CIVILIAN SCIENTISTS AND ENGINEERS IN ARMY, NAVY AND AIR FORCE RDT/E

E. M. Glass

Office of the Director of Defense Research and Engineering
Washington, D. C.

1 September 1969

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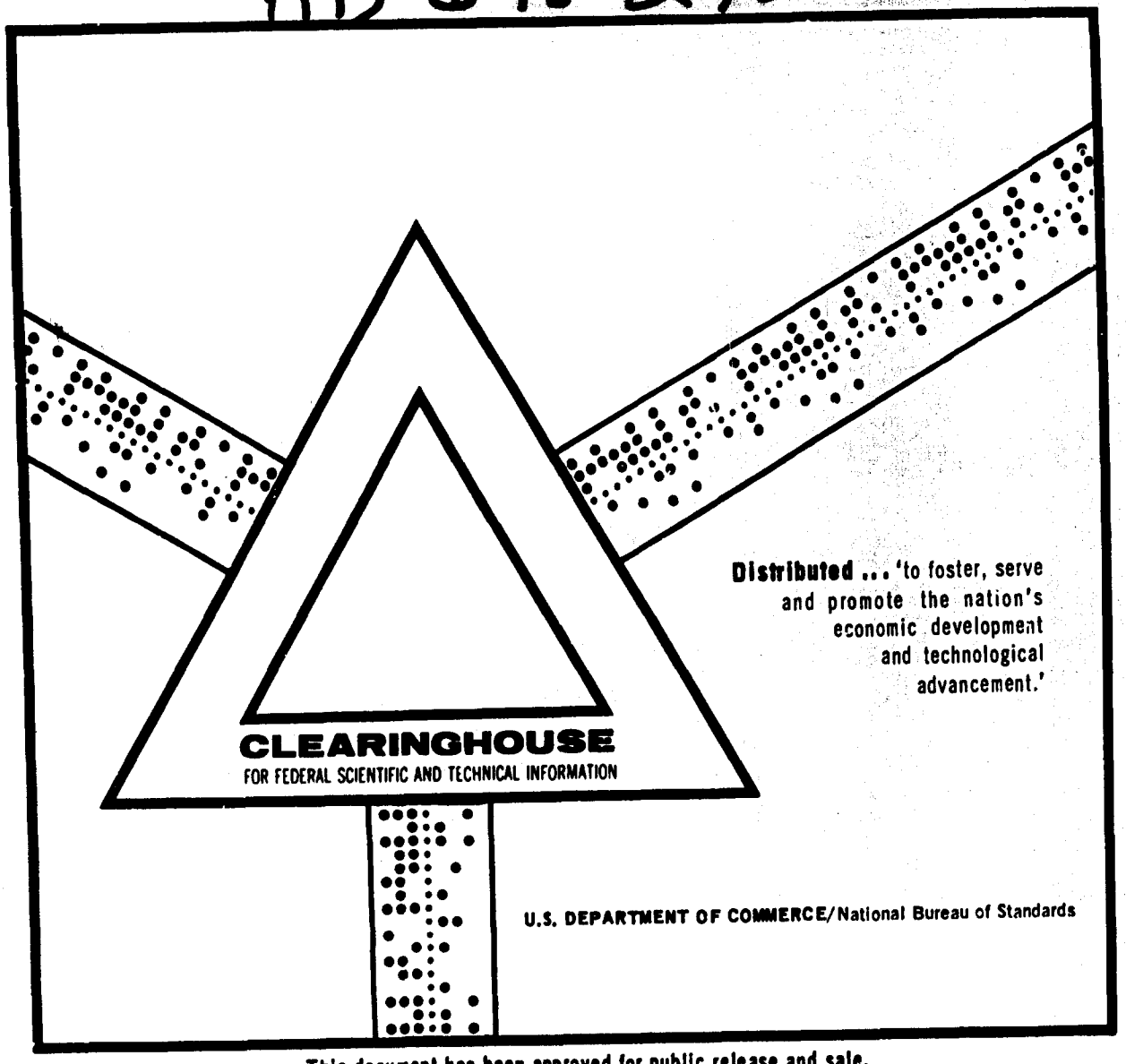

CIVILIAN SCIENTISTS AND ENGINEERS

IN ARMY, NAVY AND AIR FORCE RDT&E

by

E. M. Glass
Assistant Director

1 September 1969

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Office for Laboratory Management
Office of the Director of Defense Research and Engineering
Washington, D. C. 20301

INTRODUCTION

After the publication of MAR 69-1, *Profile of Civilian Scientists and Engineers in Field Activities of the Department of Defense*, dated 1 July 1969, there were many requests for similar data by individual military department and for a profile of scientists and engineers (S&E) in uniform. This report compares the S&E civilian work force of the three military departments with the DoD composite. A separate report, MAR 69-6, *Profile of Military Scientists and Engineers*, which has been completed and will soon be issued, characterizes the military scientists and engineers assigned to DoD field research, development, test and evaluation (RDT&E) activities.

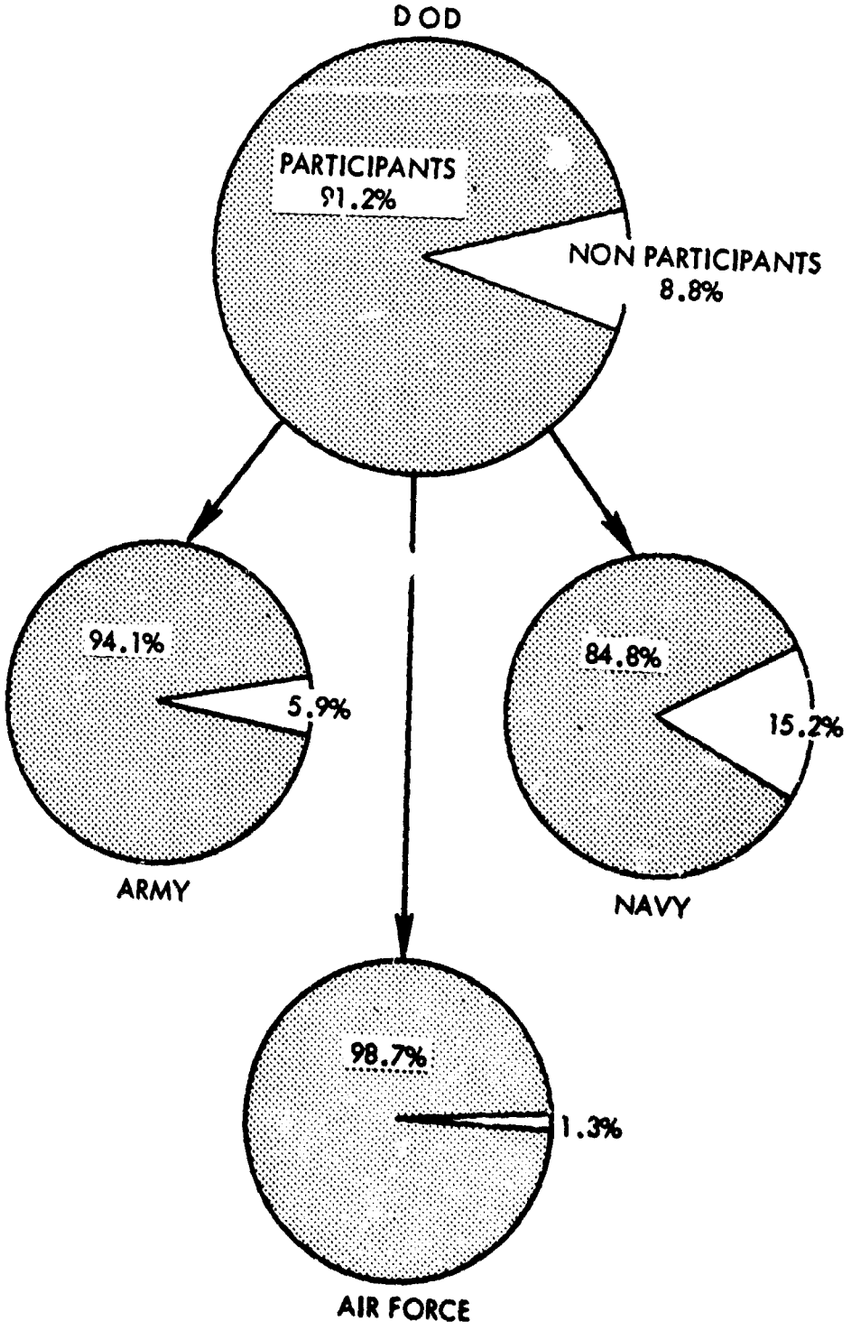
This summary is based upon a survey of the S&Es in field RDT&E activities of the Department of Defense—primarily laboratories, test centers and ranges. These activities do not include headquarters or system project offices. The information was provided by individual scientists and engineers and was forwarded by the organizations involved to the Office for Laboratory Management, Office of the Director of Defense Research and Engineering. The effective date of the information is 1 September 1968.

Programing support was provided by the U.S. Air Force's OSD Information Systems Division, chiefly by Spec. 4 Richard Hein. Beth R. King furnished editorial assistance, and the graphic arts work was done by Robert B. Logan and his associates of the Graphics and Presentations Branch, Office of the Assistant Secretary of Defense (Administration).

CONTENTS

PARTICIPATION IN THE SURVEY

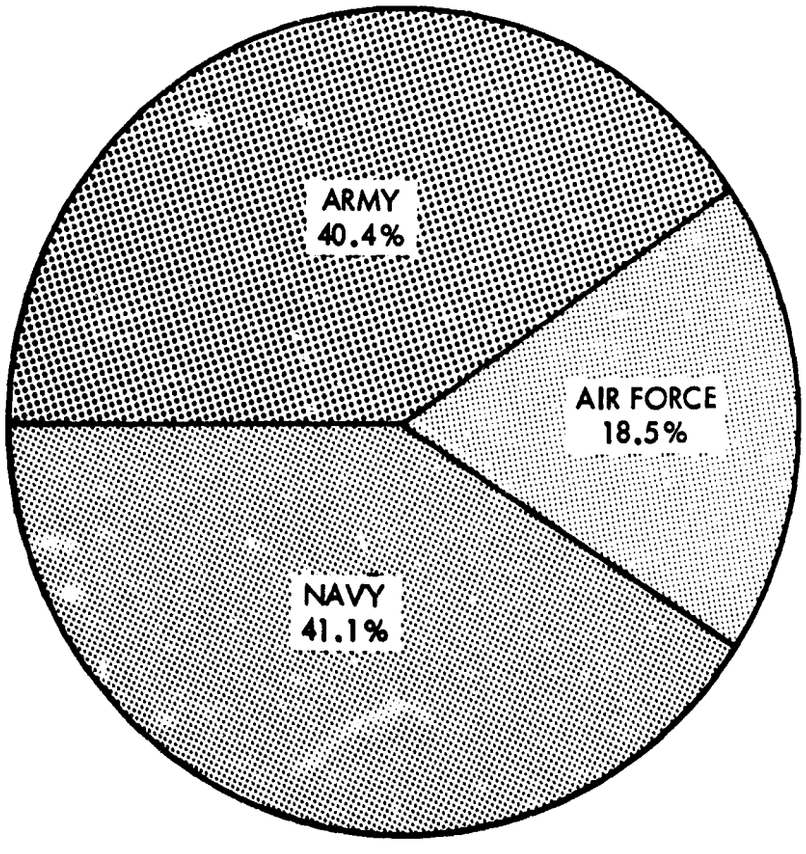
The information for this survey was provided by 26,437 civilian employees of the Department of Defense. The Air Force has the highest participation, and the Navy, the lowest.



Distribution by Military Department

The Army and Navy, the largest subsets of the sample, are almost equal in size. The size of the Air Force is less than half that of the others.

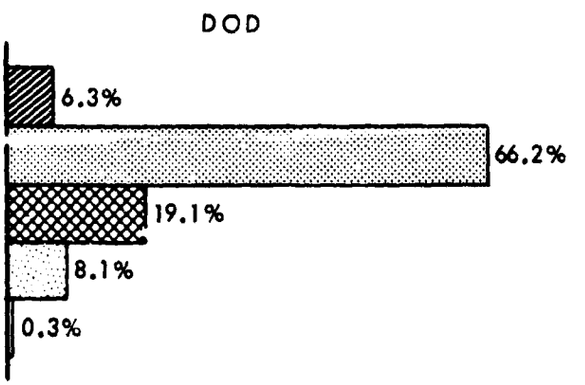
	No. of S&Es	% of Total
Army	10,680	40.4
Navy	10,872	41.1
Air Force	4,885	18.5



EDUCATIONAL LEVELS

Of the total sample of S&E professionals, 93.7 percent have at least baccalaureate degrees; this varies from 95.4 percent for the Navy to 92.4 percent for the Army. Those with advanced degrees range from 25.4 percent for the Army to 29.2 percent for the Navy.

Army	Navy	Air Force	DEGREE LEVEL
7.6%	4.6%	7.0%	NO DEGREE
67.0	66.2	64.9	BACCALAUREATE
17.2	21.2	19.1	MASTER'S
7.8	7.8	8.8	DOCTORATE
0.4	0.2	0.2	MEDICAL



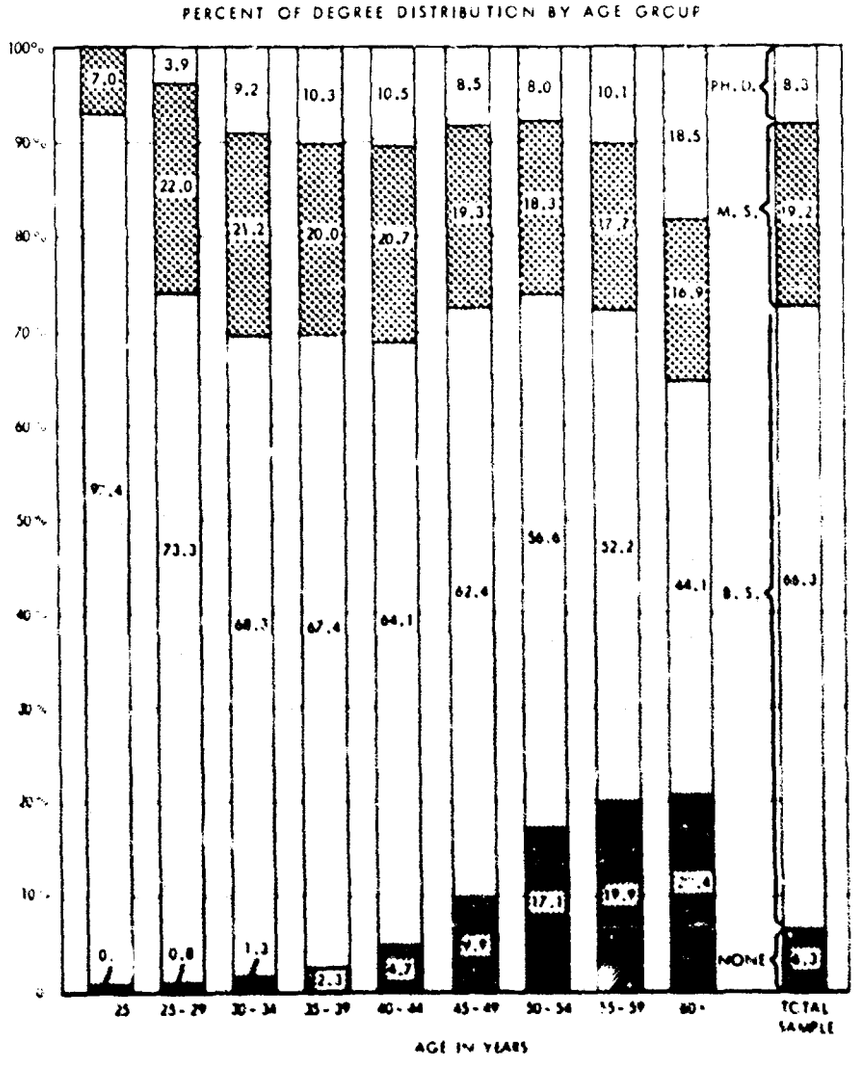
PERCENTAGE OF DOD TOTAL

Department	No degree	B.S.	M.S.	Doctorate	Medical	Total
Army	48.7	40.8	36.2	39.5	65.8	40.4
Navy	30.6	41.1	45.4	40.2	23.2	41.1
Air Force	20.7	18.1	18.4	20.3	11.0	18.5

Age

The percentage of no-degree professionals increases with increasing age. The converse is true of those with Bachelor's degrees. M.S. personnel are evenly distributed over most age groups. This is also the case with Ph.D.'s, except for the relatively high representation in the age group 60-plus.

	Doctorates	
	% of all S&Es at age 60+	% of all doctorates
Army	16.4	9.1
Navy	21.8	6.7
Air Force	19.6	8.6



AGE (continued)

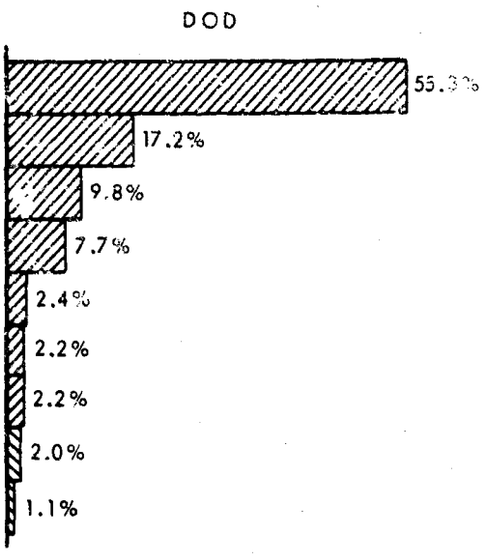
Degree Level	Department									Total
					Army					
No degree	0.3	1.8	1.3	2.8	4.0	10.8	17.9	23.0	23.2	7.6
B.S.	94.1	77.7	73.2	69.3	65.9	60.7	56.3	52.5	44.9	67.0
M.S.	5.6	16.3	16.8	18.4	19.4	20.1	17.3	15.3	15.4	17.1
Doctorate*	--	4.1	8.2	9.4	10.7	8.4	8.5	9.1	16.4	8.3
					Navy					
No degree	0.5	0.3	1.0	2.0	4.8	9.0	15.8	14.7	13.0	4.7
B.S.	91.6	68.4	64.9	66.4	62.1	63.0	56.4	53.7	46.3	66.1
M.S.	7.9	27.3	24.9	20.9	21.7	19.6	19.8	20.2	18.9	21.2
Doctorate*	0.1	3.9	9.0	10.7	11.4	8.5	8.0	11.4	21.8	8.0
					Air Force					
No degree	1.6	0.2	0.8	1.8	6.5	9.7	17.5	22.2	23.8	7.0
B.S.	91.9	80.6	65.1	66.1	63.4	64.5	57.9	48.7	38.6	64.9
M.S.	6.5	16.0	22.6	21.1	21.8	16.9	17.5	18.9	18.0	19.1
Doctorate*	--	3.2	11.4	11.0	8.4	8.9	7.0	10.2	19.6	9.0
Age (yr)	<25	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60+	

Note: *Includes M.D., D.D.S and D.V.M degrees.

Field of Highest Degree

Engineers represent the largest proportion of the sample at 55.3 percent. The range of the Services is 3.9 percentage points, from Army at 54.1 percent to Air Force at 58.0 percent. The Navy employes the greatest number of physicists, while the Army has the highest percentage of chemists and life scientists.

Army	Navy	Air Force	FIELD OF DEGREE
54.1%	55.2%	58.0%	ENGINEERING
13.7	21.3	15.7	PHYSICS
9.0	10.6	9.5	MATH. & STATISTICS
10.8	5.7	5.8	CHEMISTRY
4.5	0.9	1.6	LIFE SCIENCES - OTHER
1.8	2.3	3.0	SOCIAL SCIENCES & PSYCH.
2.2	1.9	2.7	ALL OTHER FIELDS
2.2	1.6	2.9	OTHER PHYSICAL SCIENCES
1.8	0.5	0.7	LIFE SCIENCES - HEALTH

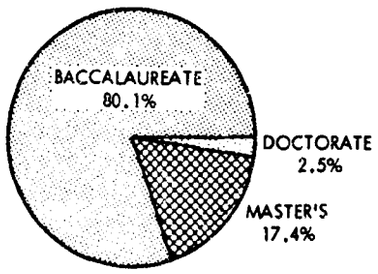


Degree Levels Attained in the Various Fields

Engineering shows the lowest relative numbers of advanced-degree holders. The largest percentage of doctorates and advanced degrees is in the life sciences, with chemistry second. Mathematics and statistics display distributions similar to those of engineering.

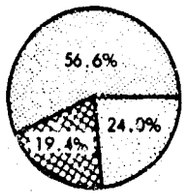
	Army	Navy	Air Force	DoD
B.S.	82.5%	77.5%	81.2%	80.1%
M.S.	15.3	19.8	16.1	17.4
Doc.	2.2	2.7	2.6	2.5

ENGINEERING



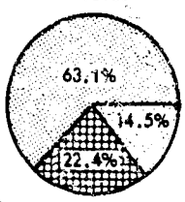
	Army	Navy	Air Force	DoD
B.S.	61.6%	50.0%	52.6%	56.6%
M.S.	19.8	19.1	19.2	19.4
Doc.	18.6	30.9	28.2	24.0

CHEMISTRY



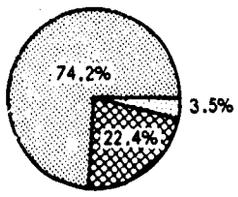
	Army	Navy	Air Force	DoD
B.S.	66.1%	62.4%	60.5%	63.1%
M.S.	20.9	22.7	23.3	22.4
Doc.	13.0	14.9	16.2	14.5

PHYSICS



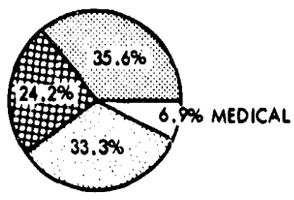
	Army	Navy	Air Force	DoD
B.S.	77.4%	71.0%	77.0%	74.2%
M.S.	20.5	25.5	18.0	22.4
Doc.	2.1	3.5	5.0	3.5

MATH. & STATISTICS



	Army	Navy	Air Force	DoD
B.S.	37.0%	33.0%	30.9%	35.6%
M.S.	23.2	29.1	23.5	24.2
Ph.D.	33.1	29.1	40.0	33.3
Med.	6.7	8.8	5.6	6.9

LIFE SCIENCES



OCCUPATIONS

The Army has the highest percentages of chemical and mechanical engineers, chemists and biologists. The Navy exceeds in electrical and electronics engineers, ocean-science engineers, physicists and mathematicians. The Air Force employs the greatest proportion of aeronautical and astronautical engineers, materials engineers and psychologists..

Army	Navy	Air Force	OCCUPATION	DOD
3.1%	4.5%	12.3%	AERO & ASTRO ENG.	5.3%
0.2	0.1	0.1	CERAMIC ENGINEERING	0.1%
2.7	0.8	0.7	CHEMICAL ENGINEERING	1.5%
1.9	0.6	1.0	CIVIL ENGINEERING	1.2%
17.2	27.5	26.4	ELECTRICAL & ELECTRONIC	23.1%
1.1	1.9	0.8	ENGINEERING MECHANICS	1.4%
2.6	0.7	0.3	INDUSTRIAL ENGINEERING	1.4%
1.7	1.3	2.5	MATERIALS ENGINEERING	1.7%
16.5	11.0	7.3	MECHANICAL ENGINEERING	12.5%
1.2	1.0	0.6	METALLURGICAL ENGINEERING	1.0%
0.0	0.0	*	MINING & PETROLEUM	*
0.4	0.2	*	NUCLEAR OR REACTOR ENG.	0.2%
*	2.6	*	OCEAN SCIENCE ENGINEERING	1.1%
0.1	*	*	SANITARY ENGINEERING	*
5.7	6.5	5.3	ALL OTHER ENGINEERING	6.0%
(54.4)	(59.9)	(57.3)	TOTAL ENGINEERING	56.5%
9.1	12.3	9.1	PHYSICS	10.4%
7.5	3.7	3.5	CHEMISTRY	5.2%
*	0.3	0.7	ASTRONOMY	0.3%
1.0	0.5	2.2	ATMOS., EARTH, MARINE, SPACE SCI.	1.0%
6.2	7.3	6.6	MATHEMATICS	6.7%
(23.8)	(24.1)	(22.1)	TOTAL PHYSICAL SCIENCES	23.6%
4.0	0.8	1.2	BIOLOGY	2.2%
0.0	0.2	*	SOCIOLOGY	0.1%
0.0	0.0	*	ANTHROPOLOGY	*
*	0.0	*	LINGUISTICS	*
0.0	0.0	*	ECONOMICS	*
1.2	1.4	2.1	PSYCHOLOGY	1.5%
(5.2)	(2.4)	(3.3)	TOTAL OTHER SCIENCES	3.8%
1.0	0.7	0.9	INTERDISCIPLINARY	0.9%
4.0	5.6	6.1	SYSTEMS ANALYSIS/ENGINEERING	5.0%
8.3	6.0	7.6	MULTIDISCIPLINE SCIENCE & ENG.	7.2%
(13.3)	(12.3)	(14.6)	TOTAL (LAST THREE ITEMS)	13.1%
3.5	2.5	2.3	OTHER SPECIALTIES	2.9%

* 13 OR FEWER DOD S&E PROFESSIONALS

TECHNICAL MOBILITY

The primary work activity is compared here to the field of highest degree. A significant number of scientists and engineers identify themselves with fields other than those in which they received their academic training. This compilation does not include persons having no degree.

FIELD OF HIGHEST DEGREE VS. PRIMARY WORK ACTIVITY
(Cell percent is based on column sum.)

Primary work activity	Field of Highest Degree									Total	Percentage
	Engineering	Chemistry	Physics	Other physical sciences	Life sciences (Health-related)	Life sciences (Other)	Social and behavioral sciences	Mathematics and statistics	All other fields		
Aeronautical and astronautical engineering	9.1 1,247	0.6 11	1.2 52	0.6 3	-- --	0.2 1	0.5 3	1.3 32	3.1 15	1,364	5.5
Chemical engineering	2.1 293	4.4 85	0.2 8	0.2 1	0.4 1	0.3 2	-- --	0.1 3	1.0 5	398	1.6
Electrical and electronic engineering	33.4 4,573	1.9 36	14.9 636	4.4 22	2.6 7	0.5 3	3.1 17	5.0 122	11.1 53	5,469	22.2
Mechanical engineering	20.5 2,805	1.1 21	1.7 73	3.0 15	0.4 1	0.5 3	0.9 5	1.4 35	8.6 41	2,999	12.1
Nuclear and reactor engineering	0.2 27	0.6 11	0.4 15	0.2 1	0.4 1	-- --	-- --	0.1 3	0.2 1	59	0.2
Other engineering	23.9 3,267	10.3 197	12.4 531	23.4 118	3.8 10	5.6 34	4.9 27	14.5 350	25.1 120	4,645	18.8
Physics and astronomy	1.2 165	4.1 78	54.1 2,309	13.5 68	1.5 4	0.3 2	0.2 1	3.9 94	5.0 24	2,745	11.1
Chemistry	0.3 37	61.9 1,187	0.3 11	3.6 18	9.8 26	8.6 52	-- --	0.2 5	2.3 11	1,347	5.5
Atmospheric and space sciences	0.1 15	0.3 6	1.7 72	24.8 125	-- --	0.3 2	1.5 8	0.4 10	1.9 9	247	1.0
Biology and agriculture	0.0 1	0.5 9	0.0 1	0.4 2	55.1 146	63.3 383	0.4 2	0.1 2	2.3 11	557	2.3
Social and behavioral sciences	0.0 1	-- --	0.0 1	0.2 1	-- --	1.2 7	73.1 399	0.1 3	2.1 10	422	1.7
Mathematics and statistics	0.2 34	0.5 10	1.5 65	3.2 16	0.8 2	0.5 3	2.6 14	63.7 1,543	8.8 42	1,729	7.0
Other specialties	8.9 1,215	13.9 267	11.6 497	22.8 115	25.3 67	10.7 113	12.0 70	9.1 220	28.5 136	2,700	10.9
Percentage	55.4	7.8	17.3	2.0	1.1	2.5	2.2	9.8	1.9		100.0
Total	13,680	1,918	4,271	505	265	605	546	2,422	478	24,690	

Occupation	FIELD OF HIGHEST DEGREE													
	Engineering			Chemistry			Physics			Other Physical Sciences			Hea.th	
	A	N	AF	A	N	AF	A	N	AF	A	N	AF	A	
Engineering:														
Aeronautical and astronautical	5.0	7.7	20.5	0.7	0.5	0.4	1.1	1.0	2.1	0.9	--	0.8	--	-
Chemical	3.9	1.1	0.9	5.8	2.6	2.7	0.4	0.0	0.3	0.5	--	--	0.6	-
Electrical and electronic	26.2	40.3	33.0	1.2	2.0	4.2	9.2	16.[illegible]	22.3	3.3	5.0	5.3	0.6	9
Mechanical	26.6	18.8	11.8	1.4	1.0	--	3.7	0.8	0.7	4.7	2.5	0.8	--	1
Nuclear	0.3	0.2	0.1	0.8	0.3	--	0.7	0.3	--	0.5	--	--	--	1
Other	25.4	23.5	21.7	7.7	13.1	14.4	9.6	16.[illegible]	5.7	19.2	38.5	11.5	2.8	5
Physics and astronautics	1.0	1.2	1.7	2.5	4.8	8.7	58.4	52.9	49.4	6.1	18.0	19.8	1.1	1
Chemistry	0.5	0.1	0.1	64.0	61.5	54.4	0.3	0.3	0.1	3.8	3.1	3.8	11.2	3
Atmospheric and space sciences	0.1	0.1	0.3	0.2	0.2	1.1	1.6	1.0	3.8	22.5	13.0	42.7	--	-
Biology and agriculture	--	0.0	--	0.6	--	1.1	0.1	--	--	0.9	--	--	60.7	3
Social and behavioral sciences	0.0	--	--	--	--	--	0.1	--	--	--	0.6	--	--	-
Mathematics and statistics	0.2	0.2	0.3	0.6	0.7	--	1.7	1.5	1.3	3.3	5.0	0.8	0.6	1
Other specialties	10.8	6.8	9.5	14.5	13.3	12.9	13.2	10.2	13.3	34.3	14.3	14.5	22.5	4
Total	5341	5709	2630	1063	587	263	1353	2204	713	213	161	131	178	
Percentage	54.3	55.3	58.1	10.8	5.7	5.8	13.8	21.3	15.7	2.2	1.6	2.9	1.8	

NICAL MOBILITY (continued)

FIELD OF HIGHEST DEGREE																	
Life Sciences						Social & Behavioral Sciences			Mathematics & Statistics			All Other Fields			Total		
Health-Related			Other														
A	N	AF	A	N	AF	A	N	AF	A	N	AF	A	N	AF	A	N	AF
--	--	--	0.2	--	--	0.6	0.8	--	1.5	0.7	2.5	2.1	0.6	8.6	3.2	4.6	12.7
0.6	--	--	0.5	--	--	--	--	--	0.2	--	0.2	1.1	1.1	0.9	2.9	0.8	0.8
0.6	9.4	3.0	0.5	--	1.4	2.3	2.5	5.2	3.8	5.2	7.2	6.0	9.4	21.6	16.3	26.7	24.5
--	1.9	--	0.2	--	2.7	1.7	0.8	--	2.8	0.5	0.9	14.3	5.0	5.2	15.8	10.9	7.3
--	1.9	--	--	--	--	--	--	--	0.2	0.1	--	0.5	--	--	0.4	0.2	--
2.8	5.7	6.1	3.2	17.4	5.4	5.7	5.1	3.7	15.2	16.4	7.9	19.8	28.3	28.4	18.4	20.3	16.6
1.1	1.9	3.0	0.5	--	--	0.6	--	--	3.6	4.6	2.5	6.0	5.0	3.4	9.5	13.1	10.2
11.2	3.8	9.1	7.1	7.6	18.9	--	--	--	0.2	0.2	0.2	3.8	1.1	1.7	7.9	3.8	3.8
--	--	--	0.5	--	--	3.4	0.8	--	0.1	0.4	1.2	3.8	0.6	0.9	C.9	0.5	2.2
60.7	32.1	63.6	66.5	62.0	45.9	--	0.4	0.7	0.1	0.1	--	4.9	1.1	--	4.3	0.8	1.3
--	--	--	0.9	1.1	2.7	70.9	70.0	81.3	0.1	0.2	--	2.2	2.8	0.9	1.4	1.7	2.5
0.6	1.9	--	0.7	--	--	3.4	2.5	1.5	63.2	63.7	64.9	7.7	8.3	11.2	6.4	7.6	6.9
22.5	41.5	15.2	19.4	12.0	23.0	11.4	16.9	7.5	8.9	7.9	12.5	27.5	36.7	17.2	12.8	9.1	11.1
178	53	33	439	92	74	175	237	134	888	1101	433	182	180	116	9832	10,324	4527
1.8	0.5	0.7	4.5	0.9	1.6	1.8	2.3	3.0	9.0	10.7	9.6	1.9	1.7	2.6	100.0	100.0	100.0

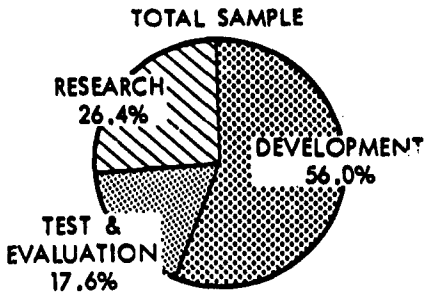
(2)

FUNCTIONAL AREA

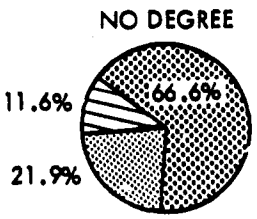
Over half of the S&E personnel are engaged in developmental activities. At least three-quarters of doctorate-level S&Es are engaged in research.

(DISTRIBUTION IN %)

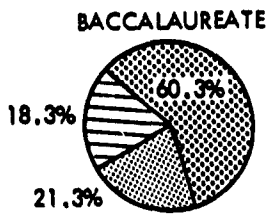
	Army	Navy	Air Force	DoD
Res.	28.1%	28.1%	25.6%	26.4%
Dev.	56.0	53.6	56.7	56.0
T&E	17.6	18.4	17.7	17.6



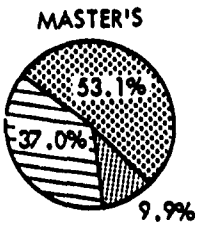
	Army	Navy	Air Force	DoD
Res.	14.3%	7.8%	10.5%	11.6%
Dev.	63.9	66.5	73.3	66.6
T&E	21.8	25.7	16.3	21.9



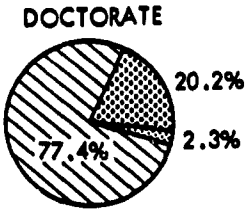
	Army	Navy	Air Force	DoD
Res.	20.6%	17.7%	14.7%	18.3%
Dev.	57.3	60.3	67.1	60.3
T&E	22.1	22.0	18.2	21.3



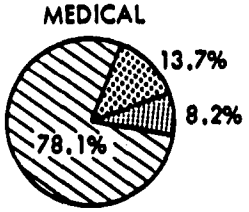
	Army	Navy	Air Force	DoD
Res.	39.3%	34.7%	38.0%	37.0%
Dev.	50.8	56.8	48.5	53.1
T&E	9.9	8.6	13.4	9.9



	Army	Navy	Air Force	DoD
Res.	77.7%	76.7%	78.4%	77.4%
Dev.	19.8	21.2	19.5	20.3
T&E	2.5	2.1	2.1	2.3



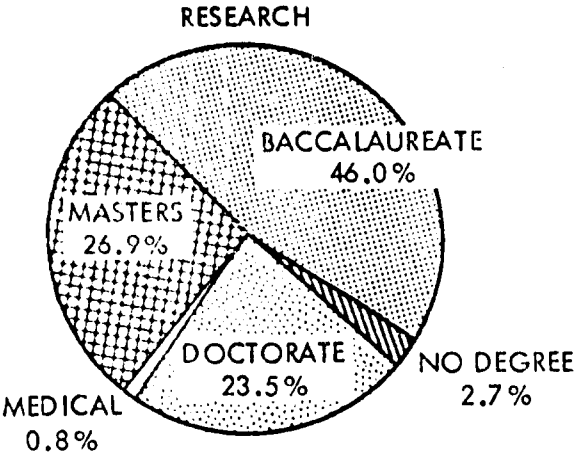
	Army	Navy	Air Force	DoD
Res.	77.1%	88.2%	62.5%	78.1%
Dev.	12.5	11.8	25.0	13.7
T&E	10.4	0.0	12.5	8.2



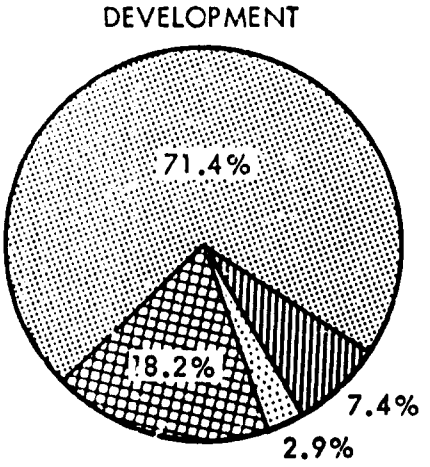
Advanced-degree professionals tend to be the majority of those performing research, from 47.9 percent in the Army to 58.2 percent in the Air Force. No-degree and B.S. professionals dominate the development and test and evaluation functional areas.

(DISTRIBUTION IN %)

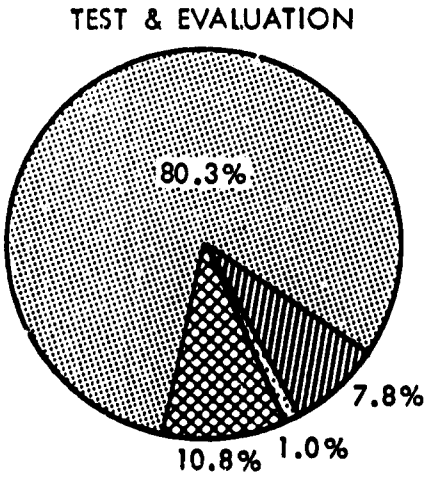
	Army	Navy	Air Force	DoD
No degree	5.1%	1.4%	3.0%	2.7%
B.S.	49.1	45.8	38.8	46.0
M.S.	24.0	28.8	29.6	26.9
Ph.D.	21.7	23.5	28.2	23.5
Medical	1.2	0.5	0.4	0.8



	Army	Navy	Air Force	DoD
No degree	9.0%	5.5%	8.6%	7.4%
B.S.	71.7	70.3	72.9	71.4
M.S.	16.3	21.2	15.5	18.2
Ph.D.	2.9	2.9	2.9	2.9
Medical	0.1	0.1	0.1	0.1

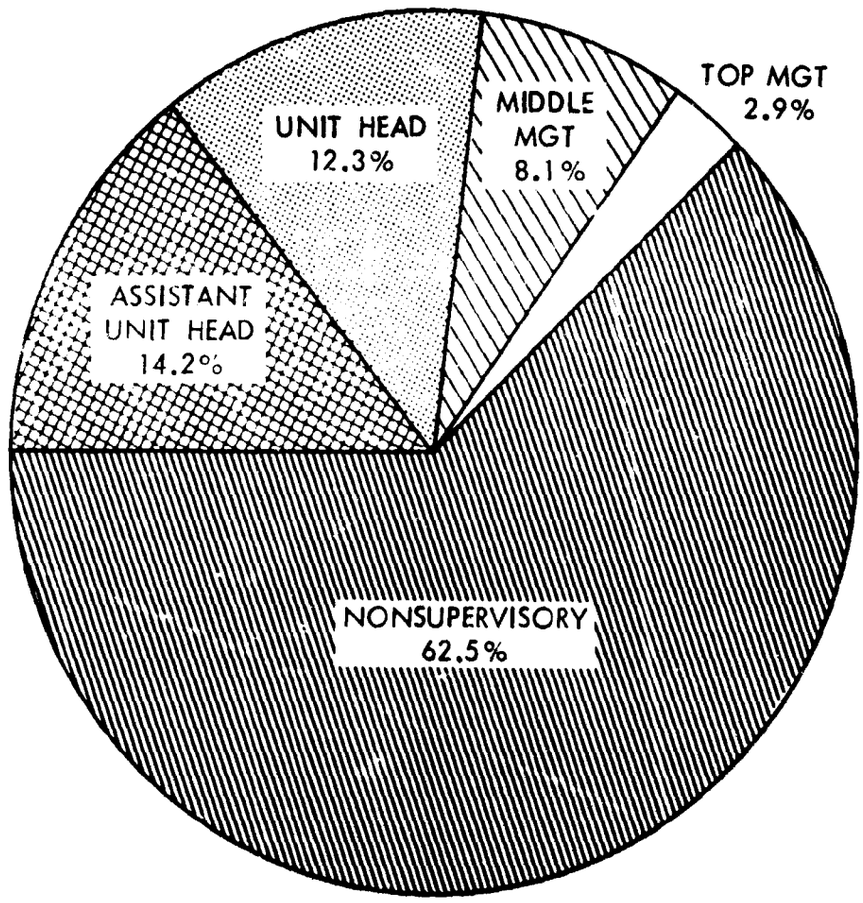


	Army	Navy	Air Force	DoD
No degree	9.0%	6.7%	7.3%	7.8%
B.S.	80.5	82.1	75.2	80.3
M.S.	9.2	10.2	16.2	10.8
Ph.D.	1.1	0.9	1.2	1.0
Medical	0.3	0.0	0.1	0.1



SUPERVISORY LEVELS

The Army has the highest percentage of supervisory personnel (42.2 percent), and the Navy, the lowest (33.7 percent). The Army exceeds the other Services in each level of supervision.

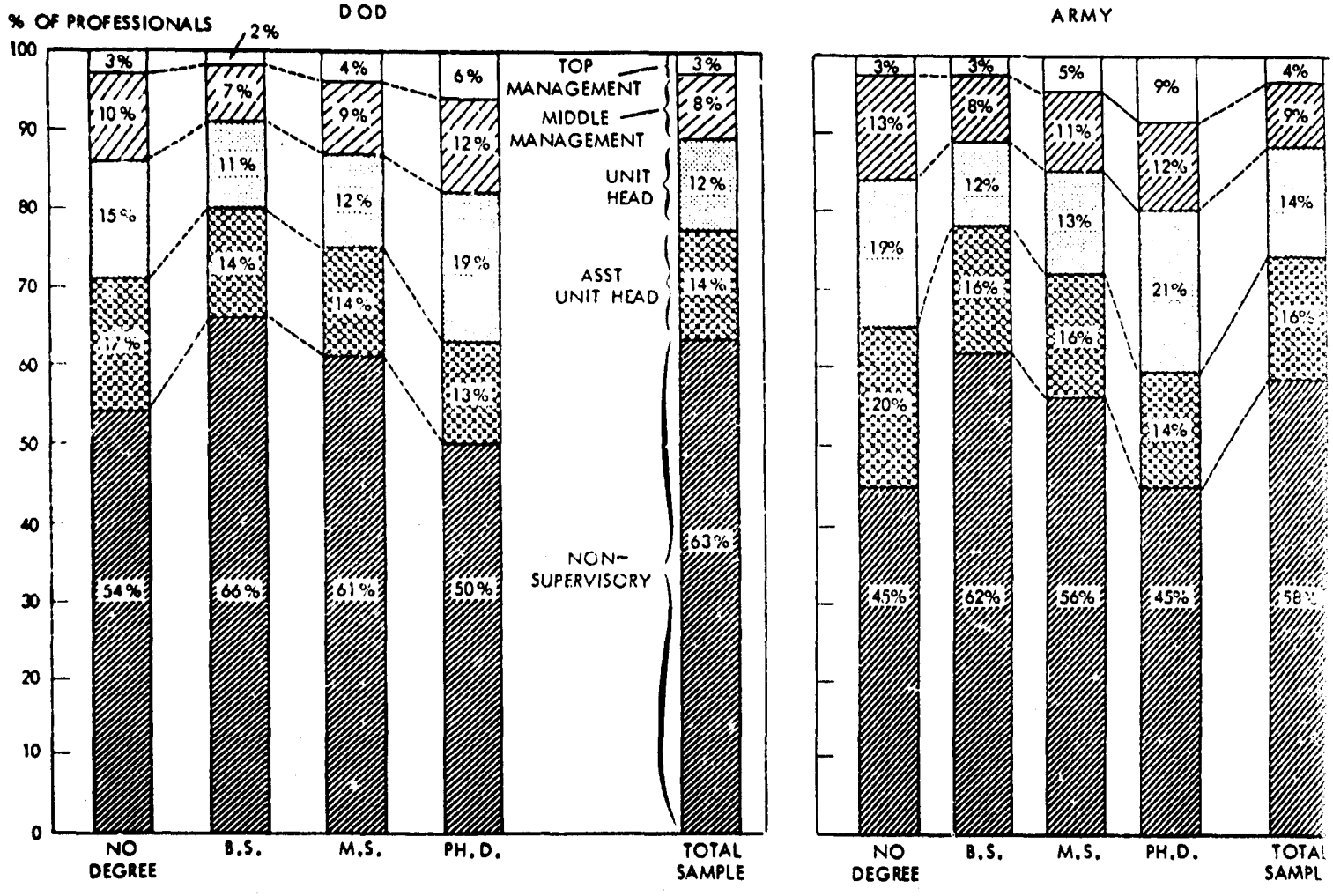


Level of Supervision	Army	Navy	Air Force	DoD
Nonsupervisory	57.8	66.3	64.2	62.5
Assistant Unit Head	15.7	13.0	13.7	14.2
Unit Head	13.7	11.1	11.6	12.3
Middle Management	9.0	7.8	7.0	8.1
Top Management	3.7	1.8	3.5	2.9

Notes: Assistant unit head--primarily technical supervision.
Unit head--lowest level for hire/fire recommendation and preparation of performance ratings, etc.
Middle management--administration and direction of several units.
Top management--staff and policy-making personnel.

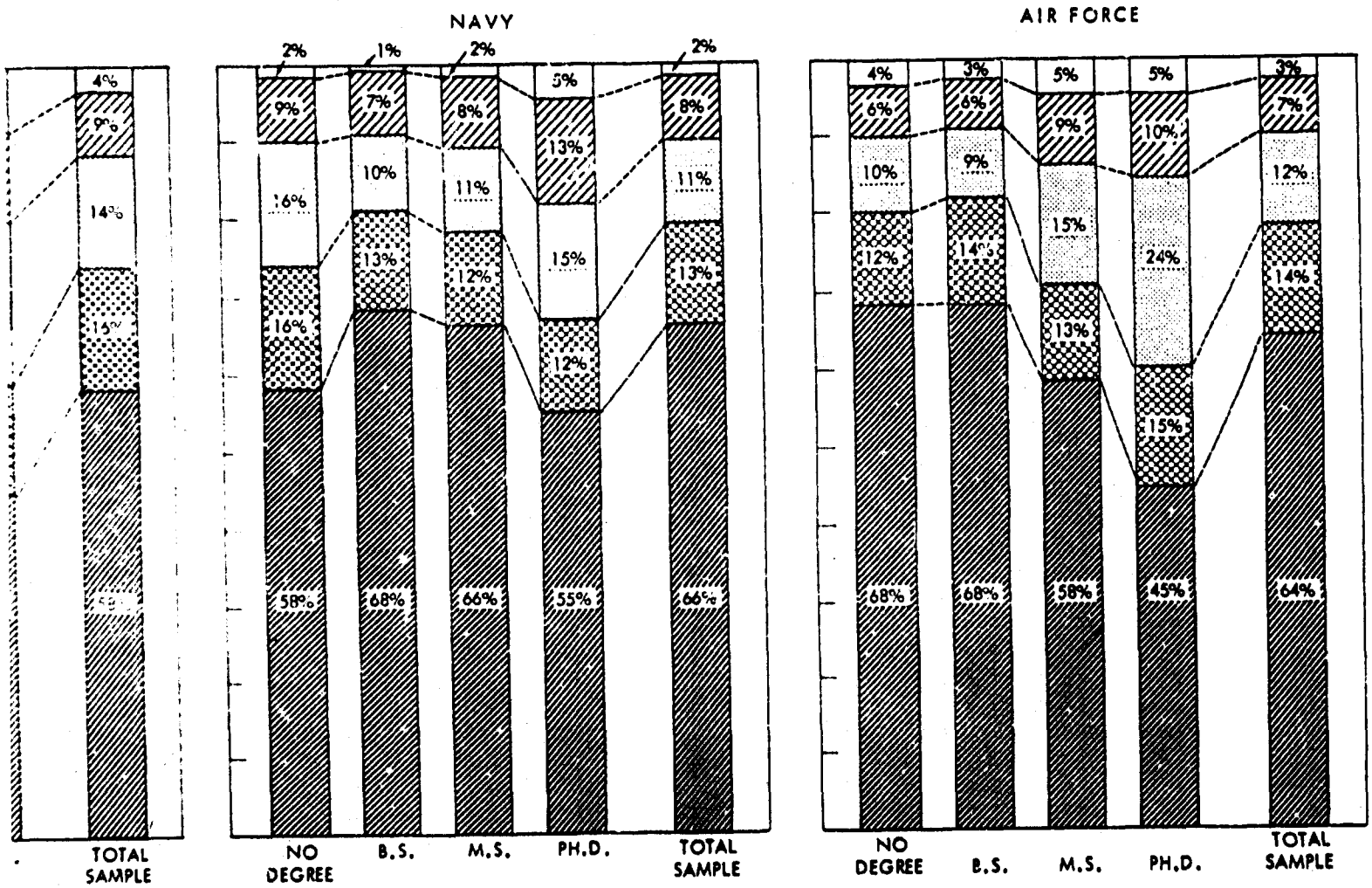
SUPERVISORY

There are significant differences in supervi-
professionals at the doctorate level in the Army,
of those with doctorates hold supervisory positio
Force's doctorate personnel are supervisors.



SUPERVISORY LEVELS (continued)

ces in supervisory levels with regard to degree. Of the no-degree
l in the Army, 55 percent are supervisors. In the Navy, 45 percent
visory positions. As in the case of theArmy, 55 percent of the Air
rvisors.

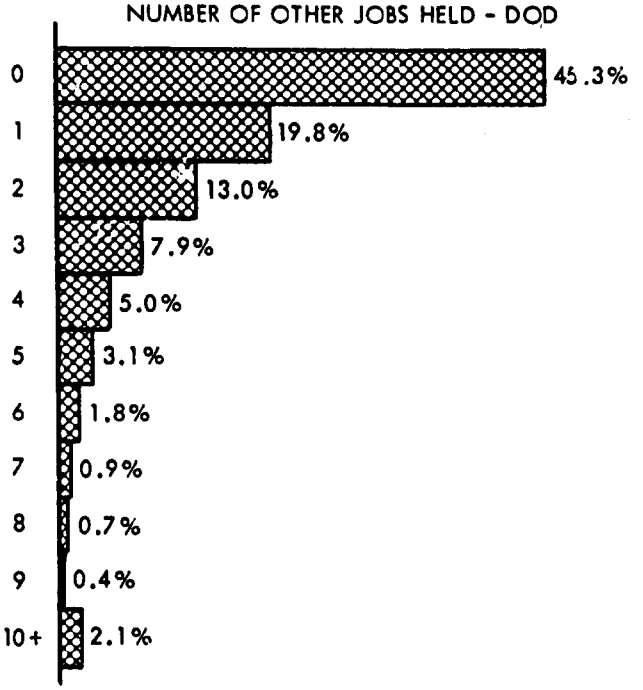


2

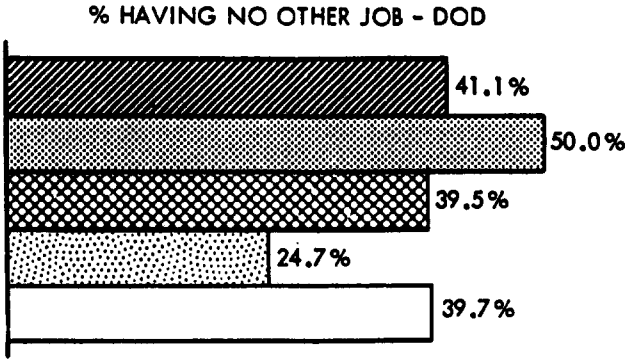
JOB MOBILITY

Almost half of the S&Es in the survey have worked for no employer other than their current DoD component or activity. This ranged from the Army's 37.5 percent to the Navy's 53.0 percent. The Army subset shows the greatest m obility; 52.3 percent of its professionals have had two or more jobs. This is significantly greater than the Navy and the Air Force, in which 27.1 percent and 33.6 percent, respectively, have held two or more j obs.

Army	Navy	Air Force
37.5%	53.0%	45.5%
19.3	19.7	20.8
13.9	11.7	13.7
9.6	6.5	7.2
6.3	3.7	4.7
4.4	1.9	2.8
2.6	1.1	1.5
1.4	0.5	0.9
1.1	0.4	0.5
0.8	0.2	0.2
3.2	1.1	2.1

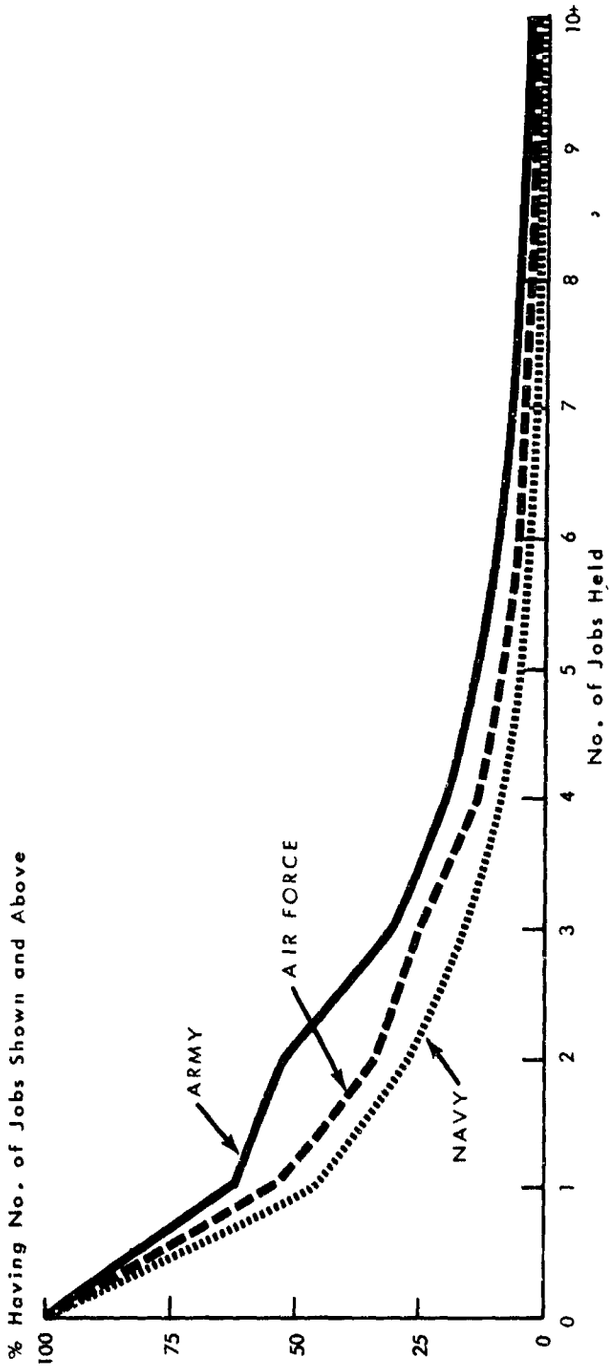


Army	Navy	Air Force	DEGREE LEVEL
33.6	48.6	47.7	NO DEGREE
41.5	58.2	50.2	BACCALAUREATE
30.1	46.7	40.1	MASTER'S
22.6	29.0	20.5	DOCTORATE
37.5	35.3	*	MEDICAL



* Less than 13 Professionals

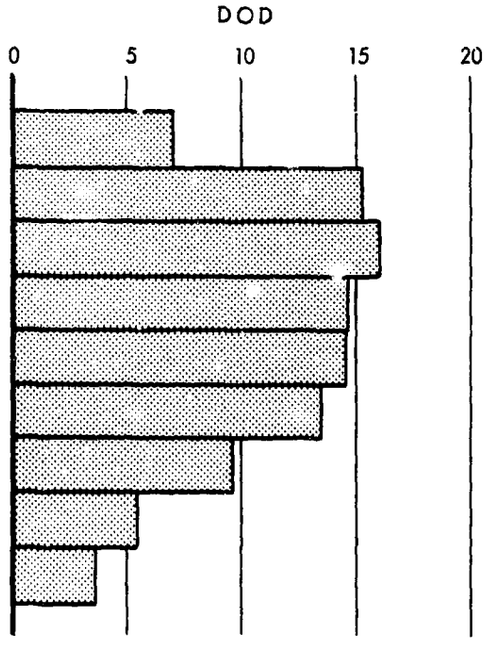
JOB MOBILITY (continued)



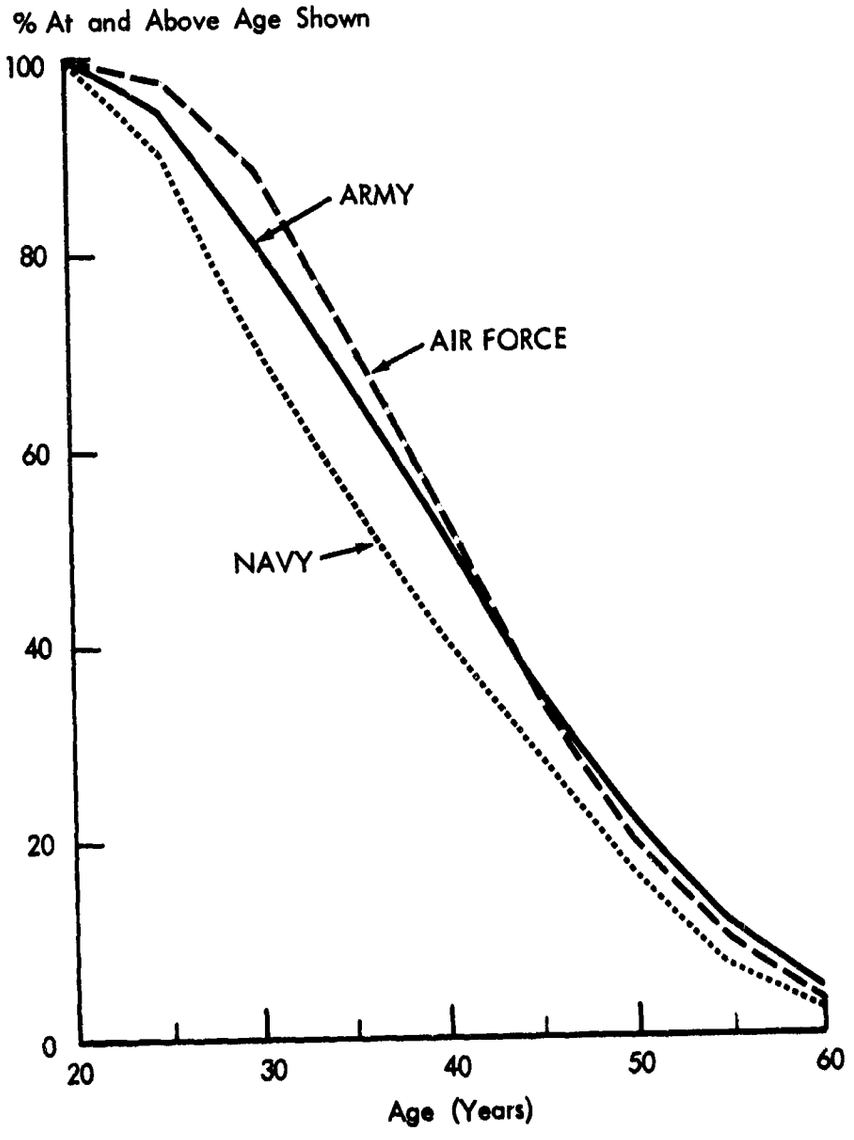
AGE

Of the S&Es surveyed, 53 percent are below age 40, and 9.3 percent are 55 or older. The Navy has the youngest population, with 59.3 percent at and below age 40. Its median age is 37 years, while the Army's is 40 years and the Air Force's is 41.

Army	Navy	Air Force	AGE GROUP (Years)	%
5.4%	10.2%	3.8%	20 - 24	7.1
13.0	19.2	11.0	25 - 29	15.2
15.8	15.5	17.2	30 - 34	16.0
13.9	14.0	18.2	35 - 39	14.7
16.2	12.8	14.9	40 - 44	14.6
14.1	12.1	14.8	45 - 49	13.4
10.4	8.8	10.5	50 - 54	9.7
6.5	4.8	5.6	55 - 59	5.6
4.8	2.6	3.9	60+	3.7



AGE (continued)

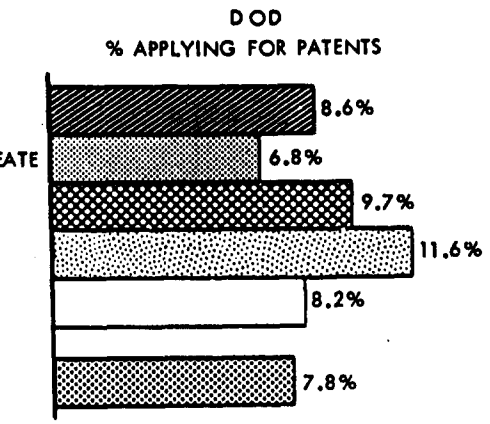


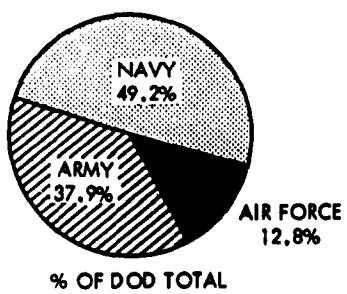
PATENT APPLICATIONS

Holders of advanced degrees are more likely to apply for patents than baccalaureate-degree holders. The Navy, with 41.1 percent of the survey sample, has applied for 48.6 percent of the survey's patent applications. The Air Force, with 18.5 percent of the survey, applied for only 11.7 percent of the survey's patent applications.

(DISTRIBUTION IN %)

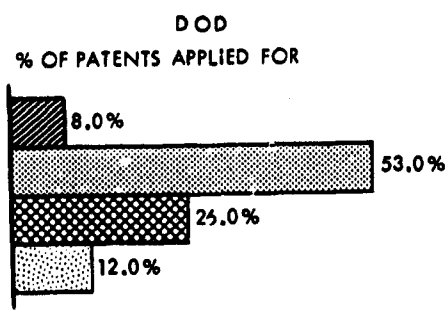
Army	Navy	Air Force	DEGREE LEVEL
7.2	11.6	7.6	NO DEGREE
5.9	8.5	3.8	BACCALAUREATE
9.8	11.6	6.8	MASTER'S
10.8	11.4	10.4	DOCTORATE
6.3	17.6	0.0	MEDICAL
7.4	9.6	5.2	TOTAL

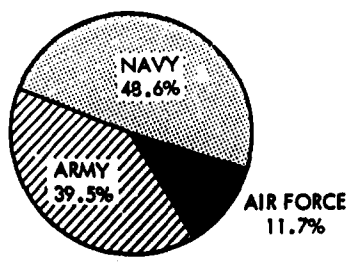




% OF DOD TOTAL

Army	Navy	Air Force	DEGREE LEVEL
9.1	7.4	9.3	NO DEGREE
50.9	53.6	52.7	BACCALAUREATE
27.5	26.7	20.9	MASTER'S
12.5	11.3	17.1	DOCTORATE



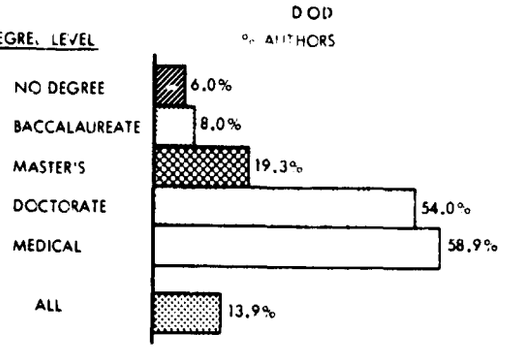


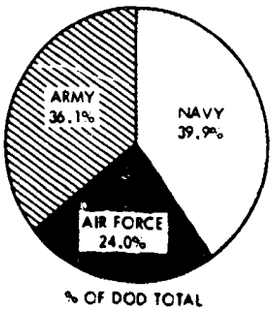
% OF DOD TOTAL

PAPERS PUBLISHED

Of the Defense S&E personnel surveyed, 13.9 percent were authors of at least one published paper. The range was from 12.4 percent for the Army to 18.2 percent for the Air Force. In all cases, doctorate professionals published more papers than all others. Relative to its sample size, the Air Force tends to publish more than the other two Departments.

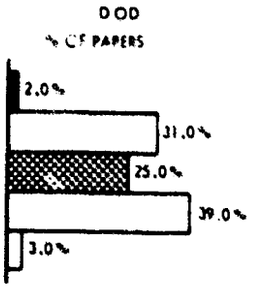
Army	Navy	Air Force	DEGREE LEVEL
6.3	5.6	6.1	NO DEGREE
7.4	7.9	9.8	BACCALAUREATE
16.3	17.4	27.7	MASTER'S
50.2	51.2	67.3	DOCTORATE
58.6	52.8	75.0	MEDICAL
12.4	13.4	18.2	ALL

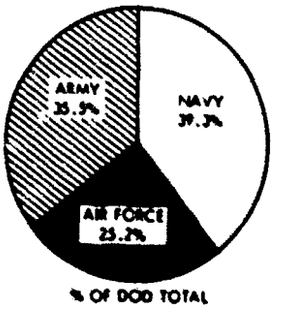




% OF DOD TOTAL

Army	Navy	Air Force	DEGREE LEVEL
4.1	1.3	1.6	NO DEGREE
32.5	33.2	26.4	BACCALAUREATE
22.2	25.3	28.2	MASTER'S
36.8	39.0	39.7	DOCTORATE
4.2	1.2	5.1	MEDICAL



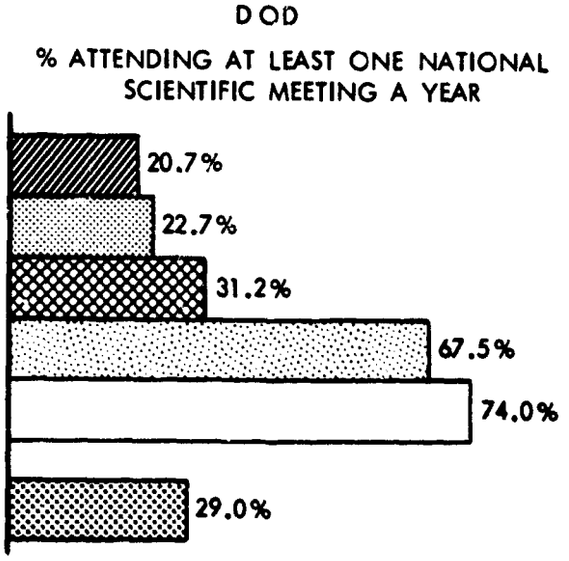


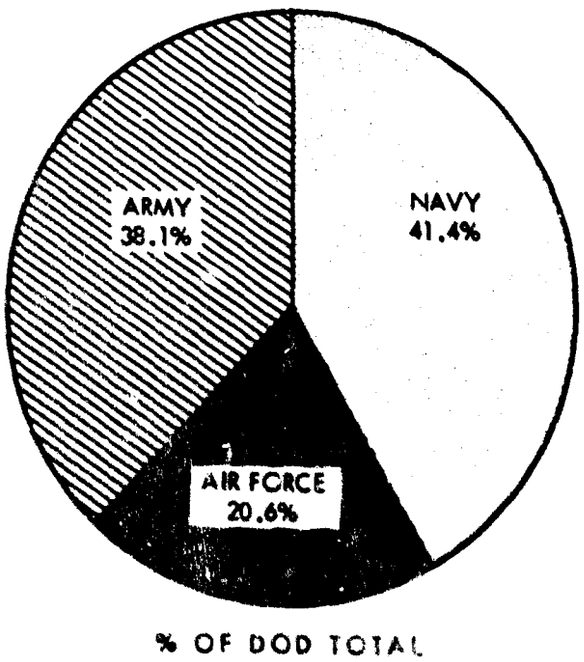
% OF DOD TOTAL

ATTENDANCE AT NATIONAL SCIENTIFIC MEETINGS

About one scientist or engineer in four attends a national meeting of a technical or scientific society each year. Two out of every three holders of doctorates attend such meetings. The Air Force is above the DoD average in attendance, and the Army is the lowest. This appears to correlate closely with papers published.

Army	Navy	Air Force	DEGREE LEVEL
21.9	19.8	19.5	NO DEGREE
21.8	23.2	23.7	BACCALAUREATE
34.1	36.4	44.6	MASTER'S
64.2	67.3	75.1	DOCTORATE
67.1	88.5	87.7	MEDICAL
27.5	29.3	32.1	ALL





% OF DOD TOTAL

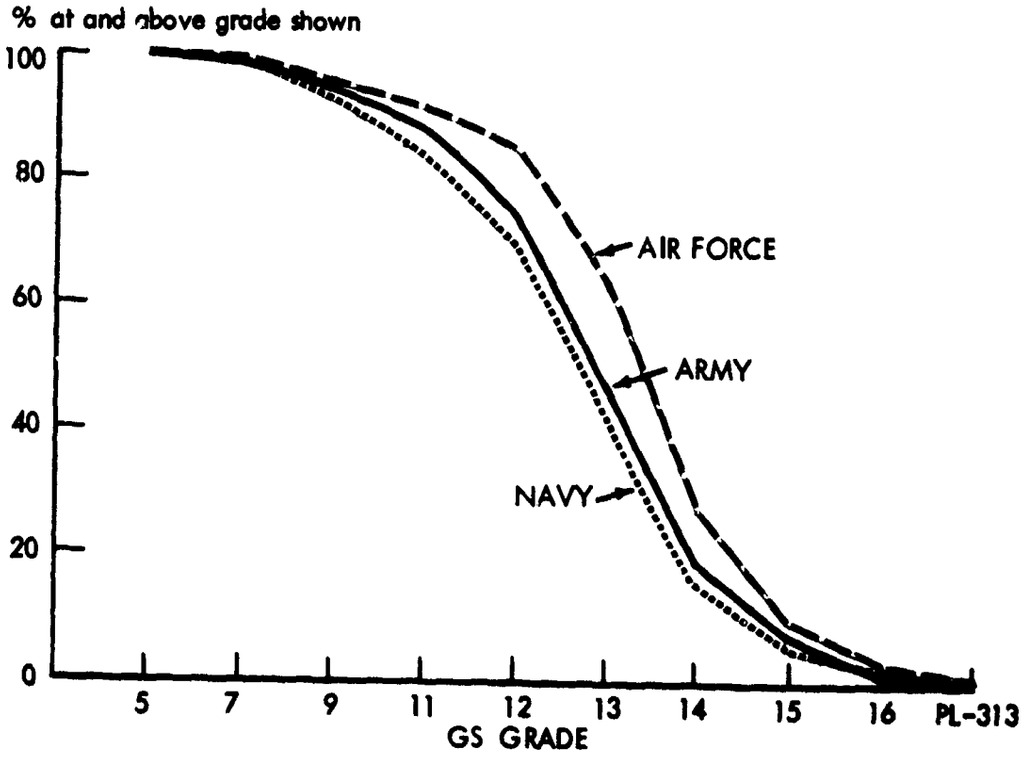
GRADE DISTRIBUTIONS

Overall, more than 50 percent of the survey sample is at or below grade GS-12. Over half are GS-12s and GS-13s; about one-fifth are at GS-14 and above. The Air Force has the highest grade level, with 63.3 percent at and above GS-13, compared to the Army and the Navy with 47.3 percent and 41.7 percent, respectively.

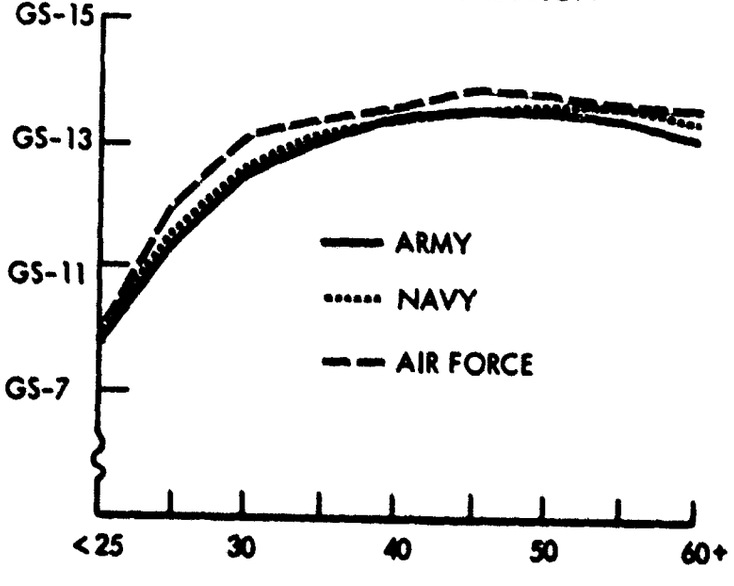
Army	Navy	Air Force	GRADE	%
1.4	0.8	0.8	GS-5	1.0
4.2	6.9	3.5	GS-7	5.2
6.8	8.4	4.1	GS-9	7.0
14.1	15.4	6.8	GS-11	13.3
26.3	26.7	21.6	GS-12	25.6
27.6	26.1	36.9	GS-13	28.7
13.0	10.2	17.1	GS-14	12.6
5.7	4.1	7.2	GS-15	5.3
0.4	0.8	1.2	GS-16	0.7
0.6	0.5	0.9	PL + GS-17, 18	0.6

GRADE DISTRIBUTIONS (continued)

CUMULATIVE GRADE DISTRIBUTION



AGE-GRADE DISTRIBUTION



GRADE—DEGREE LEVEL

Over 50 percent of the PL-313s have doctorates, and more t
At and above GS-15, over 40 percent have advanced degrees. The
with rising grade level. B.S.-degree holders show an opposite
degrees were evenly distributed over practically the whole age

ARMY					NAVY					AIR FORCE				
None	BS	MS	Ph.D.	Med.	None	BS	MS	Ph.D.	Med.	None	BS	MS	Ph.D.	Med.
5.0	15.0	15.0	53.3	11.7	–	22.9	16.7	53.0	8.3	–	23.9	4.3	71.7	–
–	41.0	20.5	33.3	5.1	3.4	26.4	24.1	43.7	2.3	1.7	28.3	36.7	31.7	1.7
4.0	50.2	21.4	22.8	1.7	2.2	42.2	26.7	28.4	0.4	3.7	41.3	27.5	26.1	1.4
8.7	54.9	21.1	14.9	0.4	4.6	51.0	26.3	18.0	0.1	7.0	51.2	25.0	16.6	0.2
9.5	63.0	18.5	8.5	0.4	5.2	62.1	23.0	9.6	0.1	7.3	66.5	19.9	6.3	–
9.3	69.1	15.4	6.0	0.1	6.1	67.7	20.4	5.7	0.1	10.2	73.9	12.7	3.1	–
6.0	73.9	18.1	1.8	0.3	5.6	70.7	22.9	0.8	0.1	4.2	73.4	22.1	0.3	–
3.1	81.7	15.0	0.1	–	1.6	76.7	21.3	0.2	0.1	5.5	79.4	14.6	0.5	–
1.3	91.5	7.0	–	0.2	1.2	93.4	5.4	–	–	0.6	95.3	4.1	–	–
–	98.7	–	–	1.3	1.1	97.8	1.1	–	–	8.1	89.2	2.7	–	–

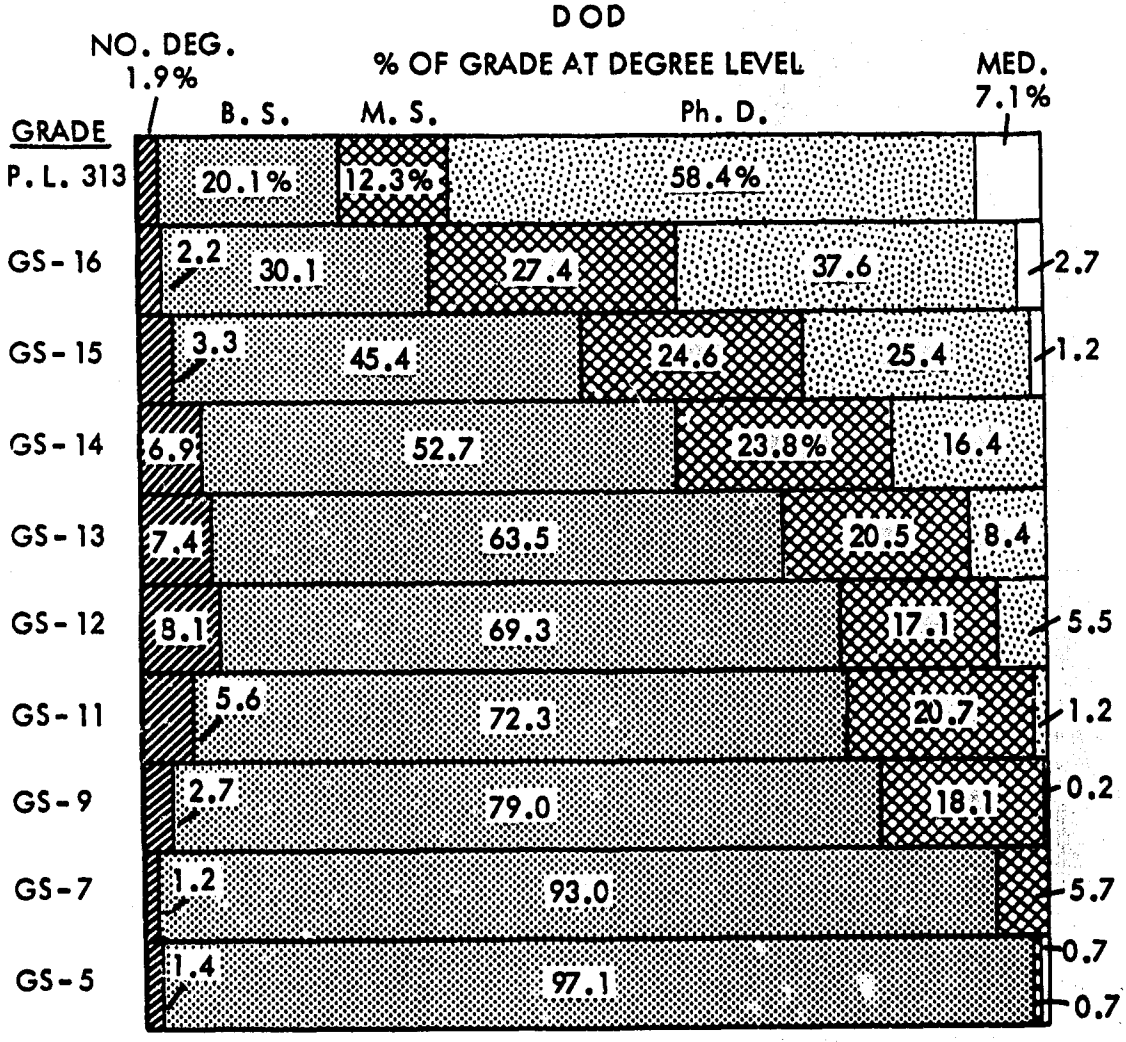
GRADE—DEGREE LEVEL

3s have doctorates, and more than 75 percent have advanced degrees.
nt have advanced degrees. The percentages of doctorates increases
gree holders show an opposite trend, while holders of Master's
ver practically the whole age spectrum.

AIR FORCE

	BS	MS	Ph.D.	Med.
	23.9	4.3	71.7	–
7	28.3	36.7	31.7	1.7
7	41.3	27.5	26.1	1.4
)	51.2	25.0	16.6	0.2
3	66.5	19.9	6.3	–
2	73.9	12.7	3.1	–
2	73.4	22.1	0.3	–
5	79.4	14.6	0.5	–
6	95.3	4.1	–	–
	89.2	2.7	–	–

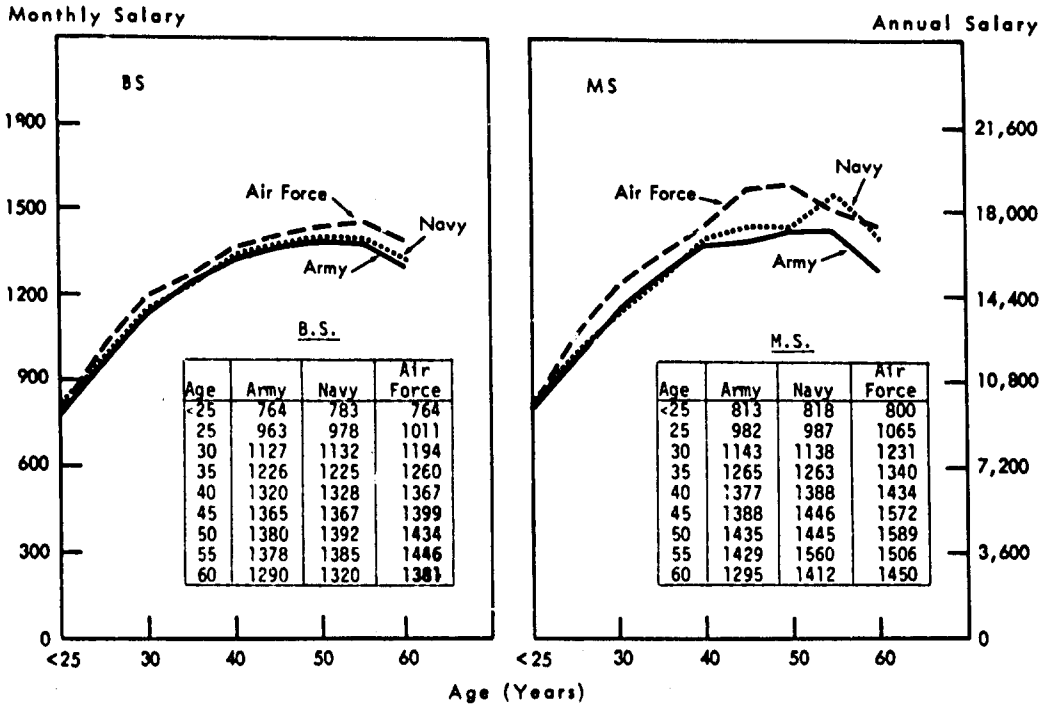
DOD



(2)

MEDIAN SALARIES

The median salary of personnel with M.S. degrees is 6.5 percent greater than that of holders of B.S. degrees. The salaries of Ph.D.'s exceed B.S. salaries by 23.5 percent. Salaries increase with age at least up to 50 years. The Air Force pays higher salaries at all degree levels and in practically all age groups.

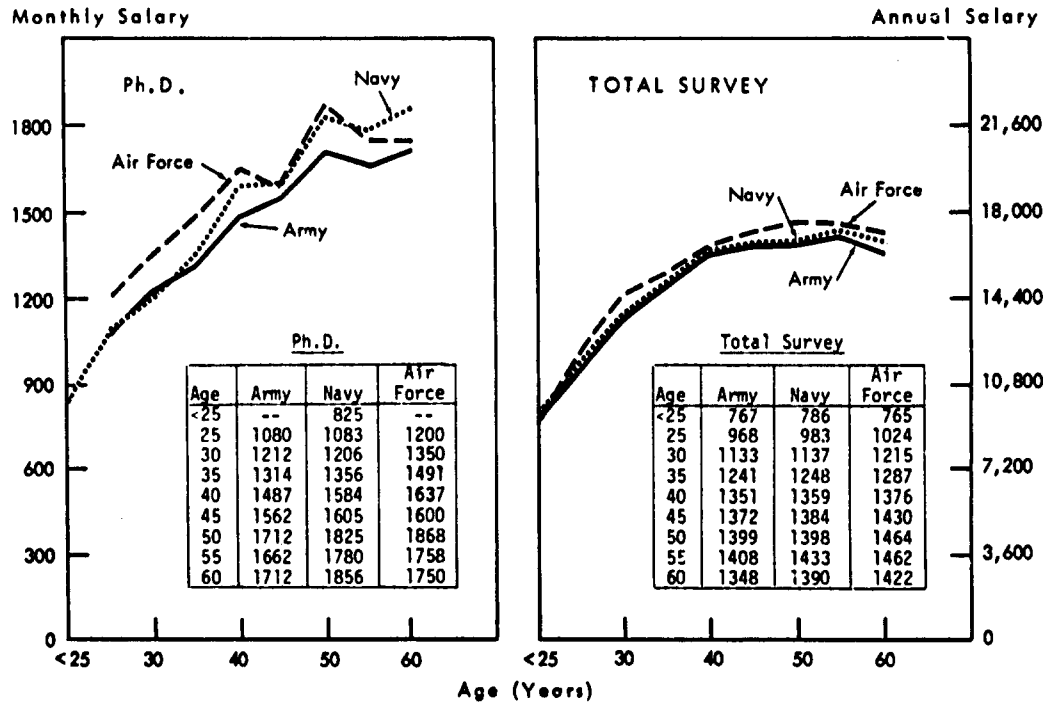


B.S.

Age	Army	Navy	Air Force
<25	764	783	764
25	963	978	1011
30	1127	1132	1194
35	1226	1225	1260
40	1320	1328	1367
45	1365	1367	1399
50	1380	1392	1434
55	1378	1385	1446
60	1290	1320	1381

M.S.

Age	Army	Navy	Air Force
<25	813	818	800
25	982	987	1065
30	1143	1138	1231
35	1265	1263	1340
40	1377	1388	1434
45	1388	1446	1572
50	1435	1445	1589
55	1429	1560	1506
60	1295	1412	1450



Ph.D.

Age	Army	Navy	Air Force
<25	--	825	--
25	1080	1083	1200
30	1212	1206	1350
35	1314	1356	1491
40	1487	1584	1637
45	1562	1605	1600
50	1712	1825	1868
55	1662	1780	1758
60	1712	1856	1750

Total Survey

Age	Army	Navy	Air Force
<25	767	786	765
25	968	983	1024
30	1133	1137	1215
35	1241	1248	1287
40	1351	1359	1376
45	1372	1384	1430
50	1399	1398	1464
55	1408	1433	1462
60	1348	1390	1422

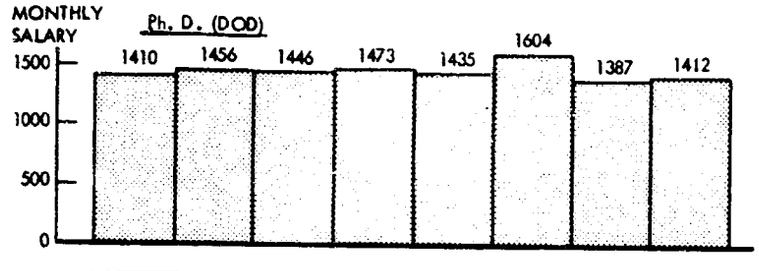
MEDIAN SALARIES (continued)

B.S. and M.S. degrees—Engineers receive higher salaries in the Army and the Air Force than people in other disciplines. In the Navy, chemists get the highest compensation.

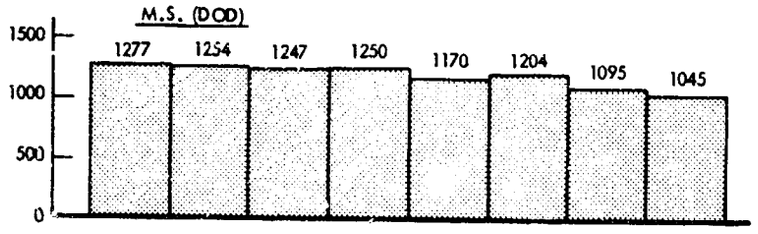
Ph.D. degrees—Mathematicians receive the highest median salary of all disciplines compared.

The higher the degree level, the higher the median salary is in all disciplines compared.

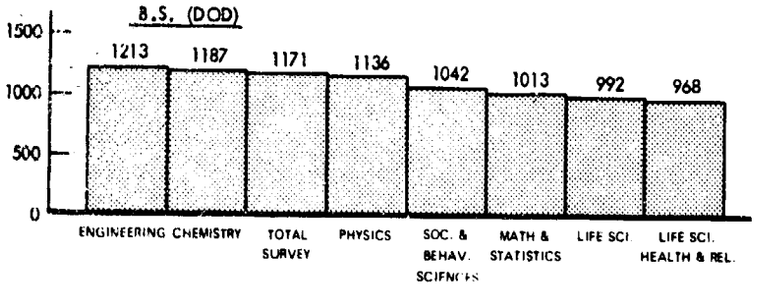
MEDIAN SALARY FOR VARIOUS DISCIPLINES
DOD CIVILIAN PROFESSIONALS



Army	1358	1415	1408	1412	1475	1591	1359	1385
Navy	1406	1414	1424	1450	1362	1602	1393	1450
Air Force	1490	1556	1550	1556	1456	1650	1512	1525



Army	1320	1238	1262	1246	1145	1283	1056	1041
Navy	1210	1253	1202	1214	1162	1139	1125	1162
Air Force	1376	1292	1354	1360	1187	1280	1150	1025



Army	1215	1159	1172	1130	1103	1059	990	945
Navy	1153	1219	1137	1127	991	980	975	1025
Air Force	1288	1240	1251	1200	1187	1067	1025	775