because of the enthusiasm of its first secretary, F. S. Spiers, whose name is perpetuated by the Spiers Memorial Lectures (the seventh of which will be delivered this year by Prof. J. H. Hildebrand), and of his successor, G. S. W. Marlow, the Society has never lost its initial impetus.

Its purpose remains to serve the changing needs of those interested in the sciences lying between chemistry, physics and biology, and to foster the international co-operation of scientists. Inspired by this purpose, a General Discussion on "The Reactivity of Free Radicals" was held last year in Canada at the University of Toronto. It proved a stimulating innovation; forty-five members travelled from Great Britain to meet in conference some eighty Canadians and sixty Americans. Those members will long remember their enthusiastic welcome in that great Dominion; they returned richer in knowledge and experience, with an increased appreciation of the high quality of the scientific contribution which Canada is making. The future may see this as the first of many Faraday Discussions to be held in other parts of the Commonwealth, the United States and Western Europe. The Society may hope thereby to contribute still further to "the glory of holding aloft among the nations the scientific name of England", to quote the words of Tyndall in appraising the genius of the man whose name the Society has been proud to assume.

OBITUARIES

Prof. J. W. McBain, F.R.S.

On March 12, one of the great pioneers in the field of what is now termed 'colloid science' passed away. The era of regarding colloids as an interesting field for those who desired to prepare chemical substances in curious and unexpected states was just beginning to pass when, as Leverhulme professor at the University of Bristol, James W. McBain commenced what proved to be his main interest in subsequent years at Leland Stanford University, California, namely, a systematic investigation of the properties of soaps and their solutions. We are indebted to McBain not only for the elucidation of the complex series of phases which these systems can exhibit but also for the concept of the 'micelle', both neutral and ionic, which had the most profound influence on subsequent developments in the fields of colloidal electrolytes. While the actual shape of the micelle in any particular system is still a matter of controversy, we may note that McBain recognized two distinct forms, the spherical and the lamellar. Indeed, he postulated the existence of the latter form, re-discovered in 1947, as early as 1925.

The contributions of the McBain school to the thermodynamic properties and physico-chemical behaviour of these molecularly associated colloidal electrolytes would alone justify the inclusion of his name among the fathers of the science.

McBain's researches in molecular association were not confined to aqueous systems. Apart from detailed studies on gels and jellies in non-aqueous systems, a great deal of pioneer work on what is now termed 'solubilization', for example, of water-insoluble dyes and hydrocarbons by means of soaps, has come from his laboratory; and we are indebted to him for an understanding of the factors operative in what he termed 'co-solvency', which is of great importance in blending.

McBain was one of the first to recognize that the uptake of a gas by a porous solid might involve quite a number of distinct and separate processes taking place simultaneously, and, to cover them all, introduced the term 'sorption'.

On the technical side we are indebted to McBain for many interesting and valuable research methods, such as the McBain sorption spring balance, the McBain air-driven centrifuge, as well as his ingenious methods of skimming off the Gibbs layer in a Langmuir trough, and evaluation of the osmotic coefficient by observations on the depression of the dew point.

McBain's contributions to colloid science consist not only in numerous papers to scientific journals; a number of valuable text-books have also emanated from his pen. These books are distinguished for their clarity of exposition, their style and their broadness in outlook on the topics under discussion. His last book, published in 1950, is designed to give the author's concept of the domain of colloid science. It is interesting to note that he does not limit the field to the properties of interfaces, but considers organization and form as equally important.

On retirement from Leland Stanford, McBain spent five years as director of the National Chemical Laboratory in India, a period which he completed only last year.

McBain had many friends, and he kept them. His character is most clearly revealed by his answer to the query put to him by the writer as to what impelled him to accept Pandit Nehru's offer of the Indian appointment. He replied that he was so impressed by the signs of starvation and low economy of many of the Indians that he thought it necessary for him to try to do something about it, and he believed that the infiltration of science and scientific methods was the only way by which anything radical could be accomplished.

Eric K. Rideal

Father A. Gatterer, S.J.

Father Alois Gatterer, S.J., who died on February 17, was a natural scientist of the best nineteenth-century tradition, student and teacher by turns throughout his career. Born of Austrian stock in 1886, he was educated in Carinthia and there entered the Society of Jesus at the age of nineteen to continue his studies in rhetoric, philosophy and theology. He was ordained as priest in 1915 and joined the staff of the faculty of theology in the University of Innsbruck; there he also studied chemistry and physics, graduated and was appointed to the staff. He was released from lecturing in philosophy in order to pursue his scientific studies. At the age of about forty he studied physics for a year at Oxford and developed an interest in spectroscopy, which he pursued on his return to Innsbruck.

In 1930, when he was forty-four, he was invited to join the staff of the Observatory at the Vatican, where he established and developed a spectroscopic laboratory, largely with the aim of analysing a valuable collection of meteorites bequeathed to the Observatory by a French mineralogist. This laboratory has gradually become excellently equipped, with the aid of grants from Pius XI and his successor.

One of Father Gatterer's first tasks was to purify carbon rods for electrodes: a new method of doing this was developed, and then early tests on meteorites showed up the weakness of the atlases of spectra then available. During 1937–49 one of the main tasks of his laboratory was the preparation of

photographic atlases of the arc and spark spectra of iron, and then of the most useful lines of the remaining elements—a task which demonstrated Gatterer's endless patience and devotion to precision. These atlases are valued all over the world, and the last of them is one of the few subjects about which there is ever direct communication between Moscow and the Vatican.

In order to obtain pure iron for these reference spectra, pioneer work was done on the purification of iron; the method was eventually applied in an Austrian industrial laboratory in 1938. Another analytical problem which Father Gatterer helped to solve was the spectroscopic estimation of the halogens and of sulphur by the use of high-frequency discharges in vacuum to excite the spectrum. In 1938 Gatterer took the initiative in founding the international journal called *Spectrochimica Acta*, which was published in Germany by Springer, and which continued to appear with the names of its foreign editors on the cover until 1944. In 1947 Gatterer revived the journal and it was published from the Vatican Observatory for two years, after which it was returned to commercial production. Under Gatterer's editorship the printing received the same attention to detail as a spectrum gets.

Father Gatterer was a member of the Joint Commission on Spectroscopy of the International Astronomical Union and the International Union of Pure and Applied Physics; and he was delighted when that Commission and the International Astronomical Union both met in Rome last year, so that many of his friends could visit his laboratory.

Not only natural scientists but also industrial spectroscopists owe much to their contacts with Gatterer, who was an honorary member of national organizations of spectroscopists in both Italy and France. Manufacturers of spectrographs in both hemispheres benefited when he visited them to order apparatus to his own exacting specifications. From the age of twenty-six onwards he suffered from a series of painful illnesses, and he was partly crippled during most of these years. His cheerful fortitude under physical burdens and the humility underlying his devotion to truth made him an inspiring friend and teacher.

E. VAN SOMEREN

Prof. P. Niggli

PROF. PAUL NIGGLI, who died recently in Zurich after only a few hours illness, was born on June 26, 1888. He had been director of the Mineralogical and Petrographical Institute of the Eidgenössische Technische Hochschule since 1920; and he had been also rector of the Highschool during 1929–32, and of the University of Zurich during 1940–42.

Paul Niggli graduated at the Eidgenössische Technische Hochschule in 1907 as an engineer, but he chose to make mineralogy his special subject and studied for a short time at Karlsruhe and later at the Geophysical Laboratory of the Carnegie Institution at Washington and published several papers with G. W. Morey. In 1914 he returned to Zurich, but later in the year he accepted a professorship in mineralogy and petrography at Leipzig and went to Tübingen in a similar capacity in 1918. On Grubenmann's retirement, Niggli was called to succeed him as professor at Zurich in 1920, and there then began the building up of an institute renowned for the high standard of its teaching and research. He was assisted there by a devoted team of able professors and assistants. Germany made one attempt to lure him back to take the chair of mineralogy and petrography at Charlottenburg, but Niggli decided to remain at Zurich, to the great delight of staff and students, who celebrated the occasion by a torchlight procession in his honour.

Niggli was a man of great ability, wide knowledge, and immense industry. His masters at Zurich were Albert Heim and Grubenmann, and his earliest published works as a student were on the chloritoid schists of the Gotthard massif and a geological map of Zofingen, his own birthplace. A list of his very numerous books and papers was published in the "Festschrift" issued in honour of his sixtieth birthday in 1948. He ranged over the whole field of crystallography, mineralogy and petrography, and sought especially to expound the principles of physical chemistry that apply to the paragenesis of minerals and the differentiation processes and metamorphism of rocks. In his "Geometrische Kristallographie des Diskontinuums" (Leipzig, 1918–19), he brought up to date Schoenflies's "Krystallsysteme und Krystallstruktur" (1891), introducing the new work based on X-ray analysis. This was followed by many papers and chapters in his "Lehrbuch", and others on crystal structure and stereochemistry. He was an editor of the *Zeitschrift für Kristallographie* during 1920–40.

His "Lehrbuch" (Berlin, 1920) ran to three editions; but each 'edition' was really a different book presenting various parts of the subject of crystallography and mineralogy from new angles and in the light of new knowledge. Unfortunately, Part 3 of the third edition, written in 1944 and set up in type, was twice destroyed in Berlin during the War, and Niggli had not the heart to write it again.

Petrology and the working out of methods of handling and studying the mass of chemical data available on igneous and metamorphic rocks, and the application of physical chemical principles and phase rule to the problems, figured largely in his work at Zurich. He collaborated with Grubenmann in a new book on metamorphism (1924) and with Burri in a vast survey of the mineral-chemical characters of the younger eruptive rocks of the Mediterranean orogeny, covering, in fact, a region stretching from America eastwards to the western shores of the Pacific. This work, in which more than two thousand chemical analyses were handled, used to the full Niggli's method of recalculating analyses in 'Niggli values', a method which, together with his later system of molecular norms and his graphical methods for comparing and exhibiting chemical characters of rocks, have all had considerable influence on petrography throughout the world.

Niggli was somewhat reserved in manner, especially in later years. Much of his writing was in rather difficult German, and he rarely wrote in English although he spoke it fluently. His great ability received world-wide recognition. He received honorary doctorates from the Universities of Stuttgart, Budapest, Liège and Sofia; he was given the Hayden Award of the Philadelphia Academy of Natural Science, the Roebling Medal of the Mineralogical Society of America, and the Orville Derby Medal (Rio de Janeiro), 1952. As a corresponding or honorary member he had been elected to no less than twenty-seven academies and societies, including the Geological Society of London and the Mineralogical Society, of which he was the senior honorary member, having been elected in 1933.

W. CAMPBELL SMITH