in El Salvador's urban areas, but a strong effort also will be made to distribute the product in the rural areas, where the incidence of malnutrition is high. Plans have been made to manufacture the product in El Salvador. Pillsbury also will attempt to avoid being accused of commercial imperialism and already has a partnership with a local firm for a flour mill; this relationship may be extended.

As effective food fortification programs are established, the headaches of contracting companies are no greater than those suffered by government, because it is assumed that added costs resulting from fortification could limit sales. If neither consumer nor company is willing to supply the added cost, then a mass market is not likely to be achieved. Martin Forman, AID Director of Nutrition and Child Feeding Services, recommended that perhaps the costs for mass distribution could best be absorbed by the receiving foreign government.

With government interest in food fortification programs increasing, it has been suggested that all such programs be centrally coordinated. Almost 2 years ago, Secretary of Agriculture Orville Freeman took a step in that direction when he appointed biochemist Aaron Altschul, of the Agriculture Department's Seed Pioneering Research Laboratory in New Orleans, as his special assistant and adviser on food science and new protein food programs. Altschul has an office in the Department of Agriculture and answers to Secretary Freeman, but he receives his salary from AID. To an outsider, despite Altschul's liaison position, the relation between AID and the Agriculture Department is still not well defined. As one AID official put it, there are too many agencies involved in the problems of malnutrition, too much overlapping, and too little real effective action. As an example, he referred to the Food for Freedom program, which is coordinated by AID and the Agriculture Department. AID's primary goal in the program is to ship food abroad for consumption by the needy, whereas the Agriculture Department's primary goal seems to be domestic: namely, to manage farm commodities for the benefit of the American farmer. The goals of the two agencies often conflict.

New fortified food products are being created through basic research. Nevertheless, how to get these products to the people who need them may prove at least as difficult a task.

—MARTI MUELLER

Sakharov: Soviet Physicist Appeals for Bold Initiatives

In a 10,000-word essay, circulated and discussed in Soviet scientific-intellectual circles, a nuclear physicist who helped develop the Soviet H-bomb has urged "peaceful coexistence and intellectual freedom" while the two main world powers use the "scientific method . . . deep analysis of facts . . . unfearing open discussion and conclusions" to deal with the "great possibilities and dangers linked with the scientific-technical revolution."

In his belief that the method of science can avert thermonuclear war, famine in the poor countries, and environmental pollution in the advanced ones, Academician Andrei Dmitrievich Sakharov joins many other eminent scientists in both the United States and the U.S.S.R. who have been seeking this objective outside official channels. But Sakharov goes farther than any other influential spokesman in either country in advancing an explicit and detailed proposal for rapprochement and cooperation between the two countries and in taking a bold look at the "mass myths that put entire peoples and continents under the power of cruel and treacherous demagogues." The statement is without precedent from a man of his rank in Soviet life.

The gist of Sakharov's essay was first reported by the New York *Time's* Moscow correspondent, Raymond Anderson, on 12 July. Anderson later was able to send a complete copy to the *Times,* which translated and printed the essay in full, using three pages in the 22 July edition.

While reflecting a deep commitment to Marxism and socialism in the classic sense, Sakharov says that "both capitalism and socialism are capable of long-term development, borrowing positive elements from each other and actually coming closer to each other in a number of essential aspects." To accelerate what he calls an "inevitable convergence," Sakharov urges the two world powers to disarm and join together to avert world catastrophe by applying one-fifth of their national incomes to development of the poorer half of the world. To this end, both nations must abandon "extremist ideologies that reject all possibility of rapprochement, discussion and compromise." Both must make "significant changes in their foreign and domestic policies."

The United States, Sakharov says, must accept a "serious decline in the United States rate of economic growth" in order to support "worldwide efforts to change the level of living of billions of people," and must be "willing to do this . . . for the sake of preserving civilization and mankind on our planet." White citizens of the United States must accept "minimum sacrifices to eliminate the unequal economic and cultural position of the country's black citizens."

Sakharov concentrates much of his discussion on changes in Soviet society that he believes necessary to consolidate the achievements of socialism. The chief of these is development toward "intellectual freedom . . . essential for human society" and the "key to a progressive restructuring of the system of government in the interests of mankind."

At a time of grave official Soviet concern over liberalizing trends in Czechoslovakia, Sakharov's eloquent plea for intellectual freedom may reflect a rising attitude among Soviet professionals. Sakharov says that the Czechoslovaks understand the essential nature of intellectual freedom. "We should support their bold initiative, which is so valuable for the future of socialism and all mankind. That sup-

port should be political and, in the early stages, include increased economic aid."

Some Western observers suggest that facing the Kremlin is the blunt fact that the massive and still unevenly developed Soviet society cannot cope with change at the Czech pace. Nevertheless, one of the foremost Soviet experts in the U.S. said that the "fact that a top Soviet scientist can write along these lines, addressing fundamental issues in fearless terms, reflects great credit to the U.S.S.R. and is evidence of the basic strength of Soviet society."

Top U.S. scientists, some of whom have participated in the Pugwash conferences in which American and Russian scientists have met for discussion since 1961, reflected the same view. Paul Doty, Harvard physical chemist, member of the National Academy of Sciences, and a former member of the President's Science Advisory Committee, said: "It adds prestige to Soviet society that such idealism and objectivity are being brought to bear on major problems." Referring to Sakharov's detailed discussion of the "10 to 15 million deaths" and other results of 24 years of Stalinism, Doty, who has made many trips to the U.S.S.R. since 1960 on both official and nonofficial missions, said: "The extent to which Sakharov discusses Stalinism reflects the extent to which the damage of these years is still a problem in Soviet society. Just as generations were needed in the U.S. to deal with the residual damage of our Civil War, so prolonged efforts will be needed to deal with the consequences of the Stalinist period in Soviet society. The Sakharov text may signal a healthy departure from the main way of dealing with the Stalinist experience in the U.S.S.R.—that is, not talking about it."

Jerome Wiesner, M.I.T. physicist, head of the President's Science Advisory Committee in the Kennedy administration, and member of the National Academy of Sciences, who visits the U.S.S.R. once a year with the hope of finding common ground with Soviet scientists for action along the lines suggested by Sakharov, said: "Sakharov's essay is a statement that I would be proud to have written. It is addressed to our government as well as to that of the U.S.S.R.—in fact, to all governments of the world."

"Sakharov's statement is tremendously interesting," said Polykarp Kusch, the Columbia physicist who won the Nobel prize for measurement of the electron dipole moment, work that laid the foundation for quantum electrodynamics. "That a man of this scientific stature has circulated such a statement without going through the machinery of the political apparatus is new evidence of how much the views of the scientific community are being respected. It suggests a new Russian style; it is inconceivable to me that this could have happened a few years ago."

Gerard Piel, publisher of the *Scientific American,* another frequent visitor to the U.S.S.R. and participant in the Pugwash conferences, said: "The Sakharov article is another expression of the honesty and sense of personal responsibility that scientists of this rank have. It is part of a sequence of events suggesting that scientists of stature have indeed gotten closer to the center in this kind of decision making on both sides of the Iron Curtain."

Said Edward Teller, Lawrence Radiation Laboratory physicist, chief developer of the H-bomb in the United States, and member of the National Academy: "I like what Sakharov says about freedom. I can't agree with the emphasis he places on socialism as the best form of economic structure. In many places he sounds a little naive but if I were to go into detail on politics I would sound naive."

A major part of Sakharov's essay is discussion of "three technical aspects of thermonuclear weapons that have made thermonuclear war a peril to the very existence of humanity." This discussion, which parallels many published statements by U.S. physicists who shared in the development of fission and fusion weapons, describes the "enormous destructive power of a thermonuclear explosion, the relative cheapness of rocket-thermonuclear weapons and the practical impossibility of an effective defense against a massive rocket-nuclear attack."

In support of this last point, Sakharov mentions an article written by Nobel laureate Hans Bethe and Richard L. Garwin, director of applied research at IBM's Thomas J. Watson Research Center, and published in the March 1968 *Scientific American.* The article, "Anti-Ballistic-Missile Systems," argues that fairly cheap penetration methods can make such intercontinental nuclear weapons ineffective.

"I was directing my remarks as much at the Russians as at the U.S.," Bethe said. "Whether the article influenced the Russian government, I think I will never know."

Bethe, who won the Nobel prize for contributions to the theory of nuclear reactions, has also worked for 10 years on the problem of antiballistic missiles for the Abco Missiles System, Wilmington, Massachusetts. Some observers believe that the effect of the Bethe-Garwin article on scientists in both countries had a role in the U.S.–Soviet agreement to discuss offensive and defensive missile systems, announced by President Johnson on 1 July.

The Bethe-Garwin view is supported by Herbert York, chairman of the department of physics of the University of California, former head of Lawrence Radiation Laboratory, and top scientist in the Defense Department during both the Eisenhower and Kennedy administrations. York told *Science,* "I think I know enough about military technology to know there isn't any safety in an anti-missile system. This problem doesn't have a technological fix; solutions must be sought along political lines."

Only meager facts about Sakharov are available here; of the many eminent physicists reached by *Science* who travel regularly to the Soviet Union, only Wiesner remembers meeting him, quite briefly at a reception at the Soviet Academy. At 47, Sakharov has spent all his life under Communism and more than half of it under the Stalinist system. A U.S. source describes him as having presented the most brilliant thesis ever offered in physics at Moscow University, work done early in World

News Staff Appointments

Daniel S. Greenberg, who has headed the News and Comment section of *Science* since 1962, has been appointed to the newly established post of foreign editor. His address is 22 Mulberry Walk, London, S.W.3, England (Telephone 352 9749). John Walsh, European correspondent of *Science* for the past 2 years, succeeds Greenberg as news editor in Washington.

War II under the late I. V. Kurchatov, father of the Soviet H-bomb. He won the Order of Lenin and the Stalin prize in 1948.

In 1950 Sakharov, with Igor E. Tamm, who won the Nobel prize for elucidation of the theory of the Cerenkov effect, proposed a model for controlled nuclear fusion reactions that helped set the direction of most of the current research in this field. The model outlined how a magnetic field could be used to confine a plasma of bare nuclei and electrons, brought to the kindling temperature for nuclear fusion of above 100 million degrees Kelvin. Similar proposals were made by scientists in other countries and to date magnetic-confinement seems the most effective way to meet the principal problem in controlled nuclear fusion: how to prevent the charged particles of the plasma from striking the walls of a solid-state container.

In a 1958 paper in the Soviet *Journal of Atomic Energy* Sakharov estimated the amount of genetic damage resulting from "nuclear tests already performed" and said that "continued testing . . . cannot be reconciled with humanity or international law."

In a recent paper, Sakharov describes several systems he has designed for using explosives to raise a magnetic field to megagauss intensity. C. W. Fowler of the Lawrence Radiation Laboratory at Los Alamos, New Mexico, published a similar method in 1960. Other teams in this country and in Italy are trying to apply the method to plasma confinement. Sakharov believes the explosive method for reaching megagauss magnetic fields may ultimately be applied to particle accelerators, producing acceleration up to 100 Bev (the Weston accelerator now being built reaches 200 Bev).

Sakharov's nonappearance abroad may be due as much to his extraordinary scientific value (he was, for example, elected to the Soviet Academy of Sciences at age 32, without having gone through the route of "corresponding member," a rank at which his senior colleague, Tamm, stayed for 20 years) as to his political maverickism, although there is plenty of that. He vigorously opposed the genetic theories publicized by Lysenko. With other Soviet physicists, he petitioned Party chief Leonid I. Brezhnev to oppose a rumored restoration of Stalin's status. Later he joined in a petition opposing a new law making unauthorized demonstrations a crime.

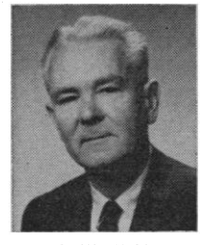
Sakharov's quality as a scientist gives him a privileged position shared by few others, even in the elite intellectual community, and makes his plain speaking possible. Many governments, including our own, have found it not possible to limit the wide-ranging mind of the theoretical physicist.

Do these top minds speak also for the majority of scientists in the two countries? Says Doty, who knows both: "Some share the world view but perhaps the majority still put their interest and actions into short-range or tactical problems."—LOUISE CAMPBELL*

* Mrs. Campbell is a former staff member of the AAAS.

APPOINTMENTS

D. A. Jones



J. W. Mehl

Don A. Jones, associate administrator of Environmental Science Service Administration, Department of Commerce, to director of the Coast and Geodetic Survey of ESSA. . . . **John W. Mehl,** chairman of the department of biochemistry, University of Southern California, to deputy director of the division of biological and medical sciences, National Science Foundation . . . **Vincent M. Barnett,** president of Colgate University, to professor of political science at Williams College. . . . **Robert M. Grainger,** head of the dental clinic at the University of British Columbia, to associate director for extramural programs at the National Institute of Dental Research, NIH. . . . **Leslie R. Shepherd,** deputy chief executive of European Nuclear Energy's High Temperature Reactor Project Dragon, to chief executive of the project. . . . **James H. Zumberge,** president of Grand Valley State College, to director of the school of earth sciences, University of Arizona. . . . **Vernon E. Wilson,** executive director of health affairs, University of Missouri, to vice president for academic affairs at the university. . . . **Bruce Cork,** physicist in the Lawrence Radiation Laboratory, University of California, Berkeley, to associate laboratory director for high-energy physics at Argonne National Laboratory. . . . **Oleg Jardetzky,** director of the department of biophysics and pharmacology, Merck Sharp & Dohme Research Laboratories, to deputy director, Medical Research Council unit of molecular pharmacology, University of Cambridge. . . . **Thomas M. Durant,** chairman of the department of medicine, Albert Einstein Medical Center, to chairman of the Drug Research Board, National Research Council. . . . **Edward C. Moore,** dean of the graduate school and coordinator of research, University of Massachusetts, to the new position of vice president for graduate studies and research, State University of New York at Binghamton. . . . **James L. McGaugh,** acting dean of the school of biological sciences, University of California, Irvine, to dean of the school. . . . **James E. Martin,** head of agricultural economics, Virginia Polytechnic Institute, to dean of the College of Agriculture at the university. . . . **Gerald T. Perkoff,** professor of internal medicine at Washington University, to director of the newly created division of health care research at the university. . . . **Bertram M. Gross,** professor of political science, and director of the National Planning Studies Program at the Maxwell Graduate School, Syracuse University, and consultant to the Secretary of HEW, to director of the Center for Urban Studies of Wayne State University. . . . **Kenneth J. McCallum,** head of the department of chemistry and chemical engineering, University of Saskatchewan, to president of The Chemical Institute of Canada. . . . **Elliott C. Lasser,** chairman of the department of radiology, University of Pittsburgh School of Medicine, to chairman of the department of radiology at the School of Medicine, University of California, San Diego.

Erratum: The Department of Defense letter cited in "Senate aims blow at colleges that bar recruiters" (21 June 1968, p. 1320) was in error in its list of colleges that bar military recruiters from their campuses. Several of the colleges listed—including Rutgers and Fordham—do not bar recruiters, and at present only Oberlin has such a policy.

Erratum: The last sentence of "APS to stay aloof from politics" (26 July, p. 340) should read "A *strong supporter* was . . . Jay Orear" rather than "A strong opponent. . . ."

Erratum: In the report "Induction and survival of hemoglobin-less and erythrocyte-less tadpoles and young bullfrogs" by G. Flores and E. Frieden [159, 101 (1968)], sentences 4 and 5, paragraph 1, column 3, page 102, should read "Air-saturated water is 0.25 m*M* in oxygen in the same temperature range, or 5.5 μl O_2/ml. Thus, if tadpole fluids equilibrate with air within 0.1 hour, minimal amounts of oxygen should be available for normal respiration."