

the teaching of science. He was an impressive preacher and an exceptionally fine lecturer, and to many generations of his boys the memory of his personality will ever remain one of the most powerful influences of their lives.

Cooke was, indeed, one of the really great men who touched nothing that he did not adorn. He had no mean reputation as a classical scholar and his dual record—Senior Classic and Doctor of Science of Cambridge—must be unique. In 1920 he retired to the Eton living of Mapledurham, where, attracted to the study of archæology, he quickly mastered a new subject and produced, in 1925, his fascinating book, "The Early History of Mapledurham". It was here that he died on November 28. T. H. S.

WE regret to announce the following deaths:

Dr. Aristarch Belopolsky, vice-director of the Central Astronomical Observatory, Pulkovo, U.S.S.R., on May 16, aged eighty years.

Prof. O. D. Chwolson, formerly professor of mathematical physics in the University, Leningrad, on May 11, aged eighty-two years.

Dr. J. W. Leather, agricultural chemist to the Government of India in 1892–1916, on November 14, aged seventy-three years.

Dr. Theobald Smith, For.Mem.R.S., formerly director of the Department of Animal Pathology of the Rockefeller Institute of Medical Research, New Jersey, aged seventy-five years.

News and Views

Charles Augustus Young (1834–1908)

AMONG the many eminent American astronomers of last century, few were better known than Charles Augustus Young, the centenary of whose birth occurs on December 15. As a pioneer of solar spectroscopy, he was second to none, while his great gifts as a writer and teacher gained for him a world-wide reputation. Born at Hanover, New Hampshire, where both his father and grandfather had held chairs in Dartmouth College, he graduated in 1853, and then after a tour in Europe with his father, for a few years taught classics and theology. At twenty-three years of age he was made professor of mathematics in Western Reserve College, Ohio, and from that time onwards devoted himself to astronomy. The Civil War for a short time interrupted his work, but in 1866 he succeeded his father in the chair of astronomy at Dartmouth College, and eleven years later succeeded Alexander as professor of astronomy at Princeton, a position he held until his retirement in 1905. Although he made investigations of the spectra of the planets, comets, stars and nebulae, his main interest was in solar investigations. He observed total solar eclipses at Burlington, Iowa, in 1869, at Tenez de Frontena, Spain, in 1870, at Denver in 1878, in Russia in 1887 and in North Carolina in 1900. It was in connexion with the eclipse of 1870 that he made his striking discovery of the so-called 'reversing layer'. He observed the transit of Venus of 1874 at Peking and that of 1882 at Princeton. His well-known book "The Sun" appeared first in 1881, while later he published his "General Astronomy", 1889, "Elements of Astronomy", 1891 and "Manual of Astronomy", 1902. His book on "The Sun" passed through many editions and was translated into several languages. Honours came to him from England, Germany, Italy and France, and in 1891 he was awarded the Janssen Medal of the Paris Academy of Sciences. In 1882 he served as president of the American Association for the Advancement of Science. He died at Hanover, New Hampshire, on January 3, 1908, at the age of seventy-three years.

Present-day Scientific Research

SIR JAMES IRVINE, principal of the University of St. Andrews, in replying to the toast of the profession of chemistry at the Ramsay Chemical Dinner held in Glasgow on December 7, gave his views on some aspects of modern research. Sir James reviewed the changes which have taken place in chemical industry since the beginning of the century and referred particularly to Scotland. He said that a country which produced men like Neilson, Young, Tennant, Townsend and Watt appeared to have nothing to fear from changes in industrial conditions. But the new conditions have formed themselves too quickly, and their impact on a disorganised world has been too swift for readjustment to be entirely satisfactory or even possible. In regard to scientific training, Sir James finds himself at variance with the spirit of the times because he cannot resist the thought that scientific training in Great Britain is already over regimented. He did not refer particularly to undergraduate instruction but more to the extreme specialisation and almost mechanical quality of much of the work termed research. The ladder of research was once difficult of access and steep to climb. Only the zealots made the attempt, impelled by a force they could not control, and only the strongest survived. To-day no training is reckoned complete on first graduation, and in consequence research students, sometimes singly, more often in teams, work towards the goal of a higher degree.

SUCH a form of research is a costly business: it is time-consuming, and the penalties fall on those who ought to be spared. Advances in science are certainly made, but Sir James is concerned chiefly with the effect of such work on the individual and the stultification it begets in his power to think. Many students at present engaged in research would be infinitely better employed in supplementing their academic knowledge by a training in the methods whereby science is operated in industry and in the conduct of the practical affairs of life. Many professors, too, would be better professors and capable of greater

service to the world if they were allowed the leisure and peace of mind to prosecute their researches unhampered by the care and training of research collaborators. The methods of the solitary philosopher, the methods of Davy and Faraday, can scarcely be excelled. Research in the academic sense has become a fashion; it will soon become a trade and then farewell to the hopes that Great Britain will again produce the few particular men who, in a flash of genius, have turned discovery into invention and invention into industry. Scotland has given to the world such pioneers, and is not lacking in the qualities which are needful.

Reduction of Working Hours in Industry

THE uncompromising attitude of certain sections of British industry to proposals for the reduction of working hours might be regarded with some amusement but for the serious results which it is likely to precipitate. The portentous arguments set forth, for example, by the National Federation of Employers Organisations against the forty-four hour week recapitulate in unmistakably the same accents those advanced with equal plausibility in previous generations against Factory Acts, the abolition of child labour and the limitation by law of the hours of work by women and children. There are, however, important firms such as Imperial Chemical Industries, Ltd., in its Billingham Works, and Boots Pure Drug Co., at Nottingham, which have had the courage and wisdom to determine the possibilities of the forty-hour or five-day week by direct experiment. The experiment carried out at Nottingham is of the greater interest in that its results have been made generally available in an important report by Sir Richard Redmayne, who was nominated by the Ministry of Labour, at the firm's request, to conduct an exhaustive inquiry as to whether the permanent adoption of the five-day week in all its works is possible ("A Review of the Experimental Working of the Five Days Week by Boots Pure Drug Company at Nottingham." By Sir Richard A. S. Redmayne. Pp. 70. Nottingham: Boots Pure Drug Co., 1934. 1s.). The publication of the full details of this investigation in itself constitutes a noteworthy break with the tradition of secrecy which has hampered the pooling of experience in matters of industrial safety, hygiene, labour policy, etc.

SIR RICHARD REDMAYNE concludes that the working of the five days working week inaugurated on April 30, 1934, and terminating on September 29, has proved an unqualified success both from the business point of view and from that of the employees. He is satisfied that the cost in the aggregate has not been enhanced and the efficiency of the employees has been increased. Marked improvements in health, contentment, regularity of attendance at work and diminution of absenteeism have been observed since the start of the experiment, and the employees themselves would view with dismay any return to the five and a half day week. Had the working hours per week not been reduced, it would have

been necessary to discharge a number of workers, and from this point of view alone the experiment has already been of real benefit to the community itself. Sir Richard Redmayne is satisfied that equally satisfactory results would be obtained if the experiment was continued over the winter months. It is, of course, difficult to say how far the experiment can be applied to other concerns with equal prospects of success. The intimate relation of production and distribution in this particular concern has probably contributed largely to its success, but Sir Richard Redmayne considers that there are many works at which the five day week might be tried with equal prospects of success. Messrs. Boots have set an example in scientific experiment on a most important social-industrial question, and scientific workers should not be slow in pointing out to the community the possibility of obtaining similar decisions in these matters in other industries or concerns.

Rare Books on Magic

AN exhibition of old and rare works dealing with magic, witchcraft, legerdemain and kindred subjects was opened on December 6 and was on view until December 14 at the University of London Council of Psychical Investigation, 13D Roland Gardens, South Kensington, London, S.W.7. Five hundred items had been selected for exhibition out of the 12,000 volumes collected by Mr. Harry Price, the honorary secretary of the Council, forming what is probably the largest and most important assemblage of printed works relating to occult subjects available for the student. The books exhibited ranged in date from about 1490 to the present day, though, curiously enough, the "Malleus Maleficarum" (1488), the first printed work on witchcraft, and the Bible of the witch finder, was not represented by a copy earlier than 1576. Works dealing with magic and the witch, ghosts and spiritual manifestations generally, of the sixteenth, seventeenth and early eighteenth centuries are becoming increasingly rare and expensive, and many of them in a few years' time will be unobtainable. A specialised library of the size of that of the Council for Psychical Investigation is, therefore, of great importance for the psychologist and the social historian. In looking through any extensive range of books such as this, it is significant to note how slow has been the growth in appreciation of the nature of evidence when any element of the supernatural has been implicated in an investigation. Although early works, such as Lavater's "Ghostes and Spirites Walking by nyghte . . ." (1572) and Scot's "The Discoverie of Witchcraft" are thoroughly sceptical, it was not until 1668, in the work of the Rev. Joseph Glanville, fellow of the Royal Society and virtually the father of psychical research, that anything in the nature of a systematic setting out of evidence was attempted.

THE recent haunting at Saragossa, in which voices in a chimney have been explained as due to the "unconscious ventriloquism" of a serving maid—an explanation almost as mysterious as the phenomena it explains—adds interest to the accounts in this