and I continue to advise the young men, who recurrently visit our collections at the Natural History Museum, to revert boldly to the bygone nomenclatures (condemned by some) of the great *scientific* Foraminiferists, who died in peaceful ignorance of the pending effects of commerce upon their study—Parker, Jones, Brady, Millett, Williamson in our country; d'Orbigny, Berthelin, Schlumberger, Terquem in France; Haeusler, Karrer, Reuss, Schultze in Germany; Costa, Fornasini, Seguenza in Italy—to mention only the names which spring to the memory at once.

The works of these giants will tell them all they need to know. Let them fix this sound *corpus* of genera in their minds, and distinguish the variations of species by numbers, each for himself, species that they will recognise as their own old friends in every district which they have to examine and report upon.

When their work has been done and borne fruit in the form of adequate remuneration, let them if they like—and are allowed by their board of directors to do so—hand their 'mounts' on to the pupils of Profs. A, B and C, and let them fight it out *They* need not bother about it any more—taking the Omarian advice of the late Aurelius D. Godley:

"The moving Finger writes; then, having writ,
The Product of your Scholarship and Wit
Deposit in the proper Pigeonhole—
And thank your Stars that there's an End of It."

Obituary

Prof. Hugo de Vries, For.Mem.R.S.

BY the death of Hugo de Vries, on May 20, at the age of eighty-seven years, biology has lost one of its outstanding figures in the history of the last century. He proved himself a master of plant physiology in the period 1870–85 when that science may be said to have had its modern beginnings; but the problems of evolution held his attention from the time when, as an undergraduate at Leyden, he read a German translation of the "Origin of Species". The transition from experimental physiology to evolutionary theory took place with the publication of his "Intracellular Pangenesis" in 1889, but his earlier work no doubt made it easy for him to introduce experimental methods into the investigation of evolutionary problems.

The range of de Vries's early physiological researches may be indicated by series of papers on such topics as the permeability of protoplasm, the movements of climbing plants, contractile roots, the germination and growth of such crop plants as red clover, potatoes and sugar beets, the reactions of *Spirogyra* and *Drosera*. A series of investigations on food plants were done for the Prussian Ministry of Agriculture while a student with Sachs at Würzburg.

In his classical researches on the mechanical causes of cell stretching in plants (1877), de Vries introduced the plasmolytic method, determining the osmotic pressures of cells and developing the conception of isotonic coefficients. In 1884, by comparing the plasmolytic effects of many isosmotic solutions, he was able to show that the osmotic pressure depends on the number of molecules in solution. He also used these methods to determine the molecular weight of raffinose. This work formed the basis for the laws of dissociation in dilute solutions, with which the names of the physical chemists Van 't Hoff and Arrnenius are connected.

The intracellular pangenesis was an important development of Darwin's earlier theory of pangenesis. In it de Vries related theories of heredity and development to the increasing knowledge of cells, and put forward the view which modern work has proved to be correct, that every nucleus of the organism contains a full representation of the hereditary materials. In that work is clearly stated the conclusion that "hereditary qualities are independent units, from the numerous and various groupings of which specific characters originate", and for these units he adopted the term 'pangen'. This anticipation of the modern theory of the gene in all its essentials was a masterly triumph of clear thinking—especially when we remember its date, 1889.

In the same work de Vries criticised the views of Weismann, especially as regards his theory of the idioplasm and his idea that a sorting out of germinal materials takes place in different types of somatic nuclei. The influence of these erroneous views would have been avoided had contemporary zoologists been able to recognise that Weismann's elaborate architecture of the germplasm held less truth than de Vries's simpler but better founded theory. The two authors agreed, however, in denying the inheritance of acquired characters.

In the same year (1889) the publications with what we would now call a genetical bearing were begun, with papers on sterile maize plants and on the inheritance of twisted stems. This was followed during the next decade by a stream of papers on similar subjects. From now onwards, heredity and variation claimed the whole of de Vries's interest, yet the problems were viewed from the first with an experimental background.

The turn of the century marked the well-known triple rediscovery of Mendel's principle of segregation in hybrids, which de Vries had confirmed in several plants before publishing his account in 1900. In the meantime, in searching for mutable plants in accordance with his theoretical views, he had begun so early as 1886 the cultivation of *Œnothera Lamarckiana* and the investigation of its variability. His first paper on *Œnothera* appears to have been in 1895, on the introduction of *Œ. Lamarckiana* into the Low Countries. The "Mutation Theory", first published in 1901–3, and afterwards translated into English, will remain a classic as the earliest example of the pedigree method applied to evolutionary problems, and as a statement of the broad biological distinction between mutations and fluctuations which has gained general acceptance in modern biology. It may safely be said that no work since the "Origin of Species" has had so profound an effect on evolutionary thought. The early years of this century were epoch-making, and progress has gone on with increasing rapidity since de Vries and Bateson led the way with the conception of discontinuity, or better, definiteness in variation.

Œnothera became classical material for the investigation of the more complicated problems of genetics and cytology. No other genus of plants has been subjected to such prolonged and extensive genetical investigations. By 1915 the mutations had been analysed in terms of change in chromosome numbers. The succeeding twenty years has disclosed new conditions in the genus, many species have been recognised as heterozygous, with two complexes yet breeding true owing to balanced lethals and fixed chromosome catenations. While the mass of evidence has necessitated many developments and re-orientations in points of view, yet the general conception of mutation which de Vries founded has remained the basis of genetical work, although views still differ as to the value to be attached to mutations as the raw materials of evolution.

De Vries continued his breeding work with evening primroses until the end. In 1909 was published "Species and Varieties: their Origin by Mutation", as a result of an American lecture tour, and in 1913 "Gruppenweise Artbildung", which is entirely devoted to analytical breeding experiments with *Œnothera*. In 1918–20 six volumes of his collected early papers were published, a seventh volume, of *Œnothera* papers (1915–25), being added in 1927.

De Vries was born in Haarlem on February 16, 1848, the son of a former Prime Minister of Holland. After study in various German universities, he occupied the chair of botany at Amsterdam from about 1878 to 1918, and was not tempted away by flattering offers from Berlin, Columbia and other universities. In Holland his name became a household word and in scientific circles his fame spread throughout the world. When he retired at seventy years of age, he went to live in the village of Lunteren. Here he continued his experiments with evening primroses in a private garden and laboratory attached to his residence. Among the numerous scientific honours conferred upon him was the foreign membership of the Royal Society (1905), the Darwin Medal of the Royal Society (1906), and the gold medal of the Linnean Society (1929).

The genius of Hugo de Vries resulted from the combination of an acute, sagacious and clear-reasoning mind with a power of accurate observation which is rarely equalled. Every biologist would gain from a re-reading of "Intracellular Pangenesis", which was translated into English in 1910. It shows how unerringly his reasoning from the few known facts guided him to views which require extraordinarily little alteration in the light of modern detailed knowledge.

R. RUGGLES GATES.

Miss Ida M. Roper

MISS I. M. ROPER, who died at a nursing home in Bristol on June 8, in her seventieth year, was known widely for her devoted work as a field botanist, and as a contributor of well selected dried specimens to both the British Botanical Exchange Clubs. She had been honorary secretary and librarian of the Bristol Naturalists' Society for nineteen years, and was the only woman to become president (1913–16); also the first woman to serve on the Council of the Bristol and Gloucestershire Archæological Society. Her presidential address on mistletoe showed wide research on the host trees of that parasite; and her second annual address was appropriately entitled "Some Historical Associations of Flowers". Her power of organisation was remarkable. In 1920 she joined the Somersetshire Archæological and Natural History Society, and was also a useful committee member of the Botanical Section.

Miss Roper gave great help to the late J. W. White in the compilation of his excellent "Flora of Bristol", 1912, "not only for field work, but for assistance in literary research and in revision and correction for the press". More remarkable is the fact that for thirteen years she made the collecting and exhibition of local wild plants at the Bristol Museum and Art Gallery a labour of love, both in summer and winter. Her own herbarium of British Phanerogams and ferns, good and beautifully arranged, was recently given to the University of Leeds.

Miss Roper had a particularly good knowledge of British violets. Mosses also interested her, and the British Bryological Society excursions were among the numerous scientific or antiquarian meetings which she enjoyed attending. These included many British Association meetings; hence her cheerful and energetic personality was known to many.

In 1928 Miss Roper rediscovered *Erodium Ballii* in Ireland. Jordan had named it in 1852 from Irish specimens gathered by John Ball, F.R.S. In 1920 she found *Euphorbia platyphyllos* at Keynsham, near Bristol, Ray having noticed it in 1670 as a first record for Britain. Other notes and short articles on British flowering plants appeared in the *Journal of Botany* and in the *Proceedings of the Bristol Naturalists' Society*.