Calendar of Industrial Pioneers.

October 1, 1838. Charles Tennant died. — The founder in 1797 of famous chemical works at St. Rollox, Glasgow, Tennant while manager of a bleaching field near Paisley discovered a method of controlling chlorine gas by the admixture of lime. He introduced the manufacture of chloride of lime in a solid state, to which he gave the name bleaching powder. His production of bleaching powder in 1799–1800 was 52 tons, the price being 140*l.* per ton. By 1835 the St. Rollox works had become the most important chemical works in the world.

October 2, 1804. Nicolas Joseph Cugnot died.—A military engineer and the author in 1766 of "Éléments de l'art militaire ancien et moderne," Cugnot in 1769 made the first steam-propelled road carriage, and two years later built a steam tractor for the French Government for hauling artillery. This vehicle was to carry a load of 4½ tons at 2¼ miles per hour. Though never used, this carriage is preserved in the Conservatoire des Arts et Métiers.

October 3, 1867. Elias Howe died.—One of the chief pioneers of the sewing machine, Howe was the son of a farmer of Spencer, Massachusetts, and was born in 1819. He began work on the sewing machine in 1841, took out a patent in 1846, and was one of the first inventors to place the eye of the needle towards the point.

October 4, 1821. John Rennie died.—Acknowledged as the greatest civil engineer of his day, Rennie was the builder of the London Docks, the East India Docks, the Plymouth Breakwater, Waterloo and Southwark Bridges, and he prepared designs for London Bridge. He was born at Phantassie, East Lothian, in 1761, gained practical experience under Andrew Meikle, attended the lectures of Robison and Black, and in 1789 erected the Albion Mills for Boulton & Watt, in London, the site of which was afterwards occupied by Rennie's workshops. He is buried in St. Paul's Cathedral.

October 5, 1892. Alexander Carnegie Kirk died.—The author of many improvements in marine engineering, Kirk, after gaining experience at Maudslay's and at Elder's, became a partner in 1877 in the firm of Napier. He was especially known for his advocacy of high steam pressure and the triple-expansion engine, the advantages of which were demonstrated in the s.s. *Aberdeen* built by him in 1882, which on a voyage to Australia showed a saving of 500 tons of coal.

October 6, 1905. Charles Brown died.—Brown has been called the founder of mechanical industry in Switzerland. Brought up in London, in 1851 at the age of 24 he entered the service of Sulzer Brothers, a firm of mechanical engineers at Winterthur. He established afterwards the Swiss locomotive works at Winterthur and also played a prominent part in the creation of the Swiss electrical industry.

October 7, 1908. Jean Baptiste Gustave Adolphe Canet died.—A distinguished armament engineer, Canet was trained at the École Centrale des Arts et Manufactures, fought in the Franco-German War, and for a time engaged in railway engineering. From 1872 to 1881 he was associated with Vavasseur at the London Ordnance Works, and in 1876 brought forward his theory of hydraulic brakes for checking the recoil of guns. Returning to France he became the head of armament works at Havre and after the amalgamation of these works with those of Schneider at Creusot became manager.

E. C. S.

Societies and Academies.

SWANSEA.

Institute of Metals, September 20.—G. D. **Bengough** and J. M. **Stuart**: The nature of corrosive action, and the function of colloids in corrosion (Sixth Report to the Corrosion Research Committee of the Institute).—Sir Henry **Fowler**: The effect of superheated steam on non-ferrous metals used in locomotives. Superheated steam as used on locomotives generally leaves the superheater at a temperature of 340° C. On the Midland Railway, piston tail rod bushes were made of M.R. A.1 alloy (copper, 87; tin, 9; zinc, 2; lead, 2). A phosphor bronze (copper, 88; tin, 11; phosphorus, 1) has been found satisfactory. For piston rod packing, McNamee rings (copper, 75·5; tin, 8·5; zinc, 0·33; phosphorus, trace; nickel, 0·5; lead, 15·0) are used satisfactorily. These rings prevent the steam coming into contact with the white metal (lead, 70; antimony, 30) packing rings. With the temperature rising to 425° C. the packing rings may fuse. Piston valve fittings and cylinder relief valves are made of alloy M.R. A.1. For by-pass valves which are subjected to shock, a nickel-brass gave good service, but was replaced for economy by malleable iron or steel castings.—A. H. **Mundey**, C. C. **Bissett**, and J. **Cartland**: White metals. The manufacture and use of white metal for industrial purposes is described, and constitution and microstructure are dealt with only so far as the uses and manufacture are concerned. Antifriction or bearing metal, printing alloys, die-casting alloys, metals for chemical works castings, solders, are discussed.—J. H. **Andrew** and R. **Higgins**: Grain-size and diffusion. Diffusion at high temperatures may take place simultaneously with grain-growth, while at low temperatures it promotes a breakdown in the grain-size. These results have been applied to the annealing treatment of castings. It has been assumed that in the interior of the crystalline grains the system of closest packing holds, while at the boundaries the atoms in the separate grains touch only at one part of the circumference. This explains the decrease in specific gravity with an increase in the number of grains, for in such an arrangement free spaces occur. Plastic deformation, by shifting some of the atoms from their positions of equilibrium, will cause them to rearrange themselves when heated to a sufficiently high temperature. This rearrangement will be such that the stressed atoms will fall in, row for row, with the unstrained atoms of the adjacent crystal. This effects a gradual migration of the grain boundary which, proceeding from every side of a crystalline unit, may result in one grain being divided up and absorbed by others. The final bounding surface will result when the boundary configuration is reached.

PARIS.

Academy of Sciences, August 28.—M. L. Maquenne in the chair.—L. **Mangin** and N. **Patouillard**: The destruction of the woodwork at the château of Versailles by *Phellinus cryptarum*. A detailed examination of the oak beams showed a varied fauna and flora, but *Phellinus cryptarum* is mainly responsible for the damage. This fungus has not hitherto been regarded as destructive to wood.—Jacques **Chokhate**: The development of the integral $\int_a^2 \frac{p(v)}{x-y}.dy$ as a continued fraction.—Ch. N. **Moore**: The equivalence of the methods of summation of Cesàro and of Holder for multiple limits.—Nilos **Sakellariou**: Polar systems.—Amédée **Béjot**: Placing in reciprocal