focus in a skit in which a woman wishing to go into meteorology in graduate school (played by June Bacon-Bercey) is greeted by numerous sexist questions from her advisor, played by AMS President-Elect Charles Hosler. Instead of inquiries as to the field she wanted to enter, Bacon-Bercey was confronted with questions of how she could handle working on night shift, a long field trip, being a woman boss, and still manage to have a husband and family. The inappropriateness of such questions is emphasized by having the advisor and student switch roles, with the female advisor asking the male student how he could leave his wife alone while he was away on a long field trip, how he could raise a family on a university salary, how he could avoid dissipating in the tropics, and how he could handle the (statistical) danger of heart disease when statistically he should be in a management position. To point out some of the myths on women illustrated in the skit, LeMone cited U.S. Department of Labor statistics which show that the absentee rate for women does not bear out the myth that women are absent more from the job, and that most derogatory statements about women bosses are made by people who never had them. Both Drs. Pauline Austin and Joanne Simpson confirmed this, saying that they managed to cope quite well with the "problems" of being a woman boss and with less difficulty than the myth suggested.

June Bacon-Bercey, in the role of a woman wishing to attend graduate school, is questioned by her advisor, played by Charles Hosler.

2. Solutions

In recent years, the Federal government has recognized the problem women have in obtaining jobs, and a series of laws were passed to alleviate them: Title VII of the Civil Rights Act of 1964, which prohibits discrimination because of race, sex, religion, or national origin; the Equal Pay Act of 1967, which states that the payment for a job should be based on what is done in that job; and Order Number 4 (1970) and Revised Order Number IV (1972), which require certain government contractors to set up Affirmative Action Programs for minorities and women.

The latter was discussed in detail by Gail Isbell, Research Specialist at the University of Colorado Affirmative Action Office, in a talk entitled, "Affirmative Action, What Is It?". According to Isbell, Affirmative Action programs require government contractors to remove the effects of discrimination by making extra efforts to hire and promote women and minorities. Such extra efforts include advertising and other methods of actively seeking out potential women and minorities for positions, helping them through the maze of application for a job, hiring them if they meet the qualifications for the job, and setting up training positions to get them into better jobs. The initiation of Affirmative Action Programs (AAP's) was necessitated by the failure of Equal Opportunity Programs to produce real Equal Employment Opportunity.

The failure of mere equal employment opportunity is due to the same factors that make AAP's difficult. An older woman's resume will reflect the effects of past problems and lack of opportunity. And other things being equal, the Anglo male somehow seems to come out on top in an evaluation of objective data. To illustrate this, Isbell cited a study on hiring decisions in mathematics departments, conducted by Lewin and Duchon (1971). In this study, resumes of male and female mathematicians were sent around the country to department chairmen for evaluation, and asking them whether they would consider the mathematician in question. Comparisons of evaluations of equivalent resumes for women and men showed that the men were consistently rated higher (although the difference in the rating was not statistically significant).

Difficulties have been compounded by the recent Peter Holmes memo from the HEW which "clarifies" (sic) Affirmative Action and reduces some of its thrust. Among other things, the memo states: 1) that Affirmative Action in recruiting students is voluntary, not required; 2) that the "best possible qualified" applicant be hired; and 3) that sex and race information be given on a piece of separate paper from the job application itself. Although the HEW is an Affirmative Action Compliance Agency for only a subsection of government contractors, this memo could have wide impact outside the HEW.

Because of the difficulties, Isbell concluded that the

time for effective Affirmative Action may be short, so it is necessary to work aggressively and fast, before Affirmative Action disappears.

The discussion following Isbell's presentation showed that audience participants were divided with respect to the utility, fairness, and desirability of Affirmative Action Programs, and their alleged reverse discrimination. Does "reverse discrimination" occur just "on the books" or does it really happen in fact? As pointed out by one audience participant, the subjectivity of hiring, coupled with the tendency for both males and females to rate females lower than males, would tend to support Isbell's statement that real "reverse discrimination" is a rarity. But neither sociologists nor lawmakers have really solved the problem. Twenty millions of dollars have been spent by women in anti-discrimination suits, and white males are beginning to sue as they feel the brunt of all the effort to help women and minorities as exemplified by the *DeFunis vs University of Washington* case cited by one university administrator. Unfortunately, the case was not heard by the Supreme Court. The audience did agree, however, that women should not have to work three times as hard as a man to get the same place, and that the ultimate goal is, as Gail Isbell put it: "The right to succeed, the right to be mediocre, the right to fail, on the same standards as any other (male) employee."

But the procedures will ultimately be determined in the legal arena. Mrs. Lee Saenz, of the Women's Bureau in Denver, discussed what a woman might do should she choose to fight for her rights through the court system. She advised that a woman keep a detailed diary of the discriminatory actions against her. Several members of the audience expressed agreement.

Leslie Tarleton Julian then detailed how she had obtained a job on a ship in a large field experiment by pointing out that one of the criteria used in choosing the scientist to serve aboard ships, "past ship experience," systematically excluded women and was hence discriminatory. She got her job.

Several of the problems of women on the job can be solved in house, provided the parties concerned are cognizant of the problems and sufficiently ingenious to find viable solutions. This was well illustrated in a skit, written by Dr. Don Barrick of NOAA, in which a Laboratory Director (played by Brig. General Collens, Commander Air Weather Service) is suddenly called into a meeting with one of his most scientifically productive Divisions Chiefs (Dr. Robert Grossman of NCAR), when the possibility of an EEO complaint arises. The complaint concerns the chief's appointment of a less experienced young man to be the Project Leader of a large field experiment, after telling Dr. June Conroy (Ms. Anita Baker-Blocker, Univ. of Michigan) of his staff that—as the only applicant for the temporary field position—she would most likely receive this appointment. During a meeting with the EEO Counselor the Director finds that the reason for the appointment

of the male was that the head technician in the field, an outstanding man in all other respects, will not work for a woman. The Director solves the problem by appointing Dr. Conroy as Project Coordinator and boss of the field director. The part of the director was not written into the skit, but was designed to challenge a member of the audience.

3. Results

Progress so far in increasing the representation of women in university faculties is still slow, according to Gail Isbell. Citing statistics from the University of Colorado, she said that women represented 24% of new hires in 1972–74, and 30% in 1974–75. Proportions of females increased in several job categories: in the professional and technical staff, from 45.5 to 49.9, in the crafts, from 6.1 to 7.3%.

With respect to faculty, progress has been slow: the percentages cited above represent proportions of small numbers. Due to an economic slow down, slow down in the University growth, and a significant percentage of the faculty on tenure, only 82 faculty positions were available in 1973–74, and 53 in 1974–75. With fewer opportunities and unemployment rising, each job has about 200–300 applications.

In addition to the economic situation, Isbell also cited lack of availability of qualified women, and the "let the courts decide" attitude that a number of administrators have taken as blocks to progress in affirmative action.

In NOAA, according to Mrs. Lena Loman, chairperson for the NOAA EEO Advisory Committee to Robert White, women have moved to middle management but not upper management positions. They have had particular success in their graduate science training program. Students who have just received Bachelor's degrees in the sciences are recruited for this program which trains them for positions in NOAA as meteorologists, marine biologists, oceanographers, and other related fields. They receive their training at a number of universities, with the largest program going on at Pennsylvania State University, where about ten women and minorities are enrolled through this program.

LeMone closed the program by listing some action items for the newly-formed AMS Board on Women and Minorities and soliciting suggestions for others. As soon as the board is formed, she said, it will be starting an employment "clearing house" for women and minorities wanting jobs or seeking better ones, for employers who want minorities, for locating and encouraging training (or refreshing) programs for women and minorities in the atmospheric sciences and for disseminating this information.

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conference summary

Report of Workshop on Polar Meteorology

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A Workshop on Polar Meteorology, sponsored by the Office of Polar Programs, National Science Foundation, was held in Reno, Nevada, on 6-8 May 1975. The meeting was attended by 45 scientists currently involved in meteorological programs in both North and South Polar regions. The principal goal of the Workshop was to develop a plan for future meteorological research in both the Arctic and Antarctic.

The Workshop provided a forum for active workers in this area of meteorological activity so that they might describe their current programs and to discuss and devise ways of improving these efforts and of coordinating future scientific activities. The Workshop also discussed ways of developing joint usage of large facilities such as aircraft, satellites, weather stations, and clean air facilities in these remote regions.

The first day of the meeting was spent in a plenary session at which each of the current active workers in both Arctic and Antarctic meteorology presented short, ten-minute resumes of their current programs.

A short welcoming address was given by Dr. Lloyd P. Smith, President of Desert Research Institute, and an opening address was given by Al Fowler, Deputy Director, Office of Polar Programs, National Science Foundation. Prior to the presentation of the formal papers, an overview of Polar Meteorology was given by Dr. John Kelley, National Science Foundation.

The presentations were arranged in four principal areas: namely, a) Climatology and Synoptic Meteorology; b) Atmospheric Chemistry, Precipitation Processes, Particulates and Gases; c) Energy Transfer and Atmospheric Structure; and d) Logistics.

Participants were asked to divide into working groups in each of the first three areas of scientific endeavor, and the second day of the Workshop consisted of three concurrent working group sessions, discussing in detail the requirements for future research in these disciplines in both North and South Polar regions.

The chairmen and co-chairmen of the sessions were:

a) Climatology and Synoptic Meteorology—Dr. W. Schwerdtfeger, University of Wisconsin, and Dr. R. J. Renard, U.S. Navy Post-Graduate School; b) Atmospheric Chemistry—Dr. William Zoller, University of Maryland, and Prof. J. A. Warburton, Desert Research Institute; c) Energy Transfer—Dr. K. Coulson, and Dr. J. Carroll, both of University of California, Davis; and d) Logistics—The logistics session was chaired by the Deputy Director of the Office of Polar Programs, Al Fowler.

The chairman and co-chairman of each session summarized the activities of their working group at a late morning session on the third day of the Workshop, and the summaries were then open for general discussion by all participants.

Many vital areas of research were identified in each of the specific subjects discussed. The details of these research requirements, the importance and priorities associated with them and the personnel, equipment, and facilities required to achieve them are to be described in the Proceedings of the Workshop, which is presently being prepared.

The conveners for this Workshop were K. L. Coulson, W. H. Zoller, and J. A. Warburton, and the Workshop was supported through a grant from the National Science Foundation, Office of Polar Programs, J. A. Warburton, Principal Investigator.

We wish to thank the National Science Foundation for its support in providing an opportunity for the active workers in polar meteorology to identify important areas of meteorological research in Polar regions and to develop coordinated plans for the future of this work.

Conveners particularly wish to thank Dr. John Kelley, Program Manager for Meteorology, Office of Polar Programs, for his enthusiasm and guidance in the operation and conduct of this Workshop.