THURSDAY, JULY 11, 1918.

SIR WILLIAM RAMSAY.

Sir William Ramsay, K.C.B., F.R.S. Memorials of his Life and Work. By Sir W. A. Tilden. Pp. xvi+311. (London: Macmillan and Co., Ltd., 1918.) Price 10s. net

IT has been said that every man has in his own history the making of at least one romance. If by romance is implied not merely a work of fiction, but also a story which is both true and marvellous, this may certainly be asserted of the life-histories of many men of science. A score of illustrations might be cited, if necessary, in proof of it. But it needs no proof to those who are in the least degree familiar with the personal history of science. The life-story of the subject of this memoir, as developed by Sir William Tilden, is further evidence of it. His biography of his eminent friend is one more addition to the already extensive literature of the romance of science.

Ramsay's relation to his epoch and his position in the chronicles of science are established for all time by his share in the discovery of the inert gases of the atmosphere, and by his recognition of helium as a terrestrial element. Most discoveries are based, in greater or less degree, upon antecedent knowledge, and the discoveries upon which Ramsay's fame chiefly rests are no exception to this general rule. Their wonderful succession may be said to take rise from Lord Rayleigh's memorable letter of September 29, 1892, in these columns, in which he first directed public attention to the difference in density between atmospheric and factitious nitrogen, and invited chemists to offer suggestions as to the cause. Ramsay's alert mind was soon at work on the mystery. How he came to associate himself with Lord Rayleigh in attempting to solve it, and how, by independent steps, the two investigators succeeded in completely elucidating it, constitute not the least interesting, and certainly the most historically valuable, chapter in Sir William Tilden's book. Although nearly a quarter of a century has elapsed since the British Association meeting at Oxford at which the epoch-making announcement of the discovery of argon was made, to be followed, a few months later, by the remarkable gathering in the theatre of the University of London in Burlington Gardens, at which a detailed account of the investigation was presented to the Royal Society, the memory of it all is still fresh to those now living who were fortunate enough to be present on those historic occasions. The story is again told in this book, simply and directly, and to a great extent by excerpts from Ramsay's correspondence with his wife and with his co-worker. Indeed, it tells itself by its intrinsic interest and power, and the author, like a true artist, shows a wise restraint in not over-elaborating it.

The formal announcement of the isolation of argon was followed, with an almost dramatic

quickness, by Ramsay's detection of helium among the gases which Hillebrand had found to be evolved from the mineral cleveite, and to which Ramsay's attention had been directed by Sir Henry Miers, at that time keeper of the Mineral Department of the British Museum. The identity of the new gas with the solar helium of Lockyer, who first discovered it spectroscopically, was established by Sir William Crookes, to whom Ramsay had sent a sample of the gas.

In June, 1898, Ramsay and Travers announced the existence of krypton in the least volatile portions of liquid air, and a fortnight later they detected the presence of another new gas, neon, followed some little time afterwards by the recognition of a third hitherto unknown substance, xenon—all of them companions of argon and resembling it in chemical inertness. They are, indeed, as an American chemist wittily termed them, the "tramps" among the chemical elements—"useless things which never did an honest day's work in their lives." An examination of the lighter portions and of the residues obtained from the less volatile fractions of about 120 tons of liquid air revealed no other new constituent of the atmosphere.

It is the detection, in such rapid succession, of these extraordinary substances which constitutes the element of romance in Ramsay's career. The gases are not only remarkable in themselves: they open up an entirely new and wholly unlooked-for development in the philosophy of chemistry. Although a score of years have passed since their existence was made known, the mystery of their origin, past history, and functions still remains one of the unsolved riddles of the universe. This epoch-making work was all compressed within less than half a dozen strenuous years. There has been nothing like it in the history of science since Davy's time, now more than a century ago.

On Ramsay's earlier and subsequent scientific work—mainly in inorganic and physical chemistry, for the most part done in collaboration with his demonstrators and students, to whom, like the born leader he was, he sought to impart some of his own unselfish and eager enthusiasm for investigation—there is the less necessity to dilate since it is all admirably summarised in the book under review.

In the space that remains we may indicate some of Ramsay's more obvious personal attributes. He was certainly a very complex character, and probably few outside the family circle could justly claim to know him thoroughly. Not that he was in the least degree unapproachable or retiring. On the contrary, a man of many social gifts and accomplishments, he was invariably at ease and happy in the society of his fellows and capable of strong and enduring friendships, as his biographer abundantly proves from the many letters which have been placed at his disposal. He was, moreover, an excellent conversationalist, with more of the saving grace of humour than we envious Southrons commonly attribute to the generality of his countrymen. An admirable *raconteur*, he had almost as big a fund of good stories as his name-

sake the Dean. He shared with his friend Fitzgerald an Irishman's love of the whimsical and his fondness for paradox. Imagination is an excellent quality in a man of science, but it needs to be disciplined, and it must be admitted that Ramsay's, like the Laird of Dumbiedike's "will-yard powny," occasionally ran away with him. But men of his temperament are to be judged not so much by what they say as by what they print, and although there are, no doubt, occasional lapses, there is but little in Ramsay's published scientific work that will not stand the test of time.

It is perhaps useless to speculate on the influences which led Ramsay to adopt a career in science. He himself was inclined to attribute his calling to heredity; many of his forbears for generations on his father's side had been dyers, whilst on his mother's side they were physicians. It must have needed some strong predisposing cause of this kind, as there was little or nothing in the circumstances of his school or college life to determine it. The teaching of chemistry was on a low plane in Glasgow in those days, and mainly as part of the medical curriculum. The University as a school of research lived on the traditions created by Thomas Thomson. Ramsay received little regular instruction in theoretical chemistry in his youth, but he learned to use his fingers in Mr. Tatlock's laboratory. It was only when he went to Tübingen to study under Fittig that he gained some insight into systematic chemistry. Not that Fittig was a particularly inspiring teacher. At all events he seems to have exercised no permanent influence on Ramsay, for the dissertation on toluic and nitrotoluic acids which he presented for his degree is one of his very few papers on organic chemistry.

Nor was he more fortunate in his first appointment as assistant in the newly created department of chemical technology in Anderson's College, where he had few opportunities for research and none for being generally useful. On his removal to the university, as a demonstrator under the late Prof. Ferguson, he had more scope, and availing himself of a collection of Anderson's preparations of bone-oil products, he attacked the chemistry of the pyridine series.

As in the case of other chemists who, in the past, have risen to eminence, it thus happened that Ramsay was largely self-taught. What he became was due almost wholly to his own exertions. The habit of self-reliance thus engendered served to strengthen his independent character and to develop his mental vigour. That with such a training he should have reached the position in the world of science to which he ultimately attained is perhaps the strongest testimony that could be adduced to his innate power and capacity.

On his appointment to University College, Bristol, and especially after his election to the principalship, Ramsay began to take an active part in the educational movements of the time, and he was concerned, with others, in securing some measure of State aid for the poorly endowed and struggling provincial colleges. He held very

strong views on university policy and on its relations to original inquiry, and his contempt for the examination system, which a certain section of the governing body in the University of London seems to worship like a fetish, became at length almost an obsession, and occasionally brought him into collision with colleagues who, whatever their private opinions might be, felt themselves bound in loyalty to make the best of a system which had been deliberately sanctioned by those who were ultimately responsible.

Sir William Tilden, with the aid of Lady Ramsay and of many friends, to whom he makes graceful acknowledgment, has put together an eminently readable book, in which he has handled his material with tact and discretion. He has evidently been in thorough sympathy with his subject, and has thus succeeded in presenting a particularly pleasing pen-portrait of his friend, for which those who knew and admired Ramsay will be grateful to him. We trace in his book the lineaments of one who has shed lustre on British science, whose happy life was rich in achievements which will hand down his name to remotest time, who was wholly unspoiled by success, but continued to the end to be the same generous, active-minded man which those who knew him best knew him to be.

T. E. THORPE.

ARTIFICIAL SEASONING OF WOOD.

The Kiln-drying of Lumber. A Practical and Theoretical Treatise. By H. D. Tiemann. Pp. ix + 316. (Philadelphia and London: J. B. Lippincott Co., 1917.) Price 18s. net.

THE true technique of the artificial seasoning of timber will depend upon a number of factors, as yet unknown, concerning the rate of passage of water in the walls of the constituents in different directions and under various conditions of dryness, also concerning the influence of stresses and rate of drying upon the shrinkage of the constituents and the wood itself. Our knowledge of these fundamental facts is, however, in an embryonic stage, and up to the present only certain elementary facts bearing on these problems have been discovered and partially elucidated. To their discovery Mr. Tiemann has contributed by years of research.

In the work under review, by reference to modern practice in kiln-drying and by discussions of the defects induced by inappropriate methods, conclusions are drawn as to the immediate causes of such defects as case-hardening (in which the external wood, shrinking under tension exerted by the internal wood, acquires a permanent set), lack of strength, brittleness, longitudinal furrowing and collapse, and splits induced by differential shrinkage or "explosion." These phenomena at the same time serve as means of partially gauging the efficiency of the precise treatment adopted. The differences in the treatments to be adopted in connection with various kinds of timber are in some cases correlated with marked structural features, as in the case of the oak, but in other cases are