minimum of time for administration. The university and state administrations were able and willing to give him cordial support, and he made his laboratory the resort of all who were pursuing plant-physiological studies or were interested in them.

His long list of publications, beginning with one on mosses, plant-geographical in character, and one or two embryological papers, not only opened the way for plant-physiological work by many others, but directed and to a great extent molded their studies. He not only influenced botanical study, but his osmotical investigations were and are of fundamental importance in physical-chemistry. As friends and neighbors for years, Pfeffer and Ostwald conversed and thought together, to the corresponding advantage of the sciences to which they were devoted.

Two publications stand out from the many because of their general, rather than special, botanical interest, namely the Handbuch der Pflanzenphysiologie, which passed through two editions and in the second was translated by Ewart into English, and was the great reference book in plant-physiology for two generations; and the Jahrbücher für wissenschaftliche Botanik, founded by Pringsheim, and continued after Pringsheim's death and until Strasburger's, in collaboration with him. The Untersuchungen aus dem botanischen Institut zu Tübingen, which lasted only during Pfeffer's stay at the south German university, gave him experience in the mechanical detail as well as in the editorial work of serial publication.

Pfeffer is survived by his widow, his daughter-in-law, and a grandson. He had one child, a son who was of age to be one of the direct sacrifices of the war, and presumably was. But he himself, a man of deep feeling and clear vision, must also have been a sacrifice.

Just as the war began, a jubilee volume was being prepared to celebrate the fiftieth anniversary of his doctorate and his seventieth birthday. Contributions had been promised by his students all over the world. With the coming of war many found themselves prevented from sending their papers, and in consequence the Jubilee Volume which appeared in 1915, as part of the Pringsheim series of Jahrbücher, contained only a fraction of the contributions to science which his students had planned to make in his honor.

Belonging to an age in Germany in which ideas were more sought than discipline, when scholarship was more honored than military rank, when a professor was more likely than a tradesman to become a Geheimrath, his life lasted through the fall of German imperialism and came to an end before German reconstruction was more than begun. Honors, national and international, were conferred upon him; and we who had the privilege of studying under his direction will continue to honor him as an inspiring teacher and a great example of scholarly devotion and productiveness.

G. J. P.

SCIENTIFIC EVENTS

THE ORGANIZATION OF SCIENTIFIC WORK IN INDIA[1]

The reorganization and development of scientific work in India are now under consideration, and important and far-reaching decisions on these questions will shortly be made by the Secretary of State. It has already been decided, both by the government of India and by the Secretary of State, that large sums of money must be found at the earliest possible moment for the purpose of fostering the development of the Indian empire by means of scientific research. The principle of state aid on a generous scale has been accepted, but the important question of the best method of utilizing this form of assistance in the future development of India remains to be settled. These matters were referred to by the Viceroy on January 30 last in his speech opening the present session of the Imperial Legislative Council at Delhi. It is evident from the report of Lord Chelmsford's remarks which appeared in the London *Times* of February 6 that the government of India is now considering large schemes of expansion in regard to the scientific activities of the state.

Two policies at present hold the field: (*a*) Centralization under a proposed Imperial De-

[1] From *Nature*, February 19, 1920.

partment of Industries of the government of India in which chemists, botanists, zoologists, and so on will be formed into distinct, water-tight, 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