its kind to be held, attracted 1,700 investigators from thirteen different countries. Two years later followed the second congress which was broader in its scope, including discussions on pulverized fuel, low temperature carbonization of coal, rubber from coal, the hydrogenation of coal and by-product nitrogen. Speakers during the two conferences have included M. Georges Claude, Dr. Friedrich Bergius, Professor Franz Fischer, Dr. C. H. Lander, Dr. R. Lessing, General Georges Patart, Dr. Fritz Hofman, Dr. Karl Krauch and many other fuel technologists.

AERONAUTIC RADIO RESEARCH AT THE BUREAU OF STANDARDS

THE development of radio aids to aviation is being forwarded through work of the National Bureau of Standards, which is operating also as the research division of the Aeronautics Branch, Department of Commerce. In recent months improvements have been made in equipment for use with the system of radio range beacons which the department is installing on the airways. Since a beginning has been made in the installation of beacons of the type which operate a visual indicator, a greater need has been felt for an automatic volume control on the receiving set used aboard the airplanes. Such a device has been developed at the bureau. It relieves the pilot entirely of manipulation in the use of the visual indicator of the beacon signals. It can be used to advantage also in receiving aural-type beacon signals. Another application is in connection with the runway localizing beacon for use either at airports or as part of the system of blind-landing aids which is being developed at the bureau. In connection with the automatic volume control, a deflection instrument is used which serves as an approximate distance indicator. Recent experiments have also added a means of indicating when the airplane is directly over the beacon transmitter, so that the landing field location is thus conveniently and directly indicated to the pilot.

Another device developed at the bureau to facilitate the use of the visual-type range beacon is the "deviometer." By its use a pilot can follow any chosen course, within limits, on either side of the equi-signal line for which the beacon transmitter is adjusted. It is a shunting arrangement which varies the relative current in the coils actuating the two reeds of the reed indicator, and a pointer indicates the number of degrees off the equi-signal line for which the deviometer is set. The device has been found useful in experimental flight tests. The bureau recently furnished one to an air transport company for service tests.

As part of the aeronautical radio work at the bureau special attention has been devoted to receiving sets. For receiving both telephone messages and beacon signals aboard an airplane, receiving sets of special design must be employed. They must be so designed as to function under particular conditions of vibration, local interference, small input voltage, high output level required, and special audio-frequency requirements. The basic designs for such sets have been developed at the bureau. It also keeps in touch with commercial developments in aircraft radio receivers by means of laboratory measurements and experimental trials on an airplane. Satisfactory receiving sets are now found to be available commercially.

SHIPPEE-JOHNSON PERUVIAN EXPEDITION

THE Shippee-Johnson Peruvian Expedition will sail from New York on December 5 to carry out, with the endorsement of the American Geographical Society, a program of aerial mapping in various parts of Peru. The expedition is equipped with two Bellanca cabin monoplanes, one of which will be used for photographic work and the other for transporting supplies. The photographic plane in addition to being equipped with the most up-to-date and efficient of photographic apparatus has a supercharged 300 horse-power motor which will make it possible to rise to altitudes up to 28,000 feet for photographic work in the Maritime Cordillera of the Andes.

The primary purpose of the expedition is to map from the air and study and photograph on the ground the little known agricultural communities on the floor of the deep gorge of the Colca River some seventy miles north of Arequipa. The Chimú Valley, the site of Chan-Chan, the capital of the kingdom of the Great Chimú, whom the Inca conquered shortly before the Spanish conquest, will also be photographed from the air and an attempt will be made to discover whether aerial mapping in the heavily forested eastern valleys of the Andes and the Amazon lowland is feasible.

Lieutenant George R. Johnson, co-leader and photographer of the expedition, served as chief photographer of the Peruvian naval air force during 1928 and 1929, and during that time made a remarkable series of aerial photographs of Peru, a selected group of which the American Geographical Society has just published as full-page illustrations (8½ by 6½ inches) in a book entitled "Peru from the Air."