

A large amount of experimental work has been done on the mechanical behaviour of leather under tension, repeated bending to test fatigue effects, and abrasion. Some of these results have been given in a printed paper entitled "Experiments on the Wearing of Bottom Stock Leather under Abrasion," copies of which may be obtained from the secretary at the address given above.

The nature of the problems which are considered likely to be of immediate importance may be illustrated by the questions which have arisen in the work of the special committee on welted insole leather. This committee was set up to consider the properties required in leather to render it satisfactory for welted insoles, to seek the relation between different tannages and the extent to which the desired properties are produced, and to set up a standard for an adulterant-free welted insole.

During the process of manufacture the leather must be such as admits of a satisfactory and durable seam in the process of welt sewing and in wear. It should behave in an ideal manner in

its relation to the perspiration from the feet. Most of the English tanners who produce this kind of leather have submitted samples of their products, and these samples are being submitted to the following kinds of tests:—

- (1) Wearing tests on hot and dry feet.
- (2) Chemical analyses giving percentage of ash, fat, moisture, hide substance, tannin, and water solubles.
- (3) Microscopic examination of fibres.
- (4) Physical and chemical tests, including tension, abrasion, fatigue on repeated bending, water penetration, drying after wetting, and the tearing strength given by the channel cut in a standard manner.

In conclusion, it must be stated that the Boot and Shoe Research Association has been set up on a very modest scale, with some uncertainty as to the extent to which scientific methods can be applied to the industry. Experience to date has shown that definite and important lines of investigation do exist, and it is hoped that the work of the association will extend.

Obituary.

DR. J. C. CAIN.

DR. JOHN CANNELL CAIN, whose death occurred suddenly at his residence in Brondesbury Park on Monday morning, January 31, at the early age of forty-nine, was the eldest son of the Rev. Thomas Cain, of Stubbins, Lancashire, and was born on September 28, 1871, at Edenfield, near Manchester. He received his education at the Victoria University (Owens College) and at the Universities of Tübingen and Heidelberg, obtaining the B.Sc. in the Honours school at Owens in 1892, and the D.Sc. at Tübingen in 1893. It was after he had migrated from Tübingen to Heidelberg in the autumn of 1893 that the writer of this notice first met him. He returned to Owens College for a short time in 1894, where he worked with W. A. Bone, but it is evident that at this period he was already feeling drawn towards that field of organic chemistry to which he ultimately devoted his life, for in 1895 he resisted the lure of research in the rapidly developing organic school at Manchester and entered the works of Messrs. Levinstein, Ltd., of Crumpsal Vale, where he remained until 1901. It was during this period of his career that the writer became intimately acquainted with him, for they lived in the same house at Cheetham Hill, the writer working at research at Owens College, and Cain at Crumpsal. Many were the discussions on colour chemistry which were held during the evenings, and it was here that it was decided to write the book which ultimately appeared under the title of "The Synthetic Dyestuffs" in 1905.

Cain did not, however, remain long at Levinstein's, and in 1901 he became head of the chemistry and physics departments of the Municipal Technical School at Bury, in Lancashire, where

he started, with Frank Nicoll, the important series of researches on the rate of decomposition of diazo-compounds, three parts of which were published during 1902 and 1903. At this stage he also commenced his study of the diphenyl compounds, an investigation which, as will be seen, he continued at a later date elsewhere. As an outcome of his research work, Cain obtained the degree of D.Sc. in the University of Manchester in 1904, being one of the first three to receive the highest degree of the newly created University. Nevertheless, his love for the practical side of his science prompted him in 1904 to leave the Bury Technical School and to take up the post of manager and head chemist to Messrs. Brook, Simpson, and Spiller, of London, a position in which he remained until 1906, when he was appointed editor of the Chemical Society's publications, an office he held at his death.

During the period of his editorship Cain spent much of his spare time at research, and in 1907 published his theory of the constitution of the diazo-compounds, an ingenious attempt to harmonise much conflicting evidence, which, although it has not found general acceptance, yet still affords the simplest means of explaining many of the reactions of these very reactive substances. In 1908 Cain published the first edition of his "Chemistry of the Diazo-Compounds," a book which contains a complete account of these valuable substances. Although during this period he was handicapped by the strenuous work required by his office, and to a certain extent by the lack of laboratory accommodation, he was able to continue his research work on the diphenyl compounds, and in conjunction with Miss Micklethwait, Dr. Brady, and others he published

three parts of the series. Perhaps one of the most interesting features arising out of this work was the final demonstration that there are two distinct *o*-dinitrobenzidines yielding distinct acetyl derivatives and distinct dinitrodiphenyls, phenomena which, it is suggested, are due to a form of isomerism which depends on the limitation of the free rotation of the singly linked carbon atoms.

During the war Cain placed his services where they were most needed, and as chief chemist to the Dalton Works of British Dyes, Ltd., at Huddersfield, he was responsible for much of the work which has led to the reorganisation of our dye industry. He also, for a short time, acted as superintendent to H.M. factory at Hackney Wick. The services he rendered to the Chemical Warfare Committee were especially valuable, because to him was allotted the task of searching the literature for substances likely to be of a noxious character. This, to the writer's knowledge, he did in no uncertain manner.

During recent years Cain produced a new edition of the "Chemistry of the Diazo-Compounds," a valuable and interesting book on the "Intermediate Products," and a revision of vol. i. of "Roscoe and Schorlemmer." It will be seen, therefore, that Cain was an organic chemist of no mean order, especially in connection with the theory and practice of his favourite subject. That he was an editor who carried out the duties of his editorship with the thoroughness which characterised all his actions the publications of the Chemical Society for fifteen years bear witness; but it will be neither as an organic chemist nor as an editor that he will be remembered best, because he occupied a position alone, in that he possessed a knowledge of chemistry and of chemical data which can only be described as encyclopædic. He was, in fact, a living "Beilstein," and no question seemed to come to him amiss. Woe betide the man who ventured to ignore the previously published work of others, Cain soon pointed out his error to him. The writer can recall an instance in which he had happened to forget a previous paper published by himself on the same subject and to which Cain at once directed his attention.

Cain had an exceedingly lovable disposition. His loss to his friends will be grievous, and to science one which it will be hard to repair.

J. F. T.

CHARLES EDWARD FAGAN, C.B.E., I.S.O.

MR. C. E. FAGAN, secretary of the Natural History Departments of the British Museum, died at his residence in West Kensington on January 30, after an illness which commenced about a month earlier. A short account of the value of his services to the museum was published in NATURE of January 13, p. 638, in a notice of
NO. 2676, VOL. 106]

his impending retirement, which was to have taken place on March 31 next.

Mr. Fagan's immediate ancestors were in the Diplomatic Service, and he himself possessed to a remarkable degree qualities which might well have led to high distinction in the same career if he had adopted it. He was born at Naples on Christmas Day, 1855, when his father was Secretary of the Legation in that city. At the age of nine he came to England and was placed under the charge of Sir Anthony Panizzi, being sent to school at Leytonstone. After Sir Anthony's retirement from the post of principal librarian of the British Museum, Mr. Fagan was frequently at his house, where Mr. W. E. Gladstone sometimes joined them in a game of whist. In 1873 he entered the British Museum, and he afterwards followed the natural history collections to the South Kensington branch, where the remainder of his work was done. He became assistant secretary in 1889, and he was appointed secretary of the Natural History Departments in 1919, in special recognition of his services, as a part of the reorganisation consequent on the retirement from the directorship of his contemporary, Sir Lazarus Fletcher, who died on January 6 last.

Mr. Fagan was a man of wide and varied tastes. He had a strong love for natural history; but he was also interested in art, on which he was well informed, and in European history. He could speak with authority of the Napoleonic campaigns, on which he had a good library, and he had also a wide knowledge of the history of the Victorian era. He was joint-author with Mr. Andrew W. Ture of a book on this subject, entitled "The First Year of a Silken Reign." He was interested in every form of sport, and he never missed a University boat race from the year in which he came to London to the last year of his life. His knowledge of the history of English racing was of good service to the museum in the formation of a collection of distinguished racehorses. During the recent war he organised propaganda work, which was important in informing our Allies of the efforts made by this country in the great struggle. In view of his ancestry, which was partly Italian, and of his artistic tastes, it is not surprising that he had a special affection for Italy, which he often visited.

It is impossible to speak too highly of the services Mr. Fagan rendered to the Natural History Museum. Events beginning with Sir William Flower's illness while still director placed important responsibilities in his hands, and the administrative experience thus gained was of the greatest use to Flower's successors in that post, while he worthily upheld the interests of the museum during periods of interregnum. He possessed conspicuous tact and remarkable insight, and he had an extraordinary capacity for forming a correct judgment on a difficult question. These qualities gave him an exceptional position in the museum, and his colleagues who sought his assist-