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K. D. Nichols, General Manager

November 17, 1953

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

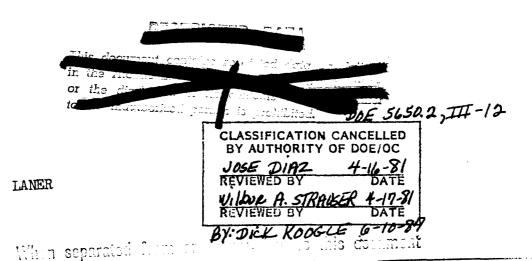
MONTHLY STATUS AND PROGRESS REPORT, OCTOBER 1953 DIVISION OF BIOLOGY AND MEDICINE R

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

Enclosure: Report

CC: J. H. Burchard



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MONTHLY STATUS AND PROCESS REPORT Division of Biology and Medicine MONTH OF OCTUBER, 1953

Second Test offvition

Oak Ridge Rational Leberatory into the program of mention radiation measurebeing made to incorporate sentron sensuring techniques developed by the Nautron Postneter Program-Speration Cistia

ents being undertaken by the Lavel Research Leboratory

during Sparation

The program will be of because to both groups and will involve a

minimum of expense and offert. The Cak Aldge resourch group has used use of neptunium, HELDER SE

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Ension detectors in studies to

determine total centures cluss

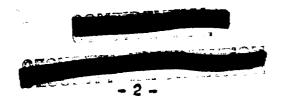
det wide range of neutron energies of interest to the biophysicists. Southon measurements made during provious field tests have not coroned the derived from those fission detector assourements would be of considerimportance in interpreting the total neutron down S.

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been studied in the intact call. to the de Call Tree Protograthmets. the compr Of the sum is converted to food start, has what (dreamstand) Photosynthesis, the process

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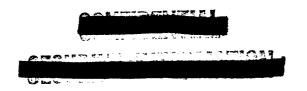




The alga Chara has very large calls from which the cytoplasm may be squeezed out, free of call wall and call sap. At Oak Ridge National Laboratory, it has been found that this preparation when placed in an atmosphere of Carbon 14 synthesized carbohydrate. Thus essentially a call free medium is capable of carrying out photosynthesis.

Effect of Thermal Neutrons on Seeds. (UNCLASSIFIED) The number of mutations produced in barloy seeds by doses of X rays and thermal neutrons has been compared with the amount of damage indicated by growth inhibition and the amount of visible chromosomal damage. At Drookhaven Mational Laboratory, it was found that the mutation frequency was closely correlated with the chromosomal damage but not correlated with growth inhibition. This means that with thermal neutrons many more mutations will be produced for a given degree of injury than for X rays, and thus thermal neutrons give great promise as a tool for genetic study.

Use of Phosphorus 32 in Sicklo Cell Ameria. (UNCLASSIFIED) Sickle cell anemia, a serious blood disorder in which red blood cells assume an abnormal sickle shape, affects approximately one in 500 negro children. Under a project with the Howard University, a study is being made of blood from victims of this disease both as a means of increasing an understanding of this condition and for information concerning protein synthesis and the dynamics of phosphorus transfer in the blood. Investigators in the use of Phosphorus 32 have shown that phosphate exchanges across the

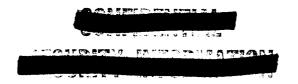


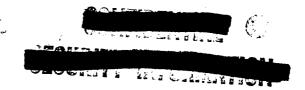
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red blood cell membrane are at a slower rate in sickle cells than in normal cells. The alkaline phosphatase in sickle cell memia plasma is significantly higher than that in normal plasma. Initial studies on phosphate transfer using metabolic inhibitors indicate the absence of a cortain ensure from the sickle cell amenia blood. One of the most significant observations of this group on the problem is that one of the protein components of the plasma has a different mobility as determined by electrophoresis. This finding is being investigated further with additional electrophoresis equipment and under varying experimental conditions.

This work complements other investigations in which the globin part of hemoglobin in sickle cells is found to be different from that of normal cells.

Shielding Studies. (UNCLASUIFIED) The problem of providing adequate shielding for personnel protection in equipment designed for radiation sources must be coupled with that of economies in operation. For lower energy ranges, shielding is not an expensive factor. However in the use of higher intensity radiations, the problem of personnel protection involves high expenditures. This problem is being investigated under a cooperative project with the Mational Bureau of Standards to determine design factors of various types of equipment in which savings might be realized, and at the save time to determine with greater accuracy the





walidity of former assumptions so that more reliable calculations may be made in shielding design. The present work is concerned with the attenuation characteristics of a shield when the rays from the source enter the shield obliquely. To a first approximation, the affective thickness of the shield has been assumed to be the length of path of the ray in the shield - that is, the more oblique the direction of incidence, the longer the path and the greater the degree of shielding. In this study it has been shown that while oblique thickness of the barrier may be utilized in designing equipment to shield against the primary rays, the contribution of scattered radiation from within the shield may become appreciable. Scattered radiation increases significantly as the obliquity of the incident ray increases, because of the shorter path length for a number of the scattered rays.

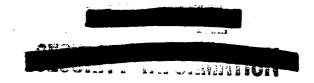
Data obtained from these investigations will be applicable to the design of protective shielding for personnel operating cyclotrons, Van de Graaff generators, or handling Cobalt 60 and radium sewross which are used in research and therapy.

Radiation Instruments Program (UNCLASSIFIED)

Recent work under the cooperative contract with the Entional Bureau of Standards for studies in the radiation instrument field includes:

1. Study of Film Tosimeters. A report has been completed on the evaluation of the neveral types of film desimeters in use at the various Commission installations. The work commisted of two parts:





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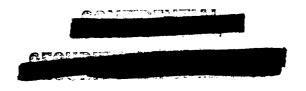
- a. Study of the sensitivity, quality dependence, and naminam range of the film bedge; and
- b. . cross-calibration study.

chow that most of these installations are able to get a fair degree of procision in measuring and interpreting gamm and n-ray radiation doses over a wide range of energies and interpretings. The survey has been important in pointing out areas where improvements may be initiated in order to reduce inaccuracies in film desirator measurements.

2. Testing of Tadianctive Testric Cells. Tests were made of two libdel I-50 electric cells of the radioactive source type manufactured by the Tadiation Tessarch Corporation of Gest Talm Beach, Florida. These are the first cells of this type which have appeared on the market. Preliminary results indicate that the load characteristics are better than those chained by the manufacturer. However, the voltage of the cells when no load is applied should some dependence on humidity conditions. It is expected that electric cells of the radioactive rounce type will find which application in lew current devices where long storage and small buttery dimensions are required.

Cenoral (UNCLASSIFIED)

The Edvicory Board on Water Decontamination must at Cak Ridge Mational Laboratory in October to review the current status of the Oak Ridge project on water decontamination. The Board was set up in 1950 to provide technical advise on the project which is under the nominal supervision of



-6-

the U. . Public Scalth Service at tak Ridge. Representatives were present from ABC, U. . Rubbic Health Service, Department of Defense (AFBF), Hew York State Waterworks Cosmission, and the American Waterworks Associations.

The secting included discussions of the interim Progress Report submitted by the tak-like research group, and the following subjects were covered: Research on the decontamination of radioactive waters, the problem of radioactivity in water courses, reconcentration of radioactivity by natural agents, water decontamination, and instrumentation. The subject report will be revised to include further studies and later issued as an official document for distribution by the tak hidge National Laboratory. It contains comprehensive data on decontamination studies and will be of considerable value to all waterworks engineers in the country, in addition to having wide application in ADC operations.

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