

F. A. S. NEWSLETTER

FEDERATION OF AMERICAN SCIENTISTS
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FAS COUNCIL MEETS IN WASHINGTON

FROM THE CHAIRMAN

The acceptance of the Chairmanship of the Federation causes me to review the work of the Federation both past and future: In retrospect, the organization was conceived in the secret laboratories of the Manhattan project, born in the glare of atomic publicity, and reared in the post-war era. The vigor of youth has in large measure departed. The world has not responded to our campaign of salvation. Today we find the world in an early epoch of the atomic age, but it is not the Atomic Age for which we hoped.

Our accomplishments have not been negligible: Our efforts on national legislation have been justified by the McMahon Act and the record of the AEC. Our support of the National Science Foundation has been and will continue to be an important effort. Our assertions that there was no true defense against atomic attack, that we could expect no enduring monopoly, have now been vindicated. Our efforts on international control have assisted the U.S. Government to present a progressive and far-sighted policy to the United Nations. But the failure to reach international agreement and the progressive deterioration of the international scene have destroyed any sense of accomplishment we might otherwise have.

Just as the Federation's membership is older, so the Federation has aged. Whether it is to be regarded as a mature or a senescent organization depends more upon its actions in the future than in the past. There is around us no dearth of problems. Rather problems are numerous and overwhelming. On most of them, however, the Federation has no special voice. We have lost our divine inspiration as atomic scientists and returned to the status of socially conscious citizens.

As an organization of scientists, we will support and assist the National Science Foundation. As scientists we will present our views to agencies concerned with scientific manpower mobilization. As scientists we cannot help but deplore recent administrative changes in the loyalty program whereby reasonable doubt of a person's loyalty, whether or not his position has relation to the national security, is justification for his removal from public service.

In the field of civil defense, the Federation can speak with special competence. The consensus of the Council is that at present certain aspects of civil defense are not being handled in a manner which best serves the interests of the nation. A thorough analysis of present policy and organization is necessary before the Federation can decide upon specific action. Upon completion of this analysis, the Federation and its chapters may wish to speak.

The Chicago association has presented a new proposal with regard to international control, calling for the establishment of a board of consultants, much like the Lillenthal Board, to analyze the present situation in order that the United States know within what framework negotiations can be carried on. The Acheson-Lillenthal plan is history and can no longer be realistically proposed. At present, there is no published plan for general disarmament nor for the more limited problem of atomic armament limitation. The Chicago proposal has been referred to the local chapters and Council delegates-at-large for suggestions and modifications.

A new, more limited, positive and constructive suggestion has been made. In 1946 the United States, through its occupation forces, destroyed the cyclotrons of Japan. This national error was acknowledged at least partially through the influence of the Federation. Perhaps it is now time to make good this act of depredation by assisting the Japanese to rebuild their nuclear physics laboratories. The desirability as well as the mechanism of such a program is yet to be decided.

For the coming year, the Federation must define and carry out a dynamic program. This program must affirm and reaffirm our desire for international accord. In the absence of progress in this direction, the Federation will continue to expend its efforts to strengthen the Nation for peace or war.

- - L. B. Borst

INTERNAL AFFAIRS PREDOMINATE

The new FAS Council, meeting in Washington on April 28-29, worked through a long agenda with major emphasis on internal organizational items, but with attention as well to matters of national and international policy. The meeting was exceptionally well attended, with every chapter except Los Alamos represented and six out of ten delegates-at-large present. Under the heading of internal affairs, the Council elected an Executive Committee (see p. 2), considered the precarious state of FAS finances, approved a reorganization of the Washington office, and accepted into the Federation a new chapter at the University of Illinois, subject to completion of technical admission requirements. Under national affairs, discussion centered on student deferrals, civilian defense activities, and federal loyalty regulations. In the international field, proposals were considered for re-examination of the U.S. position on international atomic control, and for some move to re-establish nuclear physics facilities destroyed by U.S. forces when they occupied Japan. (See "From the Chairman.")

Changes in Washington Office. In revising the arrangements for carrying on FAS affairs by volunteers in the Washington office, the Council established three new appointive positions -- Newsletter Editor, Washington Secretary, and Washington Representative. The first two of these have been filled, at least temporarily, by the Executive Committee.

The Newsletter Editor will coordinate the work of the dozen or so members (writers, researchers, sub-editors) who each have been contributing a few hours of time per issue these last 2 years. The Washington Representative will maintain FAS' contact with official Washington and the press, ferret out issues and information for FAS consideration, and bring these promptly to the attention of chapters and members for possible action. The Washington Secretary will coordinate the internal affairs of the FAS and supervise the routine work of the office -- including membership lists, correspondence, chapter organization, mimeographing, and purely business matters. For specific work assignments, the large corps of cooperative volunteers from the Washington chapter will continue to be called on.

The Council seriously considered whether FAS can still afford a Washington office, however minimum its activity, on a budget of \$7300 which is raised only with difficulty. This has been possible in the past because of a unique arrangement in which executive and clerical time is all volunteer, and only a single secretary is paid. It was decided that, in spite of difficulties, every effort should be made to continue the Office in order to maintain a steady flow of information to members and to serve as a rallying center when major issues arise.

Financial Plight. An unfortunately large percentage of the Council's time was taken up by monetary problems. The FAS has not been strong financially since mid-1948, when it started to subsist almost exclusively on membership dues. The skeleton in the financial closet has not been hidden, but it also has not been emphasized in communications to members. In three years, only a single request for contributions has gone to chapters, none to the whole membership. Having reaffirmed its belief that the operation of the Washington office at its present minimum level should be continued, the Council directed that all members and friends of the FAS be advised of the danger that the Office as presently constituted will have to be given up this summer unless FAS income rises sharply in the next three months. Specifically, at least \$300 must be forthcoming by July 1 from new members or from contributions. Accordingly the Council invited, requested, and urged each member to make sure his dues are paid for the current year, to take the personal responsibility to enroll at least one new member, and if at all possible to send a contribution (perhaps in the form of gift

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subscriptions to the Newsletter) to the Washington Office.

The financial report presented to the Council (and available to any member upon request) showed that \$2000, or 27% of the budgeted \$7300, had been received during the first third of 1951. Expenses have been within \$100 of receipts so far. It was pointed out, however, that during the first third of the year dues income normally is highest. To last through the summer months when scientists scatter but Congress and world events continue, FAS should now have a cash surplus instead of being slightly in the red.

The reason for FAS penury is easy to find, but not so the remedy. On the bright side -- 75% to 80% of the members-at-large are renewing their membership; a new chapter (Illinois) has been formed and another (Stanford) is a possibility. On the dark side -- new members-at-large have been few this year because there has been no continuing membership campaign (the Cornell chapter is to manage a national membership drive in May); chapters have been slow to recruit new members and report renewals to the national office (especially the Los Alamos, Cornell, and Schenectady chapters). Seeking an estimate of probabilities for financial stability, the Council came up with the following formula. If by July 1st, from the chapters, 60 new members or renewals could be reported by Chicago, 30 each by Brookhaven, Cornell, Schenectady, Los Alamos, and Illinois, 15 each by Washington, Rochester, and Wisconsin; in addition, if at least 75% of members-at-large renew when billed, and if an additional \$300 is received in new membership, contributions, Newsletter subscriptions, etc., the Federation can continue its program of information and action at the present level at least until next fall. (All concerned please note! -- Ed.)

Student Deferrals. Taking cognizance of protests from many quarters that deferment of higher-ranking college students, as directed by the President (see NL 51-3, Apr. 3), involves undemocratic preferential treatment, Council discussion stressed the importance to the nation of a steady supply of trained personnel. The Council felt that some system of student deferment is essential, but agreed on the validity of the charge of discrimination against otherwise qualified young people who cannot afford to go to college. Accordingly, it adopted the following resolution as a statement of FAS policy to be appropriately publicized by the Executive Committee:

"Having considered the current controversy arising from the President's Order to Selective Service Director Hershey governing the deferment of college students, the FAS Council has reached the following consensus:

"1. That in any program for student deferment, the broad national interest must be the determining factor. Neither special interest nor the charge of special privilege can be allowed to prevent the continuing training of a corps of specialized personnel in science and other areas so essential to the country's welfare.

"It must be clearly recognized that deferment of military service is for the purpose of additional training for later specialized tasks either in military or civilian capacity. Individuals so deferred, therefore, are not being granted special privilege but are rather selected for special responsibility.

"2. That any such program shall be designed to tap all available human resources by giving equal opportunity to every young person, on the basis of aptitude alone, to receive specialized training. To ensure this, the standards for selection should be national in application and mandatory on local draft boards. To prevent exclusion of qualified young people who cannot themselves afford specialized training, a limited scholarship program should be initiated."

Loyalty Standards. The Council recommended that FAS express disapproval of President Truman's Executive Order of April 28 redefining loyalty standards for Federal employees and applicants for government jobs. Hitherto "reasonable grounds" for believing a person disloyal were required for denial of employment. The new Order makes "reasonable doubt" of loyalty sufficient to bar an individual from federal civil service.

The text of the new regulation: "The standard for the refusal of employment or the removal from employment in an executive department or agency on grounds relating to loyalty shall be that on all evidence, there is reasonable doubt as to the loyalty of the person involved to the Government of the United States."

In a brisk Council discussion, delegates criticized the new policy on a number of grounds, chief among which were: (1) That the order sets an improper political test for public employment, (2) That loyalty is difficult either to define or to prove, (3) That the order, in effect, improperly extends the area of security and further confuses legitimate security risks with disloyalty, (4) That a negative decision on loyalty is, in effect, a defamation of charac-

NEW FAS OFFICIALS

Election Results. The new FAS Executive Committee for 1951-52 consists of Lyle B. Borst, Chairman, W. A. Higinbotham, Vice-chairman, and the following members, elected by the Council at its meeting April 28: Jules Halpern, Physics, Univ. of Penna.; Maurice M. Shapiro, Nucleonics Div., Naval Research Lab.; Robert W. Williams, Physics, M.I.T.; Hugh C. Wolfe, Physics, Cooper Union; and William W. Woodward, Lab. of Nuclear Studies, Cornell. Williams will serve as Secretary-Treasurer for the coming year.

Council delegates-at-large elected prior to the meeting of the Council were: Julius Ashkin, Physics, Carnegie Institute of Tech.; Peter Axel, Physics, Univ. of Illinois; Charles D. Coryell, Chemistry, M.I.T., Jules Halpern; David L. Hill, Physics, Vanderbilt Univ.; Robert L. Platzman, Physics, Purdue Univ.; Joseph H. Rush, High Altitude Observatory, Boulder, Colo.; Leonard I. Schiff, Physics, Stanford Univ.; Lyman Spitzer, Jr., Astronomy, Princeton Univ.; and Robert W. Williams.

ter, and hence should not be reached without judicial procedure, and (5) That loyalty criteria fluctuate with the political temper of the times and their incautious application can result in intimidation of free thought. The Council directed its Chairman to summarize the discussion in a letter to the President, and in a press release.

The President's Order came as something of a surprise, despite the fact he had been urged to take such a step by two separate groups in the Executive Branch. The Loyalty Review Board (Chairman, former Sen. Hiram Bingham) made the first public suggestion (see NL 51-2, Feb. 28). The President referred the matter to the Nimitz Commission on Internal Security and Individual Rights, which he had created to survey the whole controversial problem of Federal employee loyalty. The suggestion was renewed on Apr. 16 by Robert Ramspeck, recently appointed chairman of the Civil Service Commission, although it was opposed by CSC Commissioner Frances Perkins. Truman had not been expected to take action until his own commission had made its recommendation. However, red tape halted the functioning of the Nimitz Commission almost before it started. The group refused to work unless exempted from the "conflict of interests" statutes, which restrain federal employees (and hence the commission and its staff) from doing business with government agencies for two years after their withdrawal from service. The necessary exempting legislation passed the House, but has been rejected by the Senate Judiciary Committee whose chairman, Sen. McCarran (and a prominent member, Sen. Ferguson) has expressed open hostility to the Nimitz Commission.

Civil Atomic Defense. The activity of several FAS chapters in local CD programs was reported to the Council. Delegates generally were critical of the way CD is being handled (although unanimous on the need for CD in the present circumstances), and it was thought FAS groups could participate more fully at the local level. In addition, the preparation of a critical analysis of the CD problem was decided on, to be drafted by a group in the Mohawk chapter on the basis of official material and comments and reports of FAS members. The competence of the FAS in evaluating the power of atomic weapons, the resulting radiation hazards, the effectiveness of detection devices, etc., was considered sufficient justification for FAS to concern itself with the effectiveness of present CD programs. Comments and material may be sent c/o Dr. J. R. Stehn, 1421 Van Antwerp Road, Schenectady 10, New York.

Washington Party. Federation members and their friends who came to Washington last week will remember with pleasure the Federation party sponsored by the Washington chapter at the AVC Clubhouse Thursday night. More than 150 persons were present, with members from many of our out-of-town chapters and members-at-large from as far West as Stanford. The local members and their guests also had an opportunity to meet Lyle Borst, the new FAS Chairman, and Willy Higinbotham, Vice-chairman. With direction from Lyle, the group sang several songs by Art Roberts, who took the occasion to introduce a new one on the tribulations of liberal education. Among the Washington folk present were E. U. Condon, Watson Davis, and Herb Block, guest cartoonist for the Newsletter (by courtesy of the Washington Post). Contributions from those attending defrayed about 2/3rds of the cost of the hall, help, and refreshments.

The FAS Newsletter is edited and published in Washington, D.C. by the Federation of American Scientists, a national organization of scientists concerned with the impact of science on national and world affairs. Non-member subscriptions are invited.

ITEMS of INTEREST

Science Defense Advisory Committee. Eleven top scientists were named by President Truman on April 20 to a Science Advisory Committee of the Office of Defense Mobilization, to provide advice on scientific research and development in relation to defense.

Chairman of the group is Dr. Oliver E. Buckley, for the last 10 years president of Bell Telephone Laboratories. The other members of the committee are Detlev W. Bronk, President of Johns Hopkins University and of the National Academy of Sciences; William Webster, Chairman of the Research and Development Board; Alan T. Waterman, NSF Director; Hugh Dryden, of the Interdepartmental Committee on Research and Development; James B. Conant, President of Harvard; Lee A. DuBridge, President of Cal. Tech.; James R. Killian, President of M.I.T.; Robert F. Loeb of the College of Physicians & Surgeons of Columbia University and a member of the NSF Board; J. R. Oppenheimer, Director of the Institute for Advanced Study; and Charles A. Thomas, Vice-president of Monsanto Chemical Company.

The duties of the Committee will be: (1) "To provide independent advice on scientific matters especially as regards the objectives and interrelations of the several Federal agencies engaged in research of defense significance, including relevant foreign relations and intelligence matters." (2) "To advise on progress being made in dealing with current scientific research problems of defense significance and also concerning defense research matters which need greater attention or emphasis." (3) "To advise concerning plans and methods for the implementation of scientific effort for defense." (4) To transmit "the views of the scientific community of the country on research and development matters of national defense significance."

On March 26, FAS wrote to President Truman suggesting that a National Scientific Personnel Board be appointed to set up registers, establish a basis for draft policy for specialized personnel, and advise the President on scientific manpower policy. It is not clear from the announcement to what extent the new Committee will concern itself with these matters; whatever they do will be no more than advisory.

Science for International Health. The Newsletter of the World Health Organization (published monthly by the Div. of Public Information, WHO, Geneva, Switzerland) provides little-publicized examples of the constructive influence of science in international relations. Each issue begins with WHO's motto, "The health of all peoples is fundamental to the attainment of peace and security."

The February issue tells of a Malaria Conference in dark-est Africa, attended by experts from all over the world. Meeting in recently highly malarious Kampala, Uganda, the experts made their contribution to alleviating the local situation, and took back to their laboratories new data and problems important to the general science of malariology. The March issue describes an experiment in tuberculosis control in Istanbul, Turkey, a country in which "there are hospital beds for only 3,500 tubercular patients, whereas there are 300,000 contagious cases of the disease."

Faced with similar staggering medical problems all over the world, the Executive Board of WHO is reported to have recommended an increase of over one million dollars in the organization's regular budget -- to the incongruously modest figure of \$7,700,000.

Civil Defense Notes. Even a limited civil defense program finds difficult going in Congress. Requested CD funds have been slashed in the House by over 50%, and minimum dispersal of essential activities from the Nation's capital, as proposed by the President, has been refused by the Senate.

Two newsletters in the CD field have recently made their appearance. The first, Alert, sponsored by the Federal Civil Defense Administration for State and Local CD Staffs, is too new (one issue distributed) for intelligent comment. The second, Civil Defense News, published bi-weekly by Robert Pettengill and Albert Gottlieb of the Los Angeles Council on Atomic Implications, appeals to a broader audience. It presents, in brief form, civil defense material from domestic and foreign sources, and is directed not only to civil defense units but also to industry, business, and the average citizen. Sources are provided for those desiring fuller information. Possibly the News, unhampered by government sponsorship, can maintain a soundly critical attitude toward civil defense measures -- which could have salutary effects in an area where hysteria too easily can predominate. (\$12 a year, 12 weeks at \$3; 4238 LaSalle Avenue, Los Angeles 62, California)

NSF Beginnings. Alan T. Waterman, newly appointed NSF Director, spoke to the American Physical Society on April 27 on "The Role of the National Science Foundation in the Emergency." He reported that NSF has established temporary headquarters at 901 16th St., N.W., Washington -- not far from the FAS office. Definite planning of the NSF program awaits presentation and approval of a budget for the coming fiscal year. As yet no appointments have been made to the scientific staff; there will not be funds for a sizeable group until next fiscal year.

Discussing prospects for the immediate future, Waterman indicated that first steps would include setting up the divisional structure established in the Act, initiation of a fellowship program at graduate and post-doctoral levels, and encouragement of country-wide fundamental research through grants or contracts. In the last connection, "the Board proposes to make its grants and contracts good for extended periods of time" in order to permit years of uninterrupted work. The NSF Director gave no indication that an early study of current utilization of our scientific resources is planned, as suggested by FAS to provide a basis for Foundation plans and programs.

Waterman spoke of the need for "operational readiness" on the part of scientists but emphasized that stimulation of basic research is the strongest contribution NSF can make in the current situation. He concluded by asking for the "cooperation and sympathetic understanding of the national scientific body as a whole as well as of the scientists who take part in its program."

A Soft Answer? Rep. Richard B. Vail, member of a House Un-American Activities Sub-committee which smeared E. U. Condon in 1948 but failed to grant him a hearing, has called for Condon's suspension as Director of the Bureau of Standards. The Congressman, in a long speech on April 23 (Cong. Record, p. 4270) proposed a "formal hearing to develop the additional facts that may well expose another source of vital information to the Soviet government." On this eighth or tenth repetition, the attack got a very poor press.

Speaking to the American Physical Society on April 27, Condon urged scientists not to be "snobbish" towards Congressmen who "don't have much understanding of science." Congressmen, he said, are "good public servants" -- by and large.

Conference on Science and Security. Roosevelt College in Chicago will sponsor a conference on "Science and National Security." Scheduled for the afternoon and evening of May 18, the conference will consider "What Is Loyalty for the Scientist?" and "Do Security Regulations Hamper Scientific Research?" Speakers include Prof. Mark Graubard, State Senator Noble W. Lee, Prof. Morton Grodzins, Byron Miller, Attorney, and Dr. James Arnold. Registration is being conducted by Professor Morris Goran, Roosevelt College, 430 South Michigan Avenue, Chicago 5, Illinois.

Show Your Continued Interest in the FAS by obtaining more members, and more Newsletter subscriptions -- and by maintaining your own membership. Among benefits of membership in FAS are the Newsletter, and the privilege of subscribing, at a special reduced rate, to the independent Bulletin of the Atomic Scientists. On its modest income, FAS maintains its Washington "listening post" and keeps its membership informed on pertinent issues.

The work of the FAS is not duplicated by any other scientific organization. Its continued activity depends on you -- and your support. Why not become a Supporting member (\$10) or a Patron (\$25)? And bring this Newsletter and the coupon below to the attention of your colleagues.

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California Loyalty Oaths Undecided. A State Appeal Court decision on April 6 held that the Regents of the University of California violated the State Constitution by imposing a special non-Communist loyalty oath as a condition of employment. Nevertheless, the California controversy is not yet over. At a meeting of the Regents on April 20, parliamentary maneuvers by intransigent Regent Neylan prevented the issue from being dropped, as a majority of those present preferred to do. Instead, the matter has gone over to the Regents' next meeting when, as happened once before, the pro-faculty vote of April 20 will probably be reversed by the presence of two additional anti-faculty Regents. In any event, the attitude of the anti-faculty Regents makes almost certain an ultimate test in the State Supreme Court.

The decision of the California Third District Court of Appeal, which ordered the Regents to reinstate all faculty members dismissed for refusal to sign the special oath, was particularly significant in that it brushed aside subsidiary issues and based itself on the most fundamental one -- freedom of opinion.

After analyzing relevant passages of both the State and Federal constitutions, the Court concluded that "the people of California intended, at least, that no one could be subjected, as a condition to holding office, to any test of political or religious belief other than his pledge to support the Constitutions of this state and of the United States; that that pledge is the highest loyalty that can be demonstrated by any citizen, and that the exacting of any other test of loyalty would be antithetical to our fundamental concept of freedom. Any other conclusion would be to approve that which from the beginning of our government has been denounced as the most effective means by which one special brand of political or economic philosophy can entrench and perpetuate itself to the eventual exclusion of all others; the imposition of any more inclusive test would be the forerunner of tyranny and oppression."

If sustained, the decision would completely demolish the Regents' position, and end the long fight in victory for the faculty. Even if this occurs, however, it will require years to repair the injury the University has already suffered and continues to suffer. A lengthy interim report of the Committee on Academic Freedom (submitted to and published by the Northern Section of the U.C. Academic Senate) surveys the damage to February 1, 1951 and records: 26 dismissals (many of those dismissed now hold new positions and may not accept reinstatement if offered), 37 resignations in protest, 47 refusals of offers of appointment, 55 courses dropped from the curriculum, and in many more the loss of key teachers has made necessary rearrangements and larger enrollment limits. Nearly every department in the University reported serious disruption and curtailment of its functions.

What effect the California decision may have on many other educational centers faced by similar threats is not clear. For example, members of faculties of institutions receiving Pennsylvania state funds are concerned over bills in the State Legislature requiring a loyalty oath of all state employees and employees "of any college or school which receives State aid" (Senate Bill No. 27). It is clear that though a skirmish has been won in California, the battle over loyalty oaths will go on -- there and elsewhere.

SCIENCE AND COMMON SENSE, by James B. Conant. Yale University Press, 353 pp.; \$4.00.

Dr. Conant states that this book is intended "to provide a briefing for the busy citizen as to the way scientists carry on their work.... To impart a 'feel' for the tactics and strategy of science. To an ever-increasing extent, the layman will be confronted by questions of policy involving science and scientists; Conant hopes to give him sufficient background to formulate mature judgments. For this task, the author is eminently suited by both temperament and broad experience.

Conant pursues his objective by carefully analyzing available definitions of science, showing their inadequacy, and then substituting a definition of his own. He points out the similarities and differences between science and technology, pure and applied science, science and other branches of "accumulative knowledge," scientist and engineer -- stressing all the while the absence of any unique and generally applicable "scientific method." Carefully selected case histories from classical science are presented at some length. The concluding chapters on "Impact of Science on Industry and Medicine" and "Science, Invention, and the State" are highly interesting and timely to layman and scientist alike.

Science is viewed as a dynamic enterprise, "an interconnected series of concepts and conceptual schemes that have developed as a result of experimentation and observation and are fruitful of further experimentation and observations." The word "fruitful" is important. "The dynamic view in contrast to the static regards science as an activity ... therefore one may consider science as an attempt either to lower the degree of empiricism or to extend the range of theory." Again, science is viewed as a "self-propagating social phenomenon." Science, the activity, is the "sum total of the potential findings of the workers in the laboratories; it is their plans, hopes, ambitions in the process of realization, week after week, year after year, that is the essence of modern science."

The general reasoning processes involved in science are quite successfully described. It may be argued, however, that limitation to case histories from the classical period is a technique not above reproach. The general outline of the reasoning process of science may not have changed, but the workaday world of the scientific laboratory certainly has. Present-day science is, for better or worse, a big business. It is difficult to accept the picture of the "uncommitted investigator" in the quiet atmosphere of the university as the sole fountainhead of basic scientific advances. Economic necessity has driven an ever-increasing number of scientists into the maelstrom of the large laboratory. To suggest that this new atmosphere is not and will not be productive of basic advances is to admit a mistake of great consequence.

This is not a book to be read lightly. The average scientist or educator will probably find Dr. Conant's previous book, "On Understanding Science," a more convenient one, and share this reviewer's opinion that the shorter volume was better organized than the new one addressed to laymen. But "Science and Common Sense" is a valuable, stimulating, and timely contribution to the understanding of science and the scientist.

- - Serge E. Golian

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