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MONTHLY STATUS AND PROGRESS REPORTS

FOR

APRIL 1951

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VI - BIOLOGY AND MEDICINE

Greenhouse

Representatives of the Division spent approximately 3 weeks at Eniwetok Atoll in connection with the Biomedical Test Program. This program was designed to answer a number of specific questions concerning the effects of atomic bomb explosions upon biological systems. The first problem was to determine whether experimental data obtained under laboratory conditions could be directly applied to bomb conditions.

In addition, the program was set up to give accurate information concerning radiation dosages and effective radiation energies at varying distances from the bomb; and a detailed analysis of the thermal spectrum of the bomb explosion. Up to the time of the test there was uncertainty as to the relative effectiveness of the infra-red, visible, and ultra-violet portions of the spectrum in producing flash burn injury. The tests were also designed to verify the efficacy of certain biological dosimeters in correlating purely physical measurements of radiation dosages and energies with biological damage. While the factual information concerning these problems must await detailed analyses which will be forthcoming in the next few weeks, the preliminary data indicate that the tests were completely successful in providing definitive answers concerning the radiation dosage-energy question and the thermal burn problem.

Biology Branch

University of Hawaii. Dr. Paul B. Pearson on April 3 conferred with G. M. Sinclair, President of the University of Hawaii, and with staff members interested in biology and agriculture. There is considerable interest among the faculty in the use of radioisotopes. Support given the University would perhaps encourage building up a group familiar with monitoring instruments and the general effects of radiation.

Spray fertilizers. Recent work at Michigan State College using isotopically labeled fertilizers has shown that phosphorus 32, applied as a spray to the tips of the branches of dormant trees, moved to the roots within 26 hours. This information shows that even in dormant trees metabolic processes are continuing and apparently at a much more rapid rate than was previously realized. This observation has led to the application of spray fertilizers to dormant trees that have been injured by low temperatures. The response of such trees to spray fertilizers this year has been so promising that this gives promise of being an important method in reducing winter injury to trees.

Blood substitutes. A contract providing for partial AEC support of the National Research Council Subcommittee on Shock has been completed with the National Academy of Sciences. The U. S. Public Health Service and the Office of Naval Research are also supporting this work on an equal basis. The principal responsibility of the Subcommittee on Shock is to

develop and evaluate various synthetic blood plasma substitutes which would be needed in large quantities to treat the shock associated with burns, traumatic injury, and radiation injury in the event of a mass civil disaster. Significant progress has already been made toward adapting the use of "Periston," a German discovery, to American standards. Clinical evaluation of the metabolism of carbon 14-labeled "Periston" is under way at the Medical Division of Brookhaven National Laboratory.

Conference of industrial health personnel. The first annual conference of AEC industrial health personnel was held at Atlantic City on Friday, April 27, 1951. The Health and Safety Division of the New York Operations Office was the host for the meeting, which was attended by 68 persons from 25 installations.

The second annual meeting will be held in Cincinnati, Ohio, on the Monday immediately preceding the American Industrial Hygiene Association meeting. All AEC and AEC-contractor health personnel are urged to write Drs. Felton or Morgan indicating topics that they would like discussed at next year's meeting. Drs. K. Z. Morgan and Jean Felton of ORNL have agreed to be hosts at this meeting.

Industrial medicine fellowships. Fellowships have been informally offered to, and accepted by, eight physicians. Formal announcement will be withheld pending clearance and determination of the schools at which time these men will take their year of academic training in industrial medicine, beginning in the Fall of 1951.

Plans have been made for one physician to take his second or in-plant year of training at ORNL, K-25, and Y-12 upon completion of his fellowship year at the University of Rochester.

Medical fellowship training courses. Arrangements have been made to reactivate the medical fellowship training courses at Duke University and Reed College. The Department of Defense has been invited to send up to 10 students to the Duke University course.

Biophysics Branch

Biological tolerances. Members of the Branch met with representatives of the Reactor Development Division and Knolls Atomic Power Laboratory in connection with biological tolerances for neutrons and the effect such tolerances would have on shielding needs for the Submarine Intermediate Reactor now being developed at KAPL. The group also considered the types and locations of monitoring devices which will be required.

Monitoring of air and rainfall. In cooperation with the Division of Military Application (which is serving as the main AEC liaison with the National Association of Photographic Manufacturers), the Biophysics Branch arranged for country-wide monitoring of air and rainfall to measure the amount of radioactivity over the United States as a result of the Greenhouse tests. The monitoring procedures were devised to be as simple

as possible in order to minimize the time and effort required for the survey. All abnormal observations were to be relayed to the Branch immediately, and a summary submitted at the end of the test series. Agreeing to cooperate were Hanford Works, Berkeley Radiation Laboratory, Atomic Energy Project at UCLA, Idaho Test Site, University of Utah, Los Alamos Scientific Laboratory, Argonne National Laboratory, Oak Ridge National Laboratory including a special installation at the University of Florida, Brookhaven National Laboratory, and the New York Laboratory. Because of its location close to the largest photographic industries, the New York Laboratory has set up an elaborate network of cooperating laboratories including: U. S. Weather Bureau at St. Louis, du Pont Laboratories at Parlin, N. J., Biology and Medicine Instruments Branch in Washington, D. C., Eastman Kodak and Atomic Energy Project at Rochester, N. Y., Ansco Laboratories at Binghamton, N. Y., Western Reserve University at Cleveland, Ohio, and of course its own staff. The major part of the observed radioactivity is appearing over the northeastern part of the United States, as it did following the Nevada tests.

Radiological aspects of underground weapon tests. The Biophysics Branch has been concerned to a large extent in the radiological aspects of the underground weapon tests which are proposed for the continental site. It has cooperated with representatives from AFSWP in considering and extending calculations on expected problems, and with the Division of Military Application in making recommendations relative to such a test. In view of the Commission's desire to assure itself of the safety of the operation, a preliminary test was agreed upon, and possible sites and conditions have been explored. On the assumption that a western site will be selected, the Branch is studying the nature of observations which will have to be made in a preliminary shot in order to assure radiological safety for succeeding test shots.

Savannah River. A member of the Branch met with representatives from the U. S. Public Health Service, Division of Reactor Development, Wilmington AEC Office, and du Pont Company to consider the USPHS proposal for a stream study on the Savannah River as related to stream uses. The study will be conducted in such a way as best to meet the needs and responsibilities of the Public Health Service, the states involved, and the AEC, including the hydrological, physical, chemical, and biological characteristics of the river as they affect treatment of the water for reactor cooling, domestic and other industrial uses. Other effects, such as those due to impoundment by reservoirs under construction, discharge of sewage and industrial wastes, etc., are also to be studied. To mesh with the Public Health Service study will be another, more elaborate survey of the biological aspects of the river to be conducted by the Philadelphia Academy of Science under contract with du Pont. Insofar as is practical, members of the biology departments of the Universities of Georgia and of South Carolina will be included in the latter study.

Civil Defense Liaison Branch

FCDA proposal for participation in weapon tests. Following

preliminary discussions by representatives of the Division of Military Application, the Division of Information Services, and this Branch with Federal Civil Defense Administration liaison and research personnel, Governor Caldwell submitted to the Commission a proposal specifying FCDA requirements for information and data from future tests. The proposal has been referred to the Division of Military Application for preparation of a reply to be considered by the Commission.

British participation in weapon tests. Through informal discussions with FCDA personnel, the Branch learned that British civil defense representatives have expressed a desire to participate in the AEC testing program. Previously an official request for the testing of Anderson (family-type) shelters at Operation Greenhouse had been received through military channels. This request was not approved by Joint Task Force 3.

To discuss the pending British request, Colonel B. W. Beers, Director of Military Liaison, FCDA, called a meeting of representatives of FCDA, Department of State, Department of Defense, Military Liaison Committee, and AEC on April 13. The consensus developed at this meeting indicated that the best method of procedure was for an integration of the British requirements with those of FCDA, in light of the difficulties of permitting direct foreign participation in the testing program.

Radiation Instruments Branch

Joint United Kingdom-Canadian-United States Instrumentation Conference. The planning and coordination for the Third Joint United Kingdom-Canadian-United States Instrumentation Conference was completed. It was held at Harwell, England, April 30 through May 11, 1951, and was attended by seven United States representatives.

Greenhouse participation. The results obtained from the instruments tested at Greenhouse should be of considerable value in determining the future course of instrument development both for application within the AEC and for civil defense purposes.

AEC-sponsored research and development. Requirements for large additional quantities of enriched boron-lined neutron counters for the Santa Fe Operations Office have stimulated reconsideration of the need for an alternate producer of these components for the AEC.

The existing contract for the supply of these tubes let with the General Electric Company is being administered by the NYOO. Thus far, five companies, that is, Raytheon Manufacturing Company, Federal Tele-Communications Laboratories, Rauland Manufacturing Company, Allan B. Dumont Laboratories, and Radiation Counter Laboratories have been or will be extended an opportunity to participate in this work. The Instruments Branch of the NYOO Health and Safety Division will continue to furnish technical supervision for this program.

Civil defense training. Two shipments, totaling 32 survey meters,

were made during the month for civil defense training purposes. Twelve of the instruments were loaned to the State of Alabama for a 2-month period with training to be under the supervision of Dr. Eric Rodgers of the University of Alabama. Twenty instruments were loaned to California for 3 weeks with training to be directed by the University of California.

RA-DET. The May issue of RA-DET will feature a report by B. Cassen and others at the Berkeley Radiation Laboratory on scintillation counting equipment for medical usage. This month's biographical sketch is of P. R. Bell of Oak Ridge National Laboratory. The first progress report of work performed by RCA under the Special Tube Development Contract will also appear in this issue. It is planned to disseminate information on RCA's work by publishing all future progress reports in RA-DET.

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