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M. W. Boyer, General Manager — February 12, 1953

John C. Bugher, M.D., Director, Division of Biology and Medicine

MONTHLY STATUS AND PROGRESS REPORT, JANUARY, 1953 - DIVISION OF BIOLOGY AND MEDICINE

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Transmitted herewith is the Monthly Status and Progress Report for this Division covering the month of January, 1953.

Enclosure:
Report

CC: J. H. Burchard

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MONTHLY STATUS AND PROGRESS REPORT

Division of Biology and Medicine

MONTH OF JANUARY, 1953

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[redacted] contains restricted data [redacted] in the Atomic [redacted] or the [redacted] its contents in any [redacted] unauthorized person is prohibited.

Research Activities

Off-Site Research Contract Program. (UNCLASSIFIED) The Division of Biology and Medicine has reserved in its 1953 budget some $6,500,000 for the financial support of an estimated 360 research projects in cancer, medicine, biology, and biophysics to be conducted at universities, hospitals, and other institution laboratories throughout the country. The estimate includes approximately $5,800,000 for the renewal of some 295 research projects, and $700,000 for anticipated support of new worth-while research projects. Through January of the current fiscal year, the Division has renewed some 117 projects at approximately $2,500,000; in addition, 34 new research projects totaling approximately $400,000 were approved. In the month of January alone, customarily a slow month for contract actions, the Division approved 14 renewals at $150,000 and approved five new projects for a total of $40,000.

Respiratory Exchange Recording System. (UNCLASSIFIED) Equipment which will greatly facilitate and improve the accuracy of studies on the action of ionizing radiation on mammalian respiratory metabolism has recently been developed under a National Cancer Institute-AEC project. This equipment will permit continuous automatic analysis and recording of total metabolism of small laboratory animals. The animal is undisturbed by any attachment to the apparatus and can remain free in a comfortable enclosure from which urine can be collected for nitrogen analysis. The newly developed equipment can record the rate of oxygen consumption, the rate of carbon-dioxide production, and the respiratory quotient, continuously for an indefinite period, and with a degree of resolution on the time scale such that minute-to-minute changes are readily distinguished. It provides also an integrated tabulation of the total respiratory gas exchange over any set period. The combined records permit ready calculation of the separate rates of consumption of fats, proteins, and carbohydrates, and the shifting disturbances of the metabolism in this regard, in parallel with the animal's activity.

Radiation-Induced Cataract Study. (UNCLASSIFIED) At the State University of Iowa, a quantitative study of radiation-induced cataracts is currently in progress. This group has been comparing the effectiveness of fast neutrons (cyclotron-produced) and x-irradiation (200 KV) on the production of cataracts in laboratory mice, in both single and cumulative doses. The median effective (single) dose for the production

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of complete cataracts was found to be about 210 r.e.p. for the neutron radiation and 860 r for the x-radiation. In the multiple exposure experiments (with weekly neutron irradiation of 70-90 r.e.p. and x-irradiation of 300-400 r), there appeared to be a greater loss in the effectiveness of x-irradiation than with corresponding neutron fractionation.

Effects of Radiation on Ocular Lens. (UNCLASSIFIED) Investigators at the Kresge Eye Institute in Detroit, studying the effects of neutrons and other radiations on the ocular lens, have reported some interesting findings. Their observations suggest that the portion of the lens which is most sensitive to x-ray damage is the epithelium, and, of the compounds investigated nuclear protein is the first to be affected. This finding is consistent with the observation of others who have found that x-rays produce a more or less immediate effect on cell division, presumably through their effect on cell nuclei. A secondary chemical effect of x-irradiation reported by this group is the inhibition of carbohydrate metabolism. Studies are being continued to further elucidate the mechanism involved.

Improved Tracer Technique for Blood Volume Determination. (UNCLASSIFIED) Investigators at the St. Louis University School of Medicine have developed a useful new modification of tracer technique for the study of human blood volume and turnover. In the study of cases of severe closed head injuries, the usefulness of the results has been partially vitiated by the delay caused by the necessity of incubating the patient's own blood with the tracer. The inability to predict the time and place of arrival of these patients led to unavoidable delay in initiating the procedure; and variation in therapy instituted during this period further confused the picture. The new procedure avoids these difficulties by making use of "universal" donor (Rh-negative, type O) red cells. Large batches of these cells are tagged with Cr^{51} every few weeks at a central station and divided into a number of single dose aliquots, some of which are stored at each of several hospitals. This permits immediate initiation of the blood volume determination upon the patient's arrival at any of these points.

General

Proposed Biological Laboratory at Eniwetok. (UNCLASSIFIED) Beginning with the Bikini tests in 1946 and continuing through the recent tests at Eniwetok, a program has been conducted to study the radioactive contamination of plants and animals in the Bikini and Eniwetok areas. The investigations have been carried out chiefly by the Applied Fisheries Laboratory of the University of Washington, with surveys being made immediately following atomic detonations and resurveys after intervals of several months or longer.

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The advisability of establishing a small permanent marine biological laboratory at Eniwetok is being investigated since the Commission has a responsibility to carry out continuing studies of radioactive contamination of the test area. Virtually nothing is known of the biology of marine life of that part of the Pacific, including food chains of marine animals which determine the abundance of food fishes such as the salmon and tuna. Both an interest and a willingness to cooperate in such an undertaking. Arrangements have been made to have a party of six scientists from the Office of Naval Research and from the Pacific Science Board of the National Research Council (who will be meeting in Hawaii in February) to visit Eniwetok accompanied by Dr. Karl Wilbur of the Division of Biology and Medicine. This visit is being coordinated with the Division of Military Application and the Division of Security.

During the visit to Eniwetok the group will visit Parry Island to inspect present laboratory facilities and evaluate the site from the standpoint of possible future facilities.

Tri-Partite Conference on Permissible Doses. (UNCLASSIFIED) Delegates from Canada, the United Kingdom, and the United States will meet in Washington to participate in an international conference on permissible dose levels on March 30, 31, and April 1, 1953. This will be the fourth meeting of the Tri-Partite Conference on Permissible Doses which is held periodically to review the permissible dose levels for both external and internal radiation. These periodic reviews permit a maximum exchange of information and experience on permissible dose levels, thus minimizing variations in standards between the participating countries.

Cesium Teletherapy Unit for Cancer Research. (UNCLASSIFIED) The Oak Ridge Institute of Nuclear Studies recently awarded a contract to the W.F. and John Barnes Company of Rockford, Illinois, for design and construction of a prototype Cesium-137 teletherapy unit. Delivery of the unit is expected within a year; it will be used for cancer research under the Teletherapy Evaluation Program by the ORINS Medical Division and the participating medical schools.

National Laboratory Spring Program Reviews. (UNCLASSIFIED) It is planned that the practice of holding spring reviews of the national laboratory programs will be continued this year as in the past. A sampling of opinions has indicated that the management staffs of the national laboratories, operations offices, and staff members of the Washington program divisions have found these reviews to be extremely valuable from the standpoint of over-all review of programs and review of financial requirements for ensuing budget years.

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Civil Defense Activities

Transmittal of Weapons Information to FCDA. ([redacted]) As reported periodically, the Division has transmitted to the Federal

As reported periodically, the Division has transmitted information to the Federal Civil Defense Administration in various established atomic weapons effects categories, and upon the showing of justification of need by the FCDA. These categories have been mutually agreed upon under a cooperative agreement with AFSWP of the Department of Defense.

of information in order to effect a broadening and simplification. At the request of AFSWP the Division has reviewed and commented upon the proposed revision.

Concurrently, the FCDA has requested "broader access to certain types of information available to the AEC." This request involves weapons development data, as well as the effects categories mentioned above. In reply the Commission has pointed out that all information available to date in the agreed-upon categories, up to Operation IVY, has been provided; that other agencies such as NSC, CIA, DOD, and NSRB are inextricably concerned with this request and that their collaboration is necessary; and that specific review of present FCDA needs be accomplished through existing liaison channels.

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