

hills, Lanarkshire, in 1763. Given a good education, he became a student in Black's classes at the University of Edinburgh; but following in his father's footsteps, he entered the service of the Wanlockhead Mining Company near Leadhills. Familiar with the steam engines of Newcomen and Watt, in 1786 he made a model steam carriage and in 1787 took out a patent for a new form of steam engine. Through this he was brought into contact with Patrick Miller, the banker, who was desirous of trying a steam engine in one of the double-hulled boats with which he was experimenting. To meet Miller's wishes, Symington constructed an engine with cylinders 4 in. in diameter, which in October 1788 drove one of Miller's boats across the little Dalswinton Loch in Dumfriesshire at 4.5 miles an hour. Next year a larger boat and a larger engine were experimented with, but the results were not very satisfactory and the matter was not pursued further. The engine of 1788 happily was preserved and can be seen in the Science Museum, South Kensington. It is the oldest marine engine in existence, and there are few older steam engines of any kind.

The experiments of Miller and Symington had been preceded by those of Rumsey on the Potomac and of Fitch on the Delaware, and Fitch was the first in the world to form a steam boat company and to carry passengers. His company, it is true, had but a short life, but from then onwards to the end of the eighteenth century there was probably never a time when one or other of the steam boat pioneers was not at work. Symington's second opportunity came in 1801, when Thomas, Lord Dundas of Kerse, a governor of the Forth and Clyde Canal Company, instructed him to build a steam boat for use on the Canal. The hull was constructed by Hart, of Grangemouth, and the *Charlotte Dundas*, as the boat was called, was 56 ft. long and 18 ft. wide. There was a recess in the stern for a paddle wheel, the boiler was placed aft on the starboard side, and the engine on the port side. To the uninitiated, the engine of 1788 might appear to have required more ingenuity to design than that of 1801. It is certainly far more complicated, but this was partly due to the steps Symington had to take to avoid the ramifications of Watt's patents which were in force. In 1801 those patents had expired, and, free to use the ideas of his predecessors and to combine these in any way he thought best, Symington was able to construct an engine for the *Charlotte Dundas* which would almost meet modern requirements. The

engine was double-acting with one cylinder, and the piston rod drove the crank shaft of the paddle wheel direct through a crosshead and a connecting rod. The air pump and condenser were placed below the cylinder, the former being worked by a bell-crank lever.

The running of the *Charlotte Dundas* quickly proved that Symington had produced a reliable and powerful engine, and the capacity of the boat was shown by her successfully towing two vessels of 70 tons each a distance of 19½ miles. Convinced of the utility of the boat, Lord Dundas introduced Symington to the Duke of Bridgewater, who without much hesitation decided to adopt vessels similar to the *Charlotte Dundas* for the Bridgewater Canal and ordered the construction of eight steam boats. Had the Duke lived but another year, there is little doubt that the boats would have been built and that to-day we should date the birth of steam navigation from the *Charlotte Dundas* and not from the *Clermont* and the *Comet*. The Duke's death in 1803, however, led to the cancellation of the order; and about the same time the owners of the Forth and Clyde Canal, afraid of the effects of the wash caused by the *Charlotte Dundas*, laid her up on the mud near Bainsford Drawbridge, which became her grave. She was never used again, and engine and hull alike have long since been destroyed.

This proved the turning-point in Symington's career and he never recovered from the disastrous set-back to his fortunes. When more than sixty years of age, he sought assistance from the Government and was granted two small sums, of £100 and £50. His death took place in London on Mar. 22, 1831, and three days later he was buried in the churchyard of St. Botolph, Aldgate. His grave never bore a stone, but in 1903 a tablet to his memory was placed in the church by the late Lord Bearsted, who was then Sir Marcus Samuel and Lord Mayor of London. A marble bust of Symington was unveiled in the Royal Scottish Museum in 1890 by Lord Kelvin.

Though in his day neglected, Symington to-day is recognised as the designer of the first practical steam boat, and at the request of the Institute of Marine Engineers and the Newcomen Society, the vicar of St. Botolph, Aldgate, has arranged to hold a special service to commemorate the centenary of his death. This service will take place at 11 A.M. on Sunday, Mar. 22, the hundredth anniversary of Symington's death, and an address on Symington's work will be given by Engineer Vice-Admiral Sir Robert Dixon.

Obituary.

MR. H. HARRIES.

WITH the death of Mr. Henry Harries on Feb. 8, at the age of seventy-nine years, we lose one of the older generation of meteorologists. Born on Jan. 20, 1852, he entered the Marine Division of the Meteorological Office in 1875. In 1903 he was transferred to the Forecast Division, where he took regular duty as a forecaster. In 1919 he

returned to the Marine Division, where he held the post of assistant superintendent until his retirement in March 1920.

Mr. Harries' interest in meteorological matters extended beyond his official duties, however, especially along a number of curious bypaths of knowledge. He was convinced that explosions in collieries were connected with high barometric

pressure and supported his thesis in a long letter to NATURE in 1887 (vol. 36, p. 437). He also developed the theory that some of the barometric depressions which visit the British Isles originate in tropical cyclones, and he actually succeeded in tracing the course of one such storm from the Philippines to Scandinavia, more than half-way round the globe—no easy matter in 1882.

The capacity for painstaking research which characterised this paper also marked Mr. Harries' collection of occurrences of hail and thunder storms in Arctic regions, his study of the frequency, size, and distribution of hail at sea, and his paper on the great storm of November 1703, in which he brought to light some long-buried official records. The same thoroughness, in a different direction, was shown in his paper on "The Eddy Winds of Gibraltar", in which he displayed great ingenuity in the use of simple methods of aerological investigation. This paper was published in 1914 by the Royal Meteorological Society, of which he was a fellow from 1887 until 1914.

DR. FLORENCE BUCHANAN.

By the death of Dr. Florence Buchanan on Mar. 13, a familiar figure is removed from the laboratories at Oxford. For the past ten years she had been handicapped by increasing blindness; but even so, occasional articles have appeared from her pen. Previously she had carried out many interesting studies in the fields of zoology and physiology. Her earliest papers, on the respiratory organs of decapods and on annelids, appeared in the *Quarterly Journal of Microscopical Science* while she was still a student at University College, London, and there the influence of Sir Ray Lankester turned her attention to zoological studies, particularly of the polychaets. Later, with Sir John Burdon Sanderson at Oxford, she turned to physiological experiments upon the electrical response of muscle, recorded photographically by a capillary electrometer, and as a result of her investigations she was awarded several prizes, received the degree of D.Sc. from the University of London, and was made a fellow of University College.

Throughout her physiological work, Dr. Buchanan retained her first interest in animal life, and to a biologist some of her most striking researches were concerned with the frequency of the heart-beat in small mammals and birds, with the varying rates of

heart-beat in hibernating and waking mammals, and with the general problem of hibernation. Heredity may have accounted for Dr. Buchanan's scientific skill and enthusiasm, for she was a daughter of the late Sir George Buchanan, chief medical officer of the Local Government Board, and a sister of Sir George Seaton Buchanan and Lady Adam Smith, wife of the principal of the University of Aberdeen. J. R.

THE death occurred on Sunday, Feb. 15, of W. G. Robson, lecturer in natural philosophy in the United College of the University of St. Andrews. From 1892, when Mr. Robson was appointed assistant to Prof. A. S. Butler, he was almost continuously associated with the University either in St. Andrews or Dundee. During the War he was engaged in the Aircraft Instruments Department in London, and had charge of the Oxygen Research Laboratory. His wide experience, kindly disposition, and his knowledge of mathematics, physics, and electrical engineering made him a most valuable member of the University staff.

WE regret to announce the following deaths:

Dr. M. W. Beijerinck, founder and director of the Microbiological Institute at Delft, on Jan. 1, aged seventy-nine years.

Prof. G. Gehlhoff, of the Technical Highschool, Berlin, president of the Deutsche Gesellschaft für Technische Physik, vice-president of the Deutsche Glastechnische Gesellschaft and a director of the Osram G.m.b.H., who in recent years took a leading part in the development of glass technology in Germany and made a number of notable contributions from his own laboratory, died on Mar. 12.

Prof. D. Hepburn, C.M.G., professor of anatomy in the Cardiff Medical School of the University of Wales, formerly president of the Anatomical Society of Great Britain and Ireland, on Mar. 10, aged seventy-two years.

Prof. Carl Emil Hansen Ostenfeld, professor of botany and director of the botanical garden in the University of Copenhagen, on Jan. 16, aged fifty-eight years.

Prof. Enrico Sereni, head of the department of physiology in the Stazione Zoologica, Naples, on Mar. 1, aged thirty-one years.

Prof. Otto Wallach, emeritus professor of chemistry in the University of Bonn, who specialised in the chemistry and industrial uses of the terpenes and was awarded the Nobel prize for chemistry in 1910, on Mar. 1, aged eighty-four years.

News and Views.

THE Council of the Royal Society has agreed to recommend for election as fellows of the Society the following seventeen candidates: Percy George Hamnall Boswell, professor of geology in the Imperial College of Science and Technology; Alfred Joseph Clark, professor of pharmacology in the University of Edinburgh; Charles Davidson, assistant at the Royal Observatory, Greenwich; Reginald Ruggles Gates, professor of botany, King's College, London; Charles Stanley Gibson, professor of chemistry, Guy's Hospital Medical School; Hermann Glauert, Principal Scien-

tific Officer, Royal Aircraft Establishment, Farnborough; Charles Robert Harington, reader in pathological chemistry in the University of London (University College Hospital Medical School); Isidor Morris Heilbron, professor of organic chemistry in the University of Liverpool; Sir Alexander Cruikshank Houston, Director of Water Examinations to the Metropolitan Water Board; Lieut.-Col. Sydney Price James, I.M.S., adviser on tropical diseases to the Ministry of Health; Charles Frewen Jenkin, lately professor of engineering science in the University of