

Fritz Ephraim (1876–1935)

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MANY a chemist has secured a widespread reputation by writing an unusually good book. Often then his name comes to signify the literary product rather than the man himself. A case in point is Fritz Ephraim, whose "Inorganic Chemistry" is commonly referred to as "Ephraim." This "Textbook for Advanced Study and Reference" appeared in 1922. It has had five German editions, and has been translated into Russian, Spanish, Italian, and English. The third and fourth English editions appeared after the author's death, but though the facts have been brought down to date, these posthumous issues have preserved the original general scheme. The material is not arranged in the usual dictionary-like manner; the elements are not dealt with one after the other. Rather, related compounds are discussed with emphasis on their comparable and unifying characteristics. It has appropriately been called a comparative inorganic chemistry. Ephraim exhibited here his extraordinary wealth of factual knowledge and also his keen comprehension of relationships. The result was not a bulky tiresome reference volume, but an interesting presentation of the bewildering array of inorganic facts in a collective rather than individual form. The volume (*circa* 900 pages) contains a vast amount of information, presented so attractively that it is hard to put the book down.

Another notable and gigantic literary task was his contribution to the 7th edition of Gmelin-Kraut's "Handbuch der anorganischen Chemie." Ephraim wrote (1902–12) the sections on the alkali and alkali-earth metals; beryllium, aluminum, niobium, manganese, arsenic, antimony, tantalum; the nitrogenous compounds of sulfur. The chapters on vanadium, bismuth, and tungsten in "Muspratt" (1905) came from his pen; likewise the chapter on vanadium in Fehling's "Handwörterbuch" (1912). *Fortschritte der Chemie, Physik und Physikalischen Chemie* from 1909 to 1914 contained his surveys of the "Advances in the field of complex compounds." His "Chemische Valenz-und Bindungs-Lehre" (306 pp.) appeared in 1928 and was a great success.

Fritz Ephraim was more than an indefatigable student and gifted writer. He was also a successful and beloved teacher, always willing to help and guide his students and to give them the benefit of his enormous store of information. Retiring and modest, he took whatever fame came to him quietly and philosophically,

glad that he was privileged to participate in the great quest for further illumination on the problems posed by our surroundings.

The story of his life is soon told. Born in Berlin on September 4, 1876, he was educated at Charlottenburg, Munich, and Berlin. His principal teachers were Baeyer, Liebermann, and Emil Fischer, in whose laboratory he received post-doctorate training. Though his background, through contact with these masters, was organic, in 1901 he accepted a call to Berne to take charge of the general inorganic laboratory. He retained this responsibility for almost three decades. His reputation was made in the inorganic field. Nonetheless, in 1932 he was appointed professor of theoretical and organic chemistry, and so great was his versatility that he switched back to this, his original field, with little if any difficulty. Not many modern chemists can so successfully accomplish this feat of reconversion.

His investigations can be roughly divided into three groups, each covering approximately 10 years. The list comprises about 120 papers, and includes 43 doctorate theses. The first period was devoted to a wide variety of studies on the preparation and investigation of the reactions of numerous inorganic compounds, hitherto wholly or partly unknown. The second period comprises his comprehensive investigations of the nature of auxiliary valences and the stability of complex compounds. The third period dealt with such fundamental topics as the relation of solubility and stability of hydrates, the deformation of the outer and inner electron shells when compounds are formed, etc. After years of special study, this expert in chemical binding wrote, in 1931: "So far as there is any certainty in our knowledge, it can now be said that there is no longer any place for the concept of a special chemical force; its reduction to space and charge surely signify a gratifying simplification of our world picture."

In 1930, Dr. Ephraim was offered the directorship of the chemical institute of a university in Palestine, but he could not bring himself to leave his beloved Berne. Yet he did not seek Swiss citizenship until 1932. His last years were made miserable by a chronic illness, to which he succumbed on January 17, 1935.¹

¹ A detailed biography and complete bibliography of Ephraim's publications was given by E. Michel, *Helv. chim. acta*, **18**, 1448–64 (1935). See also *Ber.*, **68A**, 62–5 (1935).

The poet, according to Gilbert K. Chesterton, is content to walk along with his head in the heavens, while the scientist must ever seek in vain to cram the heavens into his head!