

state & society

Loans for out-of-work scientists proposed

A bill to provide long-term guaranteed loans for unemployed scientists and engineers was introduced by Senator Edward Kennedy (D-Mass.) and by Representatives John W. Davis (D-Ga.) and Robert N. Giaimo (D-Conn.) on 16 March. The bill is intended to supplement the Conversion Research and Education Bill of 1971, introduced by the same men late in January.

In introducing the loan bill Kennedy noted that the unemployment rate for scientists and engineers was 3% in January, the highest level for professional personnel since the Federal Government started keeping such statistics in 1958. Kennedy acknowledged that although many Americans are unemployed, scientists and engineers are a special group, whose talents can be converted from defense and space to civilian, socially useful programs. He said that these men will undoubtedly eventually find jobs at salaries equal to or greater than their old ones.

The bill would offer each unemployed scientist or engineer a "conversion loan" to assist him in making the transition, for an amount up to 60% of his previous salary, to a maximum of \$12 000 for the loan. He would begin repaying the loan three months after he finds a job with a salary equal to at

least two-thirds of his previous salary. The program would be administered by NSF, which would be authorized \$200 million over a three-year period to cover interest and default insurance. While an individual was unemployed, NSF would pay the interest on the loan. After reemployment, the individual would pay 3% interest, and NSF would pay the difference between 3% and the actual amount of interest charged for the loan. The amount of money available for loans is estimated to be over \$500 million dollars annually.

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KENNEDY

Job shortage hits older physicists hardest

The main burden of the present employment crisis is being borne by the more experienced physicist, not the more visible new PhD's. In 1970 about 1500 new PhD's and 1700 experienced PhD's were looking for positions. Of these more than 30% of those looking for jobs in traditional areas of physics in the US failed to find them. An increasing number of physicists are finding jobs

abroad. The percentage of unemployed, now about 4% for new PhD's, and 1.5-2.5% for all of physics, is growing. These are some of the findings of the American Physical Society Economic Concerns Committee, headed by Lee Grodzins (MIT). A report on the findings can be obtained from Grodzins and will appear in the June *Bulletin of the American Physical Society*.

Grodzins constructed a flow chart of PhD employment in 1967 (which he calls the last of the "good" years) and compared it with a chart for 1970. (See figures 1 and 2.) In 1967 the number of employed physicists increased by about 1200. Most of the new employees were new PhD's, but about 150 entered from abroad or came from other fields. By 1970 the flow of new jobs had diminished to a dribble: No more than 100 additional jobs were available. So there were at least 1000 fewer openings in 1970 than in 1967 while the number of new PhD's was 20% greater.

Of these 1500 new PhD's about 1100 found acceptable positions and about 400 did not. (Perhaps 200 would not have sought such positions in the US in a normal year.) The experienced PhD's fared much worse: Only about 900 out of the 1700 looking for jobs found new ones. So over a three-year period the situation changed from an undersupply of doctorates to an oversupply almost

White House finds \$42m to help jobless technologists

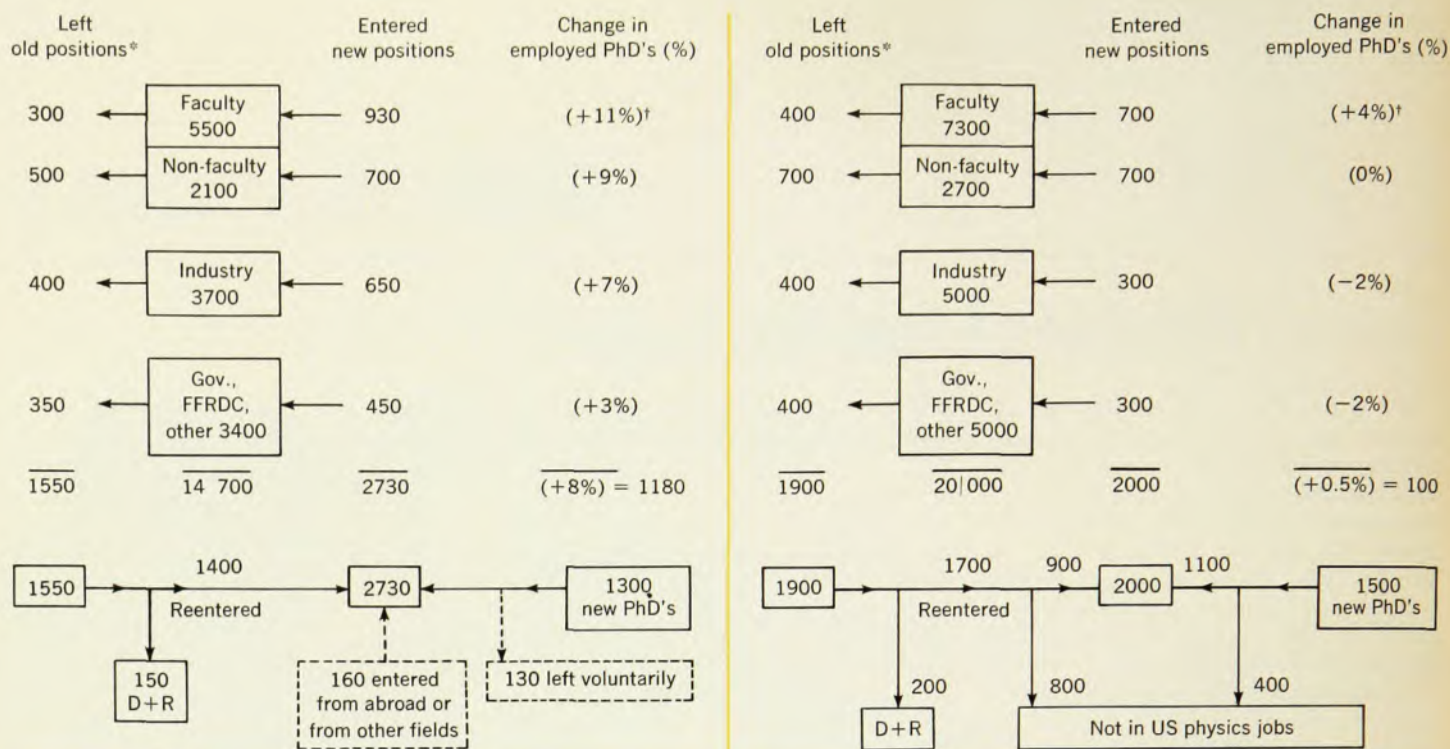
A \$42-million program to find jobs and help retrain unemployed scientists and technicians was announced by the White House on 1 April. The new program, which will be administered by the Department of Labor's Manpower Division, will use funds already available in this year's budget.

The Federal Government and professional societies will join in promoting new jobs. The recently established National Registry for Scientists and Engineers, which acts as a central clearinghouse for applications and job openings throughout the US, is to be expanded.

Secretary of Labor James D. Hodgson said that out of the \$42 million, \$25 million would go for retraining so that engineers and scientists can redirect their talents into fields such as

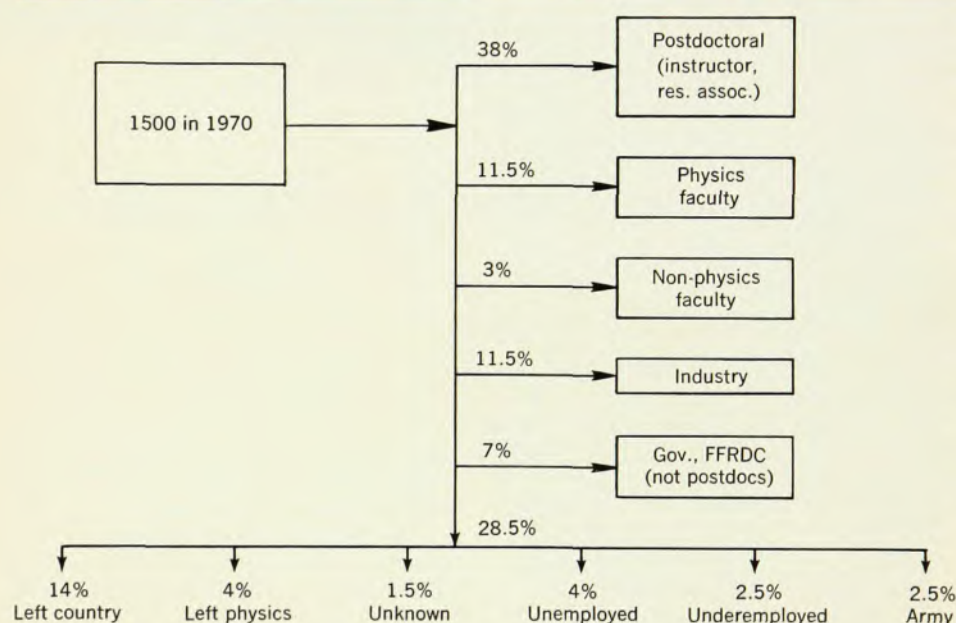
the environment, urban problems, health and safety engineering. A "job-search" program, which would allow 20 000 job seekers to look for employment in new regions of the country, would cost \$5 million. Relocation funds would go to 10 000 families, at a cost of \$10 million. Two million dollars would fund a program in which small groups of professionals would seek methods for giving technological help to traditional sectors of the economy.

The new program was announced at a meeting in San Clemente, Calif. between aerospace and defense officials and some representatives of professional societies and universities. It was the second in what is expected to be a series of technological-unemployment meetings.



Flux of PhD employment in 1967 (upper left). FFRDC are federally-funded research and development centers. Numbers for faculty came from direct count of physics faculty directories. For other sectors the changes in employment came from averages over 1964-1968 according to *American Science Manpower* series. * includes 1% death and retirement (D+R) and † includes upgrading of faculty. Figure 1

Flux of PhD employment in 1970 (right). Remarks for figure 1 apply, except that changes in employment in non-faculty sectors were estimated from surveys and from information supplied by funding agencies. Figure 2



Whereabouts of about 1500 PhD's (lower left) who graduated from September 1969 through September 1970 (based on 750 PhD's and complete returns from 38 schools). Figure 3

equal to the production rate. The number of experienced physicists who left the field was almost as big as the number of new PhD's entering the profession.

New PhD's. The committee surveyed 38 graduate schools (750 PhD's) to find out what happened to the roughly 1500 PhD's who graduated between September 1969 and September 1970 (see figure 3). Grodzins points out that the 4% unemployed is a disaster figure; the prospective graduate has already been looking for a job for six months before he earns his degree.

The "underemployed" classification includes mainly high school and community-college positions.

The percentage of new PhD's taking postdoctorals is apparently less than it was in 1969, though the total number of

postdoctorals in the US is probably unchanged, suggesting that the "holding pattern" observed last year is now trying to rescue present postdoctorals rather than new PhD's.

Experienced PhD's. The new PhD is more easily employable than the experienced one, Grodzins says, because he is more mobile, will work for less and requires less financial support. His major professor, his department and the professional societies will all try to find him a job. The older one is much less visible and receives much less help.

The massive layoffs such as the one at the NASA Electronics Research Center in Cambridge, Mass. are qualitatively different than normal attrition or forced lay-offs of small groups, Grodzins points out. When the center closed

last July the 48 physics PhD's still there already had six months' notice; by November, 19 were still unemployed, despite a concerted placement effort by NASA.

The committee studied what happened to all individuals entering or leaving certain institutions from October 1969 through October 1970, sampling certain universities and national laboratories. Among the 158 physicists who were in faculty positions in 42 PhD-granting institutions in 1969-70 and were not there in 1970-71, 48 of them left traditional physics in the US. (The total of positions in the departments was 1387.)

Five national laboratories were studied: Argonne, Brookhaven, Livermore, Los Alamos and Oak Ridge. One hundred PhD physicists left; their average

age was 38. Seventy-nine PhD's were hired, with an average age of 30. Except in postdoctoral-type jobs, the younger physicist did not displace an older physicist in any direct fashion, Grodzins says. In one lab, for example, new physicists were hired for a large project where there was a long-term commitment; at the same time, because of a decrease in the lab's overall budget, it essentially closed down an entire program in a completely different subfield of physics. Of the 100 who left, 45 left the country, left physics, were unemployed or their status was unknown. (Most of the latter were unemployed when they left the labs.)

What of the future? For the next few years, Grodzins says, there will continue to be a severe imbalance between the training and aspirations of

the students and the opportunities that will exist. In 1970 about 23% of the new PhD's specialized in particle physics and 20% in nuclear physics. Neither field has grown significantly in the past few years, but because of the new particle accelerators throughout the US, it will be difficult to stem their flow: The number of graduate students now in the pipeline for particle physics will sustain the output for several years. But at least 75% of them will have to find jobs outside the field.

Grodzins believes that during the 1970's physics faculties will probably need no more than 300-500 new PhD's per year. Forty percent of the PhD's are on faculties. If the other kinds of jobs grow at the same rate, only 800-1200 new PhD's per year will be needed. Taking attrition into account, the need

will be no greater than 1400 PhD's per year, he estimates.

What can we do? For the near future Grodzins feels we must find new opportunities for physicists, such as jobs in hospitals, as science advisers to secondary-school systems, in junior colleges, and working on societal needs. Grodzins says we ought to reduce the self-interest pressures that sustain the flow of students into graduate school. One temporary solution is to reduce the number of graduate assistantships, putting the money saved into postdoctorate positions. (The latest version of this scheme is known as the "Arden House Proposal.") Standards for the PhD should be tightened, and the PhD program should not train the physicist only for the kind of career for which few opportunities exist. —GBL

Budget office seeks guidance on science problems

The Office of Management and Budget has a strong disposition to support science and technology, according to William D. Carey, formerly assistant director of the old Bureau of the Budget, now the OMB. (Carey is now senior staff consultant at Arthur D. Little Inc). Speaking to a seminar on science and public policy held at the National Academy of Sciences 22-24 February, and sponsored by the Council for the Advancement of Science Writing, Carey, who was with the BOB for 26 years, said that the OMB regards itself as a friend of science, despite the contrary opinion of many scientists. Over the years BOB repeatedly asked the scientific community for guidance on scientific priorities, he said, but to no avail. OMB is still looking for such criteria of choice.

The OMB view of NSF has changed, he said, and NSF is being led closer to hard problems in the market place, with the emphasis on applied research. In the past, he noted, there was a revulsion towards tainting the NSF with any applied research.

Last year there were oft-repeated rumors that the Office of Science and Technology had been shut out of the final stages of the budget preparation. Carey confirmed the truth of the rumor. In the old days the director's review in the BOB would be attended by many interested parties. Then this open meeting became a closed one, and OST did not participate. Now OST and OMB have become friends again.

At the same meeting Congressman Edward Boland (D-Mass.) pointed out that the Subcommittee on Independent Offices and Housing and Urban Development (Appropriations), whose chairmanship he just assumed, is responsible for considering the NSF budget. After the House Science and As-

tronautics Committee has authorized a budget, it is Boland's subcommittee that recommends the appropriation. Their recommendation is never for more money than has been authorized, frequently for less. Boland said that in his judgment the NSF budget will increase substantially. He noted that because of the Mansfield amendment there is a tendency to shift mission-agency research to NSF.

Presidential Science Adviser Edward E. David Jr, in his remarks to the meet-

ing, said that he feels the most serious problem facing the nation "is the increasing alienation of people in our society from rational ways of thought." He said that society is losing the courage to experiment. As an example, he insisted that we must "build those experimental supersonic vehicles which will lead us to understand whether or not supersonic travel is feasible. Make no mistake, a limitation on experimentation in whatever cause is the beginning of a wider suppression." GBL

CERN II begins at last with support from ten nations

After considerable behind-the-scenes maneuvering, CERN will at last get its 300-GeV accelerator. At a Council meeting on 19 February three nations (Netherlands, Norway and Sweden) that had held back from a final decision declared their approval; so now ten countries will be participating. The total cost of the eight-year construction program will be 1150 million Swiss francs (at 1970 prices), and the 1971 budget will be 29.3 million Swiss francs.

CERN expects to start immediately recruiting heads of design and construction groups so that site work can

begin this summer. Research is scheduled to begin in 1976. The 300-GeV laboratory, to be known as "CERN II," has John B. Adams as Director General. Willibald Jentschke is Director General of CERN I. When the new accelerator is completed the programs of both laboratories will be united under the direction of a single Director General.

The cost of the program is to be shared as follows: Austria 2.01%, Belgium 3.88%, France 20.48%, Federal Republic of Germany 23.96%, Italy 13.27%, Netherlands 4.56%, Norway 1.57%, Sweden 4.72%, Switzerland 3.30%, United Kingdom 22.25%.

KMS Industries will do classified fusion research

The Atomic Energy Commission has given permission to KMS Industries, Inc to conduct research at its own expense on a controlled-fusion idea, but will require that the work be classified because of its potential weapons applications. This appears to be the first time a private firm has been allowed by

AEC to work on a device that is potentially explosive. The idea would use a high-power short-pulse laser to irradiate pellets of thermonuclear material, heating them to thermonuclear temperatures very rapidly, and possibly lead to a controlled release of thermonuclear energy.