Calendar of Discovery and Invention.

April 17, 1823.—Though Dalton in 1801 had remarked, "There can scarcely be a doubt entertained respecting the reducibility of all elastic fluids of whatever kind into liquids, and we ought not to despair of effecting it in low temperatures and by strong pressures exerted on the unmixed gases," it was not until 1823 that the question was submitted to systematic experiment. Faraday then first obtained liquid chloride and afterwards liquid carbonic acid, ammonia, etc. The details of this work were given to the Royal Society by Faraday in two papers dated Mar. 13 and April 10, and on April 17, Davy in another paper suggested the employment of some of these substances as mechanical agents.

April 17, 1891.—Mechanical traction on common roads long met with opposition from the authorities, and it was an important gain when on April 17, 1891, Leon Serpollet received authorisation to place his steam cars on the streets of Paris.

April 19, 1758.—On this day John Dollond obtained a patent for his achromatic telescope, and that same year he received the Copley Medal "for his curious experiments and discoveries concerning the different refrangibility of the rays of light," communicated to the Royal Society.

April 21, 1686.—As is well known, the publication of Newton's "Principia" was mainly due to Halley. On April 21, 1686, Halley read "A Discourse concerning Gravity" to the Royal Society as preparation for the "incomparable treatise of motion almost ready for the press"; six days later, Dr. Vincent presented to the Society the manuscript of the first book of the "Principia," and on May 19 the Society resolved that "Mr. Newton's Philosophiæ Naturalis Principia Mathematica be printed forthwith in quarto, in a fair letter."

April 21, 1783.—One of the great scientific controversies of the eighteenth century concerned the discovery of the composition of water. The experiments of Cavendish were described in a paper in January 1784, but Watt, so early as April 21, 1783, had written to Black, "In the deflagration of inflammable and dephlogisticated airs, the airs unite with violence—become red hot,—and on cooling totally disappear. The only fixed matter which remains is water, and water, light, and heat are all the products. Are we not then authorised to conclude that water is composed of dephlogisticated and inflammable air?"

April 22, 1663.—The first Charter of Incorporation of the Royal Society was granted in 1661, but it having been found that this failed to give the Society certain privileges essential to its welfare, a second charter was obtained, the patent for which was dated April 22, 1663.

April 23, 1868.—In a paper read to the Royal Society on April 23, 1868, Huggins described the first successful investigation of the motion of the stars in the line of sight by the application of Doppler's principle, announced in 1842.

April 23, 1884.—It is estimated that the development of the steam turbine has halved the cost of the generation of electricity. Though there had been many earlier inventions, no advance was made until 1884, when de Laval and Sir Charles Parsons secured their patents. The patents of Parsons, Nos. 6734 and 6735, taken out on April 23, 1884, were for "improvements in electric generators and in working them by fluid pressure" and for "improvements in rotary motors actuated by elastic fluid pressure, and applicable also as pumps."

E. C. S.

Societies and Academies.

LONDON.

Institute of Metals (Annual General Meeting), Mar. 9.—D. **Hanson** and Grace W. **Ford**: Investigation of the effects of impurities on copper. Pt. v.—The effect of bismuth on copper. Experiments on copper containing up to 0·1 per cent. of bismuth confirm the great embrittling effect of bismuth, and indicate that when more than a trace of bismuth alone is present in copper, the working properties, particularly the cold-working properties, are seriously affected. The solid solubility of bismuth in copper has also been investigated.—Clement **Blazey**: Brittleness in arsenical copper. A description is given of a type of brittleness in arsenical copper tubing developed by annealing in the temperature range 450° to about 650° C. The susceptibility to brittleness was inherent in the 'as cast' billets from which the tubes were made, and no alteration in hot and cold working methods could eliminate it. The degree of susceptibility varied from billet to billet, but the variation could not be connected with chemical composition. After remelting, no trace of brittleness could be developed. Over a period of several years the brittleness was encountered in a certain mill on three occasions, and appeared to be connected with the composition of the refinery charges and with melting operations.

Mar. 10.—R. **Genders**: The penetration of mild steel by brazing solder and other metals. The cracking of mild steel under slight stress when heated and wetted with brazing solder is due to rapid intercrystalline penetration of the steel by the brass. Copper behaves similarly to brass, but zinc, tin, and lead-tin solder have no perceptible action. The phenomenon of intercrystalline penetration is in many cases of a complex character, involving a third factor.—H. J. **Miller**: The penetration of brass by tin and solder, with a few notes on the copper-tin equilibrium diagram. The cracking of stressed brass articles by a process of intercrystalline penetration when in contact with molten solder of the tin-lead variety is associated with the phenomenon of 'season-cracking' and the penetration of mercury into brass. Tensile tests upon brass test-pieces surrounded by various molten metals and solders indicate that the stress required for penetration to take place is much higher than that required for the penetration of mercury. The eutectic composition of the series copper-tin alloys occurs with about 0·7 per cent. of copper as against 1 per cent. by Heycock and Neville, 2 per cent. by Guertler, Shepherd, and Blough, and 5 per cent. by Giolitti and Tavanti.—Harold J. **Hartley**: The attack of molten metals on certain non-ferrous metals and alloys. Penetration of the molten into the solid material occurs when the latter is stressed in tension. Fully annealed materials are attacked at very low stresses with ultimate breakdown.—H. **Moore** and S. **Beckinsale**: Notes on the manufacture and properties of hairsprings. To raise the elastic limit to the required degree, hardening by heat-treatment or by cold-working is necessary, but all hardening operations are liable to produce a state of imperfect elasticity detrimental to the spring. The use of low-temperature heat-treatments to restore elasticity after cold-working (drawing, rolling, and the coiling of the spring) is described. Steel hairsprings are subject to corrosion, but elinvar is highly resistant.—F. **Hargreaves**: (1) The application of strain methods to the investigation of the structure of eutectic alloys. Investigation of the lead-tin, tin-zinc, and copper-silver eutectics shows that straining by suitable methods results in markings due to slip,