with a home-made phonograph. In 1899, when only twenty-six years of age, he produced the drum cable relay used in submarine telegraphy. This was followed by the magnetic shunt and other devices connected with duplex working over long-distance cables. Also at this time, with Sir Henry Hozier, he demonstrated a system of directional beam wireless using a parabolic reflector of wire. Signals were transmitted for over a mile between a coastguard station and a lighthouse at Beachy Head. These distances were later increased. This patent was dated 1899.

Finding difficulties in getting his inventions manufactured, he opened in 1910 his own workshops near Liverpool Street, London. After two moves to obtain more space he decided in 1915 to have his own factory built, for which purpose he purchased a large site in Acton, London.

In 1910 he patented his reed type telephone earpiece, by means of which wireless messages could be read when otherwise inaudible. They were adopted as standard by the Royal Navy. He worked on electrical aids for the deaf and was possibly the first to demonstrate bone conduction for hearing. In 1909 he perfected various types of relays for the purpose of amplifying feeble currents both for use in wireless and telephony. This was in the days before the introduction of the thermionic valve. Early in 1914 one of these, the microphone relay, was accepted by the Royal Air Force for use in aeroplanes. By its use wireless messages could be received during flight. The same relays were used by the Admiralty for extending the range of signalling at sea.

Mr. Brown conducted considerable research on rare metals for contact purposes. At the request of the Admiralty he designed the electro megaphone for loudspeaking on warships. One form of this instrument is used on the London Underground Railways for speech between guard and driver. The late Admiral Lord Fisher personally wrote thanking Mr. Brown for his work on relays for detonating mines, using the current from a selenium cell operated by the rays of a searchlight.

The greatest of Mr. Brown's inventions, however, and the one that he himself ranked as his highest achievement, was his gyroscopic compass. The two principal features are the vertical axis and the liquid ballistic. By the first, friction is reduced to a minimum by raising and lowering the whole of the north-seeking parts, including the gyro wheel, at more than a hundred times a minute, using a column of oil, pump-operated. To overcome quadrantal error, common to all gyro compasses, he replaced the solid weight used to precess the compass by a liquid which was free to flow from side to side of the wheel during the rolling of the ship. To work in conjunction with his compass he designed an automatic helmsman which makes it possible to steer a course at sea direct from the compass. He further made a multiple repeater for the ease of steering by hand, also a recorder on which the course of the ship can be plotted on a moving chart. His last invention was a gunnery control compass. This demanded an extreme accuracy at sea only previously associated with a laboratory compass working in a stationary position on land. Such a compass was completed and had passed Admiralty requirements when its adoption was delayed owing to the Second World War making its application impracticable.

With the introduction of broadcasting, Mr. Brown turned his mind to mass production, thousands of pairs of headphones being produced daily. He gave the name to the loudspeaker. While he produced many types fitted with horns he foresaw the development of the large cone diaphragm back in 1910, when he referred to its possibilities in his receiver specification.

During the First World War, Mr. Brown served on the Research Committee for the Detection of Enemy Submarines, the Inventions Board and the Admiralty Ordnance Council. He was elected a fellow of the Royal Society in 1916. In March, 1909, he read a paper before the Royal Institution on "Submarine Telegraphy", and in 1920 one on the "Gyroscopic Compass".

Apart from his activities with the Company that bears his name, he founded and was chairman of the Telegraph Condenser Company.

With all his inventions Mr. Brown acted as his own designer. He was an accomplished engineer capable of giving advice in any department of his works. He was held in great respect by his staff, with whose assistance he earned a great reputation for the high quality of all his work. H. PASMORE

Prof. Marcel Brillouin

THE Nestor of French physics, Marcel Brillouin, formerly professor of physics in the Collège de France, died on June 16 at the age of ninety-four. He belonged to a generation of men of science who could not only master the whole realm of their subject but also make important original contributions to almost every branch of it. As a result they were able to present that subject to their students in a most perfect form, thus providing them with a solid foundation for their own future activities in this field. Prof. Brillouin's lecture courses at the Collège de France provide an outstanding example of this almost extinct art, and many of them have been published in book form, like the well-known "Leçons sur la viscosité des liquides et des gaz"

Like many great physicists, he started as a mathematician at the École normale; but his natural inclination soon diverted him first to mechanics and later to physics as a whole. Thus he acquired skill in the use of mathematics as well as in the handling of apparatus which enabled him to carry out investigations requiring refined experimental and mathematical techniques at the same time, which is so rarely found in physicists of the present generation.

Only a brief indication of Brillouin's most important research subjects can be given here. In hydrodynamics he did fundamental work on the theory of discontinuity surfaces in liquid flow and the formation of vortices on similar lines to Helmholtz, and in aerodynamics he developed a theory of the dispersion of sound. In thermodynamics he devoted himself to the study of permanent deformations of solids and to the specific heat of black body radiation, and he derived the proportionality of this quantity with the third power of absolute temperature. The kinetic theory of matter was enriched by Brillouin's contributions to the theory of diffusion and viscosity in gases and liquids, and he also took part in the once topical controversy on the apparent contradiction in statistical mechanics between the reversibility of the laws of dynamics and the irreversibility of those of thermodynamics. He was very much interested in geophysics as well, and he con-

tributed to this branch of applied physics by papers on the circulation of the atmosphere, the formation of rain, the theory of the tides, etc. An outstanding piece of research in this field consisted in a series of precision measurements of gravity within the Simplon tunnel aiming at a determination of the shape of the 'geoid'. Although naturally his main activity was in the domain of 'classical' physics, he was nevertheless actively interested in the theory of relativity and in quantum theory, where he made an early attempt to give a representation of quantum phenomena in terms of a continuum theory.

It was a source of great satisfaction to Brillouin that the successor to his chair was one of his own sons, Léon Brillouin, who, carrying further the work of his father, has become one of our leading theoretical physicists.

R. FÜRTH

Prof. Beatrice Edgell

THE death of Prof. Beatrice Edgell, professor emeritus in the University of London, takes from us one of the significant figures in the development of British psychology. Born in 1871, she was of the same generation as McDougall and C. S. Myers, with whom she collaborated in the pioneer work of the British Psychological Society and with whom she helped to establish the traditions on which the study of psychology is still based in British universities. Trained first in philosophy at the University College of Wales, Aberystwyth, she turned to experimental psychology and studied at Würzburg, where the use of experimental method was being developed in the study of the processes of thought and judgment. Throughout her life she combined her interests in philosophy and in experimental psychology, though with a special leaning to the latter, and from 1897 until 1933 she was head of the Department of Philosophy and Psychology at Bedford College in the University of London.

At a time when in many universities psychology was at best a subordinate partner of philosophy, her position as professor of psychology in charge of both subjects was unusual. The laboratory she established bears witness to her concern for exact and objective experimental method aided by the best material equipment then available. Her chief publications ("Theories of Memory" (1924), "Mental Life" (1926) and "Ethical Problems" (1929)) indicate the two sides of her interest, as does the fact of her contributing both to psychological journals and to the *Proceedings of the Aristotelian Society*. Her example and influence thus aided the development of psychology in Britain as an independent experimental science which still retained the stabilizing effect of philosophical discipline. Her psychological interests centred largely on the cognitive aspect of mental experience, especially memory and perception, and she also paid particular attention to the experimental approach to æsthetics. As a teacher, however, she was stimulating over a wider range. "Ethical Problems" was written specially with the view of helping nurses, and her text-book, "Mental Life", was intended for students preparing for social work. Precise of mind and emphatic of utterance she was an excellent teacher, and she is held in affectionate respect by a large number of former students, many of whom are now engaged in psychological work applied to industry, education and various branches of social work.

In her retirement Prof. Edgell still occupied herself with psychology, including its newer developments. She was recently, for example, using the Rorschach test with critical appreciation. She continued to help students, and to take an active interest in the British Psychological Society, of which she was a past president and honorary fellow. During the War she wrote a history of the Society, part of which she read at the annual meeting of the Society in 1946. This was the first occasion on which many of her younger colleagues had met her, and they will remember her as they saw her then, frail, alert and indomitable.

NEWS and VIEWS

Psychological Medicine in Glasgow: Prof. T. Ferguson Rodger

DR. T. FERGUSON RODGER has been chosen as the first occupant of the newly founded chair of psychological medicine in the University of Glasgow. Dr. Rodger graduated in science and medicine at Glasgow in 1927–29 and holds the diploma in psychological medicine of the University of London. During 1931–32 he worked at Johns Hopkins University, where he was a pupil of Adolf Meyer. From 1933 until 1939 he was senior assistant at Glasgow Royal Mental Hospital (Gartnavel), and an assistant to the lecturer in psychiatry in the University. Throughout the War he served in the Royal Army Medical Corps as consulting psychiatrist at Headquarters, Land Forces, South-East Asia, and at General Headquarters, India. Latterly, he has been a commissioner of the General Board of Control (which functions under the Lunacy, Mental Treatment and Mental Deficiency Acts). Dr. Rodger has specialized in psychosomatic medicine. He was responsible for research into the methods of selecting officers for the army. He has also published work on fibrositis and on night-blindness.

Pathology in Glasgow: Prof. G. L. Montgomery

GEORGE LIGHTBODY MONTGOMERY has been appointed to the St. Mungo-Notman chair of pathology (associated with the Royal Infirmary, Glasgow) in succession to Prof. John W. S. Blacklock, who has moved to St. Bartholomew's Hospital, London. Prof. Montgomery graduated at Glasgow (M.B., Ch.B., 1928; M.D., 1946), and also holds the Ph.D. degree of the University of St. Andrews (1936). After holding appointments at Glasgow Royal Infirmary, in 1931 he became lecturer in clinical pathology at St. Andrews and assistant pathologist at Dundee Royal Infirmary. Since 1937 he has been Gardiner research lecturer in the pathology of disease in infancy and childhood in the University of Glasgow, and pathologist at the Royal Hospital for Sick Children, Yorkhill. During almost the whole of the