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ABSTRACT

Provided in this document are full-page charts (with accompanying text) for use in a basic presentation on present and projected career and employment opportunities in the various fields of science and engineering. The material is designed for college students and individuals planning to re-enter the labor market in science or engineering, as well as for policy makers, science teachers, placement specialists, counselors, and other advisors of students. The charts, which may be photocopied as transparencies or handouts or photographed for slides, are organized into four major sections; supply of scientists and engineers (6 charts); demand for scientists and engineers (13 charts); future supply of and demand for scientists and engineers (12 charts); and summary and conclusions (5 charts). In addition, 22 data tables are included in an appendix. Although the information included in the charts emphasizes the growing participation of and opportunities for women in science and engineering fields, it is equally relevant for mixed groups. Any segments may be omitted as desired by a speaker, to fit particular audiences, and additional information may be added in any field by utilizing the appendix tables. (JN)

OPPORTUNITIES IN SCIENCE AND ENGINEERING

A Chartbook Presentation

SMC

SCIENTIFIC MANPOWER COMMISSION

1776 Massachusetts Avenue, N.W.,

Washington, D.C. 20036

November, 1982

The Scientific Manpower Commission, A Participating Organization of the American Association for the Advancement of Science, is a nonprofit corporation whose Commissioners represent its sponsoring scientific societies.

The Commission is charged with the collection, analysis and dissemination of reliable information pertaining to the manpower resources of the United States in the fields of science and technology; promotion of the best possible programs of education and training for potential scientists, engineers and technicians; and the development of policies of utilization of scientific and technological manpower by educational institutions, industry and government for optimum benefit to the nation.

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OPPORTUNITIES IN SCIENCE AND ENGINEERING

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by

Betty M. Vetter

EXECUTIVE DIRECTOR

SCIENTIFIC MANPOWER COMMISSION

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TABLE OF CONTENTS

FOREWORD

THIS PRESENTATION GREW OUT OF A PILOT PROJECT CARRIED OUT BY THE AUTHOR IN 1978 UNDER A GRANT FROM NATIONAL SCIENCE FOUNDATION (GRANT NO. SPI-79-13025). SPECIAL THANKS ARE EXTENDED TO THE NSF AND TO THE ADVISORY COMMITTEE FOR THAT PILOT PROJECT WHICH RECOMMENDED UPDATING OF THOSE MATERIALS AND SOME CHANGES IN FORMAT AS A RESULT OF THE QUESTIONNAIRES RETURNED BY USERS OF THAT PROJECT. THAT COMMITTEE WAS MADE UP OF SHIRLEY MALCOM (CHAIRMAN), ANNE BRISCOE, ALMA LANTZ, RICHARD WILCOX AND BEVERLY PORTER. M. JOAN CALLANAN, PROGRAM OFFICER FROM THE NATIONAL SCIENCE FOUNDATION, WAS PARTICULARLY HELPFUL ON BOTH THE PILOT PROJECT AND THIS ONE.

SPECIAL THANKS ALSO ARE EXTENDED TO SALLY YOCHELSON AND TIM BABCO WHO TYPED THE APPENDIX TABLES, AND TO THE STAFF OF THE SCIENTIFIC MANPOWER COMMISSION.

BETTY M. VETTER

INTRODUCTION

THIS UNCOPYRIGHTED CHARTBOOK IS DESIGNED TO PROVIDE CHARTS (WITH BACKUP TABLES) AND TEXT FOR A BASIC PRESENTATION ON PRESENT AND PROJECTED CAREER AND EMPLOYMENT OPPORTUNITIES IN THE VARIOUS FIELDS OF SCIENCE AND ENGINEERING. IT MAY BE USED BY INDIVIDUALS OR PRESENTED TO GROUPS BY PHOTOCOPYING THE CHARTS AS TRANSPARENCIES OR HANDOUTS, OR PHOTOGRAPHING FOR SLIDES. ALTHOUGH THE INFORMATION INCLUDED EMPHASIZES THE GROWING PARTICIPATION OF AND OPPORTUNITIES FOR WOMEN IN THESE FIELDS, IT IS EQUALLY RELEVANT FOR MIXED GROUPS. ANY SEGMENTS MAY BE OMITTED AS DESIRED BY A SPEAKER, TO FIT PARTICULAR AUDIENCES, AND ADDITIONAL INFORMATION MAY BE ADDED IN ANY FIELDS BY UTILIZING THE APPENDIX TABLES.

THIS PRESENTATION IS DESIGNED FOR COLLEGE STUDENTS AND INDIVIDUALS PLANNING TO RE-ENTER THE LABOR MARKET IN SCIENCE OR ENGINEERING, AS WELL AS FOR POLICY MAKERS, SCIENCE TEACHERS, PLACEMENT SPECIALISTS, COUNSELORS AND OTHER ADVISORS OF STUDENTS. ADAPTATION FOR OTHER AUDIENCES IS ENCOURAGED.

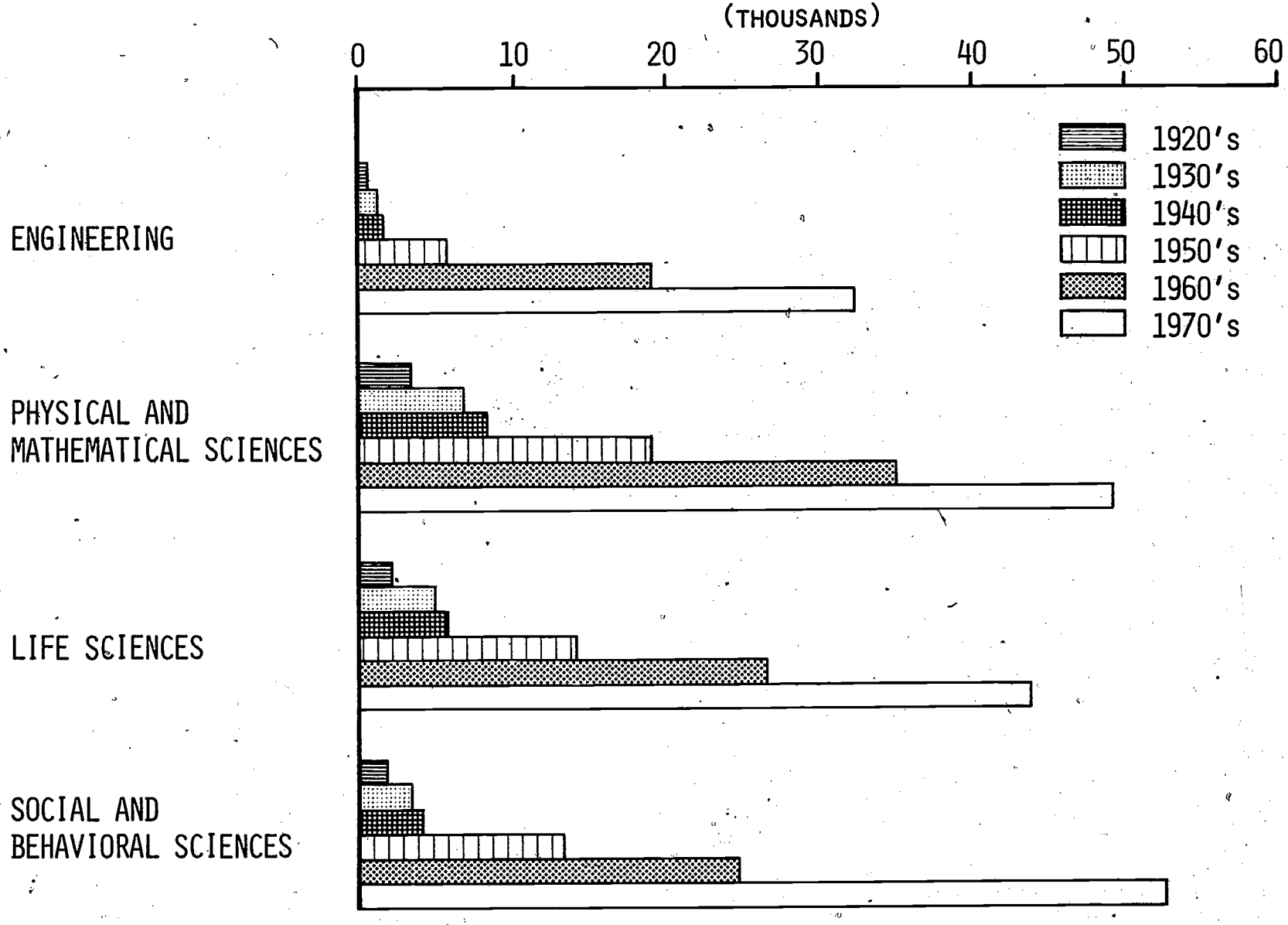
MATERIALS FOR OTHER AUDIENCES ALSO ARE AVAILABLE. IN CONJUNCTION WITH THE SCIENTIFIC MANPOWER COMMISSION AND OTHERS, A SERIES OF CHARTBOOK PRESENTATIONS IS BEING DEVELOPED BY THE ELECTRONIC INDUSTRIES ASSOCIATION TO PROVIDE PRESENTATIONS FOR ELEMENTARY, HIGH SCHOOL AND TWO-YEAR COLLEGE STUDENTS, INTERESTED LAYPERSONS AND OTHERS, OUTLINING THE NEED FOR MORE TECHNOLOGICALLY TRAINED WORKERS OVER THE COMING DECADE, AND ENCOURAGING STUDENTS TO STUDY MATH AND SCIENCE THROUGHOUT THEIR HIGH SCHOOL YEARS, SO THAT THEY DO NOT SHUT DOORS TO THE MANY TECHNOLOGICAL CAREERS THAT WILL BE AVAILABLE TO THEM IN THE FUTURE. FURTHER INFORMATION ON THIS SERIES IS AVAILABLE FROM THE ELECTRONIC INDUSTRIES ASSOCIATION, 2001 EYE ST., N.W., WASHINGTON,D.C. 20006.

FOR STUDENTS AT THE ELEMENTARY AND JUNIOR HIGH SCHOOL LEVELS, A SET OF CAREER ORIENTED MODULES TO EXPLORE TOPICS IN SCIENCE (COMETS) ENCOURAGES SCIENCE CAREER INTEREST AMONG BOTH GIRLS AND BOYS, URGING THEM TO TAKE ELECTIVE MATH AND SCIENCE COURSES TO OPEN UP, BUT NOT FORCE SUCH A CHOICE. COMETS SCIENCE PROVIDES 450 PAGES OF DESCRIPTIONS OF SCIENCE CLASSROOM ACTIVITIES FOR USE BY RESOURCE PEOPLE INCLUDING TEACHERS; AND COMETS PROFILES INCLUDES 24 BIOGRAPHICAL SKETCHES OF WOMEN IN SCIENCE CAREERS WRITTEN FOR THE EARLY ADOLESCENT READER.

FURTHER INFORMATION ON THIS SERIES IS AVAILABLE FROM WALTER S. SMITH, COMETS DIRECTOR, 205 BAILEY HALL, UNIVERSITY OF KANSAS, LAWRENCE, KS 66045.

FOR GRADES 4-9, EXPLORING CAREERS IN SCIENCE AND ENGINEERING INCLUDES POSTERS, A SLIDE-TAPE PRESENTATION, TRANSPARENCIES, STUDENT ACTIVITIES, WORKSHEETS AND PUZZLES PLUS RESOURCE MATERIALS FOR THE TEACHER. FURTHER INFORMATION IS AVAILABLE FROM IRIS R. WEISS, PROJECT DIRECTOR, RESEARCH TRIANGLE INSTITUTE, P.O. BOX 12194, RESEARCH TRIANGLE PARK, NC, 27709.

DOCTORATE DEGREES AWARDED, 1920's - 1970's



SOURCE: NATIONAL RESEARCH COUNCIL

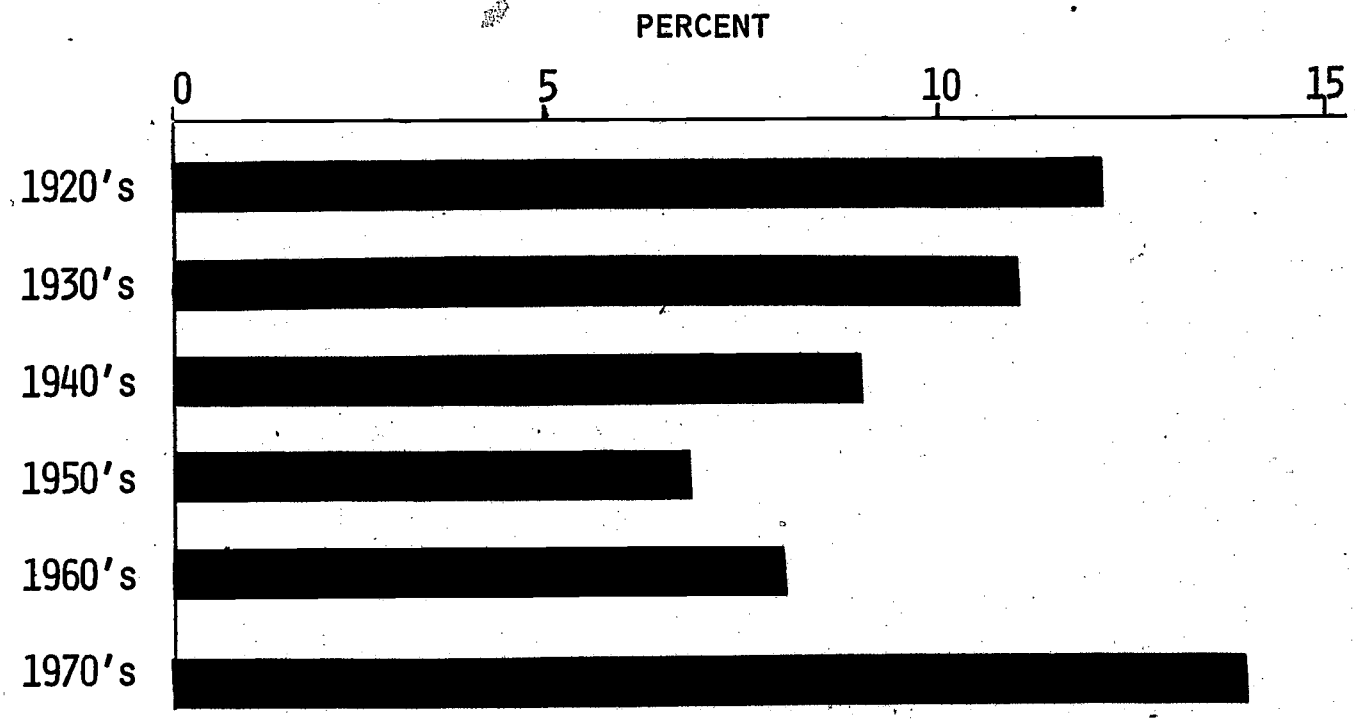
IT IS PROBABLY TRUE THAT ABOUT 90% OF ALL SCIENTISTS AND ENGINEERS EVER BORN ARE ALIVE TODAY - PARTICULARLY IN THE UNITED STATES.

MORE DOCTORATE DEGREES IN SCIENCE AND ENGINEERING WERE AWARDED IN THE 1950'S THAN HAD BEEN EARNED IN THE THREE PRECEDING DECADES. THE NUMBER DOUBLED AGAIN IN THE SIXTIES, AND GREW ANOTHER 67 PERCENT IN THE SEVENTIES.

SOME FIELDS GREW FASTER THAN OTHERS. THE GREATEST GROWTH IN THE PHYSICAL AND MATH SCIENCES OCCURRED IN THE SIXTIES, WHILE THE SOCIAL SCIENCES INCREASED FASTER IN THE SEVENTIES.

Data Source: Appendix Table 1

PERCENT OF SCIENCE AND ENGINEERING DOCTORATES EARNED BY WOMEN
1920's - 1970's



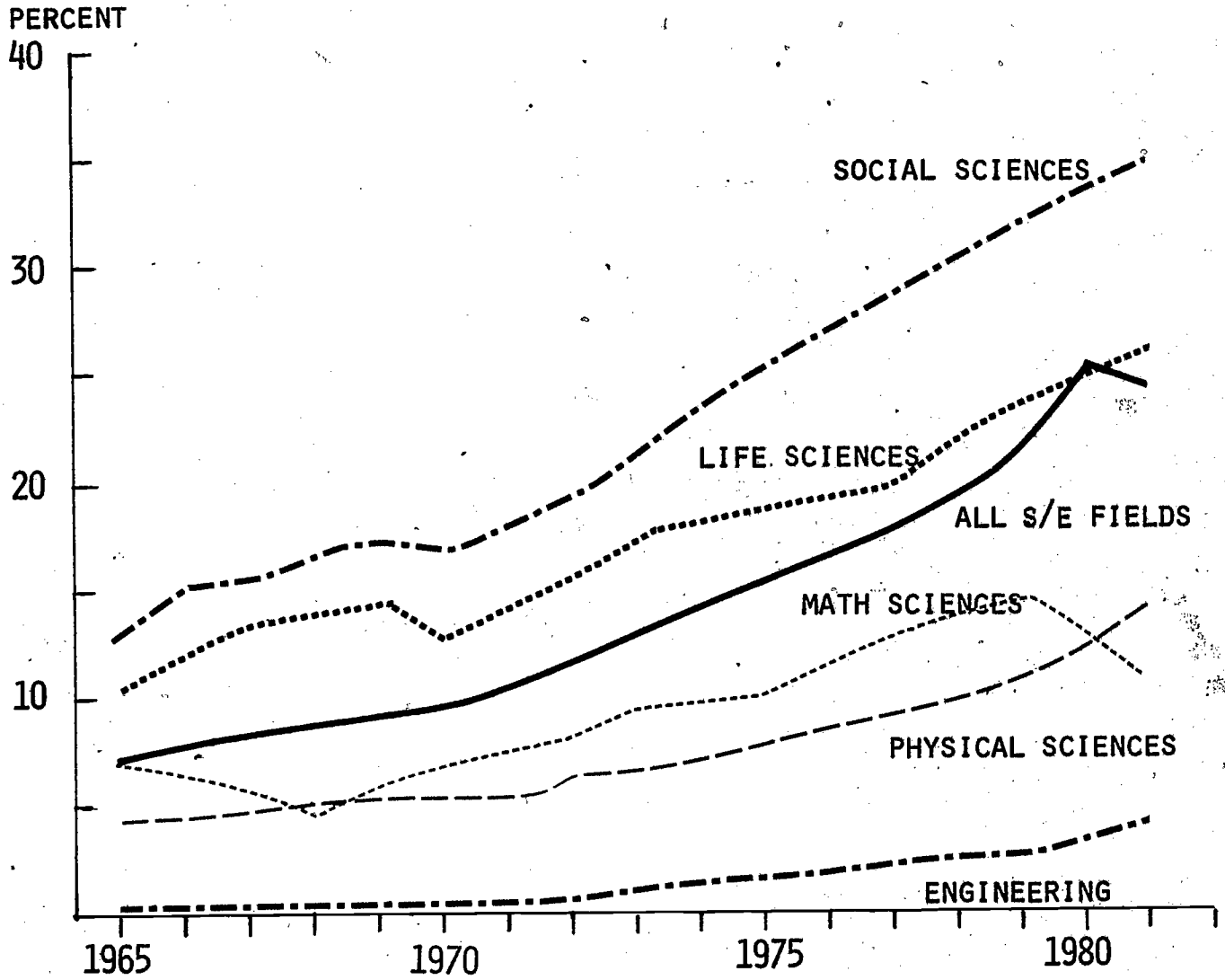
SOURCE: NATIONAL ACADEMY OF SCIENCES

TWELVE IN EVERY HUNDRED WHO EARNED THESE DEGREES IN THE 1920's WERE WOMEN, BUT THAT PROPORTION FELL DURING THE DEPRESSION OF THE THIRTIES, AND FELL EVEN FASTER IN THE FORTIES AND FIFTIES AS THE MEN WHO FOUGHT IN WORLD WAR II RETURNED HOME AND UTILIZED THEIR GI BILL BENEFITS.

NOT UNTIL THE MID-SEVENTIES DID WOMEN REACH THE SAME PROPORTION OF SCIENCE AND ENGINEERING DOCTORATES THEY HAD EARNED IN THE TWENTIES, BUT BY THE END OF THE DECADE, THEY HAD SURPASSED ALL PREVIOUS RECORDS, AND BY 1981, ONE IN EVERY FOUR DOCTORAL DEGREES AWARDED IN THESE FIELDS WAS EARNED BY A WOMAN.

Data Source: Appendix Table 1

PERCENT OF S/E PH.D.'S EARNED BY WOMEN



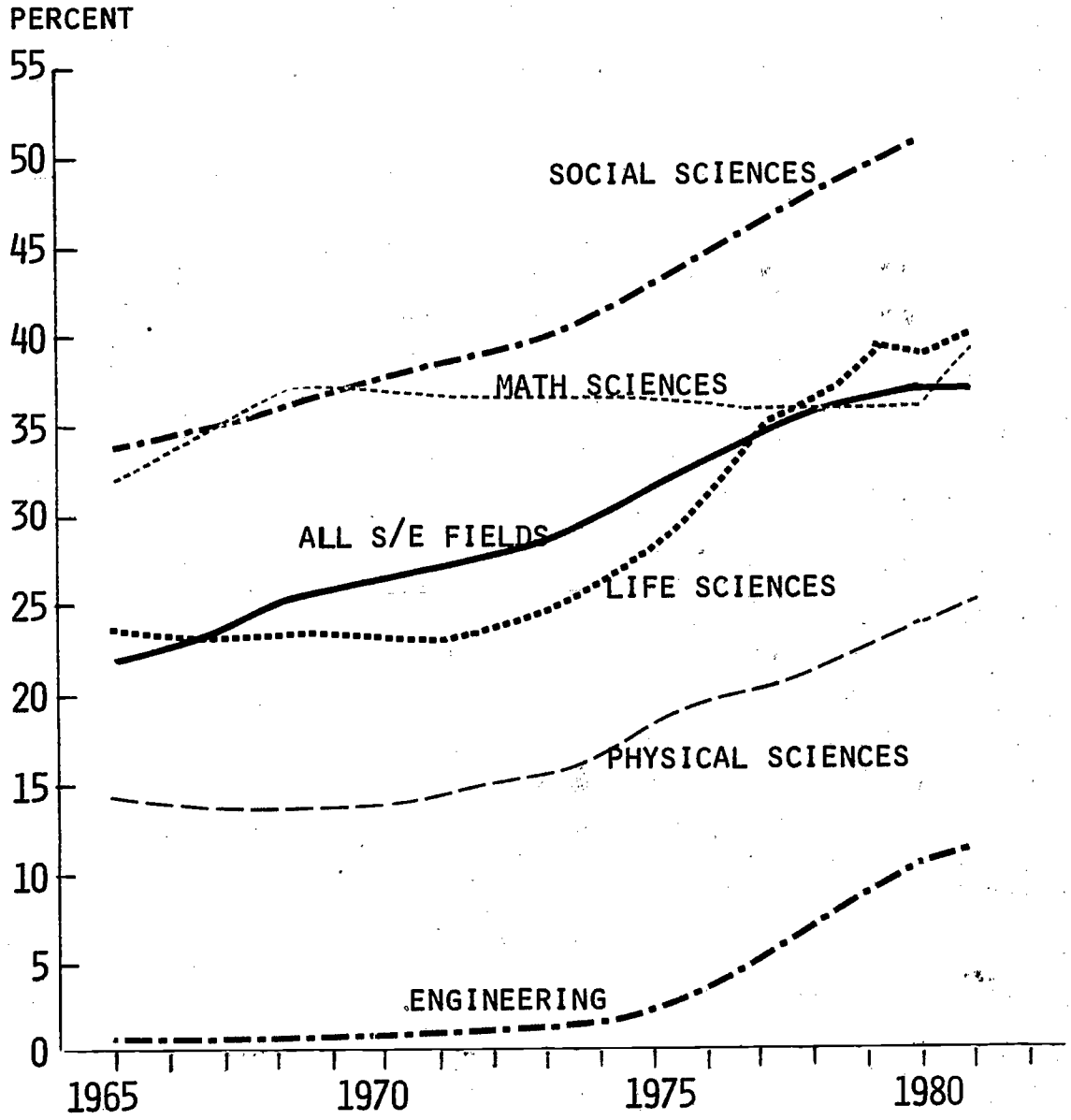
SOURCE: NATIONAL RESEARCH COUNCIL

WOMEN'S SHARE OF SCIENCE AND ENGINEERING DOCTORATES GREW FROM SEVEN PERCENT TO 23 PERCENT BETWEEN 1965 AND 1981.

ALTHOUGH THE FIELDS CHOSEN BY WOMEN CONTINUE TO BE DOMINATED BY THE SOCIAL AND LIFE SCIENCES, BY 1981, WOMEN EARNED A SUBSTANTIAL FRACTION OF ALL SCIENCE DEGREES, AND HAD RAISED THEIR SHARE OF ENGINEERING DOCTORATES FROM LESS THAN ONE PERCENT TO FOUR PERCENT.

Data Source: Appendix Table 3

PERCENT OF S/E BACHELOR'S DEGREES EARNED BY WOMEN



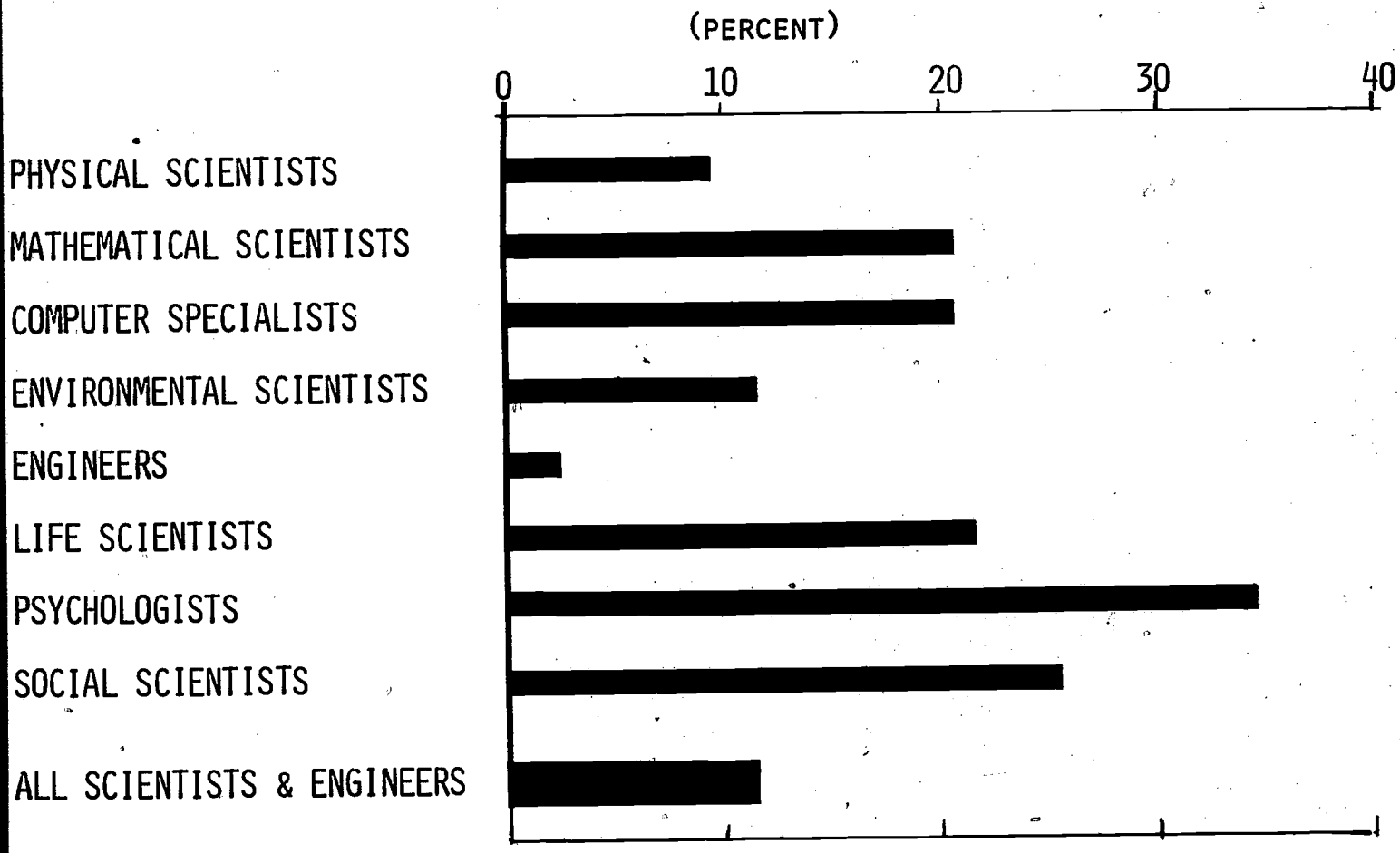
SOURCE: NATIONAL CENTER FOR EDUCATION STATISTICS

THIS INCREASING PROPORTION OF DOCTORATES EARNED BY WOMEN WAS, OF COURSE, PRECEDED BY AN INCREASE IN THEIR SHARE OF BACHELOR'S DEGREES, WHICH HAS CLIMBED FROM 22 PERCENT TO 37 PERCENT OF ALL SCIENCE AND ENGINEERING DEGREES SINCE 1965.

THEIR SHARE WITHIN FIELDS FOLLOWS THE SAME PATTERN AS IN THE DOCTORAL DEGREES, WITH SOCIAL AND LIFE SCIENCES PREDOMINATING AND ENGINEERING CLIMBING PAST THE TEN PERCENT LEVEL BY 1981.

Data Source: Appendix Table 2

PERCENT WOMEN IN THE SCIENCE & ENGINEERING LABOR FORCE 1980



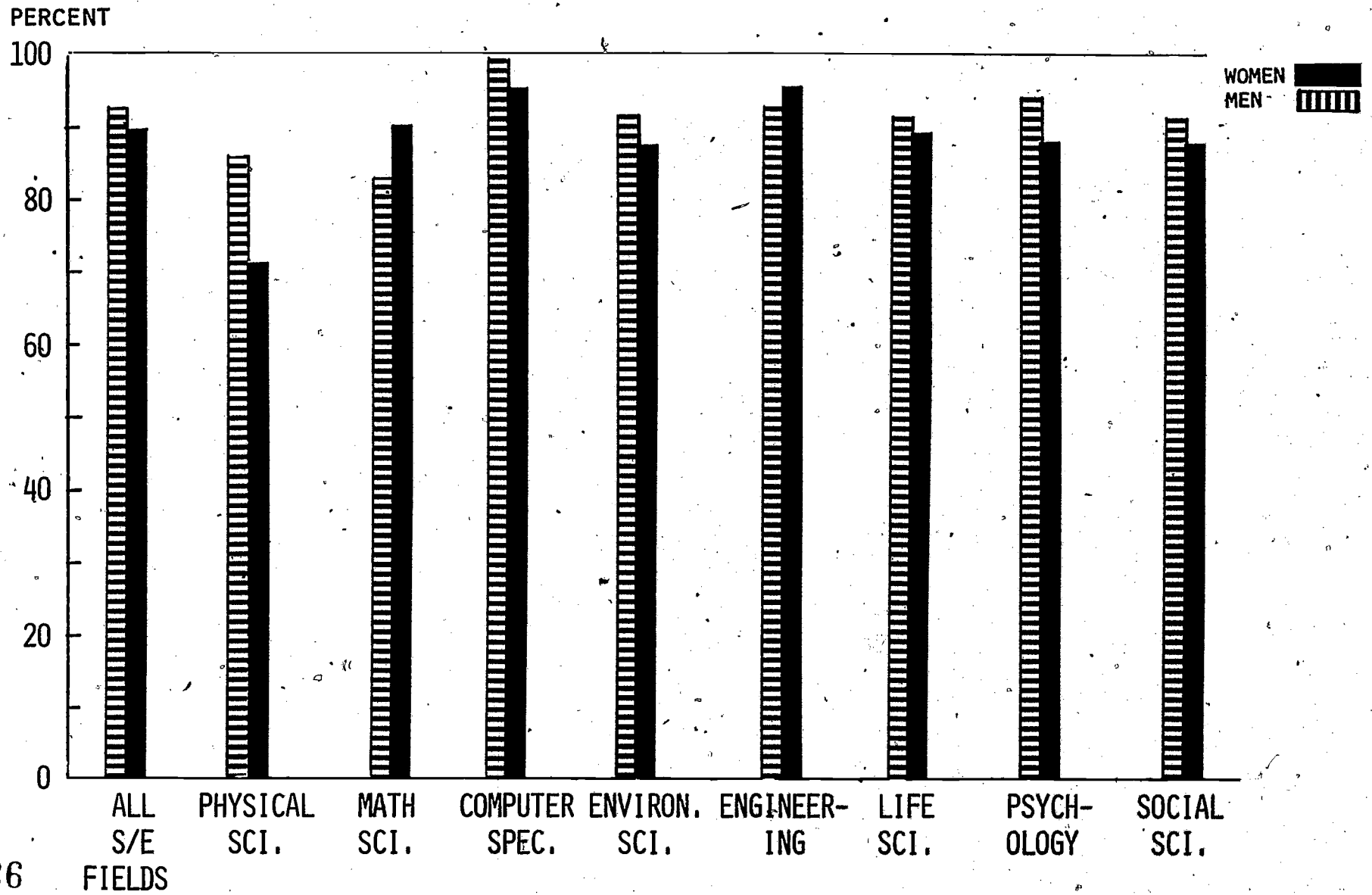
SOURCE: NATIONAL SCIENCE FOUNDATION

ALTHOUGH WOMEN ARE NOW EARNING A SUBSTANTIAL PROPORTION OF S/E DEGREES, EVEN IN THE LEAST TRADITIONAL FIELDS, THEY ARE A MUCH SMALLER FRACTION OF THE S/E LABOR FORCE THAN THEIR PRESENT PROPORTION OF NEW GRADUATES.

IN 1980, THEIR PROPORTION IN THE LABOR FORCE RANGED FROM 35% OF PSYCHOLOGISTS TO 4% OF ENGINEERS, AVERAGING 11.4% ACROSS ALL S/E FIELDS.

Data Source: Appendix Table 4

LABOR FORCE PARTICIPATION RATES OF SCIENTISTS AND ENGINEERS, 1980



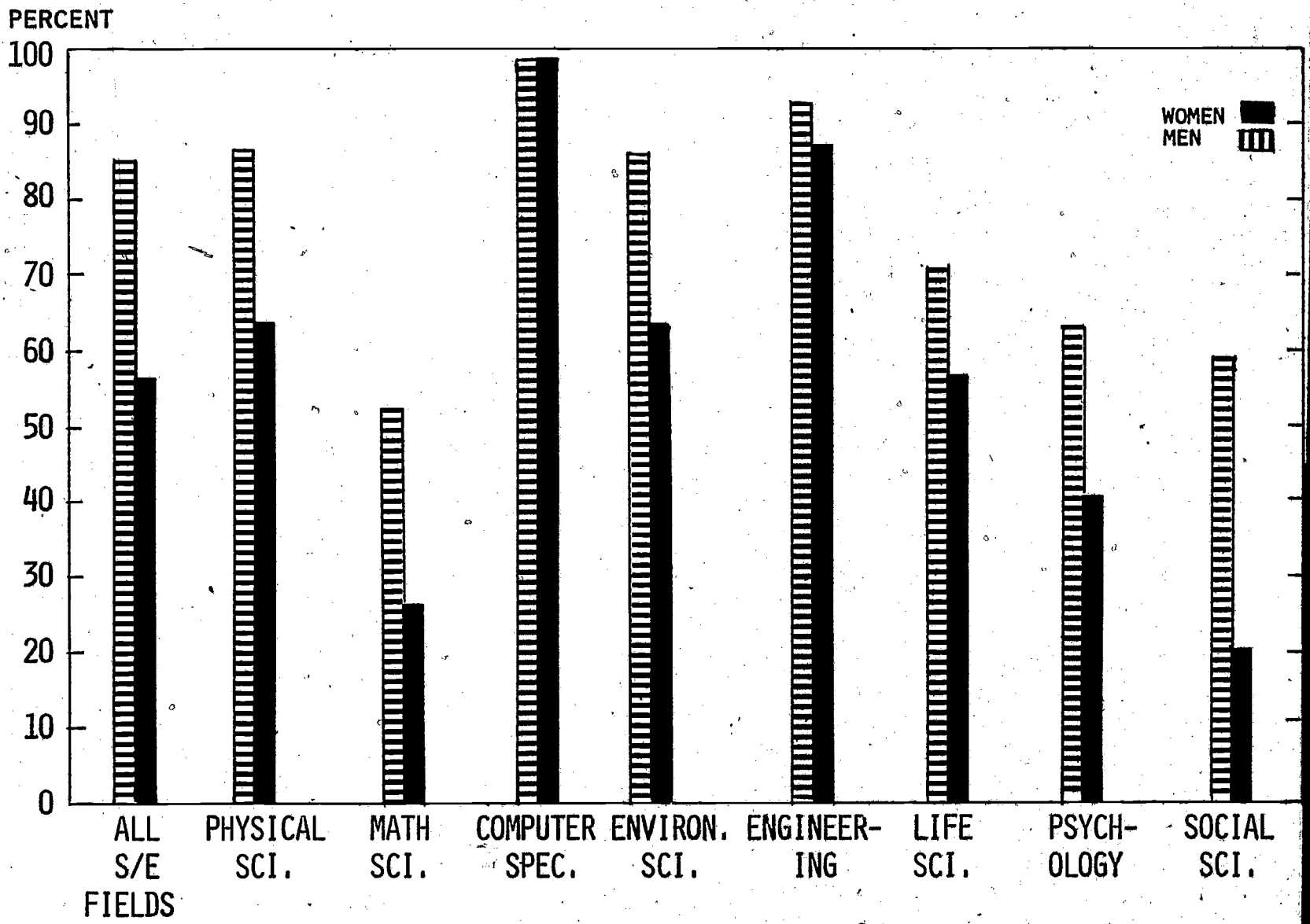
SOURCE: NATIONAL SCIENCE FOUNDATION

THIS DIFFERENCE IN WOMEN'S PROPORTION OF DEGREES AND THEIR PROPORTION OF THE LABOR FORCE IS LARGELY ATTRIBUTABLE TO THE RELATIVELY SMALLER PROPORTIONS OF WOMEN WHO GRADUATED IN THE FIFTIES AND SIXTIES THAN IN THE SEVENTIES. IN PART, IT ALSO IS BECAUSE WOMEN ARE SOMEWHAT LESS LIKELY THAN MEN TO BE IN THE LABOR FORCE -- THAT IS, ACTUALLY WORKING OR LOOKING FOR WORK.

AMONG SCIENTISTS AND ENGINEERS IDENTIFIED BY THE NATIONAL SCIENCE FOUNDATION IN 1980, 8% OF MEN AND 11% OF WOMEN WERE OUT OF THE LABOR FORCE, SOME BECAUSE OF RETIREMENT, OTHERS FOR DIFFERENT REASONS. IN MOST FIELDS, THE DIFFERENCES ARE RELATIVELY SMALL, AND THE LABOR FORCE PARTICIPATION OF WOMEN IN MATHEMATICAL SCIENCES AND ENGINEERING IS SOMEWHAT LARGER THAN FOR MEN.

Data Source: Appendix Table 5

S/E UTILIZATION RATES OF SCIENTISTS AND ENGINEERS, 1978

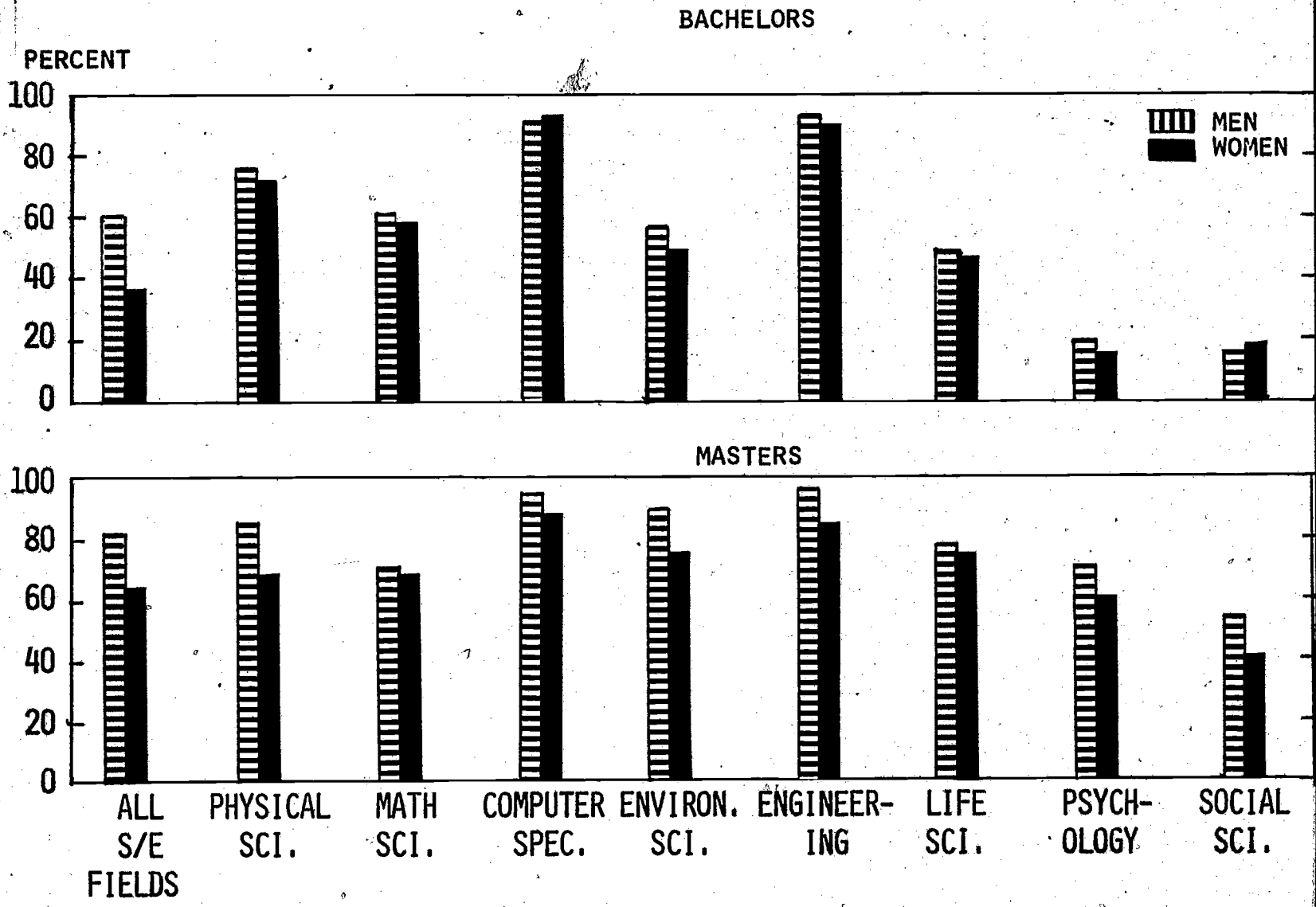


SOURCE: NATIONAL SCIENCE FOUNDATION

HOWEVER, EVEN AMONG THOSE WHO ARE IN THE LABOR FORCE, MEN ARE SOMEWHAT MORE LIKELY THAN WOMEN TO FIND JOBS IN SCIENCE AND ENGINEERING. IN 1978, 86% OF MEN BUT ONLY 57% OF WOMEN SCIENTISTS AND ENGINEERS WERE EMPLOYED IN THESE AREAS. THIS DIFFERENCE OCCURRED ACROSS ALL FIELDS EXCEPT COMPUTER SPECIALTIES.

Data Source: Appendix Table 6

S/E UTILIZATION RATES FOR RECENT GRADUATES, 1981



SOURCE: NATIONAL SCIENCE FOUNDATION

THIS DIFFERENCE BEGINS AT THE TIME OF GRADUATION. FOR EXAMPLE, AMONG 1978 AND 1979 BACHELOR'S AND MASTER'S GRADUATES IN SCIENCE AND ENGINEERING WHO WERE SURVEYED IN 1980, HIGHER PROPORTIONS OF EMPLOYED MEN THAN OF EMPLOYED WOMEN WERE WORKING IN SCIENCE OR ENGINEERING, AS HAS BEEN TRUE IN EACH OF THE SURVEYS OF RECENT GRADUATES UNDERTAKEN SINCE 1976.

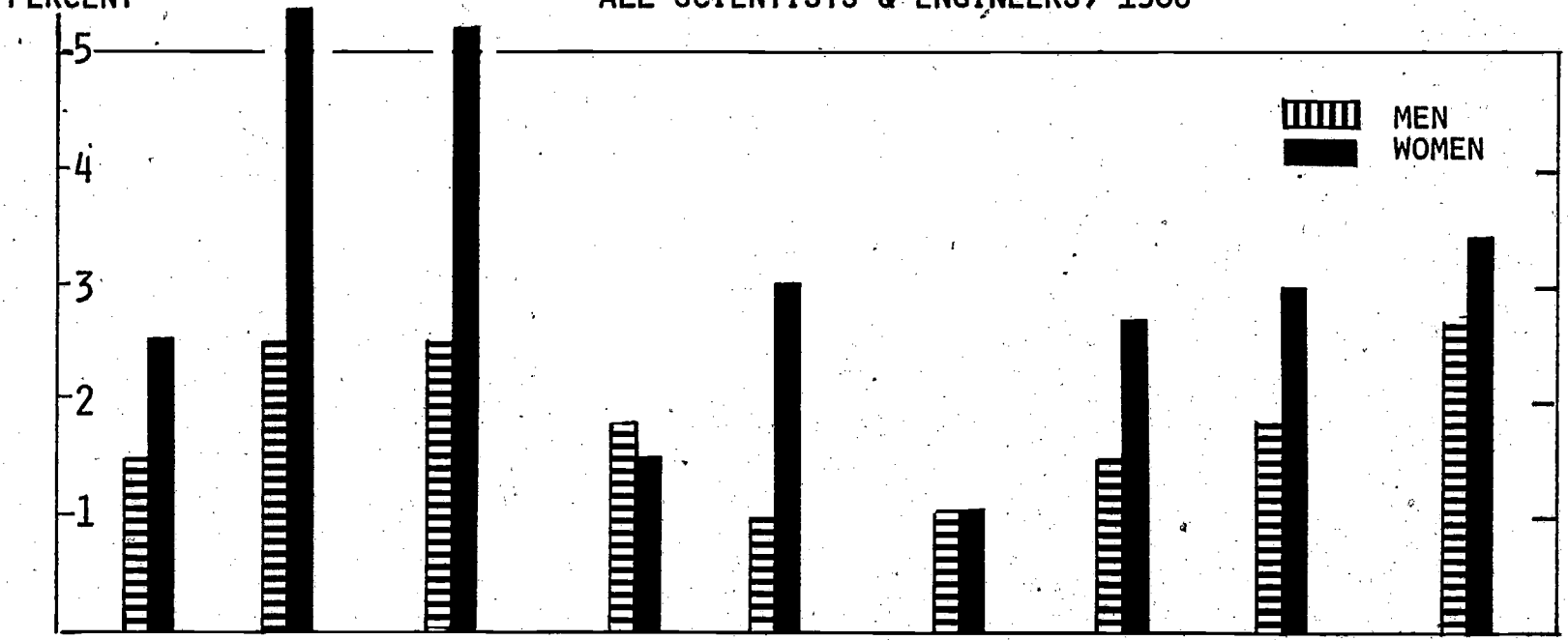
IN 1980, THE S/E UTILIZATION RATE FOR RECENT WOMEN BACHELOR'S GRADUATES WAS 37% COMPARED TO 58% FOR MEN. IN PART, THIS REFLECTS THE HIGHER PROPORTION OF ENGINEERS AMONG MALE GRADUATES AND OF SOCIAL AND BEHAVIORAL SCIENCE GRADUATES AMONG WOMEN. HOWEVER, THE DIFFERENTIAL EXISTS IN EVERY FIELD EXCEPT COMPUTER SCIENCE.

AT THE MASTER'S LEVEL, S/E UTILIZATION RATES ARE HIGHER FOR BOTH SEXES, BUT THOSE FOR WOMEN REMAIN BELOW THOSE FOR MEN ACROSS ALL MAJOR FIELDS.

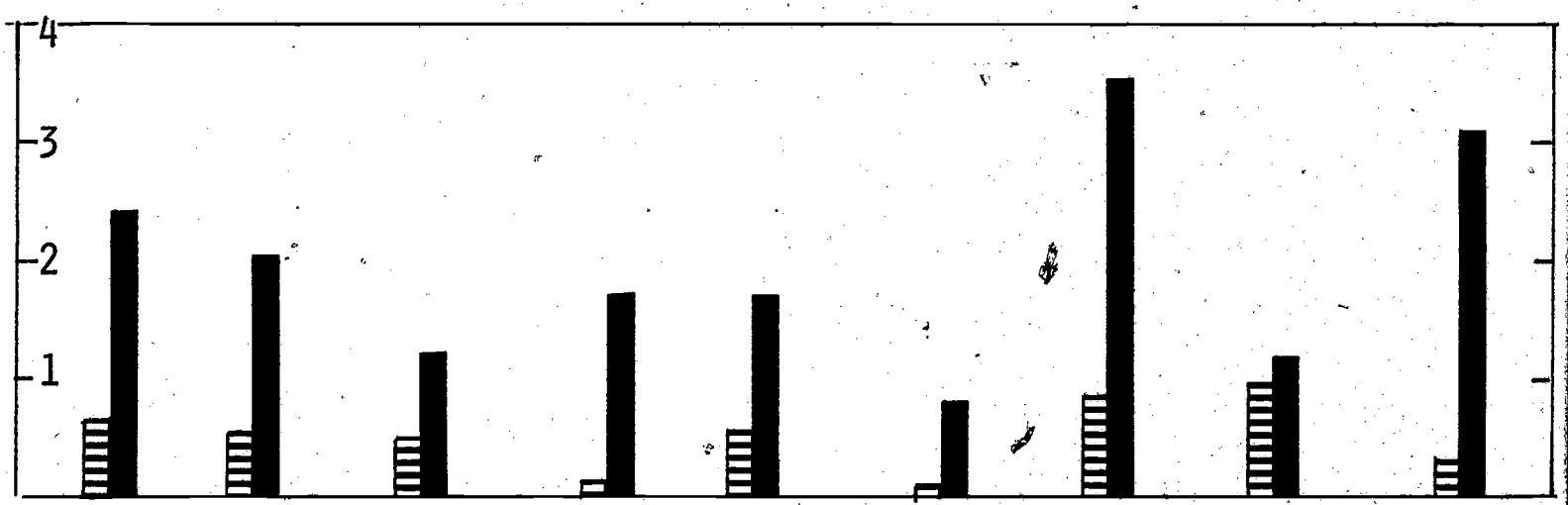
Data Source: Appendix Table 7

UNEMPLOYMENT RATES

ALL SCIENTISTS & ENGINEERS, 1980



DOCTORAL SCIENTISTS & ENGINEERS, 1981



SOURCES: NATIONAL SCIENCE FOUNDATION AND NATIONAL RESEARCH COUNCIL

WOMEN SCIENTISTS AND ENGINEERS ALSO ARE MORE LIKELY THAN MEN TO BE UNEMPLOYED AND SEEKING WORK. THE UNEMPLOYMENT RATES FOR WOMEN ARE HIGHER THAN FOR MEN IN EVERY FIELD EXCEPT COMPUTER SCIENCE, AT EVERY DEGREE LEVEL, AND AT ALMOST EVERY LEVEL OF EXPERIENCE.

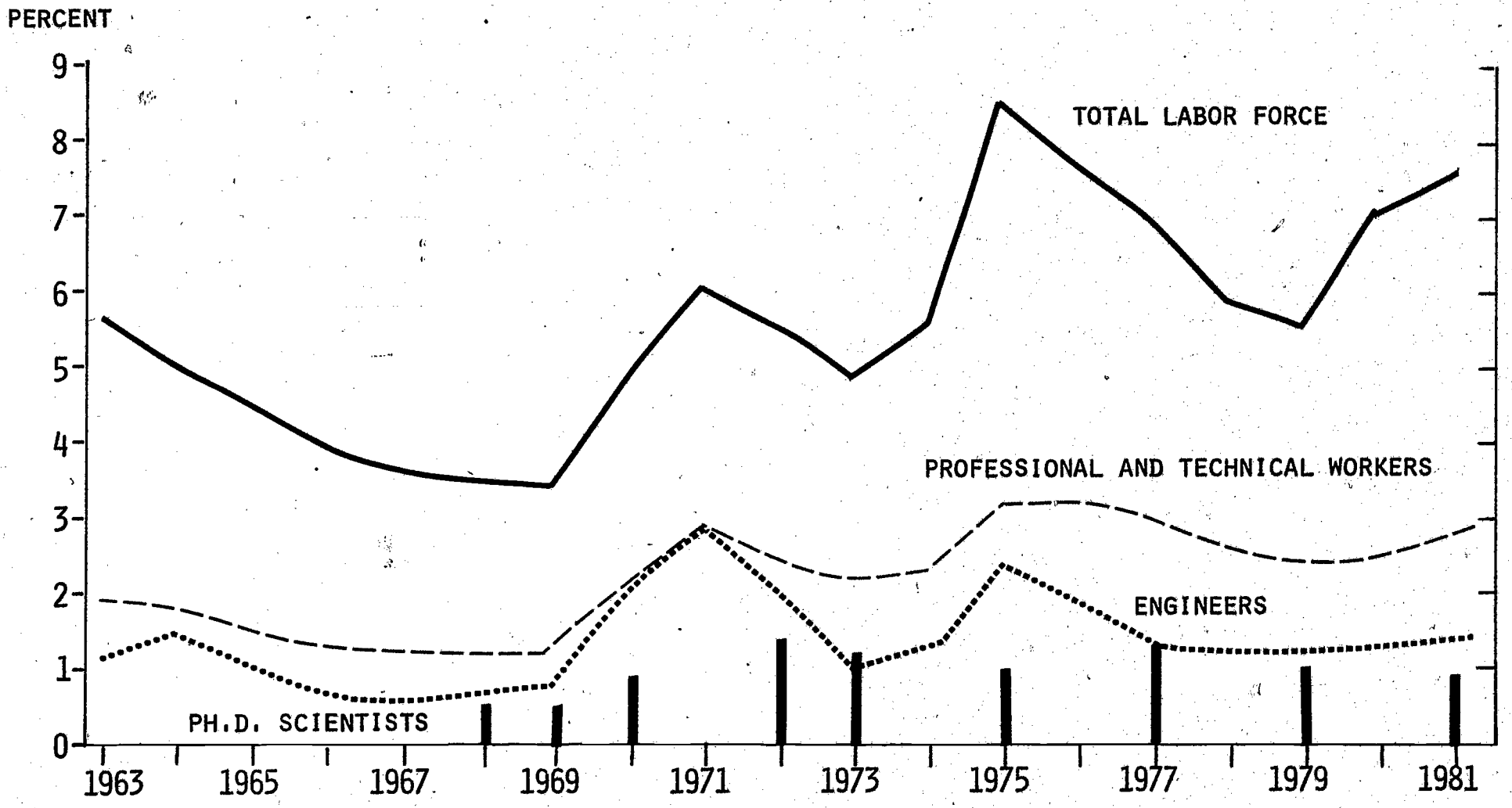
THE UNEMPLOYMENT RATE FOR WOMEN SCIENTISTS AND ENGINEERS WAS TWICE AS HIGH AS FOR MEN IN 1980, ALTHOUGH THE COMBINED UNEMPLOYMENT RATE WAS LESS THAN TWO PERCENT. DOCTORAL WOMEN SCIENTISTS AND ENGINEERS WERE FOUR TIMES AS LIKELY AS MEN TO BE INVOLUNTARILY UNEMPLOYED IN 1981, BUT THE TOTAL UNEMPLOYMENT RATE FOR THIS GROUP IS BELOW ONE PERCENT.

IN 1980, WOMEN WERE 11.4% OF ALL SCIENTISTS AND ENGINEERS IN THE LABOR FORCE, BUT 18.7% OF ALL THOSE WHO WERE UNEMPLOYED AND SEEKING EMPLOYMENT. AT THE DOCTORAL LEVEL IN 1981, WOMEN WERE 12% OF THE LABOR FORCE AND 35% OF THOSE WHO WERE UNEMPLOYED AND SEEKING WORK.

THERE IS ALSO VARIATION BY FIELD. AMONG ALL SCIENTISTS AND ENGINEERS, PHYSICAL, MATH AND SOCIAL SCIENTISTS SHOW THE HIGHEST UNEMPLOYMENT RATES. WITHIN THE DOCTORAL POPULATION, LIFE AND SOCIAL SCIENTISTS HAVE MUCH HIGHER UNEMPLOYMENT RATES THAN ENGINEERS OR COMPUTER SPECIALISTS.

Data Source: Appendix Tables 5 and 8

UNEMPLOYMENT RATES



SOURCES: BUREAU OF LABOR STATISTICS, NATIONAL SCIENCE FOUNDATION, NATIONAL RESEARCH COUNCIL

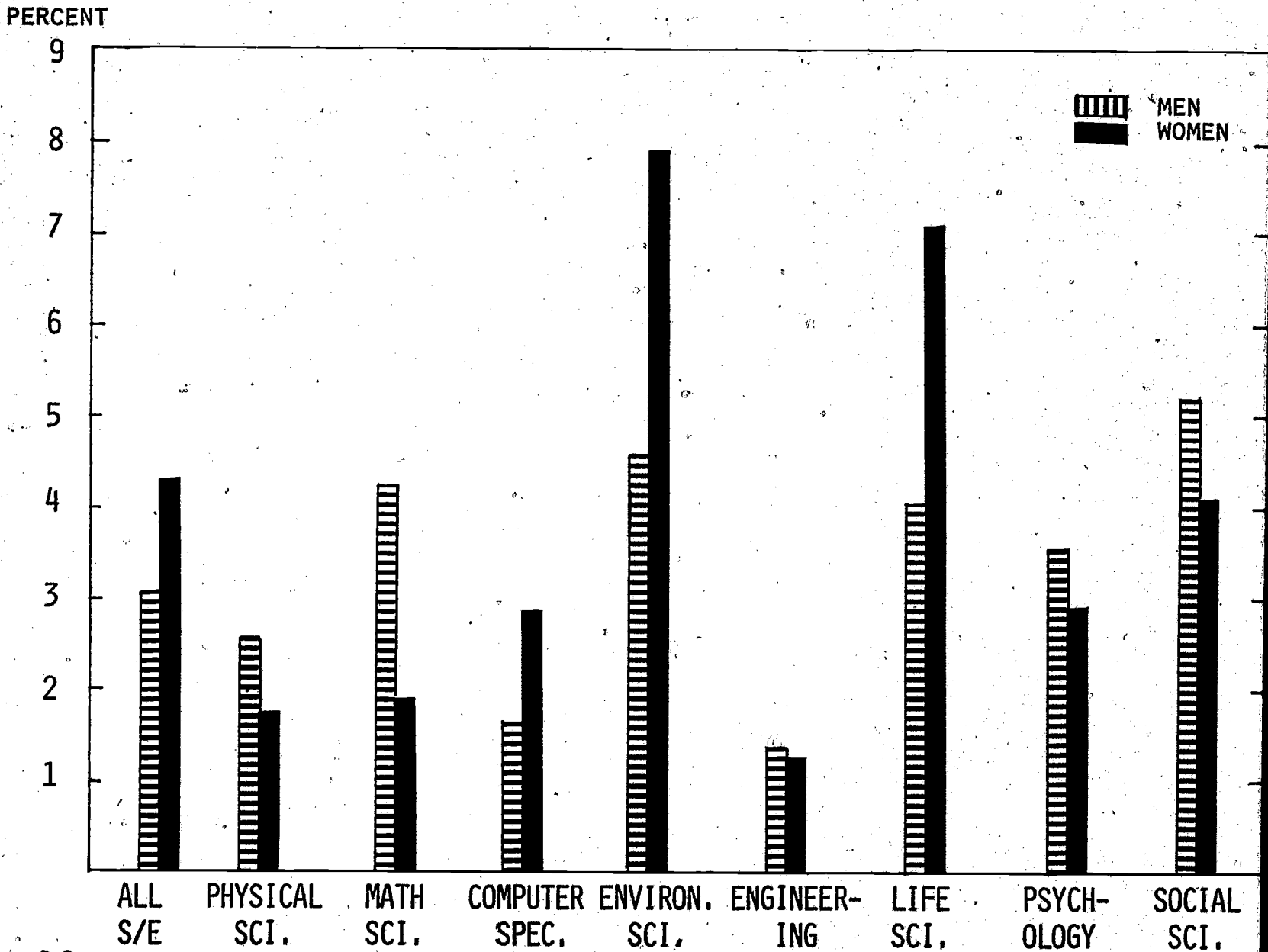
DESPITE THIS APPARENT DISADVANTAGE FOR WOMEN IN SCIENCE, HOWEVER, IT IS IMPORTANT TO EMPHASIZE THAT SCIENTISTS AND ENGINEERS HAVE LOWER UNEMPLOYMENT RATES THAN OTHER SEGMENTS OF THE U.S. LABOR FORCE, PARTICULARLY AT THE DOCTORAL LEVEL.

IN 1980, THE UNEMPLOYMENT RATE FOR SCIENTISTS AND ENGINEERS WAS 1.7%, COMPARED WITH 7.1% FOR THE GENERAL POPULATION AND 2.5% FOR ALL PROFESSIONAL AND TECHNICAL WORKERS.

IN 1981, ONLY 0.8% OF DOCTORAL SCIENTISTS AND ENGINEERS WERE UNEMPLOYED AND SEEKING WORK, IN CONTRAST TO 7.6% OF THE TOTAL U.S. LABOR FORCE AND 2.8% OF THE PROFESSIONAL AND TECHNICAL LABOR FORCE.

Data Source: Appendix Table 9

UNEMPLOYMENT RATES OF RECENT[1] S/E BACCALAUREATES, 1980



[1] RECENT BACCALAUREATES ARE THOSE FROM THE CLASSES OF 1978 AND 1979.

AGAIN, THE GREATER DIFFICULTY EXPERIENCED BY WOMEN SCIENTISTS AND ENGINEERS IN COMPARISON WITH MEN IN FINDING EMPLOYMENT OFTEN BEGINS WITH THE FIRST JOB.

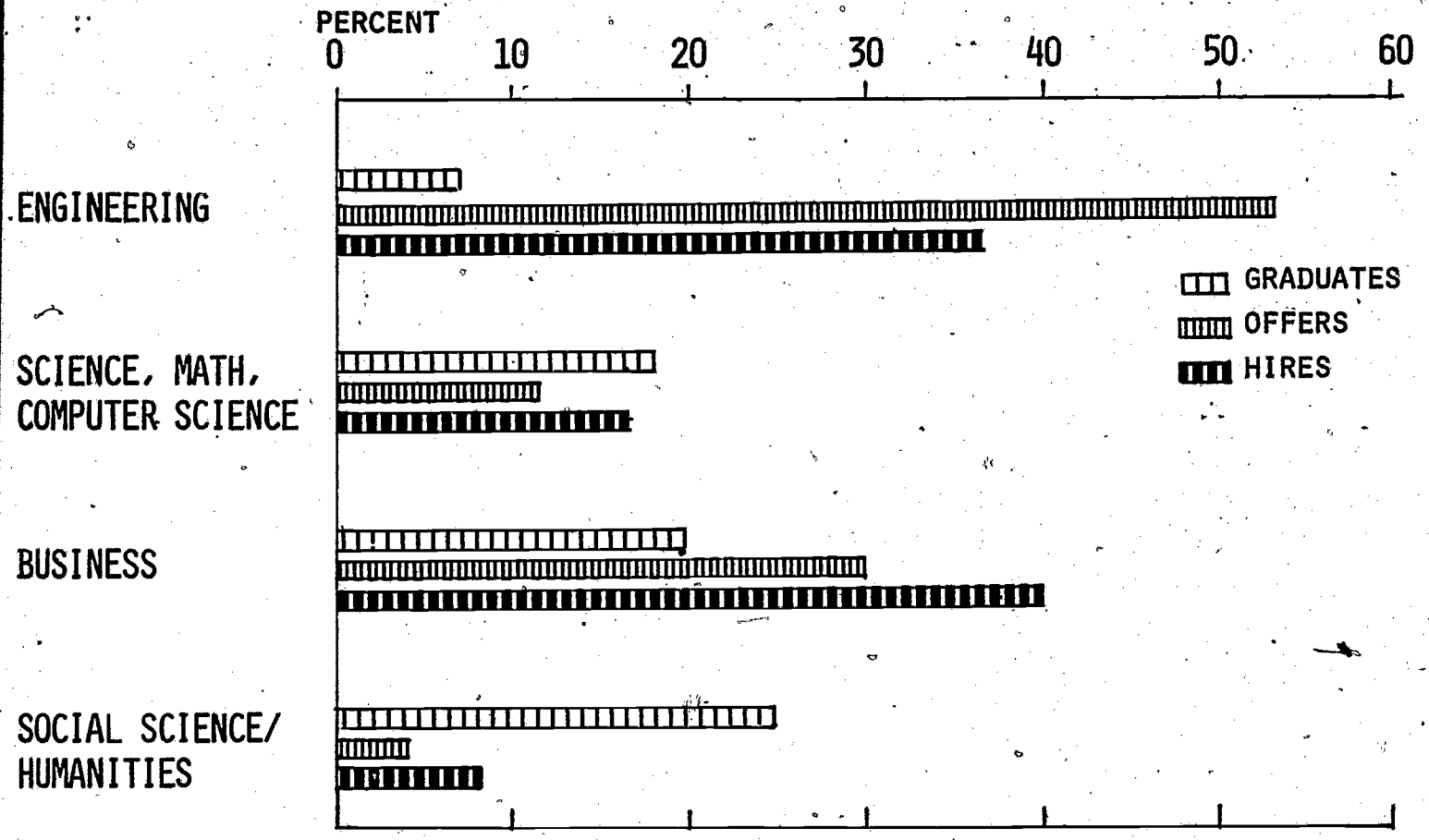
1980 UNEMPLOYMENT RATES FOR RECENT BACHELOR'S GRADUATES - THOSE ONE AND TWO YEARS OUT OF SCHOOL - ARE 4.3% FOR WOMEN AND 3.2% FOR MEN. RECENT WOMEN MASTER'S GRADUATES HAD A 5.4% UNEMPLOYMENT RATE IN 1980 COMPARED TO 1.2% FOR MEN.

AT THE BACHELOR'S LEVEL, HOWEVER, ALTHOUGH WOMEN SHOW HIGHER UNEMPLOYMENT RATES THAN MEN IN THE ENVIRONMENTAL SCIENCES, LIFE SCIENCES AND COMPUTER SPECIALTIES; THEY SHOW LOWER RATES THAN MEN IN THE SOCIAL, MATHEMATICAL AND PHYSICAL SCIENCES. THUS, AT LEAST PART OF THE REASON FOR HIGHER UNEMPLOYMENT AMONG WOMEN IS THEIR FIELD DISTRIBUTION AMONG THE VARIOUS FIELDS OF SCIENCE AND ENGINEERING.

UNEMPLOYMENT RATES ARE ONE MEASURE OF SUPPLY VS. DEMAND. WHERE UNEMPLOYMENT RATES ARE LOW, SUPPLY GENERALLY IS EQUAL TO OR LESS THAN DEMAND.

Data Source: Appendix Table 7

CURRICULUM DISTRIBUTION OF ALL DEGREE RECIPIENTS NON-ACADEMIC JOB OFFERS AND HIRES,* 1980-81



*ALL DEGREE LEVELS COMBINED

SOURCE: NATIONAL CENTER FOR EDUCATION STATISTICS AND COLLEGE PLACEMENT COUNCIL

WE CAN SEE SOME OF THE RELATIONSHIP BETWEEN THESE HIGHER UNEMPLOYMENT FIELDS AND RELATIVE DEMAND BY COMPARING THE PROPORTION OF ALL GRADUATES CHOOSING THESE FIELDS WITH THE PROPORTION OF JOB OFFERS AND HIRES OF NEW GRADUATES IN THE SAME FIELDS.

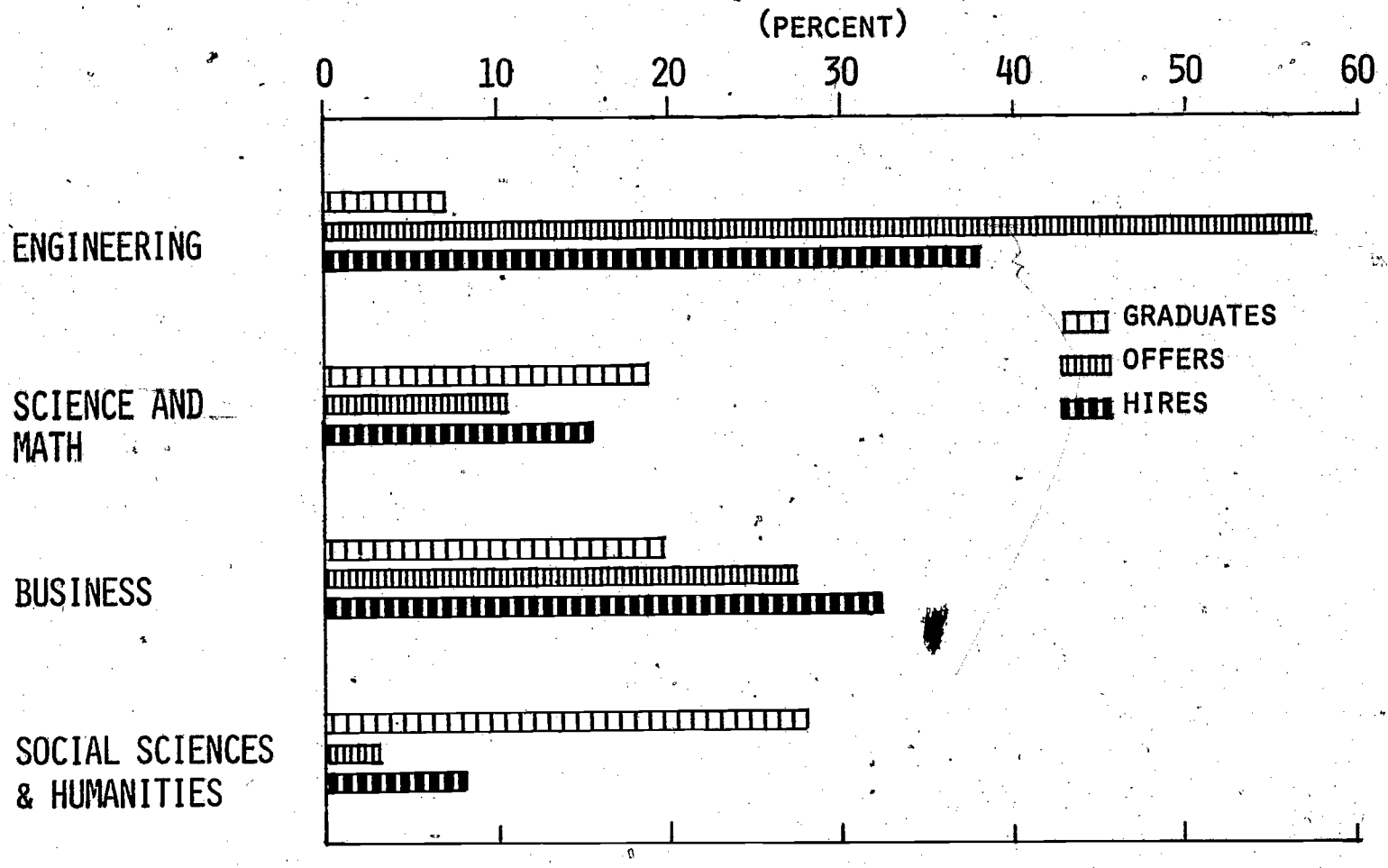
IN 1981, FIFTY-FOUR PERCENT OF ALL OFFERS AND 36% OF ALL HIRES OF NEW GRADUATES BY NON-ACADEMIC EMPLOYERS WERE ENGINEERING MAJORS, WHO MADE UP ONLY SEVEN PERCENT OF GRADUATES AT ALL DEGREE LEVELS COMBINED.

IN THE SCIENCES AND MATH, PROPORTIONS OF GRADUATES AND HIRES ARE SIMILAR, AS IS ALSO TRUE WITHIN THE PHYSICAL SCIENCES. HOWEVER, LIFE SCIENCE GRADUATES FAR EXCEED THEIR PROPORTION OF OFFERS, WHILE THE OPPOSITE IS TRUE IN THE COMPUTER SCIENCES.

SOCIAL SCIENCES AND HUMANITIES GRADUATES ALSO EXCEED THEIR PROPORTION OF JOB OFFERS. BUSINESS GRADUATES, ON THE OTHER HAND, ARE BETTER REPRESENTED AMONG HIRES THAN AMONG GRADUATES.

Data Source: Appendix Table 10

DISTRIBUTION OF BACHELOR'S GRADUATES, JOB OFFERS AND NON-ACADEMIC HIRES



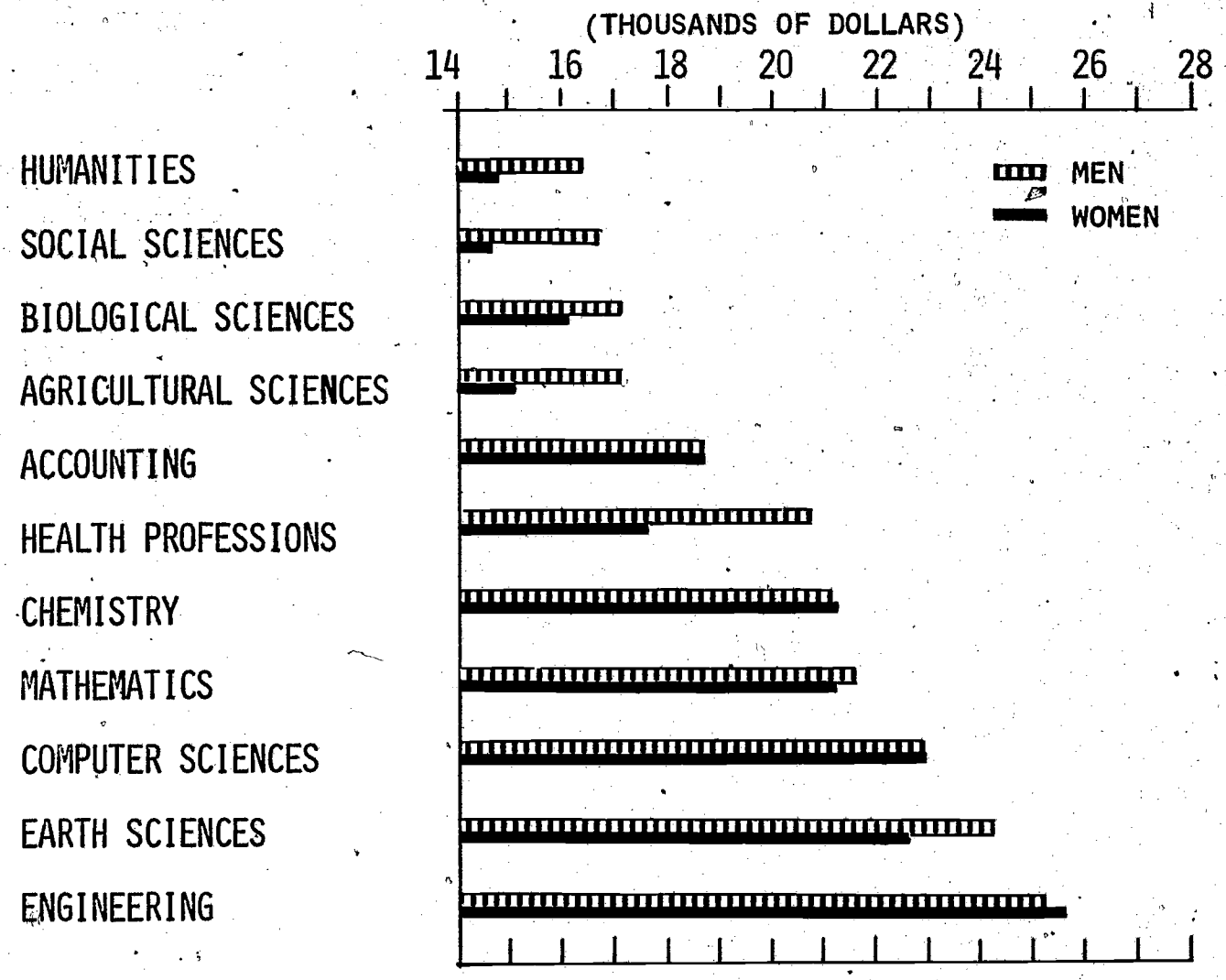
SOURCES: COLLEGE PLACEMENT COUNCIL & NATIONAL CENTER FOR EDUCATION STATISTICS

LOOKING ONLY AT BACHELOR'S GRADUATES, THE SAME PATTERN EMERGES, WITH ENGINEERS AND BUSINESS GRADUATES BEING HIRED IN HIGHER PROPORTION THAN THEY REPRESENT AMONG ALL GRADUATES; SCIENCE AND MATH MAJORS SHOWING SIMILAR PROPORTIONS OF GRADUATES AND HIRES, AND SOCIAL SCIENCE AND HUMANITIES GRADUATES FAR EXCEEDING THEIR PROPORTION OF HIRES.

THE RELATIVE PROPORTION OF OFFERS TO WOMEN ALSO IS HEAVILY SKEWED TOWARD ENGINEERING AND COMPUTER SCIENCES, AND AWAY FROM THEIR TRADITIONAL FIELDS OF HUMANITIES, SOCIAL SCIENCES AND EDUCATION.

Data Source: Appendix Table 11

BEGINNING OFFERS TO BACHELOR'S GRADUATES, 1982



SOURCE: COLLEGE PLACEMENT COUNCIL

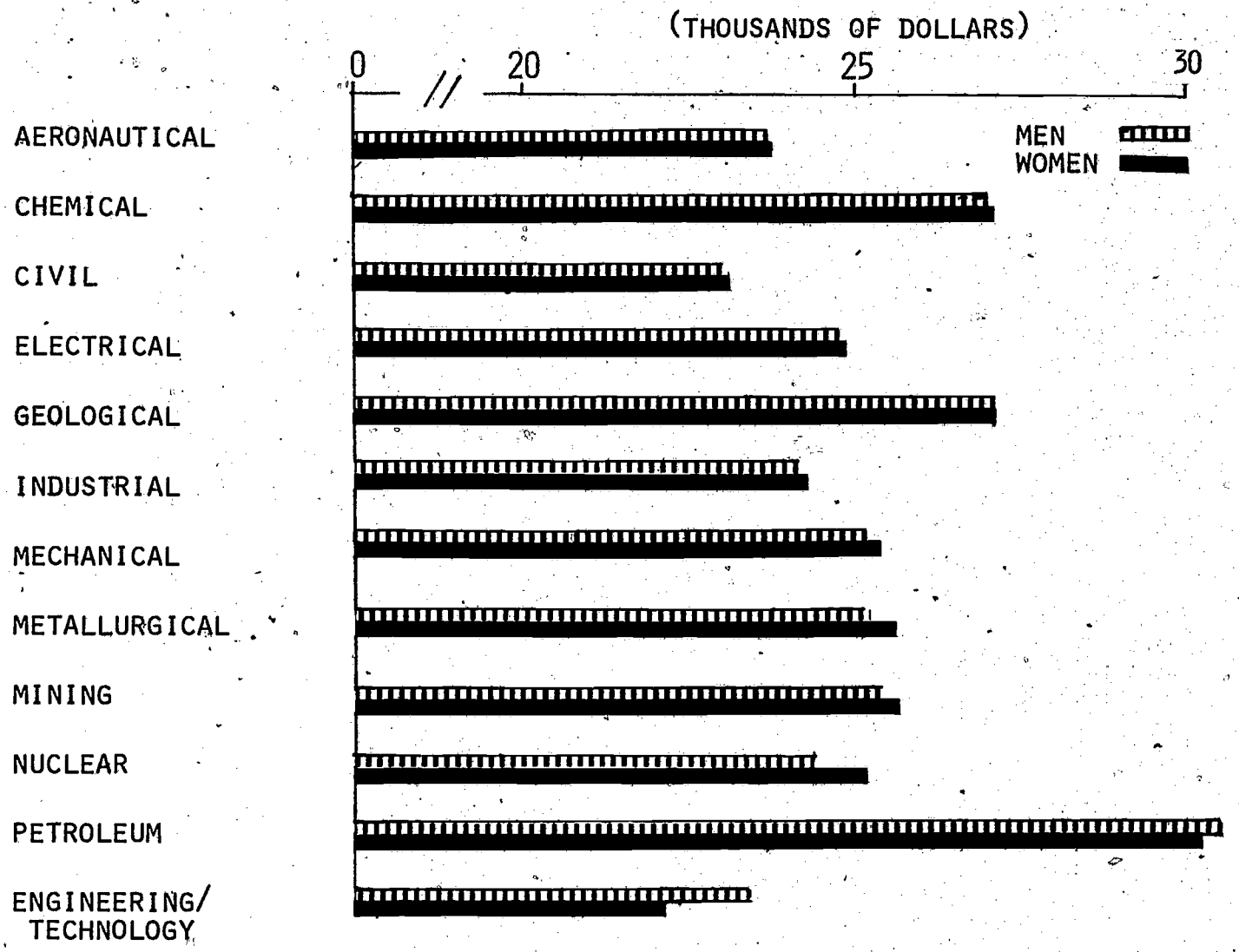
ANOTHER INDICATER OF SUPPLY VS. DEMAND IN ONE FIELD RELATIVE TO ANOTHER IS STARTING SALARY LEVELS. AVERAGE BEGINNING OFFERS TO 1982 GRADUATES AT THE BACHELOR'S LEVEL RANGED FROM $15,400 FOR GRADUATES IN THE HUMANITIES TO $25,260 OVERALL FOR GRADUATES IN ENGINEERING.

WOMEN IN HIGH SALARIED FIELDS SUCH AS ENGINEERING, COMPUTER SCIENCE OR CHEMISTRY ARE OFFERED ABOUT THE SAME STARTING SALARIES AS MEN. HOWEVER, WHERE DEMAND IS LOW RELATIVE TO SUPPLY, AS INDICATED BY STARTING SALARIES IN THE HUMANITIES, SOCIAL SCIENCES AND LIFE SCIENCES, OFFERS TO WOMEN ARE WELL BELOW OFFERS TO MEN.

AVAILABLE DATA ON MINORITY WOMEN IN REGARD TO SALARIES AND JOB OPPORTUNITIES SHOW THEM TO FALL CONSISTENTLY WITHIN THE SAME PATTERNS OF DISADVANTGAGE AND ADVANTAGE AS MAJORITY WOMEN, WHILE MINORITY MEN FOLLOW MORE CLOSELY THE PATTERNS OF MAJORITY MEN.

Data Source: Appendix Table 12

AVERAGE ANNUAL SALARY OFFERS TO BACHELOR'S GRADUATES IN ENGINEERING, 1982

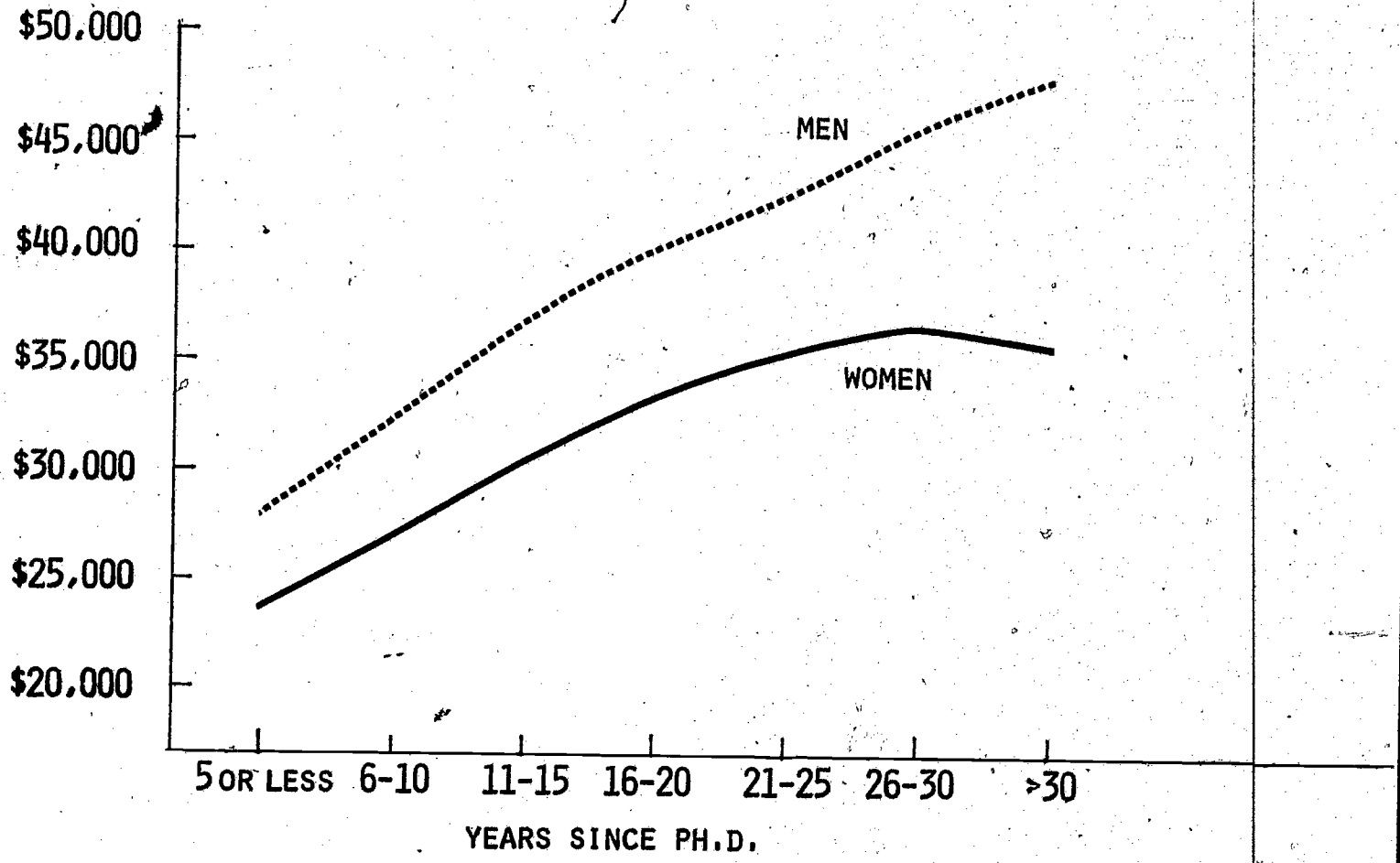


SOURCE: COLLEGE PLACEMENT COUNCIL

WITHIN THE GENERAL CATEGORY OF ENGINEERING, STARTING SALARIES VARY FROM $23,100 FOR CIVIL ENGINEERING GRADUATES TO $30,500 FOR GRADUATES IN PETROLEUM ENGINEERING, INDICATING SOME PERCEIVED DIFFERENCES IN THE BALANCE BETWEEN SUPPLY OF NEW GRADUATES AND DEMAND FOR THEIR SERVICES. HOWEVER, THE RELATIVE STARTING SALARIES OF MEN AND WOMEN REMAIN CLOSE IN ALL OF THE ENGINEERING SUBFIELDS.

Data Source: Appendix Table 12

SALARIES OF FULL TIME PH.D. SCIENTISTS AND ENGINEERS, 1981

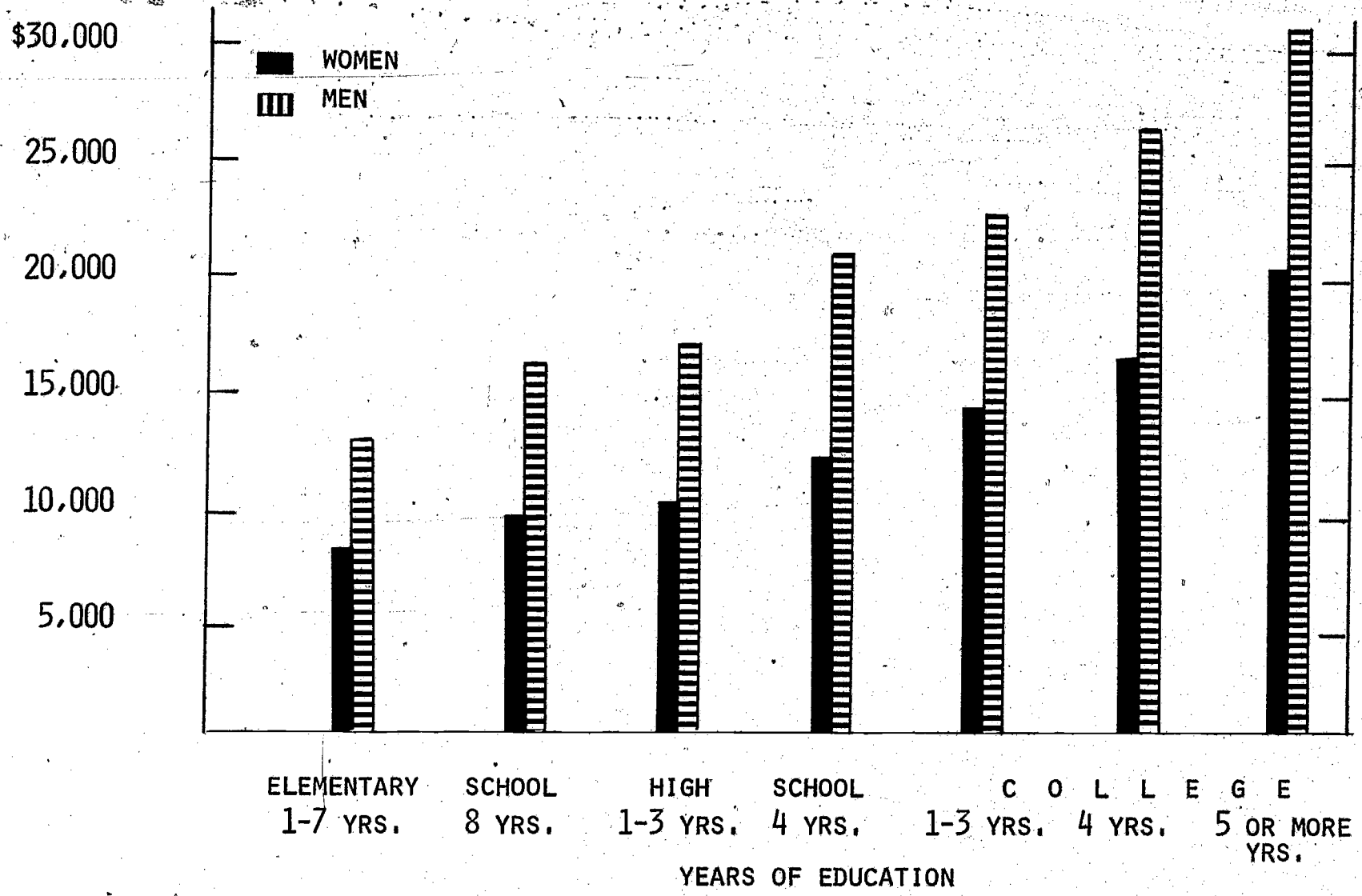


SOURCE: NATIONAL RESEARCH COUNCIL

THE SALARY DIFFERENTIAL BETWEEN MEN AND WOMEN WHICH WE SAW IN STARTING SALARIES WIDENS WITH AGE, AND IS GREATER AT THE DOCTORAL LEVEL THAN AT THE BACHELOR'S LEVEL. THIS IS TRUE ACROSS ALL FIELDS OF SCIENCE AND ENGINEERING. IT IS ALSO TRUE IN THE HUMANITIES FIELDS.

Data Source: Appendix Table 13

MEDIAN INCOME OF FULL-TIME, YEAR-ROUND WORKERS, 1981



SOURCE: BUREAU OF THE CENSUS

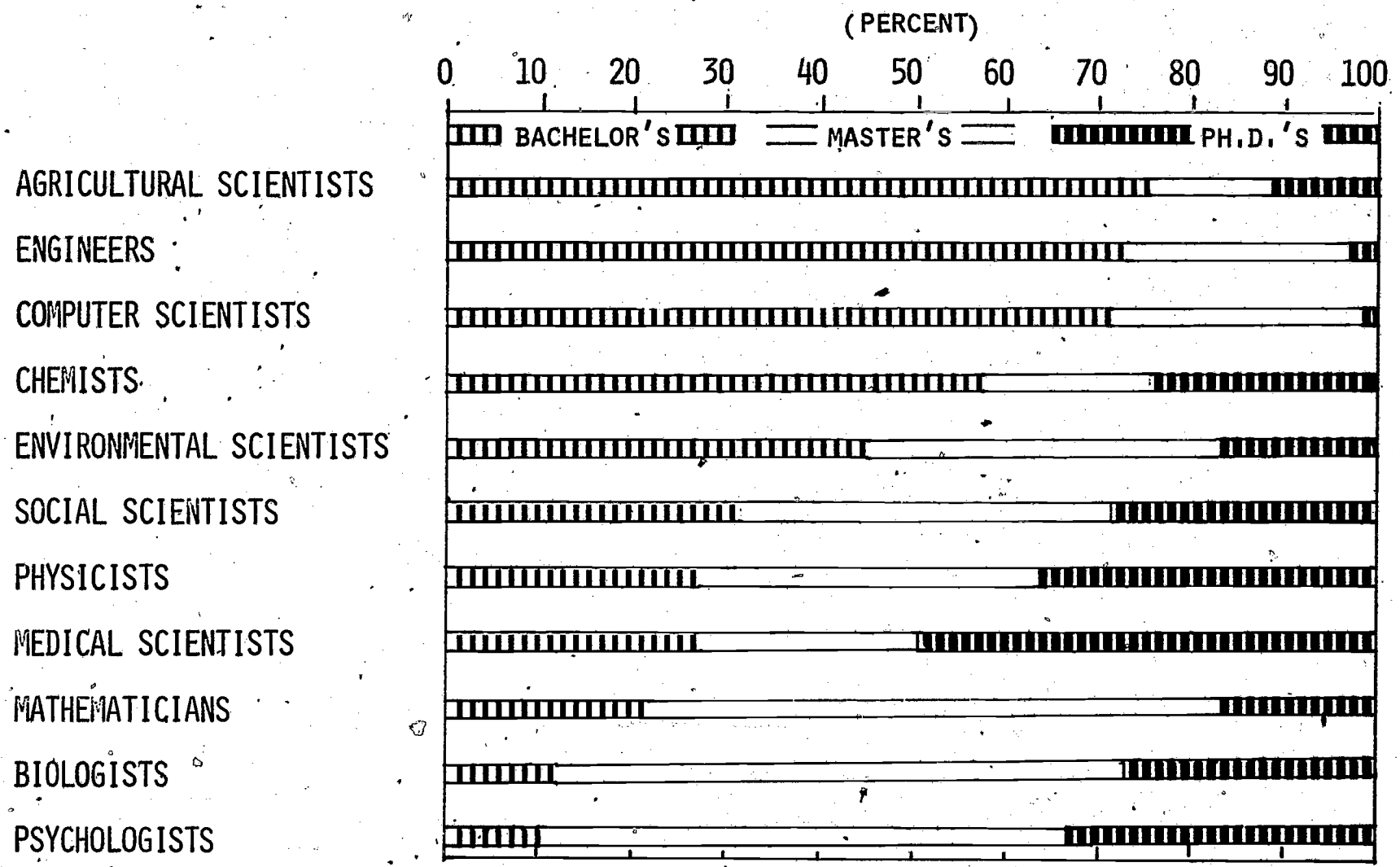
HOWEVER, THE SALARY DIFFERENTIAL IS FAR MORE PRONOUNCED OUTSIDE OF SCIENCE AND ENGINEERING, REGARDLESS OF FIELD OR EDUCATIONAL LEVEL.

AMONG ALL FULL TIME YEAR-ROUND WORKERS, WOMEN STILL EARN ONLY 60 CENTS FOR EVERY DOLLAR EARNED BY MEN. HIGHER LEVELS OF EDUCATION INCREASE SALARY FOR BOTH SEXES, BUT EVEN IN 1981 WOMEN WITH FIVE OR MORE YEARS OF COLLEGE CONTINUE TO EARN LESS ON AVERAGE THAN MEN WHO ARE JUST HIGH SCHOOL GRADUATES.

MUCH OF THIS DIFFERENTIAL RESULTS FROM THE FACT THAT OCCUPATIONS TRADITIONALLY DOMINATED BY WOMEN ARE LOW-PAYING OCCUPATIONS. AS MORE WOMEN MOVE INTO HIGHER PAYING FIELDS AND ACTIVITIES, WHERE THEIR PARTICIPATION HAS BEEN LOW OR NON-EXISTENT, THIS EARNINGS GAP SHOULD TEND TO DIMINISH. ALTHOUGH THERE ARE STILL SOME BARRIERS TO EQUALITY FOR WOMEN IN SCIENCE, OPPORTUNITIES THERE ARE MUCH BETTER THAN IN MOST OTHER FIELDS.

Data Source: Appendix Table 14

HIGHEST DEGREE LEVEL OF SCIENTISTS AND ENGINEERS IN 1980



SOURCE: NATIONAL SCIENCE FOUNDATION

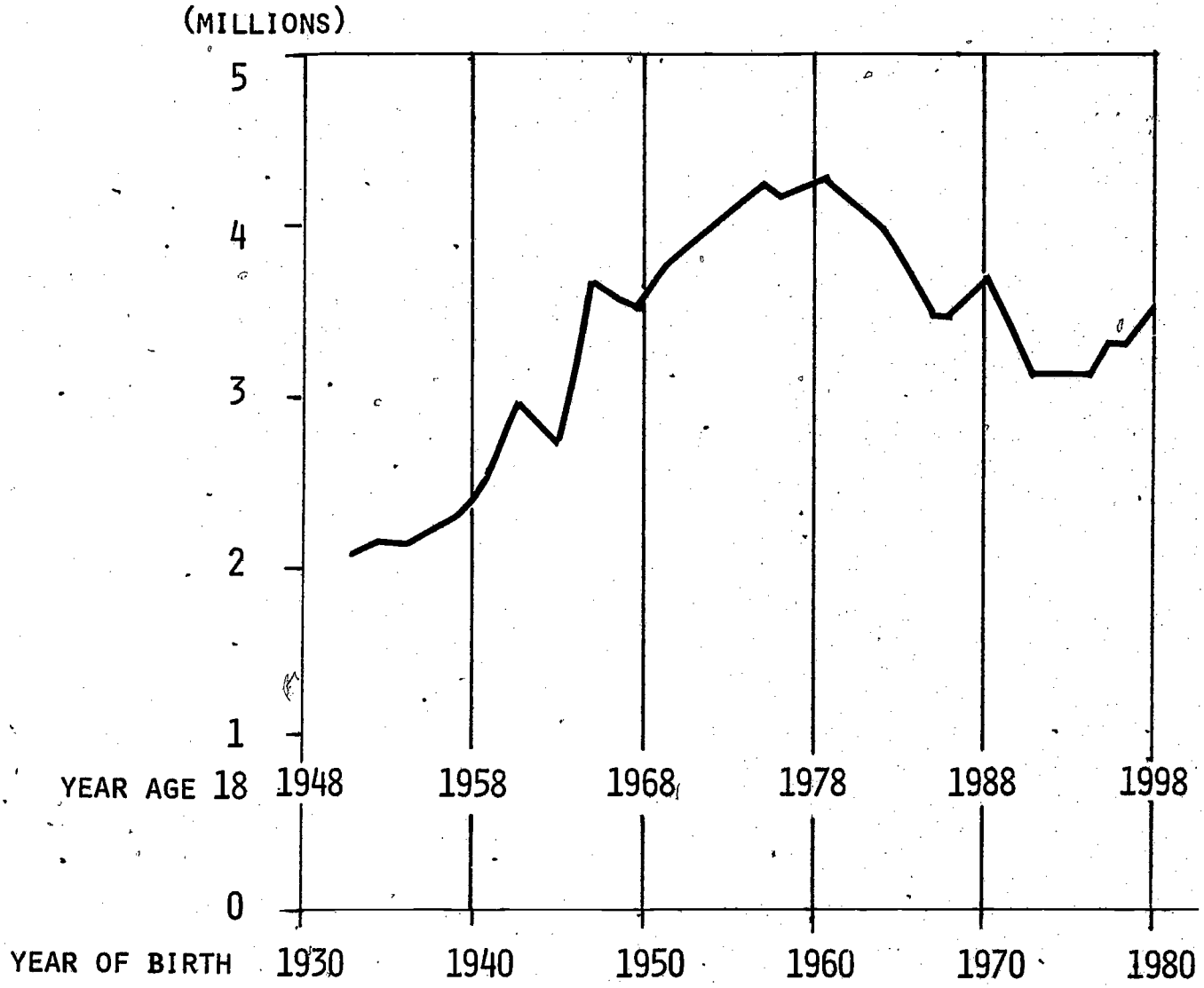
SALARIES AND UNEMPLOYMENT RATES DIFFER FROM ONE FIELD TO ANOTHER. THE EDUCATIONAL REQUIREMENTS FOR PROFESSIONAL ENTRY ALSO ARE DIFFERENT, SO THAT INDIVIDUALS SEEKING CAREERS IN SOME FIELDS NEED TO PLAN ON A LONGER PERIOD OF FORMAL TRAINING THAN WILL BE TRUE IN OTHERS.

IN GENERAL, AGRICULTURAL SCIENTISTS, ENGINEERS AND COMPUTER SCIENTISTS ENTER PROFESSIONAL EMPLOYMENT AT THE END OF A BACHELOR'S DEGREE. SOME CHEMISTS AND GEOLOGISTS ALSO ENTER THE WORK FORCE AT THAT LEVEL, BUT A MASTER'S DEGREE IS THE PREFERRED ENTRY LEVEL FOR THESE FIELDS BY MOST INDUSTRIAL EMPLOYERS. SOCIAL SCIENTISTS, BIOLOGISTS, PHYSICISTS, MEDICAL SCIENTISTS, MATHEMATICIANS AND PSYCHOLOGISTS ARE INCREASINGLY REQUIRED TO HAVE AT LEAST A MASTER'S AND PREFERABLY A DOCTORAL DEGREE.

THE HIGHEST DEGREE LEVEL OF THE SCIENTIFIC AND ENGINEERING WORKFORCE IN 1980 SHOWS HIGHER PROPORTIONS OF INDIVIDUALS IN SEVERAL OF THE SCIENCE FIELDS WHO HAVE ONLY A BACHELOR'S OR MASTER'S DEGREE THAN PROBABLY WILL BE TRUE BY 1990.

Data Source: Appendix Table 15

BIRTHS IN THE UNITED STATES



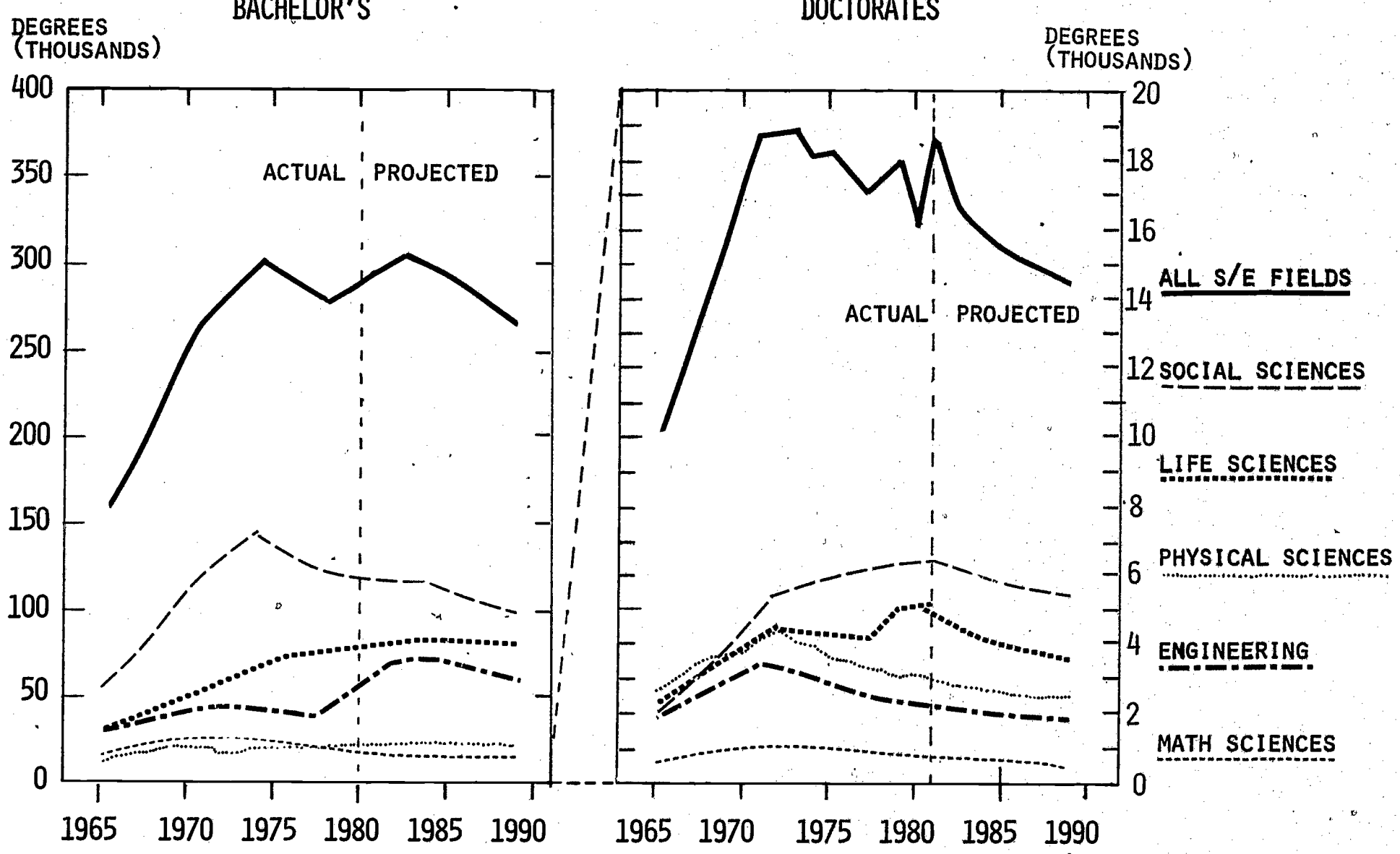
SOURCE: NATIONAL CENTER FOR HEALTH STATISTICS

OTHER THINGS ALSO WILL CHANGE OVER THE NEXT DECADE. THE NUMBER OF 18-YEAR OLDS WILL DECLINE 26 PERCENT BY 1992 FROM THE 1979 PEAK, BEFORE STARTING UP AGAIN, AND THE NUMBER OF COLLEGE GRADUATES ALSO WILL DECLINE THROUGH THE REST OF THE CENTURY IF THERE IS NOT A SIGNIFICANT CHANGE IN THE PROPORTION OF STUDENTS ENTERING AND COMPLETING COLLEGE AFTER HIGH SCHOOL; AND IF THE PRESENT TREND OF AN INCREASING PROPORTION OF OLDER STUDENTS IN COLLEGE LEVELS OFF.

IN EITHER CASE, IF AVAILABLE JOBS CONTINUE TO INCREASE AT ABOUT THE SAME RATE AS ADDITIONAL GRADUATES ARE PREPARED TO SEEK THEM, SOME FIELDS WILL REMAIN HIGHLY COMPETITIVE, WHILE OTHERS WILL EXPERIENCE A SHORTAGE OF WORKERS.

Data Source: Appendix Table 16

DEGREE AWARDS, 1965-1981, PROJECTED TO 1989



SOURCE: NATIONAL CENTER FOR EDUCATION STATISTICS

SOURCE: NATIONAL RESEARCH COUNCIL AND NCES

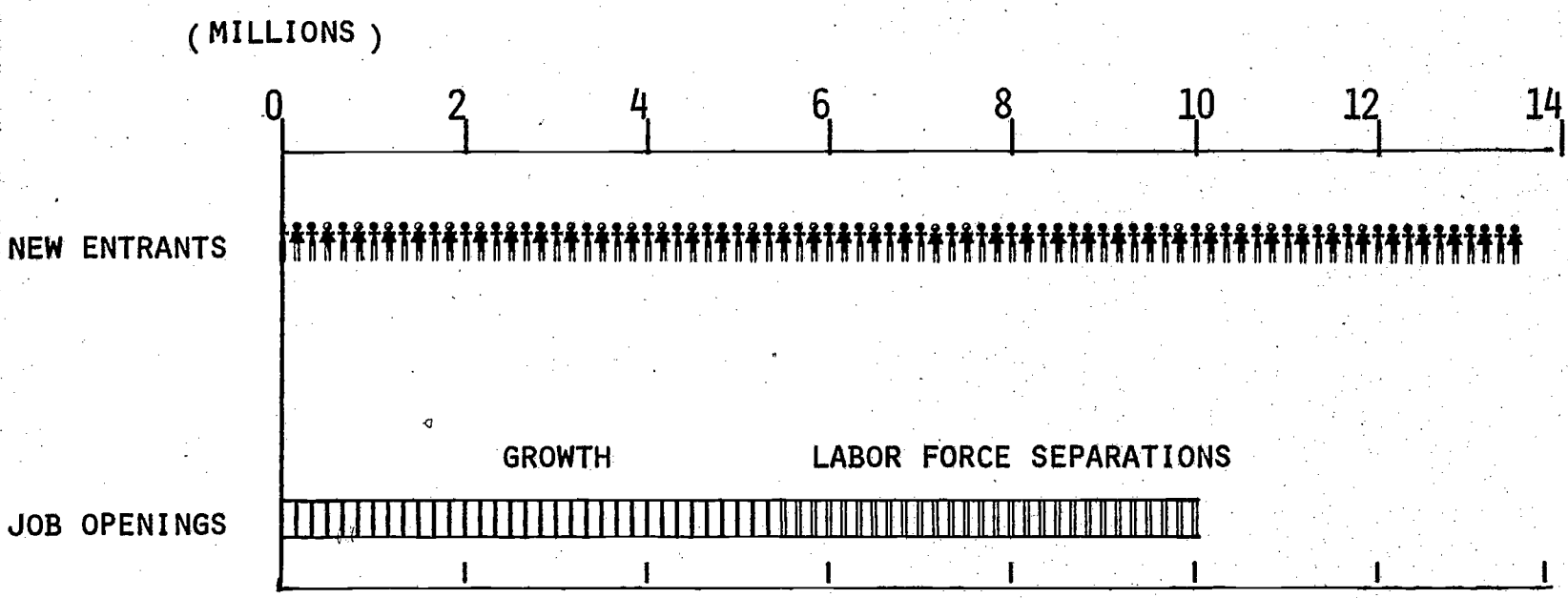
ALTHOUGH INCREASING NUMBERS OF STUDENTS ENTERED AND GRADUATED FROM COLLEGE DURING THE SEVENTIES, THE NUMBER OF BACHELOR'S DEGREES IN SCIENCE AND ENGINEERING DROPPED OFF AFTER 1974.

AT THE DOCTORAL LEVEL, THAT PEAK OCCURRED A YEAR EARLIER.

PROJECTIONS OF EARNED DEGREES MADE BY THE NATIONAL CENTER FOR EDUCATION STATISTICS INDICATE THAT THE NUMBER OF DEGREES IN MOST OF THESE FIELDS WILL DROP BELOW THE 1980 LEVEL BY 1990. HOWEVER, THESE PROJECTIONS MAY PROVE TO BE WRONG IF THE PRESENT INCREASE (AND PARTICULARLY THE RATE OF INCREASE) IN THE NUMBER AND PROPORTION OF WOMEN EARNING DEGREES IN THESE FIELDS CONTINUES. FOR EXAMPLE, THE PROJECTIONS FOR 1981 OVERESTIMATED THE NUMBER OF MEN EARNING DOCTORAL DEGREES BY 2.5%, BUT UNDERESTIMATED THE NUMBER OF WOMEN EARNING SUCH DEGREES BY 26.4%. THUS, THE TOTAL NUMBER OF SCIENCE AND ENGINEERING DEGREES PROJECTED WAS 7.8% BELOW THE ACTUAL NUMBER AWARDED.

Data Source: Appendix Tables 2, 3, 17 and 18

COLLEGE GRADUATE ENTRANTS AND TRADITIONAL JOB OPENINGS FOR GRADUATES, 1978-1990



SOURCE: BUREAU OF LABOR STATISTICS

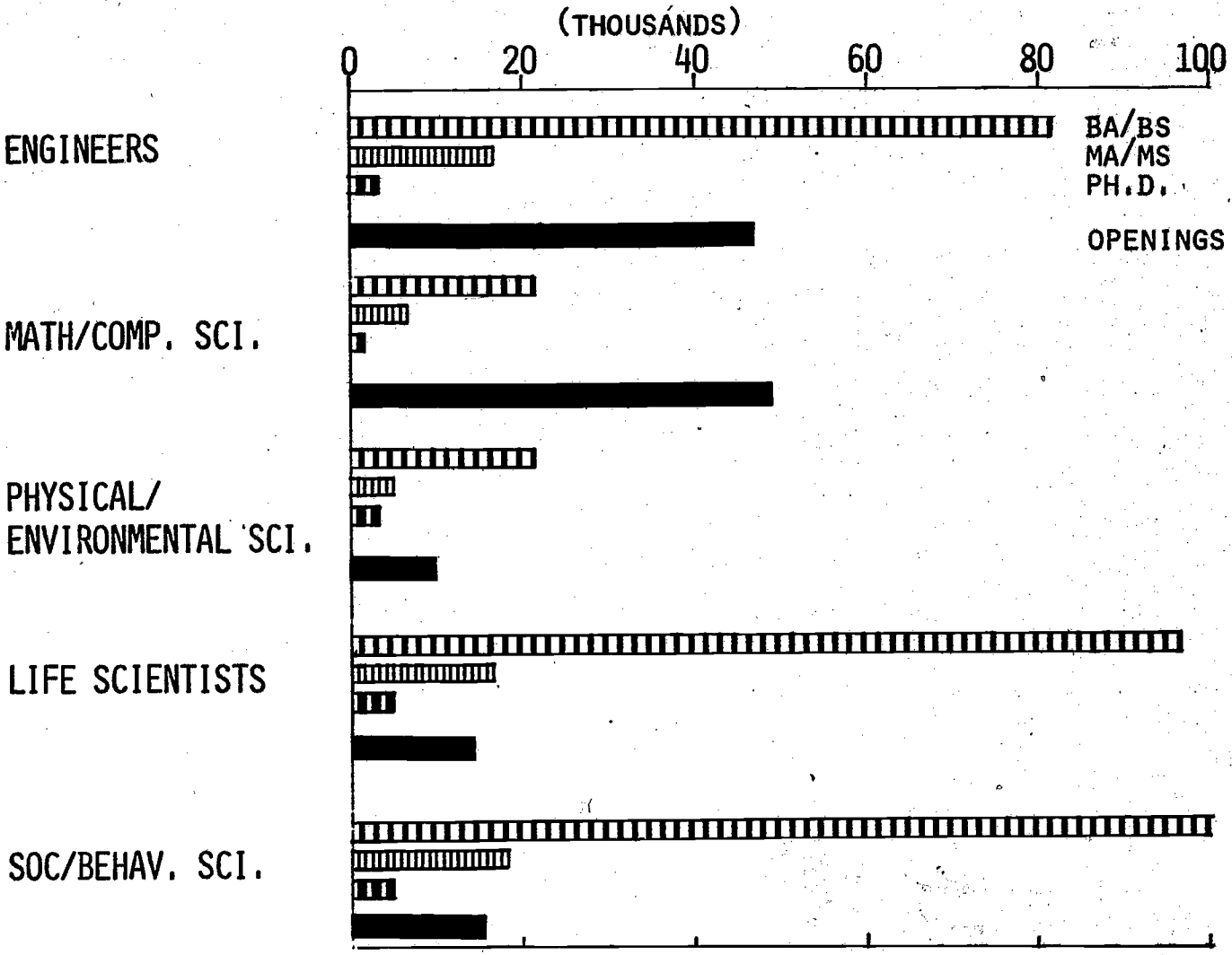
HOW WELL WILL THIS PROJECTED SUPPLY MATCH WITH PROJECTED DEMAND?

NOBODY CAN BE SURE, OF COURSE, ABOUT THE FUTURE, BUT A NUMBER OF FORECASTS HAVE BEEN MADE BY GOVERNMENT AGENCIES AND OTHERS WHICH INDICATE THAT THERE WILL BE NO SHORTAGE OF COLLEGE EDUCATED WORKERS IN GENERAL.

INDEED, THE BUREAU OF LABOR STATISTICS HAS PROJECTED THAT ABOUT 13.5 MILLION COLLEGE GRADUATES WILL ENTER THE LABOR FORCE FROM 1978 TO 1990, BUT ONLY 10.2 MILLION JOB OPENINGS ARE EXPECTED TO BE AVAILABLE IN TRADITIONAL JOBS FOR GRADUATES. THUS, ONE OUT OF EVERY FOUR COLLEGE GRADUATES WILL FIND EMPLOYMENT IN JOBS NOT PREVIOUSLY SOUGHT OR FILLED BY COLLEGE EDUCATED WORKERS.

Data Source: Bureau of Labor Statistics: Occupational Projections and Training Data, 1980 Edition, Bulletin 2052, September 1980

PROJECTIONS OF ANNUAL AVERAGE OPENINGS AND DEGREES 1978-1990



SOURCE: BLS OCCUPATIONAL PROJECTIONS AND TRAINING DATA, 1980

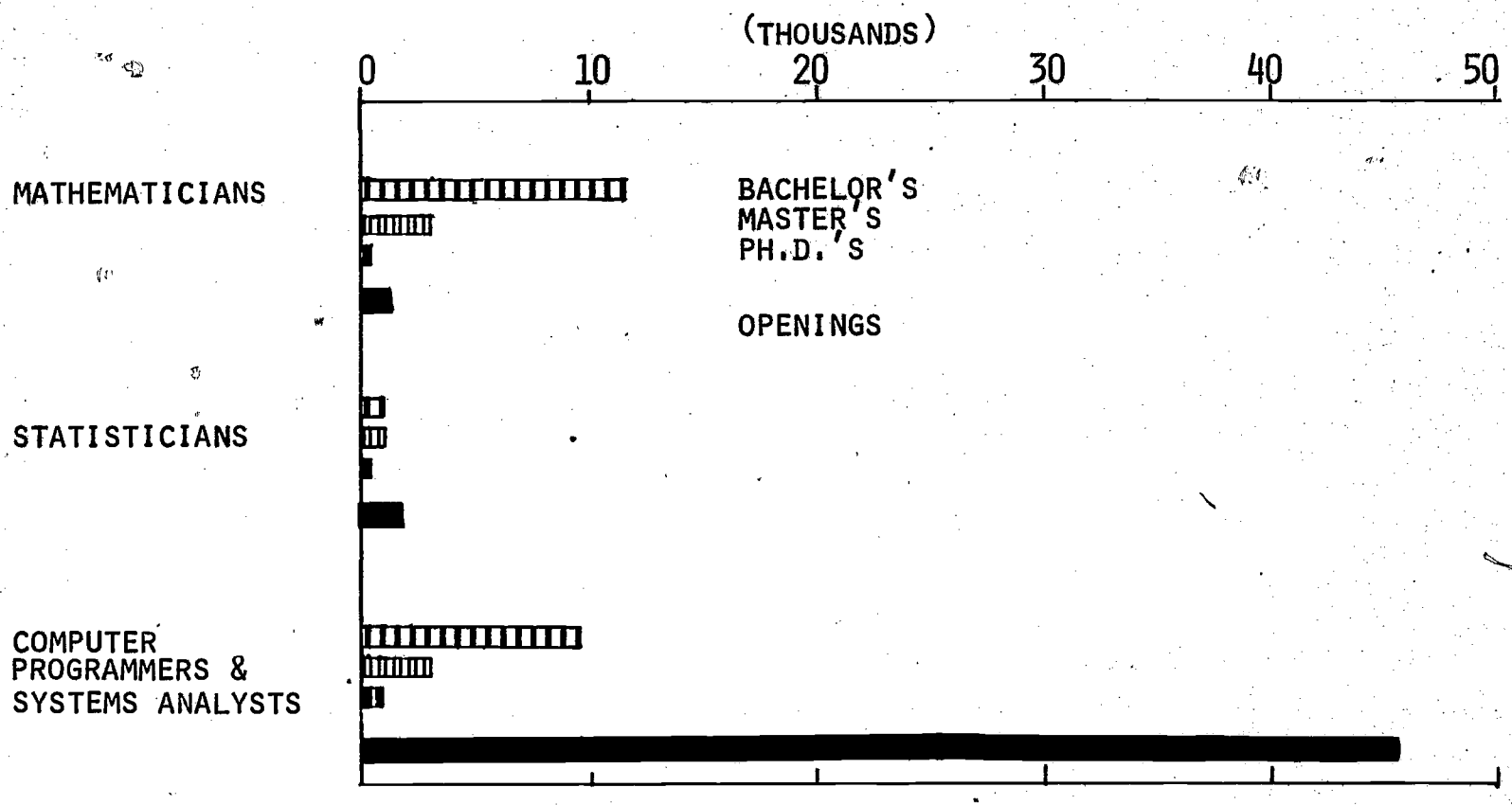
HOWEVER, THE EXCESS GRADUATES ARE NOT EVENLY DISTRIBUTED ACROSS ALL FIELDS. IN SOME OF THE SCIENCES AND IN ENGINEERING, GRADUATES ARE EXPECTED TO BE IN APPROXIMATE BALANCE WITH THE JOB OPENINGS AVAILABLE. IT IS IMPORTANT TO NOTE THAT IN THESE PROJECTIONS, THE JOB OPENINGS ARE NOT DIFFERENTIATED BY DEGREE LEVEL, SO THAT IN GENERAL ONE MIGHT ASSUME THAT THOSE WITH BETTER EDUCATIONAL CREDENTIALS WOULD BE MOST LIKELY TO GET THE JOBS. AS WE NOTED EARLIER, SOME FIELDS REQUIRE HIGHER DEGREES FOR PROFESSIONAL ENTRY THAN DO OTHERS.

IN ENGINEERING AND THE PHYSICAL SCIENCES, ANTICIPATED OPENINGS ARE SUFFICIENT TO ABSORB ALL OF THE EXPECTED DOCTORAL GRADUATES, THE MASTER'S GRADUATES, AND SOME PORTION OF THE BACHELOR'S GRADUATES. JOB OPENINGS FOR MATH AND COMPUTER PROFESSIONALS WILL EXCEED THE TOTAL OF ALL DEGREES AWARDED AT ALL LEVELS.

IN THE LIFE AND SOCIAL SCIENCES, THE OPENINGS SHOULD BE ABLE TO ABSORB THE PH.D.'S AND SOME OF THE MASTER'S GRADUATES, BUT FEW OR NONE AT THE BACHELOR'S LEVEL.

Data Source: Appendix Table 19

PROJECTIONS OF AVERAGE ANNUAL DEGREES AND OPENINGS IN MATH & COMPUTER SCIENCES 1978-1990



SOURCE: BUREAU OF LABOR STATISTICS

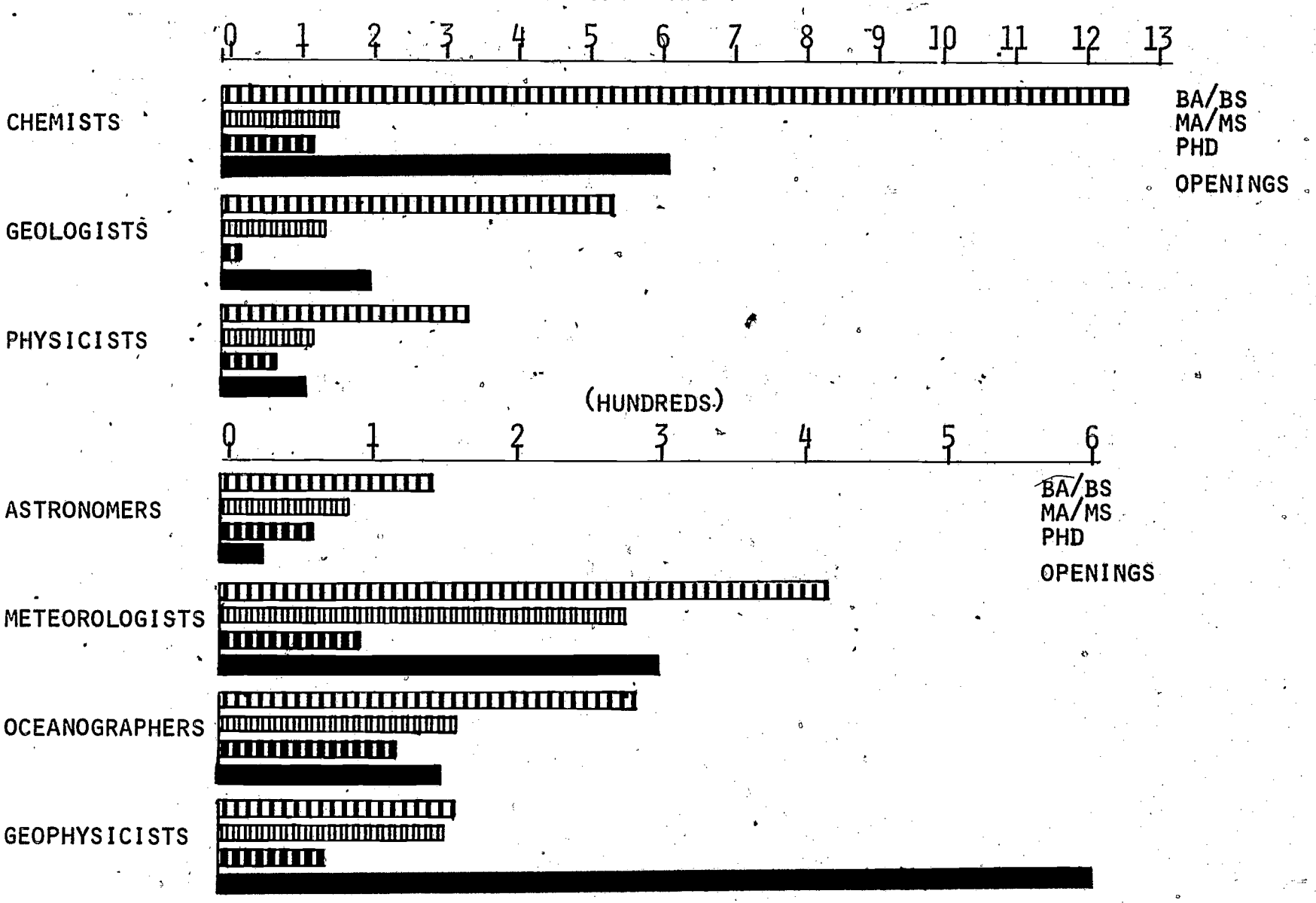
GROUPING INTO LARGER FIELDS, HOWEVER, MASKS MUCH OF THE DETAIL THAT IS NEEDED TO EXAMINE CAREER OPPORTUNITIES MORE CAREFULLY IN LIGHT OF THESE PROJECTIONS.

MATHEMATICS IS EXPECTED TO BE SIGNIFICANTLY OVER-SUPPLIED WITH GRADUATES, WHILE MORE STATISTICIANS AND COMPUTER SPECIALISTS WILL BE NEEDED THAN WILL GRADUATE AT ANY LEVEL.

MANY OF THE MATHEMATICS GRADUATES CAN BE EXPECTED TO FIND EMPLOYMENT IN THE STATISTICS AND COMPUTER AREAS, AND SOME OF THE COMPUTER OPENINGS ALSO WILL BE FILLED WITH GRADUATES FROM TWO YEAR COLLEGES AND FROM OTHER FIELDS. THIS WILL BE PARTICULARLY TRUE FOR PROGRAMMERS.

Data Source: Appendix Table 19

PROJECTIONS OF AVERAGE ANNUAL DEGREES AND JOB OPENINGS IN PHYSICAL & ENVIRONMENTAL SCIENCES, 1978-1990



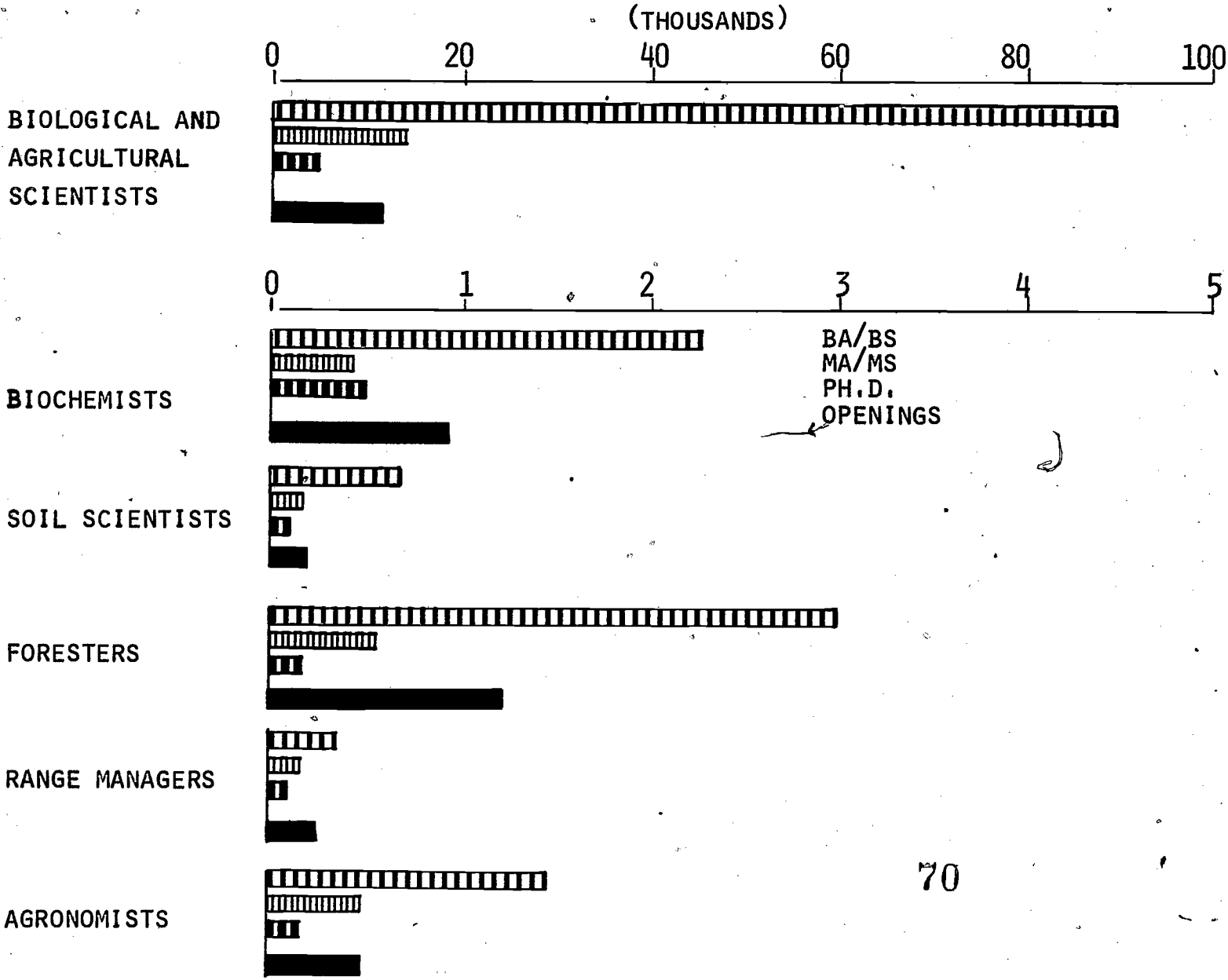
SOURCE: BUREAU OF LABOR STATISTICS

WITHIN THE PHYSICAL AND ENVIRONMENTAL SCIENCES, THE LARGER FIELDS OF CHEMISTRY AND GEOLOGY WILL HAVE ENOUGH OPENINGS FOR THOSE WITH GRADUATE DEGREES, AND WILL ALSO UTILIZE MANY AT THE BACHELOR'S LEVEL. PHYSICS APPEARS TO BE SOMEWHAT OVERSUPPLIED EVEN AT THE MASTER'S LEVEL.

ON A MUCH SMALLER SCALE, ASTRONOMERS AT THE DOCTORAL LEVEL WILL EXCEED JOB OPENINGS EACH YEAR, WHILE METEOROLOGY AND OCEANOGRAPHY WILL PROVIDE SOME EXCESS OF MASTER'S GRADUATES FOR AVAILABLE OPENINGS, ACCORDING TO THESE PROJECTIONS. IN GEOPHYSICS, HOWEVER, THERE WILL BE TOO FEW GRADUATES TO MEET THE NEEDS, EVEN IF ALL GRADUATES WERE AVAILABLE EACH YEAR.

Data Source: Appendix Table 19

PROJECTIONS OF AVERAGE ANNUAL DEGREES AND OPENINGS IN LIFE SCIENCES, 1978-1990



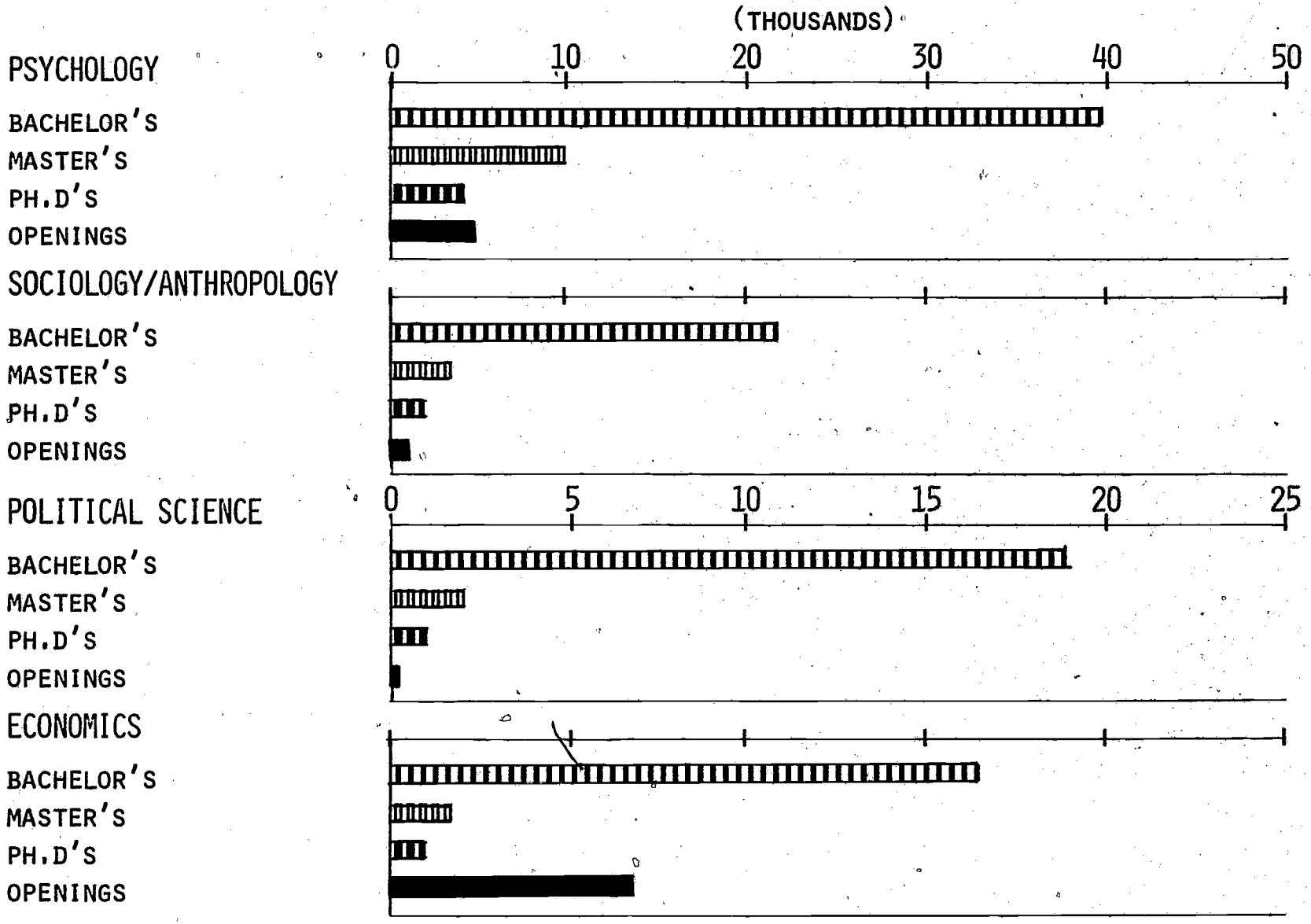
SOURCE: BUREAU OF LABOR STATISTICS

IN THE LIFE SCIENCES, THE LARGEST OVERSUPPLY IS EXPECTED IN GENERAL BIOLOGICAL AND AGRICULTURAL SCIENCES, WHERE JOB OPENINGS ARE NOT EXPECTED TO BE SUFFICIENT TO UTILIZE ALL THOSE WITH GRADUATE DEGREES.

HOWEVER, IN MANY OF THE MUCH SMALLER SUBFIELDS, SUCH AS RANGE MANAGEMENT, A BALANCE EXISTS BETWEEN EXPECTED NEW GRADUATES AND JOB OPENINGS. BIOCHEMISTS, SOIL SCIENTISTS AND FORESTERS AT THE GRADUATE LEVELS ALSO ARE IN APPROXIMATE BALANCE WITH ANTICIPATED OPENINGS.

Data Source: Appendix Table 19

AVERAGE ANNUAL DEGREES AND EMPLOYMENT OPENINGS, 1978-1990



SOURCE: BUREAU OF LABOR STATISTICS

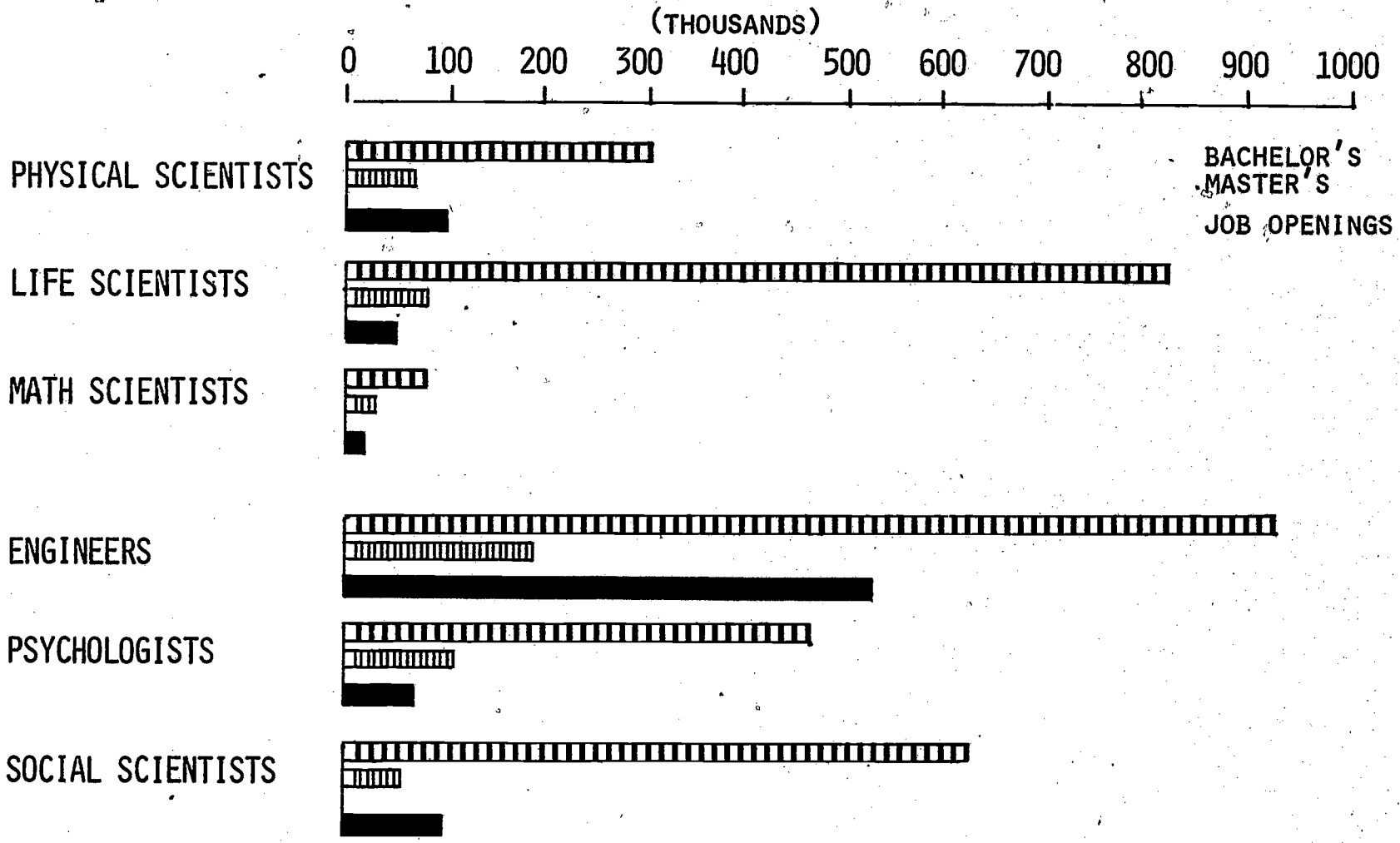
IN PSYCHOLOGY, DOCTORAL AND SOME MASTER'S GRADUATES WILL BE NEEDED TO FILL EXPECTED OPENINGS.

IN SOCIOLOGY, ANTHROPOLOGY AND POLITICAL SCIENCE, THE NUMBER OF OPENINGS WILL BE LESS THAN THE DOCTORATE DEGREES AWARDED, SO THAT THOSE WITH LOWER DEGREES MAY HAVE VERY LITTLE OPPORTUNITY FOR PROFESSIONAL EMPLOYMENT IN THESE FIELDS.

ECONOMICS GRADUATES, HOWEVER, ARE EXPECTED TO BE IN GREATER DEMAND, AND EVEN SOME BACHELOR'S LEVEL GRADUATES MAY FIND JOBS IN THIS FIELD.

Data Source: Appendix Table 19

PROJECTED JOB OPENINGS AND DEGREES IN SCIENCE AND ENGINEERING 1978-1990



SOURCES: NATIONAL SCIENCE FOUNDATION AND NATIONAL CENTER FOR EDUCATION STATISTICS

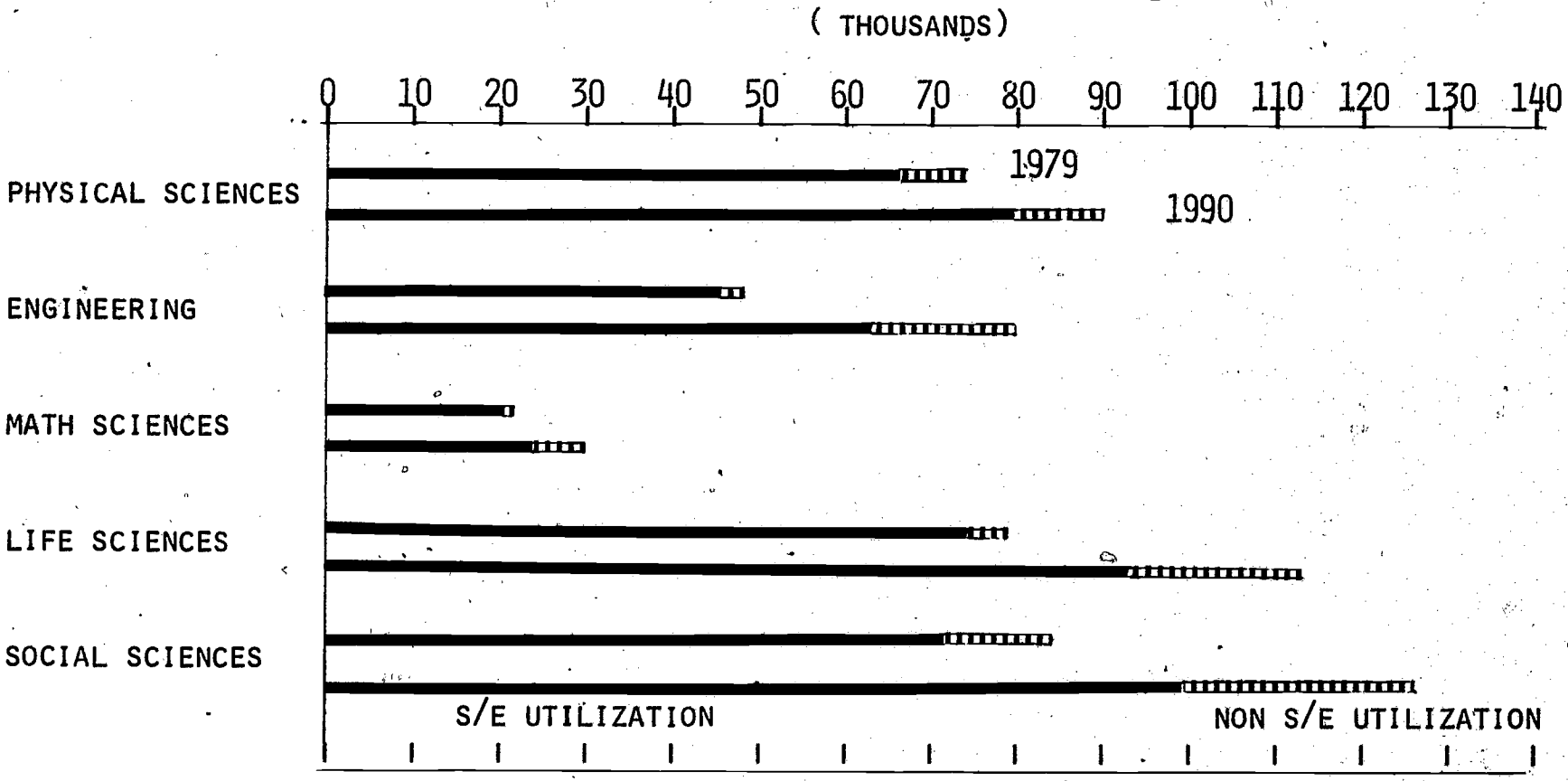
ANOTHER STUDY PREPARED BY THE NATIONAL SCIENCE FOUNDATION AND THE DEPARTMENT OF EDUCATION COMPARES PROJECTED JOB OPENINGS FOR BACHELOR'S AND MASTER'S GRADUATES WITH EXPECTED DEGREES AT THOSE LEVELS FOR THE TOTAL PERIOD 1978 TO 1990. THESE PROJECTIONS DO NOT INDICATE ANY SHORTAGE OF GRADUATES AT THE BACCALAUREATE LEVEL EXCEPT IN INDUSTRIAL ENGINEERING.

A LARGE OVERSUPPLY OF GRADUATES RELATIVE TO JOBS IS FORECAST IN THE LIFE SCIENCES, PSYCHOLOGY AND THE SOCIAL SCIENCES.

THIS REPORT DOES NOT COMPARE DEGREES IN COMPUTER SCIENCE WITH JOB OPENINGS FOR COMPUTER PROFESSIONALS. HOWEVER, THE NUMBER OF DEGREES PROJECTED IN THE COMPUTER SCIENCES IS ONLY A SMALL FRACTION OF THE NUMBER OF ESTIMATED PROFESSIONAL JOB OPENINGS. SOME PROGRAMMING POSITIONS WILL NOT REQUIRE A DEGREE.

Data Source: Appendix Table 20

S/E UTILIZATION OF DOCTORAL LABOR FORCE IN 1979 AND 1990

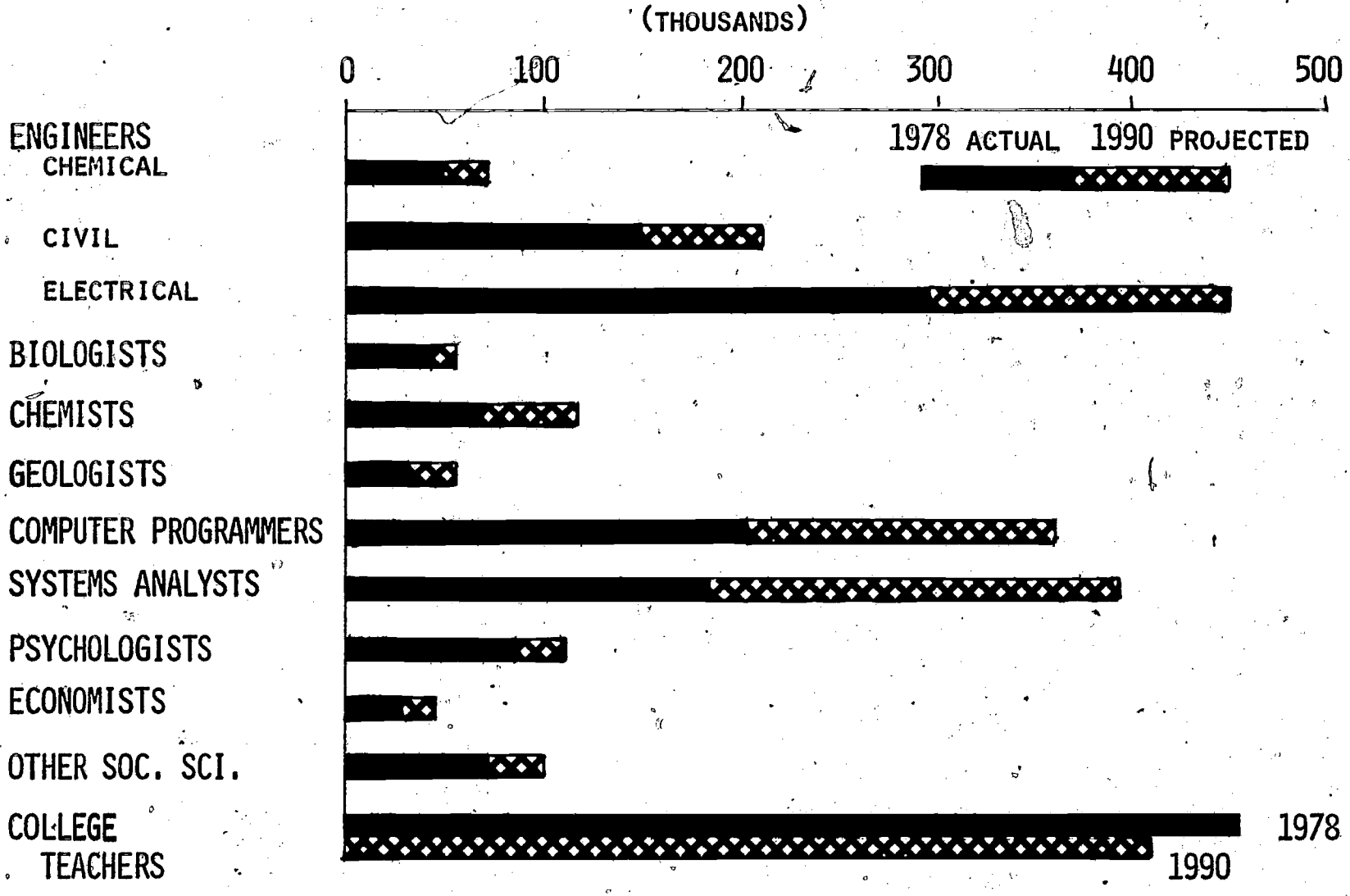


SOURCE: NATIONAL SCIENCE FOUNDATION

AT THE DOCTORAL LEVEL, THIS SAME STUDY ESTIMATES THAT BY 1990, SOME 80,000 PH.D.'S OR 18% OF ALL DOCTORAL SCIENTISTS AND ENGINEERS, WILL BE UTILIZED OUTSIDE OF SCIENCE AND ENGINEERING. THE NON-S/E UTILIZATION WILL INCLUDE 26,000 SOCIAL SCIENTISTS, 20,000 LIFE SCIENTISTS, 17,000 ENGINEERS, 10,000 PHYSICAL SCIENTISTS AND 7,000 MATHEMATICAL SCIENTISTS. THESE NUMBERS COMPARE WITH 28,000 DOCTORAL SCIENTISTS AND ENGINEERS IN 1979 (9% OF THE TOTAL) WHO ARE UTILIZED OUTSIDE OF SCIENCE AND ENGINEERING.

Data Source: Appendix Table 21

EMPLOYMENT IN SELECTED OCCUPATIONS, 1978 AND 1990



SOURCE: BUREAU OF LABOR STATISTICS

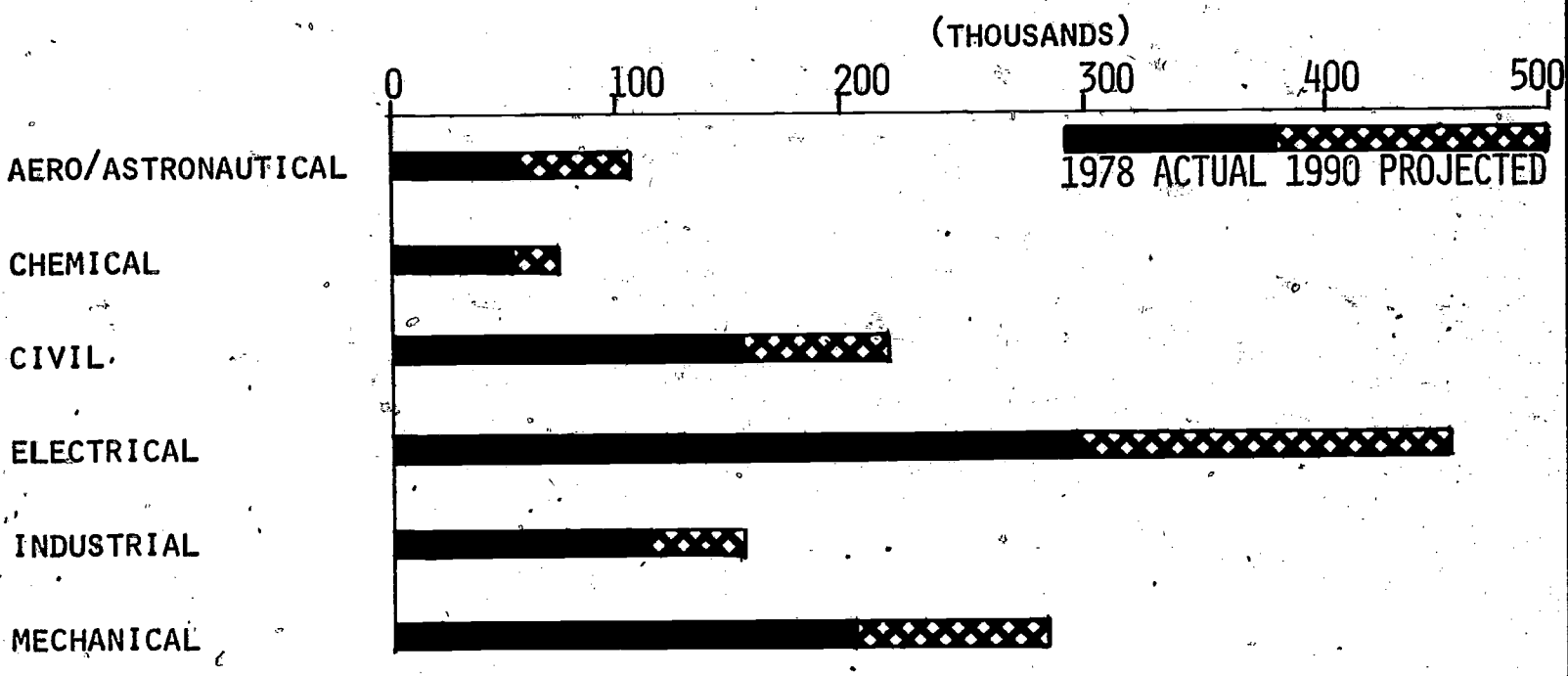
STILL ANOTHER STUDY BY THE BUREAU OF LABOR STATISTICS PROJECTS A 29% TO 36% INCREASE IN THE EMPLOYMENT OF PROFESSIONAL, TECHNICAL AND RELATED WORKERS BETWEEN 1978 AND 1990, DEPENDING ON ECONOMIC AND PRODUCTIVITY INCREASES.

ENGINEERS, GEOLOGISTS, ENGINEERING AND SCIENCE TECHNICIANS, COMPUTER SPECIALISTS, ECONOMISTS AND PSYCHOLOGISTS ALL SHOW HIGHER THAN AVERAGE GROWTH IN THE PROFESSIONAL, TECHNICAL AND RELATED OCCUPATIONS GROUP, WHILE EMPLOYMENT OF LIFE SCIENTISTS AND CHEMISTS IS EXPECTED TO GROW SOMEWHAT BELOW THE AVERAGES, AND THE NUMBER OF COLLEGE AND UNIVERSITY TEACHERS IS EXPECTED TO DROP BY ALMOST 10 PERCENT.

IN ACTUAL NUMBERS, THE LARGEST INCREASES ARE PROJECTED IN ELECTRICAL ENGINEERING, COMPUTER PROGRAMMING AND SYSTEMS ANALYSIS.

Data Source: Appendix Table 22

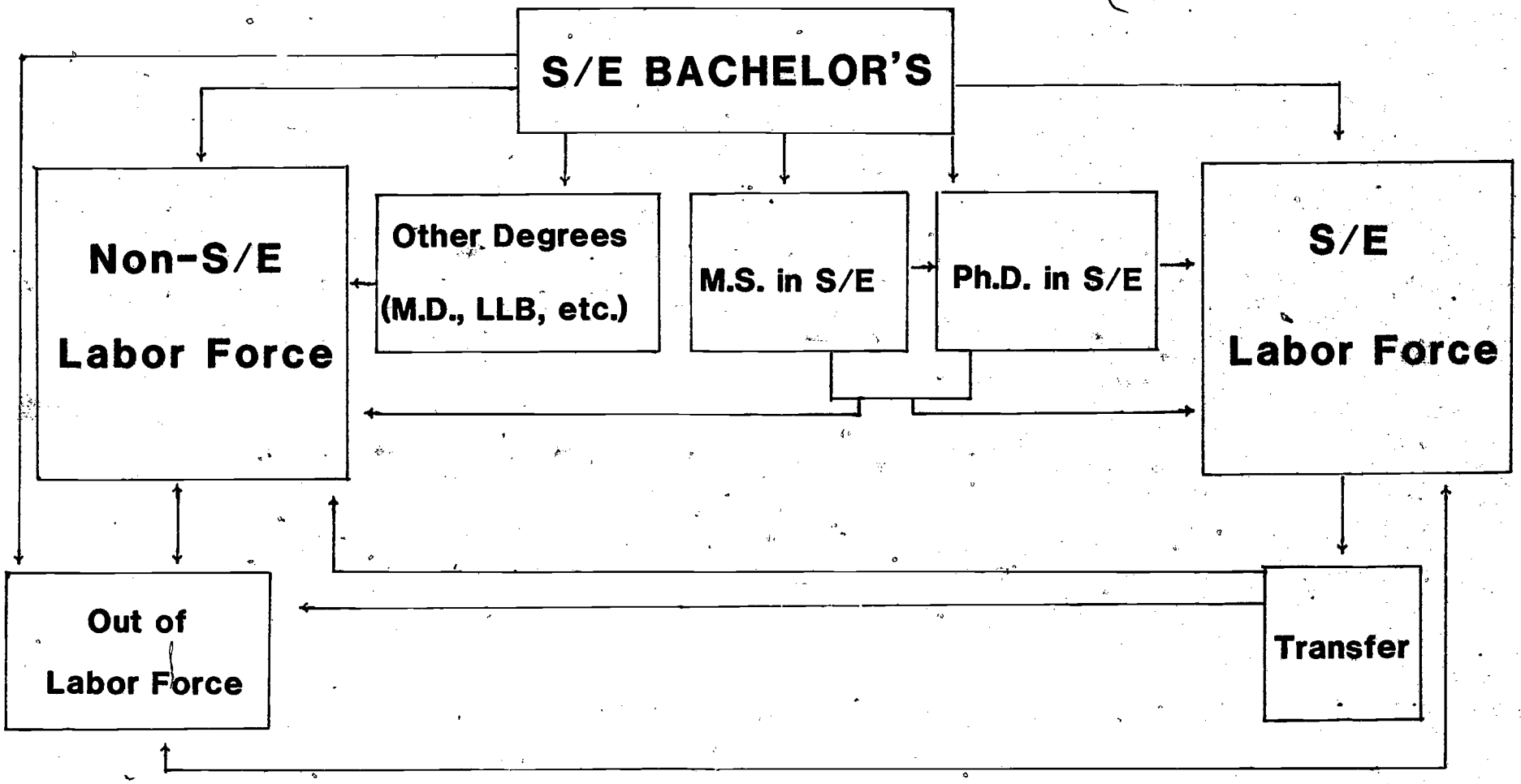
EMPLOYMENT IN ENGINEERING OCCUPATIONS, 1978 AND 1990



SOURCE: BUREAU OF LABOR STATISTICS

PERCENTAGE GROWTH IN ALL ENGINEERING FIELDS AVERAGES 42% OVER THE TWELVE YEAR SPAN, BUT WITHIN THE SUBFIELDS OF ENGINEERING, THE RANGE IS FAR WIDER. CHEMICAL ENGINEERING IS EXPECTED TO GROW ONLY 32%, COMPARED WITH A 54% GROWTH IN ELECTRICAL ENGINEERING AND A 75% GROWTH IN AERONAUTICAL/ASTRONAUTICAL ENGINEERING. THE LARGEST NUMERICAL INCREASE WILL BE IN ELECTRICAL ENGINEERING.

Data Source: Appendix Table 22


S/E BACHELOR'S
Non-S/E Labor Force
Other Degrees (M.D., LLB, etc.)
M.S. in S/E
Ph.D. in S/E
S/E Labor Force
Out of Labor Force
Transfer

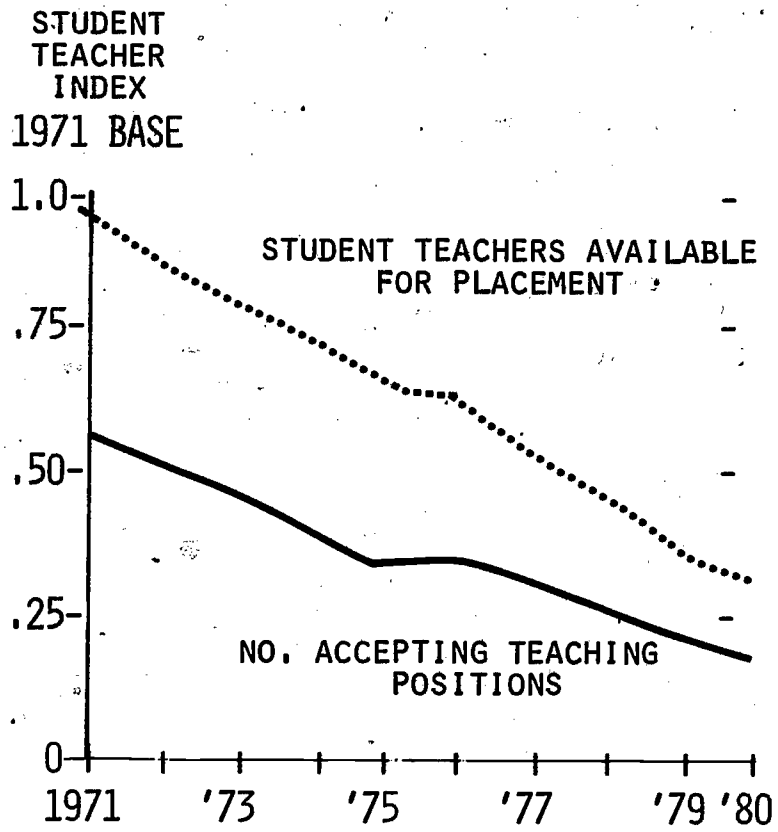
MOST PROJECTIONS OF SUPPLY AND DEMAND INDICATE THAT THE NUMBER OF STUDENTS GRADUATING IN ALMOST ALL AREAS PROBABLY WILL BE SUFFICIENT TO FILL AVAILABLE JOB OPENINGS CREATED BOTH BY GROWTH IN EMPLOYMENT AND REPLACEMENT OF THOSE IN THE PRESENT LABOR FORCE WHO DIE, RETIRE, OR TRANSFER TO OTHER PROFESSIONS. IN MOST INSTANCES, PROJECTIONS INDICATE A LARGER SUPPLY THAN CAN BE UTLIZED IN SCIENCE AND ENGINEERING EMPLOYMENT. HOWEVER, NO SIGNIFICANT INCREASE IN UNEMPLOYMENT FOR SCIENCE AND ENGINEERING GRADUATES IS ANTICIPATED.

DIRECT EMPLOYMENT FOR ALL GRADUATES IN OCCUPATIONS CLOSELY RELATED TO THEIR COLLEGE MAJORS IS NOT NECESSARILY DESIREABLE, NOR DOES IT REPRESENT OPTIMUM UTILIZATION OF EDUCATION EITHER FOR THE INDIVIDUAL OR THE NATION. IN ORDER TO MAINTAIN TECHNOLOGICAL COMPETITIVENESS WITH OTHER NATIONS OF THE WORLD, THE U.S. MUST HAVE PERSONS INVOLVED IN THE DECISION MAKING AND MANAGERIAL PROCESSES OF BOTH GOVERNMENT AND INDUSTRY WHO ARE TRAINED IN SCIENCE AND ENGINEERING.

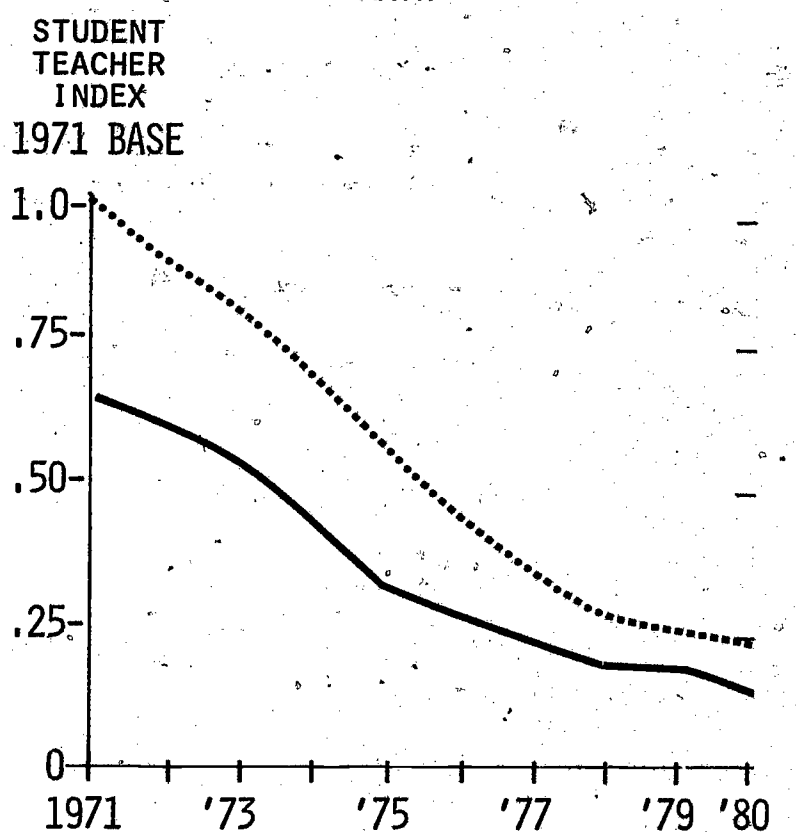
ADDITIONALLY, BACHELOR'S DEGREES IN VARIOUS FIELDS OF SCIENCE AND ENGINEERING ARE EXCELLENT STEPPING STONES TO CAREERS IN MEDICINE, LAW, BUSINESS AND OTHER OCCUPATIONS. EVEN WHEN NOT DIRECTLY ASSOCIATED WITH A SPECIFIC CAREER, SCIENTIFIC AND TECHNOLOGICAL TRAINING WILL BE A NECESSARY REQUISITE TO GOOD PERFORMANCE IN MOST JOB SPHERES IN OUR INCREASINGLY TECHNOLOGICAL WORLD.

STUDENT TEACHER SUPPLY INDEX

SCIENCE



MATH



SOURCE: NATIONAL SCIENCE TEACHERS ASSOCIATION 1982

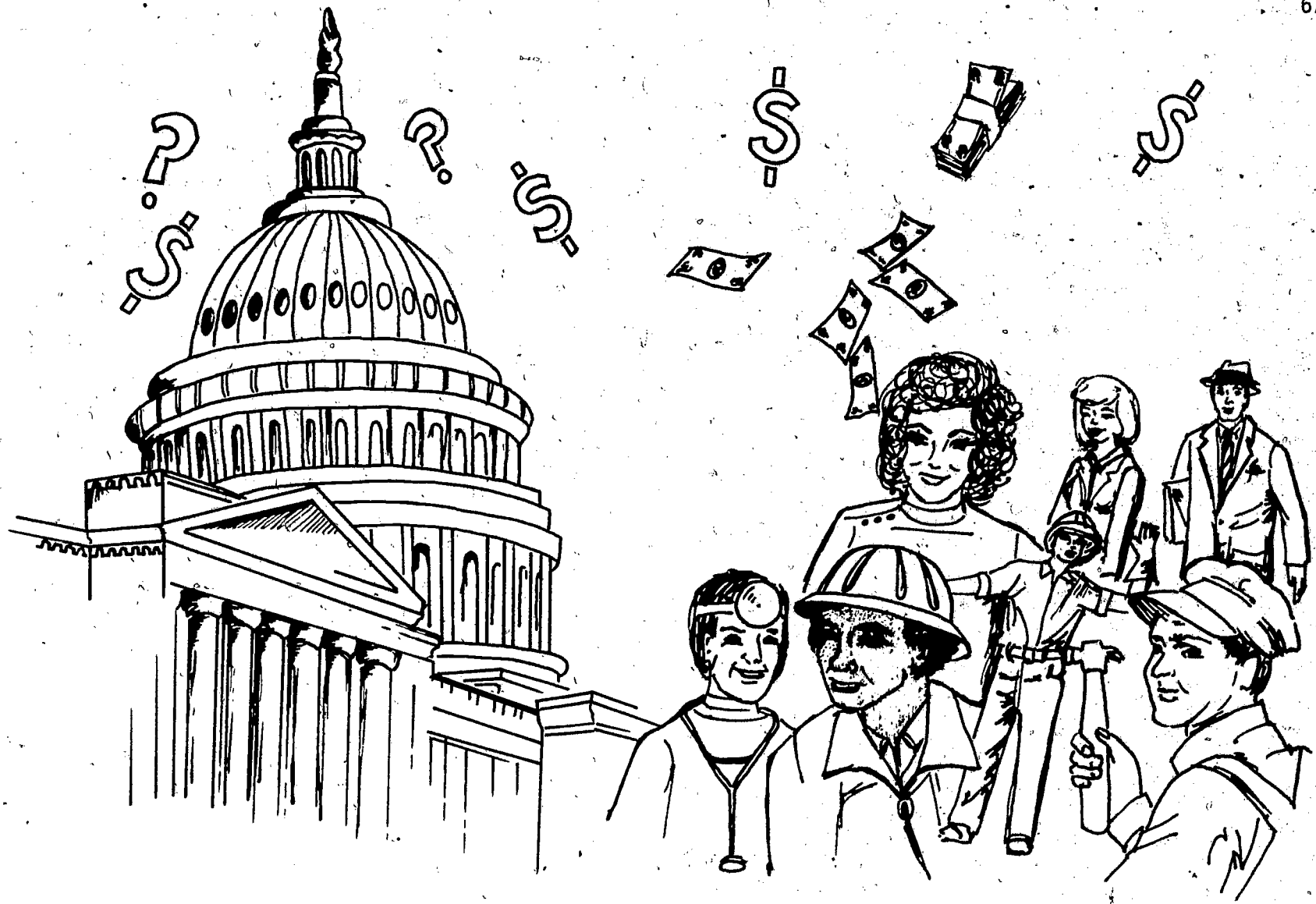
ONE AREA IN SERIOUS NEED OF MORE GRADUATES IS SCIENCE OR MATHEMATICS TEACHING AT THE ELEMENTARY AND SECONDARY LEVELS.

SINCE 1971, THERE HAS BEEN A 77% DECLINE IN THE NUMBER OF MATH TEACHERS AND A 65% DECLINE IN THE NUMBER OF SCIENCE TEACHERS PREPARED TO TEACH IN SECONDARY SCHOOLS. THE FRACTION OF THOSE TEACHERS WHO ACTUALLY ENTER TEACHING ALSO HAS DROPPED, SO THAT THE TOTAL EFFECT IS A 68% REDUCTION IN NEWLY EMPLOYED SCIENCE TEACHERS AND AN 80% DROP IN MATH TEACHERS SINCE 1971.

QUALIFIED TEACHERS ALREADY IN THE SCHOOL SYSTEM ARE LEAVING FOR NON-TEACHING JOBS, SO THAT THE NET LOSS OF TEACHERS HAS REQUIRED SCHOOLS TO UTILIZE UNQUALIFIED TEACHERS, AND TO DROP MATH AND SCIENCE COURSES.

AMONG NEWLY EMPLOYED SCIENCE AND MATH TEACHERS IN 1981, MORE THAN HALF WERE UNQUALIFIED TO TEACH IN THOSE FIELDS.

Data Source: Survey of college and university placement officers conducted in 1982 by J. A. Shymansky of the University of Iowa for the National Science Teachers Association



92

93

MANY OPPORTUNITIES IN SCIENCE AND ENGINEERING WILL DEPEND ON DECISIONS MADE BY THE FEDERAL GOVERNMENT. THESE INCLUDE APPROPRIATIONS FOR ACTIVITIES UTILIZING LARGE NUMBERS OF PERSONS WITH TECHNOLOGICAL TRAINING. CONGRESSIONAL DECISIONS FOR FUNDING ENERGY PROGRAMS, ENVIRONMENTAL ACTIVITIES, FOOD TECHNOLOGIES, NATIONAL DEFENSE, HEALTH CARE AND A HOST OF OTHER NATIONAL ENTERPRISES WILL AFFECT THE TOTAL DEMAND FOR SCIENTISTS AND ENGINEERS, AS WELL AS THE MIX OF FIELDS IN GREATEST DEMAND.

CHANGES IN FEDERAL TAX LAWS SOMETIMES HAVE A MAJOR IMPACT ON THE EXTENT OF INDUSTRIAL R&D. ALSO, THE IMPOSITION OF FEDERAL (AND STATE) REGULATIONS ON INDUSTRIES OFTEN GENERATES NEW TECHNOLOGICAL REQUIREMENTS, AND THUS NEW OPPORTUNITIES FOR SCIENTISTS AND ENGINEERS. THE EMERGENCE OF RADICALLY DIFFERENT TECHNOLOGIES, SUCH AS COMPUTERS AND LASERS, CREATES NEW OPPORTUNITIES AS WELL AS REDUCING THE DEMAND FOR SOME EXISTING SCIENTIFIC AND TECHNICAL SPECIALTIES.

WE CANNOT ALWAYS FORECAST WHAT THESE GOVERNMENTAL DECISIONS WILL BE. NEITHER CAN WE PREDICT THAT UNEXPECTED DISCOVERY OR HAPPENING THAT WILL CHANGE THE FORECAST, ALTHOUGH WE CAN BE QUITE CERTAIN THAT SOMETHING UNEXPECTED WILL OCCUR.

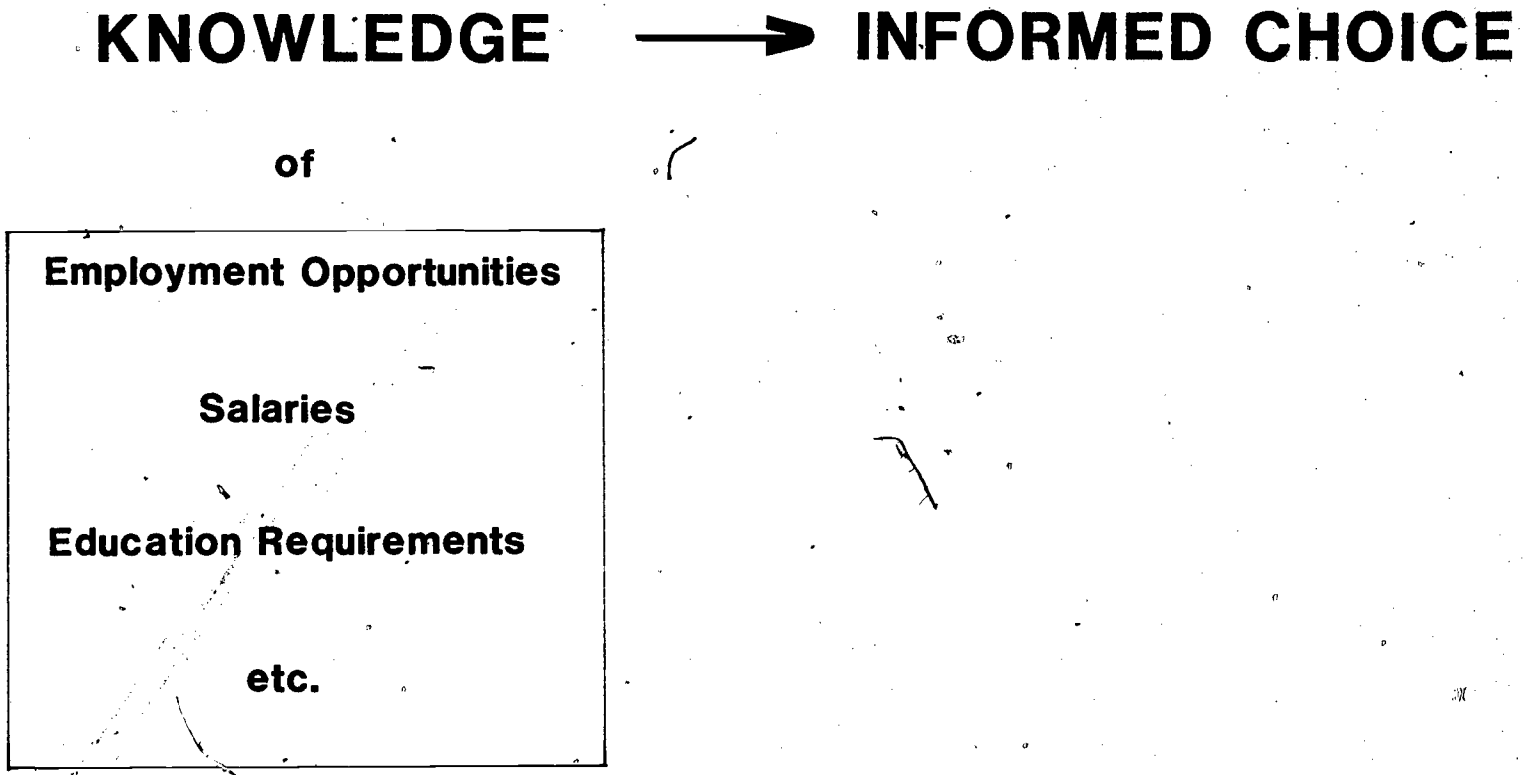
NEEDS + MONEY = DEMAND

in	from	for
Energy	Government	Scientists
Environment	Industry	Engineers
Cities	Foundations	
Transportation		
Health		
Defense		

THE IMPORTANT THING TO REMEMBER IN EXAMINING PROJECTIONS OF SUPPLY AND DEMAND IS THE DIFFERENCE BETWEEN DEMAND AND NEED. THE DIFFERENCE IS MONEY. NO MATTER HOW MANY SCIENTISTS AND ENGINEERS MAY BE NEEDED TO ACCOMPLISH SOME NATIONAL OBJECTIVE, NONE CAN BE HIRED UNTIL MONEY IS AVAILABLE TO PAY FOR THEIR SERVICES.

THE NATION'S NEEDS FOR TECHNOLOGICALLY TRAINED EXPERTS WILL NOT HAVE DIMINISHED OVER THE COMING DECADE. WE WILL STILL BE TRYING TO PRODUCE ADEQUATE, CLEAN ENERGY, KEEP OUR ENVIRONMENT HABITABLE, ERASE URBAN BLIGHT, CREATE ADEQUATE TRANSPORTATION SYSTEMS, AND PROVIDE HEALTH CARE, WHILE MAINTAINING OUR NATIONAL DEFENSE. THE STATE OF THE ECONOMY AND THE REORDERING OF PRIORITIES WILL ENABLE US TO CONVERT AT LEAST SOME OF THESE NEEDS INTO DEMAND.

SINCE WE CANNOT ALWAYS TELL WHICH AREAS OF NEED WILL BE FUNDED, TAXED OR REGULATED BY A CHANGING CONGRESS AND DIFFERENT ADMINISTRATIONS; OR WHICH WILL BE DEVELOPED SUCCESSFULLY BY INDUSTRY; IT IS IMPORTANT TO KEEP WATCH OVER NATIONAL DEVELOPMENTS AND TECHNOLOGICAL/ECONOMIC ADVANCES AS WELL AS TO KEEP A BROAD INTEREST IN ANY CHOSEN CAREER SPECIALTY.


KNOWLEDGE
INFORMED CHOICE
of
Employment Opportunities
Salaries
Education Requirements
etc.

AS WE HAVE SEEN, OPPORTUNITIES FOR WOMEN IN MOST AREAS ARE NOT YET QUITE AS GOOD AS FOR MEN - BUT CHANGES ARE OCCURRING WITH GREAT RAPIDITY, AND FIELDS THAT APPEAR TO OFFER GOOD PROSPECTS FOR EMPLOYMENT ALSO ARE THOSE IN WHICH THE TRADITIONAL BARRIERS ARE BEGINNING TO DISAPPEAR.

NO ONE SHOULD CHOOSE A MAJOR FIELD OF STUDY OR A CAREER SOLELY ON THE BASIS OF THE PRESENT OR PROJECTED JOB MARKET IN THAT FIELD. THERE IS ALWAYS A DEMAND FOR OUTSTANDING PEOPLE IN EVERY FIELD. BUT TRUE CHOICE IS AVAILABLE ONLY TO THOSE WHO UNDERSTAND THE COMPONENTS AND THE ALTERNATIVES OF THE DECISION. AN UNDERSTANDING OF POTENTIAL EMPLOYMENT OPPORTUNITIES IS ONE COMPONENT OF INFORMED CHOICE. ANOTHER IS THE RECOGNITION THAT SITUATIONS CHANGE IN WAYS THAT CANNOT ALWAYS BE FORESEEN IN ADVANCE.

CAREER PATTERNS TYPICALLY WILL CHANGE SEVERAL TIMES OVER A LIFETIME, AND SO IT IS IMPORTANT TO MAINTAIN AS WIDE AN INTEREST AS POSSIBLE IN ANY AREA CHOSEN. A GOOD EDUCATION IN SCIENCE OR ENGINEERING MAY BE ESPECIALLY HELPFUL IN PREPARING STUDENTS FOR WHATEVER CHANGES THEY MAY CHOOSE OR MAY BE REQUIRED TO MAKE, BECAUSE THE WORLD OF PROFESSIONAL WORK INCREASINGLY WILL MOVE TOWARD MORE TECHNOLOGICAL SOPHISTICATION.

TABLE 1

S/E Ph.D'S AWARDED BY DECADE 1920's - 1970's

	20's	30's	40's	50's	60's	70's
Math & Physical Sciences	3,271	6,687	8,202	18,745	34,307	48,852
Engineering	228	833	1,439	5,765	19,042	31,479
Life Sciences	2,370	5,081	5,822	14,459	26,461	43,123
Social Sciences	1,898	3,550	4,001	13,692	25,120	52,294
Total S/E	7,767	16,151	19,464	52,661	104,930	175,748
NUMBER OF S/E Ph.D'S AWARDED TO WOMEN						
Math & Physical Science	247	442	406	685	1,577	4,047
Engineering	2	6	7	20	77	541
Life Sciences	378	765	738	1,318	3,078	7,446
Social Sciences	325	562	580	1,510	3,604	12,634
Total S/E	952	1,775	1,731	3,533	8,336	24,667

Source: National Research Council

TABLE 2

SCIENCE AND ENGINEERING BACHELOR'S DEGREES, 1965-1980

YEAR	All Bachelor's Degrees					
	Total S/E	Physical Sciences[1]	Engi-neering	Math Sciences[2]	Life Sciences	Social Sciences[3]
1965	164,936	17,916	36,795	19,668	34,842	55,715
1966	173,471	17,186	35,815	20,182	36,864	63,424
1967	187,849	17,794	36,188	21,530	39,408	72,929
1968	212,174	19,442	37,614	24,084	43,260	87,774
1969	244,519	21,591	41,553	28,263	48,713	104,399
1970	264,122	21,551	44,772	29,109	52,129	116,561
1971	271,176	21,549	45,387	27,306	51,461	125,473
1972	281,228	20,887	46,003	27,250	53,484	133,604
1973	295,391	20,809	46,989	27,528	59,486	140,579
1974	305,062	21,287	43,530	26,570	68,226	145,449
1975	294,920	20,896	40,065	23,385	72,710	137,864
1976	292,174	21,559	39,114	21,749	77,301	132,451
1977	288,543	22,618	41,581	20,729	78,472	125,143
1978	288,167	23,175	47,411	19,925	77,138	120,518
1979	288,625	23,363	53,720	20,670	75,085	115,787
1980	292,271	23,682	59,903	22,594	71,630	114,462
1981	287,175	22,994	63,673	25,290	65,805	109,413
	Degrees Awarded to Women					
1965	36,213	2,532	139	6,453	8,277	18,812
1966	39,482	2,333	146	6,702	8,464	21,837
1967	44,002	2,402	184	7,334	8,948	25,134
1968	53,463	2,674	211	8,841	10,091	31,646
1969	63,196	2,952	313	10,348	11,308	38,275
1970	68,878	2,969	338	10,516	11,875	43,180
1971	72,996	3,014	365	9,818	11,803	47,996
1972	77,671	3,148	501	9,784	12,694	51,544
1973	83,839	3,121	580	9,985	14,570	55,583
1974	91,793	3,536	706	9,719	17,836	59,996
1975	93,342	3,838	860	8,656	20,811	59,177
1976	95,597	4,139	1,443	7,678	23,789	58,584
1977	97,453	4,551	2,086	7,488	25,609	57,719
1978	100,060	4,987	3,497	7,110	26,954	57,512
1979	102,292	5,287	4,919	7,421	27,548	57,117
1980	105,784	5,647	6,072	8,221	27,606	58,238
1981	105,251	5,702	7,083	9,655	26,352	56,459

1 Includes Environmental Science
2 Includes Computer Specialties
3 Includes Psychology

SOURCE: NCES, Earned Degrees Conferred (annual series)

75

TABLE 3

SCIENCE AND ENGINEERING DOCTORATE DEGREES, 1965-1981

YEAR	TOTAL DEGREES AWARDED					
	Total S/E	Physical Sciences[1]	Engi-neering	Math Sciences[2]	Life Sciences	Social Sciences[3]
1965	10,477	2,865	2,073	685	2,539	2,315
1966	11,456	3,058	2,299	769	2,712	2,618
1967	12,982	3,502	2,603	830	2,967	3,080
1968	14,411	3,667	2,847	970	3,501	3,426
1969	15,949	3,910	3,249	1,064	3,796	3,930
1970	17,731	4,400	3,432	1,222	4,163	4,514
1971	18,880	4,494	3,495	1,236	4,533	5,122
1972	18,940	4,226	3,475	1,281	4,505	5,453
1973	18,948	4,016	3,338	1,222	4,574	5,798
1974	18,316	3,696	3,144	1,196	4,407	5,873
1975	18,352	3,611	2,959	1,149	4,540	6,093
1976	17,872	3,442	2,791	1,003	4,480	6,156
1977	17,373	3,410	2,641	959	4,266	6,097
1978	17,956	3,234	2,423	959	4,887	6,453
1979	18,247	3,321	2,494	977	5,076	6,379
1980	16,171	3,151	2,479	963	5,325	6,253
1981	18,662	3,208	2,528	960	5,461	6,505
	DEGREES AWARDED TO WOMEN					
1965	744	127	7	50	263	297
1966	911	132	8	48	326	397
1967	1,086	161	9	48	401	467
1968	1,295	185	12	47	483	568
1969	1,472	205	10	56	537	664
1970	1,626	243	15	77	538	753
1971	1,929	244	16	96	656	917
1972	2,101	269	21	96	680	1,035
1973	2,446	257	45	119	795	1,230
1974	2,590	260	34	115	784	1,397
1975	2,838	284	50	110	863	1,531
1976	2,986	296	53	113	870	1,654
1977	3,103	303	74	128	845	1,753
1978	3,526	309	53	131	1,082	1,951
1979	3,854	351	63	145	1,190	2,105
1980	4,099	386	90	116	1,342	2,165
1981	4,359	364	99	138	1,443	2,315

[1] Includes Environmental Sciences
[2] Includes Computer Sciences
[3] Includes Psychology

SOURCE: National Research Council

TABLE 4

LABOR FORCE STATUS OF SCIENTISTS AND ENGINEERS, 1980

FIELD	TOTAL			LABOR FORCE			UNEMPLOYED/SEEKING			OUTSIDE LABOR FORCE		
	Total	Men	Women	Total	Men	Women	Total	Men	Women	Total	Men	Women
All Fields	2,964,200	2,617,100	347,000	2,720,300	2,409,600	310,200	45,400	36,800	8,500	243,800	207,600	36,300
Physical Scientists	260,300	230,400	29,900	217,300	196,000	21,300	6,100	4,900	1,200	43,100	34,500	8,600
Chemists	178,200	153,700	24,600	146,900	129,300	17,600	4,700	3,500	1,200	31,300	24,400	6,900
Physicists/Astronomers	63,000	60,100	2,900	53,800	51,900	2,000	1,200	1,200	*	9,200	8,300	900
Other Physical Scientists	19,100	16,700	2,400	16,500	14,900	1,700	200	200	*	2,600	1,800	700
Mathematical Scientists	98,300	79,900	18,400	82,300	65,700	16,600	2,600	1,600	900	16,000	14,300	1,700
Mathematicians	86,600	70,500	16,200	73,200	58,200	15,000	2,400	1,500	900	13,400	12,200	1,200
Statisticians	11,700	9,500	2,200	9,100	7,400	1,600	200	200	*	2,600	2,000	600
Computer Specialists	299,300	235,100	64,200	295,500	234,000	61,500	5,000	4,100	900	3,800	1,100	2,700
Environmental Scientists	96,100	84,900	11,300	87,500	77,600	9,900	1,200	900	300	8,600	7,300	1,300
Earth Scientists	70,300	62,100	8,200	63,400	56,300	7,200	500	300	200	6,900	5,900	1,000
Oceanographers	3,000	2,900	200	2,800	2,700	200	300	300	*	200	200	*
Atmospheric Scientists	22,800	19,900	2,900	21,300	18,700	2,600	500	300	100	1,500	1,200	300
Engineers	1,477,300	1,442,300	35,000	1,368,900	1,335,400	33,500	16,600	16,200	400	108,400	106,900	1,500
Aero./Astro.	44,400	42,200	2,100	40,600	38,800	1,800	1,300	1,300	*	3,800	3,400	400
Chemical Engineers	78,100	73,400	4,700	72,600	68,100	4,500	800	700	100	5,500	5,300	200
Civil Engineers	200,400	196,900	3,500	191,700	188,400	3,300	2,900	2,900	*	8,800	8,600	200
Electrical/Electronic	274,300	270,800	3,500	263,100	259,900	3,200	2,800	2,800	*	11,200	10,900	300
Mechanical Engineers	245,300	240,700	4,600	237,000	232,400	4,600	1,900	1,900	*	8,300	8,200	*
Other Engineers	634,900	618,200	16,700	564,000	547,800	16,200	6,800	6,600	200	70,900	70,500	400
Life Scientists	411,800	320,400	91,500	375,300	293,300	81,900	6,400	4,300	2,200	36,600	27,000	9,600
Biologists	189,300	130,700	58,600	166,300	114,000	52,300	2,000	1,100	900	23,100	16,700	6,300
Agricultural Scientists	179,600	157,800	21,800	166,800	147,800	19,000	4,300	3,000	1,200	12,800	10,000	2,800
Medical Scientists	42,900	31,900	11,000	42,100	31,600	10,600	200	100	100	700	300	400
Psychologists	129,500	82,500	47,000	119,300	77,900	41,400	2,600	1,400	1,200	10,100	4,600	5,500
Social Scientists	191,500	141,700	49,800	174,200	129,700	44,500	5,000	3,500	1,500	17,300	11,900	5,400
Economists	65,900	56,700	9,200	59,000	51,500	7,500	1,500	1,200	300	6,900	5,300	1,600
Socio./Anthrop.	54,200	33,900	20,300	47,900	30,200	17,700	1,000	700	300	6,300	3,600	2,700
Other Social Scientists	71,400	50,900	20,500	67,300	48,000	19,300	2,500	1,600	900	4,100	2,900	1,100

Note: Detail may not add to totals because of rounding.

* Too few cases to estimate

SOURCE: National Science Foundation, U.S. Scientists and Engineers, 1980 (in press)

TABLE 5

SCIENTISTS AND ENGINEERS, 1980
LABOR FORCE PARTICIPATION RATES AND UNEMPLOYMENT RATES

FIELD	LABOR FORCE PARTICIPATION RATES		UNEMPLOYMENT RATES	
	Men	Women	Men	Women
Total All Fields	**92.1**	**89.5**	**1.5**	**2.7**
Physical Scientists	**85.1**	**71.2**	**2.5**	**5.6**
Chemists	84.1	71.5	2.7	6.8
Physicists/Astronomers	86.4	69.0	2.3	*
Other Physical Scientists	89.2	70.8	1.3	*
Mathematical Scientists	**82.2**	**90.2**	**2.4**	**5.4**
Mathematicians	82.6	92.6	2.6	6.0
Statisticians	77.9	72.7	2.7	*
Computer Specialists	**99.5**	**95.8**	**1.8**	**1.5**
Environmental Scientists	**91.4**	**87.6**	**1.1**	**3.0**
Earth Scientists	90.7	87.8	0.5	2.8
Oceanographers	93.1	100.0	11.1	*
Atmospheric Scientists	94.0	89.7	1.6	3.9
Engineers	**92.6**	**95.7**	**1.2**	**1.2**
Aero./Astro.	91.9	85.7	3.4	*
Chemical Engineers	92.8	95.7	1.0	2.2
Civil Engineers	95.7	94.3	1.5	*
Electrical/Electronic	96.0	91.4	1.1	*
Mechanical Engineers	96.6	100.0	0.8	*
Other Engineers	88.6	97.0	1.2	1.2
Life Scientists	**91.5**	**89.5**	**1.5**	**2.7**
Biologists	87.2	89.3	1.0	1.7
Agricultural Scientists	93.7	87.2	2.0	6.3
Medical Scientists	99.1	96.4	0.3	0.9
Psychologists	**94.4**	**88.1**	**1.8**	**2.9**
Social Scientists	**91.5**	**89.4**	**2.7**	**3.4**
Economists	90.8	81.5	2.3	4.0
Socio./Anthrop.	89.1	87.2	2.3	1.7
Other Social Scientists	94.3	94.2	3.3	4.7

SOURCE: National Science Foundation, U.S. Scientists and Engineers, 1980 (in press)

TABLE 6

LABOR FORCE PARTICIPATION RATES, SCIENCE AND ENGINEERING UTILIZATION RATES, AND UNEMPLOYMENT RATES; BY FIELD AND SEX: 1978

	LABOR FORCE PARTICIPATION RATES		SCIENCE AND ENGINEERING UTILIZATION RATES		UNEMPLOYMENT RATES	
FIELD	MEN	WOMEN	MEN	WOMEN	MEN	WOMEN
All fields	92	89	86.2	56.7	1.3	2.4
Physical scientists	87	70	86.9	64.4	1.7	6.3
Mathematical scientists	82	91	53.1	26.4	1.3	2.8
Computer specialists	99.5	95	98.5	99.2	0.3	0.2
Environmental scientists	92	91	86.8	63.9	2.4	1.3
Engineers	92	94	93.6	86.7	1.3	3.4
Life scientists	91	89	71.5	56.3	1.6	1.9
Psychologists	95	89	63.9	40.7	1.5	2.8
Social scientists	93	90	59.1	18.9	0.7	3.7

SOURCE: National Science Foundation, U.S. Scientists and Engineers: 1978 (NSF 80-304) and unpublished data.

TABLE 7

RECENT SCIENCE AND ENGINEERING DEGREE RECIPIENTS BY FIELD, SEX, DEGREE LEVEL, LABOR FORCE PARTICIPATION RATES, SCIENCE AND ENGINEERING UTILIZATION RATES, AND UNEMPLOYMENT RATES: 1978 and 1979 in 1980

	LABOR FORCE PARTICIPATION RATES		SCIENCE AND ENGINEERING UTILIZATION RATES		UNEMPLOYMENT RATES	
FIELD AND DEGREE LEVEL	MEN	WOMEN	MEN	WOMEN	MEN	WOMEN
	B A C H E L O R ' S					
All fields	98.3	93.7	58.1	36.8	3.2	4.3
Physical scientists	97.4	92.8	76.2	73.2	2.6	1.7
Mathematical scientists	99.0	94.8	60.3	59.3	4.0	1.9
Computer specialists	99.5	100.0	90.6	94.4	1.6	2.9
Environmental scientists	98.3	89.6	57.5	49.7	4.6	7.9
Engineers	99.2	99.4	91.5	90.9	1.4	1.3
Life scientists	97.4	93.9	50.4	49.0	4.0	7.1
Psychologists	99.2	92.5	18.4	17.0	3.6	2.9
Social scientists	97.2	93.4	17.7	19.4	5.4	4.3
	M A S T E R ' S					
All fields	98.7	92.1	83.8	67.4	1.2	5.4
Physical scientists	96.4	100.0	87.0	69.0	1.7	4.8
Mathematical scientists	100.0	91.4	71.7	69.9	3.6	1.9
Computer specialists	99.1	90.3	93.8	89.1	*	*
Environmental scientists	99.5	93.4	88.4	76.6	1.8	*
Engineers	99.2	95.0	94.9	86.0	0.2	8.2
Life scientists	99.8	94.5	77.5	76.5	1.1	5.2
Psychologists	94.9	87.7	70.8	62.2	0.8	6.6
Social scientists	87.9	94.1	55.7	41.8	4.5	7.9

* Too few cases to estimate.

SOURCE: National Science Foundation, Women and Minorities in Science and Engineering, 1982

TABLE 8

U.S. DOCTORAL SCIENTISTS AND ENGINEERS, 1981

FIELD OF PhD	TOTAL			LABOR FORCE			LABOR FORCE PARTICIPATION RATES			UNEMPLOYMENT RATES		
	Total	Men	Women	Total	Men	Women	Total	Men	Women	Total	Men	Women
All Fields	358,600	314,100	44,500	340,900	300,100	40,800	95.1	95.5	91.8	0.8	0.6	2.4
Math	19,000	17,400	1,600	18,200	16,700	1,500	95.8	96.0	93.8	0.5	0.5	1.2
Computer Sciences	2,200	2,000	200	2,200	2,000	200	100.0	100.0	100.0	0.2	0.1	1.7
Physics/Astron.	29,200	28,300	900	28,300	27,500	800	96.9	97.2	89.0	0.6	0.5	1.8
Chemistry	48,000	44,500	3,500	45,000	41,800	3,200	93.8	93.9	91.4	0.7	0.6	2.1
Earth/Environ. Sci.	12,400	11,800	600	11,900	11,300	600	96.0	95.8	100.0	0.8	0.7	1.7
Engineering	52,900	52,400	500	51,600	51,100	500	97.5	97.5	100.0	0.1	0.1	0.8
Agricultural Sciences	16,500	16,000	500	15,100	14,700	400	91.5	91.9	80.0	0.4	0.4	1.5
Medical Sciences	11,100	9,200	1,900	10,600	8,800	1,800	95.5	95.6	94.7	0.7	0.3	2.8
Biological Sciences	64,800	52,500	12,300	60,500	49,500	11,000	93.4	94.3	89.4	1.5	1.0	3.7
Psychology	47,400	34,300	13,100	45,500	33,300	12,200	96.0	97.1	93.1	1.1	1.0	1.2
Social Sciences	55,100	45,700	9,400	52,000	43,400	8,600	94.4	95.0	91.5	0.8	0.3	3.1

SOURCE: NRC, Science, Engineering and Humanities Doctorates in the U.S., 1981 Profile, 1982.

TABLE 9

UNEMPLOYMENT RATES

	Total U.S.	Prof. & Tech. Workers	Doctoral Scientists	Doctoral Engineers	All Scientists	All Engineers
1963	5.7	1.9				1.2
1964	5.1	1.8				1.5
1965	4.6	1.5				1.1
1966	3.9	1.3			0.4	0.7
1967	3.7	1.3				0.6
1968	3.5	1.2	0.5			0.7
1969	3.5	1.3	0.5		0.9	0.8
1970	4.9	2.0	0.9			2.2
1971	5.9	2.9	1.4	1.9	2.6	2.9
1972	5.6	2.4			4.1	2.0
1973	4.9	2.2	1.2	0.8		1.0
1974	5.6	2.3		0.9	2.3	1.3
1975	8.5	3.2	1.0	0.7		2.6
1976	7.7	3.2			4.0	2.0
1977	7.0	3.0	1.3	0.7		1.3
1978	5.9	2.6			1.5	1.3
1979	5.6	2.4	1.0	0.5		1.2
1980	7.1	2.5			2.5	1.3
1981	7.6	2.8	0.9	0.1		1.4
1982	9.1*	3.2*				

* To May

S Bureau of Labor Statistics, National Science Foundation, National Research Council

TABLE 10

DISTRIBUTION OF COLLEGE GRADUATES, NON-ACADEMIC JOB OFFERS AND HIRES, BY CURRICULUM GROUP

	BACHELOR'S			MASTER'S			DOCTORATES			ALL DEGREE LEVELS		
	Degrees 1979-80	Hires[6] 1980-81	Offers[7] 1981-82	Degrees 1979-80	Hires[6] 1980-81	Offers[7] 1981-82	Degrees 1980-81	Hires[6] 1980-81	Offers[7] 1981-82	Degrees 1980-81	Hires[5] 1981-82	Offers 1980-81
	PERCENT											
Engineering[1]	7.4	38.4	57.0	5.4	23.5	28.1	8.1	35.7	39.2	6.9	36.4	53.9
Science/Math/Other Tech.[2]	19.2	14.8	11.0	12.7	17.2	12.8	30.7	56.6	60.8	18.0	16.1	11.8
Business[3]	20.1	38.2	27.6	18.5	54.6	56.4	2.0	2.6	-	19.3	39.6	30.2
Soc. Sci. and Human.[4]	27.6	8.5	4.2	14.1	4.6	2.7	44.7	5.1	-	24.8	7.9	4.0
	NUMBER											
Engineering[1]	69,265	25,075	29,248	16,250	2,378	1,647	2,528	598	272	88,034	28,051	31,167
Science/Math/Other Tech.[2]	180,958	9,684	5,635	38,083	1,742	752	9,629	947	421	228,670	12,373	6,808
Business[3]	189,224	24,967	14,139	55,322	5,528	3,305	622	44	-	245,168	30,589	17,444
Soc. Sci. and Human.[4]	259,177	5,563	2,168	42,299	469	155	14,020	85	-	315,496	6,117	2,323
Total	940,251	65,289	51,290	299,095	10,117	5,859	31,319	1,674	693	1,270,665	77,080	57,842

[1]Includes Engineering Technologies.
[2]Includes Computer Sciences.
[3]Includes Accounting, Marketing, Business Management, Finance, etc.
[4]Includes Liberal Arts, Humanities, Social Sciences, Home Economics, etc.
[5]Actual and Anticipated Hires.
[6]Actual Hires.
[7]Inexperienced.

SOURCE: College Placement Council, Recruiting '81 and Salary Survey: A study of 1981-82 Beginning Offers; and Center for Education Statistics, Earned Degrees Conferred, 1980-81

TABLE 11

PERCENT OF ALL OFFERS AND PERCENT OF ALL BACHELOR'S GRADUATES BY FIELD

FIELD	% of all 1982 Offers			% of all 1980 Degrees		
	Total	Men	Women	Total	Men	Women
Business & Management	27.6	22.7	42.1	20.1	26.2	2.7
Humanities & Social Sciences	4.2	2.8	8.5	25.9	23.0	28.8
Engineering	62.8	62.7	31.2	6.3	11.1	1.3
Engineering Technologies	2.1	2.7	0.5	1.1	2.1	0.1
Agricultural Sciences	0.9	1.0	0.7	2.4	3.4	1.5
Biological Sciences	0.3	0.2	0.6	5.0	5.7	4.3
Chemistry	0.5	0.4	0.8	1.2	1.7	0.7
Computer Sciences	6.3	5.2	9.5	1.2	1.6	0.7
Health Professions	0.9	0.2	2.9	6.9	2.4	11.5
Mathematics	1.4	1.0	2.6	1.2	1.4	1.0
Other Physical/ Earth Sciences	0.9	1.0	0.7	1.3	2.1	0.5

Sources: College Placement Council, 1982 and National Center for Education Statistics, Earned Degrees, 1980

TABLE 12

AVERAGE ANNUAL SALARY OFFERS TO BACHELOR'S DEGREE CANDIDATES, 1982

FIELD	TOTAL	MEN	WOMEN
Accounting	$18,540	$18,516	$18,564
Business/Management	17,724	17,952	17,280
Marketing	16,440	16,944	15,768
Humanities	15,396	16,344	14,724
Economics	18,516	18,948	17,784
Other Social Sciences	15,432	16,500	14,508
Engineering	25,260	25,224	25,548
Aeronautical	23,676	23,676	23,664
Chemical	27,072	27,036	27,156
Civil	23,100	23,088	23,160
Electrical	24,768	24,744	24,984
Geological	27,036	27,048	27,000
Industrial	24,276	24,276	24,288
Mechanical	25,176	25,152	25,356
Metallurgical	25,272	25,200	25,548
Mining	25,368	25,356	25,668
Nuclear	24,468	24,336	25,224
Petroleum	30,468	30,504	30,216
Engineering Technology	23,496	23,544	22,608
Agricultural Sciences	16,692	17,064	14,988
Biological Sciences	16,500	16,980	15,984
Chemistry	21,012	20,964	21,084
Computer Sciences	22,896	22,884	22,908
Health Professions	17,904	20,664	17,436
Mathematics	21,324	21,528	21,084
Other Physical/Earth Sciences	23,760	24,072	22,452

SOURCE: College Placement Council, Salary Survey, Final Report, 1982

TABLE 13

AVERAGE SALARIES OF DOCTORAL SCIENTISTS AND ENGINEERS BY FIELD AND YEARS SINCE Ph.D.

Sex and Years Since Degree	FIELD OF DOCTORATE											
	All Fields	Math	Comp. Sci.	Phys./ Astrn.	Chem.	Earth/ Envir.	Engr.	Agric.	Med.	Biol.	Psych.	Social Sci.
TOTAL	**$34.8**	**$31.8**	**$34.8**	**$36.9**	**$36.9**	**$34.9**	**$40.2**	**$33.1**	**$36.5**	**$32.5**	**$30.9**	**$30.9**
5 or less	26.6	23.9	32.3	29.6	29.6	28.0	33.0	25.4	28.4	23.9	24.0	24.3
6-10	31.3	29.1	36.8	34.6	33.5	32.6	37.9	30.4	35.1	28.1	28.4	29.2
11-15	36.5	32.9		37.1	37.0	38.6	42.5	35.1	38.8	33.8	33.9	35.0
16-20	39.6	37.2			40.7	39.7	45.3	37.3	47.9	37.3	36.6	37.1
21-25	41.9	41.9		43.7	40.9		48.4	38.2	46.0	39.8	40.7	39.5
26-30	45.5			48.4	45.9		50.2	40.9		44.0	42.9	44.0
Over 30	46.6	47.2			47.5	50.3	50.3	42.0	50.1	46.0		44.9
Male, TOTAL	**35.7**	**32.3**	**35.3**	**37.0**	**37.4**	**35.3**	**40.2**	**33.3**	**38.2**	**33.7**	**32.8**	**32.0**
5 or less	27.5	23.9	32.5	29.8	29.8	28.0	33.1	25.6	29.5	24.2	24.6	24.7
6-10	32.1	29.2	36.9	34.7	33.9	32.9	37.9	30.4	36.0	28.9	29.4	29.5
11-15	36.9	33.2		37.3	37.3	38.7	42.5	35.2	39.4	34.6	34.4	35.6
16-20	40.1	37.5			41.1	39.7	45.3	37.5	48.6	38.7	36.9	37.2
21-25	42.2	42.1		43.9	41.8		48.4	38.2		40.1	40.8	39.7
26-30	45.8			48.5	46.2		50.2	41.0		44.5	43.7	44.5
Over 30	47.5	47.8		47.4			50.3	42.0		46.9		
Female, TOTAL	**27.1**	**27.0**	**30.8**	**30.8**	**29.5**	**29.4**	**32.8**	**24.9**	**30.1**	**26.6**	**26.1**	**26.0**
5 or less	23.6	23.7	29.8	28.2	28.0	26.3	31.1	23.6	27.1	21.8	23.0	23.2
6-10	26.8	26.2		30.6	28.9	29.1	35.1	26.5	29.8	25.9	26.4	26.9
11-15	30.3	29.2		30.3	29.5	30.3	36.1		35.6	28.6	31.0	31.3
16-20	33.1				31.3				38.2	30.4	34.8	35.3
21-25	34.5				33.2					35.0		34.5
26-30	36.8									35.4		35.3
Over 30	35.6											

NOTE: Median salaries were computed only for Ph.D.s employed full-time, excluding those in the U.S. military. Academic salaries were multiplied by 11/9 to adjust for a full-year scale. Medians were not reported for cells with less than 20 cases reporting salary or with a sampling error of more than ± $2,000.

SOURCE: National Research Council, Science, Engineering and Humanities Doctorates in the United States, 1981 Profile

TABLE 14

MEDIAN INCOME OF YEAR ROUND, FULL TIME WORKERS, BY YEARS OF EDUCATION, 1981

	Years of Education						
	Elementary		High School		College		
	<8	8	1-3	4	1-3	4	5 or more
Men	$12,866	$16,084	$16,938	$20,598	$22,565	$26,394	$30,434
Women	8,419	9,723	10,043	12,332	14,343	16,322	20,148

SOURCE: U.S. Department of Commerce, Bureau of Census, Money Income and Poverty Status of Families and Persons in the U.S.: 1981, (Advance data from 1982 current population surveys, May, 1982)

TABLE 15

HIGHEST DEGREE LEVEL OF SCIENTISTS AND ENGINEERS IN 1980

	TOTAL			MEN			WOMEN		
	PhD	Master's	Bachelor's	PhD	Master's	Bachelor's	PhD	Master's	Bachelor's
All Fields	11.8	28.0	58.1	11.9	25.6	60.2	11.5	46.5	42.3
Chemists	25.3	16.7	57.9	27.2	16.3	56.3	13.0	19.5	67.5
Physicists	36.4	36.5	27.1	36.9	36.1	27.0	24.1	44.8	31.0
Math/Statisticians	17.3	61.4	21.1	19.5	55.2	25.2	7.6	88.6	3.8
Computer Specialists	2.4	26.4	71.1	2.9	26.7	70.4	0.6	25.2	74.0
Environ. Scientists	16.6	38.4	45.0	17.9	39.1	42.9	6.2	32.7	60.2
Engineers	3.7	19.7	72.6	3.7	19.9	72.3	1.4	13.4	85.1
Biologists	27.9	60.1	12.0	32.8	52.2	15.1	17.1	77.8	5.1
Agric. Scientists	9.5	15.3	75.2	10.5	14.7	74.7	1.8	19.7	78.5
Medical Scientists	49.7	21.5	26.8	56.6	21.1	20.1	30.9	22.7	46.4
Psychologists	32.8	57.1	10.0	38.6	49.9	11.5	22.8	69.6	7.5
Social Scientists	28.7	40.2	31.1	32.7	35.5	31.6	17.2	53.3	29.3

NOTE: Where columns do not add to 100%, remainder is "other and no degree."
SOURCE: NSF, U.S. Scientists & Engineers, 1980 (in press)

TABLE 16

LIVE BIRTHS IN THE U.S. BY SEX: 1933-1980

YEAR	TOTAL	MALE	FEMALE
1933	2,081,232	1,068,871	1,012,361
1934	2,167,636	1,112,703	1,054,933
1935	2,155,105	1,105,489	1,049,616
1936	2,144,790	1,099,465	1,045,325
1937	2,203,337	1,130,641	1,072,696
1938	2,286,962	1,172,541	1,114,421
1939	2,265,558	1,162,600	1,102,988
1940	2,360,399	1,211,684	1,148,715
1941	2,513,427	1,289,734	1,223,693
1942	2,808,996	1,444,365	1,364,631
1943	2,936,860	1,508,959	1,427,901
1944	2,794,800	1,435,301	1,359,499
1945	2,735,456	1,404,587	1,330,869
1946	3,288,672	1,691,220	1,597,452
1947	3,699,940	1,899,876	1,800,064
1948	3,535,068	1,813,852	1,721,216
1949	3,559,529	1,826,352	1,733,177
1950	3,554,149	1,823,555	1,730,594
1951	3,750,850	1,923,020	1,827,830
1952	3,846,986	1,971,262	1,875,724
1953	3,902,120	2,001,798	1,900,322
1954	4,017,362	2,059,068	1,958,294
1955	4,047,295	2,073,719	1,973,576
1956	4,163,090	2,133,588	2,029,502
1957	4,254,784	2,179,960	2,074,824
1958	4,203,812	2,152,546	2,051,266
1959	4,244,796	2,173,638	2,071,158
1960	4,257,850	2,179,708	2,078,142
1961	4,268,326	2,186,274	2,082,052
1962	4,167,362	2,132,466	2,034,896
1963	4,098,020	2,101,632	1,996,388
1964	4,027,490	2,060,162	1,967,328
1965	3,760,358	1,927,054	1,833,304
1966	3,606,274	1,845,862	1,760,412
1967	3,520,959	1,803,388	1,717,571
1968	3,501,564	1,796,326	1,705,238
1969	3,600,206	1,846,572	1,753,634
1970	3,731,386	1,915,378	1,816,008
1971	3,555,970	1,822,910	1,733,060
1972	3,258,411	1,669,927	1,588,484
1973	3,136,965	1,608,326	1,528,639
1974	3,159,958	1,622,114	1,537,844
1975	3,144,198	1,613,135	1,531,063
1976	3,167,788	1,624,436	1,543,352
1977	3,326,632	1,705,916	1,620,716
1978	3,333,279	1,709,394	1,623,885
1979	3,494,398	1,791,267	1,703,131
1980	3,598,000*		

*Estimated
SOURCE: National Center for Health Statistics

TABLE 17

PROJECTIONS OF BACHELOR'S DEGREES, 1981-1989

YEAR	All Bachelor's Degrees					
	Total S/E	Physical Sciences[1]	Engi-neering	Math Sciences[2]	Life Sciences	Social Sciences[3]
1981	299,664	24,660	68,210	16,850	81,630	108,310
1982	307,382	25,410	76,060	17,070	83,910	104,930
1983	305,527	26,370	75,130	17,620	84,650	101,760
1984	299,768	26,190	73,400	17,750	84,630	97,800
1985	292,064	25,610	71,470	17,730	83,940	93,310
1986	287,114	25,310	69,330	17,820	83,900	90,750
1987	279,021	24,780	67,060	17,780	82,910	86,490
1988	275,094	24,590	65,490	18,040	82,940	84,030
1989	272,964	24,740	64,340	18,290	83,580	82,010
	Projections for Women					
1981	92,500	5,840	6,210	5,340	28,420	52,320
1982	102,070	6,360	7,610	5,490	29,820	52,790
1983	100,240	6,580	7,390	5,570	30,110	50,590
1984	97,950	6,740	7,130	5,620	30,300	48,160
1985	94,880	6,620	6,810	5,830	30,170	45,450
1986	95,840	6,990	6,810	6,130	31,040	44,870
1987	93,260	6,980	6,530	6,270	30,960	42,520
1988	93,110	7,170	6,460	6,530	31,410	41,540
1989	93,530	7,560	6,420	6,670	32,190	40,690

[1] Includes Environmental Science
[2] Includes Computer Specialties
[3] Includes Psychology

SOURCE: National Center for Education Statistics, Projections of Bachelor's Degrees to 1989, 1980.

TABLE 18

PROJECTIONS OF DOCTORAL DEGREES, 1981-1989

YEAR	All Doctoral Degrees					
	Total S/E	Physical Sciences[1]	Engi-neering	Math Sciences[2]	Life Sciences	Social Sciences[3]
1981	17,320	2,960	2,300	890	4,610	6,560
1982	17,100	2,850	2,330	830	4,600	6,490
1983	16,530	2,780	2,270	810	4,460	6,210
1984	16,110	2,730	2,230	800	4,350	6,000
1985	15,710	2,660	2,170	780	4,220	5,880
1986	15,390	2,610	2,130	770	4,120	5,760
1987	15,080	2,560	2,090	750	4,020	5,660
1988	14,810	2,570	2,050	730	3,920	5,540
1989	14,400	2,450	2,000	710	3,820	5,420
	Projections for Women					
1981	3,450	320	50	140	950	1,990
1982	3,350	310	50	140	920	1,930
1983	3,250	300	50	130	900	1,870
1984	3,210	300	50	130	890	1,840
1985	3,160	290	50	130	870	1,820
1986	3,110	290	50	130	860	1,780
1987	3,060	280	50	120	850	1,760
1988	3,020	280	50	120	840	1,730
1989	2,960	280	50	110	830	1,690

1 Includes Environmental Sciences
2 Includes Computer Specialties
3 Includes Psychology

SOURCE: National Center for Education Statistics, Projections of Education Statistics to 1988-89, 1980

TABLE 19

PROJECTIONS OF OPENINGS AND DEGREES - ANNUAL AVERAGES, 1978-1990

FIELD	Bachelor's	Master's	Ph.D.	Openings
Engineers	**81,441**	**16,722**	**3,158**	**46,500**
Math/Computer Scientists	**21,016**	**6,215**	**835**	**48,250**
Computer Programmers	9,100	3,038	196	9,200
Systems Analysts				7,900
Mathematicians	11,616	2,667	508	1,000
Statisticians	300	510	131	1,500
Physical/Environ. Scientists	**22,173**	**4,673**	**2,611**	**9,890**
Astronomers	138	80	64	40
Physicists	3,290	1,204	763	1,000
Chemists	12,523	1,483	1,199	6,100
Geologists	5,392	1,332	323	1,700
Geophysicists	149	145	59	600
Meteorologists	408	275	86	300
Oceanographers	273	154	117	150
Life Scientists	**95,993**	**15,525**	**4,904**	**14,330**
Biochemists	2,275	374	478	900
Biologists/Agric. Scientists	88,268	13,972	4,096	11,200
Soil Scientists	620	136	81	180
Foresters	3,000	500	65	1,400
Range managers (Agronomists)	221	100	27	200
Soil Conservationists	1,609	443	157	450
Social Scientists	**99,184**	**17,684**	**5,317**	**15,950**
Psychologists	40,687	10,280	3,003	6,700
Sociologists/Anthropologists	22,179	2,865	1,053	950
Political Scientists	19,395	2,285	555	500
Economists	16,923	2,254	706	7,800

SOURCE: Bureau of Labor Statistics, Occupational Projections and Training Data, 1980 (Bulletin 2052)

TABLE 20

COMPARISONS OF PROJECTED JOB OPENINGS WITH PROJECTED DEGREES IN SCIENCE AND ENGINEERING 1978-1990

	Job Openings, 1978-1990 (in thousands): Senario				Graduates, 1978-1990 (in thousands): Level	
	Baseline Assumptions	Accelerated Defense Spending	Synthetic Fuels Program	Balanced Federal Budget	Bachelor's Degrees	Master's Degrees
Life and Physical Scientists						
Agricultural	16	16	16	16	193	34
Atmospheric	5	5	5	5	5	4
Biological	38	38	38	37	637	78
Chemical	63	64	64	63	178	26
Geological	22	22	23	22	67	18
Marine	2	2	2	2	10	3
Physics and Astronomy	11	11	11	11	45	19
Total	157	159	157	156	1,135	182
Mathematical Sciences						
Mathematicians	3	3	3	3	102	27
Statisticians	19	19	19	19	3	5
Total	22	22	22	22	105	32
Computer Professionals						
Programmers	300	302	300	299	NA	NA
Systems Analysts	221	223	221	221		
Other	28	29	28	28		
Total	549	553	550	547	110	47
Social Scientists						
Psychologists	76	76	76	75	490	111
Other[1]	100	102	101	99	628	58
Total	176	178	177	175	1,117	170
Engineers						
Aeronautical	24	35	24	24	28	NA
Chemical	22	22	22	21	92	
Civil	95	95	95	94	134	
Electrical	121	128	121	120	172	
Industrial	94	98	94	93	48	
Mechanical	89	95	89	89	171	
Metallurgical	9	9	9	9	16	
Mining	7	7	7	7	11	
Petroleum	11	11	11	11	14	
Other	59	61	59	59	115	
Total	528	561	534[2]	525	928[3]	196
Total All Fields	1,432	1,473	1,439	1,424	3,395	626

[1]Includes economists, political scientists and sociologists.
[2]Includes 4,000 engineers who are not distributed by field.
[3]Includes 128,000 engineering technology degrees not distributed by field.

NOTE: Estimates of openings do not include academic employment. Detail may not add to totals because of rounding.

SOURCES: National Science Foundation, Bureau of Labor Statistics and National Center for Education Statistics.

TABLE 21

FULL-TIME SCIENCE AND ENGINEERING DOCTORAL LABOR FORCE BY FIELD 1979 ACTUAL AND 1990 PROJECTED

(in thousands)

	Physical Sciences	Engineering	Math Sciences	Life Sciences	Social Sciences	Total
Labor Force						
1979	73	49	21	79	83	306
1990	103	80	30	113	125	450
Science/Engineering Utilization						
1979	67	47	20	74	71	278
1990	93	63	23	93	99	370
Non-Science/Engineering Utilization						
1979	7	3	1	5	12	28
1990	10	17	7	20	26	80
Non-Science/Engineering Utilization as Percent of Labor Force						
1979	9	6	6	6	14	9
1990	10	21	23	18	21	18

Note: Detail may not add to totals because of rounding.

SOURCE: National Science Foundation

TABLE 22

CIVILIAN EMPLOYMENT IN SELECTED S/E OCCUPATIONS WITH 25,000 WORKERS OR MORE, ACTUAL 1978 AND PROJECTED 1990

Occupation	Employment (in thousands)				Percent Change, 1978-1990		
	1978	1990 Low-Trend	1990 High-Trend I	1990 High-Trend II	Low-Trend	High-Trend I	High-Trend II
Total, All Occupations	97,610	119,590	127,907	121,447	22.52	31.04	24.52
Prof., Tech., & Rel. Workers	15,570	20,038	21,119	20,295	28.70	35.64	30.34
Engineers	1,071	1,504	1,624	1,531	40.41	51.61	42.92
Aero/Astronautic	57	98	104	100	70.35	80.86	74.81
Chemical	53	68	73	70	28.92	37.70	31.80
Civil	149	208	218	211	39.38	45.59	40.97
Electrical	291	441	479	448	51.18	64.41	53.90
Industrial	109	146	159	148	34.03	46.49	36.37
Mechanical	199	274	300	279	37.56	50.67	40.18
Life & Physical Scientists	236	299	316	304	26.44	33.63	28.70
Biologists	42	51	54	53	21.82	28.86	24.98
Chemists	90	113	120	115	24.95	32.19	27.23
Geologists	33	50	53	51	52.08	61.36	52.69
Engr. & Sci. Technicians	1,160	1,577	1,700	1,609	35.97	46.54	38.73
Drafters	293	412	446	419	40.59	52.25	43.20
Electrical & Electronic	319	464	512	478	45.42	60.24	49.79
Industrial Engineering	31	40	44	41	30.37	41.33	32.09
Mechanical Engineering	45	61	67	62	35.96	49.67	38.75
Surveyors	54	73	78	76	35.19	44.73	39.91
Computer Specialists	389	738	793	754	89.83	104.05	93.94
Programmers	204	354	381	361	73.57	86.90	77.22
Systems Analysts	185	384	412	392	107.75	122.97	112.38
Social Scientists	176	243	256	248	38.12	45.51	41.26
Economists	27	41	43	42	54.17	62.93	56.30
Psychologists	78	107	111	109	36.79	42.69	39.31
College & Univ. Teachers	618	557	560	556	-9.78	-9.30	-9.97
College Teachers	454	409	410	408	-10.06	-9.72	-10.28
Graduate Assistants	131	110	110	109	-16.45	-16.13	-16.65

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SCIENTIFIC, ENGINEERING, TECHNICAL MANPOWER COMMENTS, periodical, 10 issues per year, 1 yr., $30; 2 yrs., $55; 3 yrs. $75.

A monthly digest of current developments affecting the recruitment, training and utilization of scientific, engineering and technical manpower. Special sections include current information on supply and demand, salaries, women and minorities in science, education, pending legislation, federal agency activities, and new publications of interest to producers and users of technical manpower.

PROFESSIONAL WOMEN AND MINORITIES, A Manpower Data Resource Service, Third Edition, March 1982, $60.

A comprehensive reference book of manpower data presented in approximately 400 tables and charts, with breakouts by sex and/or minority status, compiled from more than 200 sources. Data on enrollments, degrees, and general, academic and federal work force participation by field and subfield are supplemented with textual highlights; annotated recruitment resources for women and minority professionals, by field; a comprehensive cross index; and an extensive bibliography.

The 1978 edition, plus the 1980 and 1981 supplements, provides trend data. This edition with its accompanying notebook and subject dividers is available for $60.

SALARIES OF SCIENTISTS, ENGINEERS AND TECHNICIANS, A Summary of Salary Surveys, Tenth Edition, November 1981, $25.

A 148-page report presenting detailed information on starting and advanced salaries in industry, government and educational institutions with breakouts by field, highest degree, sex, years since first degree, age group, category of employment, work activity, type of employer, geographic area, academic rank, Civil Service grade and grade distribution, and level of responsibility, with some comparative salary data in non-technical fields. Includes both published and previously unpublished data on salaries for the period 1978-1981, with some trend data beginning in 1964.

SUPPLY AND DEMAND FOR SCIENTISTS AND ENGINEERS, January 1982, $25.

This 50-page report, which includes 51 tables and charts, examines past, present and future imbalances in the supply of and demand for scientists and engineers. The supply is assessed by source and by field, and compared with current and short range demand for new graduates and for experienced scientists and engineers, including assessment of the increasing participation of women and foreign nationals in degree output. Surveys projecting supply/demand imbalances over the next decade are examined and compared.