CAREER PATTERNS

OF

WOMEN SCIENTISTS

IN THE

GEOLOGIC DIVISION

OF THE

U.S. GEOLOGICAL SURVEY

1980

U.S. Geological Survey
Open-File Report 81-246

The Geologic Division Committee on Women's Career Patterns

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SUMMARY

As part of the informal settlement of a sex-discrimination complaint brought before the Geologic Division in 1978, a Committee on Women's Career Patterns was appointed by the Chief Geologist. The Committee was asked to identify past instances in which the career development of individual women scientists or groups of women scientists in the Division might have been diverted, slowed, or halted, or had such an appearance, thus indicating a possibility of discrimination. This report presents the results of that study.

The career patterns of 263 women scientists hired before 1976 were reviewed using available Professional/Technical (P/T) Records, Departmental Integrated Personnel System (DIPS) files, and a questionnaire-interview procedure specially designed for the study by the Committee.

After interviewing almost all the women, the Committee concluded that the careers of nine women had indeed appeared in some way to have been limited by sex discrimination; recommendations for corrective action were made to the Chief Geologist. Continuing study of the career patterns of individual women in relation to peer-group patterns from the data files suggested that the careers of an additional eight women had been limited and had the appearance of being adversely affected by sex discrimination; recommendations for action in these cases were made to the Chief Geologist.

For all 17 women so identified, corrective action was recommended only after supportive evidence had been obtained. The various studies showed that an additional 86 women appeared to have had a variety of problems that may have been related to discrimination. No action was recommended for these women either because they did not want their problems reviewed or because they apparently have had or were having their problems resolved. The situations of 32 of these women should be reviewed in 1981 to be certain that their problems have been resolved.

The Committee limited its study to women hired before January 1, 1976, because it believed that at least 3 years of work in the Division was necessary to establish a career pattern. Thus, the findings may not reflect changes that have taken place in Division management practices in the last few years. The Committee further acknowledges that some of the problems identified in this report were the result of general societal patterns for which the Division was not responsible, and that in recent years the Division has made progress in providing more equal opportunities, particularly for the newly hired women. On the other hand, residual effects from earlier disadvantages appear to continue to limit the careers of many women hired more than about 10 years ago.

The problems summarized in this report were recognized from various methods of investigation and sources of data. Some of the problems affected women uniquely, some affected both women and men but appeared to have affected women signficantly more than men, and others affected both women and men probably almost equally. This third group of problems is included in this report because the Committee believed that, although these problems are not necessarily examples of sex discrimination, they did have a distinctly negative effect on the career patterns of many women and thus came within the definition of the Committee's charge.

Analyses of the questionnaire responses, P/T records, and DIPS file data indicated that:

(1) Women were commonly hired at a lower grade than were comparably educated men.
(2) For some groups of women, promotion rates were slower than those for comparable groups of men.
(3) The 1978 grade distribution for women was lower than that for comparable groups of men.
(4) A much lower proportion of women than men have reached grade levels of GS-14 and above.

Furthermore, as of December 1978 no woman in the Division had held a position at Branch Chief or higher, and no woman had held a grade of GS-16 or higher.

The study also found that twice as many women as men have been refused opportunities to do fieldwork, primarily on the basis of their sex. The Committee concluded that in a heavily field-oriented Division, this lack of fieldwork has had a severe negative influence on the careers of many women.

Many women believed that their careers had been held back by some combination of (1) an unreasonably long wait for conversion from a WAE to a permanent position or from a permanent part-time to permanent full-time position; (2) questionable classification as Physical Science Technician (PST), when their educational qualifications and their work assignment qualified them for classification as Scientist (Geologist, Geophysicist, etc.); and (3) inordinately long assignment to a dead-end position.

The lack of supervisory training for project-level supervisors and the virtual absence of career counseling were cited by many women as having adversely affected both their careers and their morale. These problems particularly affected women in lower GS-grades and women during their first years with the Division.

In conclusion, the Committee feels that if greater attention is paid to equity of the grades at which both women and men of comparable qualifications are hired, and if the management practices alluded to above and discussed in the body of this report are amended, equality of treatment of women in the Division will follow. Although past injustices can never be completely rectified, implementation of the recommendations submitted to the Chief Geologist for the 17 individual women will go a long way toward that goal.

The Committee requests that Division personnel be kept advised of the progress being made on these issues by a series of letters from the Chief Geologist in December 1980, 1981, and 1982. These letters will demonstrate the continuing concern and commitment of the Division.

The Committee recognizes, as noted above, that the Division has already taken steps to correct some of the problems outlined here and to implement the recommendations for some of the 17 individual women. The Committee acknowledges these positive steps and supports the Division fully in its continuing efforts. Also, the Committee would like to point out its awareness of the fact that the successful implementation of the recommendations made here depends upon the initiative and cooperation of the Division's women scientists as well as on the actions taken by the Division.

METHODS OF STUDY

Information on women's career patterns in the Geologic Division was gathered by three methods: (1) designing and distributing a questionnaire to women scientists and a comparable group of men, analyzing the responses, and interviewing the women in this population; (2) analyzing grade distribution and promotion rate from the Professional/Technical (P/T) Records; and (3) analyzing salary and grade data from the Departmental Integrated Personnel System (DIPS) file.

The questionnaire (table 1) was sent to all 263 women in the Division who (1) had an "enter on duty" (EOD) date of 1975 or earlier; (2) were permanent full-time, permanent part-time, or WAE employees working more than 1,040 hours in 1978; and (3) were included in the scientific job series under the Civil Service occupational groups "Professional Engineers and Scientists" or "Technicians and Aides" or held scientific degrees but were in nonscientific job series under the occupational groups "Other Professionals and Technical Specialists" or "Technicians and Aides." Two hundred and thirty-seven of the women responded in time to be included in the analyses.

Questionnaires were also sent to a comparison population of men scientists who were selected from the P/T record data to match the education level and the hiring date (EOD) of the women in the study; the sample was not intended to be, and was not, representative of all the men in the Division. Because only 130 men responded in time to be included in the analyses, an adequate match was not available for some women. Forty-four men had to be used for two comparisons; others were used more than twice, the maximum being seven times. Caution must therefore be exercised in interpreting these data.

Personal interviews with almost all the women, as a follow-up to the questionnaires, were the primary step in which individual instances of apparent sex discrimination were identified; supportive evidence was obtained for all instances finally presented to the Chief Geologist for remedial action. Interviews with the women and about one-fourth of the men also provided data and insights that were used in reaching the general conclusions and recommendations of this report.

Two studies were made of the available P/T records for permanent full-time people in the Division who were at GS-5 or above and were classified as Scientists, Professionals, and Technicians as of December 1978; the permanent part-time and WAE people were not included in these studies because the populations were too small for statistical analysis. These two studies were: (1) Promotion rates of the 169 women and 1,295 men hired before 1976, divided into groups by highest educational degree, were compared by calculating the differences between the median promotion time of women and men into each grade, GS-7 and above. A subset of those people receiving degrees from 1970 through 1978 was also studied to determine any changes during the last decade. (2) Promotion rates and grades were analyzed for all, and a variety of subsets of, the population of 212 women and 1,351 men hired before 1979 at GS-5 or above.

Departmental Integrated Personnel System (DIPS) files were analyzed for the effect of sex, educational degree, job classification, years in Government service, and age on salary and grade. The study included 372 women and 1,660 men Scientists, Professionals, and Technicians who were hired before 1979 at any grade and who had permanent part-time and permanent full-time positions.

DISCUSSION OF FINDINGS

From its studies, the Committee recognized two kinds of problems. The first concerned individual women who had specific problems possibly related to sex discrimination; the second concerned general practices that appear to have adversely affected the careers of many women in the Geologic Division.

After reviewing the careers of the women scientists, the Committee concluded that 147 women (56 percent) had no apparent problems, that 103 had problems, and that no information was available for 13 who did not return the questionnaire. Recommendations for specific remedial actions for 17 women have already been made to the Chief Geologist by the Committee. Nine of these 17 women were identified from the questionnaires, interviews, and other pertinent available information; the remaining eight were identified from patterns in the P/T and DIPS data and from follow-up clarification. Progress has already been made in providing remedial action for some of these 17 women. The situations of these women should be monitored until the problems are resolved. Past problems that were already resolved, or that were being resolved, were identified for 74 women; the circumstances of 32 of these 74 women need to be reviewed in January 1981 to ascertain whether their problems have indeed been resolved. Twelve women who had possible discrimination problems refused to have their situations further clarified.

Described below are the general practices that have been recognized by the Committee, from one or more of the methods of study, as adversely affecting the careers of many women, together with the suggested recommendations for modification of these practices. Although some of these practices may also have affected the careers of men, they appear to have had a more severe effect on the career progress of women. Because the total number of women scientists is much smaller than that of men scientists and because the percentage of women who have the highest graduate degree is much smaller that that of men (fig. 1), conclusions are generally presented as percents, means, or medians.

1. Grade and Promotion

Many women have been hired at lower grades than men having the same college degree (fig. 2, table 2).

Promotion rate has commonly been slower for women than for men (figs. 3, 4, 5; table 3).

A smaller percentage of women than men has been promoted by means of selection to administrative and management positions. As of December 1978, no woman in the Division had held a grade above GS-15 (fig. 6), and no women had been selected to "line" (versus "staff") positions at Branch Chief or higher level.

Median and mean grades of women in 1978 were one to two GS-grades lower than those of men having comparable education (fig. 6; tables 4 and 5).

A significant salary disparity between women and men was shown (table 5); the disparity was -$4,400 for women hired before 1970 and -$3,400 for women hired in 1970-78.

Discussion

Analyses of the available P/T records, which contained data through December 1978, showed that the mean hiring grades for women had been generally one GS-grade lower than those for men who had comparable education, and that women hired in 1970-1978 had been hired 1 1/2 to 2 GS-grades lower than men (fig. 2, table 2). Some of these discrepancies may have been due to differences in prior work experience. The Committee found that some members of both sexes had significant prior work experience, but it was unable to determine the effect because information on prior experience was not available in the data sets used. Some of the discrepancy in hiring grade may have resulted either from an applicant's lack of knowledge concerning the highest grade for which she was qualified or from her willingness to accept a lower grade.

In addition to generally lower hiring grades, promotion rates for women have been slower by approximately half a year than promotion rates for men having comparable educational backgrounds (figs. 3, 4 and 5; table 3). Detailed analyses of these data sets showed that those women hired and promoted before 1970 were most disadvantaged. Data from the questionnaire responses, (table 1, question 4) showed that the disparity in promotion rate may be partly explained by career breaks for 14 percent (32) of the women. It should be noted that the situation seems to have improved by 1978 for those women hired in 1970-1978; their promotion rate is half a year faster than that for men hired in the same period (table 3). Caution should be used in interpreting all promotion data, however, because those who had not been promoted do not appear in these calculations. Thus the numbers are most heavily influenced by those who have had rapid promotions and are completely unaffected by those who have remained in the same grade for 30 years or more.

The Geologic Division, like the rest of the Federal Government, uses standardized criteria for promotions. However, the practices and procedures used before 1979 in applying the standards appeared to vary considerably among Offices, and even among Branches within the same Office. The variation appeared to stem from: (1) apparently arbitrary practices of some supervisors in awarding promotions; (2) ignorance or lack of training on the part of the supervisors or administrative officers; (3) honest differences of interpretation of the standards; (4) the vigor with which different supervisors pursue promotions; and (5) the aggressiveness of the individual candidate. Many employees as well as many supervisors did not appear to understand the criteria for assigning grades at hiring or for evaluating employees' work progress for promotion, particularly up to GS-12.

Promotions up to GS-12 for scientific and technical personnel have been, and in some Branches still were in 1978, made at the discretion of the Branch Chief. In other Branches, these promotions were recommended by the Branch promotion-evaluation committee.

For grades GS-12 and above, there were two paths to promotion--one through science and one through management. Promotions for research personnel follow established procedures involving use of the Civil Service Research Grade Evaluation Guide and of Branch-level promotion-evaluation committees. The second promotion route, through management positions, has been available almost exclusively to men in the past. Although a few women have been promoted

through this route in the past 10 years, the number so promoted probably is not representative of the number of qualified women in the Division. In 1979, an estimated 1 percent of the women and 5 percent of the men in the Division held staff and line positions, the women being entirely in staff positions.

The combined effects of slower promotion rates (table 3) and lower initial hiring grades (table 2) were reflected in the 1978 grades of women, which were proportionately lower than those of men for all educational backgrounds in December 1978 (tables 4 and 5). As of December 1978, there were no women GS-16's or above in the Division. In addition, the percentage of women scientists in the higher grades (GS-14 and up) in each educational group was disproportionately smaller than the proportion of women within the Division (fig. 6). For example, only 5 percent of women having BS/BA or lower degrees had attained GS-14 and above, as compared with 14 percent of men having these degrees. Similarly, about 17 percent of women having MS or PhD degrees had attained GS-14 and above, compared with 53 percent of men having these degrees.

Another measure of career progress is salary. The individual's salary at any given time depends upon both hiring grade and promotion rate. A study of the salaries of Division scientists as of December 1978 (DIPS study, table 5) showed that the average salary disparity between women and men in 1978 was -$4,100 for women. When the group was divided according to date of hire, the disparity was -$4,400 for women hired before 1970 and -$3,400 for women hired in 1970-78. Caution must be exercised if data for individuals are compared with these data because variations within the factors (such as amount of working time during each degree level in an individual's career) would affect the individual's salary. (For example: Someone having a BS starts at grade 5, is promoted through grades 7, 9, 11 and after 10 years gets a PhD and reaches grade 12. Another person, someone already having a PhD, starts at grade 12 and after 10 years reaches grade 14. Although both individuals have the PhD and 10 years of service, their salaries are not the same.)

Recommendation

Ensure uniform hiring practices with regard to grade and classification.

Ensure uniform Division-wide evaluation and promotion practices for all grades, series, and appointments; inform all employees of these practices.

Rotate membership on, and the chairmanship of, Branch promotion committees systematically and frequently to include appropriate representation by both sexes and by all grades being reviewed; one committee member from another Branch or Office should be included. Promotion evaluation of employees in grades below GS-12 should be done by promotion committees that include some employees in those grades.

Encourage women to apply for administrative and management positions; qualified women should be holding these appointments in proportion to their numbers.

2. Fieldwork

The lack of field experience and the denial of requests for fieldwork appear to have disadvantaged some women (table 1, question 11; table 6).

Discussion

Although the Division is engaged in many lines of geologic research, most of this research has traditionally been based on fieldwork. In the past, limited fieldwork opportunities for women have excluded many of them from this fundamental aspect of geologic research (table 6). Reluctance of some men supervisors to send women to the field, as well as the reluctance of some men (in part because of pressure from spouses) to accept women as field assistants, has denied many women the experience required to head field-based projects. The questionnaire data showed that the higher the grade, the greater the median number of field seasons for men of the questionnaire group; data by grade for women were not readily available. A usual field season was assumed to be about 3 months annually, but it may vary. The questionnaires showed that requests by women for fieldwork have been refused twice as often as similar requests by men. Although questionnaire responses indicate that the median woman of the 93 hired since 1969 has had a field season during 15 percent of her years in the Division in comparison with a median of 5 percent for the total population of women scientists (237), the median man has had a field season during 50 percent of his years with the Division. Thus, in 1978, women were still doing much less fieldwork and therefore had more limited research opportunities.

Recommendation

The Chief Geologist should direct that women be encouraged to request, and, when the request is reasonable for accomplishing the career objectives of the employee, be provided equal opportunities to obtain field experience. This directive should state that any woman who feels that she is being unreasonably denied such opportunities should inform the Deputy Chief Geologist.

3. Full-time vs. less-than-full-time appointments

Many women wait twice as long as comparable men for conversion to permanent part-time and permanent full-time positions (table 1, question 5).

Discussion

The increased use of WAE, temporary, and permanent part-time appointments in all job series as substitutes for permanent full-time appointments because of slot shortages has created a serious morale problem for, and has been professionally detrimental to, career-oriented employees who were allowed to hope for, or were led to expect, conversion to full-time appointments. Women are particularly susceptible to these career-inhibiting effects.

One aspect of this problem that is of special concern to women is the fact that some women, who in the past had held permanent full-time appointments and who later accepted other than full-time status because of family or other responsibilities, have found it difficult or impossible to regain permanent full-time appointments when returning to work. Many of these women indicated in their interviews that they regarded this situation as an unfair career limitation.

Recommendation

Although the Committee recognizes the necessity of using less-than-full-time appointments to "get the job done" in the face of continuing limitations on the number of permanent full-time employees, a greater effort must be made to ensure that employees, when hired, fully understand the exact nature of the work to be done and the nature of the appointment , including its professional and promotion potential, and their long-range future in the Division.

Conversions to permanent appointments should be only on the basis of Division staffing needs and on the scientific/technical qualifications of individual candidates.

4. Classification

Classification of individuals as PST's or Scientists has been unsystematic, and many people were unaware at the time they were hired as Technicians that they were accepting positions having limited scientific and/or advancement opportunities (table 1, questions 2, 3, and 21; and interviews).

Discussion

The classification of many positions in the Division as scientific (Geologist, Chemist, etc.) versus technical (Physical Science Technician, etc.) appeared to be unsystematic; the classification as Scientist or Technician of the individuals who fill these positions appeared equally unsystematic.

The classification of an individual commonly results somewhat haphazardly from the Civil Service (now Office of Personnel Management) register on which she or he happened to sign up, or from which she or he was selected. For example, some people having a BS/BA in Geology have signed up on the Geologist register, others on the PST register, and still others on both, depending upon the advice they were given or their perception of their best chance for a job. Consequently, the number and caliber of registrants on each register have varied greatly with time and among geographic regions. As a result, supervisors desperate to fill GS-5/6/7-level positions commonly end up with a person whose classification as PST or Geologist is a consequence of the happenstances of Office of Personnel Management registers and registrants rather than of either the qualification of the individual or the specific requirements of the position. The effects of this classification can be long term and negative upon the individual classified.

Many people who had a BS/BA degree in science when they were hired and who met the requirements for Geologist, Chemist, etc., were classified as Technician (PST, etc.), yet were doing work comparable with that of others who had identical academic training but who had been classified as Scientists. The Technicians may have been disadvantaged in that their promotions may have advanced them more slowly than did promotions for Scientists (one grade at a time versus two). Technicians also may have suffered from lower prestige than Scientists, and commonly may have been denied more challenging and career-advancing opportunities because they were Technicians.

A related problem had resulted from the common failure (as reported extensively in the interviews) of supervisors to fully explain, in writing, the career and scientific limitations and opportunities of a particular position and a particular classification. The negative effect on some of those women who have been led to, or allowed to, anticipate more than was available to them has been severe.

Recommendation

Ensure that position descriptions and actual work assignments of PST's and Scientists are appropriate to their job series.

Inform all applicants in writing, before they accept a position, of its career opportunities and limitations.

5. Mobility

Lack of mobility and confinement to service, dead-end, or slow-result projects having limited career-advancement potential have restricted the careers of many women (fig. 6; table 1, questions 19 and 21).

Discussion

Transfers of employees across project, Branch, and Office lines are difficult to effect and take place infrequently. Such transfers have commonly been viewed as desertion (if the individual initiated it), punishment (if the individual's Branch initiated it), or stealing (if any other Branch initiated it). Fear of reprisal has inhibited some employees from requesting transfers. Assignments to new projects sometimes appeared to have been made arbitrarily or via a private "grapevine" from which many women felt they had been excluded. Mobility of people among projects, Branches, and Offices can be beneficial to the scientific health of the organization. Also, benefit to the Division and to the individual from participation in a service job frequently levels off or declines with time, and thus length of time in such jobs should be limited. Therefore, the Division should, within the limitations of program and budget, do as much as it can to develop the careers of its people by: (1) attempting to match existing personnel and their interests with new job opportunities; (2) facilitating rotation between existing positions; and (3) making sure that personnel do not become stuck in jobs lacking career advancement potential. Career stagnation appears to have disproportionately affected women, as demonstrated by a comparison of grade distribution among those women having BS/BA or lower degrees with that of men having comparable education (fig. 6).

Recommendation

Advertise available project assignments and vacancies in The Cross Section. Transfers to fill such vacancies should be encouraged wherever feasible.

The length and frequency of an individual's service in assignments lacking career-advancement potential should be limited.

Expand the duties of the Branch promotion committees to include review of the project assignments of all employees to encourage optimum career development.

6. Supervisor Training

Lack of supervisory training and communication skills on the part of supervisors, including those at project level, has adversely affected the careers of women (table 1, questions 19-21; and interviews).

Discussion

Good supervision at all levels is vital to the scientific health of the organization, but it is particularly important for women in the lower grades and in the early stages of their careers. Although men may also have been adversely affected by poor supervision, peer-group contacts appear to alleviate some of the problem for men. Very few project leaders, who are the primary supervisors of new and lower GS-grade employees, have received training in supervision; many appear to have rejected the idea that such training is of value and that supervision is a significant part of their jobs. From the perspective of those being supervised, however, the situation as reported to the Committee was sometimes very different. Some individuals were told only what their supervisors felt they needed to know for the job at hand; little or no attention was paid to the professional growth of the employee. Some supervisors were insensitive to the needs of their assistants and had difficulty directing their work without irritating them. Although training is now provided for Branch Chiefs, it is not required for project chiefs and others who commonly oversee one or more subordinates but who are not formally designated supervisors. In addition to their responsibilities to the Division, supervisors at any level have the responsibility to ensure that the subordinate receives proper credit for the work performed as well as to foster career development. Many supervisors need to develop communication skills so that employees will receive honest constructive performance evaluations and helpful guidance toward doing a better job.

Recommendation

Ensure that supervisors are aware of their responsibilities for the career development of their employees.

Ensure that adequate supervisory skills are known and used by all those who supervise, regardless of job title.

7. Career Counseling

Career counseling, concerning such topics as career advancement, further education, participation in professional organizations, and how the organization functions does not exist in the Division (Table 1, question 20 and 21; and interviews).

Discussion

The lack of career counseling was identified during the interviews as a significant problem for many women. This lack of accurate information has at times hindered the career progress of many employees. Some supervisors who appear to have considered that women are less serious than men about their careers apparently have given women less career counseling.

Recommendation

Career counseling should be provided by a designated knowledgeable and concerned Branch member; these duties should be considered a formal part-time assignment.

8. Sexual Pressure

All women interviewed were asked if they had received sexual advances from their supervisors; four percent stated that they had, and some felt that their career progress had been affected by this pressure.

Recommendation

The Department of the Interior has stated clearly that it will not tolerate sexual pressure; the Division should state that any such problems should be reported to the Chief Geologist's office.

Table 1.--Questionnaire and responses

Questions		Responses[1]		
			Women (237)	Men[2] (237)
1.	Did you anticipate a possible life-long career in earth sciences when you were hired?	Yes[3]	72% (171)	84% (198)
	Distribution of questionnaire respondents by hiring period. (Data for hiring periods from P/T records)	1940-1944	1% (3)	2% (4)
		1945-1949	5% (11)	5% (12)
		1950-1954	10% (23)	9% (22)
		1955-1959	5% (11)	5% (12)
		1960-1964	9% (22)	9% (21)
		1965-1969	19% (45)	19% (45)
		1970-1974	33% (78)	31% (73)
		1975	19% (44)	20% (48)
2. a.	What was your educational level when you entered on duty with the Geologic Division?	High School Graduate	18% (43)	17% (40)
		Bachelor's Degree	55% (129)	54% (129)
		Master's Degree	22% (53)	21% (50)
		Doctor's Degree	4% (11)	8% (18)
b.	What is your present (1978) educational level?	High School Graduate	11% (26)	5% (13)
		Bachelor's Degree	53% (126)	51% (121)
		Master's Degree	24% (60)	33% (79)
		Doctor's Degree	10% (23)	10% (23)

[1]Numbers of respondents given in parentheses. Not all people answered all questions; therefore, number totals may not reach 237, and percent totals may not reach 100%.

[2]Some of the 130 men responding were replicated, some more than once, to provide a match for each of the 237 women who responded in time to be included in the analysis of the questionnaire data.

[3]Percents given are percent of "Yes" responses in relation to responses received for that particular question.

				Women	Men[2]
3.	a.	What occupation four-digit code (formerly service code) were you first hired into?	Geologists and Geophysicists	28% (66)	34% (80)
			Technicians	50% (119)	44% (105)
			Other Scientists	16% (37)	14% (34)
		(Data for 1978 occupation from DIPS records)	Geologists and Geophysicists	51% (122)	50% (118)
			Technicians	26% (62)	24% (56)
			Other Scientists	22% (51)	26% (63)
	b.	At what grade/step were you hired?	Median grade	GS 5	GS 5
			Range	GS 2-GS 13	GS 2-GS 14
		(Data for 1978 grade from DIPS records)	Median grade	GS 11	GS 11
			Range	GS 4-GS 15	GS 5-GS 15
	c.	Do you believe you were hired at a grade/step appropriate to your training and experience?	Yes	69% (163)	76% (180)
	d.	and in an appropriate category, e.g., geologists, PST, etc.)?	Yes	81% (192)	89% (211)
4.	a.	How many years of professional/ technical work have you completed?	Median years	11	11
			Range	0-43	2-40
	b.	How many years did you have when you entered on duty with the USGS?	Median years	0	0
			Range	0-25	0-25
	c.	How many (if any) aggregate years of career breaks have you had?	Median years	0	0
			Range	0-20	0-10
		Percentage taking career breaks.	People	45% (106)	22% (51)
	d.	Was most of the work or schooling during career breaks scientific and/or technical?	Yes	48%	54%
5.	a.	If you are WAE, have you requested Permanent Part-Time?	Yes	48%	36%
	b.	If yes, how many years ago did you make this request?	Median years	2	1
			Range	1-18	1-4
	c.	If you are WAE or Permanent Part-Time, have you requested Full-Time?	Yes	31%	46%
	d.	If yes, how many years ago did you make this request?	Median years	4	2
			Range	1-7	1-5

			Women	Men[2]
6. a.	Have you worked as a service-type assistant on someone else's project?	Yes	59%	48%
b.	If yes, number of years?	Median years Range	4 1-31	3 1-18
c.	Have you worked as a Junior Scientist-type assistant on someone else's project:	Yes	59%	57%
d.	If yes, number of years?	Median years Range	4 1-36	3 1-15
7. a.	Have you ever proposed a project that was approved?	Yes	25%	36%
b.	If yes, did you become the Project Chief?	Yes	62%	70%
c.	Have you ever proposed a project that was not approved?	Yes	9%	20%
d.	Have you ever turned down a project offered to you?	Yes	6%	10%
8.	How many years have you been a Project Chief? Percent becoming a Project Chief.	Median years Range People	0 0-29 22% (52)	0 0-37 37% (88)
9.	How many years have you supervised at least one other person for most of the year?	Median years Range	1 0-33	2 0-36
10. a.	How many years have you been a scientific administrator at Branch or "higher" level?	Median years Range	0 0-34	0 0-12
b.	Have you ever applied for such a position?	Yes	5%	4%
c.	Have you ever refused such a position offered to you?	Yes	1%	4%

				Women	Men[2]
11.	a.	How many season have you spent in active field work?	Median number Range	 0-43	 0-33
	b.	Have you ever asked for a field assignment and been turned down?	Yes	21%	10%
	c.	Have you ever turned down a field assignment?	Yes	7%	14%
12.	a.	Have you ever requested training?	Yes	82%	79%
	b.	If yes, was it granted?	Yes	89%	95%
	c.	Have you ever been offered training?	Yes	64%	67%
	d.	If yes, did you accept it?	Yes	95%	97%
13.		Have you been a technical reviewer?	Frequently Infrequently Never	18% 37% 45%	30% 41% 29%
14.	a.	Have you been financially supported by the USGS to attend professional/technical meetings?	Frequently Infreqently Never	22% 48% 31%	24% 55% 21%
	b.	Have you given papers at professional/technical meetings?	Frequently Infrequently Never	11% 27% 62%	18% 39% 43%
15.	a.	How many publications do you list in your Professional/Technical Personnel record through 1978?	Median number Range	5 0-106	8 0-109
	b.	Have you made substantially important scientific contributions to the publications on which you are a junior author?	Yes	76%	79%
	c.	Have you made substantially important scientific contributions to publications on which you are not an author, but feel you should have been?	Yes	21%	29%

			Women	Men[2]
16.	In general, has your Survey work been:	Boring	3%	4%
		Routine	14%	6%
		Interesting	50%	41%
		Challenging	32%	49%
		Overwhelming	1%	0%
17.	Have you been satisfied with the professional/technical opportunities offered during your USGS career?	Yes	63%	71%
18.	Do you feel that if you were a member of the opposite sex, your career advancement would have been:	Faster	52%	8%
		Slower	2%	20%
		Same	46%	72%

(The discussion questions below were designed for use during the interviews. The responses received were subjective, and only general conclusions have been made.)

19.	Please describe the events or turning points that had a noticeable positive or negative influence on your Survey career:	The most common turning point for both women and men was a positive change in position. Promotions (as either positive or negative events), completing education, and a change in supervision were also considered turning points by many women and some men.
20.	Have any specific individuals in the Geologic Division had a significant influence on your career? If so, how?	Roughly half the women and men felt that they had had the help of a mentor or other persons to assist their careers. Several women and men reported a negative turning point due to an individual.
21.	Do you believe that your Survey career has been limited for any reason? If so, why?	About half the women believed that their careers had been limited by some form of discrimination, whereas most men identified no limitations at all. Women also mentioned, in order of decreasing frequency: education, classification, marriage and family, poor or no professional counseling, service jobs, lack of responsibility, and lack of professional contacts. With the exception of education, few men mentioned these other possible limitations.

Table 2.--GS-grade and educational level at time of hire for permanent full-time women (W) and men (M). [Data are through December 1978 and were taken from available P/T records.]

Educational level		Number of people	Mean GS-grade	Standard Deviation GS-grade	Median GS-grade	Percentile 75th GS-grade	Percentile 90th GS-grade	Mode GS-grade
Hired 1939-1978:								
All educational levels	W	212	6.03	1.89	5	7	9	5
	M	1351	7.88	2.97	7	11	12	7
BS or lower	W	161	5.37	1.22	5	5	7	5
	M	617	6.47	2.25	5	7	11	5
MS or PhD	W	51	8.10	2.22	7	9	11	7
	M	734	9.07	2.98	9	12	13	5
MS	W	42	7.79	2.20	7	9	11	7
	M	404	7.52	2.42	7	7	11	5
PhD	W	9	9.56[1]	1.81	9[1]	9	12	9
	M	330	10.96	2.37	12	12	13	12
Hired 1970-1978:								
BS or lower	W	56	5.59	1.51	5	5	9	5
	M	177	6.47	2.50	5	9	11	5
MS or PhD	W	24	8.25	2.40	9	9	11	9
	M	245	11.41	2.00	12	12	13	12
MS	W	21	8.00	2.32	9	9	11	9
	M	76	9.84	2.47	9	12	13	9
PhD	W	3	10.00[1]	--	11[1]	--	--	--
	M	170	12.12	1.22	12	13	13	12

[1]Numbers are too small for meaningful statistical analysis; presented for completeness.

Table 3.--Time-to-promotion analyses of 209 permanent full-time women (W) and 1343 men (M) hired before 1979. [Data are through December 1978 and were taken from available P/T records.[1]]

Analyses		Number of promotions	Mean in years	Standard Deviation in years	Median in years	Percentile 75th in years	Percentile 90th in years	Mode in years
By agency:								
All promotions	W	487	3.93	3.05	3	5	8	2
	M	4463	3.38	2.48	3	4	7	2
USGS promotions only	W	476	3.95	3.07	3	5	8	2
	M	4118	3.46	2.52	3	4	7	2
By date of promotion:								
Promotions before 1970	W	228	3.62	2.72	3	5	7	2
	M	2960	3.04	2.15	2	4	6	2
Promotions 1970-78	W	257	4.20	3.31	3	6	8	2
	M	1496	4.05	2.90	3	5	8	2
By grade level:								
Promotions from GS 5 to GS 10	W	271	3.37	2.87	2	4	7	2
	M	1364	2.28	1.77	2	3	4	1
Promotions from GS 11 to GS 16	W	216	4.63	3.14	4	6	9	2
	M	3099	3.87	2.59	3	5	7	2
By educational level:								
BS or lower	W	316	3.99	3.11	3	5	8	2
	M	1627	3.35	2.57	3	4	7	2
MS or PhD	W	171	3.82	2.96	3	5	8	2
	M	2836	3.41	2.44	3	4	7	2
By date of hire:								
Hired before 1970, promoted before 1970	W	228	3.62	2.72	3	5	7	2
	M	2721	3.10	2.18	3	4	6	2
Hired by USGS 1970-78, promoted before 1970 by other Federal agencies	W	0	-	-	-	-	-	-
	M	239	2.28	1.45	2	3	4	1
Hired before 1970, promoted 1970-78	W	168	5.26	3.61	4	7	11	3
	M	997	4.68	3.06	4	6	8	3
Hired 1970-78, promoted 1970-78	W	89	2.20	1.02	2	3	3	2
	M	499	2.80	2.04	2	3	5	2

[1]May contain some pre-USGS promotions (mostly men) unless designated USGS promotions only.

Table 4.--Grade and educational level at time of study, 1978, for permanent full-time women (W) and 1343 men (M). [Data are through December 1978 and were taken from available P/T records.]

		Number of people	Mean GS-grade	Standard Deviation GS-grade	Median GS-grade	Percentile 75th GS-grade	Percentile 90th GS-grade	Mode GS-grade
Hired 1939-1978:								
All educational levels	W	209	9.66	2.96	11	12	13	11
	M	1343	12.72	2.09	13	14	15	13
BS or lower	W	139	8.80	2.90	9	11	13	5
	M	492	11.36	2.34	12	13	14	12
MS or PhD	W	70	11.36	2.29	11	13	14	11
	M	851	13.51	1.44	14	15	15	15
Hired 1970-1978:								
BS or lower	W	51	7.18	2.26	7	9	11	5
	M	150	10.69	2.35	11	12	13	12
MS or PhD	W	30	9.97	2.30	11	12	12	10
	M	297	12.64	1.39	13	13	14	13

Table 5.--Salary and grade differentials for permanent full-time and permanent part-time Geologic Division women and men having comparable education, length of service, age, and job classification.[1] [Data were taken from the December 1978 DIPS file.]

Education	Salary differential of women relative to men	Grade differential of women relative to men
No degree	-$5,128	-2.8
BS/BA	-$3,333	-1.2
MS/MA	-$4,612	-1.1
PhD	-$3,133	-0.4

This study examined six variable factors by regression-analysis techniques that analyzed the paired data for women and men to determine the relationship of the dependent variable (salary) with the independent variables (education, age, etc.). The coefficients were determined for the equation: Salary = constant + education + sex + length of service + age + classification. Seventy-eight percent of the variation in salary is explained by these factors; the remaining factors (22 percent) were not determined. From these data, the average salary for different groups of people sharing the same characteristic or combination of characteristics (i.e., all women, all PhD's, all women PhD's, etc.) could be calculated, and the salary differential between two groups could be determined for any characteristic. The same techniques were used to determine grade differential. The average salary of the entire population was $27,276 and the average grade was GS-11, step 6.

Factor	P/FT & P/PT hired before 1970 (1,104 persons)	P/FT & P/PT hired 1970-1978 (938 persons)	P/FT & P/PT hired before 1979 (2,032 persons)
Constant	+11.7	+3.5	+3.8
Education:			
BS/BA	+1.3	+0.7	+1.4
MS/MA	+3.5	+2.5	+3.4
PhD	+10.1	+8.0	+9.4
Sex:			
Woman	-4.4	-3.4	-4.1
Man	+0	+0	+0
Length of service	+0.4 x years	+0.06 x years	+0.17 x years
Age	+0.07 x age	+0.41 x age	+0.34 x age
Classification:			
Scientist	+5.5	+2.5	+4.3
Professional	+0	+0	+0
Technician	-3.4	-3.8	-3.4

Table 6.--Field experience of women (W) and men (M). [Data from questionnaire[1] (Table 1, question 11.)]

Group	Number of people		Median years with a field season		Range of years with a field season		Percent denied fieldwork		Percent refusing fieldwork	
	W	M	W	M	W	M	W	M	W	M
By 1978 job series:										
Geologist and geophysicists	122	118	3	8	0-43	0-33	20%	8%	7%	15%
Other scientists	51	63	0	1	0-8	0-24	15%	5%	3%	15%
Technicians	62	56	0	4	0-10	0-18	25%	18%	11%	11%
By 1978 education:										
BA/BS	126	121	0	5	0-22	0-33	28%	10%	9%	16%
MA/MS	60	79	3	3	0-30	0-30	18%	6%	5%	16%
PhD	23	23	4	9	0-43	0-30	10%	17%	10%	4%
Project chiefs:	52	88	4	11	0-43	0-33	22%	6%	6%	9%
Hired 1966-1975:	120	121	1	3	0-17	0-24	21%	10%	10%	18%

[1]Some of the 130 men responding were replicated, some more than once, to provide a match for each of the 237 women who responded in time to be included in the analysis of the questionnaire data.

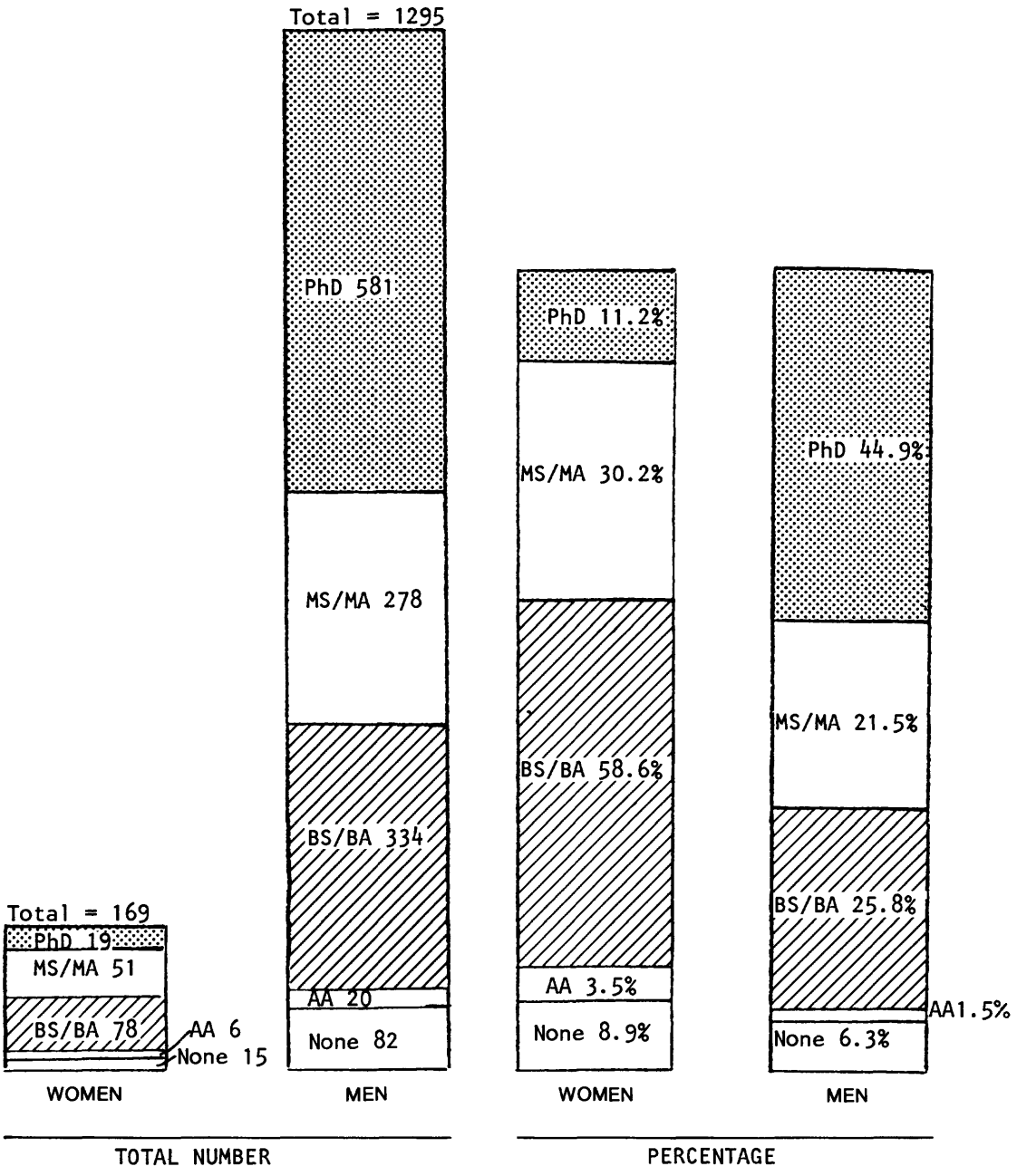


Figure 1.--Histograms showing educational levels of permanent full-time women and men Scientists, Professionals, and Technicians hired before 1976. The two histograms on the left show the numbers of men and women in each of five educational levels denoted by highest degree received; the two histograms on the right show the percentage distribution within each group. Data are through December 1978 and were taken from available P/T records.

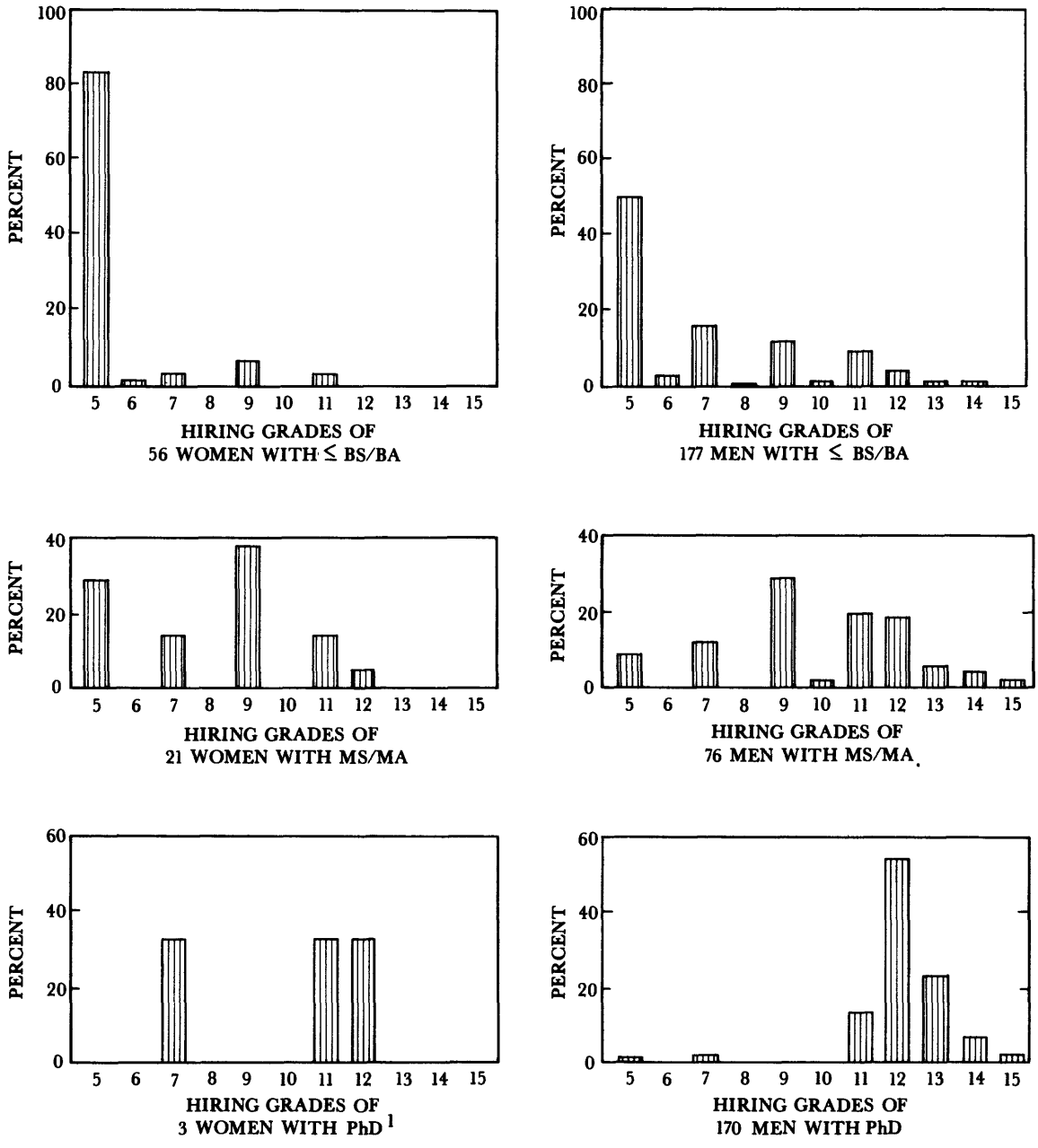
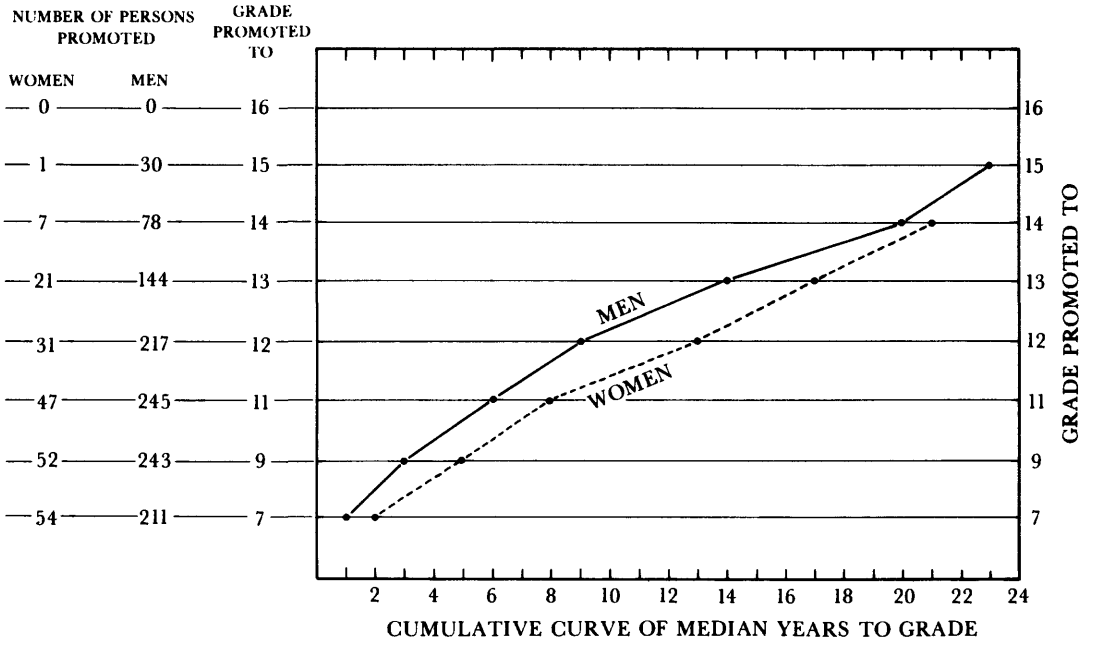


Figure 2.--Hiring grades for women and men by educational degree at time of hire (1970-78). Data are through December 1978 and were taken from available P/T records.

[1]Statistical comparison not warranted; presented only for completeness.

A. BS/BA RECEIVED 1930's-1978



B. BS/BA RECEIVED 1970-1978

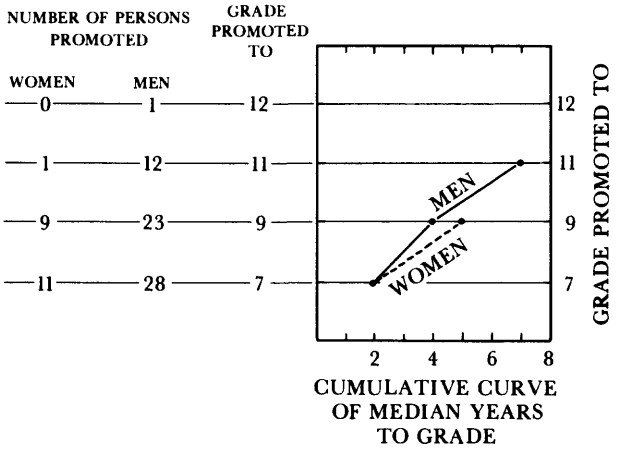
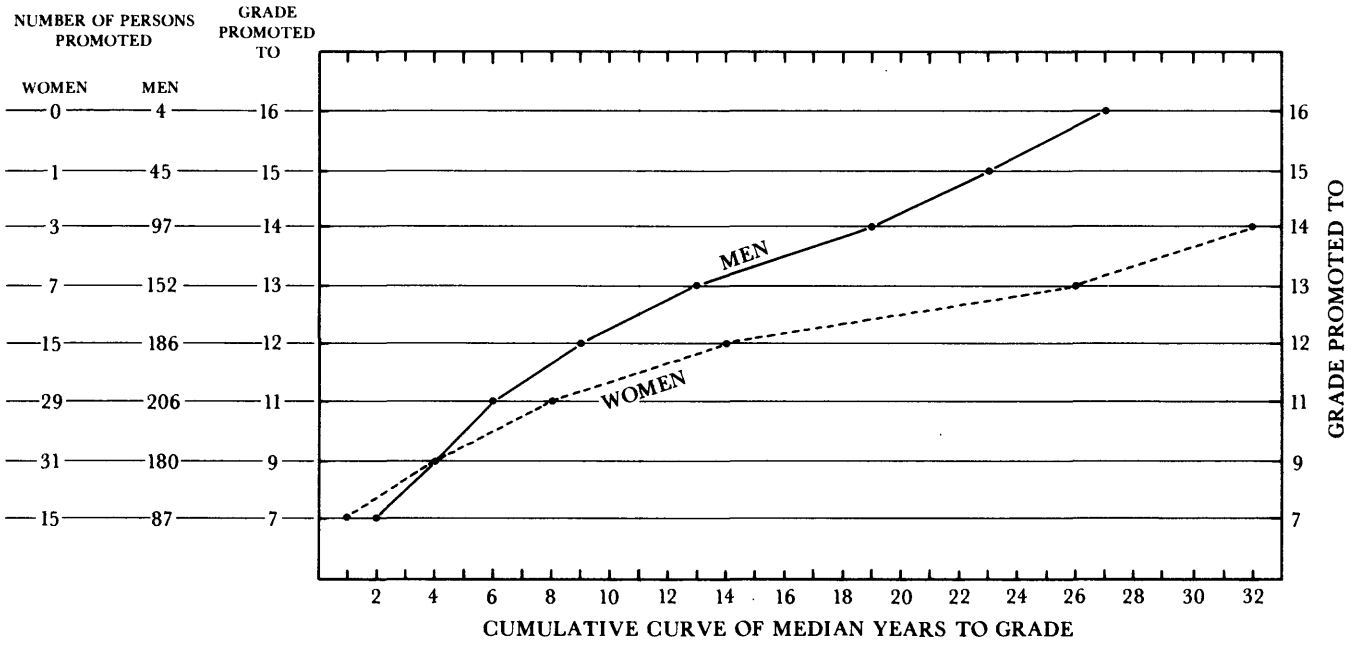


Figure 3.--Graphs showing promotion patterns for permanent full-time Scientists, Professionals, and Technicians having a BS/BA as the highest degree in 1978, who were hired before 1976 at GS-5 or above. People who were not promoted do not appear on the graphs. Each median represents a different group of people; thus, only individual segments of the cumulative curve represent the promotional pattern in the Geologic Division. Fewer than 3 people promoted was considered insufficient data to plot. Data are through December 1978 and were taken from available P/T records.

A. MS/MA RECEIVED 1930's-1978



B. MS/MA RECEIVED 1970-1978

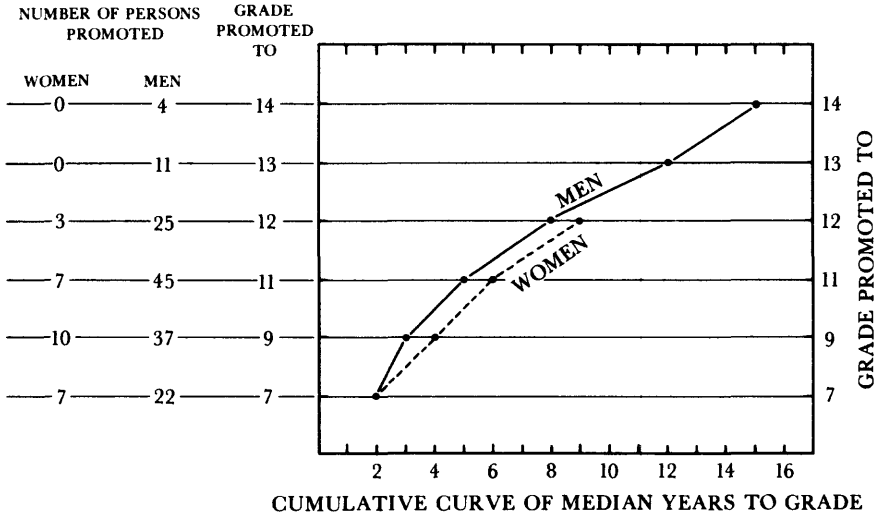
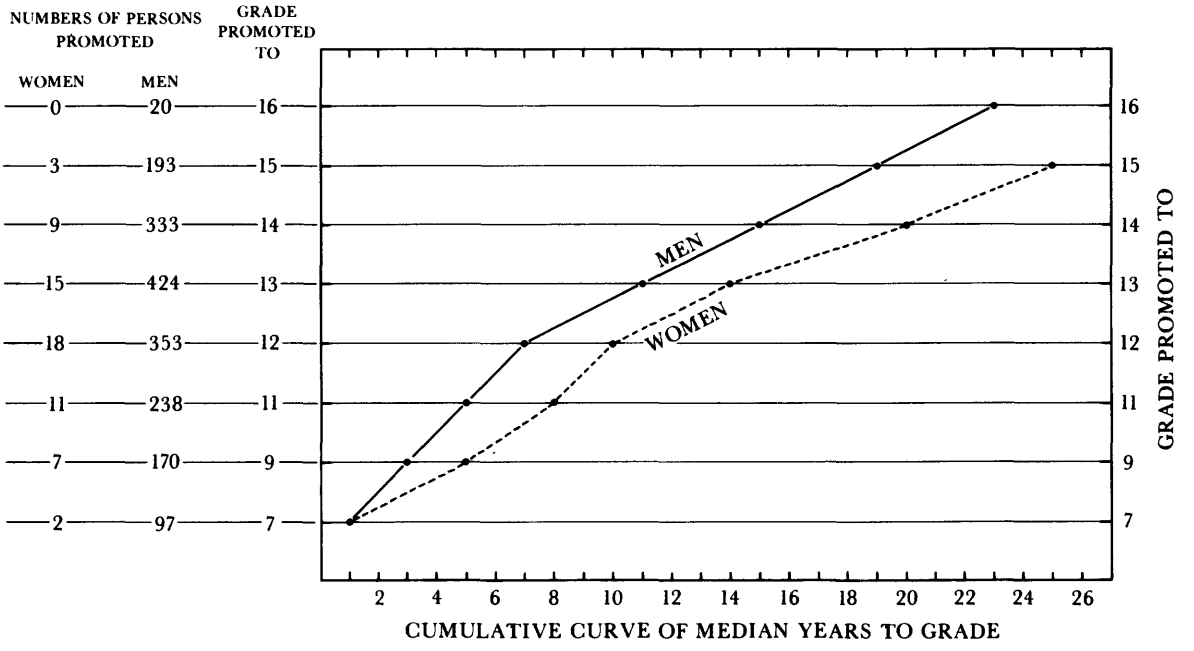


Figure 4.--Graphs showing promotion patterns for permanent full-time Scientists, Professionals, and Technicians having a MS/MA as the highest degree in 1978, who were hired before 1976 at GS-5 or above. People who were not promoted do not appear on the graphs. Each median represents a different group of people; thus, only individual segments of the cumultative curve represent the promotional pattern in the Geologic Division. Fewer than 3 people promoted was considered insufficient data to plot. Data are through December 1978 and were taken from available P/T records.

A. PhD RECEIVED 1930's-1978



B. PhD RECEIVED 1970-1978

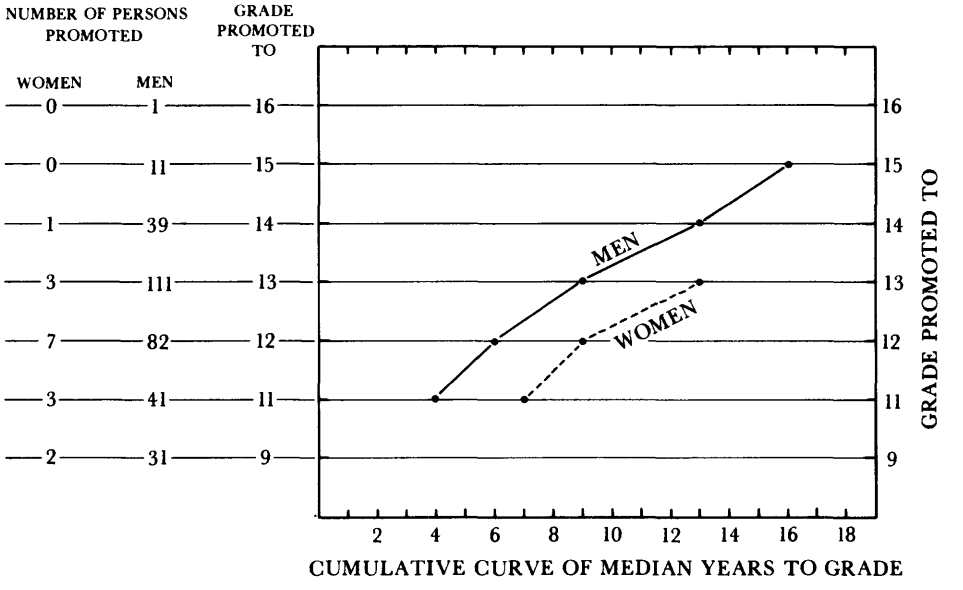


Figure 5.--Graphs showing promotion patterns for permanent full-time Scientists, Professionals, and Technicians having a PhD as their highest degree in 1978, who were hired before 1976 at GS-5 or above. People who were not promoted do not appear on the graphs. Each median represents a different group of people; thus, only individual segments of the cumulative curve represent the promotional pattern in the Geologic Division. Fewer than 3 people promoted was considered insufficient data to plot. Data are through December 1978 and were taken from available P/T records.

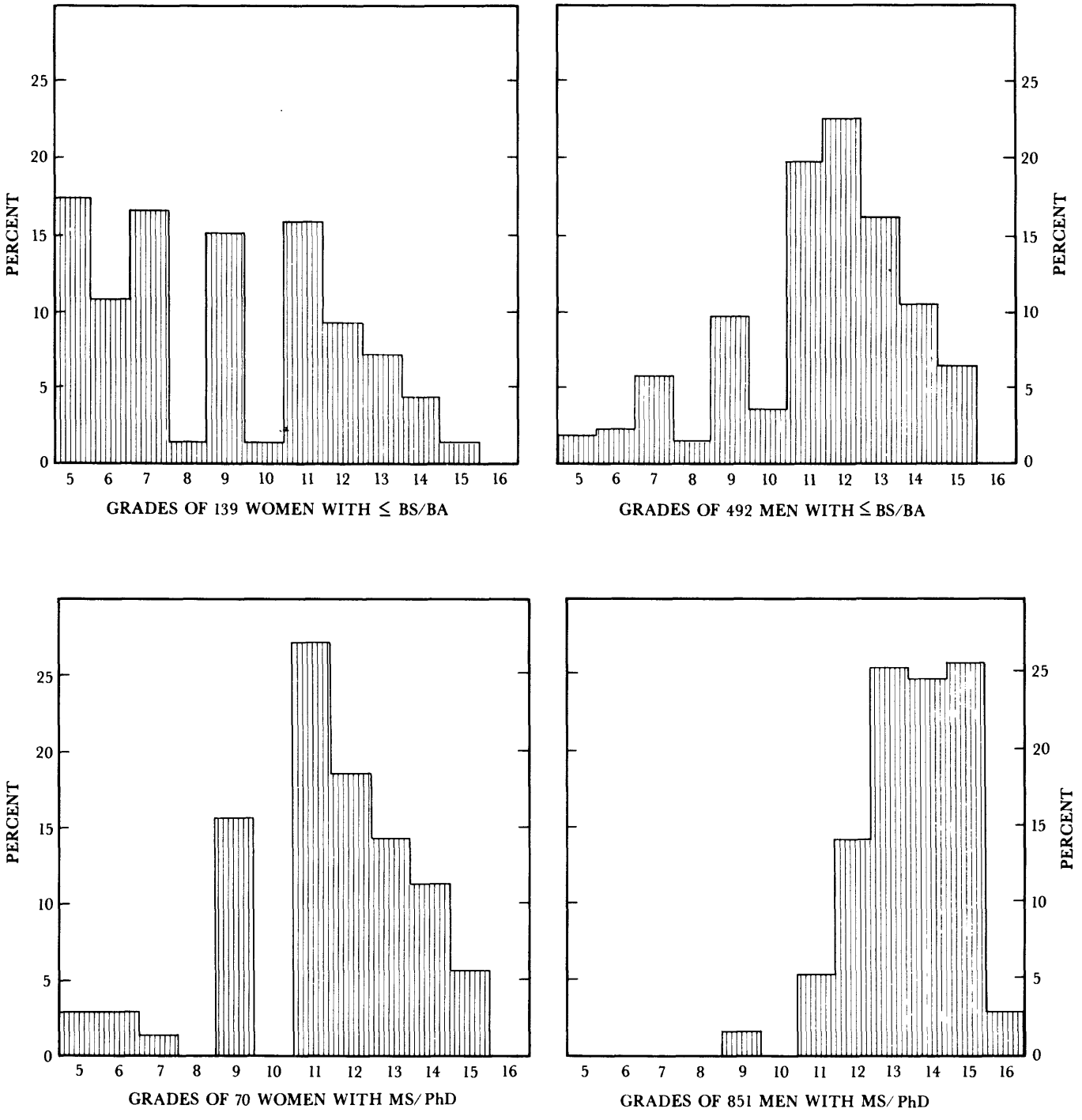


Figure 6.--Distribution of GS-grades by highest educational level of permanent full-time women and men as of 1978. Data are through December 1978 and were taken from available P/T records.

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