

mine and the sum of £500 was contributed by the Society in order that it should be thoroughly tested. The successful outcome of the trials resulted in the man-engine coming into general use in the mining world, and when a second one was installed at Poldice mine a further contribution of more than £100 was provided towards the expenditure.

Underground blasting operations at this time were effected by filling a reed or straw with gunpowder, igniting this, and thereby exploding the charges. This primitive method was extremely dangerous and often caused serious accidents, in consequence of the premature ignition of the powder. Premiums were offered for a solution to this very important problem, and the dangers were minimised by the introduction of the safety fuse, which rendered blasting operations comparatively safe. Improvement in the methods of ventilation in the deep mines was also for many years a pressing necessity, and valuable advances were made through the auspices of the Society.

Some ninety exhibitions have been held by the Royal Cornwall Polytechnic Society, at which many important inventions of the past century were first shown. Among those which received valuable awards were: the dipping needle deflector, by Robert Were Fox, F.R.S., which was later adopted by the Navy, 1834; the mining theodolite, by William Wilton, 1835; the safety fuse, by William Bickford; the steel wire rope, ventilation appliances, gas and oil engines, electrical machinery, rock drills, etc. Prior to 1864 a sum of more than £4,000 had been awarded as premiums for inventions, exclusive of medals and other prizes.

The Society was the first institution to organise scientific education in the county; a considerable amount of valuable work of this nature was later carried out by the Miners' Association of Cornwall and Devon, which had its inception in the Society, under the superintendence of Robert Hunt, then the secretary of the Polytechnic Society. Evening classes for instruction in mining and allied subjects were instituted in many towns of Cornwall, the lecturers being Sir Clement le Neve Foster, J. H. Collins, Dr. Richard Pearce, and Benedict Kitto.

A Science School, established at the Polytechnic Hall, Falmouth, existed for many years and opportunities were afforded for exhibition of the work of its students.

The Falmouth Meteorological Observatory, established by the Board of Trade in 1867, was placed under the local control of the Polytechnic Society; grants for its maintenance being made by the London Meteorological Council from 1868 until 1921. The present Observatory building was erected by the Society in 1885, and through the generosity of the Royal Society and the British Association, a set of recording magnetographs was added to its equipment and it became one of the three magnetic observatories of England. Its work was carried out for many years under the superintendence of Edward Kitto, ably supported by Wilson Lloyd Fox. At the invitation of the Falmouth Council, responsibility for the control and maintenance of the Falmouth Museum has been assumed by the Society, and the exhibits have been transferred to the Polytechnic Hall.

During recent years the depression in the mining industry, resultant from the low market value of metals, has necessitated the suspension of operations at many of the Cornish mines. It is hoped, however, that the present higher price for metals will be maintained, in which case the prospect of considerable increase in mining activities appears promising. The Society watches this improvement with satisfaction and is ever ready to assist in the advancement of the interests of industry.

The Royal Cornwall Polytechnic Society has now completed its first hundred years' service in the interests of science and industry; and its centenary celebrations will take place on July 18-21 inclusive. The Royal Society, Royal Institution, Institution of Mining and Metallurgy, British Association, and other learned and professional bodies are sending delegates. The programme for the meeting includes visits to places of historical and geological interest, engineering works, etc., and papers presented by eminent men of science, including Sir John Cadman, Sir Richard Gregory, Sir William Napier Shaw, Dr. G. C. Simpson and Prof. S. J. Truscott. H. C. G. NEWTON.

William Froude (1810-1879)

THOUGH the name of William Froude has long been a household word among naval architects, and his methods of studying the resistance of ships have been adopted in all important maritime countries, yet it may safely be said that few who are familiar with his pioneering experiments know anything of his life and character. This is not to be wondered at for, so far, the only sources of information regarding him have consisted of brief sketches. There will therefore be many who will read with interest the presidential address delivered to the Devonshire Association at Ilfracombe on July 4 by Sir

Westcott Abell, who took for his theme "William Froude—His Life and Work".

Like Froude, Sir Westcott is a Devonshire man and for many years was in the service of the Admiralty. He has thus had ample opportunities of familiarising himself with the career of Froude. Froude was the fourth son of the rector of Dartington, near Totnes, and the brother of Richard Hurrell Froude (1803-1836) and James Anthony Froude (1818-1894). He was born at Dartington on November 24, 1810, and after attending a school at Buckfastleigh, he went to Westminster School and entered Oriel College, Oxford, in 1828.

Graduating in 1832, he took up civil engineering, and a few years later became assistant to Brunel. He retired from professional work in 1846 and for the next thirteen years lived with his father.

In 1859 Froude removed to Paignton and in 1867 to Chelston Cross, Cockington, near Torquay, and there, with funds provided by the Admiralty, built the first experimental tank. In 1878 he went for a cruise to South Africa in H.M.S. *Boadicea*, was stricken with dysentery and died on May 4, 1879, at Admiralty House, Simons Town, and was buried in the naval cemetery there. He had married in 1839 and had five children, of whom Richard Edmund Froude was his assistant and successor.

At Oxford, Froude had as tutor his brother Hurrell who, writing in 1831, remarked: "W. continues very steady, getting up at half-past five and working without wasting time till two or three." A little later Hurrell remarked that his brother's "interleaves and margins are scribbled over with lug sails".

The sea was in William's veins and by 1833 he had already begun his study of the resistance and propulsion of ships for which he is remembered. At Dartington in 1850 he made screw-propeller

tests on the River Dart above Totnes, and after his removal to Paignton, he made further experiments in a storage tank on the top of his house. Towing experiments with a steam boat were first made off Dartmouth in 1867.

Froude contributed the first of his papers to the Institution of Naval Architects in 1861 and there are, in all, seventeen papers by him in the *Transactions* dealing with the rolling of ships, propellers, resistance, horse power and other matters. It was largely through the instrumentality of Sir Edward Reed, then chief constructor of the Navy, that the experimental tank at Torquay was built. This was opened in 1871.

Froude's services were always given gratuitously although his son at the start received a salary of £150 a year. When asked whether his own services ought not to be remunerated, Froude said: "The value of such services enormously outruns any possible expenditure they may involve. The cost of a single disaster, the loss of the *Captain*, exceeds immeasurably any kind of expenditure that could be devoted to the improvement of the science of naval architecture."

Sir Westcott Abell's address, it may be added, includes lists of all the papers of Froude and his son to the Institution of Naval Architects.

News and Views

Beit Memorial Fellowships for Medical Research

At the annual meeting held on July 11 of the Trustees of the Beit Memorial Fellowships for Medical Research, an important change of policy was announced. The Trustees have decided to institute a professorial fellowship of tenure similar to that of a university chair. No award has yet been made. This action is the result of a proviso in the original trust deed, whereby the trustees are empowered, after the expiration of twenty years, to modify the regulations for the award of fellowships. When the Beit Memorial Trust was created, the opportunities for medical research in Great Britain were scanty; Sir Otto Beit's gift, followed by Lord Iveagh's benefaction for the building of the Lister Institute, enormously improved the situation. Then came further openings through the Medical Research Committee and its successor, the Medical Research Council. The late Sir Walter Morley Fletcher now became the dominant figure in the development of medical research, and the obituary notice of him which appeared in our issue of July 1 (p. 17) is the story of its progress. The policy of the Beit trustees has been to provide opportunities for junior workers, many of whom have passed into posts, such as chairs of physiology and pathology, where their research work could be continued. Prolonged clinical research has, however, not been provided for. The Medical Research Council has maintained a senior post for clinical research since 1916, the holder of which, Sir Thomas Lewis, has made noteworthy contributions to knowledge. This post has recently been endowed by the Rockefeller Founda-

tion and the Medical Research Council has created another. Now the Beit trustees are adding a third post, to be held at a medical centre in Great Britain where facilities for clinical research are available.

THE following elections have been made by the Trustees of the Beit Memorial Fellowships for Medical Research, the subject being indicated after the name:—*Senior Fellowship* (£700 a year): Dr. C. L. Cope, to continue work on the excretion of non-threshold substances and of sugars in nephritis (Medical Unit, St. Thomas's Hospital, London); *Fourth Year Fellowships* (£500 a year): Mr. J. McMichael, to continue researches on enlargement of the spleen in human disease and its relationship to diseases of the liver (Medical Unit, University College Hospital, London); Dr. J. N. Myers, to continue work on biochemical changes in hearts of guinea pigs poisoned by diphtheria toxin and also on the production of active immunity through the slow absorption of oil emulsions of bacterial toxins (Pharmacological Laboratory, University of Cambridge); Dr. C. A. Ashford, to continue studies of the utilisation of carbohydrate by brain tissue (Dunn Institute of Biochemistry, University of Cambridge); Dr. F. H. Smirk, to continue studies on water diuresis and the formation of œdema fluid, and to develop his urinary test for early renal damage in man (Medical Unit, University College Hospital, London); *Junior Fellowships* (£400 a year): Mr. A. S. McFarlane, for work on the physicochemical nature of protein solutions and of suspensions of bacteria by measurement of