

First Report

The following pages contain a first report on the 1980 AMS Survey. Included in this report are data on faculty members in four-year colleges and universities, a report on the 1980 survey of new doctorates, a report on the 1980 nonacademic salary survey, and a list of names and thesis titles of members of the 1979-1980 Ph.D. class.

The Annual AMS Survey is conducted in two parts. Questionnaires were distributed in May to all departments in the mathematical sciences in colleges and universities in the United States and Canada, and later to the recipients of doctoral degrees granted by these departments between July 1979 and June 1980, inclusive. This report is based on the information collected from these questionnaires. A second round of questionnaires was distributed in Septem-

ber; these are concerned with data on fall enrollments, class size, teaching loads and faculty mobility. These data will be reported in the February or April 1981 issue of the *Notices*.

This Survey is the twenty-fourth in an annual series begun in 1957 by the Society's Committee on the Economic Status of Teachers. The present Survey is under the direction of the Committee on Employment and Educational Policy (CEEP), whose members are Lida K. Barrett (chairman), Arthur P. Mattuck, Donald C. Rung, Hans Schneider, Robert J. Thompson and William P. Ziemer. The questionnaires were devised by CEEP's Data Subcommittee consisting of Lida K. Barrett, Lincoln K. Durst, Wendell H. Fleming, Arthur P. Mattuck, and Donald C. Rung (chairman).

Faculty Salaries, Tenure, Women

The questionnaires sent to departments in the mathematical sciences asked for information on salaries and tenure. Departments submitted a minimum, median, and maximum salary figure for each of four academic ranks, for staff members both with and without doctorates. Annual salaries of full-time faculty members for the academic year of 9 or 10 months were sought. The 1980 questionnaire requested information for both the years 1979-1980 and 1980-1981. The sample in this survey is thus the same for both years and is different from the sample used in the Twenty-Third Salary Survey in 1979. In the salary tables on the following pages the numbers in parentheses give the range of the middle fifty percent of salaries reported. The figures outside the parentheses represent the minimum and maximum salary listed by any reporting institution. In some categories relatively few departments reported and, because significant figures were not available, salaries are not listed.

The information reported this year on the number of faculty members is based on returns from 867 departments in the mathematical sciences, 164 of which did not contain usable salary information.

For these reports, the departments are divided

into groups according to the highest degree offered in the mathematical sciences. The doctorate-granting departments are in six groups as follows:

Group I and **Group II** include the leading departments of mathematics in the U. S. according to the findings of the American Council on Education in 1969*, in which departments were ranked according to the quality of their graduate faculty.

Group I is composed of the 27 departments ranked highest.

Group II is made up of the other 38 leading departments listed in that report.

Group III contains all other U. S. departments of mathematics.

Group IV includes U. S. departments of statistics, biostatistics and biometrics.

Group V includes all other U. S. departments in the mathematical sciences.

Group VI consists of all doctorate-granting departments in the mathematical sciences in Canadian universities.

Although Canadian doctorate-granting departments are grouped separately, those granting bachelor and master degrees are included with U. S. departments, as in previous reports.

*The findings were published in *A Rating of Graduate Programs* by Kenneth D. Roose and Charles J. Andersen, American Council on Education, Washington, D.C., 1969, 115 pp. The information on mathematics was reprinted in the February 1971 issue of the *Notices*, pages 338-340.

TABLE 1: TOTAL FACULTY REPORTED FOR FOUR-YEAR COLLEGES AND UNIVERSITIES

	1979-1980				1980-1981			
	FACULTY		WOMEN		FACULTY		WOMEN	
	Total	With Tenure	Total	With Tenure	Total	With Tenure	Total	With Tenure
WITHOUT DOCTORATE								
Instructor/Lecturer	654	86	315	42	643	84	312	36
Assistant Professor	675	525	160	124	634	492	149	113
Associate Professor	559	529	73	69	560	532	75	70
Professor	<u>153</u>	<u>151</u>	<u>14</u>	<u>14</u>	<u>163</u>	<u>161</u>	<u>14</u>	<u>14</u>
	2041	1291	562	249	2000	1269	550	233
WITH DOCTORATE								
Instructor/Lecturer	254	8	43	1	220	8	41	0
Assistant Professor	2193	311	273	34	2178	291	287	33
Associate Professor	3025	2779	182	159	3034	2762	200	176
Professor	<u>3583</u>	<u>3523</u>	<u>150</u>	<u>148</u>	<u>3693</u>	<u>3639</u>	<u>154</u>	<u>152</u>
	9055	6621	648	342	9125	6700	682	361

NUMBER OF FACULTY MEMBERS REPORTED

The figures in Table 1 for the number of faculty members with doctorates, and among them those with tenure, show relative increases this year less than half as large as those reported last year. For women, however, the percentage increases in both these categories are larger than last year's; of the tenured doctorate-holding faculty members reported, the number of women now exceeds 5% of the total and is increasing more rapidly than the size of the group as a whole.

The figures in Table 2 break out tenure percentages for several groups of departments. These figures are comparable to last year's figures (October Notices, page 383) which indicated a sharp drop in the growth of tenure percentages compared to prior years.

TABLE 2: PERCENT OF DOCTORATE FACULTY WITH TENURE

	Fall 1979	Fall 1980
Groups I, II, III	74.1%	76.3%
Groups IV, V	64.7%	64.0%
Group VI	89.2%	89.8%
Masters and Bachelors	72.9%	71.7%

Response Rates. Response rates among the various classes of departments vary widely, thus

making it difficult to draw firm conclusions about the sizes of the faculty groups studied. Because the questionnaires request data for two years in a row, however, it is possible to estimate relative changes from one year to the next with somewhat more confidence. This year's response rates are given in Table 3. As in past years, the greatest rates of response are in Groups I, II, and III, which have a combined response rate of 77%. For these departments an independent count (cf. February 1980 Notices, page 173, Table 3) indicates that the number of faculty members reported constitutes just under 76% of the total. Corresponding counts are not available this year for the other groups.

TABLE 3: RESPONSE RATES

<i>U. S. Departments</i>								
Group	I	II	III	IV	V	M	B	
% Response	74	82	76	57	37	51	44	
<i>Canadian Departments</i>								
Group	VI	M	B					
% Response	44	42	50					

Faculty

SIZE OF FACULTY

1979-1980 1980-1981

	FACULTY		WOMEN		FACULTY		WOMEN	
	Total	With Tenure	Total	With Tenure	Total	With Tenure	Total	With Tenure
	2	0	2	0	2	0	2	0
	0	0	2	0	0	0	2	0
	71	2	7	0	44	2	5	0
	159	4	19	2	150	4	18	2
	163	156	9	9	155	152	11	11
	569	568	12	12	550	549	12	12
	962	730	47	23	899	707	46	25

DOCTORATE GRANTING DEPARTMENTS. Group I

(20 of 27 reporting)

	WITHOUT DOCTORATE		WITH DOCTORATE	
	Total	With Tenure	Total	With Tenure
Instructor/Lecturer	2	0	2	0
	0	0	2	0

WITH DOCTORATE

Instructor/Lecturer
Assistant Professor
Associate Professor
Professor

DOCTORATE GRANTING DEPARTMENTS. Group II

(31 of 38 reporting)

	WITHOUT DOCTORATE		WITH DOCTORATE	
	Total	With Tenure	Total	With Tenure
Instructor/Lecturer	42	9	25	5
Assistant Professor	8	5	0	0
Associate Professor	1	1	0	0
	51	15	25	5

WITH DOCTORATE

Instructor/Lecturer
Assistant Professor
Associate Professor
Professor

DOCTORATE GRANTING DEPARTMENTS. Group III

(66 of 87 reporting)

	WITHOUT DOCTORATE		WITH DOCTORATE	
	Total	With Tenure	Total	With Tenure
Instructor/Lecturer	83	9	41	7
Assistant Professor	52	51	16	16
Associate Professor	48	48	4	4
Professor	11	11	0	0
	194	119	61	27

WITH DOCTORATE

Instructor/Lecturer
Assistant Professor
Associate Professor
Professor

SALARIES

(in hundreds of dollars)

	1979-1980			1980-1981		
	Minimum	Median	Maximum	Minimum	Median	Maximum
	---	---	---	---	---	---
	---	---	---	---	---	---
	145(151-170)	(163-183)	(180-200)215	160(174-190)	(178-203)	(195-225)235
	177(188-210)	(210-238)	(225-278)299	185(201-232)	(237-261)	(251-288)340
	211(235-273)	(298-365)	(438-479)513	230(262-300)	(332-408)	(478-530)560
	---	---	---	---	---	---
	---	---	---	---	---	---
	115(120-190)	(125-190)	(135-195)220	120(137-206)	(142-206)	(155-206)223
	---	---	---	---	---	---
	---	---	---	---	---	---
	110(120-154)	(125-156)	(130-166)230	130(137-177)	(142-177)	(149-206)259
	85(148-168)	(160-185)	(181-210)277	119(160-184)	(176-200)	(198-224)240
	164(107-212)	(215-233)	(234-281)300	183(206-230)	(235-257)	(257-288)330
	160(225-262)	(283-330)	(398-460)537	160(250-281)	(312-367)	(422-490)572
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	---	---	---	---	---	---
	95(107-143)	(110-153)	(110-174)235	98(115-164)	(120-166)	(129-189)245
	122(153-187)	(156-188)	(166-192)226	135(158-202)	(170-204)	(181-209)240
	137(202-237)	(209-245)	(210-245)271	145(210-251)	(226-267)	(231-270)301
	---	---	---	---	---	---
	---	---	---	---	---	---
	96(105-145)	(107-142)	(107-150)167	105(118-155)	(118-157)	(118-161)200
	130(152-170)	(163-183)	(180-203)250	136(165-185)	(179-195)	(190-222)259
	153(189-210)	(210-231)	(235-269)301	165(199-227)	(223-250)	(249-292)322
	182(225-260)	(263-318)	(305-402)509	194(245-280)	(284-340)	(328-443)555

SIZE OF FACULTY

1979-1980 1980-1981

	FACULTY		WOMEN	
	Total	With Tenure	Total	With Tenure

	FACULTY		WOMEN	
	Total	With Tenure	Total	With Tenure

SALARIES

(in hundreds of dollars)

1979-1980

1980-1981

	1979-1980		1980-1981	
	Minimum	Median	Minimum	Maximum

MASTER DEGREE GRANTING DEPARTMENTS

(179 of 352 reporting including 8 of 19 Canadian Departments)

	1979-1980		1980-1981	
	Without Doctorate	With Doctorate	Without Doctorate	With Doctorate
WITHOUT DOCTORATE				
Instructor/Lecturer	255	39	129	18
Assistant Professor	283	253	68	62
Associate Professor	233	232	37	37
Professor	55	55	6	6
	826	579	240	123
WITH DOCTORATE				
Instructor/Lecturer	18	1	9	0
Assistant Professor	526	140	77	14
Associate Professor	917	863	69	63
Professor	754	745	47	45
	2215	1749	202	122

BACHELOR DEGREE GRANTING DEPARTMENTS

(470 of 1064 reporting including 16 of 32 Canadian Departments)

	1979-1980		1980-1981	
	Without Doctorate	With Doctorate	Without Doctorate	With Doctorate
WITHOUT DOCTORATE				
Instructor/Lecturer	231	28	102	12
Assistant Professor	315	203	68	40
Associate Professor	268	239	30	26
Professor	70	68	8	8
	884	538	208	86
WITH DOCTORATE				
Instructor/Lecturer	18	3	3	0
Assistant Professor	509	73	79	8
Associate Professor	603	510	58	48
Professor	473	449	43	43
	1603	1035	183	99

Salary Survey for New Recipients of Doctorates

The figures for 1980 in this article were compiled from questionnaires sent to individuals who received a doctorate in the mathematical sciences during the 1979-1980 academic year from universities in the United States and Canada. This year no attempt was made to obtain information from individuals who were reported to have left the U. S. or Canada.

Questionnaires requesting information on salaries and professional experience were distributed to 781 recipients of degrees using addresses provided by the departments which granted the degrees. Of these, 3 were returned by the postal service as undeliverable and could not be forwarded. There were 455 individuals who returned forms between late June and early September. The tables below are based on the responses from 422 of these individuals (368 men and 54 women). Data from 33 responses were not used in the compilation of the tables below; forms with insufficient data, or from individuals who had indicated they had part-time employment, were not yet employed, or were not seeking employment were considered unusable. In addition, one individual not included in the tables below is a second-year resident in psychiatry and another accepted a position as a

senior systems analyst in a dental school.

Readers should be warned that the data in this report are obtained from a self-selected sample and inferences from them may not be representative of the population. More comprehensive information on the number, the sex—minority group status—citizenship, and the employment status of the recipients of new doctorates granted last year in the mathematical sciences in the U. S. and Canada may be found on the pages which follow.

KEY TO TABLES BELOW

Salaries are listed in hundreds of dollars. Years listed refer to the academic year ending in the listed year. M and F are Male and Female respectively. One year experience means that the persons had experience limited to one year or less in the same position or a position similar to the one reported; some persons receiving a doctorate had been employed in their present position for several years. (X + Y) means there are X men and Y women in the 1980 sample. Quartile figures are given only in cases where the number of responses is large enough to make them meaningful.

NINE-MONTH SALARIES

Year	Min.	Q ₁	Median	Q ₃	Max.
TEACHING OR TEACHING AND RESEARCH (198 + 28)					
1976	85	124	133	145	245
1977	72	130	140	150	328
1978	92	135	145	159	211
1979	100	145	157	170	234
1980	105	155	171	185	250
1976M	93	125	134	145	245
1976F	85	120	125	145	168
1977M	72	130	140	150	328
1977F	72	120	135	148	170
1978M	100	135	145	160	211
1978F	92	131	145	151	195
1979M	100	145	158	170	234
1979F	115	145	152	171	200
1980M	120	155	171	185	250
1980F	105	151	164	198	210
One year experience (164 + 16)					
1980M	120	155	170	184	242
1980F	105	148	158	168	200
RESEARCH (5 + 0)					
1976	70		80		180
1977	80		86		160
1978	120		-		125
1979	110		132		160
1980	125		137		180
1976M	70		80		180
1976F	-		-		-
1977M	80		-		160
1977F	-		86		-
1978M	120		-		125
1978F	-		-		-
1979M	110		132		160
1979F	-		-		-
1980M	125		137		180
1980F	-		-		-
One year experience (5 + 0)					
1980M	125		137		180
1980F	-		-		-

TWELVE-MONTH SALARIES

Year	Min.	Median	Max.	Year	Min.	Median	Max.
TEACHING OR TEACHING AND RESEARCH (39 + 5)				GOVERNMENT (18 + 4)			
1976	100	155	270	1976	115	194	270
1977	111	170	260	1977	105	187	330
1978	101	185	290	1978	170	220	320
1979	120	195	240	1979	180	243	357
1980	143	195	350	1980	156	244	501
1976M	100	150	270	1976M	118	194	270
1976F	100	174	240	1976F	115	194	200
1977M	111	170	260	1977M	105	192	330
1977F	125	-	182	1977F	115	182	204
1978M	101	180	290	1978M	170	220	320
1978F	187	195	223	1978F	170	200	250
1979M	120	188	240	1979M	180	254	357
1979F	210	233	240	1979F	190	231	256
1980M	143	190	350	1980M	156	230	501
1980F	147	200	220	1980F	205	247	280
One year experience (28 + 4)				One year experience (14 + 4)			
1980M	143	190	282	1980M	156	208	296
1980F	147	180	220	1980F	205	247	280
RESEARCH (20 + 5)				BUSINESS AND INDUSTRY (88 + 12)			
1976	90	130	210	1976	120	205	400
1977	100	156	250	1977	100	210	380
1978	100	185	248	1978	145	240	387
1979	100	174	271	1979	140	254	380
1980	120	180	321	1980	190	284	400
1976M	90	121	210	1976M	120	206	400
1976F	-	195	-	1976F	185	-	200
1977M	100	139	210	1977M	100	216	380
1977F	190	222	250	1977F	130	195	220
1978M	100	187	248	1978M	145	246	387
1978F	-	180	-	1978F	180	210	251
1979M	100	174	271	1979M	140	251	380
1979F	-	-	-	1979F	200	255	350
1980M	120	180	321	1980M	190	284	400
1980F	178	200	264	1980F	218	283	345
One year experience (18 + 3)				One year experience (66 + 10),			
1980M	120	175	267	1980M	190	280	343
1980F	178	180	200	1980F	218	264	345

Report on the 1980 Survey of New Doctorates

by Donald C. Rung

This report concerns new doctorates in the mathematical sciences. It includes the employment status of recipients of 1979-1980 doctorates in the mathematical sciences, and a breakdown according to their sex, minority group, and citizenship. In addition, trends in the number of doctoral degrees in the mathematical sciences are reported for each group of departments as defined by the 1969 American Council on Education survey (described on page 602).

The job market for new mathematical science doctorates continued to be good in 1980. By mid-summer only 4.7% reported that they were not employed although seeking employment. As observed in previous reports in this series most of this group do find employment by the end of the summer. (A second report on the employment status of 1979-1980 doctorates is planned for the February or April 1981 issue of the Notices.)

The number of new mathematical sciences doctorates reported for 1979-1980 decreased only slightly from the total reported at this time last

year—down from 890 to 858. Whether a plateau has been reached remains to be seen.

Employment Status of New Doctorates, 1979-1980. Table 1 shows the employment status, by type of employer and field of degree, of 858 recipients of doctoral degrees conferred by mathematical sciences departments in the U.S. and Canada between July 1, 1979 and June 30, 1980. These 858 individuals are listed, with their thesis titles, in this issue of the Notices.

In rows 1 through 5, the recipients are counted who accepted appointments in U.S. doctorate-granting mathematical sciences departments (Groups I-V as defined on page 602). In the next 2 rows, the figures represent those accepting appointments in U.S. mathematical sciences departments granting masters and bachelors degrees only. The information was obtained from the departments granting the degrees and from questionnaires subsequently completed by about 52% of the recipients themselves.

Among those 1979-1980 new doctorates em-

TABLE 1
1979-1980 EMPLOYMENT STATUS OF NEW DOCTORATES IN THE MATHEMATICAL SCIENCES

Type of Employer	PURE MATHEMATICS						Statistics	Computer Science	Operations Research	Applied Mathematics	Mathematics Education	Other	Total
	Algebra and Number Theory	Analysis and Functional Analysis	Geometry and Topology	Logic	Probability								
Group I	12	22	14	2	1		2	0	0	3	0	5	61
Group II	16	5	13	1	5		3	0	0	5	1	3	52
Group III	9	13	6	5	2		11	1	0	9	0	0	56
Group IV	0	0	1	0	2		17	0	1	0	0	0	21
Group V	0	0	0	0	1		2	21	7	2	0	3	36
Masters	11	7	8	3	1		13	7	1	5	2	7	65
Bachelors	21	17	11	0	1		3	4	2	8	6	10	83
Two-year College or High School	8	1	0	0	0		0	0	0	1	1	2	13
Other Academic Departments	1	3	1	1	3		21	5	9	2	1	4	51
Research Institutes	6	2	5	0	2		4	1	2	3	0	3	28
Government	2	2	3	0	2		11	1	3	6	0	2	32
Business and Industry	9	14	10	6	4		31	23	25	17	0	11	150
Canada, Academic	3	3	1	0	1		0	11	2	2	0	2	25
Canada, Nonacademic	0	0	2	1	1		0	1	2	3	0	1	11
Foreign, Academic	7	10	3	3	1		6	2	9	8	1	4	54
Foreign, Nonacademic	3	6	1	0	0		9	4	1	1	0	4	29
Not seeking employ.	1	1	2	0	0		2	1	1	2	0	0	10
Not yet employed	2	4	4	4	2		6	2	2	9	1	4	40
Unknown	4	8	6	1	1		4	6	3	4	0	4	41
Total	115	118	91	27	30		145	90	70	90	13	69	858

ployed in the U. S. about 60% took positions in university or college mathematical sciences departments, the same percentage as last year. About 29% took positions in government, business, and industry, while the remaining 11% are in two-year colleges, high schools, other academic departments, or research institutes. These figures are virtually identical with those reported last year.

Table 1 shows as "not yet employed" about 4.7% of the 1979-1980 new doctorates (this excludes those whose employment status is unknown, and those now in Canada or other foreign countries). The data in Table 1 were in many instances obtained in early summer of 1980 and do not reflect subsequent hiring during the summer; an update of Table 1 is planned for the February or April 1981 Notices. A similar update last year revealed that nearly all new 1978-1979 doctorates not yet employed by early summer subsequently found positions by Fall 1979. (See the Notices, October 1979, p. 388, and February 1980, p. 171. Only eleven individuals included in Table 1 were reported as having taken part-time employment.

Sex, Race, and Citizenship of New Doctorates, 1979-1980. Table 2 below represents a breakdown according to sex, racial/ethnic group, and citizenship of these 858 new doctorates. The information summarized in Table 2 was obtained from department

heads and in some cases from recipients themselves.

Table 2 shows that 12.7% of the 1979-1980 doctorates are women. This is a decrease from the 13.7 percentage reported a year ago. Table 2 shows thirty-five new doctorates who are both U. S. citizens and members of a minority group, a decrease of four from last year; as in previous years this represents only a small percentage of the total.

Analysis of the 1979-1980 employment forms for the new U. S. doctorates indicates that 8% of those employed by Groups I, II, and III departments are women, as compared to a 10% figure last year. (This percentage is just under 10% if Groups IV and V departments are included.) Among new doctorates employed by bachelors and masters degree-granting departments 18% are women, while among those employed by government, business, and industry 15% are women. Among the 40 individuals shown in Table 1 as not yet employed five are women.

Trends in the Number of New Doctorates. The downward trend observed since 1971 in the number of new mathematical sciences doctorates from Groups I-III universities seems to have abated during 1979-1980. Table 3 gives the number of doctorates granted during 1977-1978, 1978-1979, and 1979-1980 by those departments in Groups I, II, and III which reported in all three years. The number of such departments is indicated in parentheses.

TABLE 2: SEX, RACE, AND CITIZENSHIP OF NEW DOCTORATES
July 1, 1979-June 30, 1980

U.S. DEGREES	MEN					WOMEN					TOTAL
	CITIZENSHIP					CITIZENSHIP					
RACIAL/ETHNIC GROUP	U.S.	Canada	Other	Not Known	Total Men	U.S.	Canada	Other	Not Known	Total Women	
Asian, Pacific Islander	11	1	85	3	100	4		10		14	114
Black	11		3		14	5				5	19
American Indian, Eskimo, Aleut	2				2						2
Mexican American, Chicano, Puerto Rican	1		2		3	1				1	4
None of those above	425	10	89	1	525	73		9		82	607
Unknown	41		2	1	44	4		2		6	50
Total Number	491	11	181	5	688	87		21		108	796

CANADIAN DEGREES	MEN					WOMEN					TOTAL
	CITIZENSHIP					CITIZENSHIP					
RACIAL/ETHNIC GROUP	U.S.	Canada	Other	Not Known	Total Men	U.S.	Canada	Other	Not Known	Total Women	
Asian, Pacific Islander		3	4		7						7
Black			2		2						2
American Indian, Eskimo, Aleut											
Mexican American, Chicano, Puerto Rican											
None of those above	2	25	12		39			1		1	40
Unknown	1	11	1		13						13
Total Number	3	39	19		61			1		1	62

TABLE 3: NUMBER OF NEW MATHEMATICAL SCIENCES DOCTORATES REPORTED

	<u>1977-1978</u>	<u>1978-1979</u>	<u>1979-1980</u>
Group I (23 depts.)	205	216	228
Group II (34 depts.)	146	128	118
Group III (74 depts.)	<u>158</u>	<u>123</u>	<u>132</u>
Total	509	467	478

Table 3 shows a modest 2.6% increase among these departments from 1978-1979 to 1979-1980. However, Group II departments continued to decrease while Groups I and III showed an upturn.

The decline in the number of new doctorates continued in the departments reporting in Groups IV, V, and VI. Table 4 compares the number of doctorates granted during 1977-1978, 1978-1979, and 1979-1980 in those Groups IV, V, and VI departments which reported in all three years.

In Table 4 the decline for the statistics-related departments in Group IV is perhaps caused by the excellent employment prospects for statisticians. Possibly more statistics students are opting for a relatively well-paying job after the masters degree. Table 4 also indicates a drop for the computer science, operations research, and other applied departments in Group V, although returns from those departments are somewhat fragmentary.

TABLE 4: NUMBER OF NEW DOCTORATES

	<u>1977-1978</u>	<u>1978-1979</u>	<u>1979-1980</u>
Group IV (44 depts.)	133	109	99
Group V (32 depts.)	109	117	115
Group VI (22 depts.)	<u>69</u>	<u>66</u>	<u>54</u>
Total	311	292	268

Report on the 1980 AMS Nonacademic Salary Survey

by Robert J. Thompson

The AMS Nonacademic Salary Survey was designed for individuals with a doctorate in the mathematical sciences who had full-time nonacademic employment in the U.S., and who were citizens or permanent residents of the U.S. At the instigation of the Society's Committee on Employment and Educational Policy, the 1980 AMS dues notice contained several questions to be used for constructing a list of such people; in this manner, 635 individuals were identified. The Mathematical Association of America graciously provided a list of MAA members

with doctorates and nonacademic employment; from this list 540 additional people were identified, but their citizenship and full-time employment status were not known.

In March, 1980, questionnaires were mailed to these 1,175 individuals; 608 were returned, and all but 9 of them were usable. Respondents were asked to provide information that was accurate as of March 1, 1980. (The questionnaire is reproduced on p. 612.) There are certainly a number of people in the intended group who were not sent the questionnaire. Statisticians and computer scientists, for example, are certainly under-represented. How many

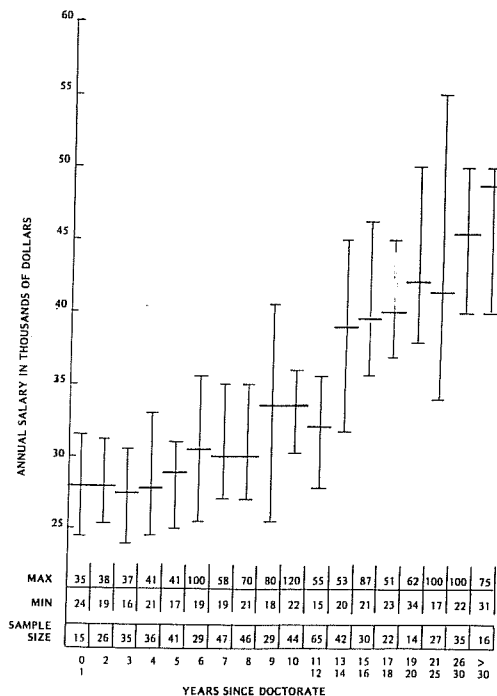


FIGURE 1

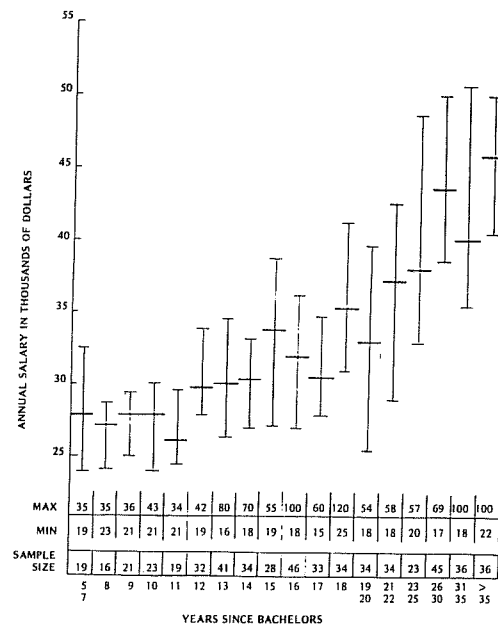


FIGURE 2

Since 1957 the American Mathematical Society has conducted an annual survey of faculty salaries. In addition, new recipients of the doctorate are surveyed annually for a study that includes both academic and non-academic salaries. The results of the most recent of those two salary surveys appear in this issue of the Notices. Those surveys were made under the direction of the Society's Committee on Employment and Educational Policy (CEEP), whose members in 1980 are Lida K. Barrett (chairman), Arthur P. Mattuck, Donald C. Rung, Hans Schneider, Robert J. Thompson and William P. Ziemer. Because of the growing importance of the employment of mathematicians outside traditional academic areas, CEEP decided in 1977 to conduct a salary survey of non-academically employed Ph.D.'s. The results of that survey appeared in the August 1978 Notices, pages 307-310. The committee is grateful to members of the AMS staff, especially Peggy Reynolds, for the efficiency with which the 1980 survey was conducted and for the preliminary organization of the data.

people were missed, and how they would have affected the results reported here are not known. One comparison with another survey can be made. The AMS survey of new doctorates referred to above reported that for males accepting jobs in business and industry in 1980 the minimum twelve-month salary was \$19,000; the first quartile (Q_1), the median, the third quartile (Q_3) and the maximum were \$25,000, \$28,000, \$30,600 and \$34,300, respectively. For the survey reported here, the corresponding numbers are \$24,000, \$24,000, \$28,000, \$33,500 and \$35,000.

In Figures 1 to 8 of this report the heavy horizontal lines designate median salaries; the lighter horizontal lines mark the first and third quartiles: thus the vertical lines joining them represent the range of the middle fifty percent of the salaries reported. Figure 1 displays salaries as a function of years since receipt of doctorate. This measure of experience was used in the report of the 1977 non-academic salary survey and is used almost exclusively in this report, so comparisons can be easily made. For example, the median salary for people who have had the doctorate for a year or less is about 27% higher for the 1980 survey than the corresponding median for the 1977 survey (about 2½ years earlier). For more experienced people, however, the percentage increase in median salaries was substantially

smaller. A weighted average of median salaries for the total survey population shows an increase of only about 12%.

Figure 2 shows salaries as a function of years since bachelors degree. That is a measure of experience which is often used in salary reports. To the extent that experience is correlated with salary, it was thought that perhaps years since bachelors degree might be a more appropriate measure of experience than years since doctorate. Comparison of Figures 1 and 2 does not reveal any significant advantage of one over the other, so years since doctorate is used throughout the rest of this report.

Figure 3 is based on the salaries of the 46 female respondents and the 542 males. (Eleven respondents did not answer Question 4.)

Survey respondents were asked whether or not they had supervisory responsibilities. Figure 4 is based on the salaries of those who answered yes to that question. There was a similar figure in the report of the 1977 survey, but for that survey respondents were not asked explicitly if they were

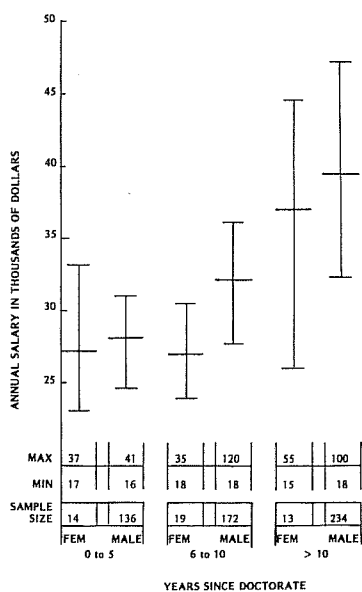


FIGURE 3

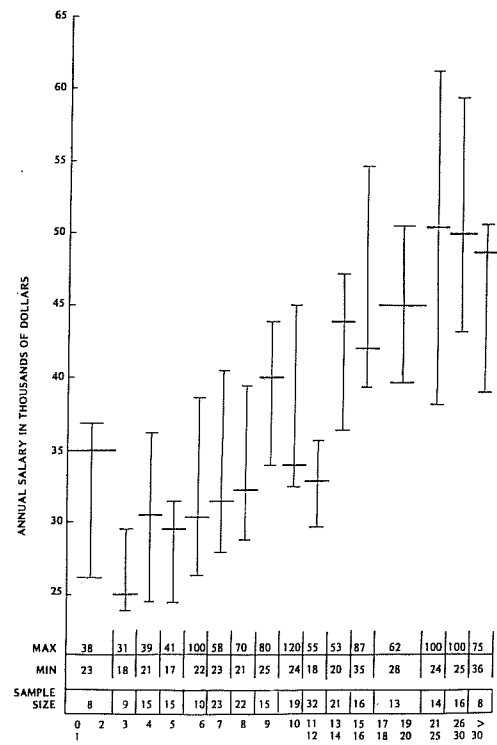


FIGURE 4

American Mathematical Society, P. O. Box 6248, Providence, RI 02940

NONACADEMIC DOCTORAL SALARY QUESTIONNAIRE

Answers to the questions below will be kept confidential. Published summaries will not permit identification of individuals or employers.

The information requested below should be accurate as of March 1, 1980.

This questionnaire is addressed to individuals who have a doctorate in the mathematical sciences, who have full-time nonacademic employment in the U.S. and who are citizens or permanent residents of the U.S. If you are not in this category, please do not return this questionnaire.

1. Employer _____ City _____ State _____
2. Type of employer: Business or industry Federal government State or local government
 None of these (Explain): _____
3. Do you have management responsibilities—that is, are you a supervisor, group leader, section head, etc.? Yes No
4. Female Male
5. Twelve month salary: \$ _____
6. Number of years since receipt of: bachelors degree _____ doctoral degree _____
7. Number of years of nonacademic professional experience since receipt of: bachelors degree _____ doctoral degree _____
8. Field of doctoral thesis: Probability theory Other pure mathematics Statistics
 Operations research Computer science Other applied mathematics
 None of these (Explain): _____
9. How do you spend your time at work? (Total should equal 100%)
 % Supervising others or administration % Computer programming % Applied research
 % Consulting or problem solving % Basic research % Other (Explain): _____

supervisors. An arbitrary decision was made that people who reported that they spent at least 30% of their time supervising others would be classified as supervisors. That distinction should be kept in mind in comparing the 1980 and 1977 results.

There are a significant number of mathematicians employed by institutions that receive essentially all of their funding from the federal government, but are not run directly by the government—such as Los Alamos National Laboratory and The Center for Naval Analyses. Employees at these institutions are not under Civil Service, and they were included in

the category business/industry in the report of the 1977 survey. For this report they are in a separate category. Figure 5 is based on the salaries of respondents in that category. There is no adequate short description that applies to all of these institutions, but for this report they are designated as Federal Contract Research Centers. Figures 6 and 7 are based, respectively, on the 357 respondents employed in business/industry and the 131 respondents employed by the federal government. Eighteen individuals were employed by state or local governments.

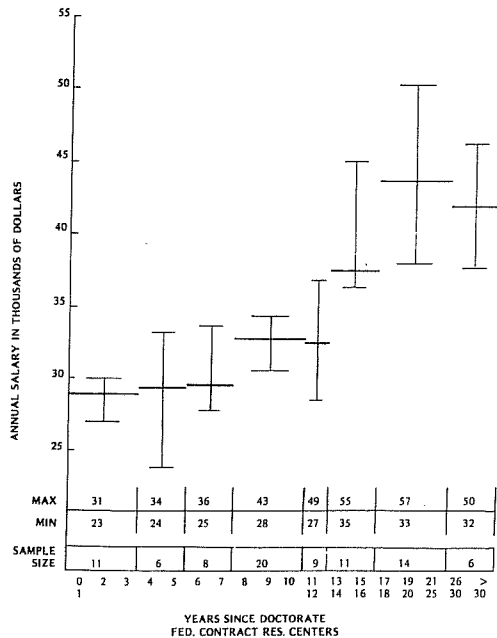


FIGURE 5

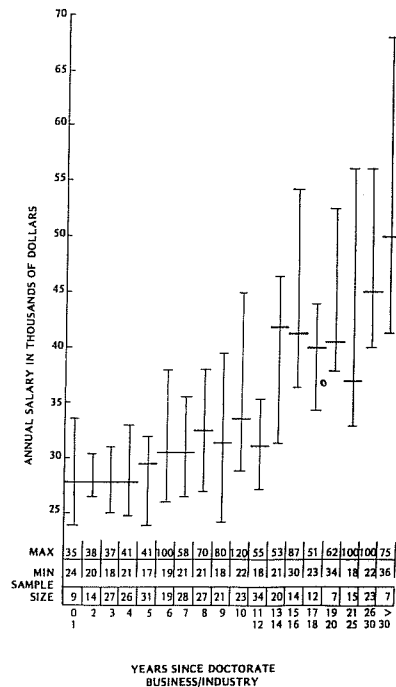


FIGURE 6

For this group the median salary was \$22,000; Q_1 was \$19,000 and Q_3 was \$30,000—essentially no change from 1977.

For business/industry—the largest group of respondents—those living in California and the Northeast were separated from the rest of the group. The results are displayed in Figure 8. Here Northeast refers to the Eastern Seaboard from the Boston metropolitan area to the Washington metropolitan area.

Respondents were asked to select from among several general areas the one which best described their field of doctoral thesis. The results were: Pure Mathematics 63%, Probability 5%, Statistics 5%, Operations Research 2%, Computer Science 5%, and Other Applied Mathematics 20%.

Respondents were asked to report the percentage of their time at work spent in each of the activities listed below. (A category "other" was included, and the total was supposed to be 100%.) The table shows for each activity what percent of the respondents reported it as their maximum. For example, seven percent of the respondents reported that they spend at least as much time on basic research as they spend on other activities. The totals in each column are over 100% because there were many ties.

	Total Sample	Business/ Industry	Fed. Contract Res. Centers	Federal Government
Supervising Others or Administration	20%	19%	16%	34%
Consulting or Problem Solving	44%	49%	41%	32%
Computer Programming	21%	24%	16%	14%
Applied Research	19%	14%	30%	26%
Basic Research	7%	5%	14%	4%

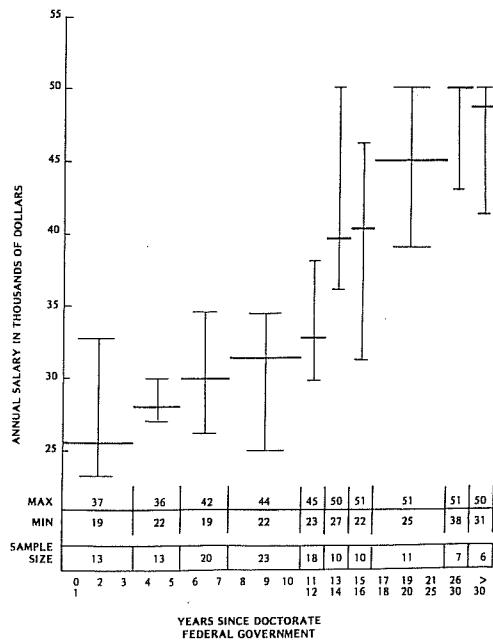


FIGURE 7

Finally, the following table shows how many people reported that they spent no time in research.

	Total Sample	Business/ Industry	Fed. Contract Res. Centers	Federal Government
No Applied Research	44%	52%	32%	39%
No Basic Research	72%	81%	68%	66%
No Research of Either Type	42%	47%	24%	33%

EDITOR'S NOTE: The Employment Concerns Subcommittee of the Society's Committee on Employment and Educational Policy (CEEP) felt that graduate students in mathematics and their advisors would find useful a list of organizations where Ph.D. mathematicians have found nonacademic employment. The list below contains the names of organizations that have employed Ph.D. mathematicians; it is not a directory of employers seeking mathematicians, and should not be used as such. (Those seeking nonacademic or academic employment should consult *Employment Information in the Mathematical Sciences*, which is published jointly by the AMS and the MAA six times each year. University and college placement offices also have information on nonacademic employers.)

The list on nonacademic employers below contains, with few exceptions, those organizations which were mentioned as the employer of at least two people who responded to the nonacademic salary survey reported above. This list does not include the names of a substantial number of employers of one of the respondents to the survey; among these organizations are insurance companies, state, county

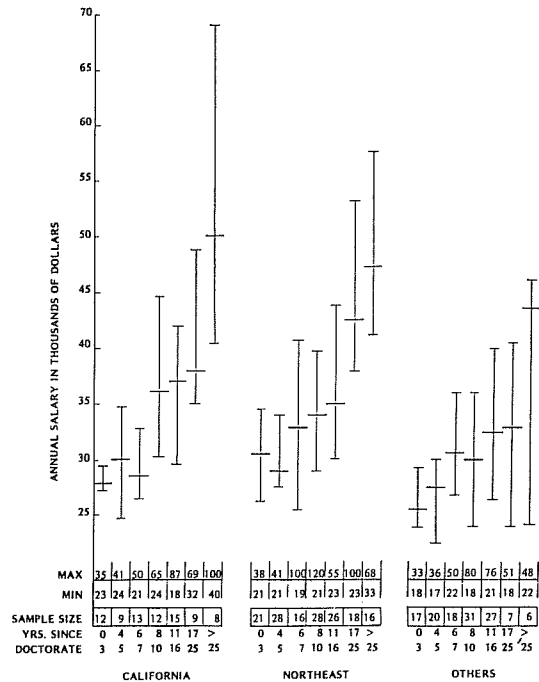


FIGURE 8

and city governments, medical centers, and small consulting firms. Anyone considering nonacademic employment should be aware that others have found jobs in such places.

BUSINESS AND INDUSTRY

Aerospace Corp., El Segundo, CA
Amoco Production Co., Tulsa, OK
Analytic Sciences Co., Reading, MA
ANSER (Analytic Services Inc.), Arlington, VA
Argonne National Laboratory, Argonne, IL
ARINC Research Corp., Annapolis, MD
AT&T, Bedminster, Morris Plains, NJ; New York, NY
Babcock and Willcox, Barberton, OH; Lynchburg, VA
Battelle Memorial Institute, Columbus, OH; Richland, WA
Bell Laboratories, Holmdel, Murray Hill, Piscataway, South Plainfield, Whippany, NJ
Boeing, Seattle, WA
Center for Naval Analyses, Alexandria, VA
Computer Sciences Corp., El Segundo, San Diego, CA; Washington, DC
Control Data Corp., Minneapolis, St. Paul, MN; New York, NY
Daniel H. Wagner Associates, Paoli, PA
Educational Testing Service, Princeton, NJ
EG&G Idaho Inc., Idaho Falls, ID
EXXON Production Research Co., Houston, TX
Ford Motor Co., Dearborn, MI
General Electric Co., Schenectady, NY; Cincinnati, OH; Philadelphia, PA
General Motors, Detroit, Warren, MI
Grumann Aerospace Corp., Bethpage, NY
GTE, Mountain View, CA; Northlake, IL; Needham, MA
Hewlett-Packard, Cupertino, CA; Corvallis, OR
Honeywell, Inc., Billerica, MA; Minneapolis, MN; Silverdale, WA
Hughes Aircraft, Culver City, El Segundo, Fullerton, Los Angeles, CA; Denver, CO
IBM Corp., Los Angeles, Palo Alto, San Jose, CA; Boulder, CO; Chicago, IL; Rockville, MD; Armonk, Endicott, Mount Kisco, Poughkeepsie, Yorktown Heights, NY
ITT Research Institute, Annapolis, MD
Institute for Defense Analyses, Princeton, NJ; Arlington, VA
Jet Propulsion Laboratory, Pasadena, CA
Ketron, Inc., Wayne, PA; Arlington, VA
Lawrence Livermore National Laboratory, Livermore, CA
Lockheed, Sunnyvale, CA; Plainfield, NJ
Los Alamos National Scientific Laboratory, Los Alamos, NM

Martin Marietta Corp., Denver, CO
Mathtech, Princeton, NJ; Arlington, VA
McDonnell-Douglas, Huntington Beach, CA; Houston, TX
MIT Lincoln Laboratory, Lexington, MA
Mitre Corp., Colorado Springs, CO; Bedford, MA; McLean, VA
Motorola Inc., Phoenix, Tempe, AZ; Schaumburg, IL
NCR Corp., Wichita, KS; St. Paul, MN; West Columbia, SC
R & D Associates, Los Angeles, Marina Del Rey, CA
RCA Corp., Princeton, NJ
Raytheon Co., Bedford, Sudbury, MA
Rockland Research Institute, Orangeburg, NY
Sandia National Laboratories, Livermore, CA; Albuquerque, NM
Science Applications, Inc., Ft. Walton Beach, FL; Albuquerque, NM; McLean, VA
Scientific Systems Inc., Cambridge, MA
Sperry Univac, Irvine, CA; Washington, DC; Roseville, MN
SRI International, Menlo Park, CA
System Development Corp., Santa Monica, CA
System Planning Corp., Arlington, VA
TASC, Reading, MA
TRW, Los Angeles, Redondo Beach, Sunnyvale, CA; McLean, VA
Union Carbide Corp., Oak Ridge, TN; Charleston, WV
Vought Corp., Dallas, TX
Westinghouse, Pittsburgh, West Mifflin, PA
Xerox, Palo Alto, CA

GOVERNMENT

Defense Mapping Agency
Department of Agriculture
Department of Commerce
Department of Defense
Department of Energy
Department of Transportation
ICASE (NASA)
National Security Agency
National Bureau of Standards
National Institutes of Health
National Oceanographic & Atmospheric Administration
Naval Research Laboratory
Naval Surface Weapons Center
Naval Weapons Center
Office of Naval Research
U. S. Air Force
U. S. Army
U. S. Navy
Veterans Administration