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* Transmitted as a separate document.

Part VII

Biology and Medicine

PROJECT SUNSHINE (UNCLASSIFIED)

The study of radioactive fallout by stratospheric sampling, soil analysis, and the open-pot and gummed-paper collection systems, continued throughout the quarter. New programs to collect food and soil samples were initiated, and the sampling of human materials was expanded. Food samples had already been obtained from Turkey and the Philippines by teams of the Interdepartmental Committee on Nutrition for National Defense.

Food Collection Programs in Latin America

An AEC representative visited Chile, Argentina, Peru, and Brazil, July 20–August 21, to enlist the assistance of persons involved in national nutrition and food programs in the collection of foods providing the major sources of calcium in the diet. These samples are to be analyzed for their calcium and strontium 90 content to ascertain the amount of strontium 90 that may be entering the food chain.

Arrangements were made for the collection of samples and shipment to the Health and Safety Laboratory of the New York Operations Office for analysis. The results of the analytical work will be made available to the countries concerned prior to publication. Those countries which have the necessary equipment and capability will be provided with duplicate samples on which to perform their own analytical work.

In Chile, the city of Santiago and five different geographical areas were selected for sampling wheat, flour, potatoes, green vegetables, and milk. In Argentina, milk, green leafy vegetables, and potatoes were being sampled from four geographical zones. In Peru, foods were being sampled from the arid coastal area, the high sierras, and the jungle area on the upper Amazon. In Brazil, a variety of foodstuffs, including local dried milk, was being sampled from five geographical zones. Since there are gummed-paper sampling stations in Brazil, it was planned to collect food samples at some of these locations to determine whether the gummed-paper and food analyses can be correlated.

Plans were made for a second Latin American food collection program, to be undertaken by Dr. J. Laurence Kulp, Lamont Geological Observatory, Columbia University, late in 1957. Dr. Kulp intends to visit Ecuador, Bolivia, Guatemala, and Venezuela to obtain samples of food which might represent the primary calcium intake of more primitive populations in areas with soil of very low calcium content. The tropical and semitropical regions are especially suited for this study since most of the calcium is leached from the soils. A second purpose of Dr. Kulp's trip is to improve communications and understanding at bone-sampling centers. Since the strontium 90 intake is highest in areas with soil of low calcium

content, this trip is in part an effort to find the maximum concentration of strontium 90 in humans and thus estimate the high end of the distribution curve for strontium 90 in the world population.

Soil Sampling Program

Since 1953 the AEC has sponsored a program of world-wide soil sample collection and analysis under a cooperative agreement with the Department of Agriculture. The purpose of this program is to provide information on the amount of strontium 90 in soils as a result of weapons testing and on the ratio in which strontium and calcium enter the food chain and ultimately find their way into the skeleton.

Arrangements were made for a Department of Agriculture representative to revisit the sites of earlier surveys to collect additional samples in Europe, Africa, South America, Asia, Australia, New Zealand, and the British Isles.

A similar program was to be conducted in the United States in the fall of 1957. Soils were to be resampled at locations visited in the past, and in addition, samples were to be taken from locations at different latitudes with similar rainfall patterns to determine the effect of latitude on the deposition of fallout material.

Activities at the Health and Safety Laboratory, New York Operations Office

Pasture survey. Strontium 90 and calcium determinations were being made on samples of vegetation, animal bone, and soil collected from five pasture sites* during the years 1953 to 1956, inclusive. Analyses of vegetation and animal bone were complete. The soil analyses were being repeated by extraction of the soil with hydrochloric acid for comparison with the results obtained by extraction with ammonium acetate and electro dialysis. Strontium 85 was being used as a tracer to permit more precise estimation of the analytical yield in the strontium 90 separation.

Available calcium in soils. Thirty soil samples from all over the world, including the United States, were being analyzed by the isotopic dilution method to determine the amount of calcium available to vegetation, in order to check the validity of other commonly accepted methods for the determination of available calcium.

Improvement of cesium 137 determination in milk. The method of analyzing powdered milk for cesium 137 was being studied to prevent losses during the initial ashing. The procedure was being tested for reliability by recovery experiments and exchange of samples with other laboratories.

Preparation and analysis of standard samples. Ten standard samples of ashed animal bone, simulated human bone ash, and ashed milk and vegetation were prepared for distribution through the United Nations to various countries. These samples will be used for inter-laboratory comparisons of analytical procedures. This will remove one of the chief obstacles in the evaluation of the analyses performed in various countries.

BACKGROUND RADIATION STUDIES

In August a team from the Health and Safety Laboratory of the New York Operations Office conducted a study of natural background radiation over a wide area of the United

* Ithaca, N. Y.; New Brunswick, N. J.; Raleigh, N. C.; Tifton, Ga.; and Logan, Utah.

States, including New York, Pittsburgh, Chicago, Denver, the Colorado Plateau, Arkansas, and Tennessee. The only significant departures from New York City natural background (7 to 11 microroentgens per hour) were found in three regions: the Dakotas, where backgrounds were approximately three times the natural New York background; Denver, Colorado, where background was approximately twice that of New York; and a 50-mile stretch on either side of U. S. Highway 70 between the towns of Carlisle and Palestine in Arkansas, where radiation levels were 5 to 15 times the normal New York background.

Measurements taken nine days later in the Arkansas area showed a 75 percent decrease in background. One month after the original measurement, radiation levels in the Black Hills of South Dakota showed almost a 50 percent reduction. Measurements taken over two months later in the Denver area showed that radiation levels had decreased about 20 percent. These lower levels indicate that in each case at least part of the original background radiation was attributable to radioactive fallout from test activities.

The Colorado Plateau showed a generally higher background than the nationwide average. This was to be expected because of the higher uranium content of many of the rocks of the area and because of the higher altitude.

Approximately 40 bricks from eight different parts of the country were received for study. Preliminary measurements indicated that whereas different types of bricks from the same location show only slight differences in radioactivity, there is a range of approximately three to one in the radiation measured from bricks of different localities. This study is being continued.

VISIT TO MARSHALL ISLANDS

Dr. C. L. Dunham, Director of the Division of Biology and Medicine, visited Rongelap Atoll during the month of September. The people had been back on their island for two months and had made a good adjustment. The new housing and community buildings are very satisfactory. The recently installed two-way radio saved two lives by permitting prompt transfer of two serious emergency cases to the hospital at the Kwajalein Naval Station.

Plans were begun for the next annual medical survey, to take place in March 1958, four years after exposure. This will be the fifth examination conducted, and it will be enlarged in scope. Extensive studies will be carried out similar to those of the last survey, with considerable emphasis on hematological investigations and on growth and development of the children, as well as on long-term effects of radiation. In addition, a whole-body gamma-counting facility will be utilized for special studies on whole-body gamma spectroscopy and radiochemical analyses of the urine to determine whether the Rongelapese have any appreciable body burden of radioisotopes. It is anticipated that this device will be used repeatedly on the Marshallese in future annual surveys. (End of UNCLASSIFIED section.)