

abnormal gills and then on regeneration. These are very valuable papers containing information which could very suitably form the groundwork of further important studies. In the case of their author they led to a series of eight papers "On the Ciliary Mechanisms and Interrelationships of Lamelli-branches" published between 1936 and 1943. In the course of some 400 pages she ranged widely throughout the bivalves describing and figuring in the most precise and beautifully illustrated detail the course of ciliary currents and the different types of cilia, with such matters as cuticular fusion and the nature of ctenidial musculature. These papers are an abiding source of knowledge, one to which I am glad to pay my testimony of gratitude and admiration. They put all workers on the bivalve Mollusca, now and in the future, in her debt.

Another source of interest, again initially stimulated by J. H. Orton, was in the Polyzoa. Early in her research career she published an account of their

ciliary feeding mechanisms followed by a detailed systematic and anatomical account of the Loxosomatidea of the Plymouth area. Later she was to describe the structure and feeding mechanisms of cyphonautes larvæ. Her latest interest, made possible by the more extensive collecting range of the post-war research vessel, *Sarsia*, was in Brachiopoda with which her last seven papers, dealing with development of the lophophore, with feeding mechanisms and with systematics, are concerned.

Although of an extremely retiring disposition, Daphne Atkins was far from being devoid of personality. Within the field of her research interests she held most decided views, supported as they were by the results of years of the most careful observation. She has left a magnificent monument in her long series of published papers. As the Plymouth Laboratory made her work possible, this itself is a justification for the existence of that Laboratory.

C. M. YONGE

NEWS and VIEWS

The First American Manned Ballistic Rocket Flight

ON May 5, at 14.34 hr. U.T., a *Redstone* rocket was launched from Cape Canaveral in Florida, carrying Commander Alan Shepard, of the U.S. Navy, in a space capsule. This first United States attempt at manned ballistic rocket flight was entirely successful. The capsule was accelerated to a maximum speed of 5,100 miles per hour, reached a height of 115 miles and travelled 302 miles down-range over the Atlantic. As it re-entered the atmosphere the capsule's heat-shield was seen from the waiting ships to be glowing red. Commander Shepard seems to have suffered no ill-effects as a result of his 15-min. flight, during which he was subjected to a deceleration of 11 *g*. He was in radio communication with the ground throughout, and was able to climb out of the capsule before a helicopter arrived to pick him up. Though this rocket firing was only a first step towards orbital flight, Commander Shepard was able to test orbital techniques by controlling the orientation of the capsule under zero-gravity conditions.

New Carbon Isotope, Carbon-16

A NEW carbon isotope of mass 16 has been discovered by physicists of the Atomic Weapons Research Establishment, Aldermaston, working in collaboration with scientists of the Clarendon Laboratory, Oxford. A carbon-14 target was bombarded with a beam of 6-MeV. tritons (ions of tritium) from the Aldermaston Van de Graaff accelerator. In some cases, the force of the collision was observed to be sufficiently great to split the triton into its constituents of one proton and two neutrons and the two neutrons were captured by the carbon-14 to form a new isotope, carbon-16. By making precise measurements with a large magnetic spectrograph on the emitted protons, the mass of the new isotope was found to be 16.014702 atomic mass units. It was anticipated that carbon-16 would suffer beta-decay like carbon-14 and carbon-15, but with the difference that the product of the decay would still have sufficient energy to emit a neutron. This occurred, and use was made of this property to measure the half-life, which was found to be 0.74 sec. The most

abundant isotope of carbon is, of course, carbon-12. Isotopes of mass 13, 14 and 15 are known, of carbon-14 and -15 are radioactive, and the former is the basis for the carbon-14 dating of archaeological specimens.

Ministry of Aviation : Mr. W. O. Broughton

MR. W. O. BROUGHTON has been promoted to deputy chief scientific officer and appointed to the post of director of air navigation and reconnaissance research and development in succession to Mr. C. J. Carter, who has joined the defence research staff in Washington. Mr. Broughton started his career in the Civil Service in 1935 at the Royal Aircraft Establishment, where he was engaged on development work connected with automatic pilots, the *Queen Bee* pilotless target aircraft and stabilized automatic bombsights. In 1942 he transferred to Headquarters, Ministry of Aircraft Production, to take charge of a section concerned with the development of automatic pilots, gyroscopes and stabilizing equipment. He returned to the Royal Aircraft Establishment in 1947 as head of the Controls Division of the Instrument and Air Photography Department, remaining in this post until 1954, when he was transferred to Headquarters, Ministry of Supply. In 1955 he was appointed assistant director, being responsible for administration of research and development connected with automatic flight control systems, automatic blind landing, flight instrument systems and aircraft fire control systems. In addition to these systems, Mr. Broughton now assumes responsibility for research and development on air photography, bombsights, flight simulators and non-radio aircraft navigation systems.

Physics at Birmingham : Prof. W. F. Vinen

DR. W. F. VINEN, who has been appointed to a chair of physics in the University of Birmingham at the early age of thirty-one, was educated at Watford Grammar School and Clare College, Cambridge, where he was elected to a research fellowship in 1955. In 1958, he was appointed a University demonstrator in physics and a Fellow of Pembroke College. In close collaboration with his contemporary, Dr. H. E.