

contributions appeared in the years 1885-86. The "Memoir on the Theory of Mathematical Form" is a first-rate piece of work. Its avowed object is to separate the necessary matter of exact or mathematical thought from the accidental clothing—geometrical, algebraical, logical, etc.—in which it is usually presented for consideration, and to indicate wherein consists the infinite variety which that necessary matter exhibits. This long and thoughtful research shows that as a thinker Kempe perhaps resembled W. K. Clifford more than any one else has done in the world of science. This indeed was recognised by Spottiswoode, who, coming into possession of "Mathematical Fragments" which had been reproduced in facsimile from the papers left by Clifford, decided to send them to Kempe. He dealt with them, and finding inspiration in the graph theory which they contained he wrote a very valuable and suggestive paper upon the "Application of Clifford's graphs to ordinary binary quantics." Clifford had not at the time of his death succeeded in effecting this, and it required a man like Kempe who was well versed in the rapidly growing theory of invariants to accomplish it.

In 1894-96 Kempe was president of the London Mathematical Society. In his valedictory address he dealt in a thoughtful and learned manner with the question of defining the subject matter of mathematical science. He finally suggests the statement, "Mathematics is the science by which we investigate the characteristics of any subject matter of thought which are due to the conception that it consists of a number of differing and non-differing individuals and pluralities." Here we can trace the influence of his studies of mathematical form. He always tried to behold the objects of his thoughts in their lowest terms freed so far as possible from all extraneous matter, and it is greatly to be regretted that, shortly after vacating the chair, he became so busy with the duties thrown upon him by his acceptance of the position of chancellor to several dioceses that his direct contributions to science, from which much might have accrued, came to an end.

Indirectly, however, Kempe was for the remaining years of the greatest service to science. Those which he rendered to the Royal Society as treasurer have been described elsewhere. It must be added that from that position he was *ex officio* treasurer of the National Physical Laboratory from its foundation until April 1918, and he was able to do much for that great institution and for its director and executive committee. He never failed to attend particularly the finance committee, and was always fully informed as to the details of finance. His help and advice, often sought, was given ungrudgingly, and it may be said that it was owing largely to him that the funds necessary for maintaining and developing the laboratories were obtained. In the scientific life of the country he took a notable position. He was universally popular and respected.

P. A. M.

SIR WM. PHIPSON BEALE, BART., K.C.

SIR WILLIAM BEALE died at Dorking while on a visit to friends, on Thursday April 13, at the ripe age of eighty-two, in full possession of his faculties. His remains were cremated at Golders-green on April 19; a service in his memory was held in Lincoln's Inn

Chapel on April 26. His qualities had endeared him to a wide circle of intimates, in scientific, legal and political society, by whom his loss will be deeply mourned.

Beale's early training was that of a chemist, the intention being that he should enter an ironworks at Rotherham in which his family was interested. He made a beginning in the laboratory of Mr. Hill, a well-known consulting chemist in Birmingham; he then studied in Heidelberg and Freiberg, finally in Paris. At Heidelberg he was brought into contact with a number of chemists who afterwards became well-known—Matthiesen, Mond, Roscoe, Russell and others.

After but a short stay in the ironworks, Beale turned his attention to the law as offering better prospects; he entered Lincoln's Inn in 1867. Throughout his life, however, he retained his scientific interests and long acted as honorary legal adviser to the Chemical Society. He was one of the most popular and active members of the now defunct B club, a club of chemists whose doings have been chronicled by Dr. A. Scott in one of his Presidential addresses to the Chemical Society. At Freiberg Beale became interested in mineralogy and crystallography. When, in later years, the subject was developed and he desired to modernise his knowledge, I was able to hand him over to William Pope, then active as demonstrator of crystallography in my department at the Central Technical College; they contracted a firm friendship. Later on Beale even wrote a treatise on the subject, in which he put forward an original graphic method of presenting the facts of crystal symmetry. He was many years Treasurer and finally President of the Mineralogical Society. He also took an active interest in the Royal Institution.

Beale entered Parliament, after several ineffective attempts at Birmingham, as Liberal member for South Ayrshire, in 1906, retaining his seat until he resigned in 1918. He enjoyed a high reputation in legal and political circles, on account of the breadth and accuracy of his knowledge and his wonderfully balanced sane judgment. Of late years he spent much of his time, always surrounded by friends, at his Scotch home, near Barrhill in Ayrshire, most beautifully placed on an open grouse moor in sight of the Galloway Cauldron, Merrick, the highest peak in South Scotland, being a prominent feature in the view. Geikie's "The Ancient Volcanoes of Great Britain" was not infrequently taken down from his shelves.

H. E. A.

SIR A. P. GOULD.

SIR ALFRED PEARCE GOULD, whose death at the age of seventy years we announced last week, had been a member of the honorary staff of the Middlesex Hospital since 1882, and was a consulting surgeon at the time of his death. He was a Fellow of the Royal College of Surgeons and a Master of Surgery at the University of London, of which he was Dean of the Faculty of Medicine 1912-16, and Vice-Chancellor 1916-17. His publications include the "Elements of Surgical Diagnosis," which went into five editions, and the Bradshaw Lecture on Cancer (1910). He was joint author of the "International Text-Book of Surgery." Though a surgeon of wide interests, Sir A. P. Gould devoted much work to the study of the clinical treatment of cancer, and was early in recognising the valuable

adjuncts which X-rays and radium were to prove in the treatment of malignant disease. At the Middlesex Hospital he acted for a number of years as chairman of the Cancer Investigation Committee, and thus held a watching brief for any new remedial agent likely to prove of benefit in the treatment of cancer. He was an excellent teacher and did not spare himself in the

many services which he was asked to undertake. He was at some time president of the clinical section of the Royal Society of Medicine, of the Medical Society of London, and of the Röntgen Society. Throughout the period of the war he acted as Officer-in-Charge of the Surgical Division of the 3rd London General Hospital at Wandsworth.

Current Topics and Events.

DR. E. H. GRIFFITHS, the General Treasurer of the British Association, informs us that Sir Charles Parsons has conveyed to the Trustees of the Association a gift of ten thousand pounds 5 per cent. War Loan Stock, which he has placed unreservedly at the disposal of the Council. This generous gift comes at a very opportune time, as the finances of the Association have suffered depletion during the past seven years, and there was a danger that the activities of an association which has rendered such notable services to science in the past might suffer restriction. It is interesting to note that the total sum granted in aid of research by the Association, since its foundation in 1831, exceeds 83,000*l.*

THE Mount Everest Expedition, with the exception of Messrs. Finch and Crawford, who are delayed by the transport of the oxygen apparatus, arrived at Khampa Dzong on April 11. General Bruce's despatch to the *Times* describes the march from Phari Dzong. Considerable difficulty was experienced in obtaining a sufficiency of transport animals. The Tibetan authorities did their best, but owing to the earliness of the season many of the animals were in very poor condition. The expedition travelled in two divisions and found the march very trying. On the Dongka pass, where ridges of 17,000 ft. had to be crossed, low temperatures were experienced, but fortunately the blizzard experienced on the previous day had ceased. All members of the expedition are in good health, the trying experiences having affected neither the white men nor the hillmen.

THE Bessemer Gold Medal of the Iron and Steel Institute for the year 1921 has been awarded to Mr. Charles Fremont, in recognition of his services in the advancement of the metallurgy of iron and steel and the technology of the testing materials. The following grants from the Andrew Carnegie Research Fund were made during the year by the council of the Institute: 100*l.* to Dr. L. Aitchison, Birmingham, for the investigation of the low apparent elastic limit in quenched and work-hardened steels, with particular reference to fatigue strength, proof stress, and constitution; 100*l.* to Prof. C. O. Bannister and Mr. A. E. Findley, Liverpool, for the investigation of the mechanical properties and heat treatment of very low carbon high chromium steels; 100*l.* to Mr. F. C. Langenberg, of Watertown Arsenal, United States, for research on impact testing; and 50*l.* to Mr. J. N.

Greenwood, Sheffield, for research in optical data of steels and steel-making materials necessary for correcting temperature measurements of molten steel taken with an optical pyrometer.

THE Third Hurter and Driffeld Memorial lecture of the Royal Photographic Society is to be delivered at the Royal Society of Arts, at 8 o'clock, on Tuesday, May 9, by Prof. The. Svedberg, who will take as his subject "The Interpretation of Light Sensitivity in Photography."

At the annual general meeting of the Manchester Literary and Philosophical Society held on April 25, the following officers and members of council were elected:—*President*: Mr. T. A. Coward; *Vice-Presidents*: Sir Henry A. Miers, Mr. W. Henry Todd, Prof. Arthur Lapworth, and Mr. C. E. Stromeyer; *Hon. Secretaries*: Dr. H. F. Coward and Prof. T. H. Pear; *Hon. Treasurer*: Mr. R. H. Clayton; *Hon. Librarians*: Mr. C. L. Barnes and Dr. Wilfrid Robinson; *Hon. Curator*: Prof. W. W. Haldane Gee; *Members of Council*: Dr. W. M. Tattersall, Prof. F. E. Weiss, Mr. Francis Jones, Miss Laura Start, Prof. S. Chapman, Prof. W. L. Bragg, the Rev. A. L. Cortie, Mr. R. L. Taylor, and Mr. William Thomson.

A PROVISIONAL programme has been issued of the annual general meeting of the Society of Chemical Industry to be held in Glasgow on July 4-11 next. On the first day of the meeting, formal business will be discussed and Dr. R. F. Ruttan will deliver his presidential address. During the morning of July 5, Prof. H. E. Armstrong will give the Messel Memorial lecture, while on the following day a novel feature will be introduced in the form of a demonstration of kinematograph {films showing the manufacture of rubber, the production of sulphur, and the preparation of paper from wood. The Chemical Engineering Group of the Society will hold two sessions on July 6, at which papers on the design of ammoniacal liquor stills, tar and glycerine distillation, and the general problem of evaporation will be read. Visits to various works, among which are the Nobel Industries, Ltd., and several excursions, will occupy the remaining portions of the meeting.

At the fifth annual general meeting of the Society of Glass Technology held on April 26, Prof. W. E. S. Turner was elected president. In his presidential address entitled "The British Glass Industry: its