

landfalls believed they had reached India; those who stayed at home sometimes mistook West Indian for East Indian products. The "gallopavo" (*Meleagris gallopavo*) came to Europe in 1541. Its French popular names—"dindon" and "dinde"—leave open the question of origin; the English popular name "turkey-cock" indicates a belief that the bird came from the East. The French do not, however, claim greater perspicacity because of this; when "maize" (*Zea Mays*) first appeared they termed this cereal "blé de Turquie"; we, with fortuitous caution, used the non-committal name "Indian corn."

One undoubtedly western introduction attributed to Chang-kien is "hwan lan" (*Carthamus tinctorius*). The biography of the general and the annals of the Han contain nothing to this effect, and this introduction cannot antedate Tsin times (200-400 A.D.). This plant, which was unknown to classical writers, is the Arabic "kurtum"; its dried flowers, the Arabic "usfūr," came to medieval Europe under the Italian trade-names "asfore" and "saffiore," our "safflower." The Chinese confused this product with "yü-kin," our "saffron," the dried stigmas of *Crocus sativus*; the two were colloquially termed "hun hwa" (=red flower). One of the uses of the dried flowers of "hwan lan" provided the plant with the alternative name "yen-chi," and thus led to its confusion with an indigenous "yen-chi" (*Basella rubra*), tinctorial in all its parts. Matters were further complicated by the existence of Mt. Yenching and by the homophony of the Chinese name "yen-chi" (=cosmetic) with the Hiun-nu word "yen-chi" (=royal consort). It is scarcely surprising that Chinese disquisitions on "yen-chi" are more remarkable for their graceful style than for their historical accuracy.

The natural history of European economic products supplies problems equally complicated. The Greeks gave σκορπίουρον, the inflorescence of which is circinal, the alternative name ἡλιοτρόπιον because it flowers at the summer solstice. They distinguished two sorts of ἡλιοτρόπιον—τὸ μέγα, found in dry situations, and τὸ μικρόν, confined to damp places. No Greek text asserts that the blossoms of σκορπίουρον open only in bright sunshine or follow the sun from morn until eve. In spite of this some Latin authors regard Heliotropium as one of the "helioscopia," while others include it among the "solsequia." The Aramaic equivalent of ἡλιοτρόπιον is either "somar yauma" (=day turning) or "smar yauma" (=day-turned), so that in Syria the plant identified with

that of the Greeks was one which the Romans, at least, would have included among their "solsequia." Arab naturalists identified "somar yauma" with the "tharanchul" of Andalusia. This Spanish "tornesol" (*Chrozophora tinctoria*) was in 1554 identified by Amatus Lusitanus with ἡλιοτρόπιον τὸ μέγα; in 1557 Clusius decided that it was ἡλιοτρόπιον τὸ μικρόν.

While our earliest records of *Chrozophora tinctoria* thus happen to be Iberian, Languedoc is the only region in which the economic product of the plant was ever systematically exploited. The Spanish name "tornesol" may therefore be, as we know the French name "tornesol" certainly is, only a local variant of the Provençal word "tornesola." Tournefort tells us that what we now know as *Chrozophora tinctoria* is the plant *ex qua paratur Tournesol galorum* (=litmus) as contrasted with "Tournesol lusitanorum" (=cochineal). Pomet informs us that of the three distinct kinds of "French tournesol" known to commerce in the seventeenth century, only that termed "tornesol en drapeau" was prepared from this plant. The French term "tornesol," like the Chinese term "yen-chi," is therefore primarily the name of a commercial article colloquially transferred to the plant which yields it. The identification of "tornesol" with ἡλιοτρόπιον, propounded by two distinguished scholar-naturalists, teaches us that scholarship may prove as imperfect an instrument in solving problems connected with the history of cultivated plants and products as Laufer has found botany to be. Though both names are capable of conveying the same meaning, historical research shows that here "tornesol" involves a poetic comparison of the colour-change of an alterable dye with the hues of dawn and sunset, while ἡλιοτρόπιον supplies a prosaic intimation as to the season of the year at which a particular plant blossoms.

The difficulties which beset the conscientious study of European cultivated plants justify the remark made by T. Johnson in 1633 that "those that vulgarly impose names upon plants have little either judgment or knowledge of them." If the task of the historian of Chinese plants and products be less troublesome, this should lend support to the conclusion of Laufer in 1919 that "the Chinese were thinking, sensible and broad-minded people." However this may be, economic botanists of all nationalities will join to the penitence they feel for those shortcomings on their part which Laufer so unsparingly condemns a lively gratitude for the fund of information supplied by him in "Sino-iranica."

Obituary.

PROF. E. J. MILLS, F.R.S.

DR. EDMUND JAMES MILLS, formerly professor of technical chemistry in the West of Scotland Technical College, Glasgow, who died on April 21, was born in London on December 8, 1840. He received his early education at the

Grammar School, Cheltenham, and later at the Royal School of Mines, London. The chemical instruction for students at the School of Mines was in those days given at the Royal College of Chemistry in Oxford Street, and there Mills worked during the later 'fifties, having as a fellow

NO. 2692, VOL. 107]

student Herbert McLeod, afterwards professor of chemistry at the Coopers Hill College, with whom he formed a life-long friendship. At that time the only institution granting degrees in pure science was London University, and Mills utilised his education at the School of Mines with the intention of proceeding to such a degree at a later period. He obtained his Bachelor of Science degree in 1863 and the Doctorate in 1865, his name appearing in the list of graduates at a date intermediate between those of Prof. Crum Brown in 1862 and Sir Wm. Tilden in 1871. In 1861 he went as an assistant to Dr. John Stenhouse, having Tilden as one of his colleagues in that laboratory.

In 1862 Mills was appointed one of the demonstrators of chemistry in Glasgow University under Prof. Thomas Anderson, his chief duty being the conduct of tutorial classes in connection with the medical curriculum. This particular duty was by no means congenial to Mills, and his own perfect knowledge of his subject made him somewhat impatient with the backwardness of the majority of first-year medical students; with advanced students, however, and in the laboratory, he was a good teacher.

Anderson was then working on the products from the destructive distillation of coal and shale, and when not engaged in teaching duties Mills assisted him in that work. This brought him in contact with several people in Glasgow, notably John Young and others, who were interested in the oil industry, which at that time was attracting considerable attention in the Lanarkshire and Lothian districts. The friendships made in these early days may have had some influence in inducing Mills to return to Glasgow, as he did at a later date, but in 1865 he resigned his position as demonstrator at the university and returned to London.

In 1870 Mr. John Young founded the "Young Laboratory" in Anderson's College, Glasgow, a laboratory intended by him to be associated essentially with technical chemistry. The first superintendent of this laboratory was W. H. Perkin, sen. (1870-71), followed by G. Bischof (1871-75); they were succeeded by Mills in 1876.

About 1886 the "Young Laboratory" together with Anderson's College was incorporated in the Glasgow and West of Scotland Technical College, and became the "Young Chair of Technical Chemistry." This appointment Mills held until his resignation in 1891.

Papers recording Mills's original work are published in the proceedings of the Royal Societies of London and Edinburgh, the *Philosophical Magazine*, and the journals of the Chemical Society and the Society of Chemical Industry in London. They are numerous and of a varied nature. His first paper, given to the Royal Society in 1860, was on bromo- and chloro-phenyl, but his early work dealt more with questions on the general principles of chemistry and inorganic chemistry, such as isomerism, electric attraction, chemical mass, and chemical equivalents. In the

Journal of the Chemical Society he published papers on aniline derivatives and nitrotoluene, potable waters, chemical repulsion, and melting points. From 1879-82 he published in four parts "Researches on Chemical Equivalents," "Investigations on the Action of Oxides on Salts," and in conjunction with Mr. Louis Campbell about 1879 "Researches on Dyeing." At a later period, on the foundation of the Society of Chemical Industry, he gave to that society papers on the quantitative estimation of oils and fats, viscosity determinations, and the oxidation of aniline. In the Proceedings of the Royal Society of Edinburgh he published researches on thermochemistry.

In the four small works which he published Mills did not confine himself to purely scientific subjects; in addition to two books, "Fuel and its Applications," in conjunction with E. J. Rowan, and "Destructive Distillation," he wrote a volume of poems, "My only Child," published in 1895, and "The Secret of Petrarch" in 1904.

After retiring from the professorship at the Glasgow and West of Scotland Technical College Mills returned to London, where he occupied himself with various pursuits, among them photography, which he had practised with considerable skill from early days. A certain deafness which overcame him during later years tended to increase a reserve of manner which Mills always possessed, but he continued until a short time ago to attend the meetings of the various societies to which he belonged, and was to be found regularly once a week at the Athenæum Club, where he met his more particular friends. He had a good knowledge not only of scientific, but also of general literature, and held some distinct views on religious questions; these, however, he never discussed.

Mills was elected a fellow of the Royal Society of London in 1874. He became a fellow of the Chemical Society in 1862, serving several times on the council, and as a vice-president from 1912 to 1915. He was an original member of the Society of Chemical Industry, and for a period president of the Glasgow and West of Scotland section of that society. He received the honorary degree of LL.D. from the University of Glasgow.

J. M. T.

DR. GEORGE FREDERICK WRIGHT, who died recently at the age of eighty-three years from heart failure following influenza, was, from 1881 to 1907, a professor in the Oberlin Theological Seminary, Ohio, and had been since 1884 the editor of a well-known theological publication, "Bibliotheca Sacra." His most important work, however, was done as a geologist, and his "Ice Age in North America," first published in 1889, remains a standard work on the subject. He wrote also on "The Glacial Boundary in Ohio, Indiana, and Kentucky," "Man and the Glacial Period," and "Greenland Ice-fields." At the invitation of the late Tsar of Russia Dr. Wright visited Siberia for