

ON May 11, Professor F. Keeble delivered the first of two lectures at the Royal Institute on "Plant sensitiveness;" and on May 13, Professor O. W. Richardson began a course of two lectures on "The disappearing gap between the X-ray and the ultraviolet spectra." The Friday evening discourse on May 12 was delivered by Dr. H. H. Dale on "The search for specific remedies."

AMONG five busts unveiled in the Hall of Fame for Great Americans at New York University on May 20 was one of Maria Mitchell, the gift of her nephew, William Mitchell Kendall, and the work of Emma S. Brigham. President Henry Noble McCracken, of Vassar College, where Miss Mitchell was professor of astronomy from 1865 to 1888, unveiled the bust.

HENRY MARION HOWE, professor-emeritus of metallurgy in Columbia University, died on May 14 at his home in Bedford Hills, N. Y., in the seventy-fifth year of his age.

DR. JOHN SANDFORD SHEARER, professor of physics at Cornell University since 1910, died on May 18 at the age of sixty-six years.

GEORGE SIMONDS BOULGER, the well known English writer on botany, died on May 4, at the age of fifty-nine years.

SIR ALFRED BRAY KEMPE, president of the London Mathematical Society in 1894, for many years treasurer of the Royal Society, died on April 27, at the age of seventy-three years.

C. L. A. LAVERAN, professor at the Pasteur Institute, Paris, died on May 18, at the age of seventy-seven years. Dr. Laveran, then a French army surgeon serving in Algeria, discovered the parasite of malaria in 1880. He received the Nobel prize for medicine in 1907.

ATHERTON KINSLEY DUNBAR, of Cambridge, fellow for research in cryogenic engineering at Harvard, and William Connell of Cambridge, a carpenter, were instantly killed on May 20, by the explosion of a tank of liquid oxygen in the basement of the Jefferson Physical Laboratory.

SIR CHARLES PARSONS, F.R.S., has conveyed to the trustees of the British Association for the Advancement of Science a gift of £10,000

five per cent. war loan stock, which he has placed unreservedly at the disposal of the council. The London Times writes: "This generous gift comes at an opportune time, as the finances of the association have, like those of other institutions, suffered depletion during the past seven years, and there was a danger that the activities of an association which has rendered notable services to science in the past might suffer restriction. The total grants in aid of research made by the association since its foundation in 1831 exceed £83,000."

THE International Congress of Ophthalmology met in Washington on April 25 and 26. The congress was greeted by Vice-president Coolidge. During the first session, Dr. William H. Wilmer, of Washington, presided. Representatives of many foreign countries attended the meetings. The following officers were elected: *President*, George E. de Schweinitz, Philadelphia, and *secretary*, Luther C. Peter, Philadelphia.

THE Rockefeller Foundation has offered to Indian medical graduates, selected by the scientific board of the Indian Research Fund, five scholarships of \$1,000 each, for the purpose of graduate public health work in America.

THE Royal Academy of Belgium has established a prize of 1,000 francs, which will be awarded biennially, under the name of the *Prix O. van Ertborn*, for the best work on geology.

UNIVERSITY AND EDUCATIONAL NOTES

UNDER the will of the late Mr. Henry Musgrave sums amounting to £57,000 have been bequeathed to Queen's University, Belfast. A Musgrave Research Studentship will be established.

A CONFERENCE of Representatives of the Universities of the United Kingdom was held on May 13 in the Botanical Theater, University College, London. The subjects for discussion were the urgent need for the provision of enlarged opportunities for advanced study and research; the increase of residential accommodation for undergraduate and other students; specialization in certain subjects of study by

certain universities; and the organization of adult education as an integral part of the work of the universities.

DR. DAVID P. BARROWS, president of the University of California, on May 16 presented his resignation as president.

DR. GEORGE P. CUTTEN, president of Acadia University, Nova Scotia, has been elected president of Colgate University at Hamilton, N. Y.

DR. ALAN MARA BATEMAN has been appointed associate professor of economic geology at Yale University, with assignment to the Sheffield Scientific School.

DISCUSSION AND CORRESPONDENCE

THE CYTOLOGY OF VEGETABLE CRYSTALS

THE title of this note involves, especially to those of mechanistic outlook, an apparent contradiction in terms. It is very generally asserted that crystals of calcium oxalate, the commonest type found in plants, are formed by the ordinary processes of crystallization in the fluid of the cell sap, occupying the vacuolated center of the mature vegetable cell. It is the intention of the present preliminary statement to call attention to the fact that this description of the mode of formation of vegetable crystals is in all respects profoundly inaccurate. The commonest type of crystal of calcium oxalate is the compound crystal or druse which prevails from the Ginkgoales to the Angiospermæ. The most favorable object for study is Ginkgo. Longitudinal and transverse sections through the mature tissues as well as through the growing points show the presence of druses in great numbers, and often of large size, particularly in the pith, cortex, and phloem. In spite of the presence of such crystals, sections as thin as five micromillimeters can easily be cut off the tissues. When these are stained and mounted the crystals stand out with particular clearness as occupying practically the entire lumen of the cell.

When measures are taken to remove the calcium oxalate by the use of solvents, the presence of an organic matrix in the crystals becomes obvious, as a residuum maintaining

the form of the crystals after the lime compound itself has disappeared. If sections are made in proximity to the growing point, a very interesting situation becomes apparent. The cells in this region are densely filled with protoplasm and those which are to produce crystals are easily recognized from the first. They contain, as do other young cells, a central nucleus and it is obvious in demineralized sections that the crystals are laid down about the nucleus, when the protoplasm of the element is still dense and unvacuolated. From the very beginning the crystals occupy practically the whole lumen of the cell and more or less protoplasm surrounds the nucleus which is the organic center of the druses. The crystals in fact constitute an irregular spiny casing, which surrounds the nucleus and protoplasm. Even in very large and old crystals indications of the presence of a nucleus can frequently be demonstrated by appropriate methods.

Similar observations have been made in the case of crystals of oxalate of lime, so commonly present as a metabolic byproduct in the Dicotyledons. Particularly favorable objects for such studies are the Juglandaceæ, Cactaceæ, Begoniaceæ, Geraniaceæ, etc. In angiospermous species the nucleus becomes obscured at a very much earlier stage of development of the crystal and not infrequently the latter does not occupy the whole lumen of the cell as in Ginkgo.

Apparently the most interesting fact in the present connection is that compound crystals or druses are not formed in plants by the ordinary routine of crystallization in the watery fluid of the cell sap, as has been universally stated and supposed; but by the action of living protoplasm and under the influence of the nucleus, which is central to the crystal itself. Corresponding to this fact there is only one druse in each cell. A further surprising fact is that the cell-wall in many cases grows in size to accommodate the crystal under the influence of protoplasm contained within the crystal itself. This condition constitutes a very serious problem for those mechanists who attempt to explain all the properties of living beings by the so-called artificial cell and colloidal chemistry. The crystal-containing cells