

OBITUARY NOTICE.

AUGUSTE BÉHAL

1859—1941

AUGUSTE BÉHAL was born of farming stock at Lens on 29th March, 1859, and received the greater part of his secondary education at the Collège de Béthune. His specialisation in chemistry and particularly organic chemistry, like that of so many eminent French chemists, followed the long training and qualification as "Pharmacien".

After the completion of his training with distinction at the famous Ecole de Pharmacie, Béhal in 1884 began his study under Friedel at the Sorbonne of ethylenic hydrocarbons, the subject of his thesis for the Doctorat-ès-Sciences in 1889. In the meantime he filled various appointments at well-known hospitals at which he had as pupils such men as Moureau, Desgrez, Blaise, Valeur, Tiffeneau, and Sommelet.

In 1890, at the École de Pharmacie, Béhal started his public or extra-mural lectures on Organic Chemistry which were immediately an outstanding success. He continued this course for several years even without remuneration. It led to the publication in 1896 of his "Traité de Chimie organique d'après des théories modernes" which established his reputation as a leader in organic chemistry in France, and he was given the title of Professor without assignment to any particular school.

In 1892, Béhal was one of the French delegates to the historic Geneva Conference for the Reform of the Nomenclature of Organic Chemistry; but any substantial recognition of his increasing eminence as an organic chemist did not arrive until he was appointed "Maitre des Conférences de Chimie organique" to Friedel at the Sorbonne in 1898. On Friedel's death in 1899, Béhal remained in charge until Haller was appointed to the vacant chair, and he himself had to be content with the appointment as Professor of Toxicology at the École de Pharmacie. It was not until six years later that Béhal was appointed full Professor of Organic Chemistry at the École de Pharmacie, succeeding Jungfleisch who had migrated to the newly instituted Collège de France. For thirty years, Béhal's department in the Faculté de Pharmacie was, under his inspiration and organisation, an important centre of teaching and research in organic chemistry. Béhal was Honorary Secretary of the Société chimique de France from 1893 to 1911 when he was elected President. He was also President of the Société de Pharmacie and, in 1937, President of the Société de Chimie industrielle.

Béhal was elected Member of the Académie de Médecine in 1906 and President in 1922. In 1921 he was elected into the Académie des Sciences in the Chemistry Section, and in 1939 he had the distinction of election to the Presidency. He was created Grand Officier de la Légion d'Honneur in 1929. He became an Honorary Fellow of the Chemical Society in 1933.

During the 1914—1918 War, Béhal was Director of the Department of Chemical Products charged with the organisation of the production of pharmaceuticals, toxic materials, dyestuffs, and numerous chemical materials urgently needed in the national emergency. One of the offices of the liaison staff of the British Chemical Warfare Department was established at the École de Pharmacie, and it was there that the writer first met Béhal and came to enjoy his friendship and that of his charming wife. Béhal's rugged appearance was in keeping with his forthrightness, his command of affairs, his great sense of humour, and his calmness in all circumstances. It was good to know him. Béhal's war-time service convinced him of the importance of the establishment of a suitable centre of documentation for chemistry and the maintenance of intimate relationship between academic research and industry, and he devoted himself with others to the establishment of the Maison de la Chimie. It was Béhal who secured the active support of Sir Robert Mond who with Lady Mond became the largest private benefactor. The Maison de la Chimie is almost a monument to Béhal.

Béhal's scientific work covered a wide field. Problems connected with unsaturation of complex acetylenic and ethylenic hydrocarbons were for a long time under investigation by Béhal and his pupils. In this connection, and as an example of the neatness of Béhal's work, he introduced the use of "urea chloride" (carbamyl chloride, $\text{NH}_2\cdot\text{CO}\cdot\text{Cl}$) as a convenient means of the addition of hypochlorous acid to ethylenic hydrocarbons and, with Detoëuf, prepared numerous glycol chlorohydrins. Similarly, his identification of alcohols by means of their allophanates, $\text{H}_2\text{N}\cdot\text{CO}\cdot\text{NH}\cdot\text{CO}_2\text{R}$, had a considerable influence in elucidating problems of constitution in the terpene series (*e.g.*, carvomenthol and isopulegol). Again, his introduction of the use of thionyl chloride for the preparation of acid chlorides and chlorine derivatives has been of inestimable service to organic chemists; but he also employed it in connexion with his terpene investigations by obtaining, from camphoroxime, β -campholenic acid which he converted into campholene. In his studies in the terpene series, Béhal modified the Sabatier-Sanderens method of reduction by using a nickel catalyst. On applying this to α -terpineol, he obtained a dihydro- α -terpineol isomeric with that obtained by Wallach; these two compounds were later shown to be *cis-trans* isomerides.

Following Gerhardt's classical investigations Béhal made a study of mixed anhydrides, those from formic acid showing the remarkable property of decomposing with evolution of carbon monoxide when allowed to react with a tertiary amine. Another isolated and neat piece of work, carried out with Choay, was the preparation and proof of the constitution of chloralimide, $(\text{CCl}_3\cdot\text{CH}\cdot\text{NH})_3$, and still another was the preparation of guaicol for the first time in the crystalline condition which contributed to its extended therapeutic application. With Sommelet and Tiffeneau, Béhal explored the use of the Grignard reaction for the preparation of certain



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glycol ethers, easily hydrolysable to dialkylacetaldehydes, and the preparation of phenyl ethers, incidentally proving the structure of anethole. An earlier investigation, with Auger, on the action of malonyl chloride on aromatic hydrocarbons in the presence of aluminium chloride, led to the production of β -diketones of the type, $R \cdot CO \cdot CH_2 \cdot CO \cdot R$, which had "acid" properties and formed metallic derivatives; by decomposition with concentrated alkalis these β -diketones proved to be a convenient source of ketones and acids of the general types, $R \cdot CO \cdot Me$ and $R \cdot CO_2H$, respectively.

Auguste Béhal died on 2nd February, 1941, at Mennecy (S. et O.). He never doubted that France would regain her liberty and greatness.*

C. S. GIBSON.

* The writer is greatly indebted to MM. André Kling and M. Sommelet and to (the late) M. Damiens for information regarding certain details of Béhal's career. The photograph is taken from a commemorative medal struck at the time of Béhal's retirement.
