

Doctoral survey: Employment high

Unemployment among doctoral scientists and engineers is only 1.2 percent, according to a new manpower survey prepared by the National Academy of Sciences for the National Science Foundation. Based on data collected in 1973, the survey shows that about 227,000 doctoral scientists and engineers are employed in the United States, half of them in the physical sciences and biosciences.

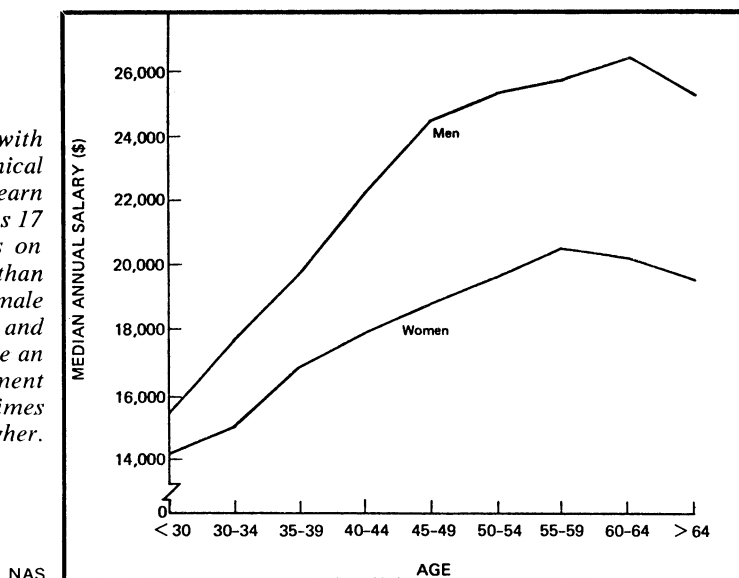
Academia remains the largest single employer, accounting for 58 percent of workers surveyed, but the pollsters note a definite shift toward industry employment. Some 41 percent of those surveyed were primarily engaged in research and development; 37 percent were primarily engaged in teaching.

The 1973 median salary for doctoral scientists and engineers was \$20,890—with a range from \$19,790 in mathematics to \$22,490 in engineering. Salaries were highest in states blessed with abundant government contracts and industrial laboratories and lowest in rural areas with primarily academic employment. The latter areas, however, had lowest unemployment.

Women now represent nine percent of the scientific doctoral labor force—21,300 strong. No comparable employment figures exist to show what improvement this represents in a field long dominated by males, but the figures probably parallel those for degrees granted, which have shown a consistent upward trend over the last decade. In 1962, only about 7.2 percent of earned, technical doctorates went to women; in 1972, the proportion was up to 11.7 percent.

Unemployment rates and salary differentials still put women at severe disadvantage, even at this high level of professional achievement. Some 3.9 percent of women doctorates surveyed were unemployed, compared with 0.9

Women with technical doctorates earn salaries 17 percent less on the average than their male counterparts and experience an unemployment rate four times higher.



percent of their male counterparts. The median salary for women (\$17,620) was 17 percent below that for men (\$21,170). Three quarters of the women surveyed were employed in three fields—psychology, biosciences and social sciences.

Racial minorities account for only five percent, or 13,300, of the total doctoral scientists and engineers. Of these, nearly 83 percent are Asian. More than half of the minority professionals are concentrated in two fields—engineering and biosciences.

Switching one's primary field of interest was found to be quite prevalent in certain disciplines. Some 13,600 workers surveyed had earned doctorates in mathematics, but 16,000 now identify themselves as mathematicians. Similar major influxes were observed into the fields of earth sciences (from 7,600 to 10,700) and psychology (from 24,500 to 26,700). The largest net losses came from physics (from 22,300 to 18,400), chemistry (from 39,300 to 31,000) and the social sciences (from 32,400 to 29,000). Overall, 89 percent of scientists are employed in the same field as their doctorate. Less than five percent have left science and engineering altogether, but many of these command the highest salaries of workers surveyed.

The new survey replaces a more haphazard previous system of head-counting based on voluntary responses to questionnaires sent out by professional societies. These surveys tended to distort unemployment figures, since society members are usually active in their fields, and salary figures, since the largest number of responses to the questionnaires came from young professionals, just starting their careers.

To gather information on nondoctorate professionals, the Census Bureau is now in the process of surveying a sample of scientists and engineers identified

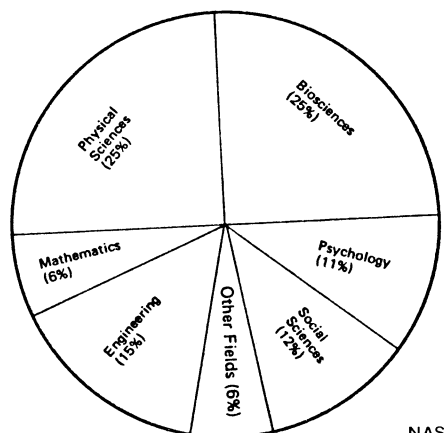
during the last census. Meanwhile, the University of California at Los Angeles has received an NSF contract to follow new additions to the field, studying recent bachelor degree recipients just beginning careers in science and engineering.

Later this year, NSF is expected to make a series of manpower predictions based on analysis of the new survey data. In its last such pronouncement, 1971, the foundation predicted the observed shift of science professionals away from academic employment toward business and industry. □

Scyllac is set for plasma pinch

One of the approaches toward the development of controlled thermonuclear fusion as a source of power is the so-called theta-pinch. This technique uses a magnetic field to confine the plasma of ions and electrons and also, by a sudden implosion, to heat the plasma to temperatures where the nuclei (ions) are expected to begin to fuse with each other.

The culminating theta-pinch experiment in the United States is the Scyllac at the Los Alamos Scientific Laboratory. The full torus shape of Scyllac, 15 feet in diameter, has now been completed. By fall the staff hope to complete at least 1,000 experimental shots. Many different characteristics of the plasma will be measured, and, it is hoped, confinement time will be increased 5 to 10 times that in open-ended tubes. Scyllac's magnetic field is designed to compensate for a problem that has bedeviled toroidal experiments in the past: the tendency of the plasma to drift to the outer wall of the tube where the magnetic field is weaker. □



Doctoral labor force by discipline.