Ray and international science

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all things are being done that should be done and to make sure they are all consonant with foreign policy," Ray said. "The bureau would like to be in a position to advise the Secretary of State on the potential implications of science and technology and international exchanges before foreign policy is made, not afterwards. Nevertheless, I am well aware that there has always been a foreign policy, but there hasn't always been a policy regarding science and technology. We have some catching up to do."

Catching up will take some time, she admits, because the United States has a very large number of scientific agreements in existence, many of which were not negotiated by the State Department and all of which are now being evaluated at Ray's direction. The outcome of these evaluations could spell major changes in the way future international science programs are carried out. "Our attitude has been that scientific agreements are a good thing," Ray said, "but what tangible results have the cooperative programs really had? We don't know in all cases. This is the kind of question we hope the evaluations will answer."

Ray has directed her staff of about 80 to assemble information on all but two agreements in science. (The two other agreements—the US–USSR Joint Commission on Scientific and Technical Cooperation and the US–Japan Cooperative Program—are already under independent review.) "The entire purpose of these exercises is to try to understand which technique is working best," Ray told us. "The same kind of thing can be done in regard to our system of about 20 scientific attachés. What do the attachés actually do; what have they accomplished; are they in the right places in the world?" The annual meeting of the scientific attachés at the end of May collected answers to a number of these questions. This information is now being digested by Ray and her staff with an eye toward change.

Travel curbs. Despite the ambitious tenor of this and other undertakings, Ray does not foresee any major changes in one area concerning a number of US scientists—restrictions on travel in US–USSR exchanges. Both countries have many rules that still discourage scientists in the US from participating in exchanges, despite substantial progress since the 1972 agreements that allowed increased exchanges of scientists. On this issue, Ray responded with her usual candor: "The world simply is not a perfect place, it's a very imperfect place. Hopefully, mankind will become one family some day, but it's not true today. It is easy for scientists to think

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of science as being apolitical, just as dancers think of ballet as being apolitical. But science is also useful. Whereas we have a splendid program of mutual exchange with the Soviets in plasma physics, the same does not hold true in the laser fusion areas—even though they are both related to fusion. And why is that? Because laser fusion has a military use as well. When and if the commercialization of fusion becomes a reality, we will see that the exchanges in plasma physics will not be so free either."

Ray does not believe that such restrictions need hamper international science cooperation and, in fact, she told us she believes there is more room for international cooperation in science and technology than at any time in the past. "The genius of science is that the scientific way of thinking and attacking problems is to do the things that can be done, and break down the problems into manageable size. Science does not tackle the imponderable problems that have no solutions." And as those who know Dixy Lee Ray can tell you, she operates the same way. —*Madeleine Jacobs*

NSF sees major PhD oversupply for 1980's

Making projections of future employment conditions is a tricky business at best, but the National Science Foundation is trying its hand in the art and anticipates, in a recent report, an increasing oversupply of doctoral scientists and engineers as we move into the 1980's. For all sciences in 1972 there were approximately 3000 unemployed PhD's and 13 000 in nonscience jobs (some by choice) out of 221 000 in the labor force. In 1985 there could be 82 000 to 107 000 who will not have science and engineering jobs—a group that would represent about a quarter of the available manpower.

These figures and others are from the NSF's *Projections of Science and Engineering Doctorate Supply and Utilization, 1980 and 1985.* PhD's have been categorized into only five broad groups —physical, life and social sciences, engineering and mathematics—mainly because further breakdowns are difficult in such projections, according to an NSF spokesman. Physical and biological science doctorates are projected to fare the best among the five categories with utilization of manpower close to 1972 levels (84–89% employment in science and engineering jobs for physical scientists in 1985 compared with 93% in 1972). It is important to note, however, that the 11%-plus physical scientists in 1985 not in science and engineering jobs would, for the most part be employed—but outside of these fields.

A change by 1980 is expected in the balance between academic and non-academic physical-science PhD's in science and engineering positions. In 1972, there were nearly an equal number in each sector (29 000 in academia and 28 000 outside), but there may be seven non-academic PhD's for every four in academia by 1985, the report shows.

The changing employment scene for physics, as monitored by the AIP Manpower Division, is similar to the broader physical-sciences picture in the NSF study. In response to a "limited" or "no growth" situation for technology in the coming years, the division has estimated that PhD production will level off at about 930 per year by 1977. This is down from over 1500 during the peak year of 1970–71. Despite this major cutback, the number of doctorates in the pipeline may still be too large for conventional demand—the university population is shrinking and major growth is not expected for industry and government research except in selected areas such as energy. The manpower division staff notes that a wide gap between the supply of physicists and the demand will narrow as they find work in applied physics, other sciences and non-science jobs. What kinds of nontraditional physics jobs these workers find is an area the division is currently watching. □

Any comments?

The Nuclear Regulatory Commission invites comment on its recently announced provisional view on plutonium recycling. The statement, issued on 8 May, says that no further licenses for the use of plutonium as a fuel for light-water reactors should be issued until alternative safeguards have been investigated. Address comments to the Secretary of the Commission, NRC, Washington, D. C. 20550, Attention: Docketing and Service Section, before 24 July.