

state & society

Physicists report on progress in US-Soviet cooperation

The US/USSR Agreement on Cooperation in the Fields of Science and Technology was renewed recently for another five years. The document was signed after negotiations between Frank Press, director of the Office of Science and Technology Policy and science adviser to the President, and Academician Vladimir A. Kirillin, chairman of the USSR State Committee on Science and Technology of the USSR Council of Ministers and deputy chairman of the USSR Council of Ministers. This agreement is one of eleven bilaterals that exist between the US and the Soviet Union, but it is the only one that requires a review-renewal process. Recently physicists from both countries had an opportunity to meet together under the auspices of the agreement.

Before the agreement was signed, a review panel was formed by the National Academy of Sciences and headed by Richard L. Garwin (IBM Watson Research Center, Yorktown Heights, N.Y.). The group submitted its conclusion that the agreement should be renewed, yet noted that "participants in the program point to significant political and cultural benefits, in addition to the relatively few citations of benefits to US science and technology." Press requested the review shortly after taking office, but gave the panel just five weeks to submit their re-



US/USSR agreement on cooperation in science and technology is signed by Vladimir A. Kirillin of the USSR (left) and Frank Press of the US. At rear is E. A. Aykazyan of the Soviet Union.

port in time for the negotiations.

The Garwin panel solicited responses from a "large fraction" of the 250 American scientists and technicians who had been involved in US/USSR cooperation, either as visitors to the Soviet Union, or

as hosts in the US. The final report consisted of summarized comments and criticisms and recommendations for the form of renewed agreement—many of which were brought up and discussed

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Changing career opportunities for physicists

The number of physicists being produced is declining, support for research is down, and the prospects for obtaining traditional jobs in physics are not good. These problems received a thorough airing at the Conference on Changing Career Opportunities for Physicists held at Pennsylvania State University in August. Despite the pessimism of many, some struck a note of cautious optimism that the future would be brighter. Ways of implementing change and a variety of alternative careers—in government, industry, public-interest science and so on—were described during the meeting.

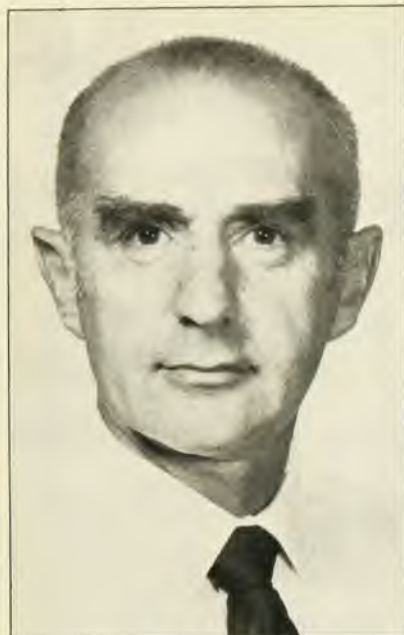
Lee Grodzins of MIT told the conference that physics is in far greater manpower trouble than the other sciences

because it has a greater proportion of PhD's, and it emphasizes research and teaching more than the other sciences (except for basic medical sciences), so that it is tied to government funding and the "fortunes of academe." Grodzins foresees a growth of only about 1% per year in traditional areas. The real growth over the next ten years, he said, will be in non-faculty, non-industrial positions—mainly in research at universities and federally funded research and development centers. He said, "I fail to see the euphoric optimism about industry," noting that the amount of funds for research and development in industry was the same in 1974 as it was in 1964. And for basic research in industry, the amount

in 1967 dollars declined by a factor of three from 1967 to 1975.

In 1970, he said, leaders in the physics community paid little attention to the manpower problem. Now when Grodzins discusses the problem, students say "What else is new?" The community is stagnant, he went on, aging at 0.5 years/year. In difficult times, when few jobs are available, there is great competition for positions, but the best people reach the top faster, he said. Academic research is being done roughly $\frac{1}{3}$ by students, $\frac{1}{3}$ by faculty and $\frac{1}{3}$ by postdocs. The number of persons doing research is dropping.

By the mystical year of 1984, Grodzins says, we will be producing only 1000 PhD's per year in physics (including as-



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tronomy and astrophysics), to be contrasted with over 1500 in 1970. By 1984 it may, however, drop as low as 850, he says, depending on the marketplace, and could rise as high as 1250.

Grodzins foresees a continued shortage of jobs but believes that if the size of the physics labor force remains constant, the demand will start to exceed the supply in the mid-1980's; in particular the supply of nuclear and particle physicists may well be too low in the early 1980's. However, the supply of theorists will exceed the demand for the foreseeable future, he believes.

Martin Perl of SLAC disagreed with Grodzins's anticipation of a shortage of physicists, noting that the projection assumed that we would have a continual upgrading of physics positions now held by bachelor's holders to PhD holders, a process not likely to continue indefinitely. Further, Perl argued that Grodzins assumed the economy will not worsen, that federal support will not decrease and that total college enrollments will not decrease. (Grodzins agrees that his projections are indeed optimistic if these assumptions are

false.) Roland Good (Penn State), who co-chaired the conference with Perl, said, "Although there is less imbalance between supply and demand now compared to 1970, I think the improvement is fragile and can be destroyed by optimism based on perfectly sensible predictions." Indeed Grodzins agrees, saying, "A projection will surely be incorrect if everyone acts as if it will be correct, and yet the converse is not necessarily true."

Harvey Brooks (Harvard University) told the conference that federal funds for academic science had dropped 17% in constant 1967 dollars between 1967 and 1973. Furthermore, the percent change in average starting salaries (relative to annual earning of all industrial workers) for new physics PhD's has declined far more than for other science and engineering professionals (see table).

In his summary talk at the end of three days of lively interaction among the 160 participants, Perl said that even if jobs are plentiful in 1984, the quality of life for physicists will worsen. He said that salaries in real dollars are declining and that they are declining relative to the total work force, as Brooks demonstrated. In spite of the efforts of the American Physical Society Professional Concerns Committee, there has been no substantial change in employee protection for physicists despite improvements for other scientific professionals, he said.

The conference was sponsored by the APS Forum on Physics and Society, the Committee on Education, the Committee on Professional Concerns, and the American Association of Physics Teachers. The conference proceedings will be published by the American Institute of Physics.

—GBL

Pimentel and Rutherford nominated to NSF posts

President Carter has announced his intention to nominate George C. Pimentel to be deputy director of the National Science Foundation. He would replace Richard C. Atkinson, the new director of NSF. The President also announced his intention to nominate F. James Ruther-

ford to be assistant director for science education.

Pimentel has been in the chemistry department of the University of California at Berkeley since 1949 and a full professor since 1959. A member of the National Academy of Sciences, Pimentel has worked on infrared spectroscopy and molecular structure, chemical lasers, hydrogen bonding, matrix isolation spectroscopy, infrared study of planetary atmospheres, rapid-scan infrared and thermodynamic properties of hydrocarbons.

Rutherford received an EdD in science education from Harvard University in 1962. From 1964 to 1971 he was involved in science education at Harvard, and was executive director of Harvard Project Physics. Since 1971 he has been chairman of the science-education department at New York University.

Yeshiva to cut graduate physics and mathematics

In accordance with a decision made this summer, teaching programs in physics and mathematics at the Yeshiva University Belfer Graduate School of Science are to be phased out by June 1978. (Chemistry programs had been phased out earlier.) Nearly 70 students and 22 faculty in graduate mathematics and physics will be affected. Nine faculty in each department are tenured.

We spoke with Arthur Komar, the dean of the Belfer Graduate School of Science, who told us the plans for the phase-out. The administration's intentions are as follows: No graduate-level courses will be offered at Yeshiva in physics and mathematics during the 1977-78 academic year, senior graduate faculty will take on a full undergraduate course load with no drop in salary and finally, the graduate students themselves will enter into comparable programs at other universities in the New York metropolitan area. Thesis advising will continue at Yeshiva for the year.

These proposals quickly hit a few snags before the fall semester even began, according to Komar. Primarily problems stemmed from the poor timing of the announcement, which occurred during the summer months when students and faculty were away, and also at a time when course enrollments had been already filled at most schools. If students cannot be accommodated elsewhere, graduate courses may be taught in the 1977-78 academic year. After that year, there might be enough work to accommodate the faculty; so some may leave their positions when the programs are terminated. Komar feels that these problems will not delay the date of the phase-out. A half-million dollars is expected to be saved by the elimination of the two programs.

David Finkelstein, chairman of the

Change in average starting salaries

(relative to all industrial workers)

Profession	1964-69	1969-73
PhD in Chem. Eng.	+2.7%	-21.2%
Civil Eng.	—	-19.1
Elec. Eng.	-5.8	-19.3
Math.	-6.6	-24.4
Mech. Eng.	-0.1	-18.2
Physics	+1.0	-28.0
All professors	+7.8	-7.6