partment of Industries of the government of India in which chemists, botanists, zoologists, and so on will be formed into distinct, watertight, graded services, each under the control of a departmental head; and (*b*) decentralization under which the scientific workers at the various universities and research institutes will be given as free a hand as possible.

The policy of centralization and the creation of graded scientific services have been strongly advocated by the Indian Industrial Commission, which was presided over by Sir Thomas Holland, formerly director of the Geological Survey of India. It is favored by a number of administrators in India who consider that some measure of official control is necessary for all scientific investigators, and it has also received the support of several of the scientific witnesses examined by the commission. The arguments advanced by Sir Thomas Holland and his supporters in favor of centralized scientific services are set out in detail in Chapter IX. of the Report of the Indian Industrial Commission, published last year.

PORTLAND CEMENT IN 1919

PRELIMINARY estimates compiled by the United States Geological Survey, Department of the Interior, indicate that the production and shipments of Portland cement in 1919 increased 13 and 21 per cent., respectively, over those in 1918 and that the stocks decreased 52 per cent., so that at the end of 1919 less than 5,000,000 barrels of Portland cement was in stock at the mills. The Portland cement industry was set back considerably in 1918, when war restrictions reduced the shipments from the 90,703,474 barrels shipped in 1917 to 70,915,508 barrels, but it is now regaining its lost ground. Early in 1919 the business was even poorer than in 1918, and practically all the increase reported was made during the latter part of 1919, so that 1920 started with favorable prospects for the cement industry. During 1919 the shipments from some mills were limited by the lack of freight cars. The increase in the value of the cement shipped in 1919 over that shipped in 1918 was about 28 per cent.

The shipments of Portland cement in 1919 amounted to 85,485,000 barrels, valued at $144,461,000; the production amounted to 80,287,000 barrels; and the stocks at the mills at the end of the year amounted to 4,976,000 barrels.

One new plant produced Portland cement in 1919—the Indiana Portland Cement Co., at Greencastle, Ind. The total number of plants that produced cement in 1919 was 110, and the total number of plants that shipped cement was 113. The average factory price per barrel for Portland cement in bulk in individual states in 1919 ranged from $1.57 in Kansas to $2.03 in Utah. The average factory price for the whole country in 1919 was $1.69, an increase of only 6 per cent. over 1918.

The exports of hydraulic cement from the United States in 1919 amounted to 2,463,689 barrels, valued at $7,516,019, or $3.05 per barrel, increases of about 9.27 and 16 per cent., respectively, over 1918.

THE INVESTIGATION OF FATIGUE PHENOMENA IN METALS

IN 1915 Mr. Ambrose Swasey gave a fund of several hundred thousand dollars, the income of which was to be used "for the advancement of arts and sciences connected with engineering and for the benefit of mankind." The income of this fund has been given in small amounts to various engineering investigations by the Engineering Foundation, which is the body organized to administer the fund. Last spring the governing board of the foundation decided that it would be advisable to give the bulk of the income for the support of one major research, and they asked the National Research Council to recommend some piece of research to be supported.

During the war the National Research Council had organized a committee to study the failure of crank shafts of airplane engines, of welded ship plates, and of other metal parts of machines under the repeated loads applied to them in service. The committee on fatigue phenomena in metals was

the title of the committee. Its chairman was Professor H. F. Moore, of the department of theoretical and applied mechanics, of the University of Illinois, and during the war and afterward some small pieces of research work were carried out under the auspices of the committee, mainly in the materials testing laboratory of the college of engineering of the University of Illinois by the chairman of the committee, and by W. J. Putnam, and A. G. Gehrig. The National Research Council recommended that the bulk of the income of the Engineering Foundation be given to the support of an extensive investigation of the resistance of metals to fatigue under repeated loading, and that Professor Moore be asked to take charge of the investigation.

Engineering Education, from which these facts are quoted, states that the formal arrangements have been completed for the active prosecution of this work, with headquarters and a laboratory at the University of Illinois. The financial support for the investigation will amount to $30,000, and it is expected to extend over a period of two years. Material for study and apparatus is already arriving, and a room is being fitted up for the installation of the score or more of special testing machines which will be required for the investigation.

The investigation is under the joint auspices of the Engineering Foundation, the University of Illinois Engineering Experiment Station, and the National Research Council, the last-named body being represented by an advisory committee of nine members, of which Professor Moore is chairman. In addition to the funds supplied by the Engineering Foundation, the university furnished Professor Moore's services, light, heat, power, a laboratory room, and the use of the standard testing equipment of the materials testing laboratory.

SCIENTIFIC NOTES AND NEWS

The degree of doctor of laws was conferred on Professor Theodore W. Richards, director of the Wolcott Gibbs Laboratory of Harvard University, at the University Day exercises of the University of Pennsylvania.

Professor Anton J. Carlson, chairman of the department of physiology at the University of Chicago, has been made an honorary M.D. by the University of Lund, Sweden. Professor Carlson has also been made a corresponding member of the French Biological Society.

Professor J. M. T. Finney, of the Johns Hopkins University, and Dr. Charles H. Mayo, of Rochester, Minn., have been elected honorary fellows of the Royal College of Surgeons of England.

Mr. Gifford Pinchot, of Milford, Pa., former chief forester of the United States, has been appointed commissioner of forestry of Pennsylvania by Governor Sproul to succeed Robert S. Conklin, of Columbia, who resigned to become a member of the State Water Supply Commission.

Dr. Henry Graves, chief of the U. S. Forest Service, and Albert F. Pottee, associate forester, have resigned.

Professor Robert B. Riggs, for thirty-three years professor of chemistry at Trinity College, will retire at the close of the present college year.

Mr. R. M. Brown, formerly librarian of the Coast and Geodetic Survey, has accepted an appointment with Rand, McNally and Company, to prepare and edit material for a new edition of their atlas of the world.

Mr. George A. Rankin, formerly with the Pittsburgh Plate Glass Company, and captain in the Chemical Warfare Service during the war, has joined the staff of the Geophysical Laboratory of the Carnegie Institution of Washington.

Julius Matz, formerly with the Florida Agricultural Experiment Station and for the past year assistant plant pathologist at the Insular Experiment Station of Porto Rico, has been appointed chief of the division of botany and plant pathology at the Insular Experiment Station, Rio Piedrus, P. R., beginning on January 1, 1920.