tive undertakings. The report shows that the cooperative work covers the entire country and includes broadly "the study of the principles of agricultural science, the determination of agricultural resources and special adaptations, the discovery and introduction of improved or better-suited methods, the establishment of new crops, the improvement of plants and animals, the marketing of products, and the safeguarding of agriculture from a long list of enemies."

The cooperative enterprises to which the department of agriculture is a party, excluding cooperative extension and experiment station work, road building and management of forest reserves, involved in 1921 a total expenditure of nearly $15,000,000, of which the department supplied $5,844,307.

Leading purposes of the central government in fostering cooperation have been to provide for the more adequate scientific investigation of matters of general interest from a national or regional standpoint and to promote nation-wide movements of various kinds. As pointed out in the report, "the scientific work which the government, the states and local institutions are called upon to perform is so vast and so varied that it is beyond the ability of a local or national agency to accomplish, working alone. Much of it is regional or national in importance or is for the benefit of science as a whole. To prevent its being fragmentary and disconnected, systematized effort is manifestly important."

The survey shows that cooperative scientific work is on a large scale and steadily increasing. In fact it is evident, as the report states, that such cooperation "has become a recognized principle of government." The number and range of the cooperative projects make it clear that "the states have no hesitation in joining hands with the federal government in carrying on research and development work of interest to them. . . . And that there is a manifest tendency on the part of the states to seek the aid of the federal government in measures of general or regional interest, and to link their efforts with those of the central agency, is shown by the fact that such proposals frequently originate locally."

SCIENTIFIC EVENTS

SCIENTIFIC RESEARCH IN AUSTRIA IN 1922[1]

IN a short report to the government, which demonstrated the meagerness of the regular appropriations to the scientific research institutes, Professors Becke and Rademacher asked for larger appropriations, and enumerated the most important investigations conducted last year in this country. Apart from the publications dealing with the geographic and ethnographic researches in the Balkans in 1915-1918, when our armies occupied these countries, the results of which were made known in 1922, one of the most important papers was that by Dr. Schedler, who made geomagnetic surveys in thirty different places and found marked differences and changes from the values heretofore accepted.

The Vienna Radium Institute, a private concern, has done excellent work in the investigation of radioactive substances. It has been shown that the age of certain mineral deposits can be estimated according to the proportion of transformation or decay of the radioactive substances contained in them. While the uranium-pitchblende of Bohemia is about 200 million years old, in Norway there are minerals at least twice as old, and in Ceylon the layers of thorianite have been found to be at least 500 million years old.

A tremendous amount of work is still going on in the biologic institute (Vienna). Here the problems of transplantation have attracted the attention of a number of gifted investigators. The pupils of Przibram study especially the physiology of transplanted eyes, hearts and legs. Koppanyi has succeeded in transplanting eyes in rats, and these eyes seem to be functioning. At a recent meeting of the Vienna Ophthalmologic Society, his experiments were vehemently attacked by the oculists, but just as vehemently defended by the physiologists. Dr. Weiss transplanted entire limbs in amphibia, exchanging, for instance, arms and legs, and demonstrated that these transplanted limbs functioned normally after

[1] From the *Journal* of the American Medical Association.

a few days. In a group of these animals, he could even transplant whole hearts into the peritoneal cavity. These transplanted hearts obtained an organic union with the new host, the animal thus having two hearts.

In the chemical laboratories of the university, important researches on the catalytic effects of copper and of the methyl-groups of methylated benezene compounds are in progress. In the physical institute, studies on colors and their differentiation are conducted by Dr. Duschek-Frankfurt. A prehistoric cave, discovered in the Styrian Alps near Mixnitz, gave opportunity for the study of animals and plants of diluvial times, while the results of botanic researches in the Far East and in the African Sudan, begun by Austrians before the war, have been published recently.

PHYSICS IN INDUSTRY AT THE WEMBLEY LABORATORIES[1]

THE General Electric Company, Ltd., is now a very large organization, which employs some twenty thousand workers. It has engineering works at Birmingham, where it manufactures all kinds of electrical machines. At Stoke, near Coventry, telephones are manufactured. At the Osram lamp works at Hammersmith, lamps and valves of all kinds are made. At Erith, the company took over a few years ago the works of Messrs. Fraser and Chalmers, which manufacture steam turbines and mining plants. At Southampton, electric cables of all kinds are manufactured, and the company has glass works at Lemington-on-Tyne. Mainly on the initiative of Mr. Hugo Hirst, the managing director, it was decided some six years ago to establish a central laboratory to carry out the scientific and industrial researches which are essential for the progress of industry. Mr. Clifford Paterson, who was then the head of the electro-technical department of the National Physical Laboratory, was appointed superintendent, and he is now helped by a staff of physicists and engineers, many of whom have world-wide reputations.

The opening of the research laboratories on February 27 was a very interesting function. Lord Robert Cecil, speaking at the opening ceremony, said that the immediate task of the country is to repair the waste of the war. To do this the first and most essential requirement is to use every endeavor to increase the output of human energy and skill. This can only be done in two ways, namely, by reducing expenditure and by increasing the efficiency of production. Research, by making every man's skill go further, adds to the world's wealth. Science has no territorial boundaries. By promoting research the relations between this country and the world are improved. Sir J. J. Thomson, who also spoke, pointed out that it is absolutely necessary that a research laboratory should have a highly efficient staff. The capacity for the highest kind of research is rare. Training may increase the efficiency of a researcher, but it can not put insight and originality into him. It is also certain that no research laboratory can guarantee delivery. The output of such a laboratory is always highly irregular and spasmodic. Sir Joseph Thomson also dwelt on the importance of cultivating the thinking powers of the community to the utmost.

The research laboratories are situated near Wembley and have a total floor area of 80,000 square feet, but they have ample room for expansion. The building has a north-light roof and nearly all of it is only one story in height.

[1] From an article in *Nature*.

THE UNIVERSITY OF MICHIGAN BIOLOGICAL STATION

THE fifteenth session of the University of Michigan Biological Station will be held on the shores of Douglas Lake, Cheboygan County, Michigan, during the eight-week period from July 2 to August 24. This station offers unique advantages for the study of a fauna and flora marked by the inclusion of the northern boreal forms and many of the forms characteristic of the region further south, the area being in the transition zone between the northern-eastern coniferous forest area and the central deciduous forest. The summer climate of this region is ideal for outdoor work of all kinds.

The station is conducted as a camp, with log and frame buildings for laboratories and small frame houses and tents for living quarters. A mess, operated on the cooperative plan, furnishes table board for the members of the station. Located six miles from the