upon cultivation, to a reduction in the cost of production. The importance of the matter to an industry consuming $1\frac{1}{2}$ million tons of fuel in a year can be readily appreciated.

It is obvious, therefore, that a very wide field lies before the British Portland Cement Research Association, and the scope both for scientific and for industrial research is ample warrant for the existence of the association for some years to come.

The British Portland Cement Research Association was incorporated in November, 1918, and had the advantage of being founded upon the research department of the two largest cement manufacturers in the country. This research department had been in existence for five years, and had gathered together an experienced staff and a valuable equipment of scientific apparatus, while the large amount of spade-work that had been done has proved of great value to the association. Both staff and equipment were taken over entire, so that no time had to be spent in organisation, and research was in progress from the first day of the association's existence.

The council of the association has addressed itself in the first instance mainly to the industrial side of research, and the chief activity has been the investigation of the thermal efficiency of rotary kilns. The basis of this investigation has been the fact that the consumption of fuel in an ideal kiln for cement calcination would be no more than 15 per cent., compared with the 30 to 40 per cent. consumptions which are prevalent in actual practice to-day. Another prominent subject of investigation has been the mechanics of pulverising and grinding, and the importance of this will be realised when it is stated that, as a rule, the production of Portland cement involves reducing to powder three materials with a total weight three times that of the final product, the power so absorbed ranging from 60 to 150 h.p.-hours per ton of cement.

A feature of investigations of this nature has been the commercial scale upon which they have been undertaken, involving the presence of the research staff of engineers and chemists upon the factories of one or other of the members of the association, and this intimate connection with the practical side of the industry has been of value in preventing research becoming too academic and too far removed from practical issues.

The purely scientific side, however, has not been neglected, and in the laboratories of the association at Greenhithe researches upon the setting of cement, the influence of raw materials upon cement, and other chemical subjects are in progress, while an experimental grinding mill has also been set up in the laboratory.

The aim of the association may be briefly summarised as an attempt to cheapen the production and to improve the quality of cement, and the achievement of this aim cannot fail to benefit the consumer while tending to stabilise the British industry.

The hearty co-operation of British manufacturers in this enterprise is shown by the fact that more than 90 per cent. of their number are members of the association.

Revel ast. Dec. 15 \$ 506

Obituary.

SIR WILLIAM ABNEY, K.C.B., F.R.S. NOTHER of the conspicuous leaders of A British science who rendered the latter part of the nineteenth century and the commencement of the twentieth so famous as a time of remarkable progress, and whose name was almost a household word throughout the land, passed away on December 2 in the charming and unique personality of Sir William de Wiveleslie Abney. Sir William Crookes, Sir Norman Lockyer, and now Sir William Abney-the recent months have indeed been heavy with fate for that glorious band of scientific workers, and the only consolation that these severe losses in the front rank leave with us is the knowledge that their great work was done, that their last paper was written with all their full mental powers, and that they passed away, at a ripe age truly, but before any failure of their great master minds became evident to the world at large.

Sir William Abney will ever be remembered, especially under his better-known earlier designation as Capt. Abney, for four things in particular: for his great services to the nation and to the cause of science in the Department of Science and Art at South Kensington; for his researches

NO. 2667, VOL. 106

on the infra-red of the spectrum, leading on to his masterly use of the spectrum in regard to colour vision and colour measurement; for his development of photography into an exact science; and for his studies of the forms of ice and snow in the high Alps. Those of us who had the great privilege of attending his lectures on colour and its measurement at the Royal College of Science, where for many years he was occasional lecturer in physics, will ever regard those hours as among the most delightful and thoroughly enjoyable ever spent in a lecture-room. They were brilliant, not for what was said so much as for what was done, for the experiments were ever most elegant, beautiful, and even exquisite as regards the pheromena exhibited, and marked by an originality which was the direct outcome of a most original mind. It was a still greater privilege to be able to follow him into his research laboratory, and to see something of the most fascinating experimental work going on there, with the aid of his devoted assistant, Mr. Walter Bradfield, and which at frequent intervals resulted in a paper to the Royal Society, of which Sir William was elected a fellow so early as the year 1876.

Yet perhaps the most charming side of Sir

William Abney's personality was brought out during his annual summer visits to his beloved mountains. There, among the monarch peaks, glaciers, and snowfields of the Swiss, French, and Italian Alps, he was at his best, a most delightful companion, from whom one learnt something of value almost every moment, and by association with whom one learnt to appreciate the beauty and the "call" of that magnificent world, high up above the vain ambitions and struggles of the world below, in a manner which became one of the highest experiences of one's life. For Sir William was not merely a man of science; he was also both a philosopher and an artist.

He saw and realised the beauty of the natural world as few perceive it, and he had quite a gift of expressing it in water-colours, yet was never satisfied, because he alone understood in so unique a manner how utterly inadequately the pure colours of sky and sea, landscape, and the eternal snows of the Alps can ever be imitated in pigments. And the luncheons on the ice, high up above the Alpine valleys, or the after-dinner talks when the expeditions were over, with the congenial company of distinguished climbers, such as his old friends, Mr. Horace Walker and his sister, Miss Lucy Walker, Mr. Matthews, Mrs. Jackson, Mr. Eccles, Miss Venables, and M Loppé-these are all memories of Sir William in his happiest moments, when, with Lady Abney and Miss Janet Abney, and often other members of his family, the most delightful anecdotes and stories from his immense répertoire used to delight all within earshot.

Sir William was the eldest son of Canon Abney, of Measham Hall, Leicestershire, and was born on July 24, 1843. He was educated at Rossall, and became Lieut. R.E. in 1861, and Capt. in 1873. He was president of the Royal Astronomical Society from 1893 to 1895, and of the Physical Society from 1895 to 1897. He was also chairman of the Royal Society of Arts in 1904. He was created K.C.B. in 1900, and was Hon. D.Sc. and D.C.L. of several universities. He was Principal Assistant Secretary, Board of Education, from 1899 to 1903. Besides his very numerous scientific memoirs to the Royal Society and other learned societies, he is perhaps best known for his published books, the chief of which are : "Instruction in Photography" (1870), "Treatise on Photography" (1875), "Colour Vision," "Colour Measurement and Mixture" (1893), "Thebes and its Five Great Temples" (1876), "The Pioneers of the Alps" (with C. D. Cunningham, 1888), and "Trichromatic Theory of Colour" (1914).

The moment, however, is not one for the appraisement of so full a life of scientific work, for the loss of his many-sided delightful personality is too fresh upon us. It is rather of the kindly, genial, and altogether lovable man himself that we think, and deplore the fact that nevermore shall we see his burly form and jovial face, and hear his cheery words, ever full of inspiration to all that was highest and best.

A. E. H. TUTTON.

MR. WILSON HARTNELL, who died on November 10 in his eighty-second year, was well known in connection with his work on steamengine governors. He was elected a member of the Institution of Mechanical Engineers in 1872, and his paper on automatic expansion gears, read in 1882, has been a mine from which hosts of engineers interested in governors have extracted theorems and data of great practical value.

SIR FREDERICK TAYLOR, BT., who died on Thursday, December 2, was born in 1847, and received his medical training at Guy's Hospital. He proceeded to the degree of M.D. at London University in 1870, and was university scholar in obstetric and forensic medicine; later he represented the university on the General Medical Council. Sir Frederick was appointed consulting physician to Guy's Hospital, and remained in close touch with that institution throughout his life; he was also physician to the Seamen's Hospital, Greenwich. In 1907 he delivered the Harveian Oration. His career reached its culminating point when he was elected president of the Royal College of Physicians, and had illness not intervened he would probably have been re-elected for a Sir Frederick was the second term of office. author of numerous contributions to medical societies and journals, although he is probably best known for his "Practice of Medicine," a standard work which has reached its eleventh edition.

Notes.

It has been generally understood that the Water Power Resources Committee of the Board of Trade has for some time been considering the possibility of tidal-power development, with special reference to the Severn estuary. In view of this it would be of interest to know to what extent the scheme formulated by the Ministry of Transport has been influenced by the conclusions of that Committee. As outlined and illustrated in the *Times* of November 26, the scheme would appear to be open to certain weighty objections, and, in view of the large number of technical problems, alike in mechanical, electrical, and hydraulic engineer-

NO. 2667, VOL. 106]

ing, which require to be co-ordinated and solved before any such scheme can be embarked upon with any certainty of ultimate success, there would not appear to be any likelihood of its materialising immediately. At the same time the prospects of the scheme, should it prove commercially and mechanically feasible, are so great that every endeavour should be made to have the matter investigated in the fullest detail by a strong technical and scientific Commission. As pointed out in NATURE of June 3 last, much still requires to be known on such questions as those regarding the effect of the proposed barrage on the