

F. A. S. NEWSLETTER

Volume 20, Number 7

September, 1967

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U.S., RUSSIA FINALLY TABLE NON-PROLIFERATION TREATY DRAFT; BUT INSPECTION CLAUSE OMITTED, AND ACCEPTABILITY TO MANY COUNTRIES UNCERTAIN

On August 24th, the U.S. and the Soviet Union tabled their long-expected identical treaty drafts in Geneva. (See the review of issues involved in the NPT negotiations in the June Newsletter.)

But Article III of the treaty, dealing with international control to assure compliance, was left blank. The U.S. and Russia had agreed several months ago on inspection by the IAEA. But West Germany, Italy, other West European countries have been holding out for inspection under Euratom, expressing fear that industrial nuclear secrets might be "leaked" by IAEA inspectors. The U.S. has been trying to work out a compromise that would satisfy both its European allies and the Russians. One possibility might involve a gradual transition from Euratom to IAEA inspection; but this question is not likely to be settled soon.

At least equally troublesome is the current attitudes of a number of countries toward the treaty. France and China, both nuclear powers, have made it clear they will not sign. And several nonnuclear countries are hoping, with emphases which depend on their particular circumstances, for (a) stronger assurances of non-interference in peaceful nuclear activities, (b) guarantees from the superpowers against aggression by, say, China, and (c) concrete steps on the part of the U.S. and Russia towards slowing down the arms race.

Since the NPT issues were reviewed in the preceding Newsletter—and have not been significantly changed by the tabling of the U.S.-Soviet draft—only some recent highlights will be noted here. The *New York Times* of August 25th contains the text of the draft treaty and a statement by President Johnson hailing the treaty. In the same issue of the *Times* is a short analysis of Soviet motives by Harry Schwartz, who concludes that the Soviets were willing to take this further step toward cooperation with the U.S., even as they decried increased American bombing in Vietnam, chiefly because of their growing concern over a war with China.

In the two weeks just before the joint treaty draft was tabled, there were contradictory reports about the imminence of any progress. On August 9th, U.S. chief negotiator William C. Foster came home from Geneva, leaving the date of his return there indefinite. On August 11th Foster announced in Washington that the Soviets had sent word that they might be ready to agree on the joint draft. On August 13th, Foster, back in Geneva, was optimistic, although various issues still appeared unresolved. By August 17th hopes for even a draft without the inspection clause had apparently declined somewhat, and there was increasing talk of carrying the matter into the UN General Assembly session beginning September 19th. Then on August 24th, the U.S.-Soviet agreement was announced. (All reports from the *New York Times*.)

FAS RELEASES STATEMENT ON CLASSIFIED RESEARCH IN UNIVERSITIES

Following is the text of a statement released by the FAS Council on 29 July 1967. Various earlier drafts had been circulated for comments over the last several months. As such statements go, this one seems to have received reasonably good press coverage.

Classified Research in The University

As an institution in our society, the university has traditionally played an important role by providing a haven for open inquiry, debate, and criticism free and detached from governmental, economic, or other influences. However, the increasing dependence of American universities on the federal government could lead to the loss of this basic function of the university. The dependence becomes dangerously close when a university takes on classified military research. Classified university research for government or industry compromises in a fundamental way freedom of discussion and criticism. To impose an official framework of secrecy on research in a university is antithetical to the spirit and requirements of scientific and scholarly study. Likewise, it sets an improper milieu for the academic training of students.

There are secondary consequences of secrecy in research which run counter to the values and basic functions of a university. We list a few of these consequences. Secret research in a university usually means classified areas, documents, and seminars or discussions. Resentments and frictions damaging to the university tend to arise between in-faculty and out-faculty. The basic process that strengthens objectivity and excellence—the presentation of results before the international community of scholars in a field—is severely inhibited for classified research. With its acceptance of classified research the university comes necessarily under the surveillance of security officers whose standards and purposes often run counter to those of the university. Pressure develops to require security clearance for department chairmen and university officials in order to judge the classified work of their professors or students. Those who are unable or unwilling to obtain security clearance are denied such positions of authority and are discriminated against in other ways. Thus when a university accepts classified research, it submits to values and practices that threaten its basic functions of objective scholarly inquiry and teaching. Not only does it acquiesce in discrimination and give up open and independent inquiry, but its faculty loses the right to know what its own university is doing.

Of course, government and industry should not be denied altogether the support and resources of university personnel for special classified work. Certainly, by means of consulting and leave-of-absence arrangements at the request of individual faculty members the university may enable such individuals or other personnel to make their expertise available for classified work elsewhere, without the harmful effects outlined above. However, it should be understood that work of a secret nature cannot be considered as the normal scholarly activity of a member of a university and under no circumstances can such work be used to fulfill any part of a

(Continued on page 2, column 1)

NEW YORK TIMES EDITORIAL IS CRITICAL OF 200-BEV ACCELERATOR FUNDING

The *New York Times* editorial whose text follows is one manifestation of the national mood of concern over the costs of Vietnam and over pressing social needs at home. The *Times* has generally held what most scientists would consider enlightened views on research support. For one response to this editorial, see a letter in *Science*, 25 August 1967, by MIT physicist and long-time FAS member Victor F. Weisskopf.

Newark's grim reminder of the nation's real needs makes particularly abhorrent the porkbarrel politics that won out when the Senate voted to approve Weston, Illinois, as the site for what is scheduled to be this country's largest atom smasher. But credit goes to Senators Pastore, Javits, and their colleagues who exposed the real issues at stake, and who won a moral victory when the vote margin in Weston's favor proved much narrower than had been expected.

Much of the Senate debate centered properly around the open-housing issue and the failure of the relevant Illinois and local authorities to provide adequate assurance that Negroes will be able to get housing on a par with whites in the neighborhood of this giant machine. There were numerous towns and cities with appropriate housing regulations that would have been delighted to have the atom smasher.

But there is an even more basic objection to any commitments or expenditures for this expensive research tool at this time. That objection is simply the irrelevance of a 200 billion electron volt accelerator to any real present national problem. The nation is engaged in a bloody war in Vietnam; the streets of its cities are swept by riots born of anger over racial and economic inequities; millions of Americans lack proper housing, adequate medical care, and essential educational opportunity. The budget cutters are now in full cry demanding reductions in already inadequate expenditures for human needs. It is a distortion of the national priorities to commit many millions now to this interesting but unnecessary scientific luxury.

FAS RELEASES STATEMENT ON CLASSIFIED RESEARCH IN UNIVERSITIES

(Continued from page 1)

degree requirement. Students should be trained to communicate and participate in open scholarly research and the free give-and-take of ideas and criticism.

The Council of the Federation of American Scientists recommends the following guidelines for university sponsored research:

Except when a national emergency has been declared by the President of the United States, and then only in circumstances which require university participation, a university, as a corporate entity, should accept or administer external contracts or grants only for research projects whose principal purpose is to produce results which will be freely available and freely publishable in the ordinary manner of open research in the relevant discipline. This should apply to all university-owned laboratories whether on or off campus. In cases of partial ownership, a useful test is whether or not the university has a controlling interest either in the choice of laboratory directorship or the choice of research programs. Universities should not accept funds that impose restrictions on the publication of research findings. Frequently universities have been successful in persuading Federal agencies to eliminate such restrictions in the wording of research contracts. Universities should move independently and in cooperation with one another in efforts to have such restrictions removed. All university facilities should be open for use by faculty and students having a legitimate and relevant need for such use, and security clearance or approvals should not be a condition for participation in Federally supported university research or for the use of any university facilities.

INTERESTING READING

"BMD and Non-Proliferation", a collection of four articles, ("Strategic Implications of BMD", by L. W. Martin; "Technical Implications of BMD", by R. X. Pay; "Political Aspects of BMD", by General Beaufre; "The NPT Draft Under Scrutiny", by Achille Albonetti) in *Survival*, July 1967. (Available from the Institute for Strategic Studies, 18 Adam Street, London, Wc2.)

"U. S. Armament Sales", a series of three articles by Neil Sheehan, *New York Times*; 18-20 July 1967. (A well-researched series which notes that the U. S. has been a principal source of weapons for other countries, and U. S. arms sales have been spurred by a large field force and a complex credit system, and that the sales of surplus armaments can be a profitable private business. See also James Reston's comment on arms sales in the *Times*, 21 July 1967.)

"Technology, Economic Growth and Public Policy", a book by Richard R. Nelson, Merton J. Peck, and Edward D. Kalachek, published by the Brookings Institution, Washington. 252 pp. \$6.00. (See the review in *Science*, 2 June 1967.)

"Impact of Chinese Communist Nuclear Progress on U. S. National Security", a report of the Joint Committee on Atomic Energy, July 1967. (Available from the Committee or the Government Printing Office. See News Item in this issue.)

"Basic Research and Financial Crisis in the Universities", article by George Pake, in *Science*, 4 August 1967. (The point is made that lagging federal research support and spiralling costs jeopardize the survival of U. S. private universities.)

"How Much Research?", article by Kenneth F. Pitzer, in *Science*, 18 August 1967. (The point is made that further growth in research is crucial for educational reasons.)

"University Basic Research", article by Lee DeBridge, in *Science*, 11 August 1967. (Persuasive arguments for an expanded role for the National Science Foundation.)

"Beyond Vietnam: What Has Science to Say to Man?", a symposium in the *Saturday Review*, 1 July 1967. (An introduction by John Lear touches on some large questions about the role of science and its prospective contributions, and about U.S. governmental organization for and funding of science. There follow 10 short essays on various possibilities and implications, by: John W. Gardner; J. Herbert Hollomon; S. F. Singer; Edward Wenk, Jr.; William D. Lotspeich; Donald J. Belcher; Urie Bronfenbrenner; Ivar Oxaal; E. F. Fennessy, Jr.; J. A. Russo, Jr.; R. H. Ellis; Holmes Welch.)

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 Jay Orear
The FAS Newsletter is prepared in Washington.
Editor: Harriette L. Phelps.

Approx. closing date for this issue: 27 August 1967.

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.

NEWS ITEMS

Senator Clark of Pennsylvania has proposed a "blue ribbon" Presidential Commission to consider the question of U.S. deployment of an anti-ballistic missile (ABM) system. Clark expressed concern over pressure from "the military-industrial complex", and proposed that President Johnson follow an example of his predecessors in appointing a Commission to make a "careful and objective evaluation of the course the United States should follow" on ABM deployment. Clark mentioned as precedents the Finletter Commission set up by President Truman in 1947 to review U. S. defense policies in the air age and the Gaither Commission set up by President Eisenhower in 1957 to consider policies in the nuclear missile age. Clark believes that his idea may appeal to the Administration, particularly if it is looking for means to forestall growing Congressional pressure to proceed with ABM deployment. Clark observed that there may be some reason to believe the Russians are not yet in accord within their own government on what line to pursue in informal discussions with the U. S. about a "freeze" on both defensive and offensive strategic missiles. (*New York Times*; 27 July 1967)

The new head of the State Department's Office of International Scientific and Technological Affairs will be Herman Pollack, a career administrator with the Department. Pollack has been acting head of the Office since January 1965, and there is general agreement that during this period the Office has functioned more effectively than before. But there is also some disappointment that the job did not go to a scientist. It was apparently hard to find a senior scientist who would take the job, although the State Department elevated the Directorship of the Office to the equivalent of an Assistant Secretary. The role and the potential of the Office in the complex relationship among science, technology, and foreign policy is obviously hard to define precisely. But the State Department says that the Office includes the job of advising the Secretary on scientific and technological matters affecting foreign policy. It also supervises the scientific attache' program, which includes some attache's at major U. S. Embassies. (*Science*; 21 July 1967)

Presidential science adviser Donald Hornig reports after a 16 day tour of European capitals that European leaders have realized in recent months that only they can close the "technological gap" between Europe and the U.S. Hornig heads an interagency committee named by President Johnson last November to find out exactly what the technological gap is and what the U. S. should do about it. Knowledgeable Europeans now appear to be inclined to complain less and to ask for fewer specific forms of U. S. aid (e.g., patents), and to consider more that the technological gap stems from an ineffective European utilization of technology, including management and the educational structure necessary to scientific and industrial progress. Hornig foresees more U. S.-European cooperation and also more intra-European cooperation in commerce and technology. (*New York Times*; 21 July 1967)

A House subcommittee report indicates that the "brain drain" of scientists, engineers, and physicians into the U.S. is increasing most from those nations that can probably afford the losses least. Over all, the brain drain has increased by 77% in the last decade. A decade ago, only about a third of the professionals emigrating to the U. S. came from the developing countries; today the figure is 46%. The report, by the Research and Technical Programs Subcommittee of the House Committee on Government Operations, noted that the influx of scientists was numerically small—about 2,000 persons last year or about 2% of U. S. science graduates. But the percentage of emigrant engineers compared to U. S. graduates was larger, and for physicians the influx was actually 26% of domestic output in 1966. (*New York Times*; 3 August 1967)

The American Institute of Physics has established a Committee on Physics and Society to evaluate the contributions of physics to society through a study of its role in education, industry, research and government. Princeton Physics Professor John Wheeler will be chairman. Among other things, the Committee is expected to consider the funding of physics education and research, the relationship among physics, technology and industry, and the "self image and public image of physics". (*Science*; 21 July 1967)

Various predictions emerge in the working papers of the Commission on the year 2000, published as a summer issue of *Daedalus*, the journal of the American Academy of Arts and Sciences. Among the predictions for the year 2000 are: a serious loss of individual privacy, and monetary value placed on privacy; very many major social changes; some sort of functional limits on the activities of individuals that will be set by man's capacity to absorb information and to operate in situations of ever-increasing complexity; individual and collective difficulties stemming from the inability to adjust to vastly increased amounts of leisure time available to most people; many likely technical innovations including pocket telephones, home computers, and programmed dreams; half the American population living in three super cities, one the East Coast strip from Boston to Washington, the second the area from Chicago to Pittsburgh, and the third the area from San Francisco to San Diego. (*New York Times*; 13 August 1967)

Two recent reports stress French progress toward a nuclear missile force. In one article by French Armed Forces Minister Messmer, the claim is made that France will explode a thermonuclear device with a yield of 500 kilotons next year and will have in operation by 1970 a nuclear powered submarine carrying 16 missiles with 500 kiloton warheads. Messmer presented the following schedule for France's "force de frappe": France now has 62 Mirage IV bombers with a range of 2500 miles, each of which can carry one 60 kiloton bomb. The second generation French force will consist of 25 intermediate range ballistic missiles in underground silos in 1969. These will have ranges of about 2000 miles and warheads of 240 kilotons. The third generation will comprise "at least three" nuclear submarines with a total of 48 of the 500 kiloton missiles. The three submarines will go into service in turn in 1970, 1972 and 1974.

The second report, a pamphlet published by the Institute for Strategic Studies in London, claims that France's aerospace labor force is less than half as big as Britain's, but that French productivity in this field is greater, ranking behind only the U. S. and Russia and that French rocket technology is "particularly advanced". Cost estimates for the French "force de frappe" are \$200 million from 1955-59, \$1.8 billion in the next five years, and \$5.7 billion between 1965 and 1970; some unofficial estimates put the actual outlays nearly twice these figures. (*New York Times*; 13 August 1967)

There is Brazilian opposition to a U.S. offer to provide nuclear materials at cost to Latin American Nations that renounce nuclear weapons development. The American offer, made in Rio de Janeiro in early July by AEC Chairman Seaborg, has stimulated newspaper editorials with reactions such as, "Brazil will not be a nuclear colony". Brazil, the most technologically and industrially advanced Latin American country, is generally agreed to have the largest nuclear potential. But in discussions of a non-proliferation treaty in Geneva, and in talks held in Mexico earlier this year about a Latin American nuclear free zone, Brazil has made reservations about her freedom to pursue nuclear development, possibly including peaceful nuclear explosives. (*New York Times*; 10 July 1967)

Possible Brazilian problems notwithstanding, the AEC is establishing a liaison office at the American Embassy in Rio. Similar offices with AEC representatives are already located

(Continued on page 4, column 1)

NEWS ITEMS

(Continued from page 3)

at Buenos Aires, Brussels, London, Paris, Tokyo, and Chalk River in Canada. (AEC release; 14 August 1967)

The Joint Congressional Committee on Atomic Energy forecasts more rapid progress than has generally been expected on the part of China in developing thermonuclear warheads and ballistic missiles to carry them. A five page Committee report, based on secret testimony earlier this year, suggests that China will be capable of launching a missile attack on the U. S. by the early 1970's. The Committee report points out that the Chinese are well ahead of the French in thermonuclear weapon design. Defense Secretary McNamara has previously estimated that China would not be able to deploy "a significant number" of ICBM's before the mid 1970's, but the Committee makes the point that even a few missiles with thermonuclear warheads could be a quite significant military threat. (*New York Times*; 3 August 1967)

The NSF's eighth annual report on weather modification suggests that increasing urbanization of the Northeast may be a factor in the drought of the last five years. The report notes that interest in weather modification has become worldwide and that the Soviet Union and other communist countries may be devoting more effort to research in this area than does the U. S. Work on suppressing hail and lightning, and seeding clouds to increase rain or snowfall was considered promising, although the evidence for effective cloud seeding is still considered ambiguous. The NSF report suggested that the reasons for long dry spell—now possibly ending—in the Northeast were very complex and poorly understood, but might relate to increasing levels of carbon dioxide in the atmosphere, the large heat output of cities, and inadvertent over-seeding of clouds. The over-seeding of clouds could come about from the lead from automobile exhausts combining with iodine from industrial air pollutants to form lead iodide particles which then serve as condensation nuclei for water droplets. (*New York Times*; 20 July 1967)

Many FAS members will be saddened by the death of Lloyd V. Berkner on June 4th. More than any other man, Berkner is credited with being the father of the International Geophysical Year of 1957-58. Berkner was President of the Graduate Research Center of the Southwest in Dallas from 1960 to 1965, and before that he was for nine years President of Associated Universities, Inc., which administered the Brookhaven National Laboratory. (*New York Times*; 5 June 1967)

A new study, reported in the American Sociological Review, suggests that receiving a Nobel prize reduces the scientific

productivity of scientists, especially younger scientists who are not previously eminent in their field. Roughly, even allowing for a normal decline in productivity with age, a Nobel prize seems to reduce the average output of scientific papers of a scientist by about one-third in the five years after he gets the prize. There seems to be agreement that the decline in productivity among Nobel laureates stems from the increased pressure for interviews and speeches, review articles, public appearances, and greater participation in policy decisions. (*New York Times*; 3 August 1967)

The Institute for Advanced Study in Princeton is setting up a trial program in the social sciences. The new program, financed by \$250,000 grants each from the Russell Sage Foundation and the Carnegie Corporation of New York will start in the fall of 1968. It will bring to the Institute at least six outstanding scholars in the social sciences. If the program is successful and financing can be found, a permanent school of social sciences will join the three older schools of mathematics, history, and the natural sciences. The Institute's Director, Carl Kaysen, observed that work in the social, or "soft" sciences has traditionally been more in the area of what might be termed "heroic speculation" and has tended to involve more scattered individual outputs than the cumulative growth of knowledge. But Kaysen observed that today a more truly scientific approach is possible in the study of social evolution. In commenting on the Institute's new program, Edmund Volkart of the American Sociological Association observed that the first third of this century belonged to the engineer, the second third to the molecular biologists and the nuclear physicists, and the final third will belong to the social scientist (—an interesting assessment but one to which scientists will certainly have varied reactions—H.L.P.) (*New York Times*)

The AEC is proceeding with plans for "Project Gasbuggy," a 26-kiloton underground nuclear explosion set for mid-October in northern New Mexico. The aim of the test is to see if underground nuclear explosions can stimulate natural gas production by fracturing rock in which gas is tightly confined. Representatives of the press, industry, and U. S. and foreign governments are expected to be present for this event in the AEC's Plowshare program. (AEC release; 4 August 1967)

An NSF report notes that U.S. universities will need about 12,000 new doctoral-level scientists and engineers by 1969-70, but that only 8,000 will be available. The shortage should be alleviated, however, by 1974, even though employment of science and engineering staff in U. S. universities will double in about the next 10 years. The report, "Science and Engineering Staff in Universities and Colleges", is available for 30¢ from the Government Printing Office.

FAS NEWSLETTER

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Volume 20, Number 7 September, 1967

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