

few months of preparation proceeded to France to provide meteorological advice to the Army and the Royal Flying Corps. On demobilization he was appointed superintendent of Army Services in the Meteorological Office, and by virtue of that position or of the time it left available for other activities Brunt was quickly able to influence the development of meteorology in Britain. Thus, he was responsible for a famous research group on atmospheric diffusion at the Chemical Defence Establishment, Porton, Wiltshire, and in a day when Government science was not much given to basic research encouraged that group to take the broadest view of its scientific responsibilities. The dividend was unquestionable. Again, Sir Napier Shaw had retired from the directorship of the Meteorological Office in 1920 to become the first holder of a part-time professorship of meteorology at the Imperial College of Science and Technology, and he quickly enlisted Brunt's assistance as a visiting lecturer for a course in physical meteorology. That course, given at a time when no adequate text existed, laid the foundations of Brunt's *Physical and Dynamical Meteorology*, which was to appear a decade later.

The chair at Imperial College became a full-time appointment in 1934 and Brunt was its first holder, the Department being essentially postgraduate. He had no other staff until 1939 when he was joined by a reader, but the Second World War came and the Department went into 'cold storage'. Then, in the post-war period, the Department grew and blossomed so that when, in 1952, Brunt retired he left behind him one of the most notable and active schools of meteorology in the world.

Brunt's own research in meteorology covered a broad front. It began effectively in 1919 with the question of long-term periodicity in weather about which extravagant claims had been—and sometimes still are—made. His periodogram analysis of the long Greenwich temperature record and, later, of central European records, showed that these records had in themselves no predictive value. Work on various dynamical problems followed, particularly on the rate of dissipation of the kinetic energy of the winds and, with C. K. M. Douglas, on weather-producing air motions associated with the field of barometric tendency—so-called isallobaric winds. Atmospheric (water vapour) radiation, its intensity and role as an agent of heat transfer in the atmosphere, was a later interest, and Brunt finally directed his attention to the reaction of the human body to its environment. Nearly all his work carried a very personal stamp—of the isolation of a moderately self-contained problem, commonly presented by a body of observations, of its illumination by simple but incisive physical insight and its transformation by suitably chosen but generally quite unsophisticated mathematics. Beyond all his research, however, Brunt's outstanding contribution to meteorology was his classical text *Physical and Dynamical Meteorology* (1934, second edition 1939). In it a coherent field of study began to emerge, and though the subject has now outgrown the text at many points it remains the most valuable single volume for to-day's serious student.

Brunt was a devoted servant of physical science in Britain. He was president of the Royal Meteorological Society from 1942 until 1944, having earlier edited its *Quarterly Journal*; he was president of the Physical Society from 1945 until 1947, and then followed his nine years of unsparing service to the Royal Society as physical secretary. In that capacity he supervised Britain's contribution to the International Geophysical Year and, particularly, the Royal Society expedition to Halley Bay in Antarctica—an ice shelf is now named in his honour there. He also encouraged the development of electronic computers in Britain and saw to it that they were made available to university scientists.

Many honours came to Brunt. He was knighted in 1949 and created K.B.E. in 1959. The Royal Meteorological Society awarded him its Buchan Prize in 1937 and its

Symons Gold Medal in 1947. He received a Royal Medal in 1944.

Brunt's zest for life was outstanding, and the many who enjoyed his companionship could not fail to be infected by his enthusiasm. Utterly loyal to his friends and colleagues, he hated the pompous or sham and was short with it. His attitude to life, as to science, was empirical, and he distrusted theory until it had been through the fire of experience. This was his strength.

P. A. SHEPPARD

Prof. Thomas Wallace, C.B.E., F.R.S.

EMERITUS PROFESSOR THOMAS WALLACE, before his retirement professor of horticultural chemistry in the University of Bristol and director of the Long Ashton Research Station, was one of the outstanding agricultural scientists of his time. Graduating just before the First World War, he served with distinction in Flanders and Gallipoli, where he won the Military Cross and was severely wounded, an injury which left him with a permanently stiff knee. Characteristically he never complained of a handicap which must have made his later work in the field difficult.

On his release from military service in 1919, he was appointed as research chemist to the Long Ashton Research Station. In 1923 he became deputy director and in 1943 director of the Institute, a post he held until his retirement in 1959. Soon after his appointment to Long Ashton, Wallace began his classical studies on plant nutrition. From the beginning his work had the stamp of the outstanding scientist, in that his experiments were direct and simple. He knew the questions to ask and how to ask them of the plant itself. His experimental work was, however, simple only in its conception. The techniques he used were difficult; others who had tried to use them had only partially succeeded. They involved the growing of plants in sand culture in which the concentration of the element under examination was reduced beyond the limits of detection by the most sensitive chemical methods. This called for skilled, painstaking and often arduous work. One by one the difficulties were overcome and the results applied in the field. At no time did Wallace lose sight of the practical objective from which his work had started. However fundamental the investigation might become there was always a clear link with the growing plant. Two years after his appointment to the Institute he published the first of his many papers on plant nutrition. At that time he was concentrating on fruit trees and made his first contribution to the fruit growers by showing that the serious disease of marginal leaf scorch was due to a deficiency of potash and could be cured by manurial treatment.

When for the second time war brought the need for intensified food production, Wallace extended his work to horticultural and agricultural crops. He devised simple field experiments, based on his knowledge of the visual symptoms of micronutrient deficiencies, to show where the newly ploughed land was deficient in these elements. Time and again he was able to point to the cause of crop failures and to show how they might be overcome by simple manurial treatments. It became clear that these visual symptoms, which Wallace and his co-workers could recognize, should be widely known. This meant colour printing in the middle of the war, but Wallace was determined to accept only pictures which portrayed the conditions accurately. Print after print was examined and rejected until at last he was satisfied, and in 1943 his book *The Diagnosis of Mineral Deficiencies in Plants by Visual Symptoms: a Colour Atlas and Guide*, was published. It is now in its third edition and is accepted as the standard work on the subject.

The impact of Wallace's work on agriculture and horticulture has been felt throughout the world. Evidence of micronutrient deficiencies has been recognized and

corrected with dramatic results on the yields of crops. Wallace himself travelled extensively to lecture and advise. He visited Australia, New Zealand, the United States and many countries in Europe, and in later years his laboratory received a constant stream of students and visitors.

To those who were fortunate enough to know Wallace, the loss is not just that of a distinguished scientific colleague, but that of a kindly, warm-hearted and entertaining friend. It was to his essential human qualities that much of his success was due. It brought around him a group of devoted workers, who knew that he had the personal interests of each one at heart. It endeared him to horticulturists and farmers; they felt that here was a man they understood and who understood them and their problems. In those responsible for financing research it engendered confidence, which was demonstrated in 1952, when the Agricultural Research Council established in the Institute at Long Ashton a unit for the investigation of the more basic problems of plant nutrition.

Wallace received in his life many honours, the C.B.E. in 1947, the Fellowship of the Royal Society in 1953 and in 1957 he became a Membre Etranger Academie d'Agriculture de France, but his death does not bring to an end his work. As the pressure of population brings new land into cultivation, his book and his other writings will be searched for the solution to the crop failures which are certain to arise. This will be the true memorial to the man and his work, that he will have helped to feed the hungry. He would be content with that.

W. K. SLATER

Dr. W. P. Jacocks

DR. WILLIAM PICARD JACOCKS, a public-health physician with the Rockefeller Foundation in the West Indies, Ceylon, India, and the American South, died on February 17 in Windsor, North Carolina. He was eighty-seven years old.

In a professional career that spanned three decades, primarily in foreign countries, Dr. Jacocks was active in the campaigns against hookworm then being waged throughout the world. He joined the Rockefeller Sanitary Commission in 1913 in his home State of North Carolina, and later, after the Commission had been merged with the Rockefeller Foundation, he worked in Texas, Arkansas, and Tennessee, helping to organize county-wide treatment centres. In 1915 he was sent to the West Indies with the

Foundation's International Health Commission, and two years later was assigned to Ceylon, where hookworm had made severe inroads among the workers on the tea plantations. The systems he established there are still the basis for public health operations in Ceylon.

With the exception of a year in the Army Medical Corps in 1918 and three years at Johns Hopkins working on a doctorate in public health, which he received in 1925, Dr. Jacocks remained in the Far East until 1942. In 1929, in addition to his work in Ceylon, he undertook a public health programme in Travancore, India, for the International Health Division, and in 1934 he became the International Health Division's regional director for India and Ceylon, a post he held until his retirement in 1942.

After his return to the United States during the Second World War, Dr. Jacocks accepted a position with the North Carolina State Board of Health, and was in charge of school health work until 1948. He was very interested in local history, and at his death had just completed a history of Bertie County, North Carolina, where he was born in 1877, and where he died.

Dr. H. Leaderman

DR. HERBERT LEADERMAN, retired physicist of the U.S. National Bureau of Standards, died on February 20, at the age of fifty-one, after a long illness.

Dr. Leaderman, well-known world-wide for his pioneering work in the fields of rheology and polymer physics, joined the Bureau staff in 1948. While at the Bureau he received the Bingham Medal of the Society of Rheology for 1955 for outstanding contributions to science. In 1956 he was awarded the Silver Medal of the Department of Commerce for outstanding work.

Before going to the National Bureau of Standards, Dr. Leaderman was a physicist for the Firestone Tire and Rubber Co. During 1938-46 he worked at the Massachusetts Institute of Technology, serving as a member of the Institute's radiation laboratory staff.

Born in London, Dr. Leaderman graduated from the University of Cambridge in 1934 and was awarded his M.S. (1938) and Ph.D. (1941) by the Massachusetts Institute of Technology. He was a recipient of two Fulbright fellowships, a Fellow of the American Physical Society and a past-chairman of its High Polymers Division. He was a member of the American Chemical Society, the Society of Rheology, and the Washington Academy of Sciences.

NEWS and VIEWS

U.S. National Academy of Sciences Gibbs Brothers Medallist : Dr. F. H. Todd

DR. F. H. TODD, scientific adviser to the Technical Director of the David Taylor Model Basin, Washington, has been awarded the Gibbs Brothers Medal of the U.S. National Academy of Sciences for outstanding contributions to naval architecture and marine engineering.

The Gold Medal was established by William Francis Gibbs, member of the Academy and president of Gibbs and Cox, Inc., New York City, and Frederic H. Gibbs, vice-president and treasurer of the firm of naval architects and marine engineers. This is the first award. Dr. Todd is well known for his contributions to the theory of ship design through model experiments, and for the leadership he has given to hydrodynamic and ship research, both in his native England and the United States. He first joined the scientific staff of the David Taylor Model Basin in 1948 as technical director of the Hydromechanics Laboratory, after serving for twenty years in research

and administrative positions with the U.K. National Physical Laboratory, when, during 1957-62, he was director of the Laboratory's new Ship Hydrodynamics Laboratory at Feltham, and had responsibility for its design and development. In addition to his awards from the U.S. Society of Naval Architects and Marine Engineers, Dr. Todd has received the Gold Medal of Britain's North East Coast Institution for work in ship vibration, premiums of the Royal Institution of Naval Architects, London, and the Institution of Engineers and Shipbuilders in Scotland, and two medals from the Swedish Engineering Society for his work on vibration, methodical series experiments with models, and the seagoing qualities of ships.

Royal Geographical Society Medals and Awards for 1965

H.M. THE QUEEN has approved the award of the Royal Medals as follows: *Patron's Medal*, Dr. E. F. Roots (Department of Mines and Technical Surveys, Canada),