

# F. A. S. NEWSLETTER

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David R. Inglis, Chairman

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No. 60-2

March 18, 1960

## TEST BAN TALKS BOG DOWN

Although the Geneva Conference on the Discontinuance of Nuclear Weapons Tests, begun in the latter part of 1958, has made little progress on a political level toward an international treaty, there seemed until recently to have been a solid base of agreement at the technical level. The first two "sub" conferences of technical experts of the U.S.S.R., U.K. and U.S.A. were considered essentially successful meetings in that both sides were able to agree on much of the mechanics of establishing a controlled suspension of nuclear weapons tests. It was hoped that this would serve as a basis for the negotiation of a political treaty. However, after the release of new U.S.A. data on underground explosions, a third sub-conference—"Technical Working Group 2"—was called to re-examine the conclusions reached by the 1958 conferences. The third conference ended on December 19, 1959 with the scientific representatives of the three powers failing to reach agreement on virtually all of the problems examined. (The reports of the three delegations were published in full in the February 1960 issue of the Bulletin of Atomic Scientists.)

The new data presented by the U.S. concerned the underground nuclear explosions held in the fall of 1958 during the "Hardtack" test series. These data indicated that the network of seismographic instruments recommended in 1958 would fail to distinguish certain underground test explosions from earthquakes. The U.S.S.R. scientists pointed out that the instrumentation employed in the "Hardtack" tests did not meet the specifications of the original Geneva agreement upon which the Russians believe the inspection criteria should be based. But even when the data were extrapolated to the non-existent "Geneva Instruments," it was clear that the explosions would still be more difficult to distinguish from earthquakes than originally had been anticipated with the result that an increased number of inspection trips would be necessary. Basically, the controversy was reduced to the U.S. contending that the recommended original network was not as good as originally believed, while the Russian delegates insisted that it was adequate and could be improved. The British took the middle ground by criticizing the Russians for failing to appreciate some of the problems and the U.S. for making it look too difficult.

### "Muffling" Data Stir Controversy

A second major area of controversy opened up by the U.S. delegation concerned the possibility of muffling underground explosions, i.e. the "big-hole" theory. This theory was initially developed by Hans Bethe two years ago and has been refined by a group of theoretical physicists at the Rand Corporation. It can be calculated that if a given explosion occurs in a chamber of optimum size the resulting elastic reflection of the shock wave would permit only a small fraction of the energy to go into the seismic wave. The calculations indicate that there would be a muffling factor of some 300 times. Thus, the seismic wave would effectively be 300 times weaker and would thereby require a detection system far more effective than anything considered up to now as being adequate. Unfortunately the U.S. introduced this theory with almost no experimental data to back it up. The Russians considered the question "purely hypothetical" and as yet on no sound basis; they argued that the material was introduced with the aim of discouraging all agreement. (It should be noted that some experimental verification of this "decoupling" effect was announced by the AEC in early February. The preliminary results from a non-nuclear explosion carried out in a Louisiana salt mine indicate a muffling factor of 150:1.)

The feasibility of carrying out a muffled test is another matter. To "cushion" a 100 kiloton bomb would require a

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## RULE OF LAW—THE WORLD COURT

Senate Resolution 94, a potential nail in the coffin of power politics, is stalled in the Senate Foreign Relations Committee. Introduced a year ago by Senators Humphrey (D., Minn.) and Javits (R., N.Y.), the resolution seeks repeal of the six-word "Connally amendment" to the 1946 Senate resolution consenting to U.S. adherence to the International Court of Justice. The 1946 reservation, authored by former Senator Connally (D., Tex.) reserved to the U.S. the right to determine unilaterally whether the U.S. would submit to ICJ jurisdiction.

### History of Prior Courts

A recent number of *Vital Issues* (published by the Center for Information on America, Washington, Conn.) outlines the history of world courts, and makes clear the import of the Connally reservation.

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## FAS EXECOM ASKS ACTION

On Feb. 18, Secretary Herter in a major policy speech stated that, after securing a nuclear test ban, a general disarmament agreement will be sought by the United States. (See story, p. 2.) The first step in that general disarmament should be, in Herter's words:

"To create certain universally accepted rules of law which, if followed, would prevent all nations from attacking other nations. Such rules of law should be backed by a world court and by effective means of enforcement—that is, by international armed force."

The FAS Executive Committee, at a recent meeting in Washington, decided to ask members to write Secretary Herter commending him on the italicized portion of his speech quoted above. The Execom views as significant and hopeful this strong, high-level, public U.S. endorsement of an international armed force as a means of preserving peace. Letters should be addressed to: Secretary of State, Washington 25, D.C.

A closely-related subject is the Administration proposal to repeal the so-called "Connally reservation" to U.S. submission to International Court of Justice jurisdiction. (See story, p. 1.) The proposal, S. Res. 94, would allow the ICJ to determine whether a matter before the Court was "domestic" (and therefore beyond ICJ jurisdiction). The U.S. has, since 1946, reserved to itself the right to make that determination unilaterally. S. Res. 94 will die in the Senate Foreign Relations Committee unless public support can be aroused.

The Execom supports S. Res. 94 as a first step toward making the ICJ an effective instrument of peaceful settlement not only of international disputes but as the judicial machinery supporting Secretary Herter's proposal for an international police force. The Execom urges FAS members to write to their senators and to Sen. William J. Fulbright, Chairman of the Senate Foreign Relations Committee, in support of S. Res. 94.

The Execom realizes that its support of the foregoing proposals may be beyond the area in which scientists, as such, have special competence. However, feeling that many FAS members may agree with the proposals, the Execom suggests writing as citizens, rather than particularly as FAS members.

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spherical cavity 800 feet in diameter and about a mile down (for comparison—The Washington Monument is 550 feet tall). The excavation effort, flushing such a hole out of a salt dome, would cost 30-40 million dollars and would take three to four years to complete. To hide such an operation would be another problem, particularly if part of the detection agreement simply includes periodic inspection of salt mine areas.

Agreement could not be reached on the criteria "which could be used by the control organization in determining the eligibility of detected and located seismic events for inspection." It was the U.S. view that if the technical information did not permit the identification of seismic events as earthquakes, then they must remain eligible for inspection. The Hardtack results indicate that many more events should be eligible. The Russians would not accept the new data as a basis for present agreement, although they agreed that it "will certainly be of significance to the work of the control system [and] help . . . improve its instrumentation." They held to the criteria set up in 1958 as the basis for selecting eligible events.

Although the conference adjourned under a cloud, some positive results were achieved. The joint technical group in examining the techniques and instrumentation for improving the detection and identification of seismic events agreed upon five specific technical recommendations (e.g., use of more than the 10 arrays specified in 1958, use of long period waves, and use of deep holes, etc.) and a general recommendation for further studies in certain areas.

#### End of Moratorium: New U.S. Proposal

On December 29, 1959 the U.S. announced the end of its voluntary test moratorium. A strong statement was issued charging "politically guided" Russian scientists with failing to take new technical data into account and announced "although we consider ourselves free to resume nuclear weapons testing, we shall not do so without announcing our intention in advance. . . ."

This resulted in a flurry of charges and statements both here and abroad, e.g., Nation, Jan. 11, "Dr. Teller again has succeeded . . . to frustrate any nuclear test ban treaty." Some scientific groups conceded that we do not have the technical means on hand to monitor underground tests properly. Others, however, feel that in two or three years we will have the seismographic capability to monitor and control underground tests.

On January 1 and 3, Premier Khrushchev announced that the Soviets may start disarmament alone—and rely more on missile and nuclear bombs. He also pledged that the Soviet would not resume tests unless the West did.

#### Soviets Demand Inspection Veto

On January 12, 1960 the negotiations of the parent Geneva Conference started anew—but apparently stalled because of the scientific differences. It was also apparent that the U.S. delegation had little, if any, instruction and was evidently waiting while plans were being studied at home for a new proposal. The U.S. (Wadsworth) continued its suggestion that the Soviet "face up" to the scientific difficulties, while the Soviets (Tsarapkin) pushed to get a treaty signed, with a specified small number of on-site inspections (the quota problem) and that detection problems be worked out later. The Soviets also continued to maintain that the final decision as to the placement of control stations and flight plans for air sampling aircraft be left to the country involved. The U.S. position called for an Administrator of the control agency to have the final say (that is, if a particular site or flight plan is unacceptable to the country involved it should suggest another which must then be approved by the head of the control agency).

On January 20, the U.S.S.R. eased its stand on the veto of site locations and air routes, but still maintained its desire for the final veto on the dispatch of inspection teams. However, it indicated that if the West would accept the idea of a small pre-determined quota of inspections it would drop its demands for the veto.

Shortly thereafter (Jan. 27) there was evidence of a possibly new Soviet position. Premier Khrushchev conceded that the present detection system may not be as effective

## HERTER ON U. S. DISARMAMENT POLICY

Secretary of State Christian A. Herter delivered what may be one of the most significant speeches of recent years before the National Press Club in Washington, D. C. on Feb. 18, 1960. He defined two major and equally important goals of the current disarmament negotiations. First, the creation of a "more stable military environment which will curtail the risk of war and permit reductions in national forces and armaments." Then, following this, a general disarmament with concomitant build-up of "international peace-keeping machinery to the point where aggression will be deterred by international rather than national forces."

#### Stable Military Environment

To obtain this first goal Secretary Herter put forth a series of proposals including zonal air and ground inspection, armament control, nuclear test ban (suitably inspected), eventual ban on production of nuclear weapons, armed forces manpower ceilings, and partial transfer of conventional weapons to an international body. These measures, he stated, would reduce the risk of war, but because large national forces would still exist "national force—not international law—would still be the ultimate resort."

#### General Disarmament Under International Law

Herter envisaged a second stage of disarmament beginning with the creation of "universally accepted rules of law which, if followed, would prevent all nations from attacking other nations." These laws "should be backed by a world court and by effective means of enforcement—that is, by international armed force." National armed forces would be reduced sufficiently so "no single nation or group of nations could effectively oppose this enforcement of international law by international machinery."

#### Working Through the UN

Herter emphasized that effective international control is a *sine qua non* for general disarmament not only to insure against possible violations but because the forces required by a large state for its own internal security would be an effective threat against smaller, adjacent nations. He recognized that the UN provides a "useful framework" within which the United States is prepared to work for "the strengthening and development of international instruments to prevent national aggression," and "to insure just and peaceful settlement of disputed issues in a disarmed world."

as one would like. However, granting this, he still proposed a complete ban.

Meanwhile many groups here were calling for an extension of the moratorium and a renewal of efforts to achieve agreement. There is strong feeling here and abroad echoing the sentiments of the Ann Arbor Conference of scientists on Feb. 1, 1960, that no detection system could be 100% effective but the risk that some small tests may escape detection must be weighed against the risk of allowing negotiations to break down and the arms race to continue.

#### New U.S. Proposal Announced

On February 11, 1960 the U.S. officially offered its new proposal. This was a treaty providing, 1) A ban on all nuclear tests in the atmosphere, in space, and in the oceans and all underground tests except small scale ones above a certain specified level. 2) Inspections of suspicious large scale underground explosions based on a numerical quota fixed in advance (a departure of U.S. from its previous position). However, the quota was to be based on scientific standards. (The U.S. estimate under its concepts of the standards would mean about 20 inspections per year in the U.S.S.R. and a similar number in the U.S.) 3) A program of joint research and experimentation by the three powers to improve techniques, etc. 4) The lower limit on "small-scale" underground events to be based on a seismographic reading of "4.75" (roughly a 20 kiloton explosion by U.S. standards).

The proposal was immediately rejected by the U.S.S.R. Officially the U.S. still hopes that the U.S.S.R. will eventually come around. Meanwhile there are indications that the U.S.S.R. might accept a "phased" treaty coupled with a voluntary moratorium on all testing.

## STUDENT NON-COMMUNIST AFFIDAVIT FIGHT

A lively and unusual Senate floor fight is expected in March over a bill to repeal the non-Communist affidavit now required of all students receiving loans under the National Defense Education Act. The bill, S. 2929, is sponsored by Senators Kennedy (D., Mass.), Clark (D., Pa.), and Javits (R., NY) and has the backing of the administration as well as that of a large segment of the educational community. The new proposal is a modification of the Kennedy-Clark measure introduced last session (S. 819) which recommended repeal of both the loyalty oath and the disclaimer affidavit. Although there has been widespread protest in academic circles against the disclaimer, there has been little opposition to the loyalty oath. President Eisenhower considered the issue of sufficient import to discuss it in his budget message on January 18. He said that the disclaimer affidavit is "unwarranted, and justifiably resented by a large part of our educational community, which feels that it is being singled out for this requirement." According to the Congressional Record for Mar. 11, as of Mar. 2, there were 25 educational institutions which declined from the outset to participate in the Education Act or which participated and later withdrew, and 57 which are participating but have protested the affidavit. In addition, faculty disapproval has been expressed at 20 schools.

Despite this continuing protest against the non-Communist disclaimer, opposition to its repeal is expected in Congress. In the Senate, this will probably come from the three Senators who voted against repeal in the Senate Labor and Public Welfare Committee, namely, Senators Dirksen (R., Ill.), Goldwater (R., Ariz.), and Prouty (R., Vt.). They said they did not object to repeal of the affidavit but wanted an amendment to make it a crime for a Communist to accept a Federal loan. Senator Mundt (R., S.D.) is expected to offer an amendment under which there would be no inquiry into belief as such—thus meeting the issue of constitutionality in the current law—but under which an active Communist party member could be prosecuted. Opposition to repeal of the disclaimer is expected to be even greater in the House than in the Senate. Although eight repeal bills have been introduced in the House, no action has been taken. All of the bills have been referred to the House Education and Labor Committee, whose chairman, Rep. Barden (D., N.C.) has shown emphatic support of the disclaimer provision.

## INDUSTRIAL SECURITY PROGRAM REVISED

The Administration has set up a new industrial security program making significant concessions to the principle that suspects should be able to confront their accusers. The prior program, covering defense plant workers, was struck down by the Supreme Court last June 29. The Court held that neither Congress nor the President had authorized a system in which informants' names were kept secret. The new order makes it the general rule that anyone charged under the industrial security program shall have the right to cross-examine any source of information against him. However, there are two specific exceptions to this general rule. First, the name of a genuine confidential informant (e.g., an FBI informant inside the Communist party) may be withheld if the head of the department supplying the information personally certifies the necessity for withholding the identity on the grounds that disclosure would be harmful to the national interest. Second, provision is made for the use in special circumstances of statements made by so-called "casual" informants (e.g., neighbors of the accused) without their being available for cross-examination. The head of the department handling the security case would have to determine that the source of information could not appear in person and that failure to use the statement would be "substantially harmful to the national security." In any case where cross-examination of a casual informant was thus denied, only the head of the department involved could make a final decision to deny security clearance. Although the criticism has been made that these two exceptions to the rule of confrontation are too broad and are open to unfair administration, nevertheless, the new program marks a drastic change in the long-standing policy of all executive department security programs. The presumption under the new order would be that the hearing board in a security case would see and hear only what is also available to the accused. The burden would be on security officials to show some special reason for changing that presumption.

## HOLIFIELD URGES POWER REACTOR DEVELOPMENT

In a January 19 speech reviewing AEC programs, Rep. Holifield (D., Calif.) stated that power reactor development in the U.S. to date has been far below expectations. For example, the AEC predicted in 1955 that it would put 2 million kilowatts of nuclear power in operation by the end of 1960, but only 400,000 kilowatts will actually be produced. He also pointed to the lag in the AEC-Euratom cooperative program where only the Italian SENN project (which was planned prior to Euratom) was submitted last year. Holifield suggested that the main reason for the lag has been the complexity of the yet unsolved technical problems. These problems have raised costs, delayed schedules and presented financial problems. The only bright spot in the power reactor program is the Naval Reactor program.

In reviewing the reports of various Congressional committees that had studied the atomic power program, the Congressman stated that they agree that "it is important to develop economic atomic power to meet sharply rising domestic needs for power in future decades and to establish and maintain clear international leadership in an important technology." He urged that the present goal of economically competitive nuclear power by 1968 be kept. In similar vein, he expressed concern over the Commission's tendency to abandon the previous program aimed at developing six to eight different types of nuclear plants with emphasis on three basic reactor concepts—pressurized water, boiling and organic cooled, and the moderated reactor. He hinted that this decision might have been made by budgeteers rather than technical authorities.

In discussing financial assistance and subsidies to private plants, he stated that despite Government subsidies and services, private organizations have not been able to proceed with projects as rapidly as promised by them and by the Commission. Holifield explained that he did not believe that a more substantial subsidy program is the best answer to the problem. He continues to favor more government-developed prototypes. He attributes the Commission's reluctance to support a greater atomic power development program to budget and power policy considerations.

## NATIONAL PEACE AGENCY PROPOSED

The Democratic Advisory Council has proposed formation of a National Peace Agency as recommended by its Committee on Science and Technology. This committee is composed of 16 prominent scientists headed by Dr. E. C. Pollard, biophysicist at Yale University. Several Senators and Congressmen have introduced bills to establish such an agency. The proposal conceives of an agency similar to the AEC, with a director appointed by the President. The agency would undertake research programs to develop the instruments and techniques for arms control inspection. It would also study the effects of modern arms and of future disarmament agreements on national economies. Sen. Kennedy, while campaigning in New Hampshire, called for the formation of an Arms Control Research Institute with similar functions.

## HOUSE UNIT PLANS SCIENCE FORUMS

Twelve outstanding scientists and engineers have been invited to use a Congressional committee as a regular forum for their theories and ideas. The House Committee on Science and Astronautics announced in January a plan to bring the scientists to Washington once or twice a year and let them speak out on problems that the world faces in the area of basic and applied science. The twelve men who have agreed to take part in the project represent a range of disciplines which include genetics, physics, applied mechanics, meteorology, chemistry and engineering.

The FAS is a national organization of scientists and engineers concerned with the impact of science on national and world affairs. The NEWSLETTER is prepared in Washington by FAS members. The staff for this issue included, Editors: E. Shelton, E. Korn and J. Edgcomb; Writers: J. Buck, H. DuBuy, F. K. Millar, R. Morales, N. Seeman, D. Steinberg, and J. Toll.

## HAZARDS OF RADIATION RE-EVALUATED

The National Committee on Radiation Protection, an ad hoc unofficial body, published a report in *Science* (Feb. 19) proposing new standards for maximum permissible levels of radiation. Until more precise data are available on the effects of low level radiation over prolonged periods of time, they recommend "that the population permissible dose for man-made radiation be based on the average natural background level," that is: the additional exposure should not be greater than that from natural sources. They emphasize, however, that one of their basic assumptions is that all radiation is harmful and, therefore, the setting of a permissible level is entirely arbitrary. "Any radiation dose should . . . be tolerated only to obtain compensatory benefits." The official standards are established by the Federal Radiation Council which is composed of the Chairman of the AEC and the Secretaries of HEW, Defense, Commerce and Labor. This group is currently studying the problem.

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### The Present ICJ

In 1945 at the San Francisco Conference a third world court, the International Court of Justice, was established. ICJ jurisdiction was strictly limited to legal disputes involving international law. The strong nations opposed giving the ICJ compulsory jurisdiction. Although the U.S. later became one of 39 nations voluntarily accepting jurisdiction, disputes with regard to matters within the domestic jurisdiction of the U.S. were excluded. "Domestic," under the Connally reservation, is "as determined by the United States," unilaterally. This means, in the words of Walter Lippman (*Wash. Post*, Feb. 11), that "the United States government has the right to exclude the Court whenever it desires to do so, without having to prove or argue its position when it declares that the case is 'domestic' . . . As a result, no other nation with which we have a dispute can be compelled to come before the Court. What is sauce for the goose is also sauce for the gander."

The "self-judging reservation," as President Eisenhower characterized the provision in his State of the Nation message of Jan. 7, is the center of a spirited controversy. Arrayed against repeal (i.e., against submitting to ICJ jurisdiction) are the American Legion, DAR, State Bar of Texas, and the Southern States Industrial Council (*Wash. Post*, Feb. 11).

### Administration Opposes Connally Reservation

The Administration is solidly for repeal of the Connally amendment, and is supported by organizations as diverse as the American Bar Association and United World Federalists. It is said (*Vital Issues*) that U.S. officials have come to realize the boomerang dangers of the amendment, as in the plane-shooting suits against Soviet Russia, Hungary, and Czechoslovakia, where those nations, as defendants, have refused to submit to ICJ jurisdiction. The Administration is sufficiently concerned to send the "first team"—Secretary Herter and Attorney General Rogers—to

## DEVELOPMENTS IN SPACE RESEARCH

While stoutly defending U.S. achievements in space research, President Eisenhower last month tacitly recognized our lagging position by giving Wernher von Braun's Saturn project top priority. The Saturn, designed to develop 1,500,000 pounds of thrust, will have twice the power of existing Soviet rockets. Ultimately it could permit launching of payloads of 10 to 20 tons in orbit around the earth, landing robot scientific stations on the moon, or putting a manned capsule in orbit around the moon. The President has asked for an additional \$10,000,000 for the Saturn, bringing the total Saturn budget to \$23,000,000, near the figure requested by von Braun. Even with this important boost in support, the first launchings cannot be expected until 1964. Testifying before the House Committee on Science and Astronautics, von Braun said that the Russians are "definitely several years ahead of us" and are "still moving faster than us" in development of superthrust rockets.

### Space Law Changes

At the same time President Eisenhower asked Congress for a series of changes in the 1958 space law. These changes reflect his conviction that civilian and military goals in space research should be kept clearly separated. He has proposed abolition of the National Aeronautics and Space Council and of the civilian-military liaison committee set up to coordinate Defense Department efforts and those of civilian agencies. The overall budget requested for the National Aeronautics and Space Administration had been boosted to \$600,000,000 from the current \$325,000,000. Plans include the launching of deep-space probes, eight satellites for collecting scientific data and several satellites for communications and weather forecasting.

### Man in Space

Meanwhile, NASA has focused its energies—and its funds—on Project Mercury, which calls for placing a manned capsule in a 15-mile-high orbit around the earth in 1961. Because of budget limitations other projects have slowed down or been temporarily abandoned according to a recent Space Agency report. The Democratic Advisory Committee on Science and Technology has issued a statement charging that "the entire space effort lacks emphasis and is underfunded." At the same time, however, the Committee urged extreme caution in the execution of Project Mercury. Mr. Trevor Gardner, former Assistant Secretary of the Air Force, pointed out that "if Mercury didn't work the first time, it would be a tragic blow to our prestige."

testify before the Senate Foreign Relations Committee on Jan. 27 (*NYT*, Jan. 28). Herter and Rogers strongly condemned the amendment as "inconsistent with the deeply-rooted notion that no one should be a judge of his own cause," and "discounted the likelihood that the court would assert jurisdiction over domestic affairs."

Nevertheless, Congressmen report heavy mail opposing repeal and the press has been generally pessimistic about the chances of passage of S. Res. 94, especially since a two-thirds vote will be required.

## FAS NEWSLETTER

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### FAS COUNCIL TO MEET

The Spring meeting of the FAS Council will be held in Washington, D. C. during the week beginning April 24, 1960. Details will be sent to members.

Not For Release

1700 K St., N. W. Washington 6, D. C., March 25, 1960

### ELECTION OF OFFICERS AND COUNCIL DELEGATES—FEDERATION OF AMERICAN SCIENTISTS

The Chairman and Vice-Chairman are chosen by the entire membership in this election. The remaining officers and members of the Executive Committee are elected by the Council at its spring meeting. Simultaneously with this election, the whole membership annually elects 12 delegates-at-large to serve 2-year terms on the national policy-making Council. The Council is made up of the Chairman, Vice-Chairman, and 2 past chairmen of FAS, one delegate from each of the 8 chapters, and 24 delegates-at-large. Chapters are located at Brookhaven, Chicago, Los Alamos, Los Angeles, Philadelphia, Schenectady-Troy, Stanford and Washington, D. C.

March 18, 1960.

W. A. Higinbotham, Chairman, Elections Committee

#### FOR CHAIRMAN

**LYLE B. BORST**, New York, N.Y.—Chrmn, Physics Dept, NYU, since '56; Ph.D. (chem.), U. of Chicago, '41; Res. Assoc., Met. Lab (Chicago) '41-'43; Sr. Physicist, Oak Ridge, '43-'46; Asst Prof., MIT, '46-'51; Head, Reactor Dept, Brookhaven, '46-'51; Prof. Physics, U. of Utah, '51-'56; FAS member since '46; member Oak Ridge Eng. & Sci. '45, Brookhaven Chapter FAS, '48-'49; Chairman FAS, '51-'52; FAS Execom, '52-'53.

**M. STANLEY LIVINGSTON**, Cambridge, Mass.—Director, Cambridge Electron Accelerator, Harvard; Asst Prof. and Prof., MIT, since '38; Ph.D., U. of Cal. (Berkeley), '31; Instr. and Asst Prof., Cornell, '34-'38; OSRD; Head, Cosmotron Div., Brookhaven, '46-'48; FAS member since '47; Chrmn, Brookhaven Chapter FAS, '47-'48; FAS Council, '47-'58; FAS Execom, '54-'58; Chairman FAS, '54-'55; Sponsor, Nat'l Comm. for a Sane Nuclear Policy, '57-'60.

#### FOR VICE-CHAIRMAN

**WILLIAM C. DAVIDON**, Lemont, Ill.—Assoc. Physicist, Argonne, since '56; Ph.D., Chicago, '54; Research Director, Nuclear Instrument Chemical Corp., '48-'54; Res. Assoc., Fermi Institute, '54-'56; FAS member since '53; Chrmn, FAS Chicago chapter, since '53; Member, FAS Committee on Disarmament; Participant in 3d Pugwash Conference, Kitzbuhel, '58; Co-author—"1970 Without Arms Control" and "The Nth Country Problem."

**JOHN S. TOLL**, Chevy Chase, Md.—Chrmn, Physics Dept, U. of Md., since '53; Ph.D., Princeton, '52; Theoretical Physics scholarship, France, '50; Theoretical Physicist, Los Alamos, '50-'51; Assoc. Dir., Project Matterhorn, Princeton, '51-'53; Guggenheim Fellow, '58-'59; active Amer. Assn of Physics Teachers, Sigma Xi, UWF; FAS member since '53; FAS Execom, '54-'55; FAS Committees on Disarmament, Passports and Visas, United Nations.

#### FOR COUNCIL DELEGATES-AT-LARGE

**PETER G. BERGMAN**, Syracuse, NY—Prof. of Physics, Syracuse U., since '47; Ph.D., theoretical physics, Prague, '36; Res. Asst. to A. Einstein, Inst. for Advanced Study, '36-'41; Asst Prof., Black Mountain College, '41-'42; Asst Prof., Lehigh, '42; NDRC, '44-'47; Adjet Prof., Brooklyn Poly, '47-'57; Visiting Prof., Yeshiva U., since '59; Editorial Bd, Physical Review, J. of Mathematical Physics, Amer. J.

Physics; FAS member since '46; FAS Council delegate-at-large, '55-'56; Member, FAS Committee on Constitutional Revision, '56-'57.

**SIDNEY BLUDMAN**, Berkeley, Cal.—Theoretical Physicist, Lawrence Radiation Lab, since '52; Ph.D., Yale, '51; Inst. for Advanced Study, '56-'57; Lecturer, U. of Cal. (Berkeley), '59; FAS Berkeley branch officer, '57-'58.

**DONALD C. BORG**, Upton, NY—Assoc. Scientist & Physicist, Med. Dept, Brookhaven, since '55; M.D., Harvard, '50; Med. House Officer, Boston City Hosp. and teaching fellow in Medicine, Harvard, '50-'52; Analysis Officer, Armed Forces Special Weapons Project, D.C., '52-'54; Asst Resident in Medicine, Barnes Hosp. and teaching fellow, Wash. U., St. Louis, '54-'55; FAS member since '58; Execom, Brookhaven chapter, '58-'59.

**OWEN CHAMBERLAIN**, Berkeley, Cal.—Prof. of Physics, U. of Cal., since '50; Ph. D., U. of Chicago, '48; Physicist, Manhattan District, Berkeley, and Los Alamos, '42-'46; Guggenheim Fellow, Rome, '57-'58; Nobel Laureate, Physics, '59; FAS member since '53; Treas., Berkeley branch, '55; Chrmn, Berkeley branch, '56; Secretary, FAS Execom, '59-'60.

**WALDO E. COHN**, Oak Ridge, Tenn.—Biochemist, Oak Ridge, since '43; Treas., Amer. Soc. Biol. Chemists, '59; member, Editorial Bd, J. Biol. Chem, since '55; Sec'y US Nat'l Comm. for Internat'l Union of Biochem.; Ph.D., U. of Cal. (Berkeley), '38; Res. Assoc., Harvard, '39-'42; FAS member since '45; Sec'y, Oak Ridge Eng. & Sci., '45; FAS Delegate-at-large, '55-'56.

**CHARLES D. CORYELL**, Cambridge, Mass.—Prof. Chem., MIT, since '46; Ph.D., Cal. Tech., '35; exchange student, Munich, '33-'34; Instr. UCLA, '38-'40; Asst, Asso. Prof., MIT, '40-'46; Section Chief, Met. Lab, Chicago, '42-'43; Oak Ridge, '43-'46; Visiting Prof., Weizmann Inst., Israel, '53-'54; FAS member since '46; member, Oak Ridge Eng. & Sci., '45; FAS Execom, '48-'49; Council delegate, '51-'56; active, Boston chapter.

**FREEMAN J. DYSON**, Princeton, NJ—Theoretical physicist, Inst. for Advanced Study, since '53; AB, Cambridge, Eng., '45; Res. Fellow, Cambridge, '46-'49, Birmingham, '49-'51; Prof. of Physics, Cornell, '51-'53; Consultant, Los Alamos, Livermore, since '57; FAS member since '53.

**JOHN M. FOWLER**, St. Louis, Mo.—Asst Prof. Physics, Wash. U., since '56; Ph.D., Johns Hopkins, '54; Res. Assoc., Wash. U., '54-'56; FAS member since '55; Sec'y, St. Louis branch, since '56; Editor, "Fallout: A Study of Superbombs, Strontium 90, and Survival."

**MARVIN I. KALKSTEIN**, Sudbury, Mass.—Nuclear chemist, AF Cambridge Res. Center, since '56; Ph. D., U. of Chicago, '51; AEC fellow, Chicago, '49-'51; Res. Chemist, Radiation Lab, Berkeley, '51-'56; FAS member since '51; helped organize Berkeley branch, '54; Sec'y, Berkeley branch, '55; member, Joint Comm. of FAS and Amer. Acad. Arts & Sci. on Technical Problems of Arms Limitation, FAS Comm. of Science Policy.

**EDWARD D. KORN**, Bethesda, Md.—Biochemist, Lab of Cellular Physiology & Metabolism, Nat'l Heart Inst., since '53; Ph.D., U. of Pa., '54; Asst Instr., U. of Pa., '49-'51; Damon Runyon Fellow, '51-'53; FAS member since '56; contributor and sometime editor, FAS Newsletter.

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**Dr. W. A. Higinbotham**  
**Brookhaven National Laboratory**  
**Upton, Long Island, New York**

**JOHN K. MCKENDRY**, Pleasantville, NY—Section head, General Precision Lab, since '46; MS, EE, Lehigh, '38; Grad. Asst., U. of Wyo., '39; Underwriters Labs, NYC, '39-'41; MIT Radiation Lab, '41-'46; MIT Servo Lab, '46; FAS member since '46.

**ANDREW W. McREYNOLDS**, San Diego, Cal.—Physicist, General Atomics, since '56; Ph.D., U. of Cal., '45; Sr. staff officer for Technical Director, '46 Bikini tests; Res. Assoc. and Instr., U. of Chicago, '46-'48; Physicist, Brookhaven, '48-'56; Fulbright, Norway, '52-'53; Staff and Degelates, Geneva Atoms-for-Peace Conferences, '55, '58; FAS member since '53.

**JAY OREAR**, Ithaca, NY—Assoc. Prof. Physics, Cornell, since '58; Ph.D., U. of Chicago, '53; Res. Assoc., Chicago, '53-'54; Instr., Columbia, '54-'57; Member, Columbia U. Institute for Study of War and Peace, project on technical problems of detection under disarmament, '57-'58; FAS members since '52; chapter and delegate to FAS Council; author, articles on inspection.

**JOHN B. PHELPS**, Columbus, O.—Res. Assoc., Mershon Nat'l Security Program, and Res. Assoc., Physics Dept., Ohio State U., since '58; Ph.D., theoretical biophysics, Yale, '59; FAS member since '51; Sec'y, FAS Committee on Loyalty and Security, '54-'58; founding member, Yale FAS branch; FAS Council delegate-at-large, '53-'54.

**CHARLES C. PRICE**, Philadelphia, Pa.—Director, Chem. Dept, U. of Pa., since '54; Ph.D., Harvard, '36; Asst '36-'37, Instr. '37-'39, Assoc. Prof. '39-'41, Asst Prof. 41-'43, U. of Ill.; Chrmn, Chem. Dept, Notre Dame, '46-'54; OSRD '44; ACS award '46; FAS member since '52; FAS chairman, '56-'57.

**ROBERT S. ROCHLIN**, Schenectady, NY—Nuclear physicist, GE, since '51; Ph.D., Cornell, '52; FAS member since '46; Sec'y, Cornell chapter, '48; Sec'y, MASE, '54; Pres., MASE, '55; MASE delegate to Council, '59-'60; member, various FAS committees.

**FRED H. SCHMIDT**, Seattle, Wash.—Assoc. Prof. Physics, U. of Wash.; Ph.D., U. of Cal., '45; Engineer, AT&T, '37-'39; Manhattan Project (Berkeley, Oak Ridge, Los Alamos), '42-'46; Asst Prof., U. of Wash., '46-'52; FAS member since '46.

**WALTER SELOVE**, Philadelphia, Pa.—Prof. of Physics, U. of Pa., since '57; Ph.D., U. of Chicago, '49; Asst Instr.,

Chicago, '42-'48; MIT Radiation Lab, '43-'45; Physicist, Argonne, '47-'50; Instr., Harvard, '50-'52, Asst Prof., '52-'56; Livermore, '53-'54; NSF Sr. Post-doctoral fellow, '56-'57; FAS member since '53; Council delegate, '57-'59; Member, FAS Radiation Hazards Committee, '55, and Committee chairman, '57.

**EMMA SHELTON**, Bethesda, Md.—Cytologist, Lab of Biology, Nat'l Cancer Inst.; Ph.D., Brown, '49; FAS member since '50; Pres., Washington chapter, '54-'55; Secretary, '58-'59; Currently, editor, FAS Newsletter.

**A. AARON YALOW**, New York, NY—Prof. of Physics Cooper Union, since '48; Physicist and consultant on medical applications of radioisotopes, Montefiore Hospital, since '46; Ph.D., U. of Ill., '45; FAS member since '46; active in Ass'n of NY Scientists and NY branch of FAS.

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| ..... Donald C. Borg      | ..... John B. Phelps       |
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| ..... Waldo E. Cohn       | ..... Robert S. Rochlin    |
| ..... Charles D. Coryell  | ..... Fred H. Schmidt      |
| ..... Freeman J. Dyson    | ..... Walter Selove        |
| ..... John M. Fowler      | ..... Emma Shelton         |
| ..... Marvin I. Kalkstein | ..... A. Aaron Yalow       |
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