

accumulated, and it is open to a political pioneer, not necessarily a lawyer, to take in hand a matter which affects immediately an important section of our industrial community—labour and capital.

Should a definite organisation result it would probably be extended to embrace the whole range of vegetable textile materials which we estimate to affect directly the interests of one-third of the working community. C. F. CROSS.

PROF. J. W. JUDD, C.B., F.R.S.

MANY will regret to hear of the death of Prof. John Wesley Judd on March 3 at his home in Kew, after some months of illness. He was born at Portsmouth on February 18, 1840, but in his eighth year went to London with his father. There he attended a school in Camberwell, and at an early age showed a love for astronomy and geology. When grown up he accepted a mastership in a school at Horncastle, Lincolnshire, where his spare time was devoted to chemistry and geology. In 1863 he became a student at the Royal School of Mines, after which he took the post of analytical chemist in some important iron and steel works in Sheffield. There began, in 1864, his friendship with H. C. Sorby, who imparted to him his newly-devised methods of petrological study, but his work in that city was brought to an end by a railway accident, which for a long time compelled him to abstain from continuous labour, so he resumed his geological studies in Lincolnshire.

In 1867 Judd joined the Geological Survey, and for the next four years was engaged in mapping Rutlandshire, with parts of the adjoining counties. But in 1871 a desire for greater freedom led him to accept an offer of temporary employment in the Education Department, and during this time began his studies of the Wealden deposits. When this work had come to an end, he devoted himself to investigating the Triassic and Jurassic deposits in Scotland and of the igneous rocks so grandly displayed in its western islands. This was a difficult task, owing to the want of good maps and to travel in that part of Scotland being less easy than at the present time. The result was a group of important papers, the first of which appeared in 1873.

These attracted much attention and led to friendships with Charles Lyell, Poulett Scrope, and Charles Darwin, the second of whom commissioned him to carry on an investigation of the volcanic districts of Europe, which he had been obliged to abandon. In April, 1874, Judd visited the Lipari Islands, going on to Vesuvius, the Phlegrean fields, and the adjacent volcanic district. He also studied the Ponza Islands, on which Scrope had published an important paper in 1827, with the great crater lakes of Central Italy, the Euganean Hills, and the volcanic districts of Hungary. After his return to England he was appointed, in 1876, professor at the Royal School of Mines in succession to Sir Andrew Ramsay. He at once began to organise the teach-

ing, but there was not room at Jermyn Street to do this effectively, so his department was soon transferred to South Kensington, and ultimately lodged in galleries which had been constructed for the 1862 Exhibition. There he established a complete system of instruction, which was then unequalled and has never been surpassed in this country, and, in addition to this, his lucidity, patience, and kindness as a teacher secured him a full and attentive classroom. In 1896 he became Dean of the Royal College of Science, and in 1905 retired under the rule of age. It is painful to add that, after accomplishing so great a work, the officials of the Government awarded him a lower pension than he had expected, on a pretext which, if in accordance with the letter of a law, was certainly inequitable.

Judd was elected a fellow of the Geological Society in 1865, was secretary from 1878 to 1886, and president from the latter year until 1888. In 1891 he received the Wollaston medal. He was elected F.R.S. in 1877, and twice served on the council. In 1885 he was president of Section C, when the British Association met at Aberdeen, and subsequently received the degree of LL.D. from that university. In 1895 he was created a C.B., and in 1913 was made an emeritus professor of the Royal College of Science. He married in 1878 Jeannie Frances Jeyes, niece of a well-known Northamptonshire geologist, who with a son and a daughter survive him.

A list of Judd's geological papers up to 1905 (after which they become rather infrequent) is added to a biography in the *Geological Magazine* for 1905. The majority fall into groups, determined by his successive fields of work, almost all appearing in the *Quarterly Journal* of the Geological Society or the *Geological Magazine*. The first group contains papers on the Neocomian, the most noteworthy clearing away many difficulties from the Speeton Clay, and showing its relation to the Neocomian beds of the Lincolnshire wolds and of North Central Europe. Another and most important group of papers deals with the Italian islands, mentioned above, the crater lakes of Central Italy, and Lake Balaton, with the old volcano of Schemnitz in Hungary, after which the older volcanic districts, especially those connected with the Alpine system, are discussed. A third not less important group refers to Scotland, in which he investigated sundry igneous rocks on the mainland and those of Tertiary age in Skye and other islands of the western coast. These papers put an end to many misunderstandings and added much to our knowledge, although his view that the gabbro is later than the granite has not been accepted by the Survey. That also, expressed in two papers, on the relation of the fluvio-marine beds of Headon Hill and Colwell Bay in the Isle of Wight has not found favour, but the two on deep borings in the London district added much to our knowledge of the underground geology of south-eastern England.

For minor papers we must refer to the above-named list, but must not forget his presidential

address; the one on past and present relations between geology and mineralogy, the other on those between mineralogy and palæontology, where he attributed life to crystals, or his study of the borings in the Nile Delta, his petrological investigations of the rocks ejected from Krakatoa in 1883, and his studies of the materials from the Funafuti borings, all published by the Royal Society. The last involved much organisation, of which he took the lion's share. The Survey memoir on the geology of Rutland (1875) was written by him, and a small but excellent book on volcanoes in 1878. He twice revised and added much to Lyell's "Students' Elements of Geology" (1896 and 1911), and contributed the "Coming of Evolution" to a Cambridge series. In this small volume he tells the story, brightened by his reminiscences of the chief actors, in a most attractive way. He was a man whose like will not readily be found.

T. G. BONNEY.

DR. PIERRE CHAPPUIS-SARASIN.

PHYSICAL science has suffered a severe loss in the death of Dr. Pierre Chappuis-Sarasin, formerly of the Bureau International des Poids et Mesures at Sèvres, who passed away at Basle on February 15.

Dr. Chappuis was born in Switzerland in 1856, and his early youth was spent in his native country. In 1881 he joined the staff of the Bureau International, then under the directorship of Dr. O. J. Broch. One of the most important early tasks of the newly-founded International Committee of Weights and Measures was to place upon a proper basis the whole system of the measurement of temperature, to define with precision the temperature-scale to which all measurements relating to length and mass were to be referred, and to set up the necessary ultimate standards. The classic work of Regnault and of Rowland had shown that practical realisation of temperatures by the gas-thermometer depended on the working limits of pressure adopted and the choice of the gas selected as thermometric substance. It was to the solution of the problem of a satisfactory ultimate thermometric standard that Dr. Chappuis at once devoted himself, and his brilliant investigations carried on at the Bureau over a period of more than twenty-two years have won him a place in the very front rank of physicists concerned with the science of exact measurement. His classic memoir on the gas-thermometer published in vol. vi. of the "Travaux et Mémoires" describes his researches on the coefficient of expansion of different gases suitable for thermometric substances, and led to the adoption by the International Committee in 1884 of the fundamental hydrogen scale of temperature.

Among other investigations may be mentioned his determination of the volume of the kilogram of water, employing the optical methods of Benoit and Michelson, and measurements to very high precision of the expansion of mercury and of water.

Family claims and the call of his native moun-

tains led Chappuis to resign his connection with the Bureau and return to Switzerland in 1903, adopting the additional name of Sarasin, to which well-known family his wife belonged. He built himself a fine private laboratory at his house at Basle, where until quite lately he continued his researches. His last considerable piece of work, hitherto unpublished, was a redetermination of the sulphur boiling point. In these experiments the quartz reservoir of the gas-thermometer was directly immersed in sulphur vapour.

M. Chappuis was of a retiring disposition, disliking self-advertisement, and rarely appeared on scientific platforms. He visited the British Association at the Dover meeting. It is impossible for one who knew him well to conclude this memoir without a tribute to his genial disposition, his indomitable energy and high personal character. All who knew him in his hospitable home at Sèvres or Basle will feel they have lost a true friend.

J. A. HARKER.

A COMMONWEALTH INSTITUTE OF SCIENCE AND INDUSTRY.

WE have just received a copy of the report of a committee appointed in pursuance of a motion passed at a conference convened by the Prime Minister of the Commonwealth of Australia that "An Advisory Committee be constituted to formulate proposals to the Government to establish a Commonwealth Bureau of Science and Industry." The members of the committee were: Representatives of universities:—Sydney—Sir T. Anderson Stuart; Melbourne—Prof. Orme Masson; Queensland—Prof. A. J. Gibson; Adelaide—Sir Douglas Mawson. Interstate Commissioners:—Mr. A. B. Piddington, the Hon. G. Swinburne. The Associated Chambers of Commerce of Australia:—Mr. W. T. Appleton. The Associated Chambers of Manufactures of Australia:—Mr. W. W. Forwood, Messrs. G. D. Delprat, W. P. Wilkinson (Commonwealth analyst), W. S. Robinson, J. M. Higgins, W. Russell Grimwade, E. W. Knox. Ex-officio Members:—Prime Minister of the Commonwealth; the Hon. F. Hagelthorn, Minister of Agriculture, Victoria; the Hon. W. Lennon, Minister of Agriculture, Queensland; the Hon. C. Goode, Minister of Agriculture, South Australia.

It will be noticed that the committee includes representatives of commerce and manufacture as well as of science and departments of State. We understand that the committee's report, which is subjoined, has the approval of the Federal Government, and that it is probable a Bill will be laid before the Federal Parliament to give effect to the recommendations after the Prime Minister's return from his present visit to England. The proposals of the committee are on lines somewhat similar to those of the British Government's scheme for the organisation and development of scientific and industrial research. Primary as well as secondary industries are included, and particular notice may be directed to the recommendations as to the governing body