

structure of the molecule, but while X-rays reveal the molecule in its static condition and are especially applicable to solids, infra-red spectra reveal the dynamic characteristics of the molecule in gases, liquids, and to a restricted degree in solids. In the future it will undoubtedly be used to a greater extent in the determination of the nature of chemical linkages and generally for a solution of problems of chemical constitution.

As Garner and his school have shown, important deductions can be made as to the rôle of infra-red radiation in combustion, as for example in the effect of water, when it is present, in carrying off the energy of radiation produced when carbon monoxide combines with oxygen, and as the bulk of the radiation from flames is in the invisible part of the spectrum and mainly in the infra-red, there is here a wide field of work in clearing up the mystery of flame, and the same is true as regards the phenomena of explosion of both gaseous and solid explosives.

It is to be regretted, however, that more work is not being done in Great Britain in the exploration of this region. It is true that the technique is difficult, and there have been several investigations reported of an accuracy that leaves a good deal to be desired. Most of the work until now has been done in Germany and in the United States,

little having so far come from British universities with the exception of Cambridge, where there is an embryonic school. The subject is perhaps scarcely one suitable for a young graduate to acquire the technique and embody a year's work in a thesis for some degree, but one for a more permanent staff, and I should like to make a plea for its greater consideration in Great Britain, as a field of experiment and study likely to assist in the solution of many physical and chemical problems, which in due course will have its reflection in the domain of technical application.

Sir J. J. Thomson has given us the electron, Rutherford the proton with its planetary electrons and the structure of the proton, the Braggs have elucidated the structure of many molecular fabrics, but the molecule as a dynamical entity has been comparatively neglected. For it is in the infra-red region of the spectrum that this behaviour can best be studied. In this aspect the problem is a physical one for the most part; the technique is difficult, but likely to be productive of much that is important in our conception of the structure of matter. It is for this reason that one would like to see in Britain a strong school arise which would have as its object the study of the dynamical behaviour of the atoms in the molecule and of the molecule itself.

Obituary.

PROF. WILLIAM KÜSTER.

DR. WILLIAM KÜSTER, professor of organic chemistry and technology at the Technische Hochschule in Stuttgart died suddenly on Mar. 5 of heart failure. From the pages of a recent issue of the *Chemiker-Zeitung* we glean the following details of his career.

Born at Leipzig in 1863, Küster received his early education in Berlin and studied later at the Universities of Tübingen, Berlin, and Leipzig. At Leipzig he worked under the direction of Wislicenus, with whom he remained for a while after graduation until he was appointed assistant to Hüfner at Tübingen, where he was given charge of the practical chemistry classes for medical students. In 1894 he published his first paper on salts of hæmatin. This was followed by an intensive study of the pigments of blood and bile, subjects which he made peculiarly his own and remained his chief interest throughout life.

In 1903, Küster was appointed professor of chemistry and pharmacology at the veterinary college at Stuttgart and lecturer on pharmaceutical chemistry at the Technische Hochschule. The duties attached to these offices were so burdensome that but little time was available for research. Moreover, at the veterinary college he found that no provision had been made by his predecessor for experimental work. In spite of these difficulties he succeeded during the next eleven years in publishing numerous papers on hæmatin, porphyrin, pyrrole, and bile-pigments.

On the retirement of Prof. C. von Hell, the de-

partment of chemistry at the Technische Hochschule at Stuttgart was completely reorganised and Küster was appointed to the chair of organic chemistry and technology. Under his direction the department was greatly enlarged, and in spite of the difficult nature of the work in which he was engaged, he attracted a great number of research students to assist him in his investigations. In this way Küster and his collaborators were able to make a large number of important contributions in the field of biochemistry. Later his interest extended to other branches of natural products such as sugar, albumen, lignin, etc. He also contributed to the well-known handbooks of Abderhalden and Thoms.

WE regret to announce the following deaths:

Prof. Jules Cornet, the distinguished geologist and professor in the University of Ghent and at the School of Mines at Mons, *correspondant* of the Paris Academy of Sciences, who was well known for his geological explorations in the Congo in 1892 and 1895, on May 17.

Mr. Stewart Culin, curator of ethnology in the Museum of the Brooklyn Institute, Brooklyn, N.Y., known especially for his comparative studies of the games of North American Indians and other races, on April 8, aged seventy years.

Prof. Charles Deperét, professor of geology in the University of Lyons and a foreign correspondent of the Geological Society of London, on May 17, aged seventy-four years.

M. Ulysse Gayon, a distinguished biologist and chemist, and honorary doyen of the Faculty of Sciences at Bordeaux, aged eighty-three years.