

commission has therefore enlarged its jurisdiction, and will publish the constants of atomic weights, isotopy, and radio-activity; moreover, instead of being composed almost exclusively of analysts of exceptional ingenuity and manipulative skill, it will include recognised experts on isotopes and atomic pedigrees.

The questions of international nomenclature, contractions, abstracts, and standards were discussed and reports adopted, but the main work on most of these topics is still to be done, and the various committees appointed to consider these matters have a huge mass of detailed investigation before them. In connection with abbreviations in chemical literature Dr. Pondal made the gratifying announcement that the Argentine Chemical Society would bear the necessary expenses.

A list of pure research chemicals manufactured in Great Britain was submitted by the Association of British Chemical Manufacturers, and a further list containing many additional products is in course of preparation. M. Marie, whose name is well known in connection with tables of constants, submitted a report on this subject.

A commission was appointed to consider international patents, and its work is not yet completed. It appears that a considerable mass of evidence is necessary before a report can be drafted, and it is hoped that those who have given consideration to this problem will communicate

with the Federal Council for Pure and Applied Chemistry at the offices of the Chemical Society at Burlington House.

The question of industrial hygiene is coming into prominence, and a commission was appointed to deal with this subject. During recent months papers on industrial hygiene have been read before the Society of Chemical Industry, the Royal Society of Arts, the British Medical Association, and other societies, and the hygiene section of the International Labour Office constituted by the Treaty of Versailles has undertaken an immense task in relation to diseases of occupation. It is time the whole question was examined scientifically and carefully, but the problem is one of considerable complexity. Very few of the medical experts have accurate knowledge of the chemical and engineering factors involved, and but few of the manufacturers or employees most concerned are able to form a sound judgment from a perusal of the pamphlets written by experts maintaining with no little heat their various opinions. If the international commission can study the problem so far as it concerns industrial chemistry, it will perform a most useful and timely service.

It has been decided to hold the next conference of the International Union in France, and there is a suggestion to have the meeting at Lyons, which will be a very convenient locality for most of the countries concerned.

Obituary.

PROF. G. LIPPMANN, For. Mem. R.S.

FRENCH science has suffered a very great loss in the person of Prof. Gabriel Lippmann, who died at sea on July 13 while returning from Canada, where he had taken part in the mission of Marshal Fayolle. Prof. Lippmann was born in 1845 at Hollerich, in the Grand Duchy of Luxemburg, of French parents, who soon after his birth settled in Paris. He passed through the higher normal school, and devoted his life to teaching and research. He became professor of physics at the Faculty of Sciences in Paris in 1878 and director of the laboratory for physical research at the Sorbonne in 1886, and was elected a member of the Paris Academy of Sciences in the same year. Of an original and independent mind, Prof. Lippmann left his personal mark on all questions he touched. The philosophical and general side of scientific conceptions claimed his attention particularly, and he saw clearly the connecting links between differing phenomena. His work on electro-capillarity dates from the time when electricians began to see the power and flexibility of the new instrument. He saw at a glance the future of electricity. Every physicist knows his capillary electrometer and the connection he established between the constant of Laplace's formula and the potential difference: but he showed as well how mechanical work could be obtained from an electro-capillary motor. At the time he made these discoveries and stated the principle of the conservation of electricity he pub-

lished other work in which he played the rôle of pioneer. In his note in the *Comptes rendus* of the Paris Academy of Sciences for 1875 on the properties of an electrified water surface, he earthed a mass of water by a wire ending in a Wollaston electrode, and showed that if a stick of rubbed resin was brought near, oxygen was set free at the electrode, while hydrogen remained in solution. Ostwald, in his "General Chemistry," begins his treatment of ionic theory with a description of this experiment. On the publication of Rowland's discovery Prof. Lippmann showed, in June, 1879, that the phenomena ought to be reversible and that electricity ought to have inertia. This idea of reversibility was a frequent subject of his thoughts, and he often reverts to it in his celebrated treatise on thermodynamics. Prof. Lippmann also published in 1889 some calculations on induction in resistance free circuits, which twenty years after were confirmed by the experiments of Prof. Kamerlingh Onnes. In 1891 he communicated to the Academy of Sciences the principles of the discovery with which his name is immediately associated: that is, colour photography by interference. The accurate solution of the problem of the reproduction of colour is thus obtained from the thin laminæ which had such an attraction for the mind of Newton. Prof. Lippmann was a man of few words. So long as he was unable to give to a problem a form which would lead him to a

solution satisfactory to himself, those who knew him little might believe him indifferent. He would gather himself together, and in a few words would show how far his thoughts had taken him into the fundamentals of the subject. During the last year of his life he devoted much attention to relativity, and on his last voyage from Havre to New York he spent most of his days discussing it with Prof. Michelson. The work Prof. Lippmann leaves behind him is of capital importance; but it represents only a part of the thoughts of a man of science with views acute and deep whom the search for perfection and a reserved temperament kept far from noise and strife.

CAPT. W. E. ROLSTON.

THE sudden death, on August 9, at forty-five years of age, of Capt. W. E. Rolston will be greatly regretted by many old students of the Royal College of Science, South Kensington, where he received his scientific training. Capt. Rolston was the founder and managing editor of the *Cologne Post*—the admirable daily paper published by the British Army on the Rhine—but he was well known in astronomical circles by his work with Sir Norman Lockyer, and at Cambridge. He entered the Royal College of Science as a Teacher in Training, and for about a year assisted in the demonstrations in the course of astronomical physics there, gaining also some experience in solar physics work. In 1899 Rolston took up a teaching post, but returned again to the Solar Physics Observatory at South Kensington in 1901, and remained on the staff of the observatory until he joined the Buffs in 1915. He was with Sir Norman Lockyer for twelve years before the transfer of the observatory to Cambridge in 1913, where he continued to be a member of the staff.

After some preliminary work in the general routine of the observatory, Rolston became mainly responsible for several specialised branches of the investigations in progress. One of the most important of these was an attempt to apply the principles of Stokes's Law of Radiation to the determination of the relative temperatures of stellar atmospheres. A fundamental feature of Sir Norman Lockyer's Kensington classification of stellar spectra required the recognition of different temperature levels, and to investigate this a special prismatic camera, with quartz-calcite optical train, was obtained and mounted on one of the equatorial telescopes. Pairs of stars were photographed on the same plate under conditions as nearly identical as possible, with controlled exposures designed to give equal photographic intensity for the region H_γ - H_ϵ . By then measuring the relative intensity of the red and violet regions respectively, it was possible to arrange the various spectra in order of temperature level. These observations extended over about three years, and the results were communicated in a paper to the Royal Society in 1904 on the "Temperature Classification of Stars." In addition to taking a share in

the observational routine work, both day and night, on solar and stellar spectra, Rolston repeated much of the reduction work on old observations of widened lines in sunspot spectra, and brought the summaries up to date.

From 1907 to 1912 Rolston was chiefly occupied with the reduction of orientations, and with stone circles and temples in various parts of the world, these being regarded as having originally been designed by their constructors to serve for the determination of time and season in the regulation of the economic and religious life of the early communities. The results of these researches were extremely suggestive, and were communicated by Sir Norman Lockyer to the Royal Society.

During the last two years before the transference of the observatory to Cambridge Rolston was engaged in preparing a comprehensive account of the observations of novæ from the discussion of all available material, and this was published as a separate volume entitled "Phenomena of New Stars." After transference to Cambridge he took charge of the Huggins spectroscopic equatorial, and also assisted in the reductional work on stellar spectra.

Throughout his connection with the Solar Physics Observatory Rolston took great interest in the dissemination of scientific knowledge, and was most successful as a writer and as a popular lecturer. For a number of years before the war he wrote the notes for *Our Astronomical Column*, and also contributed numerous articles and reviews. The experience thus obtained was turned to excellent account when in March, 1919, he founded the *Cologne Post*, the unique daily newspaper which has had such valuable influence in revealing British thought to Germany. His success showed the value of a scientific training to business management and literary balance, and the frequent articles and notes on scientific and educational subjects published in the columns of his journal commanded both attention and respect. Rolston was, indeed, a man of sterling worth and sound knowledge, and all who knew him will deplore that he has been taken from them in the prime of life.

SAMUEL ALFRED VARLEY.

By the death on August 4 of Mr. S. A. Varley, at eighty-nine years of age, we have lost almost the last of those pioneers who were associated with the application of electricity. A younger brother of the late Cromwell Varley, F.R.S., and an early student and disciple of Michael Faraday, Mr. Varley was a notable inventor even comparatively early in life, when in the service of the Electric Telegraph Company. His name and fame will always be especially associated with dynamo-electric machinery, the first example of which he produced in 1866. This was a self-exciting machine with soft iron magnets. Ten years later Mr. Varley patented the original compound-wound dynamo. This afterwards became the subject of litigation, when Mr. Varley's claims