OBITUARY NOTICES.

JOHANNES CHRISTIAN BRÜNNICH.

1862—1933.

JOHANNES CHRISTIAN BRÜNNICH, who died on July 3rd, 1933, in his seventy-second year, wandered in many countries before he settled down in Australia in 1885. Born in Gorizia, Austria, the son of a Lutheran minister, he spent his early youth in Bohemia and then received most of his education in Switzerland, first at an institution where his father was lecturer in mathematics and later at the Federal Polytechnic School at Zurich, where his special study was chemistry. Afterwards he travelled in Russia and for a time served with a firm of wholesale druggists in Tiflis; from that he turned to sugar-mill work in Bohemia. While doing military service in Switzerland in 1884, he met one of the old pioneers of Queensland, Dr. Muller, whose stories evidently fired the young man's imagination, for he migrated to Australia early in 1885, where, after holding an appointment as manager and sugar-boiler in a Queensland malt refinery, he became in 1887 the chief chemist and manager of an important mill of the Colonial Sugar Refining Company near Mackay.

His enthusiasm and capacity for original investigation quickly gained for him a high reputation and in 1896 he was invited to take the post of Agricultural Chemist in the Department of Agriculture and Stock, and there he remained for 35 years, retiring in 1931. He also served as lecturer in chemistry at the Agricultural College at Gatton, near Brisbane.

Brünnich played a big part in developing the cane sugar industry in Queensland. The original plan for experiment stations was his, and his advice was always sought on technical problems of this industry, which, ever closely associated with politics, has had its full share of public inquiries and legislation. An agricultural chemist in a dominion department must, however, be a man of wide interests and capacity and, apart from his association with sugar, Brünnich did extensive work on such widely different subjects as tobacco culture, prickly pear eradication, soil analysis, dipping fluids for countering ecto-parasites on animals, natural grasses and pastures, and fertilisers. At a time when few people realised the extent and significance of malnutrition of stock in the northern areas of Australia he was carrying out notable work which led, amongst other things, to the early introduction of phosphatic licks. His studies of pasture composition are to-day a useful basis for the much more intensive work which others, following in his wake, know to be essential to the development of the pastoral industries of Australia.

Quiet in manner, absolutely reliable in his laboratory work and in his judgments, Brünnich exercised marked influence in the development of applied chemistry in Queensland and in his own section set a high standard in the agricultural work of the State Department. He was elected to the Fellowship of the Society in 1898 and to that of the Institute of Chemistry in 1905.

A. C. D. RIVETT.

ARTHUR GEORGE EVERARD.

1864—1934.

ARTHUR GEORGE EVERARD was born at Bishop's Stortford on March 25th, 1864. He was educated at the Non-Conformist Grammar School, Bishop's Stortford, and was apprenticed to a chemist and druggist at Epping. After obtaining his membership of the Pharmaceutical Society, he took a business in Chichester, where he devoted his spare time, after shop hours, to the study of medicine. He obtained his L.S.A. in 1896 and his M.R.C.S. and L.R.C.P. at Charing Cross Hospital in 1900. For 30 years he was in practice at Clapham as a general practitioner; he lectured on hygiene and first aid at the L.C.C., and was a member of the London Panel Committee under the National Health Insurance Act, a Director of the Lambeth Pension Society, and a Life Governor of the Royal United

Beneficial Association. Retiring from practice in 1929, Everard resided in Biggin Hill, Kent, where he had many interests, including horticulture and poultry-farming. He took an active part in ecclesiastical affairs, giving a site for a mission hall and assisting in raising the necessary funds for building. After a few weeks of rapidly declining health, he died in his sleep on February 7th, 1934. An untiring worker, who ever gave strict attention to duty, he leaves many friends, to whom he had endeared himself by his thoughtful kindness, to mourn his loss.

JOHN BRIGHT HOBLYN.

1880—1933.

In his 54th year Mr. Hoblyn, who had suffered bad health for a year or two, passed away suddenly on the 24th December, 1933.

Hoblyn was born at Dewsbury in 1880 and attended the Dewsbury Technical College. In 1897 he was awarded a Queen's Prize in Practical Chemistry by the Board of Education. In 1898 he obtained Honours Part 1 in Practical Inorganic Chemistry in the Board of Education examination, and in 1899 Honours in Practical Organic Chemistry. He then passed as Hinchcliffe exhibitioner to the Royal College of Science in 1901. He took first place in England with First Class Honours Part 2 in the Board of Education examination in Practical Chemistry in 1903, and first place in England with First Class Honours Part 2 in Theoretical Chemistry in 1904, when he was also awarded an Associateship of the Royal College of Science in the first class division of chemistry. In 1905 he obtained by examination the A.I.C., and in 1912 the F.I.C.

In 1904 he was appointed science master at the Modern School, Luton, where he became an exceedingly popular master, and where opportunities were given to him to enter the social life of Luton.

Eleven years later he was invited to become Chief Chemist and Metallurgist of the Vauxhall Motors Ltd. During his 18 years with the Vauxhall Co. he never forgot his old school. It is true to say that nearly all his assistants were old boys of the Modern School, Luton.

During Hoblyn's life at the Vauxhall Motors he instituted a training scheme for apprentices which has produced many young fellows who are now doing splendid work in the automobile industry throughout the world. It was a great joy to him to see his students rise. He took a very deep interest in their social life and must be regarded with a parental affection by many.

As a public worker he was a member of the Public Libraries Committee, a representative of the County Council on the Board of Governors of Luton Modern and High Schools. Up to his illness he was a member of the local employment committee. As President of the Old Lutonians Club he was a great inspiration and guiding hand, and, of course, he never lost touch with the Old Luton Modernians Club.

He was a man of great sympathy and vision, perhaps a little unorthodox, and found difficulty in training himself to the discipline of a large commercial undertaking. His whole interest was science, and anything which was not done in a scientific way was frowned upon. He had the courage of his convictions and never lost an opportunity of declaring them both in his office and at scientific meetings. A humorous aspect of his idiosyncrasies was that right to the last he always wore a Luton straw hat exhibiting his old college colours.

I am sure that he will be missed from his many activities in the Institution of Automobile Engineers, and elsewhere.

He leaves behind a widow and one son, who is following his father's lead. He has obtained the Ph.D. in Chemical Engineering at the University of London. Last year he was awarded one of the four fellowships in Industrial Chemistry offered by the Court of the Worshipful Company of Salters.

E. A. Evans.

EDWARD WATKIN LEWIS.

EDWARD WATKIN LEWIS received his training in Chemistry at the City and Guilds College under Professor Armstrong. He gained his diploma in 1898 and continued his training while holding a Salters' Research Fellowship, subsequently acting for a year as private Assistant to the Professor. During this period he carried out researches on substitution in phenols, part of which was published under the title "Tertiary Butylphenol" in the *Transactions* (1903, **83**, 329).

He began his industrial career with the Associated Portland Cement Company at their Greenhithe Works, leaving them in 1904 to become chief chemist to Messrs. J. G. Ingram and Sons, Rubber Manufacturers, at Hackney. Here he carried out research work on rubber and translated from the German by Heil and Esch, "The Manufacture of Rubber Goods." He also wrote the article on India Rubber for the 4th (1911) Edition of Allen's "Commercial Organic Analysis."

During the War, in 1917, when leather presented so many problems of national importance, he transferred his services to Messrs. Barrow, Hepburn and Gale, of Bermondsey, for whom he acted as head chemist, and with whom he remained until 1926 throughout a period of considerable depression in the leather industry.

In 1926, he moved north to Widnes, where he became Assistant to the Managing Director of Messrs. Bowmans, who were then engaged in seeking to make lactic acid of high quality in this country, a quest in which they have now achieved success. The task in the early days was a difficult one and gave Lewis great trouble, to some extent impairing his health. He left Bowmans in 1929 and later went to Rhos-on-Sea, hoping to recover his health.

Never of strong physique, Lewis was very quiet and reticent in manner and to this extent, perhaps, his genius for thorough and sincere work would have been better used in pure research than in the strenuous life of modern industrial competition. In private life he was a charming and congenial companion.

E. F. A.

NIAL PATRICK KENNETH JAMES O'NEILL McCLELAND.

1887—1933.

NIAL PATRICK KENNETH JAMES O'NEILL MCCLELAND, who was born at Moscow, received his earlier education at Charterhouse and came up to Cambridge as a scholar of Pembroke College in 1906. During his first three years at the University he read Mathematics and was 22nd Wrangler in 1909 in the last Mathematical Tripos in which the successful candidates were arranged in order of merit. In the following year he read Natural Science and was placed in the Second Class in Part I of the Natural Sciences Tripos. He then began research work in Chemistry, at first under the direction of Dr. H. J. H. Fenton and later in conjunction with Mr. J. E. Purvis.

McCleland was keenly interested in military training. He was an active member of the Cambridge University Officers' Training Corps and from this he was commissioned into the Special Reserve of Officers and posted to the Queen's Own (Royal West Kent) Regiment. When war was declared in August, 1914, he was serving an attachment with the 1st Battalion of this Regiment in Dublin. Mobilised with them, he went out to France with the original Expeditionary Force. He was at the Battle of Mons and went through the Retreat.

He remained with his battalion until March, 1916, when he was seconded for duty under the Director of Gas Services. He acted as Chemical Adviser to the XIII Corps and later to the Third Army. He was wounded and mentioned in dispatches.

In April, 1918, after nearly $3\frac{1}{2}$ years' continuous service in France, he was transferred to the Chemical Warfare Experimental Station at Porton, where his knowledge of conditions at the Front was of great assistance.

After the Armistice he went to Archangel with the North Russian Field Force. He was given the rank of Lieutenant-Colonel and valued the title very highly.

Returning to Cambridge in October, 1919, he was elected a Fellow of his College and two years later Bursar. In the post-War period the work of the University went on at a higher pressure than ever before and in these strenuous times McCleland's bursarial duties, his research work in the Chemical Laboratory, his college teaching, and his enthusiastic interest in the social and athletic activities of his College gave him an exceedingly full and varied life.

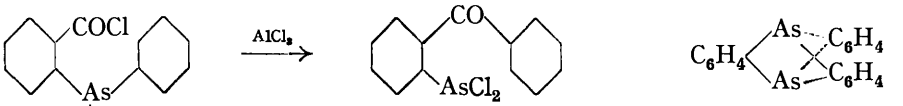
He lectured for the Board of Military Studies and was from time to time a member of that body. Until 1931 he was in command of the Infantry Battalion of the University O.T.C.

He had a great love of music, and for the works of Wagner in particular he had the most enthusiastic admiration. He was no mean performer on the pianoforte, and he has left behind him a considerable amount of musical MSS of his own composing. He took a great interest in rowing and at the Lent and May Races he was usually to be seen on horseback on the tow-path acting as an umpire. He was also an enthusiast for Association Football and for several years he was Treasurer of the University Association Football Club.

McCleland's first scientific paper dealt with the rates of transformation of the bimolecular form of glycollaldehyde into its unimolecular form in different solvents. His work with Purvis was concerned with the absorption spectra of various organic compounds in the gaseous, as well as in the liquid, or dissolved state.

After the War he was chiefly engaged in the investigation of organic compounds of arsenic and his work resulted in interesting additions to our knowledge of the formation of heterocyclic rings containing this element.

With Aeschlimann he discovered the curious transformation of the acid chloride of *o*-carboxydiphenylchloroarsine (I) into the isomeric benzophenone-*o*-dichloroarsine (II) under the influence of aluminium chloride (J., 1924, **125**, 2025).



(I.) (II.) (III.)

With Aeschlimann, Lees, and Nicklin he demonstrated the readiness of formation of various derivatives of *oo'*-diphenylenearsine (the arsenic analogue of carbazole) by ring-closure from the appropriate derivatives of diphenyl (J., 1925, **127**, 66).

Perhaps the most interesting result of this series of investigations was the discovery, with J. B. Whitworth, of a compound composed of two arsenic atoms and three *o*-phenylene residues, to which the structure (III) was assigned, in which the planes of the three benzene rings were regarded as inclined at 120° to one another (J., 1927, 2753).

His last scientific communication was a paper with R. H. Wilson on the formation of 3-chloromercuripyridine and its use in synthesis (J., 1932, 1263, 1497).

His death at the age of 46 was the result of a cycling accident. He was thrown from his bicycle by an overtaking lorry and extensively bruised, and though his injuries were not at the time regarded as serious he died a month later of embolism.

His premature death was a grievous loss to his college and his many friends. He was a capable administrator and a successful and inspiring teacher who gained the respect and affection of his pupils. He was one of the most generous of men. He was unmarried and valued highly the opportunities which life in college affords for intimate association with colleagues and undergraduates. To his College he had an intense and single-hearted devotion and he was a very loyal friend.

W. H. Mills.

PATTINSON BANKS MELMORE.

1857—1933.

PATTINSON BANKS MELMORE was educated first under Dr. R. K. Brewer at Boston Spa, Yorkshire, and then at the Edinburgh Institution, of which Dr. R. M. Ferguson was at the time Headmaster. Having passed to the Royal College of Chemistry, South Kensington, and received his technical training at the hands of Professor (afterwards Sir Edward) Frankland, he established a private practice at Maryport, Cumberland, and was thenceforth principally occupied in the analysis of the raw materials and finished products of the metallurgical industry. In the course of business he visited most of the German iron and steel centres; and as the result of a long experience was frequently called upon to arbitrate in disputed cases.

In 1889 he married Charlotte Ann Tiffin of Maryport, who died in 1919.

He took an active interest in the progress of the Cumberland and Westmorland Literary and Scientific Association, a body which, in the short period of its existence, published more than one paper of importance to those outside the two counties; and was for a time vice-president of the affiliated society in Maryport.

In 1905 he was appointed a Justice of the Peace for the County of Cumberland.

Though he did not publish any original contribution to the advancement of chemistry, he was always ready to help and encourage those engaged in scientific research, a fact to which his son will ever bear grateful testimony.

He gave up his professional activities in 1923 and retired to Acomb, near York, where he died on November 30th, 1933, having lived to the age of 76. He was elected a Fellow of the Chemical Society on May 20th, 1875.

S. M.

RICHARD JACKSON MOSS.

1847—1934.

THE death on January 27th, 1934, of Richard Jackson Moss at the age of 87 closes a career extending far back into the last century and, as was not uncommon among his contemporaries, covering many branches of scientific investigation. His life work was bound up with the many-sided activities of the Royal Dublin Society, of which he became Chemical Analyst and Keeper of the Minerals in 1875, and Registrar in 1878, a position which he held until his retirement early in 1921. The Registrar was at that time the Chief Officer of the Society, and Mr. Moss's duties included, not only the analytical work of the Society's chemical laboratory, but also such varied tasks as the organisation of the Dublin Horse Show, the holding of Art Competitions and Exhibitions, and the arrangement of the Society's programmes of recitals of classical music. Little time was thus left him for research, but in spite of this he managed to do valuable work in various directions.

Among other work may be mentioned methods of determining the gaseous content of water and also of various minerals. The latter method, which involved grinding in a vacuum, he used to estimate the helium in pitchblende. He was one of the first, if not the first person, in Ireland to take *X*-ray photographs, which he did with a tube which he made himself. He was much interested in archæological problems, and was the oldest member of the Royal Irish Academy, which he joined in 1874 and to which he contributed his last paper on a chemical examination of some ancient Irish metallurgical crucibles in 1926.

His most valuable scientific work, however, was probably the part that he played in the development of the radon method of radium therapy. The idea of using radon capillaries instead of tubes containing radium element originated with Joly, and the first application of such tubes to the treatment of disease was made by Stevenson, but the actual preparation of the tubes was carried out by Moss and his assistants, the late E. A. Stone and G. H. Deane, in the Society's laboratory, with apparatus largely constructed with his own hands. This was in 1914, and the Society's Radium Institute founded at that

time did invaluable work during the Great War in the provision of radon tubes for the treatment of wound scars, and has ever since annually distributed relatively large numbers of tubes for the treatment of disease. Moss remained a member of the Committee responsible for its management to the end, and was always a welcome visitor in the laboratory. His death within a few weeks of that of Dr. Joly, and only a few years of that of Dr. Stevenson, removes the last of a little band of co-workers to whom many of their countrymen have good reason for feeling grateful.

H. H. P.

FREDERIC LEWIS NATHAN.

1861—1933.

COLONEL SIR F. L. NATHAN, K.B.E., joined the Royal Artillery in 1879. In 1886, he took up an appointment at the Royal Arsenal, Woolwich, where he had a great deal to do with the experimental work then in progress, which ultimately led to the introduction of Cordite Mark 1 into the British Services.

It was there that Sir Frederic first began his study of the problems of Chemical Industry with which he was destined to be so closely associated for the rest of his life.

In 1889 he joined the Royal Gunpowder Factory at Waltham Abbey, where he later became Superintendent, a position which he held until he retired from Government Service in 1909, to take up the Works Managership of Nobel's Explosives Factory at Ardeer.

That Sir Frederick was at Waltham Abbey when the writer joined that factory in 1894 will always be counted by him as most fortunate. He found there a Chief whose interest in all technical and experimental work was unflagging and whose contribution to the evolution of new processes of manufacture was not merely critical but substantive.

Every process then in use for the manufacture of explosives at Waltham Abbey was carefully and intensively studied with the result that the methods for the manufacture of nitroglycerine, gun-cotton and nitrating acids and for the recovery of solvents were entirely revolutionised, and new forms of plant designed and erected.

It was indeed a great privilege to be allowed to assist in the careful investigation into safety precautions for handling explosives, a subject on which Sir Frederic was authoritative, and to have observed the growth of the Factory in efficiency until it became the model for private firms as regards costs and technique. These were educative influences which the writer would like to acknowledge as important and unforgettable.

It was again the writer's privilege to serve under Sir Frederic when he left the Government Service in 1909 to take up the position of Works Manager at Nobel's Explosives Factory at Ardeer, where many other developments in the technique of the manufacture of explosives were introduced as the result of Sir Frederic's initiative.

Early in 1914, Nobel's Explosives Company decided that it was necessary to duplicate their Ardeer Factory in another part of the country, and Sir Frederic was asked to undertake the design and supervision of the erection of this factory. Pembrey was ultimately selected as suitable for the erection of a T.N.T. and Propellant Factory, and until early in 1915 Sir Frederic was engaged on the design of this factory.

The Admiralty then requested him to take over the design and erection of what is now the Royal Naval Cordite Factory at Holton Heath.

The projection of the Nobel Factory at Pembrey proved a very fortunate thing for this country, because when war actually broke out, Sir Frederic was able to make immediately available to the Government a complete set of up-to-date plans for a modern Cordite Factory. The Misk Factory extensions at Ardeer, the Gretna Factory of the Ministry of Munitions, and the Royal Naval Cordite Factory were, to a large extent, based on these designs.

Later in the war, Sir Frederic was appointed Controller of Propellant Supplies under the Ministry of Munitions, and carried out many important investigations for which his intimate knowledge of the properties of cordite rendered him particularly well fitted.

In 1920, Sir Frederic was appointed Power Alcohol Investigation Officer under the D.S.I.R. and was responsible for several important memoranda on this subject.

In 1925, he became Intelligence Officer to the Fuel Research Board, an appointment which he held until the time of his death.

The foregoing gives only a bare outline of Sir Frederic's general activities. It does not indicate the great influence he exerted on the advancement of chemistry and chemical industry in this country.

Perhaps his most outstanding personal characteristic was his power of organisation. No matter how involved or complicated the subject he touched, his logical mind led him at once to the elimination of what was unnecessary and the simplification of what remained.

It is not too much to say that his influence on the growth and development of a large concern such as Nobel's Explosives Company was profound, and that systems of organisation which he introduced there have been widely adopted in the Chemical Industry of to-day.

Of a charming personality, the more intimately one knew Sir Frederic, the better one appreciated his qualities. Whenever a new problem presented itself he spared no pains in finding out all that was known on the subject in order to direct the work in such a way that a solution of the problem could be arrived at with as little expenditure of time and labour as possible. A master of efficiency himself, he could not tolerate inefficiency in others. He was at times frankly outspoken in his criticisms, whether of his superiors, inferiors or equals, but always strictly just in all his dealings. His loss will be deeply felt by a wide circle of friends and co-workers.

WM. RINTOUL.

ROBERT ELLIOT STEEL.

1853—1933.

ROBERT ELLIOT STEEL, who was elected a Fellow in 1885, was born on January 17th, 1853, and received his early education at Manchester Grammar School. Winning a Demyship at Magdalen College, Oxford, he there studied chemistry and obtained First Class Honours in 1876.

His first post was that of Science Master at Bradford Grammar School and it was here that he showed a flair for science teaching and became widely recognised as a pioneer.

From Bradford, he proceeded to be Headmaster of Northampton and County School, a post which he held from 1894 till 1907. The relinquishment of this post at the age of 54 for a Sciencemastership at Sherborne School was due to dissatisfaction with the increasing control of the curriculum by the education authority; for Steel, though devoted to his scientific subjects, was a firm believer in the older literary and linguistic discipline.

Steel saw the provision of new science laboratories at Sherborne in 1910, and was unremitting in his care of the exceptionally fine mineralogical collection in the School Museum. He taught chemistry himself and supervised the science teaching in general: he was, in addition, an enthusiastic geologist who gave many of the boys a keen interest in that subject.

He spoke in the downright and sometimes rather caustic manner of the North, but was essentially kindhearted as well as conscientious: and his wife was unfailing in her sympathy with the boys and interest in all that concerned the school.

Steel spent the years of his retirement (after July, 1920) at Stalbridge and died after a long illness on October 6th, 1933.

E. HOPE.

JOHN THOMAS.

1886—1933.

THE untimely death of John Thomas, B.A. (Cantab.), D.Sc. (Wales), F.I.C., at the early age of 46, on January 18th, 1933, at Wilmslow, removed one of the outstanding figures in the renaissance of the British dyestuffs industry.

Possessing a full share of the characteristic Celtic fervour, enthusiasm and imagination,

he was eminently fitted to play a pioneer part in the difficult task of establishing in this country the manufacture of the complicated vat dyes of the indanthrone type, the story of which was so graphically told a few years ago by Mr. James Morton in his lecture before the Royal Society of Arts on " Fast Dyeing and Dyes."

Thomas was born at Harlech in 1886. Leaving school at the age of 12, he entered the employment of a mineral water manufacturer, working from 6 a.m. to 8 p.m. for the princely wage of 3*s*. 6*d*. per week. Fortunately Thomas' talents even in those early days attracted attention, and the joint efforts of his employer and his former schoolmaster induced him to sit for a scholarship which took him to Barmouth County School, whence he entered Aberystwyth University College. An 1851 Research Scholarship took him to Trinity College, Cambridge, where he gained a post-graduate research exhibition as well as the Gordon Wigan Prize in chemistry, a University award. During this period he carried out investigations which were subsequently reported in this *Journal*. Joint papers with Prof. J. J. Sudborough dealt with the addition of bromine to cinnamic acid and its esters and the addition of bromine to unsaturated compounds. Independent papers described the isolation of the aromatic sulphinic acids; the four stereoisomeric, optically active 2 : 4-dimethyltetrahydroquinolines; and the separation of secondary arylamines from primary amines.

In 1911 Thomas entered the National Physical Laboratory at Teddington as a research chemist in the aeronautical section, a position he relinquished the following year to join the chemical staff of the Nobel's Explosive Co., Ardeer. His investigations during the next few years in the delicate field of explosives outside the accepted range of stability earned the rare distinction for an industrial investigator of academic recognition in the degree of Doctor of Science from the University of Wales.

In the meantime Mr. James Morton had already assembled at Carlisle a band of chemists and others engaged in the experimental manufacture of the complex anthraquinone vat dyes and had succeeded in placing Alizarine Sapphirole or Solway Blue and other important colours on the market when it was decided to detach the dye manufacturing section from the textile business. At this stage Thomas joined the newly formed Solway Dyes Company as chief chemist and his outstanding gifts and forceful personality speedily made him the accepted leader of this band of pioneers. Throughout the next decade he played an outstanding and varied part in the many developments of the Company, including the transference of manufacture to a permanent site at Grangemouth, the manufacture and utilisation of phthalic anhydride, and the period of intense research during the slump of 1920—1921 which proved so fruitful in later developments.

On this period of his career Thomas' claim to fame securely rests. His scientific genius, inspired by a full share of Celtic imagination, enabled him to make outstanding contributions on the scientific side and his part in the discovery of Caledon Jade Green, the fastest and best known colour of the indanthrone type, as well as in subsequent work on blue dyes of the anthraquinone series, particularly in connexion with Caledon Blue RC, give him a place among the outstanding discoverers of the dyestuffs industry. The 160 English patent specifications bearing his name testify to the fertility and ingenuity of his mind and demonstrate the value of his contribution to the scientific research which has given us the Soledon colours, the Celatene colours, analogous with those discovered independently by the British Dyestuffs Corporation and marketed as Duranol colours, and the Solazol colours, as well as to the technique of their application in dyeing. Included in this work was an immense amount of research concerned not only with the derivatives of benzanthrone, anthraquinone, and other polycyclic compounds which can be used directly as dyes, but with the preparation of the intermediate compounds which in this field are frequently very complex and numerous. Some 47 English patent specifications bearing Thomas' name are concerned with such intermediates. The magnitude of these achievements is the more impressive when we recall that Thomas, like his colleagues, had little, if any, experience of the problems confronting him, to which the German industry had already devoted twenty years of research.

Thomas, however, was much more than a chemist, as his rapid advance demonstrates. With the reconstitution of the Company in 1920 as Scottish Dyes Ltd., he became a

director, and in 1923 managing director. Finally, when Scottish Dyes Ltd. concluded an agreement with the British Dyestuffs Corporation Ltd. and became part of the Dyestuffs Group of Imperial Chemical Industries Ltd., Thomas was appointed joint Managing Director of the Group. To this work of development and administration he brought the gifts of a pioneer, as invaluable as his scientific genius. His boundless energy and burning enthusiasm were infectious and inspired all his colleagues in the overcoming of the innumerable obstacles between a brilliant laboratory discovery and successful manufacture. Once convinced of the possibility of a project, his energy, resources and determination were staggering. Indeed, he never seemed to contemplate the possibility of failure and no difficulties daunted him in pursuit of a scheme once adopted. His retentive memory and mental agility were phenomenal and enabled him to deal with the most varied scientific, commercial, and administrative problems with equal success. In his endeavours to establish a great dyestuffs industry in this country Thomas was unsparing of himself as of his time, and many of his friends will feel that his devotion has made him one of the casualties of the industry.

Besides being an outstanding figure in the British dyestuffs industry, Thomas was an important and well-known figure in chemical industry throughout Europe and America. With his talents as a pioneer he combined a charming personality which won him a wide and deserved popularity. He had a rare gift for friendship, with a cheery word for everyone that made it a delight to meet him. His boyish enthusiasm was endearing to many and, if it made him refreshingly direct and virile in argument, he never left any trace of rancour. One who met him for the first time during his course at Cambridge recalls that during an introductory tour of the Cambridge laboratories, the senior student, who acted as guide, insisted that the most important sight to be seen was John Thomas, then working as a research student in Professor Pope's laboratory. He was then, as he always remained, a volatile, rather untidy, but lovable Welshman, with a sparkling eye and a ready wit.

The versatility of his achievements on the scientific side of the dyestuffs industry in itself betrayed something Napoleonic in his mental equipment. He showed a true leader's capacity to select men; his eye for good men for the laboratory or works, and his ear for a loose bolt in the whirl of machinery, were rarely at fault and contributed as much as his frankness and consideration for others to successful team work at Carlisle and Grangemouth.

Thomas was an ardently patriotic Welshman, and he rejoiced particularly in the growth and success of the young Welsh County Schools and Universities, of which he himself was one of the first-fruits. He always spoke with a broad Welsh accent, and he included "English" in the space assigned to "Foreign languages" in his Nobel engagement form. In the strict sense he had no hobbies, but he was a fine golfer and few things gave him greater pleasure than his election in 1931 to the captaincy of the Royal St. David's Club, Harlech, on whose links he had once been a caddy.

Underlying his cameraderie and effervescent fun there was an element of religious feeling which revealed itself only to a few, though in his earlier days he once discoursed eloquently from the pulpit on "unrealised ideals." It is the essential tragedy of his too short life that, though he was a dreamer, many of whose dreams came true, he must nevertheless have been baulked of the fulfilment of his loftiest ideals.

Thomas was married on March 4th, 1915, to Miss Olive Morgan, and the sympathy of a wide circle of friends will be extended to his widow, the son and two daughters who survive him.

R. BRIGHTMAN.

JOHN MILLAR THOMSON.*

1849—1933.

EMERITUS PROFESSOR JOHN MILLAR THOMSON, LL.D., F.R.S., was born in 1849 in the precincts of the old college of Glasgow, where his father, Professor Allen Thomson, LL.D., M.D., D.C.L., F.R.S., was Professor of Anatomy. John Millar Thomson's family has had

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a long connection with the University of Glasgow, dating from 1761, at which time his great-grandfather, John Millar, was Professor of Law. Other members of the family subsequently held Chairs in Mathematics, Philosophy, Medicine and Anatomy, Pathology, and Military Surgery in one or other of the Scottish Universities.

John Millar Thomson was an only child and was brought up in very close companionship with his father, with the result that he was, from early boyhood, constantly in contact with notable people in academic circles, especially as his father was one of 14 professors all living in the old college. As a boy of 13 he travelled with his father in France and Germany, visiting a number of his father's friends. They remained for some time in Würzburg with Allen Thomson's great friend Kölliker.

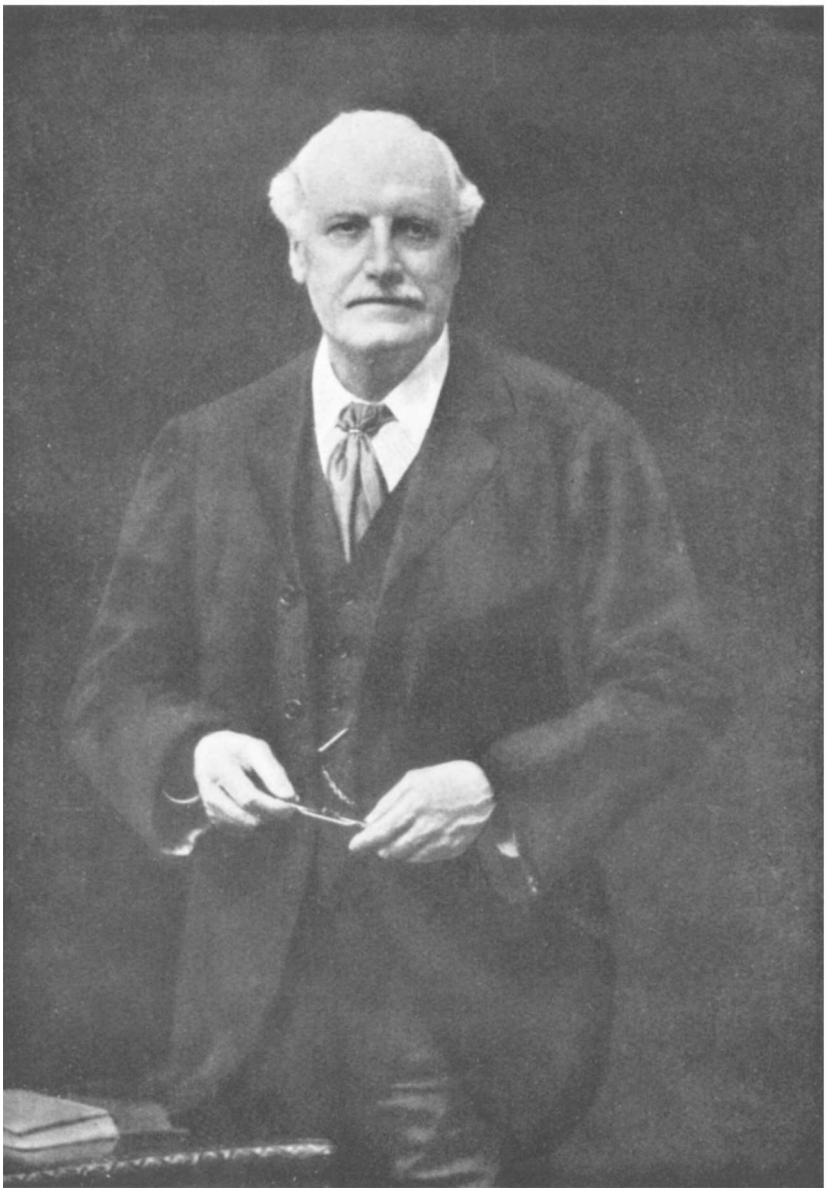
During the time when Professor Allen Thomson was going into the plans of laboratories and lecture rooms in the new University buildings at Glasgow, John Millar Thomson accompanied his father on several occasions where, as a boy, he could be helpful in such simple ways as " holding the tape " and in taking down notes. This started an interest in architectural matters which he retained all his life. In discussing laboratories with him when he was at King's College, I have lively recollections of his sitting down to make plans, and of his saying, as he brought his scales and ivory rule out of his pocket, " These are the very ones with which my old father drew out his plans when I was a boy." His skill as an architect was such that when he drew out plans for a house for one of his cousins, these were accepted by the builders as complete, and were worked to by them.

Educated at the High School and the University of Glasgow, he entered the faculty of Medicine after having first taken the usual curriculum in Arts. He soon came to the conclusion, however, that he did not wish to continue a medical training. On the advice of Professor Thomas Anderson and Professor Lyon Playfair, he took up the study of Chemistry. Naturally, from his early associations with so many professors, his ambition was to enter academic life. He worked as a student in Professor Anderson's laboratory from 1866 to 1871, being appointed Assistant to Professor Anderson in 1869. In 1868 he came to London to see Professor William Allen Miller and Professor Charles Loudon Bloxam about a demonstratorship in chemistry at King's College, London, vacant owing to the transference of his friend, James Thomson Bottomley, to the Physical Department of King's College. When referring in later years to that interview, he said that after it, he came to the conclusion that he was too young for the post. He returned, therefore, to Glasgow until, on the death of Professor Miller in 1870, Professor Bloxam, who succeeded to the Chair of Chemistry in King's College, sent for him and offered him a position of assistant demonstrator, which he took up early in 1871. Walter Noel Hartley at the same time was appointed senior demonstrator. At that time the assistant demonstrator did not lecture, but Hartley became seriously ill shortly after his appointment, and John Millar Thomson took over the whole of the senior demonstrator's work in both the day- and the evening-class departments. Bloxam told me, in later years, of the great success of Thomson's lectures and of his organisation of the practical classes given into his charge.

In 1879, Hartley was appointed professor at the College of Science, Dublin, and Thomson became senior demonstrator in his place. His lectures were remarkable for the ease with which they could be followed, for the clearness of his exposition, and for the wealth of experiment with which they were illustrated. Many of his lecture experiments were of types requiring exceptional skill but they were almost invariably carried out by him with brilliant success. His power of holding his audience was remarkable whether in his regular College lectures or in the many public lectures which he gave.

From 1880 until 1887, in addition to his work at King's College, Thomson gave lectures in chemistry at Queen's College, Harley Street, and was given the title of Professor of Chemistry in that College. It was during this time, and before he took the responsibility of the headship of the Chemical Department at King's College, that he carried out many of his investigations in connection with crystallisation and supersaturated solutions, and also on a number of other subjects, as, for example, the composition and properties of building stones, in continuation of some work which he had done under Professor Anderson at Glasgow.

Although he was much occupied with his own teaching and experimental work, he was



John M. Thurston

[*To face p.* 568.

a man with such strong general sympathies that he could not avoid being pressed to take an active and guiding part in practically all the College functions and those organised by the students' societies. The Dramatic Society owed much to him. He possessed remarkable dramatic talents and was truly a fine actor. This did not appear in his lectures into which he threw all his earnestness. It did, however, give him a singular power of expressing the wishes and desires of others when welcoming a new colleague, bidding good-bye to a retiring colleague, or speaking at functions such as College dinners or public dinners. It was frequently remarked when Thomson spoke on such occasions, that in virtue of his personality, his manner, and his simple but effective elocution, he set the tone of the whole function on a high level. It was typical of him to say the right thing whenever he was called upon to speak, even at a moment's notice.

Some special reference must be made to his activities in photography, in which he had a life-long interest; for some time in his earlier days he taught the principles and practice of photography to the engineering students of the College. He also carried out a number of experimental investigations into photographic processes, the results of which were incorporated in the various lectures which he gave.

The individual character and ability which he had shown and the influence which he had exerted in promoting the highest interests of the College in these earlier posts, were emphasised when Thomson became head of the Chemical Department at King's College. It was natural, therefore, that when the post of Vice-Principal became vacant in 1905 on the resignation of Professor W. Grylls Adams, it was the unanimous desire of his colleagues that Thomson should be invited to take over the additional duties of Vice-Principal. He accepted, and represented the College on many important occasions. On such occasions he impressed all who were present with his charm, power and high-mindedness. He retired in 1914, when he was appointed Emeritus Professor. He was an Honorary Fellow of King's and Queen's Colleges, and, in recognition of his services to chemical education, a medal was instituted in his honour to be awarded to the student of King's College who most distinguished himself in the final year of the special honours course in the Department of Chemistry.

He was Secretary of the Chemical Section of the (Royal) Society of Arts from 1879 to 1886, a Member of Council of the Society for four periods, Honorary Treasurer for five years, and Vice-President in 1913. He served on the Council of the Chemical Society for four periods, as Honorary Secretary of the Society, with Professor H. E. Armstrong as Senior Secretary, from 1883 to 1893, and as Senior Secretary from 1893 to 1898; he also occupied the position of Vice-President for the two periods 1898 to 1901, and 1923 to 1926.

Thomson did not confine his activities in the Chemical Society to the purely administrative side; he served on the Library Committee of the Society and was Chairman of that Committee from 1905 to 1924. In the Proceedings of the Society in 1924 the following reference is made to his services in connection with the library :—

> " The Council desires to place on record its great appreciation of the high services which have been rendered to the Society by Professor J. M. Thomson in his capacity of Chairman of the Library Committee. To his direction of the policy of the Committee is very largely due the value of the Library to chemists in this country, on whose behalf the Council now presents to Professor Thomson its most cordial thanks."

He was author of many contributions to scientific and technical journals—on the Composition and Properties of Ancient Glasses, the Chemistry of Pigments, Putrefaction and Antisepsis, the Chemistry of Building Materials, the Composition and Optical Properties of Double Salts of Nickel and Cobalt, the Action of Nuclei on the Crystallisation of Supersaturated Solutions, and on Photography, etc. He edited, jointly with Mr. A. G. Bloxam, several editions of *Bloxam's Chemistry, Inorganic and Organic*, of which the original, published in 1867, was produced by C. L. Bloxam, Thomson's predecessor in the Chair of Chemistry at King's College. He was elected F.R.S. in 1897, and received the honorary degree of LL.D. from the University of Glasgow in 1898.

Thomson was elected a Fellow of the Institute of Chemistry in 1878, served as a Member of Council for four periods, as a Vice-President for three periods, as an Examiner for five years, as Honorary Secretary for one year, as Honorary Registrar for six years, as a Censor for twelve years, and as President for three years (1900—1903).

Mrs. Thomson was the youngest daughter of Dr. Charles Arthur Aikin, a grand-niece of Miss Lucy Aikin, a grand-niece of Mr. Arthur Aikin (who was secretary of the Royal Society of Arts from 1817 until 1839) : she was also a great grand-niece of Mrs. Barbauld. Thomson often said how much he owed to the sympathy and ability of his wife, to whom he would frequently turn, and always with benefit, for criticisms and suggestions on decisions which he had made in connection with College matters or the treatment of a lecture.

John Millar Thomson was a remarkable man, of great ability, earnestness of purpose, and commanding influence, combined with a fine sense of humour and a great power of sympathy.

H. J.

VICTOR HERBERT VELEY.

1856—1933.

On August 20th, 1933, there passed away at the age of 77 one of the older Fellows of the Chemical Society, and yet another of the Oxford University staff of the Odling régime, in the person of Dr. Victor Herbert Veley, F.R.S. Those who worked in the University laboratories in the last decades of the past century and the first few years of the present will recollect with a sigh of affection the well-known spare figure with the humorous twinkle of the eye, and the clothes well stained with nitric acid; and those Fellows in the habit of attending scientific meetings in London in the first decade of the present century will perhaps associate his presence with a certain unwonted liveliness.

Veley claimed descent, with some pride, from the ancient family of De Velay in Auvergne. This may account for a certain French quality in his mind and hence in some of his work. He was, however, essentially English; and was the youngest son of F. T. Veley, a solicitor of Chelmsford. He received his early education at a well-known preparatory school of the period at St. Leonards, from which he went to Rugby. He must have had a happy enough time at Rugby, for he always spoke with great affection of his old school. In 1875 he went up to Oxford and entered as a commoner at University College. He appears to have entered fully into the life of the College (1875—1878), for he coxed his college eight when it went head of the River in 1877. At the same time he must have worked reasonably well, since he took a first class in the Final Honours School of Natural Science (Chemical Division).

After taking his degree, he worked for several years in the laboratory of the Lees Reader—the late A. Vernon-Harcourt—at Christ Church, and in October, 1887, was appointed by Professor Odling a demonstrator in the University laboratory at the Museum. During this period he played an active and stimulating part in the development of chemical teaching in Oxford, and acted as Tutor in Science to University, Queen's and Keble Colleges. Those who were up during this period will recollect his publication, known as Veley's List, a list of original papers which students were expected to read. As a lecturer Veley had a remarkably clear and deliberate style. He specialised particularly in physical chemistry, and I see from the Gazette that his lectures on this subject were first advertised in 1888. Later on in the 'nineties he organised a practical class in this subject, the first I think of its kind at the University Museum, taking advantage of some apparatus from the collection of the 8th Duke of Marlborough, but to a considerable extent equipped, I fear, at his own expense and with but little encouragement from the authorities. At the time, I believe, it was a great success.

Veley was elected a Fellow of the Royal Society in 1894, and in 1901 took the recently instituted D.Sc. During this active period of his career at Oxford he was fortunate in his marriage—now some 38 years ago—to Miss Lilian Jane Gould, the youngest daughter of the Rev. J. Nutcombe Gould. Miss Gould had had a distinguished career in Oxford.

She had been a scholar of Somerville College, and was allowed a first class in the Final Honours School of Natural Science (Animal Morphology). She was also one of the first women to take the D.Sc. degree in Dublin, and was one of the original Lady-Fellows of the Linnean Society. She was therefore well able to take an active and helpful interest in Veley's work, and the marriage proved an ideally happy one.

As a research worker, Veley was very industrious, and his results have been embodied in some 60—70 papers and monographs, most of which are remarkable for their clear and lucid style and careful expression. His earlier researches—from 1879 to 1887—were carried out in the Christ Church laboratory. His line of work was naturally influenced by the traditions of that laboratory and by Mr. Vernon-Harcourt and Mr. Esson, and this influence persisted in his later investigations. Much attention was therefore devoted to the determination of rates of chemical change, and at a later period to the physical properties of solutions. During the last decades of the past century the question of the influence of traces of a third substance, notably water, in promoting chemical reaction between various substances was in the air. This also influenced the direction of much of his work.

While at the Christ Church laboratory, he published papers on the higher oxides of manganese and their hydrates, on the rate of decomposition of ammonium nitrate, on the sulphur compounds of calcium and of barium, and on the lime process for the purification of coal gas. Perhaps his most ambitious paper at this period was that on the conditions of the evolution of gases from homogeneous liquids, published in the *Transactions of the Royal Society*. It was shown that the rate of evolution of gases from homogeneous liquids is accelerated by the presence of finely divided, chemically inert particles, not only when the gas is merely dissolved in the liquid, but also when it is in a state of formation as a resultant of chemical action. In the earlier stages of a chemical reaction, yielding a gas, the phenomenon of initial acceleration was observed, the rate of change increasing to a maximum and constant point, from which it decreased at a rate bearing some immediate relation to the diminution of mass. The particular case of the decomposition of formic acid into carbon monoxide and water was most fully investigated: the rate of change was shown to be directly proportional to the mass of substance undergoing the change. The curve representing the interval of time required for each unit of chemical change in terms of the mass present was shown to be hyperbolic and illustrative of Esson's law.

Veley's best known work is perhaps that on nitric acid, carried out in the University laboratory after his appointment as demonstrator. He improved the method of preparing pure nitric acid and succeeded in more nearly approaching 100% acid (99·95) than previous investigators. He found that anhydrous nitric acid had no action on copper, silver, cadmium and mercury—all of high degree of purity—or on commercial magnesium at the ordinary temperature. Purified iron and commercial granulated tin were unaffected even on boiling. Purified zinc was slightly acted on at the ordinary temperature, but sodium caught fire at once. The acid had no action whatever on powdered calcium carbonate at the ordinary temperature or at the boiling point.

Following the line of Russell's work on the action of nitric acid on silver, Veley found that the metals copper, mercury and bismuth do not dissolve in pure nitric acid of about 30% concentration and heated to 30°, provided that nitrous acid is neither present initially nor formed subsequently. To prevent these contingencies he added small quantities of some oxidising agent such as hydrogen peroxide, potassium chlorate, or some substance, such as urea, which destroys the nitrous acid by its interaction.

When the conditions are such that the metal dissolves, the amount of metal dissolved and the amount of nitrous acid present are concomitant variables, provided the nitric acid is in considerable excess. Change of conditions, such as concentration of acid and variation of temperature, which increases the former increases also the latter. When the metal dissolves, metallic nitrite is at first formed, together with nitric oxide: the former is decomposed by the excess of nitric acid to liberate nitrous acid, whilst the latter reduces the nitric acid to form a further quantity of nitrous acid. The net result is:

$$2NO + HNO_3 + H_2O \rightleftarrows 3HNO_2$$

Thus, if the conditions are such that these metals dissolve in nitric acid, nitrous acid is invariably the initial product of reduction.

He also found that copper, mercury and bismuth dissolve very readily in a 1% solution of nitrous acid, and that under these conditions nitric acid present in slight excess interferes with rather than promotes chemical change.

He also found that pure hydrogen reduces nitric to nitrous acid in the presence of cupric nitrate or lead nitrate: it also converts mercuric into mercurous nitrate, but does not produce any change in solution of bismuth or of zinc nitrate, when dissolved in nitric acid.

In consequence of this work, the late Mr. J. G. Burch and Dr. Veley were led to investigate the electromotive force of cells consisting of the above metals, platinum and nitric acid. It was found that when the metals silver, copper, bismuth and mercury are introduced into purified nitric acid of varying degrees of concentration and a couple is made with platinum, the electromotive force of such a cell increases until it reaches a constant maximum value. This rise of electromotive force is attributed to the production of nitrous acid by the decomposition of the nitric acid, and the final value is considered to be due to the nitrous acid only, while the initial value is due for the most part to the nitric acid, though it is affected to a remarkable degree by the amount of impurity of nitrous acid either initially present or produced by minute and unavoidable uncleanliness of the metallic strip and the containing vessel.

If nitrous acid has been previously added to the nitric acid, the maximum electromotive force is reached at once. In general the results obtained by the electrometer and by the chemical balance proved in every way confirmatory the one of the other.

Then followed a series of papers, with Mr. J. J. Manley, dealing with laborious experimental work, carried out partly in the University laboratory and partly in the Daubeny laboratory of Magdalen College, on the variation of physical properties with concentration of highly purified nitric acid.

Their first paper was concerned with the electric conductivity of nitric acid solutions, and at the outset they proposed to view their results from the standpoint of the hydrate theory. They then studied refractive indices, densities and contractions, and solution volumes. They found alterations, more or less defined, at concentrations approximately coincident with the composition of certain hydrates, all of which had been noted by previous workers. Besides these discontinuities they directed attention, for the first time I think, to the fact that there is a well-marked point of alteration for all physical properties at a concentration of about 95%, and in this respect nitric acid resembles sulphuric acid. At first they held the view that nitric acid of such concentration contained HNO_3 and N_2O_5 molecules, but later inclined to regard the hypothesis of associated molecules, $n HNO_3$, analogous to $n H_2O$, as more probable.

During the period of this work Veley also published numerous papers on the affinity constants of series of organic bases and acids, determined by a tintometric method based on the properties of methyl-orange.

Space does not permit me, nor do I feel competent to attempt, to trace any evolution of Veley's views on the theory of solution, but, whatever view may be taken of the interpretation, I think the papers must be regarded as models of accurate and painstaking experimental work.

Another subject of inquiry undertaken at this active period of Veley's life was an investigation, carried out in conjunction with his wife, on the cause of the "faultiness" of rum, a defect, first noticed about 16 years previously, which had caused great financial loss to the manufacturers in British Guiana and various West Indian islands.

They showed, by both chemical and physical tests, that this property of "faultiness" was due neither to any resinous or other matter extracted from the rum casks nor to saline or other substances precipitated on dilution of the rum, but to the presence of a micro-organism, hitherto undiscovered, to which they gave the rather appropriate name of *colcothrix methystes*. The organism was successfully cultivated in various media and cogent evidence was brought forth that it possesses three forms, *viz.*, coccus, rods, and filaments, and the life history of the organism under various conditions was fully described,

with details of the biological and chemical characteristics and staining reactions. They further found that faulty rum can be made sound, and sound rum faulty, by the removal and addition respectively of the organism. They thus established the remarkable fact that life can exist in alcohol of nearly 75%.

Strictly speaking, the organism survives not in the alcohol but in its gelatinous envelope, thus being as it were in a state of siege in its own castle, through the walls of which it can obtain its necessary supplies of food in the form of sugar, while keeping out its enemy alcohol.

Unfortunately, I think, the account of this work was published as a monograph, with the title " The Micro-Organism of Faulty Rum " by the Oxford University Press in 1898 and did not appear, unless in abstract, in the usual periodical literature, so it is perhaps not so well known as it ought to be. The reason for this method of publication was that certain doubts were expressed on the matter, as the authors say in their preface, " on the one hand by those with experience who had propounded rival theories, and on the other by persons, either without practical qualification to judge of bacteriological questions in connection with fermentation industries or personal inquiry into our results."

This work, we think, entitles the author to a place amongst the pioneers of modern biochemistry. After settling in London, Veley spent a good deal of time in the Physiological laboratory of the University of London at South Kensington between 1908 and 1912, and, in conjunction with the late Prof. A. D. Waller and others, published a number of papers on the action of various alkaloids, series of bases and of acids on muscle preparations. They regarded their results as due to chemical changes between muscle proteins (or their products of decomposition) and the compounds in the solution of which the muscles are immersed. Their conclusions were based on the observation that temperature factors are practically identical with those previously observed for definite chemical changes; that the relative reactivities of certain classes of compounds follow the same order as that observed in physico-chemical methods; and that in certain cases there is evidence of a sub-division of the muscle stuff, regarded as acidic, and two bases, such as nicotine and quinine, reacting simultaneously. Veley attempted to carry the argument further and to show that, in the absence of the disturbing factor of contraction, the reaction between living muscle stuff and chemical compounds can be made the subject of mathematical analysis. As the rate of reaction between *lifeless* chemical reagents is some function, generally logarithmic, and less generally linear, of time, so likewise the rate of reaction between *living* muscle stuff and a *lifeless* chemical compound follows the same general laws.

Veley had many other interests in life besides chemical. He was always an ardent stamp collector. He was a member of the Oxford Philatelic Society. He served on the Committee and for some years until he left Oxford was a Vice-president and then President of the Society. In later years he took great interest in shells and his collection might be the envy of many a museum curator, for he was content only with the best.

Veley's precise and orderly mind made him a first-rate man of business. For the last 21 years of his life he was much occupied in commercial matters in London. He was a director and later chairman of a brewery company and attended to various family properties in London and Essex. He was a good accountant, and often attended to legal matters himself, as far as he could lawfully do so. He was also a good citizen. On the outbreak of war, being too old for war service, he joined the Marylebone Borough Council and devoted himself to municipal affairs, particularly on the financial side. He was a highly respected member of the Council and was popular and trusted by all parties.

In the early part of 1933 Veley was knocked down by a motor in London and much shaken. Later he had an operation for eye trouble, but owing to his shaken state of health and probably his age he never entirely recovered from this operation and death supervened.

Socially Veley was a delightful person. His deep fund of humour, his dry wit and his kindly loyalty of disposition endeared him to all who had the privilege of his friendship. In his younger days perhaps somewhat of a *bon viveur*, he was a delightful host, and the writer has the pleasantest recollections of his kindly hospitality.

J. A. GARDNER.

VARGAS JOSÉ MARIA VERGARA.

1867—1933.

VARGAS VERGARA was born in Liverpool (England) in 1867, into one of the most distinguished and wealthy families of Bogotá, Colombia, S. America. After spending his early years in Colombia, he returned to England in 1880 and was educated at Mount St. Mary's College, Chesterfield. Later, he studied chemistry at London University during 1883—1887, under Dr. Muter. Returning to his own country, he opened a Laboratory and Central Chemistry School in Bogotá in 1890 and there taught mineral and organic chemistry. He was the first to teach the atomic theory in Colombia.

In this first class laboratory, he did valuable work on the minerals of the Antioquia, Nariño and Tolima mines, and also wrote an interesting study on the medicinal vegetable resin extracted by the natives (tunebos) in Santander, Colombia. From this resin he isolated esters, which he designated " otoviles."

He taught mineral and organic chemistry in the High Agronomical School, where he was one of the most distinguished professors. The Government used his studies on water analysis to solve problems of public hygiene.

He devoted the greater part of his life to the study and development of his profession, and in his articles and lectures always paid a grateful tribute to his English professor, Dr. Muter.

He died in Bogotá on December 3rd, 1933.

A. V. V.