heavens and preparing an astrographic catalogue: the zone of the sky allotted to Greenwich was from declination 65° N. to the pole. On his return to Greenwich as Astronomer Royal, many of the programmes of work were directed to making the information about this zone of the sky as complete as possible. Measurement of the parallaxes of stars of large proper-motion, determinations of photographic magnitudes and of effective wave-lengths were undertaken. The whole zone was photographed again, the photographs being obtained through the glass; by placing corresponding early and late photographs film to film, the proper-motions of the stars were conveniently and rapidly derived from differential measures.

The problems to be solved at total eclipses of the sun claimed much of Dyson's attention. He took part in several himself and was fortunate in never having cloudy weather. In the total eclipse of 1927, which was visible in England, he selected Giggleswick as the station for the Greenwich party, and this proved to be almost the one place where the eclipse was observed under favourable conditions. His own work on the spectra of the chromosphere and of the corona made important contributions to the subject. It was in large measure as the result of his initiative and energy that two expeditions went from England to observe the total eclipse of May 1919. Dyson had pointed out in 1917 that this eclipse would afford a particularly favourable opportunity for testing whether there was a deflection of rays of light passing near the sun of the amount predicted by Einstein from his theory of relativity. Preparations were made for the two expeditions in the hope that the Great War would end in time to make it possible for them to set out. How the expeditions set out, obtained their observations and vindicated Einstein's prediction is well known. This successful confirmation, coming at so crucial a time, undoubtedly did much to bring about a general acceptance of Einstein's theory. After his retirement in 1933, Dyson wrote, in conjunction with Dr. R. v. d. R. Woolley, "Eclipses of the Sun and Moon", published in 1937, which is the best book that has been written on this subject.

Dyson took a great interest in problems of time-keeping and in the craft of clock-making. He was responsible for the distribution through the B.B.C. of the 'six-pips' time signals, the signals being sent direct from Greenwich and making accurate time more readily available than it had hitherto been. He was for many years president of the British Horological Institute, which awarded him its Gold Medal in 1928, and he was a member of the Court of Assistants of the Clockmakers Company, of which he was twice master.

After the Great War, when international co-operation in science had lapsed to a considerable extent, Dyson played a prominent part in the reconstitution of international scientific co-operation with the International Research Council and in the formation of the International Astronomical Union. The success that this Union has achieved in securing international co-operation in different branches of astronomy is in no small degree due to Dyson's wise guidance. His election as president for the period 1928–32 was a fitting recognition of his services to the Union.

Dyson received many honours. He was president of the Royal Astronomical Society, 1911–13; president of the British Astronomical Association, 1916–18; vice-president of the Royal Society, 1913–17. He was awarded a Royal Medal of the Royal Society in 1921, the Bruce Gold Medal of the Astronomical Society of the Pacific in 1922 and the Gold Medal of the Royal Astronomical Society in 1925. He received honorary degrees from the universities of Oxford, Cambridge, Edinburgh, Durham, Leeds, Toronto, Perth and Melbourne, and was foreign or corresponding member of various national academies. He was created a Knight Bachelor in 1915 and a K.B.E. in 1926.

Dyson was a man of engaging personality and of singular charm. To all of his staff he was not merely a chief but also a friend. He married Caroline Best, daughter of Mr. Palemon Best; she died in March, 1937. They had two sons and six daughters. Foreign astronomers from all parts of the world and many other visitors to Greenwich were sure of a warm welcome and of friendly hospitality in their home. Dyson had a keen sense of public duty, and much of his leisure time was spent in work for the various schools, hospitals, charities and other good causes in which he was interested. Of no man might it more appropriately be said:

"His life was gentle, and the elements
So mix'd in him that Nature might stand up
And say to all the world 'This was a man!'"

H. S. J.

Engineer Vice-Admiral Sir Henry John Oram, K.C.B., F.R.S.

OF the many engineers who held high positions during the Great War, none had a more onerous and responsible task than Engineer Vice-Admiral Sir Henry Oram, who died at Cranleigh on May 5 at the age of eighty years. From October 1907 until June 1917 he was engineer-in-chief of the Fleet, and as such was responsible for the design, construction and maintenance of the machinery of hundreds of warships from battleships to armed trawlers, and for a personnel of something like 70,000–80,000 officers and men. He had served in various grades at the Admiralty from 1884 until 1907, when he succeeded Engineer Vice-Admiral Sir John Durston and "under him", as *The Times* said, "was created the post-Dreadnought Fleet, which formed the backbone of the Navy in the conflict with Germany, and the very high standard of efficiency obtained under the stress of war in the engine rooms of ships of all types and classes reflected the highest credit upon his professional skill, sound judgment and administrative ability".

Though, unfortunately, little has been published on the work of the engineering branch of the Navy during the Great War, both Admiral Jellicoe and

Admiral Beatty paid tribute to the high standard of efficiency maintained in the engine rooms of His Majesty's ships under difficult conditions.

Oram was a product of the eminently successful system of training introduced by the Admiralty about a century ago, whereby a boy with no other advantages than those of character and physique could climb to the top of the ladder. He was born on June 19, 1858, and at the age of fifteen years entered Devonport Dockyard as an engineer student; during the next six years he passed through the engine and boiler shops, the foundry, the smithery, the drawing office and so forth, meanwhile attending the Dockyard School. In 1879 he passed for an assistant engineer R.N. and then entered upon three further years training at the Royal Naval College, Greenwich, where at that time the staff included Hirst, Cotterill, Reinold, Hearson, Waghorn, White and W. E. Smith, while among Oram's fellow students were Rear-Admiral F. T. Bowles, U.S.N., and Rear-Admiral Miyabara, afterwards the engineer-in-chief of the Japanese Navy. From Greenwich Oram passed out with the highest distinction, and for the next two years, 1882–84, served afloat in the Indian troopships *Crocodile* and *Malabar*, the running of these and their sister ships being looked upon as the best experience for junior engineers. This proved to be Oram's only sea service, for in 1884 he was appointed to the staff of Sir James Wright at the Admiralty and never again left Whitehall.

To detail the many developments with which Oram was associated would be to trace the progress of naval engineering during the course of forty years. When he entered the Navy there were plenty of ships with horizontal simple-expansion engines working with steam at 30 lb. pressure; when he retired the standard type of machinery was the geared steam turbine working with steam at about 250 lb. pressure generated in oil-fired water-tube boilers. He was associated with all the troubles over forced draught, and by his invention of the "Admiralty" boiler-tube ferrule helped to mitigate some of them; he saw the introduction and development of the splendid triple expansion engines of last century; he was already in a responsible position when the various types of water-tube boiler—Thornycroft, Yarrow, Normand, Babcock and Wilcox, Dürr, Niclausse, Belleville, etc., were being installed, and he attended the trials of the historic *Turbinia*, and saw the turbine supersede the reciprocating engine for all warships.

There was nothing meteoric in Oram's rise to the top of his profession. He passed through all the grades of assistant engineer, engineer, chief engineer, etc., and in 1903 when the new titles were introduced he became an engineer-rear-admiral. He was made a C.B. in 1906, a K.C.B. in 1910, and his scientific attainments were fully recognized by his election in 1912 as a fellow of the Royal Society. He was the first naval engineer to be so honoured. In 1915 he was elected a member of the Athenæum under Rule II.

Besides his work at the Admiralty, Oram lectured on marine engineering at the Royal Naval College, Greenwich, and he practically rewrote the admirable text-book on the marine steam engine, first published by Richard Sennett, the engineer-in-chief from 1887 until 1889. In 1908–9 he served as president of the Junior Institution of Engineers and in 1914 of the Institute of Metals, giving to both societies very valuable addresses. At the jubilee meeting of the Institution of Naval Architects he contributed a paper entitled "Fifty Years' Changes in British Warship Machinery". Though not like his predecessor Sir John Durston, or his immediate successors Sir George Goodwin and Sir Robert Dixon, a president of the Institute of Marine Engineers, his name appears among the honorary members. From the United States he received the Distinguished Service Medal.

Since his retirement Admiral Oram had lived at Rudgwick and he was buried in the churchyard there on May 8.

EDGAR C. SMITH.

Mr. Daya Ram Sahni, C.I.E.

WE regret to record the death of Rai Bahadur Daya Ram Sahni, the distinguished Indian archæologist, formerly director-general of the Archæological Survey of India, which took place at Jaipur in March at the age of sixty years.

Sahni was educated at the University of the Panjab, and was one of the first to hold a Government of India scholarship in archæology. He was also a gold medallist of his university. He joined the Archæological Survey as scholar and assistant in 1904, reaching the grade of superintendent in 1917. He was a regular contributor to the records of the Survey, dealing more particularly with the decipherment of inscriptions and describing Buddhist sites. He is the author of two well-known and authoritative works on the Buddhist remains at Sarnath; and he contributed two chapters to Sir John Marshall's great work on Mohenjo-daro and the Indus civilization. Sahni was appointed deputy-director of the Archæological Survey in 1925, and director-general in 1930, retiring in 1935, when he received the honour of C.I.E. On his retirement he accepted the offer of the appointment of director of archæology from the Jaipur Government and was responsible for excavations at Bairat, one of the most important sites in Jaipur, publishing a report on his results.

WE regret to announce the following deaths:

Sir George Kendrick, who was actively associated with the development of the University of Birmingham, where he endowed the Poynting chair of physics, on May 28, aged eighty-nine years.

Sir William Lobjoit, O.B.E., during 1920–27 controller of horticulture at the Ministry of Agriculture, on May 28, aged seventy-nine years.

Dr. C. H. Mayo, founder with his brother of the Mayo Clinic, Rochester, Minnesota, for surgical research, and regent of the American College of Surgeons in 1913–36, on May 26, aged seventy-three years.