

while in the New England and Mid-Atlantic states, nearly 40% did so. In those areas where the student-age population is expected to grow in the next decade, namely the West Coast, the Western Mountain regions and certain parts of the South, students typically had lower graduation rates and math aptitude test scores, and they studied less science. The projected population growth may further strain the education systems in these areas, the report says.

The ubiquitous practice of "tracking," which channels students into separate curricula based on their career plans and, to a certain extent, their abilities, seems to exclude many high schoolers from taking more than the minimum amount of science. A small, academically elite group made up of the 28% of students who were both in a college preparatory track and scored above average on achievement tests accounted for four-fifths of the enrollment in calculus and two-thirds in physics. Very few students who were not in a college preparatory track took any advanced math or science courses, regardless of their aptitude.

For a copy of "Who Takes Science?" contact Roman Czujko, Education and Employment Statistics Division, American Institute of Physics, 335 East 45 Street, New York NY 10017.

—JEAN KUMAGAI

AIP SURVEY FINDS WEAKER 1988-89 JOB MARKET

The job market for physics graduates deteriorated somewhat in 1988, according to the latest employment survey prepared by the American Institute of Physics. The survey found that 1988 physics master's and bachelor's degree recipients took longer to find jobs, that PhD recipients commanded lower starting salaries and newly employed PhDs expressed lower job satisfaction than their counterparts did in 1987.

The survey is conducted annually by AIP's Education and Employment Statistics Division to find out how those physics and astronomy graduates who were interested in full-time employment, as opposed to further schooling or temporary postdoctoral positions, coped with the transition from school to the workplace during the half-year following graduation.

Only 38% of physics bachelor's degree recipients and 36% of master's degree recipients had jobs lined up when they graduated, compared with

44% for both groups the previous year; among 1988 PhD recipients, 11% had jobs upon graduation, compared with 13% the year before. The proportions of graduates who spent more than seven months searching for employment also rose slightly in 1988.

Newly employed PhDs showed lower job satisfaction than did their 1987 counterparts. Overall, more than a third of the PhD holders responding to the survey said they were interested in changing jobs, compared with 22% the previous year. Job dissatisfaction rose most sharply among those hired by industrial employers: 33% said they were interested in a job switch, compared with only 13% a year earlier.

The average monthly salary for newly employed PhDs fell from \$3500 in 1987 to \$3340 in 1988. During the same period, the average monthly salary for newly employed astronomers jumped from \$2300 to \$2900, a 26% increase. A smaller rise was seen in the average salary for physics masters, from \$2400 to \$2580, while the average salary for physics bachelors remained about the same at \$1920 per month.

Industry remained the largest employer of new physics PhD recipients who took permanent jobs, but the proportion hired by industry fell by 13 percentage points from the previous year, from 52% in 1987 to 39% in 1988. This significant drop was coupled with smaller increases in hiring by other types of employers. For example, the proportion of new PhDs hired by government labs rose from 8% in 1987 to 14% in 1988.

Industry was also the biggest source of jobs for physics bachelor's and master's degree recipients, and its relative position grew in 1988, the survey found. From 1987 to 1988, the proportions of physics masters and bachelors working for industry rose from 50% to 55% and from 47% to 50%, respectively.

The 1988 employment survey is available from Susanne D. Ellis, Education and Employment Statistics Division, American Institute of Physics, 335 East 45 Street, New York NY 10017.

—JEAN KUMAGAI

EC FRAMEWORK PROGRAM ADOPTED FOR 1990-94

In December the 12 member nations of the European Community have adopted a new framework program, amounting to 5.7 billion ECUs (ap-

proximately \$6.25 billion), for European research and development during the years 1990-94. The EC Commission had proposed a hefty increase for the framework program, but members opted instead for a no-growth budget—the previous five-year program amounted to 5.4 billion ECUs.

The largest single elements within the framework will remain the ESPRIT and RACE programs, which are devoted to information technology and telecommunications, respectively. In addition, a "European Nervous System" is to be established—a super-network linking government and industry computer-communication systems throughout Europe.

Environmental research programs in climatology, marine science and atmospheric chemistry—EPOCH, MAST and STEP—are to be expanded to embrace regions beyond the EC's boundaries, social and economic aspects of climate change and environmental monitoring technologies.

Continuation of the Joint European Torus project to 1996 is recommended, subject to ministerial approval, and it is anticipated that construction of a successor fusion reactor might begin toward the end of the new framework period.

New initiatives include a program to send graduates for two-year postdocs at institutions outside their native countries and a project exploring subterranean disposal of radioactive waste, with pilot sites in Belgium, France, West Germany and Britain.

FRG DESIGNATES NEW 'SPECIAL RESEARCH AREAS' IN PHYSICS

The German Research Society, the Federal Republic's equivalent of NSF, has designated eight new *Sonderforschungsbereiche*, or "special research areas"—cross-disciplinary and cross-institutional collaborations deemed worthy of long-term support. Two of the newly established special research areas are in physics.

A *Sonderforschungsbereich* described as dedicated to "physical foundations of low-temperature plasmas" has been set up at the University of Bochum, with participation by the University of Düsseldorf and the Jülich Research Center (the KFA). Researchers at the three institutions have been collaborating since 1986 in a plasma working group and wish to explore low-temperature phenomena, which have received less attention than high-temperature plasmas de-

spite promising applications.

"Solid bodies far removed from equilibrium" is the theme of the *Sonderforschungsbereich* set up at Göttingen. It will be dedicated to the study of disordered systems, including nonlinear processes in microelectronics and glasses.

West Germany's program of special research areas originated in 1968 with the designation of 17 *Sonderforschungsbereiche*. By 1989 there were a total of 167 special research areas—24 in physics—with aggregate annual funding of around 350 million marks. Of 299 special research areas designated in the first 20 years of the program, 132 had completed their missions by 1989.

The latest designations bring the current number of special research areas to 175, of which 26 are in physics.

FRG ESTABLISHES INSTITUTE FOR SILICON TECHNOLOGY

West Germany's Fraunhofer Society, which supports applied research, has established an Institute for Silicon Technology in Itzehoe, a town near Munich that also happens to be headquarters for the Joint European Submicron Silicon Initiative (see *PHYSICS TODAY*, March, page 67). Germany's Federal Ministry for Research and Technology has committed 1 billion marks—more than \$500 million—to the JESSI program, and the Itzehoe institute will be devoted partly to work in support of JESSI.

Anton Heuberger, currently a member of the Fraunhofer Institute for Microstructure Technology in Berlin, has been named first head of the Institute for Silicon Technology. The institute is slated to have a staff of 400, including 160 research scientists. About two-thirds of the institute's work is to be dedicated to internally funded basic research, and about one-third to externally funded contracts and grants.

Work is to cover the gamut of silicon-based microelectronics, but probably the most important single effort will be in x-ray lithography.

PHYSICS TEACHERS FORM MACINTOSH USERS GROUP

A users group has been formed for those who use a Macintosh personal computer for teaching physics. Called the Physics Educators Macin-

tosh Users Group, the group is headed by Robert Fuller of the University of Nebraska, Lincoln, and David Winch of Kalamazoo College in Michigan. The new users group plans to hold regional and national meetings at which members can swap information on Macintosh-based educational products and procedures and keep abreast of system upgrades, new software and hardware, and other product improvements. A newsletter, edited by Curtis Hieggelke of Joliet Junior College, is sent to members.

The group's recent approval as an affiliated organization of the American Association of Physics Teachers entitles it to participate in AAPT meetings. The group has also been recognized by Apple Computer Inc as an official users group. It is the first national Macintosh users group.

So far, about 120 physics educators in colleges and high schools have joined. The next national meeting of the users group will be held during the AAPT summer meeting in Minneapolis and will include a poster session and meeting session.

To join, send a \$10 check payable to Kalamazoo College to David Winch, Kalamazoo College, Kalamazoo MI 49007.

RALEIGH LEAVES LAMONT-DOHERTY FOR HAWAII

Barry Raleigh has been named the first dean of the newly established School of Ocean and Earth Science and Technology at the University of Hawaii's Manoa campus. Raleigh left his job as director of Columbia University's Lamont-Doherty Geological Observatory in Palisades, New York, last October to accept the new position.

The new school is intended to be a centerpiece of the University of Hawaii's scientific research program, Raleigh says. "People here are fascinated with the ocean, not just as a playground or something nice to look at, but also in terms of resources and development," he told us. "The commitment to the school reflects that attitude."

The state and Federal governments are each contributing \$20 million for facilities to house the new school, which includes departments of oceanography, meteorology, geology and geophysics, and ocean engineering, as well as three research institutes: the Hawaii Institute of Geophysics, the Hawaii Institute of Marine Biology and the Hawaii Natural Energy Institute. The school now employs 125

scientists and engineers, with an additional 15 faculty positions to be created over the next two to three years.

Raleigh had directed Lamont-Doherty for eight years prior to his move to Hawaii. From 1966 to 1981 he was with the US Geological Survey in Menlo Park, California. Raleigh received his PhD in geophysics from the University of California, Los Angeles, in 1963.

A search committee headed by Charles Langmuir, a geochemist at Lamont-Doherty, has been formed to find a replacement for Raleigh. Dennis B. Kent, a senior scientist who specializes in paleomagnetism, is serving as interim director.

AAS ELECTS NEW VICE PRESIDENT AND OTHER OFFICERS

Paul W. Hodge, chairman and a professor of the astronomy department at the University of Washington, has been elected to a three-year term as vice president of the American Astronomical Society. Hodge replaces J. Roger Angel of the University of Arizona and joins the two current vice presidents, Frank H. Shu of the University of California, Berkeley, whose term ends in 1991, and Harvey D. Tananbaum of the Harvard-Smithsonian Center for Astrophysics, whose term ends in 1992.

The terms for Hodge and the other newly elected officers begin in June. At the same time, John N. Bahcall of the Institute for Advanced Study will begin his two-year term as AAS president (see *PHYSICS TODAY*, December, page 58).

In other election results, C. R. O'Dell of Rice University was elected to a three-year term as treasurer; he had previously been appointed to that office in 1988 after Leonard V. Kuhl resigned. The three newly elected councillors are Harriet L. Dinerstein of the University of Texas at Austin, Marcia J. Rieke of the University of Arizona, and Paul A. Vanden Bout of the University of California, Berkeley. Catharine D. Garmany of the University of Colorado was elected to the five-member nominating committee. Catherine A. Pilachowski of Kitt Peak National Observatory was elected to a three-year term as chair of the publications board.

In addition, Robert E. Williams, director of the Cerro Tololo Inter-American Observatory, was chosen to serve on the US National Committee for the International Astronomical Union as one of three AAS-elected