

## EMIL FISCHER—BIRTH CENTENARY\*

**E**MIL FISCHER was born on 9th October 1852, in Euskirchen in Rhenish Prussia. After the termination of his scholastic life he was appointed as instructor in the Strasbourg University. In 1875 he followed his teacher, von Baeyer to Munich where he worked successively as Lecturer, Professor Extraordinary and Director of the Analytical Department of von Baeyer's Laboratory. On the demise of von Hofmann in 1892, Emil Fischer was appointed Professor and Director of the Chemical Institute in Berlin University, a post which he filled with increasing distinction for 27 years until his death.

Fischer's investigations during the first 25 years of his research career mainly comprised work on colouring matters of the rosaniline group, phenyl hydrazine and its compounds with aliphatic and aromatic substances, separation and estimation of arsenic, caffeine, theobromine and xanthine, uric acid, syntheses in sugar group, glucosides, stereochemistry, estimation of amino acids and enzymes.

His investigation on the rosaniline bases led him to conclude that, (1) rosanilines producible from aniline and the toluidines are homologues of which the simplest, pararosaniline, has the composition  $C_{19}H_{17}N_2$  whilst commercial fuchsine is a mixture of which the principal constituent is  $C_{20}H_{19}N_2$  and that, (2) the parent hydrocarbon of the whole group is triphenyl methane of which or of its homologues, the various leucanilines are tri-amino derivatives.

Although Fischer started his career with research on colouring matter under his master, von Baeyer, he soon diverted and chalked out different lines of work for himself. In 1875 he observed that diazotised aniline on treatment with neutral potassium sulphite yielded, (i) potassium benzene diazonium sulphate,  $C_6H_5N_2SO_3K$ , and (ii) potassium phenyl hydrazino sulphate,  $C_6H_5N_2H_2SO_3K$ . The latter on treatment successively with benzyl chloride and hydrochloric acid yielded benzoic acid and phenyl hydrazine. Thus was born the 'key substance' phenyl hydrazine, which helped Fischer to reveal to us the story of the sugars. Today every student of organic chemistry knows the importance of phenyl hydrazine as a reagent for the identification of carbonyl compounds.

Fischer's major work soon excelled that of von Baeyer: a fact substantiated by the award (1902) of the Nobel Prize to the pupil three

years before it was awarded (1905) to the teacher. Fischer's discovery of organic hydrazines and the effect of phenylhydrazine on aldehydes and ketones led to the establishment of the constitution and to the synthesis of various sugars and to the unravelling of their stereochemistry. His investigations on lichenic substances, depsides and tannin materials have been considered very important. His discovery of soporifics and development of barbiturates like veronal helped the development of synthetic drugs. His investigations in Walden's inversion have become equally classical. Fischer's work on spider's silk revealed that its amino acid make-up is similar to that of natural silk, but while natural silk contained serine and  $\alpha$ -anilino-propionic acid, spider silk contained glutamic acid. Perhaps the rudiments of modern paper chromatography are discernible in one of his papers entitled "Rise of salt solution in bibulous paper".

Fischer's main contribution to industry was the supply of trained personnel. In 1883 the Badische Factory in Germany offered him the lucrative position of the Directorship of the Company. But his love for research made him decline the offer. His development of the barbiturates, substitutes for atropine and strontium chloroarsenobenzenolate as remedy for carcinoma brought him in close contact with synthetic drug industry.

During the years of the First World War, Fischer's services were in constant demand for industrial and technical advice. He presided over two Commissions, one for the production of benzene and toluene, and the other for the utilisation of gypsum and kieserite for the production of sulphuric acid. It was he who as early as 1914 urged the need for the production of synthetic nitric acid from ammonia produced from coke ovens.

H. E. Armstrong, in the obituary article on Fischer, writes of him as "One of Germany's great academic experts—a man who was listened to and used by his Government and simply worshipped by industry" Emil Fischer's achievements will remain for all time a monument of perseverance and industry and a gospel of inspiration and encouragement to all that have the vision and courage to follow him.

\* Summary of the Presidential Address, by Dr. B. H. Iyer to a Colloquium, held on 29th October 1952 in the Indian Institute of Science, Bangalore.