experiments, which enables the immediate visual appreciation of their main effects and their interactions.

Richards's considerable mathematical ability found another outlet in the investigation of phyllotaxis. What was initially a hobby developed into a serious investigation. Taking into account the radial as well as the tangential spacing of leaf primordia at the apex, he was able to derive a function describing phyllotaxis uniquely in terms of a single index which grades smoothly from one order of phyllotaxis to the next and is applicable to all systems. A simple transformation allows the index to be applied to a conical surface when the apical angle is known (equivalent phyllotaxis index). Application of these techniques to data derived from serial sections of growing points enabled detailed analysis to be made of rates of growth of the various parts of the apex, its changing shape at different developmental stages of the plant, etc. These developments have placed the quantitative measurement of phyllotaxis on a completely new basis and represent the greatest advance in this field for many years. Quite recently, Richards developed a flexible, generalized growth function of great utility which is suitable for a considerable diversity of data.

In 1958, when the late Prof. F. G. Gregory retired from the chair of plant physiology and the directorship of the Institute of Plant Physiology, the Institute was dissolved, and Richards took over the research group located at Rothamsted as director of the new Agricultural Research Council Unit of Plant Morphogenesis and Nutrition formed for this purpose, which was later moved to Wye College.

Richards was one of the most modest of men and of a rather shy disposition; thus it was a particular pleasure to his friends when his achievements were recognized by his election to the Royal Society in 1954. He had a delightful, gentle sense of humour which enlivened many a tea-time discussion in the laboratory. In spite of his usual reticence, he could be very firm in any controversial matter where scientific principle was concerned. With his acutely critical mind he would at once see the essential core of any problem, and a friendly discussion between him and F. G. Gregory, who was as usual bubbling with ideas, was an intellectual joy to witness.

Richards served as executive editor of *Plant and Soil* and also on the editorial board of the *Journal of Experimental Botany*. Although he never held a teaching post, his influence on younger research workers was very considerable. In his unhurried, quiet, helpful and completely unselfish manner he would stimulate their enthusiasm as well as their critical faculties and bring out the best in all who had contact with him, and many a scientific paper which did not carry his name or even an acknowledgment was the better for his meticulous attention.

The interest in natural history in his parental home found its reflexion in Richards's scientific hobbies. He built his own reflector telescope, made a collection of most of the commoner macro-lepidoptera; a keen photographer, he specialized in stereo-photography, and above all, he enjoyed his mathematical interests: number theory, the Fibonacci series and numerous geometric and algebraic variations he derived therefrom. During his holidays in Wales, Dartmoor and elsewhere, he pursued his archaeological interests, visiting prehistoric sites and collecting artefacts. With his keen eye he even discovered and made a collection of palaeolithic flint tools on the classical fields of Rothamsted. All these hobbies were followed with the same meticulous thoroughness as was displayed in his work, and his students and colleagues were privileged indeed to share in them. When he died at the early age of sixty-three there can have been few people whose retirement would have held greater promise of useful and enjoyable activity.

He will be remembered with the greatest affection by his many friends, students and colleagues, and his wife and two daughters who survive have our sincerest sympathy in their loss.

W. W. SCHWABE

Dr. R. F. A. Dean

WHEN Dr. Rex Dean died on December 2, 1964, Britain lost an exceptional character.

After he left school, Dean went straight into the Bank of England and worked there for ten years. Here he found time for his artistic interests and revelled in the art galleries and musical opportunities of London. One of his characteristics was a desire for knowledge. Books were good, but better still was the chance of talking to an expert. He was not interested in money, and his restless ambition and enthusiasm found no satisfaction in a banking career. Comparatively late in life, therefore, he began to study medicine at St. Thomas's Hospital, where he qualified in the shortest possible time and took up a house appointment at Addenbrooke's Hospital, Cambridge, in 1943. By this time he was an accomplished pianist with a profound knowledge of the great musical masters past and present. He was also a painter of no mean skill.

Dean at once began to show his devotion to clinical medicine. He loved to examine all his patients himself, never took anything for granted and always saw that everything possible was done for their present and future welfare. He joined the Department of Medicine (later the Department of Experimental Medicine), Cambridge, in 1944 and thus started a career in medical research which he was to pursue for the rest of his life.

Dean went to Germany in 1946 with the Medical Research Council team that set out to investigate the effects of undernutrition on the German population. Here he took an active part in all the studies that were being made, and we quickly began to value his ability, not only as a clinician but also as an administrator. As an investigator he was at first almost a beginner, but he quickly grasped the essentials of organizing a controlled experiment involving a large number of people, and he was a tower of strength throughout the three years we were in Wuppertal. Dean worked very hard, and from the very beginning set high standards for himself and those working under him. His relaxations were painting and music. He delighted in the Bechstein grand piano which was in the 'Herrenzimmer' of the old German house where we lived, and he often went on playing long after everyone else had gone to bed.

The first investigation of which Dean took sole charge was one designed to find out if plant proteins could substitute effectively for milk proteins in the diet of infants and young children. It was possible to do this under controlled conditions in Wuppertal at that time, for the City and even the orphanages were desperately short of milk. He first tried soy bean proteins and at once ran into difficulties over the trypsin inhibitor associated with them, and made numerous journeys to visit experts, manufacturers and others who might help him and at the same time kept the nutritional work going and, even more important, the German staff at the orphanage and the public health authorities solidly behind him. The results of this investigation were published as a *Medical Research Council Special Report*, and on the basis of this work Dean was awarded the Ph.D. (Cambridge) degree.

Dean's success with this investigation made him anxious to apply the results on a large scale where they were clearly needed and likely to be so for some time. His chance came when he was invited by the Medical Research Council to set up a Unit for the study of infantile malnutrition at Kampala. From this he never looked back and, in spite of great difficulties and misunderstandings at times, he gradually built up an organization centred on the small research hospital and laboratories which he himself designed. The money for this was provided, largely through his own persuasive efforts, by the Uganda Government, the World Health Organization and the International Children's Centre in Paris, but he was always supported by the Medical Research Council. Here

Dean was in his element. He explored the possibilities of a number of plant proteins, but never lost sight of the importance of getting at the fundamental biochemistry of kwashiorkor, and his own work and that of his colleagues has thrown a flood of light on the disturbances in enzyme function and amino-acid metabolism which are such a feature of it. Through it all Dean always remained the clinician. He set up the highest standards of diagnosis and investigation, but always put the welfare of his children first. He knew how to deal sympathetically with those in charge of the child, and how to explain to them in the simplest possible way the child's future needs. When Dean first went to Uganda, severe kwashiorkor was quite common, but now it is rarely seen. This is largely due to his work and his influence, and 'Dr. Dean' is a household word among the people living in a wide area around Kampala. On the strength of his work in Wuppertal and Uganda he was elected a Member and later a Fellow of the Royal College of Physicians, honours which he much prized.

Dean was part author with Profs. H. C. Trowell and J. N. P. Davies of a book entitled *Kwashiorkor*, which was published in 1954 and is now the standard work on the subject. He also published many scientific papers describing his observations in Uganda.

At one period of his career Dean travelled a great deal for the World Health Organization, and one of these journeys in 1955 led him to Malaya. There he was asked to see a child in a jungle village suffering from an obscure disease. It was characteristic of Dean to accept such an opportunity to acquire experience and at the same time to be of help, but from this child he contracted an unknown virus infection which led to an ascending paralysis from which he never fully recovered, although some of his finest work was done thereafter. No longer able to take exercise on his feet, he took up swimming to keep himself fit and used to make a habit of this whenever he could afford the time. He remained in full charge of his Unit at Kampala until a few days before his death and, although he had become increasingly aware that his own future was becoming only too short, he continued to make plans enthusiastically for the future of his Unit and his staff.

Dean married in 1931, and is survived by his wife and daughter, who has taken up music as her career. He will be missed by many people throughout the world, but not least perhaps by the unborn babies of Uganda.

E. M. WIDDOWSON
R. A. McCANCE

NEWS and VIEWS

General Physiology in the University of Leicester :

Prof. R. Whittam

DR. R. WHITTAM, who has been appointed to the new chair of general physiology in the University of Leicester, read chemistry at the University of Manchester after service in the Royal Air Force and in 1951 joined the Department of Biochemistry in the University of Sheffield, under Prof. H. A. Krebs, first as a Ph.D. student and later as a Stokes Research Fellow. He worked as a Beit Memorial Research Fellow in the Physiological Laboratory, Cambridge, from 1955 until 1958 under Prof. A. L. Hodgkin and then moved to Oxford, first as a member of the Medical Research Council Unit for Research in Cell Metabolism, and later as a University lecturer in biochemistry. In 1959 he spent 6 months in Prof. D. Nachmansohn's laboratory at Columbia University, New York. His research work has been mainly concerned with the chemistry of physiological functions and especially with those processes which involve the migration of ions across cell membranes. Together with a number of collaborators he has investigated in particular the problem of how the chemical energy of foodstuffs supports such activities as secretion, mechanical contraction and electrical conduction. He has recently published a book *Transport and Diffusion in Red Cells*, one of the monographs sponsored by the Physiological Society. Dr. Whittam will bring valuable experience to the University of Leicester and further strengthen the School of Biology which was recently extended by the creation of a Department of Biochemistry (Prof. H. L. Kornberg) and a Department of Genetics (Prof. R. M. Pritchard).

Biochemistry in the University of Newcastle upon Tyne :

Prof. Kenneth Burton

DR. KENNETH BURTON, who is at present on the staff of the Medical Research Council's Cell Metabolism Research Unit in the Department of Biochemistry, University of Oxford, has been appointed to the newly-created chair of biochemistry in the University of Newcastle upon Tyne. Dr. Burton, a scholar of King's College, Cambridge, graduated in 1946. After a period of research in Cambridge he moved to Sheffield and later spent two years in the Department of Biochemistry in the University of

Chicago. His especial interest lies in the field of molecular biology, particularly the biochemistry of nucleic acids. The establishment of a new chair in biochemistry is part of a plan of expansion in biological sciences at Newcastle. It is expected that the teaching of biochemistry as a separate subject will begin in October 1966.

The Oersted Medal :

Prof. Philip Morrison

PROF. PHILIP MORRISON, of Cornell University, has been awarded the twenty-ninth annual medal conferred by the American Association of Physics Teachers. Prof. Morrison has contributed many research papers, and collaborated with H. Bethe in the production of a well-known text-book on nuclear theory. His teaching experience ranges "from kindergarten to postgraduate institutes". He originated and directed a course in physics for non-science students at Cornell, and he has pioneered the teaching of science in the elementary school, especially light, mechanics, and applied mathematics. He has prepared a book on elementary science education, but is at present working in the Massachusetts Institute of Technology on a quantum mechanics text-book for first-year university students. Prof. Morrison has been a faculty member of Cornell University since 1946, and a full professor since 1956; he has visited, and taught in, London, Israel, India and Japan.

Professional Civil Servants

IN commenting on the debate in the House of Lords on December 2, 1964, in which several speakers referred to the serious shortage of engineers, Mr. J. Lyons, writing in the February issue of *State Science*, the journal of the Institution of Professional Civil Servants, continues the Institution's criticism of the Government's failure to provide satisfactory conditions of service for its own professional staff. By the end of 1965 the pay research report on the Works Group should be available and negotiations on the pay of engineers and other professional staff in the Civil Service should commence. By that time, Mr. Lyons concludes, the Government should demonstrate very clearly, by the way it improves the salaries and status of its own professional staff, the importance it attaches to raising the status of technology and technologists throughout Britain.