Calendar of Industrial Pioneers.

April 20, 1821. Franz Karl Achard died.—Descended from a French protestant family, Achard was born in Berlin, worked at chemistry with Marggraf and became director of the physical department of the Berlin Academy of Sciences. He was a pioneer in the production of sugar from beetroot and in 1801 erected a sugar factory.

April 21, 1819. Oliver Evans died.—Born in Newport, Delaware, in 1755, Evans became a practical miller. He was the author of numerous improvements in milling, and his system was adopted both in America and Europe. He also experimented with high-pressure steam; in 1803 he began building steam engines, and the same year constructed a self-propelling dredging machine.

April 21, 1889. Robert Stirling Newall died.—The inventor in 1840 of iron wire ropes, Newall established works at Gateshead and became famous as a maker of submarine telegraph cables. The first successful cable between Dover and Calais was made by him in 1851, and he constructed half of the first Atlantic cable. He was also known as an astronomer, and presented one of his large telescopes to the University of Cambridge.

April 22, 1833. Richard Trevithick died.—One of the greatest engineers and the most fertile inventors of his day, Trevithick, like Evans, turned his attention to the use of high-pressure steam, constructed double-acting high-pressure engines, and between 1797 and 1808 made important experiments with locomotives. The son of a manager of a mine, Trevithick became chief engineer of some of the mines in Cornwall. In 1813 he erected some of his engines in Peru, where he resided about ten years.

April 22, 1864. Joseph Gilbert Totten died.—Trained as a military engineer at the West Point Academy, Totten rose to be colonel of the Corps of Engineers of the United States, and became known for his researches on the strength of materials and allied subjects, his work on the lighthouse board, and his investigation of New York harbour.

April 23, 1897. Adam Hilger died.—The founder of a firm of scientific instrument makers, Hilger was a native of Darmstadt. After being trained as a mechanical engineer he worked under Ertel in Munich and under Lerebours in Paris and about 1870 came to England. A few years later he set up in business for himself at Islington, becoming well known as a constructor of instruments for celestial spectroscopy.

April 25, 1840. Sir Robert Seppings died.—Master Shipwright at Chatham Dockyard, and then from 1813 to 1832 Surveyor of the Navy, Seppings introduced improved methods of docking and undocking ships, and was the inventor of the system of diagonally bracing and trussing the frame timbers of ships, an innovation of the first importance. He gave an account of his improvements to the Royal Society and was awarded the Copley medal.

April 26, 1893. Edward Alfred Cowper died.—An apprentice of John Braithwaite, Cowper afterwards worked with Fox and Henderson, and was employed on the buildings for the Great Exhibition of 1851. He then became a consulting engineer and was known for his work in connection with the development of the compound steam engine, his invention of the regenerative hot blast stove, and the introduction in 1868 of the modern bicycle wheel with wire-spoke suspension. In 1880 he was elected President of the Institution of Mechanical Engineers.

E. C. S.

Societies and Academies.

LONDON.

Royal Society, April 6.—Sir Charles Sherrington, president, in the chair.—F. E. **Smith**: On an electromagnetic method for the measurement of the horizontal intensity of the earth's magnetic field. A Helmholtz-Gaugain arrangement of coils consisting of two interwoven helices of bare copper wire wound in spiral grooves in a marble cylinder are mounted on each side of the centre. Each coil is of 30 cm. radius, of six turns, and of $1\frac{2}{3}$ mm. pitch. The cylinder is mounted on a non-magnetic base, and can be rotated about a vertical axis. The magnet at the centre is 1 cm. long and about 6 sq. mm. in cross-section; it is supported on a V of aluminium foil by a fine quartz fibre, to which is attached a reflecting mirror and a damping vane. The magnet is easily removed from its support, and a copper wire of equal weight substituted. The axial magnetic field due to the current in the coils is made slightly greater than "H," and its component in the magnetic meridian opposes H. By adjustment of the angle α between the axis of the cylinder and the direction of magnetic north, the indicator magnet is caused to set at right angles to the meridian. When torsion is eliminated, $H = Fi \cos \alpha$, where F is constant of coil system and i is current. A determination of H occupies less than 4 minutes. The probable error, including that due to uncertainty of the value of the current, measured by a current balance, is about ± 4 in 100,000.—G. I. **Taylor**: Stability of a viscous liquid contained between two rotating cylinders. Steady motion of viscous liquid between two concentric rotating cylinders is unstable for symmetrical disturbances, provided the velocity of the system is greater than a certain value, and the ratio of angular velocities of the cylinders is less than the reciprocal of the square of the ratio of their radii, or is negative. The type of instability is periodic along the length of the cylinders, consisting of vortices enclosed in partitions rectangular in section, and they rotate alternately in opposite directions. When the cylinders rotate in the same direction each vortex extends across the space between the cylinders. The length occupied by each vortex is equal to the thickness of fluid between them. When the cylinders rotate in opposite directions, two systems of vortices rotating as though geared together appear. Some criteria for stability in approximate form suitable for numerical computation have been obtained.—T. H. **Havelock**: Dispersion formulæ and the polarisation of scattered light; with application to hydrogen. Simple types of dispersion formulæ are considered when the medium consists of anisotropic molecules distributed at random and having an axis of symmetry. A formula for the corresponding ratio of the intensities of the two polarised components of light scattered at right angles, when the primary light is unpolarised, is given. The case of hydrogen is examined numerically and the ratio of the intensities agrees substantially with Lord Rayleigh's experimental value.—G. R. **Goldsbrough**: The cause of Encke's division in Saturn's ring. A satellite will, from its inclined path alone, produce one new division in the ring system. If the satellite be Mimas, a narrow division closely corresponding to Encke's division is produced. Similarly, Enceladus should produce a division in Ring B, but it would be almost unobservable.—C. **Spearman**: Correlation between arrays in a table of correlations. Correlations between arrays are expressed as functions of the independent variable elements entering into the main variables. When only one element is common