

F. A. S. NEWSLETTER

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

FAS COUNCIL MEETS

The FAS Council met in New York on Jan. 25-26. One statement on Strategic Nuclear Policy (printed elsewhere in this issue) was released, and a number of other questions were discussed at length.

Dr. Leonard Procita, representing the N.Y. State Society for Medical Research, described the current situation with regard to legislation regulating animal experimentation, and requested FAS assistance. The General Counsel of the FAS was authorized to set up a meeting between representatives of the NYS Society for Medical Research and Congressmen of the Sub-Committee on Health and Safety of the Interstate and Foreign Commerce Committee, with such disclaimers regarding FAS participation, and including such FAS representatives, as he deems appropriate.

Professor Amitai Etzioni discussed the program and activities of "The American Faculty Council for the Gradualist Way to Peace." He distributed a list of members of the council (includes several FAS members) and a position paper now being discussed by them. He asked if FAS could help obtain draft position papers on (1) control of BW weapons, (2) atom free zones, (3) inspection without people and (4) scientific or technological breakthroughs which might improve economies of backward nations without calling for major changes in their political structure.

The FAS Council authorized chairman Dyson to appoint a representative to serve on Etzioni's Council.

Draft statements concerning arms control and the International Atomic Energy Agency were submitted by the Washington and Chicago Chapters respectively, and are undergoing revision. There was considerable discussion of possible future FAS action with regard to arms control. J. Toll moved that the Council urge the Executive Committee to explore the possibility of high level Congressional briefings on the test ban and disarmament and that the Council authorize expenditures of up to \$1,000 for this purpose and authorize raising funds for this specific purpose. The motion passed unanimously.

Reports concerning local chapter activities emphasized the need for projects which would engage the energies of the group. Projects at Argonne, Pittsburgh and Washington were described. Chairman Dyson and others stressed the need to get more young people and more biologists interested in FAS.

WIESNER TO SPEAK AT FAS APRIL MEETING

Dr. Jerome B. Wiesner, Special Assistant to the President for Science and Technology and Director, Office of Science and Technology, will address a public, FAS-sponsored meeting on Sunday evening, April 21 at 8:30 p.m. in the Cotillion Room, Sheraton-Park Hotel, Washington, D. C. It is hoped that FAS members attending the Physical Society meetings will arrive in time for the lecture on Sunday.

The FAS Council will meet on Monday and Tuesday evenings, April 22 and 23. Time and place will be announced in the March Newsletter.

SCIENTIFIC MANPOWER REPORT

On December 12, 1962, the President's Science Advisory Committee printed a report on "Meeting Manpower Needs in Science and Technology." This first report deals with graduate training in engineering, mathematics and physical sciences, designated in the report and here, as EMP.

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FAS STATEMENT ON STRATEGIC NUCLEAR POLICY

The Federation of American Scientists is opposed to the use or threat of use of strategic nuclear forces in a massive attack on any country except in response to initiation of such an attack by that country. Such a "no first strike" policy has not been clearly accepted by the United States. We urge that it should be accepted, and that United States forces and military planning be made consistent with this policy.

EXPLANATORY TEXT

The Federation of American Scientists has previously advocated that the United States should not employ nuclear weapons except in response to their use by others. We reaffirm the desirability of this "no first use" policy, believing it to be a military and political step that is very much in the interests of the United States and the Western Alliance. Until such a "no first use" policy is adopted, we urge that the United States should at least adopt an explicit "no first strike" policy.

A "no first use" policy means that under no circumstances would the United States be the first to employ nuclear weapons in any situation. Such a policy naturally assumes adequate non-nuclear forces to cope even with a major non-nuclear attack. A "no first strike" policy, on the other hand, means that the United States would never be the first to launch a massive nuclear attack, but would retain the option of responding to a non-nuclear attack, either with tactical nuclear weapons or with limited use of strategic weapons against targets not involving cities. A "no first strike" policy could be announced and implemented immediately, without waiting for any massive build-up of non-nuclear forces.

It is sometimes argued that if confronted by a sufficiently serious provocation other than strategic attack, such as a major non-nuclear assault on Western Europe, Western strategic forces could execute an attack against Soviet strategic forces that would be likely to disarm the Soviets sufficiently to protect the Western Allies against devastating retaliation. While no one in or out of the United States Government can have certain knowledge of the numbers, effectiveness, and manner of employment of Soviet weapons, it seems clear to us that this view is almost surely wrong in fact and dangerous in its consequences.

Even if Western forces are greatly superior to those of the Soviets, the West could not count on escaping devastating Soviet retaliation in response to a Western first strike. A very modest number of surviving Soviet weapons—fired from submarines or otherwise—would suffice to produce upwards of 100 million casualties in Western Europe and the United States. The improbability of escaping such Soviet retaliation for a nuclear strike has been emphasized by Secretary of Defense McNamara in his recent testimony before the House Armed Services Committee.

It is not necessary to argue that important political objectives, such as Berlin, would not justify such casualties. It is quite sufficient to point out that the Western Alliance has the resources necessary to protect these vital objectives by means of local or tactical forces. The existence of an adequate local defense would probably be as effective, in discouraging the other side from attacking, as the threat of a massive strategic first strike. And the local response would have the enormous advantage that, even if the other side should start local attacks of the kind we are hoping to deter, we should still have a good chance of defending our objectives at a cost much lower than 100 million casualties. In this sense, a Western strategic strike in response to a Soviet non-nuclear provocation would be both inhuman and irrational.

A somewhat stronger argument in favor of retaining the option of a strategic first strike is that, however irrational

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THE TEST BAN— AN ANALYSIS AND A PROPOSAL

by Matthew Sands*

I. INTRODUCTION

Both the Soviet Union and the United States continually maintain that they would like a treaty banning tests of nuclear weapons. Yet four years of presumably conscientious negotiations have not led to an agreement. What has stood in the way?

The Conference of Experts from East and West produced, during six weeks of the summer of 1958, a unanimous report on the technical requirements for policing a test ban. It was hoped that a treaty would soon follow. Yet after three years of debate, the political Conference on the Discontinuance of Nuclear Weapons Tests was itself discontinued, having made little progress towards a resolution of the outstanding disputes.

From the history of the negotiations, it is clear that the primary stumbling block has been the divergence of views on the appropriate mechanisms for ensuring universal adherence to a treaty. Although both sides proclaim acceptance of the principle of "effective international control," they have not been able to agree on acceptable methods for achieving it—on the so-called "control" provisions of a test moratorium.

The most violent and most durable arguments have been over the staffing of a Control Commission, over its operating procedures, and over the role and authority of the Chief Administrator. There was, it is true, much discussion of various technical points, such as the precise number of seismic stations in the detection system, or the detailed provisions for the staffing of control posts. But surely these arguments were only manifestations of the basic divergence of views on the nature of the control administration. It is not conceivable that a disagreement over whether the number of seismic posts in the Soviet Union should be 19 or 23, or over whether the allowed number of on-site inspections should be 3 or 12, could have blocked agreement had the basic issue concerning the form of the control administration been resolved.

In 1961 and in 1962, the United States attempted to move the negotiations forward with new initiatives. But these new proposals dealt with such secondary matters as the ownership of installations, the number of stations, or the precise quota for on-site inspections. It is perhaps not surprising that these initiatives did not appear to the Soviet Union as providing new bases for negotiation.

The test ban was taken up again during 1962 by the Eighteen Nation Disarmament Committee of the United Nations. There, eight neutral nations made vain efforts to effect a compromise. The current Soviet position is that an international control system is unnecessary. They maintain that underground tests can be both detected and identified by observation posts at large distances; and that on-site inspections are only wanted by the West for the purpose of espionage. Despite urging by the West, the Soviet Union has not come forth with technical data to support its stand.

The current Western position is that there will occur in the Soviet Union each year some scores of natural seismic events indistinguishable from nuclear explosions, and that without the control afforded by on-site inspections the Soviet Union could easily carry out undisclosed nuclear tests. The West feels that an adequate verification of a test ban requires that some small sample of the unidentified seismic events be investigated by on-site inspections.

This paper attempts to reach an understanding of what may be the real and legitimate concerns of both sides on the

* The author of this paper is an FAS member and a physicist at the California Institute of Technology. A very similar version of the paper will appear in the March issue of the *Bulletin of Atomic Scientists*. This is the second in a series of selected papers circulated to FAS members by the FAS Committee on Arms Control and Disarmament. These papers are intended as a contribution to useful discussion, and they do not necessarily represent FAS policy. Comments on the substance of the paper will be welcomed by the author, and suggestions on FAS arms control activities should be addressed to the chairman of the FAS Committee, John Phelps, Institute for Defense Analyses, 1666 Connecticut Ave., N.W., Washington 9, D. C.

essentially political question of the administration of a test ban. A proposal is then advanced for a new approach to this question which might be acceptable to all of the nuclear powers. Hopefully, with sincere negotiations, they might even provide a basis for a treaty.

II. THE NATURE OF THE DISAGREEMENT

The conflict over the nature of a Control Commission derives from the real tensions which exist in international relations, and from the divergent views of the opposing groups on the nature of any future world order. It is realized on both sides that the test ban agreement might serve as a model of further disarmament agreements. These divergences on the administration of a test ban are indicative of a problem that would arise in any disarmament agreement: if agreement on a test ban is impossible, other agreements are not likely. It is certainly important to understand the reasons for the disparity of the two views on the nature of the administration of control measures.

The Geneva negotiators first met the key conflict over the administration of a test ban treaty when they attempted to specify the make-up of the Control Commission and its operating procedures. The Western Powers proposed that the Control Commission should be an autonomous body which, by its independent operations, would provide a guarantee of universal compliance with the treaty. Its decisions would be arrived at by a majority vote of its members. The Soviet Union maintained that the Western proposal would give rise to a "dictatorship of two countries—the United States and the United Kingdom"—and proposed instead that all major issues should be settled by unanimous consent among the three nuclear powers. It has steadfastly insisted on voting procedures that would give the major powers a veto over any decision of the Commission. The Soviet Union evidently considers that the nuclear powers must maintain sufficient unilateral control over the working details of the control system to ensure that the system could in no way act to compromise their national securities. The failure of three years of negotiations shows that there is an essential incompatibility between these two points of view.

The disagreement on the nature of the directorate of a Control Commission is highlighted by the arguments that developed on all subjects having any bearing on the territorial integrity of the Soviet Union. The Soviet Union has been reluctant to have either observation posts or inspection teams within its national boundaries. When it has admitted the possibility of one or the other, it has proposed, first, that these intrusions should be limited to small, rigidly specified numbers; second, that they should be manned primarily by Soviet personnel and under the management of Soviet citizens; and third, that central decisions (in the Control Commission) regarding such intrusions should require Soviet approval. Otherwise, they maintain, these mechanisms of control could be employed by the West as instruments of espionage.* The West cannot, of course, comprehend any proposal that the Soviet Union be allowed, in effect, to monitor its own compliance with the terms of a test ban.

The Western assumption appears to be that the essence of a test ban treaty lies in its detailed technical provisions; that if these could be specified sufficiently completely, the nature of the administration should not be a significant issue. With its functions clearly and minutely defined, the administration would simply execute the treaty's terms; it would operate "automatically," "absolutely impartially," and independently. Although the presentation of its position has been usually quite vague, it appears that the West envisages a kind of international civil service carrying out dutifully and impartially, routine tasks specifically set forth in a treaty. To ensure "objective" interpretation of the terms of the treaty, any disputes would be brought before a representative body where majority opinion would rule. The implications of the Western position are that the West would never attempt to

* It is perhaps worth remarking that an inviolate hinterland may be, at the moment, a vital element in Soviet security that could be significantly compromised by a relatively small amount of intrusion—if it is true, as is currently surmised by some, that their long-range missile force is small, soft, and possibly not dispersed.

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subvert a treaty; that "right" is an objective concept that will be upheld by a majority of "impartial" men; but that there is reason to fear that the Soviet Union, or some other nation, might break the agreement. There is, therefore, a need for an "objective" finger to be pointed at the miscreant.

It should be remarked, incidentally, that it is not at all clear that the United States has been completely honest in its espousal of an independent control authority. Has it really faced up to the problems that would be raised if the Control Commission decided that it wished to inspect locations in the United States that contained a military installation? Or even a non-military facility that might contain private commercial secrets? Is its stand compatible with its highly qualified acceptance of the jurisdiction of the World Court?

The Soviet Union has insisted from the beginning that the essential questions are political, that once these are settled, the technical details could easily be negotiated. It has, at various times, put forth new proposals dealing with the administrative problem, but they have appeared to the West as generally retrograde. For example, the Soviet Union has insisted since 1961 that the office of the Chief Administrator—previously agreed to—should be replaced by a "Troika." Then it retracted its acceptance of obligatory on-site inspections. Neither step could have been expected to appear to the West as conciliatory. More recently, the Soviet Union has taken the position (without giving supporting scientific evidence) that an international inspection system is not needed for monitoring a test ban—that existing national seismic stations are adequate.

It may be that such steps indicate that the Soviet Union does not want an agreed test ban. It may equally be, however, that its position stems from a continuing concern with what it feels is the key issue—the administration of the control machinery. The constant reassertion by the Soviet Union that on-site inspections are only for the purposes of espionage appears to make sense only if it presumes that the initiation and execution of such inspections is under an administration responsive to the interests of the West. Its recent insistence that the test ban should be coupled to a treaty on complete and general disarmament (formerly a Western position) is consistent with the same theme—with complete disarmament, there are no military secrets. If the Soviet proposals on administration had been accepted, arguments on numerous other details would, no doubt, have been avoided. Viewed in this light, their proposals could be taken as an attempt to negotiate an acceptable treaty.

The Soviet Union feels that the Western proposals do not guarantee "objectivity" as they might see it. It has said, at times, that "there are no—nor can there be—neutral men." It has maintained—pointing to the United Nations—that the Western Powers could establish control over a representative body; that, without the requirement for "cooperation" of the major powers through unanimous decisions, a Control Commission could become an instrument of the West. In the Soviet view, supposedly objective decisions could be, in reality, based on falsified data. The mechanisms of the control machinery—the observation posts and on-site inspections—could be subverted to the purpose of espionage.

The Soviet Union insists that the major powers cannot place their national security at the whim of any outside individual or group. In its thinking, the "principle of unanimity"—that is, the right of the veto—is the only guarantee of "objectivity." (After all, objective scientific facts are presumably agreed to by all.)

We should not assume that the "principle of unanimity" is merely a phrase invented to give a sugar coat to the idea of the veto. The same words are used to characterize the "democratic" process of "collective" leadership exercised in governing bodies of the Soviet Union (where it does not result in a veto power).* The Western principle of the "objective

majority," on the other hand, is patterned after Western political mechanisms and is not likely to be intrinsically appealing to the Soviet Union.

The United States and the United Kingdom, for their part, feel that control with a Soviet veto is no control at all—that if the Soviet Union wished, it could, by using the veto, seriously obstruct the operations of the Control Commission, permitting nuclear tests to be carried out in the Soviet Union without fear of detection, or more particularly, of verification.

It must be admitted that there is right on both sides. A supposedly impartial administrator or committee could engage in capricious actions inimical to the interests of the Soviet Union—or, for that matter, of the United States. On the other hand, a veto over the operation of the Control System, could permit one nation to block the effective functioning of the control machinery.

But we must now ask: Why does either of these issues appear to be so vital to either side? If the Control Commission were to become capricious in its decisions, as the Soviet Union fears, that country could always exercise a veto, in effect, by withdrawing its support and cooperation, or by refusing to permit the actual carrying out of on-site inspections. If the Soviet Union were to exercise its veto in an arbitrary way and to obstruct the functioning of the control system, the United States or the United Kingdom could declare the system inoperative, and the treaty void. The Control Commission, after all, deals primarily in words, and it is difficult to believe that the power of its words could be a direct threat to the national security of a nuclear power.

Yet it would appear that it is precisely words that are at the heart of the matter. None of the powers wishes to appear to be in the position of breaking a treaty it has signed, should events go contrary to its view of the treaty's intent. The Soviet Union wishes to protect itself with the veto. If it were forced to contravene some capricious action taken by the Commission, the veto would permit it to do so without a violation of law. The United States says that it does not fear that an international authority will act in an arbitrary manner. It does fear that if the control system were rendered ineffective by a Soviet veto, it might be difficult to establish "legally" (whatever that may mean) that the Soviet Union was technically in violation of the treaty. The West would appear as the violator in the eyes of the world, if it resumed testing. The United States' view appears to be that an impartial international body would marshal world opinion and provide legal sanctions against any Soviet violations of the letter or spirit of the treaty. If it were believed the Soviet Union were conducting tests clandestinely and avoiding detection by obstructing the operation of the treaty, such obstruction would be branded "illegal" (if there were no veto) before the eyes of the world. The West would then be relieved of its obligations and would be free to resume testing without having to bear the onus attached to the abrogation of a treaty.

If the above interpretation of the nature of the impasse is correct, we must conclude that the past emphasis on the technical details of a test ban treaty may have been somewhat excessive. We should take a new look at precisely what it is that the control provisions of a treaty are supposed to

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Chairman.....Freeman J. Dyson

The FAS Newsletter is prepared in Washington by FAS members. The staff for this issue were: Editor—Gary Felsenfeld; Writers: C. Davies, F. K. Millar, E. Shelton.

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

* It is perhaps worth remarking that the "principle of unanimity" is also employed successfully in the highly democratic process of decision-making found in a Quaker congregation.

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do, and try to design a structure both suitable to the task and acceptable to both East and West.

III. REQUIREMENTS OF A TEST BAN MONITORING SYSTEM

The essential requirement of a test ban monitoring system is that it should provide reasonable assurance to all parties that the ban is being universally honored. This requirement has two aspects: On the one hand, continued clandestine testing by one nation could obtain for it some military advantage; on the other hand, even with universal adherence to a ban, if the governmental bodies of the nuclear nations did not have a reasonable assurance ("reasonable," that is, to them) that no nation was in fact testing, irresistible pressures could build up for abrogating the agreement.

At the moment there appears to be a large asymmetry in the significance of this requirement for the Eastern and Western powers. We are wary of clandestine testing that might be possible in the relatively "closed" society of the Soviet Union. We tend to assume that because of our "openness," they have less reason to be worried. We should realize, however, that with a ban the Western powers could test in secret, and that as time went on concern for this possibility might grow in the Soviet Union, if there were no international monitoring system.

Reasonable assurance that significant testing is not being carried out can be achieved by having a monitoring system with a chance which amounts to something less than certainty of detecting an attempted evasion. One would then have some hope that a major power would be deterred from an attempt at evasion by the chance of being caught.

In specifying the precise characteristics of an acceptable monitoring system, one has to take into account several factors. First, there is the very subjective judgment about the "honesty" of the parties to the agreement. (Among "friends," a monitoring system would not be necessary.) Secondly, one must keep in mind that in large and complex managerial societies like the United States and the Soviet Union, important and complex matters (and a clandestine test would be such) come to the attention of many individuals. The chance that a treaty violation would come to light sooner or later through intelligence is probably quite high. If it were high enough, one might suggest that physical monitoring is unnecessary. Unilateral intelligence is, however, always uncertain, and it seldom provides a satisfactory legal justification for an international action. Also, reliance on unilateral intelligence would place increased emphasis on espionage, which would be likely to exacerbate international tensions. Finally, one must, of course, take into account one's perception of the military significance of one, or of several, undetected clandestine tests. Judgments on this aspect must take into account that the effectiveness of a monitoring system depends on the size of the explosion and on other factors. Clearly, the effectiveness demanded of a monitoring system must come from a political decision of the broadest sort.

An additional requirement for a test ban monitoring system is that it should provide a legal basis for action should it be determined either that the ban is being violated or that the mechanisms intended to provide assurances of compliance are inoperative, either through obstruction or ineffectiveness. But there are no very clear criteria for what does constitute a legal justification for international conduct, since international "law" remains an indefinite concept. It should, therefore, be consciously realized that a test ban treaty will need to create part of its own legal framework. Indeed, one hopes that a successful test ban would establish and provide experience with legal procedures applicable to other disarmament measures.

It should, finally, be emphasized that one cannot expect the monitoring system or its associated legal structure to provide more than "reasonable" assurance that violations do not occur, or to provide more than "reasonable" precautions against a breakdown of the system's effectiveness or even against the breakdown of the treaty itself. Airlight provisions which would satisfy the ideal requirements of either side would almost certainly preclude any agreement at all.

IV. CRITICISMS OF EARLIER PROPOSALS

It is not clear that earlier proposals have been directed at the problems of assurance and legality as they are outlined in the preceding section. There has been the implication that "control machinery" was indeed going to control, that is to enforce, compliance. Compliance with any treaty by sovereign states, it must be remembered, is always (in the absence of war) voluntary and conditional upon the continued value of the treaty to them.

Even the choice of the word "control" was unfortunate because of its inapplicable connotations.* The so-called control provisions cannot literally control. One hopes only that their indirect effect, together with the other provisions of the whole treaty, will serve to control future testing. The function of the "control" machinery is merely to "observe" or "monitor" compliance, to provide a kind of surveillance in a restricted realm; certainly it is not to control. We shall, henceforth, speak of the "monitoring" machinery. (For the same reasons, instead of the term "control posts," the term "observation stations" would be more appropriate.)

Too often, the tone of the suggested provisions for monitoring machinery has been more appropriate to criminal than to civil law, and it is civil law which, in this case, is the more appropriate model. References have continuously been made to "suspicious events," to a system designed to catch a violator, etc. It would appear essential that a different approach be adopted. One should not envisage an "impartial" international body deciding to be suspicious, or being dedicated to catching a violator. Its operations should be more like those of certain civil regulatory agencies, as for example, those charged with the administration of municipal building codes.

But perhaps the most important weakness in the Western proposals is that they have not provided for any guarantees against improper acts on the part of the monitoring administration. We may presume that this lacuna has been a matter of some concern to the Soviet Union, and that it may have given emphasis to its desire for the veto, its fear of on-site inspections, and its charges that the system could be used for espionage. We in the United States are certainly conscious of the possibility that constituted authorities (e.g., police, and state government) can, from an excess of zeal or from maliciousness, take actions outside of their intended authority. We have evolved throughout our governmental structure a system of checks and balances in order to inhibit capricious actions by any authority. The various legal restraints on our civil authority, and in particular, the operation of the courts in protecting the individual, provide the kinds of insurance against excesses that may be required in any treaty setting up an international authority. Of course, the inclusion of such protection will necessarily impede somewhat the operations of the legal authorities. A certain amount of cumbersome machinery is necessary, however, in any legal system which provides protection against arbitrary actions.

The administrative proposals of the West have, it would appear, not provided enough checks to give the Soviet Union sufficient assurance that the operations of the monitoring system would always operate legally. The proposals have attempted to create a system which is too simple and too automatic, and which could not, therefore, have some of the internal checks obtainable only in a more complex system. Yet a complex technical-legal system may be precisely what is required to give sufficient insurance against capricious acts.

In the next section, an attempt is made to outline the form of a treaty which would meet the requirements for assurance sketched in Section III, while at the same time striving to overcome the inadequacies just described.

V. PROVISIONS OF A TEST BAN TREATY

I have attempted to devise a set of provisions for a Test Ban Treaty which, hopefully, might contain the essential basis for agreement between the East and West. The details are presented below in a skeletal form; it is intended only that they might serve as a starting point for discussion by legal

* "Control: to dominate; to command; to hold in check; to curb; to exercise restraint or direction over."

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Not for Publication

FAS ELECTIONS

1963-1964

Invitation for Additional Nominations by the Membership

Listed below are the nominations for FAS Chairman and Vice-Chairman for 1962-1963, prepared by the Elections Committee (Richard S. Preston, Chairman). In accordance with the By-Laws, FAS members may nominate by petition containing the endorsing signatures of 10 members and the consent of the nominee to serve if elected. Additional nominations should be received by **March 6** by FAS Elections Committee, c/o Richard S. Preston, 725 Willow Road, Naperville, Ill. Ballots will be mailed about March 15.

The FAS membership will also elect 12 delegates-at-large for two-year terms on the national council. The Elections Committee's proposed nominees for delegates-at-large are listed below. FAS members may make additional nominations by petition containing five signatures and the nominee's consent. Additional nominations should be received by Elections Committee (at the above address) by **March 6**.

The terms of the following delegates-at-large will **not** expire until the spring of 1964: Michael Amrine, Peter G. Bergmann, Owen Chamberlain, John T. Edsall, Marvin I. Kalkstein, H. J. Kouts, Hans J. Morgenthau, Jay Orear, Jack Orloff, A. H. Rosenfeld, and M. Sands.

In addition to the 24 delegates-at-large, the FAS Council will consist of the Chairman, Vice-Chairman, 2 past chairmen, and 1 delegate from each of the ten chapters: Berkeley, Brookhaven, Chicago, Los Alamos, Los Angeles, Philadelphia, Pittsburgh, Schenectady-Troy (MASE), Stanford, and Washington. Chapter members will also vote for delegates-at-large.

NOMINEES FOR CHAIRMAN

Robert Wilson, Physicist, Cornell
Lincoln Wolfenstein, Physicist, Carnegie Tech.

NOMINEES FOR VICE-CHAIRMAN

Harry Palevsky, Physicist, Brookhaven
Louis Sohn, Professor of Law, Harvard

NOMINEES FOR DELEGATE-AT-LARGE

Ruth Adams, Mang. Editor, Bull. Atomic Scientists
Peter Axel, Physicist, U. of Illinois
Donald G. Brennan, President, Hudson Institute
Morton Brussel, Physicist, U. of Illinois
Gary Felsenfeld, Biophysicist, N.I.H.
Frank S. Ham, Physicist, G. E. Res. Lab., Schenectady
W. A. Higinbotham, Physicist, Brookhaven
Gerald Holton, Physicist, Harvard
Louis Osborne, Physicist, M.I.T.
Ernest Pollard, Biophysicist, Penn. State
Ernest Sternglass, Physicist, Westinghouse, Pittsburgh
Stanislaw Ulam, Physicist, Los Alamos
Robert Williams, Physicist, U. of Washington
Hugh C. Wolfe, Physicist, Amer. Inst. Physics

Also nominated are the losing candidates for chairman and vice-chairman. The elections committee suggests that any voter who wishes to have both candidates for each office serving FAS, may so indicate on his ballot.

FAS STATEMENT ON STRATEGIC NUCLEAR POLICY

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such a strike may be, the threat of it discourages the other side from dangerous and provocative actions. Some have argued that Khrushchev himself used the threat of a first strike safely and effectively to discourage the allies of the United States from allowing further U-2 flights to be made from their territory. And it is argued that President Kennedy's successful handling of the recent Cuban crisis relied heavily on an implied threat of a United States first strike.

There are two answers to be made to this argument which refers to Cuba. First, as the President himself has emphasized, the successful outcome of his Cuban policy rested primarily on the fact that the United States possessed overwhelming superiority of non-nuclear force in the Caribbean area. The outcome would probably have been the same, with or without the additional threat of a nuclear first strike. Second, in so far as the Cuban settlement was a victory for the policy of first-strike threats, it was a very dangerous victory. A policy of first-strike threats may succeed nine times out of ten, but the tenth time, when it fails, is a total disaster.

Though it is not wise to be dogmatic about the evolution of military technology, it seems to us highly unlikely that the basic technical character of the present situation can be made to change. Specifically, it seems most unlikely that the United States can of its own effort restore a situation in which Western strategic forces, when confronted with a non-nuclear aggression, could execute a disarming strike against Soviet forces at an expectable cost that would seem rational in comparison to alternative non-nuclear means to protect the objectives concerned. Furthermore, a major attempt to restore this kind of superiority would probably fail its object, but would exacerbate the arms race in highly dangerous ways, and might well increase the probability of war.

It does not appear that the Soviet Union has itself diverted to military procurement the resources that would be required for a serious attempt to achieve decisive strategic superiority, a fact that has probably been helpful in keeping the arms race from going to much higher levels. While we are convinced that under present circumstances the United States must maintain the ability to retaliate effectively to any likely scale of Soviet nuclear attack, we believe that the United States should restrain itself from procurement of strategic weapon systems beyond those needed for such deterrence.

We believe that the long-range security of both major nuclear powers requires large balanced reductions in the military forces of both nations. Until such substantial disarmament can be achieved, it is vital that our military policies be so formulated as to minimize the danger of precipitating an all-out nuclear war, and to minimize the motivations of other states to acquire nuclear weapons.

SCIENTIFIC MANPOWER REPORT

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The request for this report was announced by the President at a press conference on January 15, 1962 as a result of growing concern at the inadequacy of the supply of scientific and technical manpower to satisfy the expanding requirements of this country's research and development. It was noted that in 1950, 19,600 students graduated in physical sciences; in 1960 despite the substantial increase in population the number had fallen to 17,100. In the field of engineering enrollment rose from 146,000 to 269,000 from 1951-57. Since then there has been a continual decline. In 1961 the figure was down to 240,000.

The committee states that expansion in all sciences is needed. This means improved education at all levels. Today's technological advances, however, put the heaviest demand on EMP.

Recommendations are urged for increasing the supply of EMP graduates and doctorates of high quality. In 1950 2,000 received doctorates; in 1960 it was 3,000. It proposes these should be increased to 7,500 by 1970. There should also be a greater number of students in graduate training. Stipends for graduate study must be in sufficient number to attract more graduates and to allow more full time study. The stipends too should be adequate enough so that graduates would be able to maintain their studies without undue financial difficulties. It is suggested that while fellowships be still avail-

PUBLIC HEALTH SERVICE REPORTS ON FOOD RADIOACTIVITY

Analysis of food and beverages consumed by students at 21 boarding schools and institutions throughout the country during a four-month period indicated levels of intake of radioactive materials well within the Federal Radiation Council guidelines for normal peacetime operations.

The Public Health Service report covered data from its Institutional Diet Sampling program for March, April, May and June, 1962. The program, which has been in progress since 1961, is designed to estimate the daily intake of radio-nuclides in a controlled population group ranging from children to young adults of school age. Institutions selected for the program vary from exclusive boarding schools to orphanages.

The study is part of the Public Health Service national surveillance program for keeping track of and evaluating human exposure to fallout. Each institution supplies one complete seven-day diet sample each month. The sample, obtained by duplicating the meals of a different individual each day, represents the edible portions of 21 meals, plus soft drinks and between-meal snacks. Samples are then packed in dry ice and shipped to Public Health Service regional laboratories to be analyzed for certain radioactive substances of health interest and for non-radioactive calcium, potassium and phosphorus.

During the March-June period the dietary intake of strontium 90 ranged from less than one micromicrocurie per day to 36 micromicrocuries per day. Average values were 9.3 micromicrocuries per day in March, 10.1 micromicrocuries per day in April, 9.3 micromicrocuries per day in May and 12.8 per day micromicrocuries in June. The estimated values reported for iodine 131 were: less than 15 micromicrocuries per day in March, less than 16 micromicrocuries per day in April, less than 20 micromicrocuries per day in May and less than 31 micromicrocuries per day in June.

Dietary intake of radium 226, a naturally-occurring radio-nuclide, as distinct from radio active material produced by nuclear fission, also was estimated. Total radium in the diet of the students averaged 3.6 micromicrocuries per day in March and April, less than 3.7 micromicrocuries per day in May and 3.8 micromicrocuries per day in June. Radium 226 is assumed to be 30 percent of total radium activity. (U.S.P.H.S. Press Release 1/9/63)

able, the major fraction of increase in support should be in training grants.

The college courses should be improved using the latest techniques and making them more widely available. Increases too in the faculty and in equipment are necessary to meet the proposed needs. Existing "centers of excellence" in EMP should be strengthened and new centers developed, making first rate graduate education widely accessible on a state and regional basis. The "center of excellence" could be an entire institution, a department, a group of faculty or one distinguished man.

The answer to these problems is more funds quickly. The matter is urgent. The report points out that practically every student who could obtain a doctorate by 1970 has already entered college. Funds are needed for the support of graduate students, funds to cover the cost of education in EMP, funds for the expansion of existing facilities, and funds to create new centers. The committee assumed that the Government and universities pay for additional buildings by matching funds on a 50-50 basis. Available evidence indicates that private funds for the purpose will be limited because they are in great demand for other purposes. Continuation of matching funds on a 50-50 basis will inevitably prevent first rate private institutions, particularly small ones or those in economically distressed areas, participating fully. The requirement of matching funds, the report suggests, should be relaxed when necessary if growth is not otherwise possible.

While the program anticipates help from all sources, the committee recommends the Federal Government take the lead. The Federal Government, it notes, is the principal consumer of EMP graduates. It should be responsible, not only for setting up the agencies and letting out contracts, but ensuring people of high ability and training be on hand to work in these agencies.

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and technical experts. No attempt has been made here to use a terminology which would necessarily be appropriate to the language of a treaty. Comments intended to emphasize the significance of certain provisions are given in brackets; they would not, in general, be made part of the treaty itself.

A) Basic Provisions of the Treaty.

- 1) The parties shall agree to prohibit all tests of nuclear weapons of any type on territories under their jurisdiction, and to prohibit the participation of their nationals in the preparation for, or conduct of, tests of nuclear weapons anywhere.
- 2) The parties shall agree to cooperate with the other signatories in the establishment and operation of the machinery for monitoring compliance with the obligations of Paragraph 1 and in such other ways as may be necessary to provide reasonable assurances to all the parties that tests of nuclear weapons are not being conducted by any nation.
- 3) The parties shall agree to promote the acceptance by all nations of the terms of the treaty.

[The intent of Paragraph (2) is to put the requirement for assurance on an equal footing with the requirement for the cessation of tests.]

B) A Monitoring Organization.

- 1) A Monitoring Organization shall be established and operated under the control of a Commission. The Commission shall consist of 12 members, representatives of their national governments. Four members shall be nominated by the Soviet Union; four shall be nominated by the United States and the United Kingdom acting together; and four shall be nominated for specific terms by the General Assembly with the approval of the Security Council. The decisions of the Commission shall be by a majority vote. The Commission shall meet periodically to establish policy and on other occasions and for such other purposes as may be required.

[Although the Commission does not give the Soviet Union a veto, its constitution may be acceptable with the safeguards provided in later sections. The choice of four members for each bloc is to allow provision for other nations, such as France and China, to be brought in at a suitable time as members on an equal footing. The third group of four is intended to represent the neutral bloc, but intentionally avoids the label "neutral," which is difficult to specify in general terms. It is thought that the formula would, in fact, result in the selection of four neutrals, or what is more to the point, in uncommitted notions acceptable to both the West and East.]

- 2) The Commission shall appoint a Director who will have the responsibility for the administration of the Monitoring Organization.
- 3) Each group of four members of the Commission shall appoint a Review Officer who will serve on the Staff of the Director. The Review Officers will be kept continually informed about the operation of the organization; they will be consulted by the Director in all planning matters. They will review all reports, but their approval will not be required. They will be free to communicate with any government, and may be delegated by the Director for liaison with other governments. Each will be authorized to request, at his discretion, special meetings of the Commission.

[The Review Officers should provide a large measure of insurance against arbitrary action of the Director. They would serve some of the functions of the Troika proposed by the Soviet Union.]

- 4) The Staff of the Monitoring Organization shall be recruited, insofar as is possible, equally from among the three groups of nations represented on the Commission. The staff will be responsible to the Director.

C) The Functions of the Monitoring Organization.

- 1) The function of the Monitoring Organization is to provide world-wide surveillance of those observable physical effects that may be associated with nuclear explosions, and to make available to the world community objective information relating to the continued observance of the treaty.
- 2) The Organization shall develop suitable monitoring networks, shall arrange for their installation, and shall coordinate their operations. All observation stations will be nationally owned and operated under supervision of the Organization. [The nature of the monitoring networks could, if desired, be specified in an Appendix, but it would be preferable if details could, insofar as possible, be left to the Commission.]
- 3) The Organization shall collect, analyze, evaluate, and disseminate the information provided by the networks. Its evaluations shall consist only of an appraisal of information obtained from its systems. [The functions are more clearly defined in the description of Procedures which follows.]

D) Procedures.

[The following is an outline of the basic procedures to be followed in the operation of the treaty. It is important to realize that the procedures determine in an essential way the whole character of the treaty. (The basis of law is, in large measure, the universal acceptance of clearly understood procedures.) Only a suitable procedural form can provide some guarantee against—or recourse from—arbitrary actions of the Organization. The intent of the procedures outlined here is to provide the kind of "legal" protection presumably desired by both the United States and the Soviet Union.]

- 1) The Director shall issue timely reports of the technical findings of the Monitoring System. These reports shall not contain any "determinations" of suspicions of guilt or of violations.
- 2) Based on these reports (and any other information they may have), States may make a request to the Organization that it conduct an on-site inspection of an event it has reported.
- 3) The number of requests will be limited by specified quotas.
- 4) The Director will make a request to the State on whose territory the inspection is to be conducted (which will be called the "Host State"). The request will be accompanied by all available data about the event, and the nature of the investigation to be conducted. The Director will make all necessary arrangements with the Host State for the conduct of the investigations.
- 5) Requests for on-site inspections will be granted unless the Host State concludes that the information presented by the Organization could not have arisen from an actual physical event, or that the information unquestionably precludes an event of nuclear nature. If any State refuses to grant a request for an on-site inspection, the Director shall immediately give a report to the Commission.

[It might also be useful to provide that requests can be justifiably refused in "exceptional cases" on the grounds that the "proposed investigation would seriously jeopardize the national security."]

- 6) The procedures and staffing of the investigation teams shall be such as to ensure an objective investigation.
- 7) The technical findings of the on-site investigation shall be reported to the Commission.
- 8) If any State concludes that there has been an unjustified refusal of an on-site investigation or that there is reasonable evidence that a nuclear explosion has occurred, it may call for a meeting of the Commission where it may present an accusation of a violation of the treaty. The Commission shall hear arguments

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from the accuser and the accused, and shall make all reasonable attempts to arbitrate the dispute.

- 9) If the Commission is unable to reconcile the dispute within a period of one month, it shall make a report to the General Assembly, which will be called into special session if necessary.
- 10) Any State which concludes that there is reasonable evidence that the terms of the treaty are not being maintained, either with respect to the observance of the discontinuance of tests or with respect to the provision of adequate assurances, may announce to the General Assembly its intention to withdraw from the treaty. Such a withdrawal shall not become effective until one year after such announcement.

VI. CONCLUSIONS

The testing of nuclear weapons is as much a part of the arms race as the acquisition of military stockpiles. Both sides considered their recent resumption of testing a necessary military preparedness measure. The Soviet Union announced in August 1961 that it was forced to break the voluntary 3-year moratorium on testing because of an increasing military threat from the West. In announcing the plans for a new series of United States tests, President Kennedy said: "We have no other choice in fulfillment of the responsibility of the United States government to its own citizens . . ." The two governments view testing as they do their armed forces—as an essential ingredient of their military programs.

A test ban would put some limitations on the quality and the quantity of the nuclear arsenals; it would involve the acceptance of an imposed military restraint. It is, therefore, as real a disarmament measure as any restriction of weapons or forces. There has been difficulty in reaching agreement precisely because a test ban is a disarmament measure. The fear that one side or the other would gain a unilateral advantage makes each side wary of every treaty detail. But because it would be a disarmament step with limited military significance, a test ban should be easier to agree on. We cannot expect agreement, however, until a treaty which will satisfy the legitimate concerns of both sides is put forth.

The United States desires reasonable assurances that the Soviet Union would not be testing clandestinely. The Soviet Union, no doubt, desires reasonable assurances that the monitoring machinery would not give a significant unilateral intelligence advantage to the United States. It is the contention of this paper that both desires could be satisfied by a treaty which gave equal emphasis to the requirement for the cessation of tests and the need for assurances of compliance, and which specified a structure of legal procedures designed

to inhibit the subversion of the treaty to the advantage of either side. The treaty outline given above is intended to suggest the form that such procedures might take.

The generation of legal frameworks acceptable to both East and West is an essential prerequisite to any disarmament. The nuclear test ban may still be a good place to start.

UNIONS SUSPEND FIGHT AGAINST LICENSING OF NEW ATOMIC REACTOR

A major obstacle to first-stage operation of the Nation's first commercial "fast-breeder" nuclear power reactor vanished yesterday. A group of unions that have been battling the 95-million-dollar Enrico Fermi Reactor, 30 miles southwest of Detroit, decided yesterday to suspend their fight against a provisional operating license for the facility. Their decision was made in the midst of an Atomic Energy Commission licensing and safety hearing. The reactor, which has been the target of a prolonged court battle by the unions on safety grounds, is intended eventually to provide electrical power for metropolitan Detroit. But the sponsoring corporation for the power project, Power Reactor Development Co. (PRDC), is currently applying to AEC's safety and licensing board for permission to begin operation at a low-energy, 1-megawatt level for testing purposes. It is being planned for operation ultimately at a 60-megawatt electrical capacity.

The three unions battling the case are the United Auto Workers, the United Electrical Workers and the United Paper Workers. Their attorney walked out of the opening session of the hearing after the three-man AEC safety board turned down two union motions aimed at postponing the hearing. The unions had appealed for deferment until after an investigation had been completed into an accident Dec. 12 in which leaking sodium in the reactor's steam generator unit caused a severe chemical reaction. They claimed that if the system were loaded with nuclear fuel, such a sodium-water reaction could have become a radioactive hazard to the more than 2 million persons living within close range of the Fermi reactor. The unions' attorney argued that, since it would take at least six months to ascertain the cause of the mishap, action on the provisional license application should be postponed. Officials of the PRDC claimed that the absence of injury and equipment damage during the unscheduled reaction was proof of the reactor's built-in safety checks. The AEC's regulatory staff apparently agreed with this in that they turned down the unions' appeal. The attorney for the unions hinted he may re-enter the case when it moves to its next stage. The reactor corporation must come back to the AEC for approval at each successive phase of development. In earlier rounds, the unions were successful in blocking construction approval of the reactor project up to the U.S. Court of Appeals. However, the Supreme Court overruled the lower court last year on an appeal by the AEC. (Wash. Post, 1/4)

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