F. A. S. *NEWSLETTER*

Volume 21, No. 6

June, 1968

– – – – – – – – to provide information and to stimulate discussion. Not to be attributed as official FAS policy unless specifically so indicated.

NON-PROLIFERATION TREATY IS NOW A REALITY

The main provisions of the long-sought non-proliferation treaty (NPT) are summarized in the box below. The agonizingly slow progress toward the treaty has been reported in previous NEWSLETTERS. Following is a chronological outline of developments connected with the NPT from mid-April to mid-July. All the facts reported here are from the New York Times. *Almost without exception, the* Times' *story covering each development appears in the paper one day after the dates noted here.*

U.S. AND SOVIETS TO BEGIN BILATERAL ARMS LIMITATION TALKS

On April 18th, Defense Secretary Clifford told a two-day meeting of the NATO Nuclear Planning Group at the Hague that the NPT did not inhibit nuclear consultation and cooperation within the North Atlantic Treaty Organization (NATO). NATO has regarded the availability of small and

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MAIN PROVISIONS OF NPT

(from the *New York Times;* 13 June 1968)

Nations with nuclear weapons will not transfer arms or other nuclear explosive devices to any nation that has no such weapons and will refrain from assisting such nations to manufacture or obtain control over such weapons or devices.

Nations without nuclear weapons likewise will not receive such weapons and devices, or accept assistance to manufacture them.

The nations without nuclear weapons agree to accept an inspection system to be worked out with the international Atomic Energy Agency, a specialized body affiliated with the United Nations, to insure compliance with the treaty provisions.

Research, production and use of nuclear energy for peaceful purposes, except for the development of nuclear explosive devices, is guaranteed to all nations with no nuclear weapons, with the fullest possible exchange of scientific and technological information.

The peaceful applications of nuclear explosives will be made available through an international body on a nondiscriminatory basis and at a cost excluding charges for research and development.

The nations with nuclear weapons agree "to pursue negotiations in good faith on effective measures relating to cessation of the nuclear arms race at an early date" and on a treaty on "general and complete disarmament" under international control.

The treaty enters into force when the United States, the Soviet Union and Britain and 40 states without nuclear weapons have ratified it. It can be amended by a majority vote of the adherents, and the treaty can be reviewed every five years after it comes into force. The duration of the treaty is 25 years.

Any party may withdraw from the treaty with three months notice "if it decides that extraordinary events, related to the subject matter of this treaty, have jeopardized the supreme interests of its country."

U.S. AND SOVIETS TO BEGIN BILATERAL ARMS LIMITATION TALKS

Almost concurrently with the signing of the non-proliferation treaty (opposite column) came joint U.S. and Soviet announcements that the two nations were ready to begin talks on more general arms limitations, particularly limits on offensive and defensive missile systems. Either event—the signing of the NPT or the promise of imminent U.S.-Soviet talks—might by itself be regarded as the most significant arms control development since the partial test ban treaty in 1963.

On June 27th, Soviet Foreign Minister Gromyko reported to the Supreme Soviet that Russia was ready to open discussions on mutual limitations on the deployment of costly anti-ballistic missile (ABM) systems. But Gromyko emphasized that any agreement could be reached only in the context of a broad treaty limiting offensive missiles as well. It appeared that the timing of the Soviet move was linked to progress on the non-proliferation treaty. (*New York Times;* 28 June 1968) There was also speculation that the apparent Soviet willingness to consider ABM limitations stemmed from recent reconsiderations of their high cost, in relation to other Soviet economic needs, and their very limited effectiveness against large and sophisticated missile attacks of the type that the United States could launch. (*New York Times;* 30 June 1968)

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NEWS ITEMS

A team of mental health experts has suggested that the United States could learn a lot from the Soviet Union about the care of the mentally ill. This rather surprising observation—contrasting with the prevalent view that mental health is a neglected area of study in the Soviet Union—comes from a seven-member American team who spent three weeks touring Soviet psychiatric installations and reported their findings to a meeting of the American Psychiatric Association. The Americans were impressed with the attention paid to individual patients in Russia, and they cited the virtually life-long continuity of care, the high doctor-to-patients ratios in mental health centers, and apparent Soviet success in getting mental health patients functioning in their communities. Dr. Stanley Yolles, a member of the American team and Director of the National Institute of Mental Health at Bethesda, Maryland, described the continuity of care as a "basic operating principle of Soviet psychiatry." It was also pointed out by one of the Americans that "the major attraction of the Soviet system is that it has removed the economic barrier to good psychiatric care for all its people. In many ways, this is the most shocking failure here in America. Under a predominently fee-for-service system, only three percent of our people can afford private psychiatric care." (*New York Times;* 19 May 1968)

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George B. Kistiakowsky, Harvard chemist and science advisor to former President Eisenhower, has noted a "pronounced estrangement" between the Defense Department and the academic community on scientific policy matters. Kistiakowsky attributed the estrangement to moves by the

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NON-PROLIFERATION TREATY

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medium-yield nuclear weapons as insurance aginst the possibility that an accidental military clash could escalate into a major nuclear war. The apparently imminent NPT raised doubts among some NATO partners about the degree of nuclear cooperation that could continue. Clifford's assurance was reportedly received with satisfaction by the Defense ministers and other NATO representatives present.

On April 22nd, West Germany was reportedly pressing for a specific commitment from the U.S., separate from the proposed NPT, that would guarantee adequate supplies of nuclear fuel for Bonn's peaceful nuclear program. Other highly industrialized countries have expressed fears during the treaty negotiations that the NPT would limit their supplies of nuclear materials and information from the nuclear powers.

On April 23rd, it became known that the U.S. and the Soviet Union had incorporated little-publicized sanctions into the proposed NPT, which sanctions would increase the pressure on reluctant nations to accept the treaty. The sanctions, not particularly emphasized by the U.S., were to the effect that nations refusing to sign the treaty and accept its international inspection requirements could find themselves cut off from assistance, including nuclear materials for power plants and other items, that would otherwise be supplied by the U.S. or Soviet Union. Initially, many of the non-nuclear nations had feared that their signing the treaty would inhibit their peaceful development of atomic energy. But the arguments are now cutting in the opposite direction: non-signatory nations would be handicapped since they depend greatly on the nuclear powers for fuel and technology. The U.S. is apparently willing to supply nuclear fuels to nations that do not sign the treaty, so long as they accept international safeguards. The Soviets, however, incline toward the more stringent position that a nation cannot receive nuclear fuel and assistance unless it accepts international controls *and* signs the treaty.

On April 24th, the U.S. and the Soviet Union opened debate on the NPT in the Political Committee of the UN General Assembly. They pledged that, if there were a wide endorsement of the treaty, they would push forward with negotiations to further limit the nuclear arms race. They promised generosity toward non-nuclear signatory states in advancing industrial and scientific nuclear technology. Delegates of more than 120 countries were asked to endorse the treaty. Some delegates remarked on the unusual agreement of the U.S. and Soviet Union. "The only thing they didn't do was hold hands," one said. In their statements, each of which ran more than 5,000 words, U.S. Ambassador Goldberg and Soviet Ambassador Kuznetsov attempted to answer various objections and criticisms that had been raised by non-nuclear states. Each also took account of the fact that neither Communist China nor France had endorsed the treaty. Both statements were remarkably free of propaganda.

On May 1st, the draft NPT was presented in the General Assembly by a group of 20 nations, including the U.S., the Soviet Union, Britain, and various countries from Europe and the Middle East. The draft resolution called for the "widest possible adherence" to the treaty, but stressed the need for urgent negotiations on further measures to halt the nuclear arms race. The lack of sponsors from Asia and Latin America was attributed partly to reservations on the part of India, Japan, Brazil, and Argentina—influential countries in their respective continents. These countries said the treaty imposed an unequal obligation on those industrially advanced nations that have not tried to develop nuclear weapons, and does not go far enough in committing the nuclear powers to reduce their armaments. The absence of African sponsors probably stemmed in part from uncertainty about the attitudes of the big nuclear powers on the current conflicts between the UN and some white minority regimes in Africa.

On May 14th, India announced in the UN that it would not sign the NPT in its present form and while Red China remained outside the disarmament negotiations. The Indian statement stressed the inadequacy of the treaty in banning the spread of nuclear weapons to new countries while leaving the nuclear powers free to multiply their own armaments.

In a tough-sounding statement on May 20th, the Soviet Union warned non-nuclear countries who were reluctant to endorse the U.S.-Soviet draft that they were "in one company with violent opponents" of the pact, and that they would be in league with the Soviet Union's enemies. On the same day, President Bourgiba of Tunisia spoke on behalf of the treaty and said that wide endorsement was necessary to "put the two super powers on the path to real disarmament."

On May 31st, the U.S. and Soviets bowed to pressure from smaller countries and announced a series of changes in their proposed draft treaty which would give stronger guarantees to small countries that they would receive help with peaceful nuclear applications, and promise more urgent effort by the big powers to end the world arms race. An additional change would reinforce the authority of the UN Charter against the use of force in general.

On June 10th, the NPT was endorsed in the General Assembly Political Committee by a 92 to 4 vote, with 22 abstentions.

On June 12th, President Johnson, in a surprise visit to the UN, told the General Assembly that its approval of the NPT obligated the U.S. and Soviet Union to move rapidly on other disarmament negotiations. He said that the nuclear treaty was "the most important international agreement in the field of disarmament since the nuclear age began," and he promised quick U.S. action in signing the treaty and submitting it to the Senate for ratification. [To come into force, the treaty needed to be signed and ratified by the U.S., the Soviet Union, Britain, and 40 non-nuclear countries.]

On June 17th, the U.S., Britain, and the Soviet Union pledged in the Security Council to provide "immediate assistance" to any non-nuclear country facing nuclear aggression. On June 19th, with five members abstaining, the Security Council approved the tripartite guarantee. But the abstention by France, India, Brazil, Pakistan, and Algeria illustrated remaining dissatisfaction and uncertainty over the NPT.

On July 1st, the NPT was signed at separate ceremonies in Moscow, London, and Washington with the necessary 40 signatures to bring the treaty into force.

But on the same day, the West German Government indicated that it had no immediate intention of signing the treaty until "a whole series of problems had been resolved." Among the problems, a Western German spokesman indicated, was "massive Soviet political pressure" on West Germany. The Germans also suggested that problems within the Western alliance required further examination of the treaty by Bonn.

On July 6th, West German Chancellor Kiesinger said that his government sought a U.S. guarantee against nuclear aggression before accepting the NPT.

On July 12th, the NPT won unqualified support from the military and civilian chiefs of the U.S. Department of Defense. General Wheeler, Chairman of the Joint Chief of Staff, and Deputy Defense Secretary Nitze, testified side by side before the Senate Foreign Relations Committee. They said that the U.S. would be giving up nothing in its national security interests but would benefit from this major step to reduce world tensions. Nitze assured the Committee that the U.S. planned no special agreement with West Germany to guarantee this protection from nuclear invasions. By that date (July 12th) some 60 nations had signed the NPT.

(Further NPT progress—including, hopefully, U.S. Senate ratification—will be reported in the September NEWSLETTER.)

NEWS ITEMS (Continued from Page 1)

Defense Department to displace "academic scientists from the various science advisory councils of the Pentagon." During the last five years, he said, the place of the academic scientists on these councils "has been very largely taken over by professional military scientists and those in the aerospace industry and the 'think tanks'."

Kistiakowsky's complaint was contained in a letter to Senator Fulbright and made public by the Senate Foreign Relations Committee of which Fulbright is Chairman. Earlier this year it was disclosed that Kistiakowsky had withdrawn as a science advisor to the Defense Department in protest against Administration policies in Vietnam. But Kistiakowsky's letter to Fulbright contained no indication that the Harvard professor was expressing concern about a trend directly related to the war. Implicit in his letter was a concern that the Defense Department was cutting itself off from the independent advice of university scientists, who moved into a position of influence in science policy groups during the Eisenhower Administration, and was now relying more on the advice of scientists within the Pentagon complex. (*New York Times;* 21 May 1968)

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The Institute for Defense Analyses has changed its structure to deflect the protests against its links with twelve major universities. The trustees of the non-profit, government-sponsored research institute, located in Arlington, Va. near the Pentagon, announced that membership in the organization, which previously consisted of the universities, would henceforth be composed only of individuals from academic and public life. The organizational change was made because a number of the twelve universities have been under attack, mostly by student groups, because of IDA's secret defense contracts. The Institute's trustees apparently hope that by breaking direct links with the universities and by broadening their membership, they will be able to protect the universities from criticism while still maintaining academic ties.

Some of the twelve universities have been thinking of dropping their membership in the Institute anyway. The most highly publicized attack came from students at Columbia University where recent demonstrations were aimed, in part, to end Columbia's ties with the Institute. The University of Chicago subsequently announced that it planned to sever its connection with the Institute, and faculty members at Princeton and other universities were also reported to be concerned. The organizational change should take place in the next sixty to ninety days. (*New York Times;* 5 June 1968)

FAS NEWSLETTER

Published monthly except during July and August by the Federation of American Scientists, 2025 Eye St., N.W., Washington, D. C., 20006. Subscription price: $2.00 per year.

Chairman ..... Cameron B. Satterthwaite

The FAS Newsletter is prepared in Washington.

Editor: Harriette L. Phelps.

Approx. closing date for this issue: 15 July 1968.

The FAS, founded in 1946, is a national organization of scientists and engineers concerned with the impact of science on national and world affairs.

Sources of information (given in the articles in parentheses) are for further reference. Items reprinted directly from other publications are designated as such in an introductory paragraph.

The AEC is studying the potential of nuclear powered "energy centers" in the Middle East, through its Oak Ridge National Laboratory. The study is to explore the technical and economic feasibility of nuclear-power desalting plants to provide fresh water and electricity in agro-industrial production complexes for arid regions of the Middle East. The study is, in part, a response to Senate Resolution 155 adopted last year, calling on the Administration to consider nuclear desalting plants as one means of supporting a stable and durable peace in the Middle East. (*AEC News Release;* 11 June 1968)

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A WALL STREET JOURNAL article discusses the possibility that criminals and terrorists could make atomic bombs. Dr. Theodore Taylor, a nuclear physicist who headed the Defense Department's atomic bomb design and testing program for seven years, says "I've been worried about how easy it is to build bombs ever since I built my first one." He says the once-secret information needed to build nuclear bombs became available in unclassified literature several years ago, and notes particularly that the World Book encyclopedia explains clearly enough how a bomb works.

Even given the necessary and probably available knowledge, however, an atomic bomb could not be built without the right materials. But these materials are turning out to be available in more and more places, and opportunities for stealing them may be multiplying. It is reported that it takes only thirteen pounds of plutonium to make an atomic bomb as powerful as that dropped on Nagasaki by the U.S. at the end of World War II. Plutonium is shipped to reprocessing plants and transported in various ways, including trucks traveling through rural areas, and experts say that shipments will be so numerous that it will be extremely difficult to guard all of them adequately. Plutonium is "easily accessible to diversion" during reprocessing, according to Representative Chet Holifield, Vice Chairman of the Joint Congressional Committee on Atomic Energy. A nine-member panel formed by the AEC to advise on problems of safeguarding potential bomb ingredients recently predicted in a little-noticed report that a nuclear black market is likely to develop. AEC Chairman Seaborg concedes "it is possible" that a black market could develop.

There have apparently been a couple of cases, one in London and one in Pennsylvania, where significant quantities of nuclear materials have been diverted. In the London case, workers stole 20 fuel element rods containing enriched uranium and dropped them over a fence surrounding a reactor site; but the plot was broken up before the man scheduled to pick up the rods was able to reach them. In the Pennsylvania case, more than 100 kilograms of enriched uranium were lost, and the loss was not discovered until the company involved completed a series of contracts with the AEC and had to make a final tallying of the material it had been sent for processing. The loss totaled about 6% of the amount of uranium that the company had handled over a six-year period. There was initial concern that the material had been diverted illegally. But after a long hunt, a fraction of the material was found and the AEC assumed that the rest was lost in normal processing—blown out in vents, tracked out on shoes, or buried with various debris.

The AEC and Congress are reported to be preparing legislation that would require greater security for the growing supplies of nuclear materials. But as one official observed "Even Brinks trucks are held up." One useful technical possibility might be the development of a chemical that could be applied to all nuclear material and would render it useless until it was extracted; the chemical and how to extract it would be closely guarded secrets. The AEC Advisory Panel is also reported to be recommending "severe criminal penalties" for persons who traffic illegally in nuclear materials. Under current federal law, the sale of nuclear materials "with intent to injure the U.S. or gain advantage for a foreign power" is covered by espionage laws. But if a person

sells the material, intending only to make money and with no malice toward his country, he is subject to only five years in jail and a fine of $10,000. (*Wall Street Journal;* 13 June 1968)

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The rapid evolution of computers and their increasingly pervasive influence on the lives of individual and the national welfare has led the National Academy of Sciences to set up a Computer Science and Engineering Board. The new Board is made up of academic and industrial experts in computer and information science. Generally the Board will "assess the implications of the enormous and somewhat heterogeneous growth of information processing technology as it affects the public and private sectors of our nation. It will be expected to take a broad view of this subject and of its application to research and education in various branches of science and engineering, as well as to the workaday needs of government, commerce, industry, and education." The chairman of the twelve-member board, Anthony G. Oettinger of Harvard University, observed that "during the past several years a number of competent studies have raised fundamental questions regarding the general magnitude, composition, rate of growth, and use of information store that is the foundation for decisions in our society." He noted that the use of computers is expanding so rapidly that even short-range estimates of their economic and social impact are unreliable. The Board will try to establish priorities of need for orderly development in the field. (*National Academy of Science News Release;* 15 June 1968)

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The development of France's nuclear armed force may be delayed a year or two because of the economic consequences of the recent strikes in France. This announcement was made, among others, by Foreign Minister Michel Debré in discussing the seriousness of France's financial position resulting from her internal difficulties. France's current strategic nuclear programs now center around "second generation" weapons, namely 27 medium-range nuclear-tipped strategic missiles. These missiles were to replace the first generation force of 50 supersonic Mirage fighter bombers, carrying 50 kiloton weapons. The target date for the completion of the missile program has been 1970; but this may now slip to 1971 or 1972. Similarly, the date for the launching of the first of several nuclear submarines for the "third generation" force might now come later than the scheduled date of 1970. (*New York Times;* 15 June 1968)

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Britain will be unable to contribute to what would have been the world's highest energy particle accelerator, to be built at CERN in Geneva. The planned CERN machine would have surpassed in energy both the 76 GEV Soviet machine now operating at Serpukhov in Russia and the 200 GEV accelerator now under construction at Weston, Illinois.

Britain's move, prompted by financial difficulties, was a serious blow to Western Europe's ambition to keep pace with the U.S. and the Soviet Union in high energy nuclear physics. The planned CERN machine would have cost in the neighborhood of $400 million. Britain, France, and West Germany would have all made approximately equal contributions to the CERN machine and, although it is not yet clear whether West Germany and France and the other European countries involved will try to go ahead, it seems likely that the definite British withdrawal has effectively stopped progress on the CERN machine for the present. (*New York Times;* 21 June 1968)

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In an unusual move, the heads of 42 of the nation's leading universities have issued a joint appeal to the Federal Government to assume a greater share of their financial burden. The new appeal is unique for several reasons: public and private institutions joined together in an appeal for all; universities whose major concern has traditionally been graduate scholarship stressed that they wanted federal aid for all levels of higher education, from junior colleges on up; all agreed that while present federal support for such specific purposes as research, construction, and student aid are essential and must be increased, there is now a desperate need for a general subsidy for current operations on a regular and continuing basis; and, since such general aid, never provided before, will require some formula based on a combination of an institution's enrollment and quality of education, the academic leaders conceded that some national yardsticks will probably have to be accepted. The appeal was apparently also unusual in taking cognizance of political realities and there was little doubt that its timing was aimed at the political conventions in the hopes that a new higher education bill, already urged by President Johnson, will be part of the next President's program. Harvard President Nathan M. Pusey remarked that "we wouldn't be unhappy if some of this document showed up in the party platforms."

Many striking statistics support the appeal and underlie the need for federal aid to higher education: Higher education enrollment is up from 2.6 million in 1955 to 7 million now. Operating expenditures have grown from 3.4 billion to 15 billion in the past decade. Graduate education, normally an expensive business for a university, is becoming a mass education sector; graduate enrollments having grown from about 300,000 in 1960 to about 700,000 now, with the million mark expected around 1975. The cost of educating a graduate student may be as much as six times that of an undergraduate.

Another reason for the crisis is that, at the moment while the war in Vietnam has already led to a serious retrenchment in federal funds, the universities are being asked to expand into areas such as computer science, molecular biology and oceanography, and simultaneously respond to the challenge of urban crisis and environmental pollution. (Fred M. Hechinger in the *New York Times;* 30 June 1968)

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Newly announced Ford Foundation grants, totaling $3,964,550, will be used to advance the science of ecology. Ecology deals with the interrelations of living things with their common environment and with one another. It has had a respected place in science even though there are relatively few highly trained ecologists. The Ford grants apparently reflect a belief that advances in ecology can help rescue mankind from the consequences of exploiting our natural environment without regard for the creatures which inhabit it.

The Ford grants go to seven universities, with Yale receiving the largest grant of $900,000. The other universities are Johns Hopkins, the University of Washington, the University of British Columbia, Missouri Botanical Gardens affiliated with Washington University, the Davis campus of the University of California, and Colorado State University. The University of California will use its $174,000 grant to forecast from mathematical models using a computer, consequences of that State's rapid population growth, urban transportation, pollution, public health and welfare, natural resources, and the law.

Gordon Harrison, in charge of the Ford Foundation's natural resources and environment program, noted that "The precipitious increase in human population has begun all over the world to put unprecedented demands on natural resources to feed and clothe multiplying generations, to absorb wastes of industrial and life processes, and provide living environments conducive to human well-being." He observed that the technological remedies that governments are applying, even though they work for a time, can well have "consequences in the longer run that precipitate other crises," unless ecology and related sciences produce long-term solutions. (*New York Times;* 30 June 1968)

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The French are beginning a new series of nuclear tests in the Pacific, probably including France's first hydrogen bomb explosion. The French have warned all ships to keep away, until further notice, from a danger zone centered on the Mururoa Atoll, about 750 miles southeast of Tahiti, beginning in early July. The tests are expected to continue into early fall.

France considers herself free to continue atmospheric nuclear testing, not having signed the partial test ban treaty outlawing all but underground nuclear blasts. France has also left vacant her seat in the Geneva Disarmament Conference, contending that anything short of a total ban on atomic bombs, as well as the means for their delivery, was a wasted effort. The French have also refused to sign the treaty to prevent the spread of nuclear weapons (NPT), although they have let it be known that they were, in fact, opposed to the proliferation of nuclear weapons. The French have persistently made it clear that their goal is to join the exclusive club of the thermonuclear powers—the U.S., the Soviet Union, Britain, and Communist China. (*New York Times;* 4 July 1968)

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A network of survey stations is being set up to see if the Denver area "shrinks" when water is pumped out of a deep disposal well that has been linked to intensified earthquake activity in the area. [See earlier NEWSLETTERS.] The project is intended to provide a better understanding of a succession of earthquakes attributed to the injection of 160 million gallons of contaminated water deep into the earth through the well. Most of the quakes have been too small to be felt by Denver residents, but a few have reportedly caused moderate damage.

The well, on the Denver outskirts, was used by the Army's Rocky Mountain Arsenal to dispose of water contaminated with chemical warfare agents. Although injection of the water was halted in 1966, the quakes have continued. Because they seem to be increasing in severity, seismologists at the National Center for Earthquake Research in Menlo Park, California have warned that a major quake might occur this year. This led to proposals that water be pumped from the well to relieve the pressure. When pumping starts this fall instruments will keep close watch for intensified tremors. The network of survey stations will use lasers to precisely gauge distances between stations. (*New York Times;* 4 July 1968)

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U.S. physicists may be able to work with the Soviets in using the world's most powerful accelerator, the 76 GEV machine at Serpukhov, about 40 miles south of Moscow. But to take advantage of this machine, the United States may have to pay a substantial "price of admission," in terms of equipment and cost of operation. Once it goes into full-time operation, probably some time this year, the Soviet machine is expected to dominate high energy physics research until the 200 GEV machine in Weston, Illinois is completed in about 1972.

A report (see the 5 July 1968 issue of *Science*) prepared by the High Energy Physics Advisory Panel of the Atomic Energy Commission assesses the status of American high energy physics in the light of recent budget cuts. It echoes gloomy predictions by individual physicists, and suggests that if present trends in cutting back on funds for research in high energy physics continue, this "will have grave consequences for science and education in our country." The report suggests that the United States may find itself in the position it occupied before the 1930's, "when most of the major discoveries in fundamental science were made in Europe." The report calls attention to the increasing collaboration between the Soviet Union and West Europeans and recommends that U.S. budget planning be flexible enough to provide limited funds for American participation in the Soviet effort. It notes that Soviet accelerator construction, formerly somewhat handicapped by poor liaison between physicists who designed the equipment and the plants where it was made, seems to be improving, and that the Serpukhov accelerator seems "well designed."

The French are providing a large "bubble chamber" to go with the Serpukhov accelerator. CERN, the European center for nuclear research at Geneva, is preparing equipment to extract the proton beam from its circular racetrack and aim it into the target area, and a team of Soviet physicists is in residence at Geneva to help the effort along. CERN reports that the Russians and Europeans have agreed to use the same size film in recording their bubble chamber experiments.

The AEC High Energy Physics Advisory Panel, under the chairmanship of Victor S. Weisskopf of MIT, made the following recommendations: The budget for research in high energy physics must be increased to reverse a decline in the American effort. Plans should be approved to build a giant bubble chamber at the Brookhaven National Laboratory on Long Island and an electron-positron storage ring at the Stanford Linear Accelerator in California. The Weston accelerator should continue to receive the "highest priority." In recommending provision for joint research with the Russians at Serpukhov, the AEC Physics Panel report noted that "the value of such experiments in providing a new dimension in international collaboration could transcend even their great scientific merit." (Walter Sullivan in the *New York Times;* 7 July 1968)

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The U.S. and Rumania have agreed to broaden their contacts in science and technology. American officials are especially pleased with the accord in view of Eastern Europe's hostility toward the U.S. because of the Vietnamese War. A Rumanian spokesman said that the agreement should be viewed as "one aspect of Rumania's general policy of trying to relax the international situation." A joint communique envisages high-level contacts, exchanges of scientists for scholarly and practical work, and possible collaboration in the field of atomic energy. Rumania plans to build her first nuclear power plant by 1973. She has asked the United States for technical and financial aid for the construction of this plant. The Soviet Union has also been asked for help.

A Rumanian spokesman noted that the recent treaty to ban the spread of nuclear weapons has committed the nuclear powers to helping non-nuclear states to derive benefits from peaceful uses of atomic energy. "Rumania would like to be among the first to make use of this clause," the Rumanian spokesman said. Among specific agreements reached in Washington with the Rumanians were the introduction of science attachés on embassy staffs and exchange visits of specialists in civil transportation and coal research. The U.S.-Rumanian communique also called on commercial enterprises in each country to promote contacts in industrial research. (*New York Times;* 9 July 1968)

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Vice Admiral Hyman G. Rickover has apparently scored a partial victory in his campaign for more nuclear submarines. Secretary of Defense Clifford announced that the Navy would proceed to build a "super high speed" submarine, and that a so-called "quiet" submarine, driven by electric power, was still under consideration.

Congressional Armed Services Committees have traditionally backed the controversial Admiral Rickover in urging development of both types of submarines. Clifford, without naming Rickover, indicated that he thought the Admiral should concentrate on building submarines instead of "engaging in personal criticism." Rickover has criticized the Defense Department for its "endless studies" which hold up

U.S.-SOVIET TALKS (Continued from Page 1)

On July 1st, President Johnson announced that the U.S. and the Soviets had agreed to the bilateral talks "in the nearest future." U.S. officials were reported ready to go to Moscow within a week if that seemed the most convenient place for the talks. Bilateral talks of the kind now planned had originally been suggested by Johnson in 1967. But, after some initially favorable Soviet reaction, the issue has remained deadlocked for the last 17 months.

Soviet Premier Kosygin, speaking at the Moscow NPT signing ceremony, disclosed that the Soviets had addressed a memorandum to all countries proposing a nine-point disarmament and arms control program. The nine points include: a ban on the use of nuclear weapons; measures for stopping the manufacture of nuclear weapons and reducing stockpiles; limiting and reducing means for delivering strategic weapons; geographical limits on planes and submarines carrying nuclear weapons and missiles; a complete nuclear test ban; a ban on the use of chemical and bacteriological weapons; liquidation of foreign military bases; regional disarmament measures; and peaceful uses of the ocean floor. Kosygin expressed the hope that the Soviet memorandum would be considered by the Eighteen Nation Disarmament Conference (ENDC) in Geneva. (*New York Times;* 2 July 1968)

U.S. arms control experts studied the nine-point Soviet package to discern hints of significantly changed Soviet attitudes, as they simultaneously considered possible agreements on the narrower questions involved in the U.S.-Soviet missile talks (*New York Times;* 3 July 1968)

On July 8th, Soviet Communist party chief Brezhnev gave full, if unspecific, endorsement to disarmament and arms control efforts. Brezhnev's remarks followed speculation in the West that there had been some division among the Soviet leadership on emphases and tactics in the arms control area. (*New York Times;* 9 July 1968)

(The September NEWSLETTER will supplement and bring up to date the potentially important and encouraging developments reported in this brief account. The texts of Johnson's statement on the bilateral missile talks, and of Kosygin's remarks and nine-point arms memo are contained in the July 2nd issue of the New York Times.)

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submarine development, particularly singling out for criticism John S. Foster, Jr., the Defense Department's Director of Research and Engineering, and Alan C. Enthoven, Director of Systems Analysis. No cost estimates for the submarines have been disclosed, but Congressional testimony indicated the cost for the high-speed vessel might be about $185 million. (Edwin L. Dale in the *New York Times;* 12 July 1968)

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Harvard and MIT will link their two campuses in Cambridge, Mass. by computers and closed circuit television. For this purpose, the two institutions have formed a non-profit corporation called The University Information Technology Corporation.

A number of projects will be studied: development of closed circuit TV over which lectures, seminars, and special events at either Harvard or MIT could be seen in classrooms or residence halls; sharing of computer facilities so that researchers and students on either campus could call in their problems and questions to a central machine; transfer of information between libraries of the two institutions through the use of computers and television; research and experiments in teaching through the use of computers, film, and television.

Harvard and MIT, whose campuses are about a mile apart, have entered into similar cooperative ventures to operate the Cambridge Electron Accelerator and the Joint Center for Urban Studies. (*New York Times;* 13 July 1968)

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The members of the American Physical Society have voted NOT to amend their constitution to permit the involvement of the Society in social and political issues. More than half the APS' 24,000 members voted on the amendment; 3,553 favored the amendment and 9,214 opposed it. A two-thirds majority was needed for adoption.

The APS debate, noted in previous NEWSLETTERS, drew strong opinions from some of the nation's leading scientists. It delved into the social responsibility of those who had given society its most devastating weapons versus the value of keeping the Physical Society "pure." Ballots were mailed to members of the Society in May, and the results were reported in the July issue of *Physics Today.* (Walter Sullivan in the *New York Times;* 14 July 1968)

FAS NEWSLETTER

Federation of American Scientists
Suite 313
2025 Eye Street, N. W.
Washington, D. C. 20006

Volume 21, Number 6 June, 1968

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