

cultural projects; and the Beltsville (Md.) Research Center. At the same time, some of the Bureaux were renamed as follows: Bureau of Animal Industry, Office of Experiment Stations, Bureau of Entomology and Plant Quarantine, Bureau of Human Nutrition and Home Economics, Bureau of Dairy Industry, Bureau of Plant Industry, Soils, and Agricultural Engineering, and the Bureau of Agricultural and Industrial Chemistry. The work of the Regional Research Laboratories is now closely integrated with the last.

In addition to these agencies in the Agricultural Research Administration, the Department of Agriculture carries on considerable scientific research in the Forest Service and in the Soil Conservation Service. The Forest Service works in twelve forest and range experiment stations, and the Forest Products Laboratory at Madison, Wis.; the Soil Conservation Service investigates soil erosion and water depletion, and develops methods of soil and water conservation in co-operation with State agricultural experiment stations. Finally, the Bureau of Agricultural Economics is the central statistical and economic research agency of the Department, and has done outstanding work in social and economic science. As a result of Presidential Reorganization Plans announced in 1939 and 1940, the Weather Bureau was transferred to the Department of Commerce, the Food and Drug Administration to the Federal Security Agency, the Bureau of Public Roads to the Federal Works Agency, and the Bureau of Biological Survey to the Department of the Interior, where it became part of the Fish and Wildlife Service.

### Summer School in X-Ray Crystallography

A SUMMER SCHOOL in X-ray crystallography for scientific workers in industry, which was first suggested at the second conference on X-rays of the Institute of Physics, was held in Cambridge during September 6-18. It was organized by the Board of Extra-Mural Studies of the University in co-operation with the Cavendish Laboratory and the Department of Mineralogy and Petrology. Only about one third of the applicants could be accommodated; the whole course was attended by twenty-two, and, in addition, a small number were present for one week. The main object of the course was to familiarize X-ray workers in industry with the techniques used in solving fundamental problems. Thus they should be better fitted for dealing both with the routine work in industrial organizations and with the special problems that arise from time to time. Accordingly the earlier part of the course was devoted to the study of single-crystal X-ray photographs, and possible and actual practical applications were pointed out. The orientation of diamonds in the making of dies for wire drawing and of artificial sapphires for pivot bearings were two such examples.

The latter part of the course dealt mainly with powders and polycrystalline aggregates, with special reference to metals. The applications of X-ray methods to the study of equilibrium diagrams, of stress and strain, and of preferred orientation in wires and sheets, were described in detail; these were augmented by a lecture by Sir Lawrence Bragg on "The Strength of Metals". The identification of materials by the X-ray Index of Powder Photographs was also dealt with. Nineteen lectures were given altogether, by Drs. N. F. M. Henry, H. Lipson and W. A. Wooster: each lecture was followed by two hours of practical work in which assistance was given by

Miss A. M. B. Parker and Dr. D. P. Riley. Since it was not possible for the students actually to use the X-ray apparatus, the practical work was based on photographs or measurements already in existence. Opportunity to see and handle the apparatus was given in special visits to the research laboratories of the Department of Mineralogy and Petrology and the Cavendish Laboratory. The course was noteworthy as an example of fruitful collaboration between industry and a university. At the present time many industrial firms make great use of X-ray diffraction methods, and at the same time, university teachers, in order to train students effectively, need to keep in touch with the practical requirements of industry.

### The Cannibal Complex

PROF. J. H. HUTTON's presidential address to the Folk-lore Society deals with the subject of cannibalism (*Folk-lore*, 54; 1943). The thesis is upheld that the origins of the practice were many and various, and that several causes were responsible for the growth of the custom among any given people. Among the reasons for the eating of his own kind by man, Prof. Hutton enumerates the following: famine, lack of meat food in the case of folk living largely on such starchy materials as potatoes and manioc, etc., revenge, and magic. In the last case ideas of sacrifice, of obtaining the life essence or qualities of the person eaten, and of getting an extra 'dollop' of soul-stuff by the same means can be traced. One is told that 'long pig' makes good eating, but Prof. Hutton does not include this possible motive. It would appear that no one of these reasons by itself is sufficient to generate the custom—indeed the fact that among some cannibals only criminals are eaten suggests that, on the whole, man does not relish eating man. When, however, several of the above factors operate, for example, when famine has started the practice, then it may develop into a custom as a result of the operation of one or more of the other motives. Such an analysis of a 'savage' practice is very interesting and helps to show the ordinary Englishman how complex are the ideas of modern primitive peoples.

### The Cuscatlan Bridge in El Salvador

THIS bridge is the largest in Central America, and has been erected across the Lempa River, to complete another link in the Pan-American Highway (*Earthquake Notes*, 14, Nos. 3 and 4; June 1943). The main suspension span of 820 ft. is carried by cables of open construction chosen to fit the unusual erection conditions. The bridge is near the base of an extinct volcano, and test borings indicated that the foundations and anchorages would be in volcanic materials consisting of cemented ash and loose boulders or stones. These materials lie in very irregular strata and pockets. Since the bridge may be subjected to earthquake shocks, special care was necessary to support the assumed earthquake forces in the design of the concrete approaches. A study of this feature indicated that multiple-span rigid-frame structures were required. A factor in the design of structures built to resist earthquakes is the natural period of vibration. Resonance must be avoided by making this different from the supposed destructive earthquake frequencies likely to arise in the district. In this case periods of from 0.5 sec. to 1.5 sec. were avoided. The natural periods of the transverse bents of the Lempa River Bridge concrete