He devoted his whole career to this Department. His early work was a series of studies in mycorrhiza and parasitism, published in the *Proceedings of the Linnean Society of New South Wales*. Then he turned to ecology; his primary surveys of the Kosciusko and Mount Wilson districts are still standard works, and show how well McLuckie had mastered (with the aid only of an out-of-date handbook of the flora) the perplexities of Australian vegetation. But it is as a teacher that he will be remembered. For forty years medical students, pharmacists, scientists and agriculturists passed through his classes. Some of them arrived under the impression that botany was a 'soft option', but none who survived McLuckie's practical classes preserved that illusion. He took immense pains to ensure that students were given good plant material for their practical work (it was not unusual for first-year students to see fertilization in living *Hormosira*); and having provided good material, he took immense pains to ensure that students observed thoroughly and drew accurately. He was exacting in his demands and he had no patience with a student who did not take botany seriously; but the student who did take botany seriously found in McLuckie an enthusiast who delighted in plants and for whom no trouble was too much. He conveyed to his colleagues an impression of deep loyalty to his subject. On field trips he was at his best, and his students will long remember him striding ahead, under the scorching Australian sun, to show them some rare plant or some characteristic patch of vegetation; and then standing by, lighting his pipe and smilingly awaiting their comment.

Through many changes of staff, and during dislocations caused by the War, the Botany Department depended for its stability and cohesion on McLuckie. On at least five occasions he modestly undertook the duties of acting professor. He was a dedicated teacher, and his massive "Australian and New Zealand Botany", published jointly with H. S. McKee in 1954, is a fitting memorial to his career.

ERIC ASHBY

NEWS and VIEWS

Nobel Prize in Physics for 1956: Dr. W. Shockley, Prof. J. Bardeen and Dr. W. H. Brattain

THE Nobel Prize in Physics for 1956 has been awarded, jointly, to Dr. W. Shockley, Prof. J. Bardeen and Dr. W. H. Brattain for their work on semiconductors. During the years they worked together at the Bell Telephone Laboratories they removed many of the obscurities and much of the empiricism from semiconductors and founded the subject of transistors.

Bardeen and Brattain discovered transistor action when they placed two metallic whisker tips on the surface of one small piece of germanium and found that the current passed by one metal-semiconductor contact greatly influenced the properties of the other, if the separation was less than about 0·02 cm. Both current and power gains were demonstrated in this, the first solid-state amplifier (now called a point-contact transistor). The existing, one-carrier, theories of conduction postulated that the majority of mobile charge-carriers in extrinsic semiconductors were either negative electrons in the conduction band (*n*-type conductivity) or vacancies (holes) in the valence band behaving as positive charges (*p*-type conductivity). Because transistor action could not be explained in terms of majority carriers only, Bardeen and Brattain proposed that minority carriers —injected at the first contact, transmitted through the semiconductor in the presence of the majority carriers without much probability of mutual (hole-electron) annihilation and collected at the second contact—were responsible.

Shockley saw that metal contacts were not essential to the action, and in 1949 he analysed the properties of *p*–*n* junctions within one piece of a semiconductor and predicted the behaviour of transistors having *n*–*p*–*n* and *p*–*n*–*p* structures. He very quickly obtained full experimental confirmation. A theory of the recombination of electrons and holes was proposed and direct measurements made of many properties of minority carriers. Later he proposed and analysed another structure—the unipolar transistor—which, though using *p*–*n* junctions, is dependent for power gain on majority carriers only; again, experiments quantitatively confirmed his predictions. Bardeen and Brattain had meanwhile returned to studies of surfaces of semiconductors; by careful measurements they added to the understanding of the properties of very thin adsorbed layers in the presence of electric fields. Dr. Shockley is now with Beckman Instruments and Prof. Bardeen is at the University of Illinois.

Control Mechanisms and Electronics at the National Physical Laboratory: Dr. A. M. Uttley

THE appointment is announced of Dr. A. M. Uttley as superintendent of the Control Mechanisms and Electronics Division of the National Physical Laboratory, Teddington, in succession to Mr. R. H. Tizard, who has taken up a post at the London School of Economics. The Control Mechanisms and Electronics Division was formed in 1954 to study the automatic control of experimental, industrial and administrative operations and the development of techniques and equipment for data processing and computation. Dr. Uttley graduated at King's College, London, in mathematics and psychology. After some teaching experience he joined, in 1940, the Telecommunications Research Establishment (now known as the Radar Research Establishment), Malvern, Ministry of Supply, where he remained until his present appointment. During the War he was responsible for the design of many of the synthetic trainers used to great effect in the training of operational crews. While thus engaged, Dr. Uttley developed a keen interest in electronic and in electro-mechanical control systems, developing the split-field type of motor for use in such applications. One of the developments was the now well-known servo-motor known as the 'Velodyne'. Dr. Uttley's immediate interest after the War was in the automatic guiding of astronomical telescopes, and he acted as adviser on electronics for the Sir Isaac Newton telescope. Later, he turned his attention to problems of digital computation and was largely responsible for the functional design of TREAC, an electronic digital computer in use in the Physics Department at the Radar Research