to be a definite relation between the constitution of the dye and its desensitising properties. The conditions are thus very similar to those which hold in the case of sensitisers.

The great drawback to the use of Phenosafranine is its pronounced staining properties; it can only be removed from the gelatin film by prolonged washing. König has recently put on the market a desensitiser, Pinakryptol, which is claimed to be as active as Phenosafranine, but which neither stains gelatin, celluloid, nor the skin, although it gives a deep green solution.

A satisfactory explanation of the desensitising action of these substances is still wanting. Lüppo-Cramer claims that the phenomenon is connected with the formation of an oxidation product of the dye. Lumière and Seyewetz have shown, however, that if an unexposed plate is bathed in a solution of Phenosafranine it recovers its original sensitivity after being washed sufficiently long to remove the colouring matter. It is probable, according to Lumière and Seyewetz, that any oxidation product of the dye would be adsorbed by the silver bromide and not be removed by washing, so that the recovery in sensitivity would not be explicable on Lüppo-Cramer's theory.

Obituary.

PROF. GEORGES LEMOINE.

M. GEORGES LEMOINE, professor of chemistry at the Polytechnic School, Paris, whose death at the age of eighty-one has just been announced, was born at Tonnere in 1841. He entered the Polytechnic School in 1858, and two years later became *Elève ingénieur* at the École des Ponts-et-Chaussées. He early devoted himself to the study of chemistry, and investigated the compounds of sulphur and phosphorus, one of which, the sesquisulphide of phosphorus, is now largely employed in the igniting composition of the lucifer match in place of ordinary phosphorus. The substitution of this compound for phosphorus—now compulsory in most countries where matches are made—has been attended with the most beneficial results in the industry, the "phossy jaw" of the match-worker, or necrosis of the facial bones, being practically a thing of the past.

Lemoine also studied the reciprocal transformation of the two best-known allotropes of phosphorus. By heating known weights of phosphorus in closed flasks at 440°, the temperature of boiling sulphur, for varying lengths of time, and separating the products by carbon disulphide, he was able to determine the influence of time and pressure on the direction and extent of the change. He showed that the extent of the transformation is determined by the tension of the vapour, as in the case of other phenomena of volatilisation and dissociation. *In vacuo*, the conversion of ordinary into red phosphorus becomes more and more rapid as the temperature is raised. The rapidity of the transformation varies with the amount of phosphorus used. At any given moment the rapidity depends not only upon the quantity of ordinary phosphorus remaining, but also upon the quantity of red phosphorus already formed. The phenomenon is pre-eminently one of vapour tension and depends upon the capacity of the vessel in which the transformation—which is never complete—is effected. These facts are now well known and are uniformly acted upon in the phosphorus industry.

Questions of chemical dynamics had always a certain measure of attraction for Lemoine, and although he was not a particularly prolific contributor to chemical literature, much of his published work is concerned with their investigation. One of the most important of these inquiries relates to the conditions of chemical equilibrium of hydriodic acid. This substance was chosen as suitable for the study of the general phenomena of chemical equilibrium for the reason that the constituent elements are monatomic; they combine, or dissociate, without change of volume (at the temperature of the experiment), and the thermal effects of combination are very slight. The aim of the investigation was to show that under given conditions of temperature and pressure, a mixture of the two constituent gases in given proportions will attain sooner or later a definite state of chemical equilibrium in which only a certain proportion of the hydriodic acid possible is actually formed, varying with the temperature, pressure, and proportions of the gases present, but always the same for the same conditions. The conditions studied were heat, pressure, mass, the action of porous bodies, of oxygen and of light. The main results have long since been incorporated into the general theory of chemical change, and call for no detailed account. At the time of their publication they constituted a notable and novel contribution to chemical dynamics.

It has long been known that mixed solutions of ferric chloride and oxalic acid are decomposed by light with the evolution of carbonic acid (Marchand, Jodin), and that the rate of decomposition depends on the intensity of the light. Lemoine studied this change with a view of determining how far it may be made the basis of an actinometric method. He found that for a given intensity, the evolution of gas is at first uniform, but that when about half the total quantity of carbon dioxide has been evolved, the rate of decomposition gradually diminishes. The greater the volume of the liquid, the longer is the time before decomposition slackens. When the two solutions are separately exposed to light for several hours and then mixed, decomposition takes place more rapidly than if the solutions had not been previously insolated. Dilution with water increases the change, due probably to hydrolysis of the ferric chloride. At ordinary temperatures the mixed solutions are practically unaffected in the dark. On heating, gas begins to be evolved at 50° and increases rapidly in amount as the temperature rises. The general course of the change is, however, very similar to the influence exercised by light and is affected apparently by the same conditions.

Lemoine occasionally worked at subjects of organic chemistry, such as the nature of the paraffin hydrocarbons and the dissociation of haloid compounds of olefines under the influence of heat and pressure, but organic chemistry had evidently few attractions for him, and his work in this special field was very limited and calls for no special comment.

Lemoine, having served the Polytechnic School, in various capacities, from 1871, was elected professor in 1897. He succeeded Friedel as a member of the chemistry section of the Academy of Sciences in 1899.

T. E. THORPE.

HOWARD FOX.

MR. HOWARD FOX, of Falmouth, died on November 15, in his eighty-sixth year. In the intervals of a busy commercial and consular career—the firm to which he belonged were appointed American Consuls by George Washington—he contributed very largely to our knowledge of the natural history of his native county, Cornwall, especially in the domain of geology. The record of his work is to be found in many papers published by the Royal Geological Society of Cornwall, of which he was president during the years 1893 and 1894, the Geological Society of London, the *Geological Magazine*, and other scientific institutions and journals. We can only refer to a few of his more important discoveries.

Mr. Fox traced the distribution of the Radiolarian (Codden Hill) Beds of the Lower Culm Series throughout the west of England; and, in collaboration with the late Dr. G. J. Hinde, studied the characters of these rocks and of their radiolaria. He also discovered the radiolarian cherts of Mullion Island, which belong to a much lower geological horizon. Among other fossils found by him is the notable *Pteroconus mirus*, probably allied to the pteropods, occurring in the supposed Lower Devonian rocks of Bedruthan Steps, north of Newquay, the younger stages of which are sometimes preserved in such a way as closely to resemble graptolites. He also published accounts of other Cornish fossils, relying on the help of specialists for their determination and description.

But Mr. Fox's interest was by no means confined to the fossiliferous rocks. He studied the igneous and metamorphic rocks of the Lizard peninsula and made himself familiar with every nook and corner of that rock-bound coast. By mapping a small portion of the sloping face of a cliff, on a scale much larger than that of any published map, he proved conclusively that the serpentine and hornblende-schist had been intimately interfolded; and, by observations on another portion of the coast, established the fact that certain rocks, apparently belonging to the "Granulitic Series," were intrusive in the surrounding schists. He also made the important discovery that the Man of War rocks, off Lizard Head, are mainly formed of a corrugated igneous gneiss, quite different from any rock occurring on the mainland.

In petrology and mineralogy, as in palæontology, Mr. Fox availed himself of the help of specialists, and all those who were thus brought into personal contact with him were captivated by his geniality and stimulated by his enthusiasm.

LORD SUDELEY, F.R.S.

CHARLES DOUGLAS RICHARD HANBURY-TRACY fourth Baron Sudeley, whose death on December 9, in his eighty-third year, will be regretted in many circles, was elected a fellow of the Royal Society in 1888, in recognition of his services to science as chairman of the British Commission to the Electrical Exhibition at Vienna in 1883. Of late years, Lord Sudeley persistently advocated in the House of Lords and in the Press the increased use of our museums and picture-galleries for the education and recreation (in the highest sense) of the public. In 1910, struck by the value of a demonstrator engaged by the Science Committee at the Japano-British Exhibition, he urged that similar guide-lecturers should be attached to our national museums. The Natural History Museum was the first to adopt the suggestion, and now, thanks to Lord Sudeley's untiring efforts, all the larger public museums have one or more of these popular adjuncts. Next he actively promoted the production and sale of picture postcards by Government museums. Lastly, as shown by his article in the *Nineteenth Century* for October, he was preparing to move for the appointment of a Royal Commission to consider the better working of the museums of this country.

MR. HERBERT WOODVILLE MILLER, who died on December 4, was one of the pioneers of electric lighting in this country. In 1886 he was appointed to assist Crompton and Co. in working out the system of electric light distribution in the West End of London which they had successfully installed in Vienna. By 1899 it was evident that stations centrally situated in populous districts were unsuitable to meet a growing demand, and Miller therefore designed and carried out the power station at Wood-lane which supplies the Kensington and Knightsbridge Company and the Notting Hill Co. He was engineer and manager of the Kensington Co.; the station beneath the Albert Hall is an excellent example of an accumulator station. He served on several committees of the International Electrotechnical Commission, and his thorough knowledge of electrotechnical subjects made him a most useful member of the editing committee of the British Engineering Standards Association.

THE *Chemiker Zeitung* of November 23 announces the death on November 20 of Prof. August Horstmann, at the age of eighty. Prof. Horstmann was the first to show the applicability of the laws of thermodynamics to chemical problems, his first paper on this subject being published in the *Berichte* in 1869. His other work was mainly in this direction, and was concerned with problems of dissociation, the determination of vapour densities and vapour pressures, specific heats, and heats of reaction. He was therefore the pioneer in a branch of physical chemistry which has since been developed particularly by Van't Hoff and Nernst. For some years Horstmann was professor emeritus of theoretical chemistry in the University of Heidelberg.

WE learn from *Science* with much regret of the death, on November 1, of Dr. R. W. Willson, emeritus professor of astronomy at Harvard University, at the age of sixty-nine years.