

apical meristem outside it, that is, fields have inhibitive properties. It is assumed that there is no fundamental metabolic difference between shoot and leaf apices.

These ideas are now supported by a considerable body of experimental evidence which was illustrated in the lecture. Thus it was shown that a leaf primordium, or a primordium site, which is isolated from the adjacent, older primordia by vertical incisions, shows rapid relative growth and soon develops to large size. Reference was made to the work of Mr. and Mrs. Snow, who have shown by experimental means that in flowering plants the next leaf primordium to be formed arises in the 'next available space' on the meristem above the top cycle of primordia. Experimental studies have shown that this also holds good for the ferns. In them, also, the next primordium to be formed arises in the widest available space, yet only occupies a small part of it.

The explanation now advanced is that the space needed for the inception of a primordium must be wide enough so as not to be completely eclipsed by the inhibitive fields of the two adjacent primordia, though the area needed for the actual primordium site may be quite small. In other experiments Prof. Wardlaw showed that the inhibition of buds at the apex is due to the adjacent leaf primordia and that, by appropriate but simple techniques, buds can be induced to arise in what are normally leaf positions and leaves in bud positions. Indeed, it seems that very little is needed to tip the balance between leaf formation and bud formation at the fern apex. The whole of the fern apex is thus totipotent in respect of the formation of its lateral members, and the characteristic symmetry and structure of leaves and buds are due to the positions in which they are formed and to the factors of growth and related factors which are incident in these positions.

Prof. de Beer, referring to the work of Mr. and Mrs. R. Snow and of Prof. Wardlaw on correlation and phyllotaxis, stated how impressed he had been by the many parallelisms between the problems of experimental embryology in plants and animals. He then proceeded to illustrate evidence of the power possessed by certain regions of the animal body to control or suppress the appearance of other structures within a certain distance, citing the control of pharynx development in planarians: the distance of the pharynx behind the head being a function of the degree of development of the head itself. A further example of the power of inhibiting at a distance has been shown by work on the coelenterate *Cordylophora*. When fragments of this organism are allowed to aggregate, the mass normally gives off a number of outgrowths, each of which regenerates into a polyp. But if to the aggregated mass there is added an oral cone of another individual, not only does the oral cone induce the formation of a polyp immediately beneath itself, but also it inhibits the formation of other outgrowths and polyps.

At this point Prof. de Beer emphasized that these close parallelisms between phenomena in plants and animals would repay further attention. Field phenomena, as exhibited by the apices of plants, can be matched by many examples from animals. In particular, the modification of a leaf position on the meristem by experimental means is closely comparable with data which have been obtained on limb formation in amphibians. Within the limb-disk, at an early stage, there is still an indeterminacy as regards the precise location of the

future arm or arms: the only thing that is determined is that if anything is developed at all, it will have the quality of an arm. This state of indeterminacy within an area which already possesses a general determination as regards its fate is usually described by saying that the rudiment represents a morphogenetic field: within that field the power of regulation is still present. The properties of morphogenetic fields were illustrated by reference to Prof. Murray's experiments on the limb-bud of chicks. When the limb-disk has grown out into a conical bud, a regional determination into subfields apparently takes place, for, when isolated, the proximal half, in the case of a leg, develops into a complete and nearly perfect thigh, without any shank, while the distal half of the same bud can give rise to a perfect foot and shank. Within the sub-fields, regulation takes place by means of the formation of the structure characteristic of that sub-field and the suppression of others.

By reference to these and other examples, Prof. de Beer showed how the discoveries already made by experimental embryologists may shed light on some of the problems that are now engaging the attention of botanists interested in morphogenesis.

OBITUARIES

Mr. H. H. Cousins

HERBERT HENRY COUSINS, son of the Rev. W. E. Cousins, was one of the group of young scientific workers who, in the mid-eighteen-nineties, took their courage in their hands and boldly turned over to agriculture, taking advantage of the means provided by Mr. Goschen's tax on whisky, put on in 1890, the proceeds of which might be utilized by a county for advancing agricultural education. The counties of Kent and Surrey early decided to do this, and under the guidance of A. D. Hall in 1894 established an agricultural college at Wye in East Kent. From the outset, Hall took the view that his colleagues must first and foremost be thoroughly expert in the pure science which they professed; he knew that agricultural knowledge could be added at Wye, but nothing could make good any weakness in the scientific foundations. Cousins was appointed chemist. He had had a good career in pure chemistry. He was a postmaster of Merton College, Oxford, and in 1889 he gained a first-class in natural science; he studied later at Heidelberg, then the Mecca of young chemists from Great Britain. He returned to Oxford for a time as demonstrator in the chemical laboratories, and took an active part in the University extension lecture scheme, then very popular.

In 1894 Cousins went to Wye and immediately began studying the practical problems of agriculture and gardening. He took a house with a large garden on Church Green and then began to grow plants, subject always to the criticisms of the very expert village workers, acquiring the full knowledge of this subject that he afterwards set out in a delightful little book, "Chemistry of the Garden". He was obviously much influenced by Georges Ville and Sir William Crookes, and under-estimated the role of organic manures; had he revised the book when he retired and had some leisure, it might still have been a standard treatise. He was also interested in pigeons. In the laboratory he made pioneering studies of hop resins, washes and other practical problems, and he translated into very readable English Kellner's text-

book on animal nutrition, then the leading German treatise on the subject.

Short in stature, but full of courage, outspoken and very deliberate of speech, capable of vaulting over any fence or gate that he could see over, he won the respect of the students but was too reserved to make friends among them. His wife, Minnie, daughter of Mr. R. J. Hardy, and their three children, two daughters, one of whom died in 1926, and a son, made the home an attractive place for those privileged to visit it.

In 1900 Cousins accepted the post of island chemist, Jamaica, where one of his various duties was to overhaul the manufacture of rum. He so impressed the authorities that in 1908 he was appointed director of agriculture, a post which he held until 1932. He had already in 1907 been appointed a member of the Legislative Council and retained his seat until 1923; his profound knowledge of the island and of its possibilities marked him out as the obvious chairman of the commission to inquire into the distressed districts.

Cousins concentrated his attention on the island problems and made little contribution to the various controversies in agricultural science that developed during the first thirty years of this century; his records are found in his official reports and in the Jamaica Herd Book. He never lost his gift of lucid writing, however, as shown by his "History of Hope Farm".

He retired from the directorship in 1932 and in due course settled in Oxford where, through failing health, he lived in quiet retirement, taking no part in the numerous agricultural activities there going on; the younger generation, therefore, had little opportunity of getting to know him. This was a pity, for he was a man of full knowledge and ripe experience of the type of problems now daily assuming more and more importance.

E. JOHN RUSSELL

Mr. E. G. Baker

EDMUND GILBERT BAKER died at his home at Kew on December 17, at the age of eighty-five. He was the only son of John Gilbert Baker, the well-known Yorkshire botanist, who in 1866 became first assistant in and later (1890-99) keeper of the Herbarium, Royal Botanic Gardens, Kew. E. G. Baker was born at Thirsk, Yorkshire, on February 9, 1864, and received his education at Bootham School, York, and the Pharmaceutical College, London. For some time after serving an apprenticeship as a pharmacist at Chertsey he remained connected with pharmacy, and was awarded the Pereira Medal by the Pharmaceutical Society in 1886. His interest in botany was, however, already evident, and in 1887 he was appointed to a junior assistantship in the Department of Botany at the British Museum (Natural History). He was elected a fellow of the Linnean Society in the same year and served on the Council during 1917-21. He retired from the staff of the British Museum in 1924, but continued to work in the Department of Botany for many years after his official retirement and was designated honorary assistant keeper.

E. G. Baker was a taxonomist of the old school. He was for a long period in charge of the Polypetalae at the Museum and was responsible for the working out of the members of this group in many important collections received during the period he was assistant. Papers by him, often in association with colleagues,

were published in the *Journal of Botany*, the *Journal of the Linnean Society*, and elsewhere. He wrote an important paper on the African species of *Crotalaria* (*J. Linn. Soc.*, 42, 241; 1914). When he became independent of official duties he concentrated on African Leguminosae and published his most important work, "The Leguminosae of Tropical Africa", in three parts, 953 pages in all (Ghent, 1926; Ostend, 1929; Ostend, 1930). This contains generic descriptions and keys and short descriptions to the species and varieties of members of the family from tropical Africa.

E. G. Baker was closely associated with the Society of Friends and served with one of their ambulance units in the First World War. He was never married and his only sister predeceased him.

W. B. TURRILL

Mrs. Evershed

WE regret to record the death of Mary Acworth Evershed, at her home in Ewhurst on October 25. She was the fifth child of Captain Orr, R.A., and Mrs. Orr, and was born at Plymouth on January 1, 1867. Her father died when she was three years old, and her mother and family then went to live in the vicarage of South Stoke, near Bath, of which parish Mrs. Orr's father was vicar.

Even in her early days she displayed an interest in astronomy—an interest which was destined to ripen in later years into important work in this branch of science. When she was about twenty years old she went abroad, studying Italian and German and also art; afterwards she spent several years in Australia (1889-95). There she met Mr. Tebbutt, of the Observatory of Windsor, N.S.W., from whom she received a considerable amount of encouragement in her astronomical studies, and who wrote a preface to her first work, "Southern Stars".

The year following her return to England in 1895 she joined the British Astronomical Association, and went on the B.A.A. Eclipse Expeditions to Norway in 1896 and to Algiers in 1900. Arrangements were made for her to work at Dunsink Observatory in 1905, when Prof. (now Sir Edmund) Whittaker was at the University of Dublin; but the scheme did not materialize owing to her marriage in 1906 to Mr. John Evershed. When he went to Kodaikanal Observatory, India, she accompanied him, travelling by way of the United States and Japan, and visiting a number of observatories on the journey. During her stay in India she published her work, "Dante and the Early Astronomers", in 1913, and two years later her book "Stars of the Southern Skies" appeared.

Mrs. Evershed did important solar work at the Kodaikanal Observatory and contributed a memoir on prominences and also a paper in the *Monthly Notices of the Royal Astronomical Society* (73, 422; 1913). She was elected a fellow of the Society in 1923, serving for a time on the Library Committee, and was also a member of the Astronomical Society of the Pacific. In 1930 she was appointed the first director of the newly formed Historical Section of the British Astronomical Association—a position which she held for fourteen years, and in which she did very valuable work. Members will remember her unfailing courtesy and prompt attention to queries relating to the historical side of astronomy.