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NEW ATTENTION TO THE NON-PROLIFERATION TREATY

Developments relating to the non-proliferation treaty were last reviewed in the March Newsletter. Following is most of the text of a longer and more recent summary by John Walsh, written in Geneva and published in the 21 July 1967 issue of SCIENCE.

War in the Middle East and the debut of China as a thermo-nuclear power gave reason enough for the recent turn of international attention to the marathon effort at Geneva to find a formula to stop the spread of nuclear arms. And mention of the non-proliferation treaty at the Johnson-Kosygin summit meeting at Glassboro provided encouragement that positive steps toward the elusive treaty would soon be taken.

Hopes for a treaty were boosted in mid-June when Secretary of State Dean Rusk was reported to have told the NATO ministerial meeting in Luxembourg that the U.S. and the Soviet Union were in agreement on a draft of a non-proliferation treaty. This proved to be news to the Russians.

It appears that Rusk was reporting progress in negotiations which did not include an actual agreement. What Rusk had in mind as a new draft treaty was the old draft modified to leave blank the section on safeguards—inspection—that has been the major stumbling block. Observers feel that Rusk was signaling both the Soviet and U.S. allies that it is time for a final effort to achieve a treaty before it is too late.

The sense of urgency was partly generated by the timing of the NATO meeting on the eve of the U.N. General Assembly session on the Middle East crisis. But pessimists have been saying that the longer an agreement is delayed on an NPT, the slimmer grow the chances for a treaty, not so much because of differences between the two superpowers as because of the hardening attitudes of Western European countries and other potential nuclear powers such as India and Brazil.

The kind of treaty being discussed in Geneva is basically discriminatory. The world would be divided into "nuclear states," meaning those "possessing the independent power to use nuclear weapons," and "nonnuclear states," which would renounce that power. In signing the treaty, nuclear states would pledge not to give weapons to nonnuclear states or to assist them in developing their own nuclear arsenals. Non-nuclear states would agree to refrain from developing nuclear weapons or acquiring them in any way. Objections to the treaty would center on the sort of military and political apprehensions India has about China, and also on fears, particularly acute in Western Europe, that the treaty would interfere with the development of peaceful uses of atomic energy by the nonnuclear states.

The quest for a nonproliferation treaty resembles that which produced the Moscow Treaty (1963) banning nuclear tests. Agreement between the Soviet Union and the United States on a draft is a necessary precondition. But this time the drama has more major characters with key roles to play. The arena for discussion is the Eighteen Nation Disarmament Conference (ENDC), which began in Geneva in 1962. Five Western nations are represented (the United States, Canada, the United Kingdom, France, and Italy); five Communist countries (the Soviet Union, Czechoslovakia, Poland, Hungary, and Yugoslavia); and eight nonaligned states (India, Sweden, the United Arab Republic, Ethiopia, Nigeria,

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NEWS ITEMS

Reports from presumably knowledgeable Washington sources indicate that China may stage its next weapons "spectacular" the first week in October, with either a satellite or an ICBM launching. It is believed the Chinese are preparing a few large liquid-fuelled rockets that could serve either purpose. The first test shot could come in a month, or as late as next Spring; but an October feat, coming when the U.N. will probably again be discussing China's admission, would have maximum propaganda value, and would take some of the edge off the Russians' celebration of their October Revolution. (*New York Times*; 30 June 1967)

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According to *Physics Today*, organized labor is now beckoning to physicists. "In big-city universities and private research laboratories, the AFL-CIO is mounting a strong drive to gain support from physicists and other segments of the scientific community traditionally opposed to unionism." Factors influencing the labor drive include the relative numerical decline of craft and industrial workers compared to professionals, and the near equality of wages paid to skilled laborers and to teachers and some professionals. So far, only a scattering of physicists belong to unions, but the number is definitely growing. Several hundred physics teachers are among the 10,000 college faculty members—which number has tripled in the last two years—in the American Federation of Teachers. An opinion sampling at a recent American Physical Society meeting showed a general distaste for union membership, but recognition of some of its possible benefits. (*Physics Today*, June 1967)

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Estimates are that Israel could begin producing nuclear weapons in three or four years if the decision were made to do so. This judgment, by "American officials," takes into account Israel's overall technical capabilities and the plutonium production (perhaps enough for two small weapons per year) of Israel's Dimona reactor. But it also allows for the fact that Israel, unlike India and Japan, is not yet build-

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WATSON DAVIS — 1896 - 1967

In the death of Watson Davis on June 27th, the F.A.S. lost a distinguished and faithful member of its Advisory Panel, and American journalism lost a pioneering and universally esteemed science writer.

Since its founding in 1921, Davis was the guiding force of Science Service—the sponsor of Science Fairs, the Science Talent Search, a science news service, and many publications, including the weekly *Science News*. He began his career when science reporting—such as it was—stressed the sensational and the cartoonist's caricature of the scientist. He retired from active directorship of Science Service just a year ago.

In the 1940's and 50's Davis provided the Science Service conference room for the Washington meetings of the F.A.S. Council. Probably less well known, but gratefully remembered by many F.A.S. members, was the sleeping room Davis kept available at Science Service free of charge for scientists who had business in Washington but limited expense money.

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Burma, Mexico, and Brazil). Such other potential nuclear nations as Israel and Japan are not formally represented, but are obviously watching events closely. To complicate matters further, France, which did not sign the test-ban treaty, has chosen not to participate in the ENDC. Its chair at the conference table is empty, and the assumption is that France will not sign a treaty. China, a nuclear state, is another nonparticipant and presumed nonsigner.

At the NPT talks, the crucial question on inspection has been not how but who. In practical terms this has meant a decision on whether inspection of facilities in Western European countries would be carried out by Euratom (the European atomic energy agency), formed by the Common Market countries, or by the International Atomic Energy Agency (IAEA), a United Nations agency.

In the draft treaty put forward by the United States in August 1965, which has been the chief working paper of the conference since then, Article 3 on inspection said, "Each of the States party to this Treaty undertakes to cooperate in facilitating the application of International Atomic Energy Agency or equivalent international safeguards on all peaceful nuclear activities."

The wording implied that, for Euratom members, Euratom inspection would be an acceptable alternative for IAEA inspection. Then early this year, when the Americans were seeking to fashion a revised form of Article 3 which would be more attractive to the Russians, word went out on the Geneva grapevine that a new safeguards article would call simply for IAEA inspection.

Such a revision never saw the light of day, for by early February the Euratom commission was in full cry, warning the six member governments to protest.

The Euratom members objected on two main grounds:

1) Different treatment of France—whose military nuclear facilities would be off-limits to inspectors—would conflict with the principle of equality embodied in the Treaty of Rome.

2) Discrimination against nonnuclear countries would adversely affect development of their civil nuclear industry.

It was felt also that imposition of IAEA inspection on Euratom countries would not only supplant an operating system of control and inspection with a new system which may be less thorough but would also deprive Euratom of a significant function at a time when it is afflicted with a crisis of confidence and cash.

In its annual report published 16 June, the Euratom commission affirmed its position against discrimination among its members but also put forward a possible compromise. It suggested the possibility of "an agreement on technical-cooperation between Euratom and the IAEA, by which the efficiency of control could be verified by scientific methods mutually agreed upon." Presumably, this would mean consultations with IAEA.

Of all the Euratom nations, sharpest misgivings about the inspection formula have been expressed by the German Federal Republic, which, of the nonnuclear states, has the strongest civil nuclear industry. The German reaction, a somewhat delayed one, seems to have been generated by a combination of political and technological considerations. A debate within West Germany's coalition government on the country's nuclear role apparently resulted in a defeat for the Social Democrats, who wanted to drop the standing German policy in favor of joint possession of nuclear weapons along lines of a multilateral nuclear force.

Much more pointed objections to a nonproliferation treaty came from technical and commercial interests in West Germany. To some, the treaty itself looked like a plot by American nuclear industry to thwart German development of peaceful uses of atomic energy. IAEA inspections appeared to provide openings for industrial espionage by members of the Soviet bloc.

In late winter and early spring the American government gave high priority to efforts to allay German fears, which

some observers feel had given rise to the most serious strain in relations between the United States and West Germany in the postwar period. The matter of technological impact was the subject of intensive discussions in Washington, Bonn, Brussels, and Geneva. American experts, both governmental

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INTERESTING READING

"Government, Science, and International Policy," an 81-page compilation of papers prepared for the eighth meeting of the Panel on Science and Technology, Committee on Science and Astronautics, House of Representatives. (Eight papers on various topics, mostly by foreign scientists. Available for 35¢ from the Government Printing Office, Washington, D. C. 20402.)

"The Watched and the Unwatched: Inspection in the Non-Proliferation Treaty," by Arnold Kramish. (An Adelphi Paper, published by the Institute for Strategic Studies, 18 Adam Street, London, W. C. 2. Available for \$1.)

"Science, Technology, and Public Policy During the Eighty-Ninth Congress—January 1965 through December 1966," Report of the Subcommittee on Science, Research and Development, of the Committee on Science and Astronautics, House of Representatives. (A 202-page survey done by the Library of Congress. Very useful reading for those interested in the general subject. Probably available from the Committee.)

"AEC News Release Index, January 1963—December 1966." (Lists of public information releases, speeches (mostly by AEC Commissioners), news conferences, and industrial information releases; indexed generally by subject or author. Single copies available free from Division of Technical Information Extension, US A. E. C., P. O. Box 62, Oak Ridge, Tennessee 37830.)

"Applied Science and Technological Progress," a 497-page collection of 17 essays, issued on 25 May 1967 by the National Academy of Sciences. (Written by a panel of the Academy's Committee on Science and Public Policy, the essays were prepared in response to some questions posed by the House Committee on Science and Astronautics. Copies of the collection are available free from the Committee at the Rayburn Office Building, Washington, D. C. Items pertinent to the collection, all in *Science*, are the following: an appraisal by D. S. Greenberg, 2 June 1967; an editorial by Philip H. Abelson, 23 June 1967; and an article, "Applied Science and Technological Progress," condensed from Harvey Brooks' general introduction to the essays, 30 June 1967.)

"Communication Gap: LBJ's Monologue with the Intellectuals," by Bryce Nelson in *Science*, 14 July 1967. (Interesting discussion of the President's estrangements from intellectuals over Vietnam and other issues; little specific reference to the scientific community.)

"Peace-Keeping Operations: Publications of the International Information Center on Peace-Keeping Operations." (A list of one book (a bibliography), five monographs in booklet form, and 26 miscellaneous mimeographed documents. The list (and the listed items) are available from the Information Center of Peace-Keeping Operations, 16, Rue Hamelin, Paris-XVI, France.)

"Science in China," article by K. Mendelssohn, in *Nature*, 1 July 1967. (A short review by an Oxford University physicist who has been to China three times in the last seven years. One conclusion: China's rising scientific and technological prowess may not be greatly affected by the current internal unrest.)

"Space Budget: Congress Is in a Critical Cutting Mood," article by Luther J. Carter, in *Science*, 14 July 1967.

NEWS ITEMS

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ing a plutonium extraction plant. Since 1964, under an informal, unpublicized arrangement with Israel, the United States has carried out annual inspections of the Dimona reactor to be sure it is being used only for civilian purposes. (John W. Finney in the *New York Times*; 6 July 1967)

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The Russians will probably agree to re-negotiate the US-USSR scientific exchange agreement when it expires at the end of December. The scientific exchange pacts have been renewed four times since 1958. The State Department believes that the Russians will consider that the advantages of scientific exchanges outweigh the disadvantages, although in previous negotiations the Russians have referred repeatedly to the problems of the international situation. (*Physics Today*, June 1967)

The Educational Committee to Halt Atomic Weapons Spread called on President Johnson to seek negotiations with China for the control of nuclear weapons, and to pursue further talks with Soviet Premier Kosygin toward "swift agreement" on a non-proliferation treaty. The Committee (345 East 46th St., New York City) includes among its members Jerome Wiesner and Arthur Larsen. (*New York Times*; 11 July 1967)

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The Atomic Energy Commission, as a move toward expanding east-West trade in nuclear research materials, eased restrictions on the sale of radioactive isotopes to the Soviet Union and several other Communist countries. Under new regulations, announced on June 28th, American concerns will be able to export small amounts of radioisotopes to the Communist countries without being required any longer to obtain specific A.E.C. approval. Quantities up to one curie will be permitted for most isotopes, and up to 10 curies for tritium. (Eighteen years ago, AEC Chairman Lillenthal was charged on Capitol Hill with "incredible mismanagement" for allowing about one millicurie of an iron isotope to go to Norway for metallurgical research.) (*New York Times*; 29 June 1967)

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Hong Kong observers view the June 17th explosion of China's first hydrogen bomb as evidence that the country's nuclear weapons program has been insulated from the turmoil of the Cultural Revolution. The guidelines for the Revolution issued last August by the Communist Party included a directive that scientists and technicians were to be treated gently. (*New York Times*; 19 June 1967)

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An underground nuclear test in Nevada on June 29th resulted in a small release of radioactivity into the atmosphere. The highest measurement outside the test reservation was 0.7 milliroentgens per hour, and this dropped to background levels in an hour. (AEC release; 30 June 1967)

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Newsweek magazine, in its July 10th issue which is de-

voted entirely to "The Vietnam War and American Life," takes note of some effects of the war on American science and scientists. Various data—of the kind reported in earlier *Newsletters* and, especially, *Science*—are cited to show the effect of the war on funding for research. But *Newsweek* also notes that a substantial proportion of American scientists oppose American policy in Vietnam, and that this has led to noticeable turning away from defense research by many scientists. (The point is also made that Vietnam "is not a scientists' kind of war," in the sense that technology probably cannot play a decisive role in the struggle.) (*Newsweek*; 10 July 1967)

BULLETIN OF THE ATOMIC SCIENTISTS ANNOUNCES BOOK ON ABM DEBATE

The May and June 1967 issues of the *Bulletin of the Atomic Scientists* have carried a series of articles on the ABM issue. These, along with some additional items of the same subject will be published by the *Bulletin* as a 160-page book: "Debate, the Antiballistic Missile." Copies are available from the *Bulletin* at 935 East 60th Street, Chicago, Illinois 60637. Single copies are \$1.50; five or more copies are \$1.25 each. Authors and tentative titles are as follows.

- Jerome B. Wiesner—The Cold War Is Dead, but the Arms Race Rumbles On (Provost, MIT and former science advisor to Presidents Kennedy and Johnson)
- Freeman J. Dyson—Defense Against Ballistic Missiles (Theoretical physicist, Institute for Advanced Study, Princeton)
- D. G. Brennan—New Thoughts on Missile Defense (Hudson Institute and editor of *Arms Control and Disarmament Annual Review*)
- Oran R. Young—Active Defense and International Order (Center for International Studies, Princeton)
- J. I. Coffey—The Confrontation (Chief, Office of National Security Studies, Bendix Systems Division)
- David R. Inglis—Missile Defense, Nuclear Spread, and Vietnam (Senior physicist, Argonne National Laboratory)
- Leonard S. Rodberg—Some Arms Control Issues (Physicist, University of Maryland)
- Jeremy J. Stone—ABM—The Next MLF? (Mathematician, Pomona College)
- Laurence W. Martin—Ballistic Missile Defense and Europe (International politics, University of Wales)
- Betty Goetz Lall—Congress Debates (Arms control correspondent, *Bulletin of the Atomic Scientists*)
- Robert S. McNamara—Defense Secretary Testifies What Manner of Machine? (Excerpted from *Scientist and Citizen*, "Nike the Winged Goddess")
- Publications on the ABM: A Reader's Guide
The Authors

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Chairman Jay Orear

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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 WAR GAME" — MOVIE

Milton Leitenberg, Scientific Director of the Committee for Environmental Information, in St. Louis, has brought "The War Game" to the attention of the *Newsletter*. The movie is a 47-minute documentary showing in fictional style developments just before and the results of a hydrogen bomb attack on England. Originally made for television, but barred from showing on the B.B.C., the film is now being shown commercially in the U.S. Later it will be available from Contemporary Films in 16mm for showing by interested groups or individuals.

Various reviewers have applied the fullest range of forceful adjectives ("graphic," "horrifying," "fearful," "shattering," "absorbing," "awakening" . . .) to the film. Yet *Life* magazine says that it is a "flatly stated, no-nonsense semidocumentary." Leitenberg comments, "I believe the film is mild. I found no gratuitous shock in it. The impressions it gives are of absolute reality, yet the events described in the film could have been just as close to a 'predicted reality,' and yet a good bit more brutal."

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and civilian, were brought into contact with their German counterparts, and the problem was dealt with finally at the level of AEC chairman Glenn Seaborg and Vice President Humphrey; the latter had it on his agenda when he visited Germany this spring.

The American effort seems to have mitigated the worst of the German misgivings, and, in late April, West German foreign minister Willy Brandt made a statement in the Bundestag saying that German apprehension about the proposed treaty had been largely eliminated.

On the matter of technology Brandt listed the following U.S. assurances.

- 1) Nonnuclear powers would be permitted to profit from the spin-off from nuclear research in the military field.
- 2) The U.S. said it would be willing to help in setting up a service for peaceful nuclear explosions of the Plowshare type without charging R & D costs to nonnuclear states using the service.
- 3) The supply of nuclear fuel, which the U.S. provides for Western European countries and about which those countries are very sensitive, would not be affected adversely by a treaty.
- 4) Those signing the treaty would not have their research activities blocked or their nuclear industry impaired.

Having won these assurances, the West Germans gave the United States the go-ahead to continue with negotiations for a nonproliferation treaty, but they have not committed themselves to signing it.

Agreement between the United States and the Soviet Union would give great impetus toward a treaty. World opinion for a treaty would count heavily, as it did in the case of the Moscow Treaty, and the two superpowers could doubtless apply pressure to the reluctant nations. The strenuous effort made to convince the Germans indicates that President Johnson is very much in earnest about getting a nonproliferation treaty, and the Soviet Union's recent very businesslike attitude in formal and informal contacts is thought to mean that the Russians are of similar mind.

U.S.-Soviet agreement on a draft, however, would only signal the beginning of serious negotiations on a number of issues besides implementation of inspection provisions.

In the political sphere, India has fundamental doubts about renouncing the possibility of acquiring nuclear arms in the face of China's nuclear potential. In May, the Indian foreign minister said, "It is impossible to tie our hands." What the Indians are thought to want if they are to accept a treaty is a guarantee from both the superpowers that India will not be forfeiting its safety in the face of a nuclear-armed China. And such a guarantee may be very difficult to obtain from the Russians.

Technologically, the mechanics of inspection may become a live issue if the basic political issues are settled.

As for the United States, it remains to be seen how we will implement the assurances given that West Germany will not suffer economically from signing a nonproliferation treaty. The government's pledge that in peaceful uses of the atom the technology gap won't be allowed to widen appears to be a departure in diplomacy with far-reaching technical implications.

OREAR WRITES TO WASHINGTON POST ON ABM ISSUE

Following is the text of a letter from FAS Chairman Jay Orear to the Editor of the Washington Post, dated 27 June 1967 and subsequently published in the Post.

There have recently been reports indicating growing pressure for an immediate U.S. decision to deploy a limited anti-ballistic missile system, without awaiting the results of U.S.-Soviet negotiations on this subject. The argument seems to be that such a missile defense system is needed to provide a defense against a potential Communist Chinese ICBM force. According to Secretary McNamara, such a Chinese force is not expected to be in existence before 1975, although some columnists interpret Chinese statements to mean that the Chinese may have such missiles by 1972. In either case, the Federation of American Scientists does not believe that such a possibility provides a sufficiently strong justification for taking such a portentous move at this time.

Contrary to recent remarks by Secretary McNamara, we believe that a U.S. decision to deploy such an ABM system, even if declared to be a "limited" system, could hardly avoid initiating a new round in the arms race. Because of the long lead times involved, the Russians could not afford to accept U.S. assurances that the U.S. ABM system would in fact be limited, any more than the U.S. could wait-and-see whether the Russians are now building a limited or full-scale ABM system. To protect their deterrent, the Russians must take the precaution of expanding their missile force, regardless of our assertions. And the U.S. ABM system would probably not remain limited, in any case. Once such a large military establishment has been set up and an associated industry created, could a continuing buildup of the ABM system easily be stopped?

Rather than slip into this chain of irresistible move and countermove, we should exercise greater patience. The U.S.-Soviet discussions are bound to proceed slowly, with the difficulties associated with the Vietnam War only adding to the inevitable problems of discussing such a complex and delicate subject with the Russians. But the goal is of crucial importance that we must see these discussions through to the end before embarking on a path of no return.

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