

Calendar of Industrial Pioneers.

October 29, 1874. John Laird died.—One of the chief pioneers of iron shipbuilding, Laird, who was born in Greenock in 1805, was the son of William Laird, who established a boiler-making works at Birkenhead. As a partner with his father, in 1829 he built an iron lighter of 60 tons, and in 1833 built the iron paddle steamer *Lady Lansdowne*. Laird also built the first iron vessel in the Royal Navy, and in 1839 built the *Nemesis* for the East India Company, the first iron steamer to carry a gun and to steam round the Cape. The famous Birkenhead Iron Works were established by him.

October 30, 1823. Edmund Cartwright died.—The inventor of the power loom, which he brought out in 1785, Cartwright was born in the Midlands in 1743, was a student of University College, Oxford, and entered the Church. While holding the living of Goadby-Marwood in Leicestershire a visit to Arkwright at Matlock turned his attention to weaving, and within a year he had made the great invention by which he is remembered. His loom was employed but little till the 19th century, but in 1809 he was granted a sum of 10,000*l.* by Parliament. Cartwright also made improvements in woolcombing and in agriculture, and assisted Fulton in some of his experiments in steam navigation.

October 30, 1880. Sir Thomas Bouch died.—Born in Cumberland in 1822, Bouch was trained as a railway engineer and in 1849 became manager of the Edinburgh and Northern Railway. He constructed some 300 miles of railway, instituted steam ferries on the Forth and Tay, and between 1870 and 1877 built the first Tay Bridge, nearly two miles long. This bridge consisted of 85 spans, some of the wrought-iron lattice girders being 245 feet long. It was completed in September 1877, and opened for traffic in May 1878. During a hurricane on the evening of December 28, 1879, the central portion with an entire train and 70 passengers fell into the Tay.

October 30, 1898. Josiah Latimer Clark died.—A distinguished electrical engineer, Clark began life as a chemist, and after engaging in railway work, in 1850 joined the Electric and International Telegraph Company. His principal work lay in the field of submarine telegraphy and he was concerned with the laying of many cables, mainly in the East. He was also an original investigator, assisted to found the Institute of Electrical Engineers, and in 1874-75 served as president.

November 1, 1856. John Urpeth Rastrick died.—Trained under his father as a mechanical engineer, Rastrick took an important part in introducing railways into the country. He effected improvements in locomotives, was one of the judges at the Rainhill trials of 1829 who decided in favour of Stephenson's *Rocket*, assisted Stephenson to survey the Birmingham and Manchester Railway, and with Sir John Rennie was engineer to the London and Brighton line.

November 4, 1917. William Du Bois Duddell died.—Recognised as a brilliant investigator of electrical phenomena, Duddell was trained as an engineer at Colchester and then worked under Ayrton at the Central Technical College, London. His discovery of the singing arc formed the starting point in the development of the Poulsen arc, while his oscillograph marked an epoch in the experimental investigation of alternating current phenomena. He was a Fellow of the Royal Society and served as president of the Röntgen Society and of the Institution of Electrical Engineers.

E. C. S.

Societies and Academies.

LONDON.

Optical Society, October 12.—Prof. F. J. Cheshire, vice-president, in the chair.—L. C. Martin: A physical study of coma. A specially designed microscope objective and mounting, calculated to exhibit coma in the absence of spherical aberration and astigmatism, are described. Photographs of a star image, taken when the amount of coma is equivalent to that for which the light distribution has been calculated, verify the numerical work. The photometric examination of the photographic image is carried out by a special method.—F. W. Preston: Comparison of the structure of sand-blasted and ground glass surfaces. Glass surfaces smoothed or "greyed" by loose abrasives in the usual way are compared with those produced by sand blasting. The surfaces are practically indistinguishable either by the naked eye or the microscope, and the development of the structure by etching shows that the structure is virtually identical. Thus it appears that mere pounding of a glass plate can, and does, produce a surface which is structurally indistinguishable from a smoothed surface of a technical order.

PARIS.

Academy of Sciences, September 18.—M. Emile Roux in the chair.—L. Cuénot and Raymond Poisson: The development of some coaptations of insects. Coaptations are defined as mechanical arrangements formed by the reciprocal adjustment of two independent parts, like a key and a lock. Examples of such processes are given from *Nepa cinerea* and *Ranatra linearis*.—L. G. Du Pasquier: The arithmomy of quaternions.—Jean Rey: The probability of illuminating an aeroplane by the beam from an electric projector.—A. Sanfourche: The reactions between the gaseous oxides of nitrogen and alkaline solutions. The reaction generally assumed to take place occurs only when the alkali is in excess at every point. If there is any local deficiency of alkali, the gas reacts with water producing nitric acid and nitric oxide. Sulphuric acid is preferable as an absorbent.—Paul Riou: The velocity of absorption of carbon dioxide by ammoniacal solutions. Experimental results on the velocity of absorption of carbon dioxide by solutions of ammonium carbonate, with varying concentrations of salt and with varying temperatures.—P. Russo: New indications of the Trias in eastern Morocco.—Jean Bathellier: The rôle of the soldiers in *Eutermes matangensis*. In fighting, the soldiers of this species eject a sticky fluid, insoluble in water, which rapidly reduces their opponents to immobility. If the nest is broken, the workers are protected during the process of reconstruction by a line of soldiers, which follows the contour of the gallery under repair.—F. Dienert and P. Etrillard: The possibility of the existence of organisms in rocks capable of reviving after sterilisation by heat. A repetition of some experiments by M. Galippe. The results of M. Galippe were not confirmed: the rocks were sterile after prolonged heating to 180° C.

September 25.—M. L. Maquenne in the chair.—The Perpetual Secretary announced the death of M. Battandier, correspondant for the section of Botany.—P. Urysohn: The ramification of the Cantorian lines.—M. Seigle: The principal characteristics of mild steel bars previously broken by traction. It has been generally held that a steel hardened by extension is breakable and dangerous to use. Tests

on bars of mild steel broken by pulling show that this view is not exact. Details of the various tests to which the bars were submitted are given.—P. Chevenard: Nickel alloys retaining their rigidity over an extended temperature range. The alloy in the form of wire was heated to a constant temperature and loaded with a weight: an automatic arrangement recorded photographically the elongation as a function of the time. Curves are given for nickel, electrolytic iron, and for four alloys. A nickel-chromium-tungsten alloy was the most resistant to high temperatures.—L. J. Simon: The direct oxidation by oxygen or air of the esters of the alcohol acids. Methyl, ethyl, butyl, and amyl lactates when heated in a current of air undergo oxidation, giving the pyruvates in notable proportion. Ethyl glyoxylate can similarly be recognised as one of the products of oxidation by air of ethyl glycolate.—E. Fournier: The nature and structure of the strata pierced by an experimental boring at Chazelot (near Rougemont) carried to a depth of 700 metres.—L. Eblé: Magnetic measurements in the Paris basin. The results given for 41 stations form part of a new magnetic survey of France. The secular variation of the magnetic elements between January 1, 1896, and January 1, 1922, was practically the same for all the stations; the mean values were: declination $-2^{\circ} 58'$, inclination $-0^{\circ} 32'$, horizontal component $+0.0014$. These are almost exactly the values obtained at the central station of Val-Joyeux.—Marcel Mirandé: The influence of light on the formation of anthocyanine in the scales of the bulbs of lilies. It has been shown experimentally that the only radiations taking an active part in the reddening of the scales are those in the luminous part of the spectrum: there is a first maximum effect in the red, a much more important maximum in the indigo blue, and a minimum in the green.—L. Berger: The existence of an ovarian gland, homologous with the testicular interstitial gland.—L. Carrère: The dilator of the pupil in the selacians.—Paul Wintrebert: The cartilaginous pterygoid in the urodeles.

SYDNEY.

Royal Society of New South Wales, September 6.—Mr. C. A. Sussmilch, president, in the chair.—R. H. Cambage: *Acacia* seedlings, Pt. VIII. A number of seedlings of different species were described. A seed of *Acacia melanoxylon* germinated after having been continuously immersed in sea water for five years. The phyllodes of various species of *Acacia*, such as *A. conferta*, *A. elongata*, *A. floribunda*, and *A. longifolia*, close up towards the stem at night.—M. B. Welch: Relationship between oil glands and oil yields in the Eucalyptus. Measurements made of the oil glands in the leaves of different Eucalypts show that the oil yield on distillation is not absolutely dependent on the number and size of the oil glands.—S. Dodd: Poisoning of sheep by *Solanum cinereum*. Feeding experiments proved the berries to be very poisonous. The active principle is probably solanin. Half a pound of dried ripe berries given whole were innocuous, but the same amount mashed with water caused death to sheep in six hours. The probable reason for this is that when dry and whole they passed into the rumen, where they became mixed with other food; at the end of each rumination the total amount of fruits re-swallowed was insufficient to produce poisoning. In the other case the soluble alkaloid passed direct into the digestive stomach, etc., and the amount absorbed, being lethal, death resulted.

NO. 2765, VOL. 110]

Diary of Societies.

MONDAY, OCTOBER 30.

ROYAL COLLEGE OF SURGEONS OF ENGLAND, at 5.—Prof. Shattock: Specimens of Foreign Bodies.

ROYAL PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN, at 7.—W. B. Appleton: Past and Present Methods of making Photographic Lenses.

TUESDAY, OCTOBER 31.

ROYAL HORTICULTURAL SOCIETY, at 3.—C. T. Musgrave: Methods of Propagation in an Amateur's Garden.

WEDNESDAY, NOVEMBER 1.

SOCIETY OF PUBLIC ANALYSTS AND OTHER ANALYTICAL CHEMISTS (at Chemical Society), at 8.—C. Ainsworth Mitchell: The Colorimetric Estimation of Pyrogallol, Gallotannin, and Gallic Acid.—Dr. H. E. Annett and M. N. Bose: The Estimation of Narcotine and Papaverine in Opium.—J. R. Nicholls: The Estimation of Morphine.—R. L. Morris: Further Notes on the Estimation of Potassium; by Perchlorate and Cobaltinitrite Methods.

THURSDAY, NOVEMBER 2.

ROYAL SOCIETY, at 4.30.—*Probable Papers*.—Lord Rayleigh: Polarisation of the Light scattered by Mercury Vapour near the Resonance Periodicity.—Prof. G. P. Thomson: The Scattering of Hydrogen Positive Rays and the Existence of a powerful Field of Force in the Hydrogen Molecule.—H. D. Smyth: A new Method for studying Ionising Potentials.—I. Backhurst: Variation of the Intensity of reflected X-radiation with the Temperature of the Crystal.—S. Data: The Absorption Spectrum of Potassium Vapour.—K. R. Ramanathan: The Molecular Scattering of Light in Vapours and in Liquids and its Relation to the Opalescence observed in the Critical State.

LINNEAN SOCIETY, at 5.

ROYAL COLLEGE OF PHYSICIANS, at 5.—Sir Maurice Craig: Mental Symptoms in Physical Disease (Bradshaw Lecture).

ROYAL AERONAUTICAL SOCIETY (at Royal Society of Arts), at 5.30.—Major A. R. Low: A Review of Airscrew and Helicopter Theory, with Aeroplane Analogies.

CHILD-STUDY SOCIETY (at Royal Sanitary Institute), at 6.—Dr. P. B. Ballard: A Defence of Mental Tests.

INSTITUTION OF ELECTRICAL ENGINEERS, at 6.—F. Gill: Inaugural Presidential Address.

CHEMICAL SOCIETY, at 8.—N. V. Sidgwick and W. M. Dash: The Solubility and Volatility of the Nitrobenzaldehydes.—R. H. Pickard, J. Kenyon, and H. Hunter: Investigations on the Dependence of Rotatory Power on Chemical Constitution. Part XIII. The Spatial Configuration of the Unbranched Aliphatic Chain.—J. Kenyon and R. A. M'Nicol: Investigations on the Dependence of Rotatory Power on Chemical Constitution. Part XIV. The Normal Aliphatic Ethers of d - β -octanol.—H. Phillips: Investigations of the Dependence of Rotatory Power on Chemical Constitution. Part XV. The Normal Aliphatic Ethers of d -methylbenzylcarbinol.—H. Phillips: Investigations on the Dependence of Rotatory Power on Chemical Constitution. Part XVI. A new type of Walden Inversion.—L. Hall: Investigations on the Dependence of Rotatory Power on Chemical Constitution. Part XVII. The di - d - β -octyl Esters of the Acids of the General Formula $(CH_2)_n(COOH)_2$.—F. L. Pyman: Orientation of the 1:4 and 1:5-dimethylglyoxalines. Mode of Fission of 5-aminoglyoxalines.—L. Light and F. L. Pyman: Bromo-derivatives of 2-methylglyoxaline.

INSTITUTION OF BRITISH FOUNDRYMEN (at Institute of Marine Engineers), at 8.—F. A. Melmoth: Notes on the Development of the Manufacture of Steel Castings.

FRIDAY, NOVEMBER 3.

INSTITUTION OF MECHANICAL ENGINEERS, at 6.—Sir Frank Baines: Repairs to the Roof of Westminster Hall.

JUNIOR INSTITUTION OF ENGINEERS, at 7.30.—T. H. Sanders: Laminated Springs.

PUBLIC LECTURES.

SATURDAY, OCTOBER 28.

HORNIMAN MUSEUM (Forest Hill), at 3.30.—F. Balfour-Browne: The Life and Habits of Mason Wasps.

MONDAY, OCTOBER 30.

CITY OF LONDON Y.M.C.A. (186 Aldersgate Street), at 6.—Sir William M. Bayliss: The Unity of the Human Body.

WEDNESDAY, NOVEMBER 1.

UNIVERSITY COLLEGE, at 5.30.—Dr. P. Harting: Holland, the Land and its People.—S. Jones: Some Recent Results in Experimental Phonetics.

THURSDAY, NOVEMBER 2.

FINSBURY TECHNICAL COLLEGE, at 4.—Prof. C. H. Desch: The Metallurgical Chemist (Streetfield Memorial Lecture).

UNIVERSITY COLLEGE (in Physics Lecture Theatre), at 5.30.—Prof. E. G. Coker: Recent Photo-Elasticity Researches in Engineering Problems.

CITY OF LONDON Y.M.C.A. (186 Aldersgate Street), at 6.—Prof. H. Maxwell-Lefroy: How Insect Pests are tackled.

FRIDAY, NOVEMBER 3.

BEDFORD COLLEGE FOR WOMEN, at 5.30.—Miss C. A. J. Skeel: Ancient Tavel.

UNIVERSITY COLLEGE, at 8.—Prof. G. Dawes Hicks: The Philosophy of Religion. Succeding Lectures on November 10, 17, 24, December 1 and 8.

SATURDAY, NOVEMBER 4.

HORNIMAN MUSEUM (Forest Hill), at 3.30.—E. Lovett: The Folklore of the Cat.