class honours in chemistry in 1891, and then proceeded to Munich to work under von Baeyer and Bamberger.

On his return to England, Chattaway became a demonstrator in the Chemical Department of St. Bartholomew's Hospital Medical School, being appointed head of the Department when Dr. Russell retired. He left St. Bartholomew's in 1905 and again went abroad, this time to Heidelberg, where he studied under Bredig, and to Utrecht to work with Ernst Cohen. During this period, while he was in Holland, he was elected into the Royal Society.

Back in England he settled in Oxford, where in 1909 he took over from Cronshaw the chemistry teaching at Queen's, of which Collège he became in due course fellow, tutor and praelector in chemistry. He retired from teaching in 1935, remaining, however, a supernumerary fellow of Queen's until his death.

Chattaway was once described by an Oxford colleague as a "true-blue organic chemist", and the description fitted. Although his sojourn on the Continent from 1905 onwards was the result of his desire to acquaint himself with the then new subject of physical chemistry, he never really took to, or sympathized with, physical methods as applied to organic chemistry, preferring always the "beautiful crystalline body" which could be handled and investigated directly, and so with a greater feeling of reality. It was, in fact, in the production of such materials that a large part of his practical skill lay: few men excelled him in the ability to produce pure crystals from the most unpromising tars.

Within the realm of organic chemistry as he understood it, all was grist to his mill. Always his interest was in the way substances reacted together, and in the elucidation of the constitution of any hitherto undescribed products of a reaction. Here again lay one of his gifts; for he had a knack of choosing the correct alternative for synthesis, where doubt was still possible after degradation experiments, in a way reminiscent of Medicus's famous pronouncements on the purines. But he was no mere 'paper chemist': in the laboratory his industry was prodigious and his enthusiasm unbounded and infectious.

Chattaway's earliest work was done with Bamberger at Munich, and resulted in the determination of the constitution of a number of polynuclear hydrocarbons which occur in minute quantity in the highest boiling fractions of coal tar. His patience and tenacity were early shown in this work, which was both laborious and difficult, by reason of the intractable nature of the materials concerned and the very small quantities available. Later, his interest was caught by nitrogen iodide, and a series of thorough investigations enabled him to settle several hitherto doubtful points in its chemistry. He later prepared and examined exhaustively the properties of a very large number of N-substituted halogen derivatives of acylanilides, and championed with great vigour the view that the change which occurs when they are treated with acids is an intra- and not an inter-molecular change. He then became interested in organic perhalides, particularly those of the diazonium compounds, and in all aspects of the chemistry of hydrazines and hydrazones. He also investigated the nitration of benzil, condensation reactions of azides, many cases of polymorphism, and the stereoisomerism of thioparachloral derivatives, while his most recent work on condensation products of chloral and related compounds revealed a ready means of making derivatives of the benzodioxin ring system.

Chattaway's delight in the *practice* of organic

chemistry was never dimmed and he only gave up the long hours of work in the laboratory (and then grudgingly and regretfully) when advancing age and circumstances left him no alternative. A small army of pupils owes to him a training in the methods of organic chemistry which could not have been excelled.

Dr. Chattaway married in 1894 Elizabeth Bettney, second daughter of Thomas Bettney, of Handsworth, Birmingham, who, with a daughter, now survives him. Their only son, a scholar both of Eton and of Christ Church, was killed at Thiepval in 1916.

G. D. PARKES.

Prof. Alfred Stansfield

THE announcement of the death on February 5 at the age of seventy-two of Prof. Alfred Stansfield, for thirty-five years Birks professor of metallurgy at McGill University, Montreal, has recalled to many of his friends and associates the outstanding contributions made by him to the progress of physical metallurgy in Great Britain while collaborating with Sir William Chandler Roberts-Austen at the Royal Mint and also at the Royal School of Mines.

To Stansfield was due in no small measure the actual experimental work and the improved means of pyrometric measurement (including the 'null' and 'differential' methods) which constituted such remarkable features of the Third, Fourth and Fifth Reports made by Robert-Austen to the Alloys Research Committee of the Institution of Mechanical Engineers, in 1895, 1897 and 1899 respectively. An important appendix to the Third Report, on "The Pyrometric Examination of Alloys of Copper and Tin", appeared under Stansfield's name. Its importance at that time can scarcely be over-estimated. Not only did it represent the first recorded attempt to give as 'freezing-point curves' an explanation of the copper-tin series as a whole, but it also marks the beginning of all investigations which have since been made in correlating the physical and mechanical properties of alloys with their equilibrium curves. Stansfield, in fact, a few years later, himself suggested the adoption of the term 'equilibrium curve' for metallic alloys, a term which had hitherto been restricted to the consideration of fused salts and saline solutions.

Stansfield's most striking and convincing contributions to physical metallurgy, however, were those by which he participated in the discussions in the late 90's on the "Solution Theory of Carburised Iron". Of the two papers by him which appear in the *Journal of the Iron and Steel Institute*, 1899 and 1900, it can well be said that these constituted a remarkably clear enunciation of the problems involved in a proper understanding of the relations between carbon and iron within the ranges covered by steel and cast iron. The latter of these two papers was presented and discussed jointly with the well-known contribution by Bakhuis-Roozeboom on "Iron and Steel from the point of view of the Phase Doctrine". Stansfield expressly set out to dispel the tendency to regard the solution theory as being, in a sense, opposed to, or as supplanting, the older allotropic theory. His paper, he hoped, would effectually dissipate such an error by showing how entirely the solution theory of the relations of carbon and iron involves the allotropic changes with which the distinguished name of Osmond is inseparably connected. Roberts Austen, who was at that time president of the Iron

and Steel Institute, commended Stansfield's work in terms which now appear as being prophetic. He said: "He considered Dr. Stansfield's communication to be about as important as any that could well be made to the Institute. Its full significance might not be understood for months or even for years but it did afford a scientific basis on which the theories and practice relating to the metallurgy of iron might be built up".

Prof. Stansfield's subsequent work in Canada included, among other important matters, notable contributions to the technology of electric furnaces and of their application to electric smelting. This work has received wide recognition and is probably more familiar to those of later generations than his earlier work in Great Britain to which this note is intended more particularly to direct attention.

S. W. SMITH.

Prof. James Young, O.B.E.

JAMES YOUNG, who retired from the professorship of science at the Royal Military Academy, Woolwich, in 1925, died on December 2, 1943; he was born in Ulster in 1862.

Young joined the Royal Military Academy in 1889 as instructor in chemistry. When war started in 1914, the authorities had ordered that all non-military subjects should be shut down; but Young had no difficulty in persuading a sympathetic commandant that science was a necessity, not a luxury,

and the order was quietly ignored. With the small time available in a much shortened course, Young did great work, which was rewarded by the O.B.E.

When Young came to the Royal Military Academy, science there was little but chemistry applied to explosives. The Academy had been early in the field with chemistry. It was first taught there in 1789, and one of its teachers for thirty years had been the great Faraday himself. Electricity came in 1893, and Young wrote an Army handbook on that subject later on.

Young did little research, but great teaching work for the Army, and it was as unobtrusive as it was useful. He was far-sighted in his ideas of science in warfare. When wireless telegraphy was in its infancy, he put it in the curriculum, predicting its great future in the field. Also, within a few days of the first German gas attack, he was giving lectures on poison gas which became famous in the Army, and predicting that mustard gas would be the most effective.

Young was rather a recluse, and perhaps rather too gentle with his high-spirited students, though he earned their respect from his clear and original lectures, and is remembered with affection by many who are now officers of high rank. Particularly well remembered are his lectures on explosives, with their terrifying bangs, by which he made everyone realize how safe explosives are when handled with understanding; he was highly successful in giving his students the confidence due to knowledge. No one ever had an accident under his care.

NEWS and VIEWS

Science and Industry in Great Britain

A SERIES of meetings on science and industry has been arranged by the Manchester Chamber of Commerce. The first of these meetings, on March 3, was addressed by Lord Riverdale on "Research and Industry: the Need, the Ways and the Means"; the second, on March 16, by Dr. A. P. M. Fleming on "Research Workers: their Education, and their Place in Industry". At subsequent meetings on March 31 and April 20, the speakers will be, respectively, Dr. Andrew McCance on "The Application of Research" and Sir Edward Appleton on "Fundamental Research: its Practical Importance". The meetings, admission to which is by ticket, are being held in the Houldsworth Hall, Deansgate, at 11.30 a.m.

At the first of these meetings, which was attended by several hundred business men, Lord Riverdale gave an outline of the work of the Department of Scientific and Industrial Research, and more particularly of the activities of the research associations in Great Britain, which at least hinted that when publication of the annual reports of the Department is resumed, it will be found that the research association movement has gained new vitality. Lord Riverdale gave a list of twenty-two existing associations and stated that several others are in process of formation. The provision of means and the formation of research associations, however, are not enough. Until individual firms use these means and become imbued with a full appreciation of scientific research and translate it into highest quality products, full benefit to firms and the community has not been

achieved. Much remains to be done, especially in those industries containing many small units. Lord Riverdale is not satisfied that the Department can 'put over' the results of its research sufficiently dramatically, or that members of the associations really take an interest in it; the Department is now creating a public relations officer to meet this need. He also thinks that the question of invention requires further attention. Unless we have an authority with sufficient funds and able staff to watch inventions, see how they react on research in progress here, and make some attempt to introduce them to a concern which will test them effectively as to whether they are not of national importance, there is serious danger that we shall not be able to hold our own. Lord Riverdale also referred to the importance of obsolescence and of allowance being granted by the inland revenue authorities and the Treasury for expenditure on buildings and equipment for research—a matter in which he was strongly supported by Sir Raymond Streat, who also emphasized the implications for industry itself.

Lord Riverdale's address showed that the present outlook of the Advisory Council for Scientific and Industrial Research is in full harmony with that inspired by Lord Balfour and Lord Rutherford. While he did not disguise the dangers ahead and the necessity for Great Britain to increase its visible exports at least another two hundred millions if it is to continue to enjoy imports of the same value as before, he pointed out that, to an ever-increasing extent, the value of British exports must lie in the superior ability of our scientific men and technologists, the