He was a man of very great originality; he was always before his time. When he took his degree, at three-and-twenty, his thesis "On the Theory of Chemical Combination" won no prize, nor was it printed until many years afterwards; but it was a wonderful exposition of structural chemistry, and contained a system of graphic formulæ, undreamed of at the time, but to all intents and purposes that which came ultimately into universal use. He began teaching in a little extra-mural laboratory of his own in High School Yards, to the smallest of classes. He used to come down to our house of an evening and say (in a voice that some of us can still hear): "As I was saying to my man to-day!"—this was his only student. The great John Hunter himself had once no more! But when the University chair became vacant on Lyon Playfair's retirement, Crum Brown was known to and recommended by Bunsen, Hofmann, Wöhler, Baeyer, Kolbe, Beilstein—in short, by the greatest chemists of the day.

He was a man of insatiable curiosity, interested in what he did not know more than in what he knew. He wrote an important paper on the semicircular canals of the ear and their functions; and illustrated it by curious experiments and exquisite anatomical preparations. He had a passion for making models, geometrical and other. There were times when the glue-pot was always by his fire, and cardboard always ready to his hand; when he was very old indeed he lay quietly knitting, and the little mats he knitted were recondite models of interlaced figures and interwoven surfaces. He had both of these hobbies in common with Maxwell. For Maxwell had made some of the same models when he was a schoolboy, and his are in the Cavendish Laboratory to this day; and he once knitted a kettle-holder gayer than the rainbow, for it depicted a square of unannealed glass placed between crossed Nicol's prisms.

Crum Brown was at heart a mathematician. He said that unless the young chemist learns "the imperial language of science", the higher branches of chemistry (which require reason as well as skill) will pass out of his hands.

I sat in Tait's classroom for the first time well-nigh sixty years ago; and I remember as if it were yesterday the opening lecture which he gave. It was on the rainbow and the aurora—and the moral of it was to show how, of two phenomena, one may have been brought within the knowledge and comprehension of mankind, while the other, no less common nor less beautiful, remains a mysterious pageant beyond our ken. The days went by and every morning Tait gave us of his best; and all he taught us seemed to be just what we had most wanted to know. We also learned the very important lesson (as Prof. Flint long afterwards said) that here was a man whose mind was immeasurably greater than our own.

Tait played with schoolboy zest when it was playtime, and turned easily from work to play. Kelvin said of him that he had made the writing of "T. and T′" a perpetual joke; his papers here on "Knots" were one long game—always with the joke behind it that in four dimensions there would be no knots at all! Even in class, once in a way, when he had drawn a freehand circle on the board or skilfully thrown a skipping-rope into waves, his eye would meet ours in momentary triumph and schoolboy comradeship. But in fact Tait's life was one of arduous and almost continuous labour; play there might be, but idleness never; and with duty nothing was ever suffered to interfere. Until the end grew near, when his natural strength abated and sorrow came at the last, he kept the light heart and the happy laughter of a boy; and we who were his pupils, forty, fifty and sixty years ago, still think of him with love, honour and gratitude, and know by a lifetime's experience how rare and exceptional were his qualities of heart and mind.

Muhammad Ibn Umail: an Early Muslim Alchemist

NEARLY twelve years ago, it was mentioned in NATURE of October 28, 1922, p. 574 that a well-known Latin alchemical treatise entitled "Epistola Solis ad Lunam Crescentem" was apparently a translation of the Arabic work "Risālatu'l-shams ilā al-hilāl (Letter of the Sun to the New Moon) by Muhammad ibn Umail al-Tamimi. This suggestion has been confirmed by Messrs. Muhammad Turab Ali, H. E. Stapleton and M. Hidayat Husain, who, in a lengthy and valuable communication to the *Memoirs of the Asiatic Society of Bengal* (vol. 12, No. 1, pp. 1–213; 1933), have published the Arabic text of (*a*) the Risāla, (*b*) a prose commentary on the Risāla, by the author himself, entitled "Al-mā' al-waraqī wa'l-ard an-najmīyah" (Book of the Silvery Water and Starry Earth), and (*c*) a further poem of Ibn Umail's, entitled "Al-qasīdat an-nūnīyah" (Poem rhyming in Nūn). The edition of the texts is the work of Mr. M. Turab Ali; Messrs. Stapleton and Hidayat Husain contribute an excursus on the date, writings and place in alchemical history of Ibn Umail; an edition, with glossary, of an early medieval Latin rendering of the first half of the Mā' al-waraqī; and a descriptive index, chiefly of the alchemical authorities quoted by Ibn Umail.

Ibn Umail was formerly believed to have flourished in the second half of the third century A.H. (that is, A.D. 864–912), but it is now shown that this date is too early. Upon evidence deduced from the period at which his friends, and authors he makes use of, are known to have lived, it appears that his life probably covered the years from 900 to at least 960 A.D., and that his writings are consequently later than those of Razi (Rhazes).

The statement of the bibliographer Ḥājjī Khalifa that his name was not pronounced Amyal (as has sometimes been supposed), but Umail, is confirmed by the vowel points placed on the name in the Leningrad manuscript of the work. It might, however, be mentioned in this connexion that Hājjī Abdu'l-Muhyī, who possesses a very extensive acquaintance with Arabic alchemical literature, and whom the present writer consulted on the point a few years ago, was emphatically of opinion that the correct pronunciation was Amyal. The Latin transcription Hamuel would support the latter as against Umail; it is therefore difficult to arrive at a final decision.

The importance of Ibn Umail's work lies in its early date; in its possible affiliations with the celebrated "Turba philosophorum", the "Shawāhīd" of Razi, and a treatise by the little-known alchemist Mahraris; and in its richly detailed picture of Muslim alchemical thought of the tenth century. Messrs. Stapleton and Husain promise us a detailed study of the text of the Mā' al-waraqī and its comparison with the work of Razi just mentioned, as soon as leisure from their official duties permits. Meanwhile, an inspection of the Arabic version side by side with the Latin translation shows that while the latter is a creditable production for its age, the translator made a great many slips and not seldom failed completely to understand his author. Those historians who can read Ibn Umail in the original will find an abundant store of important and interesting information in Mr. Turab Ali's carefully edited text; but the general reader of alchemical literature must impatiently await an annotated English translation and hope that Mr. Stapleton may not long delay it.

The descriptive index of names of people, countries, places and books mentioned in the Mā' al-waraqī, with its Latin rendering, and in the Qasīdat an-nūnīyah, is largely the work of Prof. Maqbul Ahmad, of Presidency College, Calcutta. It is by no means the least valuable part of the treatise, for it throws considerable light on those personages, real or fictitious, then regarded as authorities, and shows at a glance the books most frequently quoted and therefore presumably esteemed most highly. We note, for example, that Jābir ibn Ḥayyān is mentioned 31 times, Mary the Jewess 27 times, and Hermes no fewer than 51 times. But we feel that we should like to know more of Abu'l-Qāsim 'Abdu'l-Maḥmūd ibn Hayyān, an unsuccessful alchemist and contemporary of Ibn Umail, who worked for twenty-three years without letting his furnace go out!

E. J. HOLMYARD.

Obituary

PROF. E. W. HOBSON, F.R.S.

ERNEST WILLIAM HOBSON, who was born at Derby on October 27, 1856, and died rather suddenly, after a short illness, on April 19, 1933, had been for many years one of the first of English mathematicians. Although he lived to be seventy-six, he was active almost up to his death; his last book (and perhaps in some ways his best) was published when he was seventy-four. He was a singular exception to the general rule that good mathematicians do their best work when they are young.

Hobson was the son of William Hobson, who was editor and part proprietor of the *Derbyshire Advertiser*, and was prominent in municipal affairs. He was the eldest of a family of six, J. A. Hobson, the well-known economist, being one of his brothers. His early education was at Derby School, where his mathematical talents were very soon noticed and encouraged. When he was fifteen he obtained a Whitworth Scholarship at what is now the Royal College of Science, and studied physics in London for a short time under Dr. F. G. Guthrie. Two years later he was elected a mathematical scholar of Christ's College, Cambridge. He went into residence in October 1874, 'coached' with Routh, and was Senior Wrangler in 1878.

A Senior Wrangler of those days succeeded almost as of right to a fellowship, and Hobson became a fellow of Christ's, and a lecturer in mathematics, in the autumn of the same year. He also did a good deal of private coaching. In 1883 he was made one of the first University lecturers in mathematics. But 'research' meant much less for a college and even for a university lecturer then than it does now, and Hobson wrote very little, and that of little importance, in his early years. His Royal Society memoir on spherical harmonics, which is now classical, and is the first of the papers on which his reputation rests, was not published until 1896.

Hobson's development as an original mathematician seems now to have been strangely slow. By 1903, however, he had moved a very long way; he had (largely as the result of intercourse with W. H. Young) acquired his interest in the modern theory of functions; and he had abandoned coaching in order to win leisure for research. From this time onward he changed rapidly into the Hobson whom we knew. In 1903 he became Stokes lecturer, a position which is now associated definitely with applied mathematics, and has been occupied, since Hobson held it, by Jeans, Fowler and Dirac; but Hobson was by then very plainly a pure mathematician. The first edition of his great "Theory of Functions of a Real Variable" appeared in 1907. In 1910, at the age of fifty-four, he succeeded Forsyth as Sadleirian professor, and he held this office until his retirement in 1931. He was still surprisingly vigorous, but, as well he might be,