

Obituary.

PROF. GIACOMO CIAMICIAN.

BY the death of Prof. Giacomo Luigi Ciamician, of the University of Bologna, Senator of the Kingdom of Italy, which occurred on January 2 of the present year, Italy has lost one of her most distinguished men of science, and modern chemistry one of the most assiduous and most successful of its cultivators.

Ciamician's work was characterised by the breadth and originality of its grasp. It ranged practically over every department of the science—spectrum analysis, electrolytic dissociation, organic synthesis by plants, chemical action of light, spatial chemistry—but it was mainly concerned with problems of organic chemistry, and it is by his labours in certain special fields of this branch that he will be chiefly remembered. One of his earliest investigations was an inquiry into the chemical nature and constitution of the resins and gum-resins—a confessedly difficult and complicated subject forty-five years ago when he first attacked it. By distilling abietic acid, the main constituent of colophony or ordinary rosin, with zinc-dust in a current of hydrogen—a reduction-process which had been already proved to be of general utility—he obtained a number of aromatic derivatives, notably toluene, *m*-ethylmethylbenzene, naphthalene, methylnaphthalene, and methylanthracene. Gum-benzoin similarly treated yielded similar products, together with small quantities of xylene. Elemi-resin also yielded toluene, and ethylmethylbenzene and ethylnaphthalene, but no naphthalene or methylanthracene. Gum-ammoniacum gave both para- and meta-xylenes and meta-ethylmethylbenzene, and the methylether of ortho-ethylphenol, but no naphthalene derivatives. These observations are of considerable interest, but they do not necessarily throw light upon the constitution of the terpene-resins, as certain of the products may be the result of secondary reactions. In fact, aldehyde-resin, obtained from ordinary aldehyde and therefore not an aromatic derivative, on reduction with zinc-dust, was found to yield ethylbenzene, meta- and para-ethyl toluene, and methylnaphthalene.

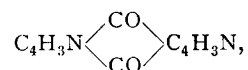
In 1881 Ciamician attacked the chemistry of pyrrole, a constituent of the fetid-smelling product obtained by heating bones in the preparation of animal charcoal, and hence termed bone-oil or Dippel's oil, from the name of the chemist who, so far back as 1711, first attempted to get an insight into its nature. This product has been known for at least four centuries, and has been the subject of repeated inquiry.

The investigation of pyrrole, first isolated by Runge in 1834, its congeners and derivatives, occupied Ciamician, at intervals, for upwards of a quarter of a century, and he published, partly alone, and partly in conjunction with Dennstedt, Weidel, Anderlini, Magnaghi, Magnanini, Silber, and Zanetti, no fewer than sixty communications on its chemistry. In 1904 he reviewed all this work in a lecture delivered to the German Chemical

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Society, afterwards printed in vol. 37 of its *Berichte*. It forms a remarkable chapter in the development of a section of organic chemistry with which Ciamician's name will always be associated. He established the nature of pyrrole as a secondary amine, its carbon and hydrogen atoms forming a closed chain, the hydrogen atoms being symmetrically situated with respect to the carbon atoms, as suggested by Baeyer. Its formation from succinimide by distillation with zinc-dust, and the fact that it yields succinaldehyde dioxime by the action of hydroxylamine, conclusively established this view of its constitution.

Ciamician's work on pyrrole had many side issues. He elucidated its relations, not only to the substances with which it is associated in bone-oil, such as pyridine, into which he showed it might be converted, but also to indole and indigo. He was naturally led to the study of the products of the destructive distillation of gelatin, and, with Weidel, discovered pyrocoll, which he regarded as a quinone of the constitution



or as the anhydride of carbopyrrolic acid, of which, with Silber, he prepared a number of derivatives, and eventually effected its synthesis by heating a solution of carbopyrrolic acid in acetic anhydride, when pyrocoll, with all the properties of that obtained from gelatin, sublimes.

Pyrrole derivatives are concerned in vital processes. They have been found in plants, and certain of them have been shown by Willstätter to exist among the decomposition products of chlorophyll and of hæmoglobin—one more illustration of the remarkable analogies which exist between these substances so important in their physiological functions.

Ciamician was early attracted to plant chemistry, and made important contributions to our knowledge of the nature and constitution of substances produced by photosynthetic processes in the vegetable organism. He determined the constitution of apiole, a substance found by von Gerichten in parsley seeds, and of the analogous compounds saffrole, the chief constituent of the essential oil of saffras and found in other natural oils, leaves, and fruits, and eugenol, a still more widely distributed natural product. With Silber he investigated the constituents of coto- and paracoto-bark, substances of pharmacological interest, and derived from plants growing in Bolivia and Venezuela.

A growing plant is a living laboratory in which synthetic processes may be directed, controlled, or modified, as in the human organism, by external means. In conjunction with Ravenna, Ciamician studied the effect of the introduction of various natural organic products into plants, with the view of determining their fate, or their influence on the life-history or development of the plant. They showed that plants will tolerate and utilise glucosides, such

as amygdalin, salicin, and arbutin, but will quickly die when the aromatic constituents of these glucosides are separately introduced. They found that plants are capable of transforming saligenin, benzyl alcohol, and vanillin into glucosides, saligenin, for example, being converted into salicin. They studied the effect of the inoculation of pyridine, piperidine, and pyrrole derivatives on the formation of alkaloids; they found that the amount of nicotine in the tobacco plant could be considerably increased by the introduction of dextrose. Their results lent support to the view that vegetable alkaloids have their origin in amino-acids, and that bases, such as lysine and ornithine, formed from amino-acids, are utilised by plants in the synthesis of alkaloids.

The chemical action of light has long been a special study with Italian chemists. Blessed with sunnier skies than we enjoy in these latitudes, they have had ampler opportunities than we possess to observe its effects, and, thanks to their long-continued and systematic work, a considerable body of information has been accumulated. Some of Ciamician's earliest observations had reference to this subject, and it continued to interest him to the end of his days. He noticed the conversion under its influence of quinone into quinol; of an alcoholic solution of nitrobenzene into aldehyde, aniline, and quinoline; and of *o*-nitrobenzaldehyde into *o*-nitrosobenzoic acid, the nature of the changes and the character of the products formed being affected by the vehicle in which the substances under examination were contained, and the refrangibility of the light-rays. Unsaturated compounds tended to polymerise. An aqueous solution of acetone yielded acetic acid and methane; maleic acid was converted into fumaric acid; vanillin, piperonal, salicylaldehyde, and cinnamaldehyde yield the corresponding acids; lævulic acid forms propionic acid; many cyclo-ketones are broken down and fatty acids and aldehydes formed; benzaldehyde is resinified, and may be condensed with many different compounds; solutions of benzophenone in aromatic hydrocarbons yield benzopinacolone, and the hydrocarbon undergoes condensation; camphor in dilute aqueous alcoholic solution yields acetaldehyde and campholenaldehyde; fenchone forms carbon monoxide and fenchone hydrate. Aromatic hydrocarbons in presence of water and oxygen are partly oxidised to the corresponding carboxylic acids. Pyrrole by prolonged exposure is completely decomposed, one of the products being succinimide, which may be regarded as the ketonic form of the quinol of pyrrole.

This is but a bald and imperfect summary of an intensely interesting and most important chain of observations, the full significance of which is scarcely yet realised. The potency of light has, of course, long been recognised, but no such evidence of its power to induce chemical action had hitherto been adduced as that afforded by Ciamician's work.

Ciamician was an accomplished, well-informed man, of great personal charm, whose influence on the chemistry of his epoch will long be felt. His merits were widely recognised. He was a foreign associate of the French Academy and an honorary

fellow, since 1911, of our Chemical Society. He was an occasional visitor to London, and personally known to some British chemists who will long cherish his memory as an earnest and single-minded follower of the science he has done so much to enlarge and adorn. T. E. THORPE.

WE regret to see the announcement of the death on Saturday, February 18, of SIR JOHN McCLURE, who for the past thirty years has been headmaster of Mill Hill School. Sir John McClure, who was born in 1860, received his education at Cambridge, where he took mathematics and law. From 1885-91 he acted as lecturer in astronomy and other scientific subjects under the Cambridge University Extension Syndicate, while from 1888-94 he was professor of astronomy at Queen's College, London. It was in 1891 that he received the appointment of headmaster at Mill Hill School, a post which he filled with conspicuous success for more than thirty years. The school, which was founded in 1807 for the education of Nonconformists when the older universities were not open to them, was reconstituted in 1869, and flourished for a time; but when Sir John McClure arrived in 1891 there were only sixty-one boys. He immediately set to work to develop and reconstruct the school, with the result that last year he was able to announce that the number of boys under his charge had grown to 361. Sir John McClure was also active in the cause of education outside his school. From 1904-13 he was honorary secretary of the Incorporated Association of Headmasters, and later became president, and it was mainly in recognition of these and similar services to education that he received the honour of knighthood in 1913.

ORIENTAL learning has suffered a grievous loss by the death, at the age of eighty years, of SIR ARTHUR NAYLOR WOLLASTON, K.C.I.E. Appointed to a post in the India Office at the age of sixteen, Wollaston served for forty-eight years in that Department. In 1898 he succeeded the late Mr. F. C. Danvers as registrar, and he was so successful in arranging the voluminous series of records that they became readily accessible to students. In this task he was succeeded by his pupil, Mr. W. Foster, who has done valuable work in calendaring the collection. Wollaston, in addition to his official duties, became an admirable Persian scholar, though he never had the good fortune to visit the East. He translated the Fables of Bidpai, and edited Sir Lewis Pelly's "Miracle Play of Hasan and Husain." But the work by which he will be best remembered is his great English-Persian Dictionary. At Walmer, where he resided for many years, he took an active share in the local administration.

THE death is announced of PROF. ERICH EBELER, professor of inorganic and analytical chemistry in the newly founded University of Frankfurt-on-Main. Prof. Ebler, who was forty-two years of age, was appointed only in 1920, after service with the Army in the field.