Calendar of Industrial Pioneers.

October 15, 1889. Sir Daniel Gooch died.—An eminent locomotive engineer and industrial administrator, Gooch served an apprenticeship in Stephenson's works at Newcastle, and at the age of twenty-one became locomotive superintendent to the Great Western Railway. He invented the Gooch link gear, experimented on the resistance of the atmosphere to trains in motion, designed a self-registering dynamometer, and built many fine broad-gauge engines. After resigning his position, he played an important part in the establishment of telegraphic communication between England and America, and from 1865 to 1887 was chairman of the Great Western Railway.

October 17, 1907. Gustav Adolf Zeuner died.—Born in Chemnitz, November 30, 1828, and educated at the Mining Academy at Freiberg, Zeuner as a professor of engineering did important work at Zurich, Freiburg, and Dresden, while his writings were highly valued by engineers. He founded the German journal *Zivilingenieur*, and he was widely known for his works on value gear and on technical thermodynamics.

October 18, 1903. Gordon McKay died.—The most successful inventor of boot-sewing machinery, McKay, who was born in Massachusetts in 1818, made an immense fortune which he bequeathed to Harvard University for science professorships and laboratories.

October 18, 1918. Marcel Deprez died.—For nearly forty years Deprez devoted himself to the application of electricity to industrial purposes. He solved many of the problems connected with the transmission of high-tension electricity, invented the compound winding for dynamos and devised measuring instruments. From 1890 he was professor of industrial electricity at the Conservatoire des Arts et Métiers.

October 19, 1749. William Ged died.—The inventor of stereotyping, Ged was born in 1690 and became a goldsmith in Edinburgh. In 1725 he took out a patent for developing Van de Mey's idea of substituting for movable type solid plates cast from type, and four years later he endeavoured without success to introduce his methods in London. His subsequent career was one of disappointment, and he died in poverty.

October 19, 1897. George Pullman died.—Pullman, to whom the world owes the modern railway carriage, was born in 1831 in New York State, and in 1859 settled at Chicago, where he began experimenting on the construction of sleeping-cars, his first successful car, the "Pioneer," being built in 1863 at a cost of 3000*l*.-4000*l*. The Pullman Palace Car Company was founded in 1867; extensive works were laid out in 1879, and at the time of Pullman's death more than 15,000 men were employed in them. The sleeping-car was introduced into England in 1875.

October 21, 1896. James Henry Greathead died.—Trained as a civil engineer under Barlow, Greathead devised the "Greathead" shield, which has since been extensively used for driving tunnels.

October 21, 1902. Sidney Howe Short died.—Regarded as one of the most brilliant electrical engineers of his day, Short was a native of Columbus, Ohio, where he was born, October 8, 1858. Educated at the Ohio State University, at the age of twenty he succeeded Mendenhall as professor of physics there, and two years afterwards removed to Denver, Colorado. Resigning his chair in 1885, he took up practical work and did pioneer work in connexion with electric railways.

E. C. S.

Societies and Academies.

SWANSEA.

Institute of Metals, September 22.—F. L. **Brady**: The structure of eutectics. An attempt has been made to correlate the micro-structure of solidified eutectics, mainly those between metals and metallic compounds, with the physical properties of the component metals. The surface tension of the molten metal and the cohesive force acting during crystallisation seem to be the main forces influencing the final structure. The eutectics examined fall into three classes: "globular," "lamellar," and "angular." The structures agree with what would be expected from theoretical considerations of the effects of surface tension and cohesion.—M. **Cook**: The antimony-bismuth system. The two metals form an isomorphous series of alloys. The liquidus curve is perfectly smooth and the solidus is horizontal at 270° C. up to 60 per cent. of antimony, after which it rises steeply to the freezing-point of antimony. Chill-cast and slowly cooled specimens reveal duplex structures, but with prolonged annealing—550 hours at 275° C.—the alloys become homogeneous. Twin crystals and peculiar banded effects were observed in some of the annealed specimens. Possibly the twin crystals are formed during solidification of the alloy by stresses due to expansion, and grew on annealing. The nature of the "bands" has not been definitely ascertained, though they are not considered to be slipbands.—A. **Jefferson**: The cause of red stains on silver-plated work. The Sheffield Silver Trade Technical Society appointed a committee to examine this subject. It was established experimentally that the red stain is caused by the indiscriminate use of rouge in the finishing and polishing processes, through the absorption of the rouge into the open pores of the heated surface, the heat being evolved by the friction of the hand or finishing "dolly."—Q. A. **Mansuri**: Intermetallic actions. The system thallium-arsenic. By thermal and microscopic analysis it was shown that thallium and arsenic do not act chemically with each other nor do they form solid solutions; they alloy in all proportions. Arsenic dissolves in molten thallium and lowers its freezing-point until a solution of 8·01 per cent. arsenic freezes at the eutectic temperature of 215° C. Then the freezing-points of the alloys rise gradually to 240° C. All alloys containing from 13 to about 40 per cent. arsenic begin to freeze at 240° C. and are made up of two layers—the upper layer rich in arsenic while the lower rich in thallium. Beyond 40 per cent. arsenic, to nearly pure arsenic, the solution is uniform and the two layers disappear. By heating such substances in evacuated, sealed glass tubes and applying the hot junction of the couple in close contact with the outside of the glass tube, the couple is almost as sensitive as when dipped in the molten substance.—F. **Johnson** and W. **Grantley Jones**: New forms of apparatus for determining the linear shrinkage and for bottom-pouring of cast metals and alloys, accompanied by data on the shrinkage and hardness of cast copper-zinc alloys. The shrinkage values of chill-cast copper-zinc alloys were higher in general than those obtained for sand-cast bars by previous investigators. Pure electrolytic metals were used, and most of the alloys were poured at a temperature interval of approximately 115° C. above their liquidi, the mould being kept at a constant temperature by a jacket of water maintained at the boiling-point. The bottom-pouring apparatus has the advantage of (*a*) control of pouring temperature; (*b*) facility for registering temperature of metal; (*c*) absence of delay between attainment of required pouring-temperature and release of metal into the