

MINUTES OF THE

66th MEETING

ADVISORY COMMITTEE FOR BIOLOGY AND MEDICINE

U. S. ATOMIC ENERGY COMMISSION

PLACE: Washington, D. C.

DATE: January 10 and 11, 1958

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The sixty-sixth meeting of the Advisory Committee for Biology and Medicine, U. S. Atomic Energy Commission, took place in Washington, D. C., on January 10 and 11, 1958.

All members of the Committee were present: Drs. Simeon T. Cantril, Chairman, Shields Warren, Vice Chairman, John C. Bugher, Charles H. Burnett, H. Bentley Glass, James G. Horsfall, Leonidas Marinelli, and Harland G. Wood. The meeting was attended by Dr. Charles L. Dunham, Director of the Division of Biology and Medicine, and various members of his staff. Dr. Henry I. Kohn of the University of California Radiological Laboratory (San Francisco) was present in his position as the newly appointed Scientific Secretary to the ACBM.

The minutes of the 64th and 65th meetings were accepted as presented.

It was decided to have the 67th meeting at Los Alamos on March 14 and 15, and the 68th meeting at Germantown on May 8, 9 and 10, 1958.

The agenda of the meeting was as follows:

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| I. Opening remarks | Dr. C. L. Dunham |
| II. Present Status of Radiation Genetics with Specific Reference to AEC Genetic Program | Dr. M. R. Zelle |
| III. Status of Radiation Biology (Killian Committee) with Specific Reference to Role of AEC Labs in Space Radiation Biology | Dr. C. L. Dunham
Dr. C. W. Shilling |
| IV. University of California's Proposal for Permanent Building for AEC-UCLA Project | Dr. C. L. Dunham |
| V. Future of Biology Program at Hanford | Dr. C. L. Dunham
Dr. P. B. Pearson
Dr. C. W. Shilling
Representatives of
GE, Hanford, and
Univ. of Washington |
| VI. Tracer Studies in Relation to Stratospheric Fallout | Dr. J. Z. Holland |
| VII. Proposed Civil Effects Tests for 1960 | Mr. R. L. Corsbie
Col. B. F. Trum |

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I. Opening Remarks

The program was opened by Dr. C. L. Dunham who, in the course of his remarks, announced several new appointments. Mr. Hal Hollister, formerly assisting the Joint Congressional Committee on Atomic Energy during their extensive hearings, has joined the staff of the Division of Biology and Medicine. Mr. W. Alfred Klement, a graduate of West Point, has joined Dr. Dunning's staff, and Mr. Norwood Meador, C.E., has joined Mr. Corsbie's staff. Dr. Dunham subsequently called the Committee's attention to the need for adequate planning within AEC establishments for a possible atomic disaster. The program formerly set up for this purpose is to be reactivated (See Appendix A, ACBM recommendation.)

II. Radiation Genetics

Dr. Max Zelle reviewed experimental work dealing with the relation between mutation rate and radiation dose. The available data indicate that the relation is linear and, consequently, that no threshold exists. Although data for mutation rates associated with doses of less than 25 rads are not available in the case of higher plants and animals, the extrapolation of a linear relation into this region appears to be fully justified. An apparent exception to the general rule has been reported for certain mutants appearing in the endosperm of corn that show a multihit (curvilinear) relation between effect and dose. These apparently involve multiple breaks in the chromosomes. It was pointed out that the existence of such a phenomenon does not invalidate the linear relation generally found in other cases. In mice, the data thus far are consistent with a linear relation at 300 and 600 rads, and work is now in progress at 150 rads.

While some of bacteriophage, the mutation rate has been found linear down to 0.5 r.

III. The Killian Committee and Space Radiation Biology

Drs. C. L. Dunham and C. W. Shilling discussed the work of the Killian Committee and its actual and potential effects on the program of the Division of Biology and Medicine. The conclusions and recommendations of the ACBM were as follows:

1. The recent action of the Civil Service Commission in raising the pay of those designated by it as "scientists" has discriminated against the biological sciences. The discrimination per se and also the method by which the pay increases were instituted are considered contrary to sound governmental scientific organization. On behalf of the ACBM, Drs. Glass and Horsfall prepared a statement bringing this matter to the attention of the Chairman of the Commission. (See Appendix B).

2. The Committee views with concern the reductions of 1958 and 1959 in the funds reserved for training programs in the Division of Biology and Medicine, and also in the AEC as a whole. Such funds are essential to insure the continuous production of needed highly-trained scientists.

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In the case of university training programs, the Committee believes that such programs should eventually become self supporting. However, the Committee recognizes the great need to promote and to assist the introduction of such programs by providing at least some support for personnel conducting them during the first three to five years of their existence.

3. It was recommended that the Killian Committee be made aware of the actual and potential importance for space biology ^{of} and current research programs within the AEC. The AEC is already concerned with the physics and biology of heavy particles, including dosimetry, shielding, and biological mode of action. Looking toward the immediate future in this field of investigation, the Committee recognizes the importance of field studies, but wishes to emphasize the economy and efficiency of laboratory studies made with an appropriately designed accelerator. These matters will be considered again when the Committee hears a report on the Berkeley Conference on Space Biology, to be held during the week of January 20th, and in which the Division of Biology and Medicine will have representation. X

IV. UCLA Building Project

The Committee was informed by Dr. Dunham of the proposal of the University of California at Los Angeles to erect a building for the AEC project of DBM, at a cost of \$2.5 million. The University would furnish the land and the AEC would amortize the cost of the building over a 25-year period by rental.

As a background for the present discussion, reference was made to the 1957 review of the UCLA project by the Division and representatives of the ACBM. The review was especially concerned with the project's program in relation to AEC needs, its integration with the general functions of the University, and its productivity in research and training. A principal recommendation of that review was the appointment of a full-time scientific director for the project. This recommendation has not as yet been acted on by the project.

The present proposal by the University necessitates a review of the project again. This review will take place on or about January 21st at AEC headquarters in Germantown. Representatives of the ACBM will join with members of the reviewing committee set up by the Division of Biology and Medicine.

The Committee recommends the following conditions, to be met by UCLA, as a basis for judging the degree of AEC support that may be considered justified:

1. The appointment of a full-time scientific director.
2. Maximum declassification of all research programs.

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3. The project's laboratories are to be placed as near as possible to the related teaching departments of the University, especially those of the Medical School, to promote the closest contact between them.

4. The University should demonstrate its genuine interest in the project by active financial support. In return, the University could arrange teaching duties by members of the project.

V. Proposal for Biology Program at Hanford

The Committee was asked by Dr. Dunham to consider a proposal from the General Electric management at Hanford that the contract to operate the biological laboratories at Hanford be transferred to the University of Washington, with the long-range view of integrating the Hanford biological laboratories within the functional framework of the University. It was explicitly stated that this proposal does not include the transfer of responsibility for such activities as physical and biological monitoring, nor of setting the standards for radiation protection at the Hanford plant.

The idea of a transfer originated with and was developed by Mr. W. E. Johnson, Manager, General Electric Hanford Laboratories Operations, who arranged for an evaluation of the proposal by the firm of management consultants of Booz, Allen, and Hamilton of San Francisco. The Booz report, ready for distribution only a week before the present meeting and distributed at the meeting, recommended the transfer. Mr. Johnson stated that he was in general agreement with the Booz report, although not in complete agreement with all of its details.

The present ACBM meeting provided the first opportunity for the Division of Biology and Medicine and the ACBM to learn the details of the proposed transfer. Mr. Johnson was present to speak for GE. He brought with him Dr. H. M. Parker, Manager, Laboratories Division, and Dr. Harry Kornberg, Manager, Biology Division, Hanford, to express their personal views but not those of the Company. Dr. Henry A. Burd, Dean of Graduate Studies, University of Washington, was present to represent the University. Mr. Kenneth Englund of the Hanford Operations Office, AEC, was also present. The Division of Biology and Medicine was represented by Drs. Dunham, Shilling and Pearson in the executive session.

Mr. Johnson stated that GE as a company had no primary interest in the field of biological research. On the other hand, the Company was interested in having available, near by, unbiased experts in the field of radiation protection and injury, familiar with the Company's operations, who could give expert advice or testimony, which he anticipates may be needed in future discussions with organized labor and also in other circumstances which may arise in plant operation. Such experts would still be available if the biological laboratories at Hanford were under the University's control. Mr. Johnson believes that transfer of the biological laboratories to the University would be beneficial to

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the AEC and to the scientists working in the laboratories, since the scientists would then have greater freedom for research and more contact with academic university life and with graduate students. The University would benefit by absorbing a laboratory that was already a going concern.

Mr. Parker stated that the original need for biological research at Hanford still exists, that over 50 per cent of the effort deals with problems relating specifically to Hanford or other Commission activities, and that such work is of general interest and utility in the development of applied radiation biology. He believes that the transfer of the Hanford biological laboratories to the University now would be unwise, although such amalgamation in the future might be profitable. He believes that a university is the proper place for basic biological research rather than applied research. He pointed out that the organization of a new program at the University might require five years before it became productive.

Dr. Kornberg expressed the opinion that the transfer would benefit all concerned. He believes that biological research at Hanford will reach its peak in effectiveness during the next three or four years, after which it will decline. He saw the causes of this in the narrowed research horizons of a stabilized staff, with relatively limited outside contacts. He saw the cure for this in exchange professorships, contact with students and with university scientific life.

Dean Burd stated that the University's study of the proposal had been limited in time and scope, that a detailed program had not been considered, that the faculty was as yet unaware of the proposal, and that no estimate of the operating costs could be made at this time. As yet the University has taken no action on the proposal other than to envisage an institute of radiobiology in the Graduate School, of which the Hanford biological laboratories and the Applied Fisheries Laboratory would become integral parts. The detailed organization of this institute and its relations with the various departments of the Graduate School have not yet been formulated.

The ACBM reached the following conclusions regarding the proposal:

1. Transfer of the biological laboratories to the University of Washington is not now recommended.
2. Efforts should be made to facilitate scientific communication between the biologists at Hanford and their scientific colleagues elsewhere.
3. Anticipated changes in high-level administrative personnel at the University of Washington, including a new president, render further detailed discussion impractical until such appointments are made in July, 1958.

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4. The door should not be closed to the development of closer ties between Hanford and the University. On this score, the University might strengthen its position by initiating a proposal to the AEC for assistance in establishing research and training in radiation biology on the campus.

5. Due consideration should also be given to establishing closer ties between Hanford biology laboratories and Washington State College.

6. On its side, the AEC should approach both the University of Washington and Washington State College to submit proposals for ways and means to achieve closer working relations with the Biology Division at Hanford.

7. The present proposals from the General Electric Company appear to the Committee as an expedient to solve certain problems that may, in fact, be temporary. The solution of these problems should not be confused with the independent question to be considered on its own merits, namely, should research and training in radiobiology be furthered in the Northwest and, if so, by what means.

The principal reasons underlying the Committee's conclusions are the following:

The present biology program at Hanford is important for the Hanford operation in particular and for the practice of applied radiobiology in general. It would be extremely inefficient to interrupt it now, or to separate the applied from the basic parts of the program, since both are closely interwoven and since the basic program helps to support the applied program.

Present administrative plans for the "transfer" are vague. It appears certain that the present program would not be pursued with the same efficiency, cost, and dispatch. Nor does it appear that the University could now give adequate financial support to the laboratory at Hanford if it were simultaneously developing research facilities on the Seattle campus. In fact, it would be unrealistic to expect that the University could amalgamate the large Hanford program with its initial radiobiology program at Seattle without jeopardizing the Hanford operation.

A variety of problems, administrative and otherwise, stand in the way of the smooth execution of the proposed transfer. Hanford and Seattle are more than 200 miles apart. Major differences in salary scales and benefit programs would have to be readjusted. Decisions would have to be made as to which staff members would receive faculty appointments and at what rank. A system for interesting graduate students in the work of the laboratory would have to be evolved. Finally, a mere change in the administration of the contract can in no way guarantee the Hanford biologists the freedom in research they

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apparently seek, while it may diminish the ready availability of technical assistance and supporting research which they now have.

The ACBM believes that certain steps can be taken now to improve the position of the biologists at Hanford, especially with respect to their contacts with scientific colleagues elsewhere. It is recommended that (1) the Biology Division be technically and geographically declassified; (2) more frequent attendance of Hanford personnel at scientific meetings be authorized; (3) closer liaison with regional universities be promoted by visiting lecturers and cooperative studies; (4) consideration should be given to setting up a mechanism whereby regional universities who may wish to do so can send graduate students to work in the Hanford biology program.

VI. Tracer Studies and Stratospheric Fallout

Dr. J. Z. Holland reviewed the problem of sampling the atmosphere and discussed the various proposals for tracer studies in regard to atmospheric fallout in the projected weapons tests.

VII. Civil Effects Tests in 1960

Mr. R. L. Corsbie discussed the present status of the proposed civil effects tests planned for 1960. Colonels Trum, LaChausse, and Maupin participated in the discussion. The Committee gave endorsement to such a test program primarily devoted to biomedical purposes and to be organized along functional rather than purely administrative lines. Insofar as practical, biologists from outside the AEC laboratories, including those in universities and in other agencies, should be invited to participate (Glass). Efforts should also be made to have participants or observers from the various members of NATO (Cantril).

The planning of this test should include a critical review of the number of shots required, and of what types. To obtain maximum efficiency in planning, it is recommended that data from past civil-effects tests and especially from Hiroshima be reviewed in the retrospective light of recent developments in dosimetry. It is thought that such revision will yield information pertinent to present civil defense needs, and will avoid errors, duplication of effort, and unnecessary refinement of techniques in the forthcoming tests. Such a study should be undertaken by a working group of the highest competence. It is felt that the cost, which may be appreciable, would be more than saved by the information thus obtained (Bugher).

It was noted that studies concerning blasts and thermal effects planned in the 1960 tests, previously carried out alone by the AEC, are now to receive support from other participating agencies.

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APPENDIX A

The following recommendation has been drafted for the ACBM by Dr. Shields Warren and concerns the matter of re-implementing plans for Civil Defense at AEC installations:

The Committee is aware that the various installations of the Atomic Energy Commission have to be self-sufficient so far as passive defense is concerned. The Federal Civil Defense Agency functions essentially as an advisory organization to the state and local Civil Defense organizations, which do not have specialized knowledge as to the particular problems of atomic energy installations. Security requires that access to plants of the AEC and knowledge of operations within those plants be restricted. Furthermore, several of the communities largely populated by AEC or contractor employees are exposed to much the same general hazards as are the plants themselves.

With the general apathy throughout the country on civil defense matters, there has tended to be similar apathy, although not nearly to as great a degree, in AEC establishments. The Committee recommends:

- a) That passive defense and radiological defense plans be reviewed at least annually for each major installation;
- b) That a shelter program, efficacious at least against radioactive fallout and intermediate levels of flash, heat and blast, be implemented;
- c) That working relationships be maintained with surrounding communities to permit aid being obtained from them in case of need.

Radiological monitoring teams are now of increasing importance not only for the AEC installations but for the emergency control of hazards from rail, traffic, or air accidents where potentially radioactive material is involved.

The Committee commends the Civil Defense Branch of DBM for the large amount of information and aid rendered to the Federal Civil Defense Agency and feels that even further aid may be necessary. It is to be hoped that FCDA will effectively and promptly utilize the material thus made available and to a greater degree than is evidenced as yet in published plans and manuals.

For the Committee,

Simeon T. Cantril, Chairman
Advisory Committee, Division of
Biology and Medicine

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APPENDIX B

The Advisory Committee for Biology and Medicine, in its meeting of January, 1958, adopted the following recommendation which was prepared by Dr. Bentley Glass and Dr. James Horsfall:

In its recent action the Civil Service Commission has faced up to the very real problem of the shortage of scientists. One of the reasons for the shortage is indeed poor pay. The desperate shortage of scientists calls for a variety of remedies, both immediate and long range. A higher salary scale is a potent remedy, for scientists are notoriously not rich and this fact discourages the pursuit of science in young persons reared in the present climate of opinion.

However, in considering the higher salary scale as a remedy, it is important to bear in mind the interdependence of the sciences and their over-all unity. Weakness in any area transmits weakness to all. Approximately equal advancement in all areas promotes greater general strength and greater promise of significant discoveries than extremely disparate advances in some fields accompanied by stagnation in others.

The shortage of scientists obtains across the whole range of science, and correspondingly, the entire scale must be raised. In the scientific transformation of civilization now being wrought by atomic energy and space travel, the biological and behavioral problems are quite as critical as those of a purely physical nature. While, therefore, we applaud the action of the Civil Service Commission in raising the salaries of physical scientists, we deplore the automatic raising of salaries within grades, and the failure to raise the salaries of biological and behavioral scientists on an equitable basis. By acting as it has, the Civil Service Commission has unwittingly created a category of second-class scientists. This action will necessarily be severely destructive of morale among the biological scientists, and will very likely cause severe future unbalances in training and education.

The Advisory Committee for Biology and Medicine (ACBM) therefore recommends that the Atomic Energy Commission use its utmost influence to persuade the Civil Service Commission to modify its decision and promptly to rectify the discrepancy. The ACBM further recommends that the AEC should endeavor within its statutory authority to maintain equitable salaries for all scientists within its jurisdiction.

For the Committee,

Simeon T. Cantril, Chairman
Advisory Committee,
Division of Biology and Medicine

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