

F. A. S. NEWSLETTER

Volume 20, Number 9

November, 1967

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

FAS STATEMENT ON ABM

Following is the text of a statement submitted on November 10th to the Subcommittee on Military Applications of the Joint Congressional Committee on Atomic Energy.

The Federation of American Scientists believes that the Administration is making a tragic mistake in initiating the construction of an anti-ballistic missile system. The United States, in deciding to construct a missile defense system, has begun a new, and essentially open-ended, phase in the nuclear arms race. There is wide agreement among the American people that, as a first priority, we must halt the spread of nuclear weapons to more and more countries, before these weapons become freely available and the threat of nuclear war becomes very much greater than it is today. Our efforts to halt nuclear proliferation will be seriously hampered by this renewal of the nuclear arms race.

The basic technical fact about any missile defense is that it can be beaten—that is, the offense can always overwhelm the defense, and at less cost. The offense can make use of decoys, multiple warheads, or precursor high altitude nuclear explosions which can black out the ABM radars. A straightforward way to beat the defense is to add to the attack more missiles than the defense is able to handle. Even one missile which gets through can destroy a city. The defense would then be rendered ineffective, and the expected destruction would be as great as before.

What is the implication of this (besides, of course, suggesting that the United States is wasting its resources)? It is that the Soviet Union—and ultimately Communist China—will be able to overcome the system, by expanding their offensive forces, and, since they will insist upon maintaining a deterrent to our use of nuclear weapons—just as we insist on maintaining a deterrent to theirs—they will do just that. As a result, the ABM system will not defend the United States. It will only carry the nuclear arms race to an ever higher level at which, in the event of a nuclear war, there will be even more destruction and loss of life than at present.

It is clear from Secretary McNamara's eloquent, but contradictory, speech announcing the deployment decision that

(Continued on Page 2, Col. 2)

FAS COUNCIL MEETINGS IN CHICAGO— PUBLIC MEETING ON ABM

The Chicago meetings of the FAS Council—to which all FAS members are invited—will be held at 5:30 p.m. on Tuesday, January 30th, and at 7:30 p.m. on Wednesday, January 31st. Both meetings will be in Private Dining Room No. 6 in the Palmer House hotel.

Also planned is a public panel discussion on the anti-ballistic missile question, at 8:00 p.m. on Monday, January 29th, in Private Dining Room No. 14 in the Palmer House.

PARTIAL TEST BAN HASN'T STOPPED WEAPONS DEVELOPMENT

Following is the text of an article entitled, "New Bombs Despite the Test Ban," by John W. Finney in the NEW YORK TIMES 10 December 1967. It's a good review of a topic that hasn't been covered in recent NEWSLETTERS.

When the limited test ban treaty was signed some four and a half years ago, the politicians extolled it as the most significant arms control measure of the nuclear age, and at least some atomic scientists expressed fear that development of new weapons would be dangerously hampered. The politicians' boasts have proved to be exaggerated and the scientists' fears to be unfounded.

Little Slowdown

The treaty has not significantly slowed down the atomic arms race. Complying with the spirit if not always the letter of the treaty, the United States and the Soviet Union—the two major contestants—have still been able to move into a new generation of offensive missiles and to embark upon the deployment of defensive missiles. In fact, megaton for megaton, missile for missile, each side is much more powerful than it was four years ago.

Nor has the treaty, which bans all but underground atomic tests, prevented the development of new or improved warheads required by the new weapons being deployed by each side.

In an effort to increase international cooperation in the general nuclear field, President Johnson last weekend offered to place all civilian atomic plants in the United States under international inspection. The hope was to remove the last major obstacle to a treaty to prevent the spread of nuclear weapons. Such a treaty has been held up by difficulties in finding a formula for safeguards acceptable to all the non-nuclear states.

As the test-ban treaty intended, underground testing imposes some serious limitations and handicaps on each side. It is no longer possible to test the warhead in the environment in which it might be used—a constraint of considerable technical importance when it comes to developing warheads for defensive missiles that will explode in the largely untested realm of space. Some ceiling—perhaps around a megaton—is imposed on the size of the device that can be exploded and still "contain" it so that none of its radioactivity is released into the atmosphere. And when the instruments must be placed right next to the device and be blown up in a microsecond after the detonation, some obvious difficulties are encountered in obtaining diagnostic information on how the warhead performed.

Circumvent Limits

As might have been expected, what has happened is that the scientists, with their ingenuity, have found ways to circumvent the limitations imposed by the politicians in their idealism. Ever since the treaty went into effect, each side has been steadily increasing the number and size of their underground tests.

Since 1963, the United States has conducted 117 underground weapons tests, rising from an annual rate of 12 in 1963 to 40 in 1966. This year the number has fallen to 26, largely because of labor difficulties at the Nevada test site.

(Continued on Page 2, Col. 1)

EDITOR'S NOTE —

For reasons of time and space, the usual NEWS ITEMS and INTERESTING READING sections are omitted from this NEWSLETTER. These will be caught up in the next couple of months.—H.L.P.

PARTIAL TEST BAN—Continued from Page 1

But in the coming two years, the Atomic Energy Commission plans an accelerated test program with a relatively large number of tests in such areas as new re-entry warheads for intercontinental missiles, guidance systems and warheads for defensive missiles.

The Soviet Side

On the Soviet side, there has been a comparable increase in underground testing. Just how many underground tests have been conducted by the Soviet Union, however, remains concealed, although the number is still smaller than the American total.

As the tests have proceeded, American scientists and engineers have developed new testing techniques unthought of three years ago. One of the major advances has been in drilling large underground holes. At the outset, much of the underground testing was conducted in tunnels at the Nevada test site. Now, except for some effects tests, it has been found cheaper and easier to set off the tests in deep underground wells.

As the underground explosions approach the megaton size, however, the A.E.C. is finding that it has to look elsewhere to dig its holes, not because of a concern about violating the treaty but because of a concern about the reaction of the citizens of Las Vegas, who do not take too kindly to the shudders set off in their apartment buildings as well as gaming tables.

An insight into just how much progress in weapons development has been possible, even with underground testing, was provided recently by Senator Henry M. Jackson of Washington, chairman of the Military Applications Subcommittee of the Joint Congressional Committee on Atomic Energy. Noting that "results are being obtained that were previously thought impossible under the treaty restrictions," Senator Jackson said that in the past year "very significant advances" were made in weapons technology and in developing "new and radically different weapon design concepts."

Give Up Advances

Necessarily, the weapons scientists have had to give up certain advances because of the limitations of underground testing. They are no longer able to develop and test the multi-megaton warheads, but then the whole emphasis now is upon developing compact warheads in the megaton class and smaller. It is no longer possible to test the overall weapons system, including its destructive effects; rather the scientists have to extrapolate from the brief data they get before their instruments are destroyed.

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: 15 Dec., 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.

FAS STATEMENT ON ABM—Continued from Page 1

The Administration very much wants to avoid a heightened arms race with the Soviet Union, while at the same time it wishes to deploy a defense against Chinese missiles. However, the simple fact is that it cannot have it both ways.—and a very high degree of effectiveness has been claimed by its supporters—would automatically have some effectiveness against the Soviet Union. In fact, it has been suggested that the system will remain effective even when the Chinese have as many as 150 ICBMs, a force which is nearly one-third of the Russian force today. Clearly such a defense would seriously degrade the present Russian deterrent, and they are unlikely to permit such a degradation.

The ABM system which the Russians have deployed around Moscow is much more limited, and more primitive, than the one we are contemplating, and yet the United States is already investing at least \$4 billion in improving our offensive missiles, to insure that they can penetrate it. There is every reason to expect that the Russians will react in exactly the same way, especially since their missile force is already numerically inferior to ours, and they can ill afford to have our defense erode its potential effectiveness still further.

In addition, the Russians must respond with a missile buildup because of uncertainty as to the eventual form of the US defense. They will probably assume that our ABM system will later be expanded and, given the political and economic pressures in this country, there is every likelihood that it will. As the Chinese increase their ICBM production, there will be irresistible pressures for us to make corresponding increases in ABM deployment, and the Russians know this. Certainly the Russians will have to abandon any plans they might have to match our cessation of missile site construction.

The American decision has already complicated our efforts to obtain agreement on a treaty to halt the spread of nuclear weapons. Only the non-nuclear countries would have to yield anything under this treaty, and they therefore have insisted that it be accompanied by a serious effort at arms limitation by the nuclear powers. An ABM deployment moves in the opposite direction and refocuses attention on the importance of nuclear weapons.

The non-nuclear countries will be led to think that they too need nuclear weapons, either as a nuclear deterrent or in the form of an ABM system of their own. If the United States needs protection against Chinese missiles, do not India and Japan need that protection even more? The Chinese will soon be able to threaten them directly, and our ABM will be small comfort to them. We must remember that the world looks very different from their perspective, and they cannot be certain that we will protect them forever. The image of the United States hiding beneath an ABM umbrella will likewise enhance their fear of, and respect for, Communist China.

The Chinese too will see this from a very different perspective than we do. They will perceive a further attempt on our part to keep them in a second-class status and to deny them an effective deterrent. This can only lead to a strengthening of their efforts to obtain such a deterrent and, perhaps, to some step such as the development of a submarine-launched low altitude missile, which will completely bypass the effect of the ABM and establish their potency on the world scene.

In sum, it appears that the United States is about to take a step which will move the Russian-American arms race to a new and more dangerous level, will make it much more difficult to stop the spread of nuclear weapons, will aggravate our relations with our allies as well as our opponents, will enhance the prestige of Communist China, and will not even provide a defense that will work.

DEFENSE RESEARCH CHIEF DISCUSSES UNIVERSITY SUPPORT

Among much continuing discussion of university-Department of Defense relationships came a DoD decision to discontinue the support of classified research in universities. This was followed by a statement on November 2nd from John S. Foster, Jr., Director of Defense Research and Engineering, aimed generally at spelling out—for scientists, Congressmen, and others concerned—DoD policies on university research and their rationale. Following are excerpts (from the complete text in Science, 24 November 1967) from the Foster statement, which is entitled, "On the Relationship between the University and the Department of Defense."

... First I should state briefly the reasons for DoD needs for research. Next we should examine our basis for believing that defense and academic research objectives are compatible. We then should review funding data comparing the DoD position with other Federal agencies as sponsors of university research. Finally we should discuss the issues related to security classification and reviews of publications.

DoD Research Responsibilities

National security depends critically upon first-rank science and technology. From a technical perspective, DoD must assure that the pool of knowledge and understanding on which we draw to maintain our security, grows as fast as new understanding and new opportunities permit. We cannot afford to lag behind any nation in any important area of science and engineering. Thus the DoD must provide its share of support to enable talented scientists and engineers to push the frontiers of what is known and what can be achieved in practice . . .

In addition, the Federal Government, through the DoD, must insure that this country has an adequate supply of highly trained scientists and engineers to staff defense industries and defense laboratories. Whenever this need is not met adequately, the DoD must take steps to provide the national capability.

There are many fields upon which defense draws heavily and sometimes uniquely: electronics, solid state physics, most branches of engineering, oceanography, high temperature and ultra-strong materials, mathematics and computer sciences, and many others. When other sources of support do not encourage these basic fields sufficiently, DoD must insure that these areas do not lag.

The defense area is, I believe, analogous to the health area. To provide better medical care now and in the future, and to keep our people healthy in the first place, the Federal Government through the Department of HEW encourages training and research in all the sciences related to health. While there are differences in programs and missions, in both cases—DoD and HEW—there is a special public need for major R & D investments to insure meeting present and future national requirements.

Academic and DoD Research Objectives

The DoD has two related major purposes in supporting research at universities. First, we need to advance knowledge and push technological limits in those fields of science and engineering that are relevant to long-range defense problems. And second, we must assist in assuring that the national effort in graduate education and research in these fields is adequate to the defense needs of our country.

Similarly, our universities have two general purposes in carrying out research as they fulfill their primary job of educating people. First, they conduct research to advance

and integrate knowledge into their instruction at all levels. And second, they introduce research as an indispensable component of the graduate educational experience.

The objectives of DoD and of universities are therefore neither divergent nor antagonistic. Indeed, they lead to complementary, compatible, even symbiotic activities. Our relationships, beginning on a significant scale with the astute activities of the Office of Naval Research immediately after World War II, have been productive. They have led to fundamental, internationally recognized results in almost every area of science and technology, and have helped put the United States in the forefront of science. Surely this is much more than a limited technical activity, more than of transitory professional interest.

We should remember another dimension, central to public policy. The U.S. defense posture is strengthened by the frequent exchange and challenge of views among professionals from both inside and outside the government. Academic consultants are critically needed for this priceless American asset in defense planning.

Project THEMIS—A Special Case

Project THEMIS is a new program responding to the President's request to broaden the base of academic excellence. It is designed to provide a special opportunity to universities which have had little or no participation in the past in defense-related research. All work under THEMIS is unclassified, and all work is funded fully by the DoD. Central to the THEMIS concept are three requirements: (1) there are scientists at the institution who desire to work in fundamental research areas of interest to DoD; (2) the proposed research plan is approved by the institution's president as completely consistent with the long-term goals of the university; and (3) the effort is managed by a senior university investigator, not the DoD. In the initial year of THEMIS, we received 483 separate proposals from 173 institutions throughout the country, and finally selected 50 projects. We believe this indicates acceptance by academic scientists and university administrators.

Some have argued that THEMIS means new "invasions" by the DoD into the academic community. But clearly, scholars and institutions are free to submit proposals to the DoD or to other agencies. In fact, why should a faculty member not be permitted to work with the DoD if he chooses and his university permits? Academic freedom is maintained not externally, but internally by the universities themselves in their autonomy to select and promote faculty, to set their own internal priorities. If an institution is strong and independent, each new potential association merely provides opportunities and a need to make choices. We do not entice academic research groups to help us. Our situation is precisely the opposite. We do not have the funds to support all of the research which university groups would like to carry out.

DoD Funding to Universities

... First, before other support became available, the DoD pioneered in the support of almost all branches of academic science and engineering. In 1952 it provided 73 percent of all Federal funds for research and training in universities. Second, in the last decade, as the country has taken up a range of scientific challenges through other agencies such as HEW, NSF, AEC and NASA, the DoD portion has declined to about 20 percent. Thus, we do not now have, nor are we developing, a predominant position. Third, about 90 percent of the Federal support of research at universities is, in fact, oriented to national missions.

DoD Research and Security

Finally, the issue of classified research. In the past fiscal year, DoD funds supported approximately 4152 contracts

(Continued on Page 4, Col. 2)

PHYSICAL SOCIETY TO CONSIDER ROLE WITH RESPECT TO PUBLIC ISSUES

Stimulated undoubtedly by concern over the Vietnam war is a movement to amend the constitution of the American Physical Society to permit the APS, as an organization, to discuss public issues. To quote from the November 1967 issue of *Physics Today*, "The 24,000 members of The American Physical Society will soon consider proposals that their organization broaden its purpose and aims to include discussion of public issues. A discussion of this matter by the membership-at-large is tentatively scheduled for the society's annual meeting in Chicago, from 29 Jan.-1 Feb. Copies of a constitutional amendment, proposed by a group of members and oriented toward discussion of public issues, and ballots for voting on the adoption of this amendment will subsequently be distributed to the APS membership.

"In recent months the APS council has received suggestions from several APS members that the APS should encourage discussions of public issues at meetings and in its publications. APS president Charles Townes has also received a petition proposing an amendment to the constitution, signed by more than 1% of the APS membership (a requirement for proposing an amendment). The proposed amendment is designed to allow the membership-at-large to initiate a vote of APS members on any issue of concern to APS and on the public stand the society should take on these issues . . .

"Since the issue is a very important one, bearing not only on the content of APS meetings and publications but on the very nature of the society itself, *Physics Today*, at the request of The American Physical Society, will publish a sample of letters to the editor expressive of different shades of opinion on the proposed amendment (not on specific public issues). . ."

TAPES OF AAAS PANEL DISCUSSIONS ON ABM AVAILABLE

Audio tapes of the AAAS panel discussions (see program in October NEWSLETTER) held on December 26th ("Is Defense Against Ballistic Missiles Possible?") and December 27th ("The Impact of Ballistic Missile Defense") are available. In addition, a video tape of the December 26th session is available. FAS members might wish to bring these tapes to the attention of their local radio or TV stations. For more information, call or write the FAS office.

FAS NEWSLETTER

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

Volume 20, Number 9 November, 1967

AVAILABILITY OF SCIENTIST & CITIZEN ISSUE ON CBW

The October NEWSLETTER took note and gave the table of contents of the special August-September issue of *Scientist & Citizen* on Chemical and Biological Warfare. Single copies of this issue are available from *Scientist & Citizen*, 5144 Delmar Blvd., St. Louis, Missouri 63108 for \$1. Five copies are \$4, and there are generous discounts on bulk orders.

UNIVERSITY SUPPORT—Continued from Page 3

in what the NSF defines as "basic research." Of these, 138 (or 3.3 percent) were classified. These few contracts were classified usually because the individual investigator's work was more applied and required limited access to classified information, rather than because the research itself was classified. I am taking steps to assure that in the future all basic research supported by DoD at universities will be unclassified. However, because universities possess special skills unique for necessary national security activities, we will continue to support a very small number of exploratory development and study efforts at universities, as well as occasional consulting arrangements.

We recognize that any requirement to review publications—for security or other reasons—can pose problems for the university. For many years we have been sensitive to this issue. With one exception, the DoD policy places no restriction on the publication of work done under unclassified contracts. The exception is this: results of research in the behavioral and social sciences related to foreign policy must be reviewed prior to publication as a safeguard against creating or increasing international tensions. This is a general governmental policy; it is not confined to DoD.

Conclusion

The United States has evolved a pattern of association between our universities and the Department of Defense. This association has led to major achievements in science and engineering, and has strengthened both national security and the national academic research base. Those who would make sweeping changes in this successfully evolving pattern should consider the whole case, all of the consequences for the country, from the many points of view. The issues must be tested in the larger context of all support to academic research, and the entire range of national groups and goals.

Second Class Postage
Paid at
Washington, D. C.

Return Postage
Guaranteed

Master