

his subject the atomic theory. From one to four o'clock various manuscripts and other objects of interest in connection with Roger Bacon and his successors will be on view in the Bodleian Library, and from four to half-past six a garden party will be held at Wadham College.

At the approaching celebration the Vatican library will be represented by Mgr. Ratti, the Institut de France by the Comte d'Haussenville, the University of Paris by Prof. Picavet, the University of Cambridge by Prof. James Ward, the Order of Friars Minor by Dr. P. Hickey, Provincial, and Prof. Paschal Robinson, the Capuchin Order by Fr. Albert (vicar-provincial), and Fr. Cuthbert.

Much has been done of recent years to establish the importance of the work of Roger Bacon in the history of Western thought. His eminence as a linguist, an educational reformer, a mathematician, and physicist was well brought out in the discourse lately delivered by Sir John Sandys before the British Academy. The late Prof. Adamson, speaking of his works, both edited and at present existing only in manuscript, wrote as follows in the "Dictionary of National Biography" :—

It is much to be desired that a more thorough and detailed study of the known manuscripts and a more extensive search for others which doubtless exist should be undertaken. Some portions are in a condition suitable for publication, and it is well-nigh an obligation resting on English scholars to continue the good work begun by the late Prof. Brewer. Bacon's works possess much historical value, for his rigorous thinking and pronounced scientific inclinations are not to be regarded as abnormal and isolated phenomena. He represents one current of thought and work in the Middle Ages which must have run strongly though obscurely, and without a thorough comprehension of his position our conceptions of an important century are incomplete and erroneous.

Prof. Picavet, of the Collège de France, adds his testimony as follows :—

L'autorité et le raisonnement ne valent, pour Roger Bacon, qu'en fonction de l'expérience. C'est elle qui doit prononcer en dernier ressort sur les affirmations des anciens comme sur nos propres conceptions. . . . Roger Bacon a donc entre les mains l'instrument qui a rendu possibles toutes les conquêtes de la science moderne.

Subscribers of one guinea and upwards to the Roger Bacon commemoration fund will be entitled to take part in the ceremonies at Oxford, and also to receive the memorial volume, which will contain essays dealing with various aspects of Roger Bacon's work, written by specialists in the various subjects. Subscriptions should be sent to Col. W. H. L. Hime, 20 West Park Road, Kew.

#### SIR JOSEPH WILSON SWAN, F.R.S.

WE regret to announce the death, in his eighty-sixth year, of Sir Joseph Swan, at Warlingham, Surrey, on May 27. Swan came from a stock exceptionally endowed with inventive abilities on both the paternal and maternal sides, his father and his maternal uncle, Robert Cameron, having both been inventors of note. He was born at

Sunderland on October 31, 1828, and there he received his education. He was removed from school at an early age, and having shown a decided taste for chemistry, was apprenticed by his father in the chemical business of Mawson, of Newcastle; of this firm Swan subsequently became a partner, the firm's name being changed to that of Mawson and Swan. At the commencement of his career Swan turned his attention more particularly to the manufacture of photographic supplies, and it is owing to his enterprise that the business of his firm was largely extended in this direction.

The nature of the business with which young Swan was thus associated enabled him to turn to account his inventive talent in bringing about important advances in photography. His patent for carbon printing, being the first commercially practicable process of the kind, was filed in 1862; later he described it in a paper read by him before the Photographic Society in April, 1864. Although the process has been simplified and improved by subsequent workers, in its essential features Swan's invention remains the basis of some of the methods of photographic reproduction still largely in use at the present day. An original investigation made by Swan on the effect of heat in increasing the sensitiveness of a gelatino-bromide silver emulsion led to the production by him of extremely rapid dry plates in 1877, and two years later he invented the bromide printing process.

Swan is, perhaps, better known to the public in connection with his invention of the incandescent carbon filament lamp than in connection with his discoveries in the field of photography. As a lad he had, in 1845, seen the experiment carried out of heating platinum-iridium wire to incandescence by means of an electric current, and this principle was applied by him, so far back as 1860, in the construction of an electric glow lamp, in which strips of carbonised paper or card mounted within an exhausted glass globe were raised to a red heat by an electric current obtained from primary batteries. At that date the method available for obtaining a vacuum was not entirely satisfactory, and in consequence the life of the earliest type of glow lamp was exceedingly short. However, when Sprengel's mercury pump for producing vacua made its appearance in 1865, Swan again turned his attention to the problem of producing a marketable electric glow lamp. Experiments carried out by him showed that high vacua were necessary to prolong the life of the incandescing filaments of which he had been investigating the properties.

In February, 1879, Swan exhibited his improved electric glow lamp at a meeting of the Newcastle Chemical Society, and the first public demonstration on any considerable scale of this new method of illumination was given before the Newcastle Literary and Philosophical Society in October, 1880. In the following month Swan read a paper before the Institution of Electrical Engineers on "The Subdivision of the Electric

Light," in which the suitability of the electric glow lamp for domestic lighting was dealt with.

Swan played a considerable part in connection with the introduction of the improvements in the manufacturing processes which have resulted in the successive reductions in the price of the glow lamp. To him was due the introduction of the "parchmentised thread" filaments formed by treating ordinary crocheted cotton-thread with sulphuric acid and then carbonising the same; later he devised the process whereby filaments of exceedingly small diameter and great uniformity were obtained by squirting artificial cellulose by hydraulic pressure through a die; the latter being first shown to the public at the Inventions Exhibition in 1885. It is only very recently that this process of manufacture has given place to the newly developed metal filament lamps.

Swan's activities in the field of electro-chemistry resulted in the invention by him of a rapid process of depositing copper, due to the discovery made by him that the addition of a suitable quantity of gelatine to the solution in the electro-depositing bath much improved the quality of the deposited metal. The process admits of the utilisation of currents of from 1000 to 1500 amperes per square foot of cathode, pure copper wire being at once reeled off from the bath through a die. Swan devoted his attention also to apparatus for measuring electric current, and the improvement of secondary batteries; his activities in the field of invention resulted in the filing of some sixty patent specifications, some in his name alone and others in the joint names of himself and his eldest son.

A recognition of Swan's services to applied science came first from France when, in 1881, he was appointed Chevalier of the Legion of Honour. In 1894 he was elected a Fellow of the Royal Society, and ten years later received a knighthood. The University of Durham also conferred upon him the honorary degrees of M.A. and D.Sc. He was the recipient, in 1903, of a gold medal from the Society of Chemical Industry, and, in 1904, of the Hughes medal from the Royal Society. In 1906 the Royal Society of Arts awarded him its Albert medal, "for the part he took in the invention of the incandescent lamp and for his invention of the carbon process of photographic printing," the medal being presented to him by King George (at that time Prince of Wales).

The career of Swan demonstrates that a scientific training and the possession of inventive faculties are not, as some suppose, necessarily incompatible with the possession of sound business capacity; and, indeed, the subject of this memoir gave ample evidence by his life work that it is possible for a man to be a productive inventor and at the same time successful as a commercial manager.

In Sir Joseph Swan the nation has lost not only a venerable investigator, whose labours did much for the material progress of civilisation, but one who was also possessed of a charming personality which deservedly endeared him to a large circle of friends and acquaintances. W. A. J. O'M.

DR. P. H. PYE-SMITH, F.R.S.

PHILIP HENRY PYE-SMITH was born August 30, 1839, at Billiter Square, E.C. He was the eldest son of Ebenezer Pye-Smith, F.R.C.S., and the grandson of the Rev. Dr. John Pye-Smith, F.R.S., the principal of the Homerton Theological College, well known, nearly a century ago, both as a geologist and theologian. He belonged to a medical family, for his father was a surgeon in the city, his brother Rutherford John Pye-Smith is emeritus professor of surgery at the University of Sheffield, and a nephew is also in the profession.

Dr. Pye-Smith was educated at Mill Hill School, and in 1858 took the B.A. of the University of London. He then entered Guy's Hospital Medical School and attained his M.D. in 1864; he gained the gold medal, thus outstripping two future distinguished colleagues, Moxon and Sir Thomas Stevenson. After a year at continental schools his teaching began by his being appointed demonstrator of anatomy. In 1871 he became assistant physician to Guy's Hospital, and full physician in 1883. He retired from the active staff in 1899, as in that year he reached the retiring age of sixty. He then became consulting physician to the hospital. During the earlier part of his assistant physiciancy he lectured on comparative anatomy, then on physiology, and when he was full physician on medicine. For many years he took charge of the department of diseases of the skin, and was regarded everywhere as one of the highest authorities in this branch of medicine.

In 1870 Pye-Smith was elected a Fellow of the Royal College of Physicians, and he later became examiner, a member of the council, and a censor. From 1900-9 he represented the college on the senate of the University of London, and held the office of vice-chancellor from 1903 to 1905. He was elected a Fellow of the Royal Society in 1886, and served on the council of the society in 1891-92. In 1899 he was appointed by the British Government joint representative with Sir Heron Maxwell at the International Congress on Tuberculosis in Berlin. He was a member of the General Medical Council and treasurer from 1901-7. He gave the address in medicine at the meeting of the British Medical Association at Ipswich in 1900. He was an hon. M.D. of the University of Dublin, an honorary fellow of the Royal College of Physicians of Philadelphia, and of the Royal Academy of Medicine in Ireland.

In 1883 his colleague Fagge died, leaving by his will the manuscript of his famous book on medicine to Pye-Smith for him to complete and see through the press. Pye-Smith greatly appreciated this act of his friend; he worked hard at the task, and was the means of giving to the world one of the best and most original books on medicine. He kept it up to date and edited the subsequent editions, so that it gradually contained more and more of Pye-Smith's writing, and the later editions were published as under the joint authorship of Fagge and Pye-Smith. This was his out-