

thanks to the rapid growth of radiolocational technology, which placed in the hands of physicists a powerful method for studying rotational spectra of gas molecules. This work was of great scientific interest, but again promised little from the point of view of useful application. It is no coincidence that industrial laboratories in the USA supported such research at first, but soon left off, and after this the work was concentrated solely in the universities.

In the Soviet Union, work on radiospectroscopy was conducted as basic research from the very start, at the P.N. Lebedev Physics Institute of the Academy of Sciences of the USSR. This research led to the creation of a molecular electromagnetic radiation generator — maser — the first quantum electronics device. Following the maser there appeared quantum generators of optical range — lasers. Once again discoveries revolutionizing entire technological areas arose as a result of systematic basic research. . . .

The most important scientific task today is the problem of controlled thermonuclear fusion, on whose resolution a significant number of scientists are working in many countries of the world. The achievement of controlled thermonuclear fusion reactions would open up practically inexhaustible sources of energy. And in this case too, basic research can bring success.

Basic research must be carried out on a broad front. The concentration of efforts on just one branch may give short-term successes, but in the long run it negatively affects the development of all branches of science without exception. Nevertheless one always finds impatient people hurrying to declare one scientific direction or another hopeless and unworthy of support.

I recall how during the development of quantum electronics, statements could be heard to the effect that optics as a division of physics had exhausted itself, and that therefore other directions should be developed. The creation of lasers led to a revolution in optics, and so no one says now that this branch has become outdated.

No branch of science should be shut down; it is possible and necessary to change directions in research. Arbitrary decisions in the area of basic research produce deplorable results; unfortunately examples of this exist. It is also very important to avoid an arbitrary approach in the choice of ways to solve concrete scientific tasks. For example, several means of solving the above-

## Soviets Endorse Fast Breeder, Reprocessing

Soviet delegates to the recent International Atomic Energy Agency (IAEA) meeting in Salzburg, Austria and the nuclear suppliers' London Club meeting endorsed the development of fast breeder nuclear technology to help meet world energy needs. At the London meeting last week, according to the *Financial Times of London*, the Soviets countered the U.S. State Department's Joseph Nye with a policy document calling reprocessing and its plutonium by-product "facts of life."

In Salzburg, according to the French financial daily *Les Echos*, the Soviet representatives urged rapid development of fast breeder programs and announced that the European socialist countries will develop two new fission plants with nuclear reprocessing facilities.

mentioned problem of controlled thermonuclear fusion are under investigation. It would be the grossest error to throw all our efforts into one method, ceasing work in the other directions, since no one can truly say which direction is the most promising. . . .

The economic effect of introducing scientific processes also cannot be a sufficient criterion for evaluating the activity of a scientific collective engaged in basic research. How, in reality, can we evaluate in rubles the research which led to the creation of quantum mechanics and the theory of relativity, the fundamental basis of modern scientific and technological progress?

Basic scientific research is very difficult to plan and to evaluate on the basis of any standard scale. In order to avoid mistakes which would have extremely serious negative consequences, it is necessary to conduct broad discussion of scientific problems among the scientific public. Analyzing the activity of the collective engaged in basic research, results must be looked at over a sufficiently long period of time — say, not less than 5-7 years. Attention must be given to how they have affected the development of science as a whole, the acceleration of technological progress in our country. . . .