

Calendar of Discovery and Invention.

October 2, 1901.—The first British submarine, launched at Barrow on Oct. 2, 1901, was 63 ft. long and 11 ft. 9 in. wide. From the sixteenth century onwards, numerous attempts were made to produce a boat to travel under water, but the early models failed because they relied on man-power for propulsion. The greatest impetus to submarine building came with the 'Holland' vessel, constructed about 1897 by J. P. Holland in America. It was propelled by a gasoline engine on the surface, and used electricity for under-water work. It also had planes, which could be inclined to assist in diving and rising.

October 3, 1846.—Gun-cotton was the invention of Prof. Schönbein, of Basel, and was made known in 1846. On Oct. 3 of that year, the Diet of Frankfurt voted a recompense of 100,000 florins to Schönbein and Dr. Boettger, as inventors of the explosive, provided the authorities of Mayence, after seeing it tried, pronounced it superior to gunpowder as an explosive. Improvements were made by Baron von Lenk, an Austrian officer, about 1852, and in 1862 details of the manufacture were communicated to the British Government.

October 4, 1877.—The Ingram web rotary machine, invented by Mr. (later Sir) W. J. Ingram, M.P., for printing illustrated newspapers, was first used to print the *Illustrated London News*, Oct. 4, 1877.

October 5, 1896.—At the Paris Academy of Sciences on this date, MM. Berthelot and Vieille read a paper describing researches which had been made with the view of seeing what precautions, if any, are necessary in the preparation, compression, and storage of acetylene for commercial purposes. Acetylene was discovered by Edmund Davy in 1836, and first systematically examined by Berthelot. Wöhler, in 1862, prepared it by the action of water on calcium carbide, but its use as an illuminant only became practicable in 1892 when Moissan and Willson showed that it was possible to make calcium carbide on the commercial scale in the electric furnace. Storage of the gas by dissolving it in liquids such as acetone was first suggested by Claude and Hess in 1896. Later Janet and Fouche found that acetylene dissolved in acetone absorbed by a suitable porous material could not be made to explode.

October 6, 1807.—Potassium was isolated by Davy by electrolysis of the fused hydroxide on Oct. 6, 1807. By a similar method Davy isolated metallic sodium. The method of manufacture on the commercial scale was given its first impulse by Deville in 1854, and in consequence of the improved processes it became possible to sell sodium at 10s. a pound in 1868. The modern Castner electrolytic process was introduced in 1890.

October 7, 1847.—Sir Isaac Holden and Samuel Cunliffe Lister were responsible for great developments in the machinery for wool-combing. On Oct. 7, 1847, a patent was taken out in their joint names for a new method of carding and combing and preparing genappe yarns, and when the machinery had been brought as near perfection as possible, factories were built which in time became the largest wool-combing concerns in the world. The business was concentrated chiefly at Bradford, to which city it brought prosperity.

October 8, 1884.—On this date, *Rodney*, an ironclad battleship of the *Benbow* class, was launched at Chatham. The modern ship of the same name was laid down on Dec. 28, 1922, with her sister ship *Nelson*. Her length is 702 ft., beam 106 ft., mean draught 30 ft., and normal displacement 35,000 tons.

W. C.

Societies and Academies.

PARIS.

Academy of Sciences, Sept. 5.—Paul Marchal: The natural strains of Trichogramma.—Riquier: The investigation of the numerical solutions of any system of integral algebraical equations with any number of unknowns.—Léon Pomey: The existence of non-linear, partial differential equations which are quasi-normal.—J. A. Lappo-Danilevski: The algorithmic solution of the problem of Riemann.—Jean Chazy: The advances and retardations of the times of passage of Mercury on the sun's disc.—Raoul Ferrier: The theory of the molecular field.—F. Gonseth and G. Juvet: The equations of electromagnetism and Schrödinger's equation in a five dimensional universe.—Lucien Vallery: The stability of the catalytic properties of palladiumised asbestos. Details of experiments bearing on the determination of hydrogen in the atmosphere by the action of asbestos coated with palladium. Traces of hydrogen arsenide and antimonide do not appear to poison the catalyst, neither does the catalytic power of the metal appear to be affected by repeated use.—Pierre Thomas and Mlle. Marie Sibi: Contribution to the study of the structure of jellies. Researches on the crystallisation of *l*-arabinoxazone. By the addition of a suitable foreign substance it is possible to modify the crystallisation of arabinosazone in such a manner that a pseudo-gel is produced. It is probable that the presence of impurities is a necessary condition for the production of gels of this nature, containing long hair-like crystals.—A. Demolon and G. Barbier: The application of viscosimetry to the study of colloidal clay. Some information can be obtained of the modifications of the state in a suspension of colloidal clay, especially the influence of electrolytes, by measurements of viscosity. It should be noted, however, that these suspensions do not obey Poiseuille's law, and hence the results have only a relative value.—Pereira de Sousa: The basalts of Portugal. At Lisbon and in its neighbourhood there have been at least two series of volcanic eruptions showing differences in their chemical composition.—O. Munerati and A. Milan: The possibility of detecting the presence of forage beet-root and semi-sugar beet-root amongst sugar beet at the commencement of growth.—L. G. Seurat: The presence of *Mercierella enigmatica* in a river in Tunis.—G. Mouriquand, A. Leulier, and P. Sédallian: The pH and the alkaline reserve in C-avitaminosis.—Edouard Chatton: The meiotic gametogenesis of *Paradinium Poucheti*.

CAPE TOWN.

Royal Society of South Africa, July 20.—A. Ogg: The symmetry and crystalline structure of the crystals potassium, ammonium, rubidium, and caesium sulphate. The crystals were shown to belong to the space group $Q_h 16$ in Hilton's notation ($V_h 16$ Schönflies notation). The elements of symmetry are:

Reflection planes $(100)_4, (100)_2$.Glide planes $(010)_2, (010)_4$. Translation $c/2$, $(001)_4, (001)_2$. Translation $\frac{a+b}{2}$.

with the corresponding dyad screw axes and centres of symmetry. The unit contains 4 molecules and the molecule has a molecular plane of symmetry. The proposed structure shows the SO_4 group in tetrahedral form, the distance between S and O centres being 1.5 Å.U. The nearest approach of a K centre to an O centre is 2.7 Å.U., and slightly increased distances for other members of the series. The structure gives an explanation of the twinning of these crystals and the

formation of almost true hexagonal prisms.—P. R. v. d. R. Copeman: Studies in the growth of grapes (Part 3). The effect of environment upon the growth constants. The same type of equation is applicable to grapes grown in various localities, but the values of the constants in the different equations are directly affected by changes in environment. It seems that plants are affected by environment to a greater extent than animals. Changes due to environmental conditions are greater than those due to seasonal conditions.—J. F. V. Phillips: The behaviour of *Acacia Melanoxylon* R. Br. (Tasmanian blackwood) in the Knysna forests: an ecological study. 'Blackwood' acts detrimentally upon the regeneration of the more important forest species, and is a plant which might become commoner if forests containing its dormant seeds were to be distributed. Despite its value as a timber tree and its efficiency as a killer of weeds on open sites, it is not considered wise to plant the species in gaps in the main forests.

WASHINGTON.

National Academy of Sciences (*Proc.*, Vol. 13, No. 7, July).—George A. Baitsch: Additional evidence as to the intercellular formation of connective tissue. Inoculation of living tubercle bacilli into the testis of the guinea-pig causes degeneration of the seminiferous tubules. In the intertubular spaces an abundant exudate appears which is quickly transformed directly into fibrous tissue.—W. M. Copenhaver: Results of heteroplastic transplantations of the heart rudiment in *Amblystoma* embryos. The whole and also part of the heart rudiment was transplanted from a large species of salamander into a smaller species and vice versa. The development of the whole heart rudiment and also the pulse rate seemed to depend mainly on its origin. The nerve supply comes from the host species but the heart muscle retains its own specific rhythm.—A. E. Hopkins: Vision and retinal structure in mice. By means of an electrical punishment plate, mice in a box were trained to choose one of two outlets with coloured papers or illuminated with coloured lights. The animals seem generally to be colour-blind; their retinae contain no structurally differentiated cones.—J. B. Green and R. A. Loring: Zeeman effect and structure in the spark spectra of tin (preliminary report).—Francis A. Jenkins: The structure of certain bands in the visible spectrum of boron monoxide.—Carl Barus: Pressure phenomena of the mucronate anode. Measurements with the interferometer U-gauge indicate that sharp surfaces of maximum and minimum potential surround an anode and cathode respectively at a distance of about half a millimetre from the electrodes.—J. W. Beams and Ernest O. Lawrence: On the lag of the Kerr effect. Light from a spark gap passes through a Nicol prism, two Kerr cells and another Nicol. The plates of the Kerr cells are connected with the spark gap by variable leads; if the leads are equal and there is no lag or equal lags in both Kerr cells, no light passes out of the system. With different liquids in the Kerr cells, or with the cells at different temperatures, the difference of the lengths of the leads divided by the velocity of light gives the relative time lag of the Kerr effect. The lag increases with viscosity and decreases with rising temperature, is constant for a given liquid for all wave-lengths, and is greater for polar molecules. The results accord with the theory that the Kerr effect is due to orientation of molecules with lag due to molecular, frictional, and inertial forces.—L. B. Loeb and L. Du Sault: Mobilities of ions in acetylene hydrogen mixtures. The mobilities of positive and negative ions in acetylene are probably the same; a higher mobility observed for the negative ion is due

to the presence of electrons. In mixtures with hydrogen, there is no certain indication of clustering effects.—Francis B. Silsbee: Current distribution in supraconductors. The 'critical current' is that at which the magnetic field due to the current itself is equal to the critical magnetic field.—F. Zwicky: On the reflexion of electrons from crystal lattices. The whole effect is produced by a few lattice planes near the surface. A theoretical explanation is developed.—R. C. Gibbs and H. E. White: Displacement of certain multiplets and multiple levels for elements in the first long period. Using the irregular doublet law and the regular displacement law of multiplets, certain characteristic multiplets of Cr III and Mn III have been located.—R. A. Millikan and I. S. Bowen: Energy relationships and ionisation potentials of atoms of the first row of the periodic table in all stages of ionisation. The most useful graphical exposition is to plot atomic number against the square root of the frequencies of the energy levels.—F. E. Wright: Polarisation of light reflected from rough surfaces with special reference to light reflected by the moon. Measurements have been made with a polarisation photometer filled to the 12-in. refractor of the U.S. Naval Observatory of the amount of polarisation of light reflected by the moon. At new moon and full moon, practically none of the reflected light is polarised; the maximum amount occurs at the ends of the first and third quarters and does not exceed 15-25 per cent. Comparison with the effects given by terrestrial substances indicates that the surface of the moon turned towards us consists largely of pumiceous substances high in silica, powders of transparent substances, quartz porphyries and possibly trachytes and granites. There seem to be no dark rocks low in silica such as basalts, no masses of iron, no large ice masses or glassy obsidians, and no powders of basic rocks.—Willard J. Fisher, Esther L. Wurl, and Marjorie S. Desmond: The trails of two periodically flickering meteors.—Bernard Lewis: The unimolecular decomposition of azo-methane; the adequacy of activation by collision.—G. L. Clark, R. H. Aborn, E. W. Brugmann, and R. L. Davidson: On X-ray diffraction patterns from liquids and colloidal gels (see NATURE, July 23, p. 119).—Florence R. Sabine and Charles A. Doan: The effect of tubercle bacilli and the chemical fractions obtained from analysis on the cells of the connective tissues in rabbits. The action in rabbits of the proteid and phosphatid fractions from human tubercle bacilli was followed by neutral red. The proteid is toxic, is associated with damage to endothelium and has a pressor effect on clasmatocytes; the phosphatid causes local production of tubercular tissue.—D. H. Campbell: The embryology of *Equisetum debile* Roxb. The buds producing secondary shoots are endogenous, thus resembling the primitive fern, *Ophioglossum*.—F. E. Denny: The effect of small amounts of chemicals in increasing the life activities of plants. Citrus fruits which are commercially ripe are often partly green. If they are stored in a chamber containing a small concentration of ethylene (1 in 5000), they ripen off quickly. The metabolism of the fruit is hastened. Similar enhanced activity has been found in dormant buds and other plant tissues stimulated by various apparently unrelated chemicals. The effect may be of the nature of an incipient wound response.—Neil M. Judd: The architectural evolution of Pueblo Bonito. Pueblo Bonito sheltered two distinct peoples; the founders, who used a single type of masonry, and a second group, who evolved three types of masonry and created for Pueblo Bonito its prestige. The site was abandoned about a thousand years ago. Neither people had beasts of burden or metal tools.