Calendar of Industrial Pioneers.

March 2, 1892. Sir John Coode died.—A pupil of J. M. Rendel, Coode became resident engineer, and then engineer-in-chief, of the Portland breakwater, completed in 1872, and afterwards rose to be the most distinguished harbour engineer of his time. Among his greatest works were those at Cape Town, Fremantle, and Colombo. From 1889 to 1891 he served as president of the Institution of Civil Engineers.

March 3, 1895. Alfred Giles died. March 4, 1847. Francis Giles died.—Both the Giles, father and son, were successful civil engineers. Francis Giles was employed under Rennie, and later carried out various important harbour and canal works; while his son was largely concerned with railway projects in Denmark, France, Canada, Galicia, and other countries. In 1893 Alfred Giles was president of the Institution of Civil Engineers.

March 4, 1902. Bryan Donkin died.—The grandson of Bryan Donkin (1768–1855), known for his pioneering work in paper-making machinery, Donkin succeeded to the business founded by his grandfather. He was, however, best known for his study of thermodynamics and the scientific testing of steam engines, his investigation of steam jacketing and condensation, and his work on gas and oil engines.

March 6, 1900. Gottlieb Daimler died.—A native of Würtemberg, Daimler became a practical engineer, worked in England under Whitworth, and about 1870 became associated with the gas-engine pioneer Nicolas Otto. In the 'eighties he constructed small internal-combustion engines, one of which he fitted to a bicycle, and in 1890 he founded the Daimler Motorengesellschaft at Cannstadt, where he died.

March 7, 1809. François Blanchard died.—One of the most celebrated of the early aeronauts and a reputed inventor of the parachute, Blanchard made some sixty ascents. On January 7, 1785, with Dr. John Jeffries, he was the first to cross the Channel in a balloon. His wife, Sophie Armant, was also an intrepid aeronaut, and perished in a balloon accident in 1819.

March 8, 1803. Francis Egerton, Duke of Bridgewater, died.—The Duke of Bridgewater has been called the founder of British inland navigation. Succeeding to the family estates at an early age, he settled in Lancashire, and to develop his collieries engaged Brindley to construct the canal from Worsley to Manchester and that from Manchester to the Mersey, the first English canals.

March 8, 1887. James Buchanan Eads died.—Born in Indiana in 1820, Eads's whole life was bound up with the Mississippi. He made a fortune by raising steamboats sunk in the river, achieved a great reputation during the Civil War by the rapid construction of gunboats for its defence, in 1867–74 constructed the great steel arch bridge which spans it at St. Louis, and later originated the jetties at its mouth for improving the channel. He was the first American to be awarded the Albert medal of the Royal Society of Arts.

March 8, 1889. John Ericsson died.—A fertile inventor, a noted engineer, and one of the foremost constructors of warships, Ericsson was a native of Sweden. From 1826 to 1839 he was in England, where he produced the first steam fire-engine, constructed the locomotive "Novelty," and built the screw-driven vessel *Robert F. Stockton*. The remainder of his life was spent in America, where during the Civil War he inaugurated the era of the armoured turret battleship. The great fight between Ericsson's *Monitor* and the *Merrimac* took place on March 9, 1862. E. C. S.

Societies and Academies.

LONDON.

Royal Society, February 23.—Sir Charles Sherrington, president, in the chair.—C. D. **Ellis**: β-Ray spectra and their meaning. A method of finding the wave-lengths of γ-rays of too high a frequency to be measured by the crystal method depends on the fact that γ-rays are converted into β-rays according to the quantum relation. If the energies of the groups of electrons ejected by γ-rays be added to the work done in removing the electron from inside the atom to the surface, $h\nu$ is obtained. The work is found from observations of the energies of corresponding groups excited in different substances, and the method is applied to find the wave-lengths of the γ-rays emitted by radium B, radium C, and thorium D. The energies of the β-ray groups of thorium D have been measured for this purpose. The γ-rays are emitted from the nucleus and the numerical values of the wave-lengths suggest that the quantum dynamics applies to the nucleus and that part of the structure can be expressed in terms of stationary states. Suggestions for the energy of these stationary states in radium B and thorium D nuclei are given.—A. E. **Conrady**: A study of the balance. The first weighings by the Gaussian method of exchange made with an inexpensive analytical balance gave a probable error of only 0·004 mg. A constructional fault in the suspensions was remedied and the probable error fell to 0·0013 mg. A further systematic error, depending on the sequence of pointer readings in successive exchanges was attributed to imperfect elasticity and irregular curvature of knife-edges. A method of double exchange of loads which, by close adjustment of a light rider, caused all readings to fall on two alternating positions of rest, brought the probable error to 0·0008 mg., and it seemed now largely due to irregular air-currents. Arrangements allowing manipulation of loads without opening of balance case reduced the probable error to an average value of 0·0004 mg. If the centre of gravity of the moving parts falls in the supporting line of the central knife-edge ("autostatic" state), the reading of the pointer becomes independent of levelling of the balance case, and highly accurate results can be obtained on very infirm supports.—J. S. **Owens**: Suspended impurity in the air. The essential part of a new instrument for measuring impurities is a fine jet of air which strikes a glass surface with high velocity, depositing its dust thereon. The velocity of jet affects the operation of the instrument. The adhesion of dust to the glass has suggested applications which indicated (*a*) that visibility is usually a function of amount of suspended impurity; (*b*) that suspended dust travels over great distances; records being described of dust from the Continent; (*c*) that the microscopical examination of such records indicates differences depending upon wind direction.—R. V. **Southwell**: On the free transverse vibrations of a uniform circular disc clamped at its centre; and on the effects of rotation. An analysis of the influence of rotation upon the normal modes and frequencies of free transverse vibration in a uniform circular disc, complete freedom from constraint being assumed, is extended to cover the effects of constraints which prevent, along a small circle concentric with the free edge, the occurrence either of finite transverse displacement w, or of finite slope $\delta w/\delta r$. The constraints are assumed to have no effect upon the centrifugal stress-system. Clamping a non-rotating disc along a small circle produces only slight changes of frequency in modes characterised by two or more