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MONTHLY STATUS AND PROGRESS REPORTS

FOR

JUNE 1949

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U. S. ATOMIC ENERGY COMMISSION

Issued July 26, 1949

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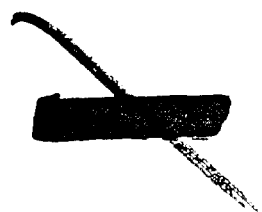
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BIOTECHNOLOGY AND MEDICINE

Research Projects

The following research projects have been approved by the Division of Biology and the various Operations Offices have been asked to negotiate the contracts:



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Oak Ridge Operations Offices:

Agriculture and Mechanical College of Texas - Dr. Raymond Reiser and Dr. Kenneth Kuiken - "The Metabolism of Glycerines" - \$15,800

University of Tennessee - Dr. T. H. Nash - "Research in the Departments of Pathology, Physiology and Chemistry" - \$15,000

Washington Headquarters Offices:

National Research Council - Contract extended for 1 year to permit the Atomic Casualty Committee to continue medical and genetic studies - \$1,200,000

Advisory Committee for Biology and Medicine

The Advisory Committee for Biology and Medicine held their sixteenth meeting at the Atomic Energy Commission on Saturday, June 11, 1949. The foreign distribution of radioactive isotopes was thoroughly discussed. The Committee recommended unanimously that the following endorsement of the program should be forwarded to the Chairman of the Atomic Energy Commission:

The Advisory Committee for Biology and Medicine has reviewed from the standpoint of biology and medicine the United States Program for the foreign distribution of radioisotopes. It is our understanding that more than 90 percent of the shipments thus far sent abroad have been for uses in medical therapy and in scientific research in biology and medicine. We have also considered the suggestions which have been advanced that the uses to which these radioisotopes might be put could possibly be disadvantageous to the security of the United States.

The Advisory Committee for Biology and Medicine believes that the foreign radioactive distribution program for diagnosis, therapy, and research in biology and medicine is advantageous to the United States and helps in assuring the broad scientific progress which is so important to our national welfare. The Advisory Committee for Biology and Medicine strongly endorses continuation of the foreign distribution program.

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Summary of Chalk River Effluent Disposal Conference

During the 3-day conference 21 representatives of Canada, the United Kingdom, and the United States exchanged information and ideas on the disposal of active effluent from pile, processing plant, and laboratory operations.

The mechanical details of such handling operations are essentially the same for the three nations. Since the British problem, with respect to possible contamination of metropolitan water supplies, is most acute, they have found it necessary to report to sea burial for high-level concentrated waste. It was felt that no international legal impediment to this practice was involved as long as the conditions of sea disposal were such that no possibility existed of contaminating the waters, shores, or food supply of another nation.

All three nations were aware of the possibility that biological accumulation and cycling of low level activities discharged into streams will pose a problem of undetermined magnitude over the years. The United States has undertaken the most extensive program of research on this problem, but data from which real conclusions can be drawn will not be forthcoming for at least 2 years. The United Kingdom and Canada are conducting research in this field on a modest scale, but will depend upon the United States' results for their major conclusions.

On the problems of personnel monitoring and tolerances, there were no essential differences in the standards and procedures of the three nations. Instrumentation for neutron monitoring is unsatisfactory. It was concluded that an instrument development program should be pushed vigorously.

There was unanimous agreement on the basic philosophy that environmental contamination must be reduced to the minimum, and that contaminated areas must be monitored continuously until our knowledge of the biological effects of radiation reaches the stage where we can safely conclude that a given level of activity does not constitute a potential hazard.

Ad Hoc Committee Future Tests

The ad hoc committee for planning future biological tests, headed by Dr. George W. Bekoy, Consultant to the Division of Biology and Medicine, held a meeting on June 7, 8, and 9, 1949. Forty proposals for test projects were presented with 21 proposals accepted.

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The proposals were arranged into a ten-point test program as follows

1. Animal Breeding Colony
2. Study of acute radiation injury
3. Study of thermal burns
4. Study of blast injury
5. Study of hematology
6. Study of particulate PP
7. Biological dosimetry
8. Study of genetical effects
9. Observation of local fauna and flora
10. Dosimetry with mineral substances

Radiation Hazards


Professor H. L. Bowman, Consultant, Division of Biology and Medicine, made a survey at Oak Ridge and is writing a report for submission to the Commission from the viewpoint of an attack on production areas, storage facilities and water supply and of flood damage due either to a natural flood in the Clinch River or the bombing of Norris Dam. Attention will be also given to the location of proposed buildings and the materials for their construction.

Thorium Nitrate and Enzymes

Studies at the Oak Ridge National Laboratory show that thorium nitrate inhibits the action of certain enzyme systems. The enzyme adenosinetriphosphatase of heart muscle, succinoxidase of the liver and malic dehydrogenase are inhibited by thorium nitrate in concentrations of the order of 1×10^{-4} and $1 \times 10^{-4}M$. The yeast metabolism of glucose is very sensitive to thorium nitrate and the inhibition appears to be confined to the anaerobic phase of glucose metabolism.

New Nucleic Acids

At the Oak Ridge National Laboratory two new nucleic acids have been prepared and isolated from spleen. The two nucleic acids appear to differ from those previously identified and reported in the literature in the position of attachment of the phosphate residue to the ribose molecule. Work is now in progress to establish the structural chemical constitution of the new acids. The discovery and elucidation of the new nucleic acids may be an important factor in advancing knowledge on the chemistry of the gene and some of the biological effects of radiation.



Mitotic Inhibition

The Biology Division of Oak Ridge National Laboratory reports results of a study of the relation of gamma ray dosage rate to mitotic effect in the grasshopper neuroblast. Doses of 8, 32 or 64r produced same degree of mitotic inhibition at rates of 2r per minute or 32r per minute. However, 32r per minute was more effective than 4r per minute at doses of 128r or 256r.

Applied Fisheries Laboratory

Applied Fisheries Laboratory, University of Washington, has reported on the results of a wide range of X-ray irradiation on the fresh water snail, Radix japonica. At approximate rates of 120 or 500r per minute 162 adult snails were given graduated doses up to 80,000r. Mortalities were significantly higher than controls in those groups receiving 10,000r or more.

Rates of embryonic growth were markedly reduced in egg masses receiving 1000r and 10,000r but not in masses receiving 180r. When adults were given doses ranging from 100r to 10,000r, reproduction was successful in groups receiving 3,000r or 10,000r.

Fish and Wildlife

Conferences have been held with the staff of the Waste Disposal Section of the Health Physics Branch at the Oak Ridge National Laboratory with the result that recommendations have been made for an expansion of studies to include more exact determination of the effects of existing waste disposal practices at Oak Ridge on the fish population of the Clinch River and Tennessee drainage.

A program is being developed for a complete ecological survey of the waters receiving wastes from Oak Ridge through conferences with AEC personnel at Oak Ridge and the branch of Fish and Game of the Tennessee Valley Authority.

Population Genetics

A staff has been assembled and preliminary experiments have been carried out at the Long Island Biological Association Laboratories on the population genetics of fish.

Biophysics Branch

A representative of the Biophysics Branch attended a meeting of the Stack and Committee at Oak Ridge. Discussions



were held with representatives of the Health Physics Division regarding training of military officers in Radiological Physics. Fifteen officers were scheduled to arrive July 1 for a 2-month course to be given by the Health Physics Division.

Conferences have been held among representatives of the Biophysics Branch, the Division of Research and Medicine at Oak Ridge, and the Dayton Area Manager on plans for disposal of the Runnymede Playhouse and for the cleanup of the schoolhouse.

EXHAUSTIVE SEARCH RESULTS

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