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The Editor regrets to report that Dr. Denis Quane passed away on 21 September 1990 shortly after correcting the final proofs for this article. Dr. Quane was an Associate Professor of Chemistry at East Texas State University, where he had been teaching a course in the history of science since 1982.

Joseph William Mellor (1869-1938)

Fathi Habashi, Université Laval

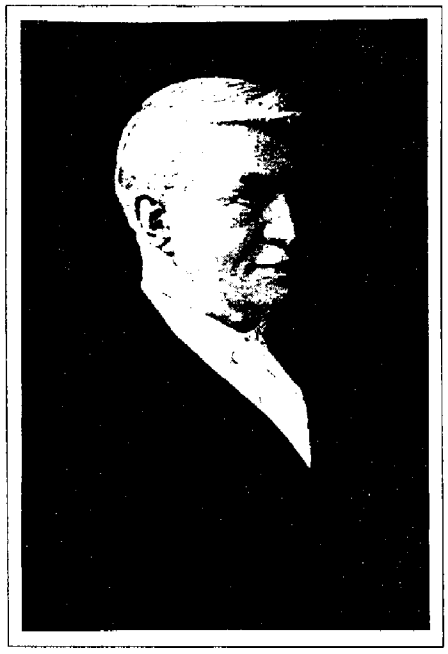
Today most students of chemistry have probably never heard of Joseph William Mellor, though his monumental 16-volume *Comprehensive Treatise on Theoretical and Inorganic Chemistry* is still to be found on the shelves of most chemistry libraries and he was, without a doubt, one of the most prolific and influential textbook authors of his time. His biography in the *Obituary Notices of the Fellows of the Royal Society* appears to have been accidentally overlooked by the standard biographical indices (1) and he does not appear in any of the standard biographical dictionaries of prominent scientists (2,

3). Consequently the author, though long interested in Mellor, could find nothing about him until a recent biographical article by Mike Rose, in the *New Zealand Potter*, was brought to his attention (4).

Mellor was born in Huddersfield, England in 1869. When he was ten years old, the family emigrated to New Zealand where his father found work in the woolen mills of Kaiapoi and later at Dunedin on the South Island. His working class background ruled out any thoughts of higher education, and at the age of 13 he left school to take employment in a boot factory. In the evenings, however, by light of a kerosene lamp, he read secondhand or borrowed books and performed simple chemical experiments.

The young man's remarkable efforts at self-education eventually came to the attention of G. M. Thomson, the Director of the local technical school, who arranged for him to attend evening classes, and who, following Mellor's matriculation in 1892, also assisted him in becoming a part-time student at Otago University. Mellor rewarded Thomson's faith in him by graduating in 1898 with first class honors. Following graduation, he took a teaching post as a science lecturer at Lincoln Agricultural College and married Emma Bakes, the organist at Mornington Church. However, a few months later, he received an 1851 Exibition Scholarship which enabled him

A self-caricature of Mellor depicting a stay in hospital (8).



Joseph William Mellor

to resign his post and to sail to England for advanced study at Owens College in Manchester. Four years earlier, in 1894, another young graduate of Otago University by the name of Ernest Rutherford had also received an 1851 Exhibition Scholarship and had departed New Zealand to study physics at Cambridge University.

At Owens College, Mellor first did research in organic chemistry with William H. Perkin Jr. but, under the influence of Harold B. Dixon, soon switched to the field of physical chemistry and the study of chemical kinetics. This led to the publication of several papers on the influence of moisture on the kinetics of gas reactions and to the writing of his first two books: *Higher Mathematics for Students of Chemistry and Physics* (1902), and *Chemical Statics and Dynamics* (1904). Mellor later described the *Chemical Statics* as having been his favorite work. As for the *Higher Mathematics*, it was, like the later American text on the same subject by Farrington Daniels, the product of the author's efforts to make up for his own lack of formal mathematical training and the insights which the resulting program of self-education had given him into the mathematical difficulties experienced by other inadequately prepared students of chemistry,

After three years of research at Owens, Mellor accepted a teaching position as Science Master at the local high school at Newcastle-under-Lyme in the Midlands - a region famous for its "Potteries". These consisted of six towns that were federated into the city of Stoke-on-Trent a few years after Mellor's arrival. The region was rich in coal and clays, the necessary elements of pottery manufacture, and the resulting dominance

of the pottery industry soon attracted Mellor's interest.

In 1904, the industry started a Pottery School which soon became part of the North Staffordshire Technical College. Mellor lectured there and later became the Principal. He also became Secretary of the newly-formed Ceramic Society. During World War I, he directed a modest research program on refractories that became the first stage in the formation of the British Ceramic Research Association and, in 1921, the British Refractories Research Association was formed with Mellor as Director.

A natural consequence of these activities was that Mellor's interests gravitated towards the fields of inorganic and industrial chemistry and, as had been the case with his earlier study of physical chemistry, the result of his thorough program of self-education in these new areas was a veritable deluge of research papers (more than 100 on the chemistry of ceramics) and books (Table 1) on these subjects, including his 16-volume *magnum opus* (Table 2). Indeed, the output from Mellor's 11 books alone (not counting his 116 published research papers and six patents) would eventually total more than 20,000 printed pages! A characteristic of all of these volumes are the

Table 1. Books by J. W. Mellor in chronological order.

Year	Title	Pages
1902	Higher Mathematics for Students of Chemistry and Physics	543
1904	Chemical Statics and Dynamics	528
1905	The Crystallization of Iron and Steel. An Introduction to the Study of Metallography	114
1912	Modern Inorganic Chemistry	871
1913	A Treatise on Quantitative Inorganic Analysis	778
1914	Clay and Pottery Industries	411
1915	Introduction to Modern Inorganic Chemistry	684
1920	Higher Inorganic and Theoretical Chemistry	na
1922-37	Comprehensive Treatise on Theoretical and Inorganic Chemistry	15,320
1930	Elementary Inorganic Chemistry	229
1930	Intermediate Inorganic Chemistry	690

Table 2. An Outline of Mellor's Comprehensive Treatise

Volume	Contents	Pages	Year
1	H, O*	1065	1922
2	F, Cl, Br, I, Li, Na, K, Rb, Cs	894	1922
3	Cu, Ag, Au, Ca, Sr, Ba	927	1923
4	Ra and Ac Families, Be, Mg, Zn, Cd, Hg**	1074	1923
5	B, Al, Ga, In, Tl, Sc, Ce, and Rare Earths, C (Part I)	1004	1924
6	C (Part II), Si, Silicates	1024	1925
7	Ti, Zr, Hf, Th, Ge, Sn, Pb, Inert Gases	977	1927
8	N, P	1110	1928
9	As, Sb, Bi, V, Nb, Ta	967	1929
10	S, Se	958	1930
11	Te, Cr, Mo, W	909	1931
12	U, Mn, Ma***, Re, Fe (Part I)	944	1932
13	Fe (Part II)	948	1934
14	Fe (Part III), Co	892	1935
15	Ni, Rn, Rh, Pd, Os, Ir	816	1936
16	Pt, General Index	811	1937
	Total number of pages	15,320	

**Includes chapters on History of Chemistry, Thermodynamics, Crystals and Crystallization, Solution, Kinetic Theory, Electrolysis, and Electrical Energy.*

***Includes chapters on the Structure of Matter, Radioactivity, and the Architecture of the Atom.*

****Ma stands for masurium - an element discovered by Ida Tacke, Walter Noddack and Otto Berg in 1925. Thought to occupy the position held today by technetium, its confirmation was controversial.*

numerous references and quotations and the thorough presentation of the history of each topic, a fact which today makes them an invaluable resource for historians of chemistry (5).

The Mellors had no children, but he had four sisters in New Zealand who provided several nieces and nephews. He used to write them amusing letters, illustrated with cartoons, some of which were collected together by friends and published in 1934 under the title of *Uncle Joe's Nonsense* (6). In addition, he described his trip to the United States in 1929, when the Ceramic Society travelled to New York on board the Cunard liner, "Laconia", in a 36-page booklet illustrated by witty cartoons and comments, three of which have been reproduced in the *Journal of Chemical Education.* (7), along with two self-caricatures (8).

Mellor retired as Principal of the North Staffordshire Technical College in 1934 and as Director of the British Refractories Research Association in 1937. He died the next year at the age of 69. After his death, some pieces from his pottery collection and other archival material were donated by his wife to the University of Otago. In 1949, the New Zealand Institute of Chemistry instituted an annual Mellor Lecture in his honor.

References and Notes

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3. Thus Mellor isn't listed in any of the dictionaries indexed in reference 2 nor in C. C. Gillespie, ed., *Dictionary of Scientific Biography*, Scribners, New York, NY., 1970 or W. R. Pötsch, A. Fischer and W Müller, *Lexikon bedeutender Chemiker*, Verlag Harri Deutsch, Frankfurt, 1989.

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5. Since Mellor's richest legacy to the chemical community is in the form of his books, a brief commentary on some of the more important items in Table 1 is not without interest:

Higher Mathematics for Students of Chemistry and Physics - This book starts with differential calculus, then discusses analytical geometry, integral calculus, infinite series, probability, determinants, differential equations, and Fourier's theorem. The book went through four editions, was reprinted in a cheap edition by Dover in 1955, and was translated into German. The book seems to have been the first to make use of practical problems in chemistry and physics to teach mathematics to students of physical science. Farrington Daniels published *Mathematical Preparation for Physical Chemistry* in 1928 - the American counterpart to Mellor's *Higher Mathematics*. The book contains a wealth of information on chemistry and physics that is now of a great historical value.

Chemical Statics and Dynamics - This book carries the subtitle *Including the Theories of Chemical Change, Catalysis, and Explosions*. On the title page, the author quotes the phrase "The first law of nature is order." The book is one in the series "Textbooks of Physical Chemistry", edited by Sir William Ramsay. In this book, Mellor brings together the origins of the theories of chemical kinetics, the mathematics of the different orders of reactions, heterogeneous reactions, equilibrium and dissociation, the effect of temperature and pressure on chemical reactions, electrolytic dissociation, catalysis, fermentation, and explosions. More than three thousand references to the original literature are included.

Modern Inorganic Chemistry - First published in 1912, this volume went through eight editions because of the widespread popularity it achieved. The last edition was prepared by G. D. Parkes of Keble College, Oxford, one year after Mellor's death. This edition of the book was still being reprinted as late as 1951. The first one-fourth of the book is devoted to general principles of physical chemistry. This is followed by an equal number of pages devoted to nonmetals, and the remainder of the book deals with the metals and metalloids.

The Comprehensive Treatise - This is Mellor's masterpiece, a 16-volume reference book on inorganic chemistry complete with extensive references to the original literature (Table 2). It is difficult to believe that this was the product of a single person working alone with only a young lady to do the typing (electric typewriters and word processors were, of course, not known at the time). When one examines the numerous references, which also included the foreign literature, one is amazed by the magnitude of the task. Mellor dedicated it to "The privates in the great army of workers in chemistry. Their names have been forgotten, their work remains."

6. J. W. Mellor, *Uncle Joe's Nonsense for Young and Old. A Medley of Fun and Philosophy Reported by J. W. Mellor*, Longmans, Green, London, 1934.

7. A. Silverman, "Mellor's Nonsense", *J. Chem. Educ.*, **1952**, *29*, 187.

8. Editor's Note, *J. Chem. Educ.*, **1954**, *31*, 17.

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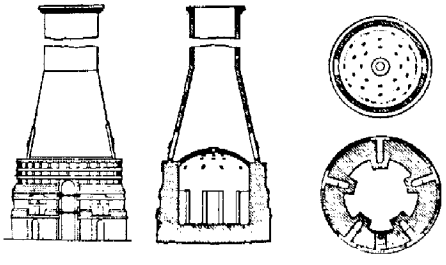

Exterior and cross-sectional views of an industrial pottery kiln, circa 1880.