Calendar of Scientific Pioneers.

November 10, 1832. Johann Gaspar Spurzheim died.—The disciple of and fellow-worker with Gall, the founder of cerebral physiology, Spurzheim studied medicine in Vienna, and with Gall published "Anatomie et Physiologie du Système nerveux en générale et du Cerveau en particulier."

November 10, 1852. Gideon Algernon Mantell died.—Especially successful in the discovery and description of fossils of the South Downs, Mantell was a surgeon by profession and practised at Lewes, Brighton, and Clapham. His collections are preserved in the British Museum and his drawings in Yale University.

November 12, 1793. Jean Sylvain Bailly died.—Originally intended for a painter, an acquaintance with Lacaille led Bailly into astronomical studies, and in 1763 he became a member of the Paris Academy of Sciences, establishing his reputation by a memoir on Jupiter's satellites. Later on he published a history of astronomy. A promoter of the French Revolution, the day of the storming of the Bastille, July 14, 1789, he was chosen mayor of Paris. His action at the Champs de Mars, July 17, 1791, lost him his popularity, and two years later he perished beneath the guillotine.

November 13, 1802. André Michaux died.—Acquiring a taste for botany from his father, Michaux studied under Jussieu, and travelled in Spain, Persia, and North America. He died at Madagascar while on a journey to Australia. The genus Michauxia is named after him.

November 14, 1716. Gottfried Wilhelm Leibniz died.—Born in Leipzig towards the end of the Thirty Years' War, Leibniz was the son of a professor of moral philosophy. During diplomatic missions to France and England he became acquainted with Huygens, Boyle, and Newton, and it was through Huygens he was led to study geometry. In 1676 he became librarian to the Hanoverian family, a post he held until his death. Equally eminent as a philosopher and a mathematician, he is recognised as one of the discoverers of the infinitesimal calculus, and the inventor of the accepted notation. The inauguration of the Berlin Academy of Sciences was due to him, and he became its first president.

November 15, 1630. Johann Kepler died.—Immortalised by his discovery of the laws of planetary motion, Kepler "may be said to have constructed the edifice of the universe." Taught astronomy at Tübingen by Maestlin, in 1593 he succeeded Stadt as professor of that subject at Gratz, and in 1600 joined Tycho Brahe at Prague, after Tycho's death becoming Court mathematician to the Emperor Rudolph II. From 1612 to 1629 he was at Linz, and the following year he died at Ratisbon. Applying the diverse talents of a singularly gifted mind to the study of Tycho's observations, Kepler in 1609 discovered the first two of the laws which bear his name, and in 1618 the third. His "Astronomia Nova" is among the classics of science. At his death his manuscripts were purchased by Hevelius, and are now preserved at Pulkowa observatory.

November 16, 1915. Raphael Meldola died.—For thirty years professor of chemistry at the Technical College, Finsbury, Meldola was especially known for his work on the chemistry of colouring matters. The friend of Darwin, he was also a naturalist, translated Weismann's "Theory of Descent," and was president of the Entomological Society. E. C. S.

Societies and Academies.

LONDON.

Royal Society, November 3.—Prof. C. S. Sherrington, president, in the chair.—T. R. **Merton**: The spectra of lead isotopes. Comparison of the wave-lengths of five lines in the spectra of ordinary lead and lead from Australian carnotite shows differences which are not constant, but vary for the different lines. The difference in wave-length observed for the principal line, $\lambda=4058$ Å., is about two hundred times as great as that expected on theoretical grounds.—G. I. **Taylor**: Experiments with rotating fluids. Methods are described by which experiments on spheres, cylinders, and vortex rings moving through rotating fluids can be projected in a lantern and instantaneous photographs taken. If any small motion be given to a rotating fluid, the resulting flow will be such that concentrated masses of coloured liquid should be drawn out into thin films, parallel to the axis of rotation. Photographs taken by a camera placed vertically above a rotating basin of water show that the liquid moves in this way.—L. **Bairstow**, Miss B. M. **Cave**, and Miss E. D. **Lang**: The two-dimensional slow motion of viscous fluids. In its restricted form the equation of motion of a viscous fluid is $\nabla^4\psi=0$, where ψ is Stokes's stream function. If the molecular rotation in the fluid be defined by $\xi\equiv\nabla^2\psi$, the equation of motion may be expressed alternatively as $\nabla^2\xi=0$. The equation $\nabla^4\psi=0$ is transformed by means of Green's theorem to a form in which the only unknown is the distribution of the ξ doublets on the boundaries. The strengths of the doublets are found by solving the resulting integral equation. An example shows the motion of fluid past a circular cylinder in an infinite parallel-walled channel. If d be the diameter of the cylinder, ρ the density of the fluid, ν the kinematic coefficient of viscosity, and U the velocity of the fluid in the centre of the channel at infinity, then, when the width of the channel is $5d$, the resistance per unit length of cylinder is $R=7{\cdot}10\rho\nu d$U. The value of Ud/ν to which this formula applies is not to exceed 0·2.—H. C. H. **Carpenter** and Constance **Elam**: The production of single crystals of aluminium and their tensile properties. The parallel portion of the test pieces of the sheet was 4 in. × 1 in. × 0·125 in., consisting of about 1,687,000. The conversion of this area into a single crystal involved heat treatment for six hours at 550° C., tensile stress of 2·4 tons per square inch, producing an average elongation of 1·6 per cent. on 3 in., and final heat treatment beginning at 450° and extending up to 600° C. On an average, one test piece in four produces a single crystal over its parallel portion, which frequently grows up into the shoulders of the test piece. The tenacity of single crystals varied from 2·8 to 4·08 tons per sq. in., while the extension on 3 in. varied from 34 to 86 per cent., according to the orientation of crystal relative to stress. Five types of specimens were recognised. Stress tests of test pieces consisting of two and three crystals show the strengthening influence of one crystal upon another. Experiments on round bars resulted in the production of single crystals in the parallel portion of bars 0·564 and 0·798 in. in diameter. The total volumes of the crystals were more than 1 cb.in., and more than 2 cb.in. respectively. The tensile properties were determined, and in every case a wedge-shaped fracture was produced, the bar diminishing principally in one dimension only. Remarkable twinning effects were observed in certain cases.—C. V. **Raman** and B. **Ray**: The transmission colours of sulphur suspensions. When a few drops of sulphuric acid are added to a dilute solution of sodium thiosulphate and a precipi-

tate of sulphur gradually forms in the liquid, the suspension becomes practically opaque to the shorter wave-lengths first and the longer wave-lengths later, and afterwards regains its transparency partially, the shorter wave-lengths re-appearing first and later the longer wave-lengths. A theoretical explanation is offered.—E. F. **Burton** and Miss E. **Bishop**: The law of distribution of particles in colloidal solution.

PARIS.

Academy of Sciences, October 24.—M. Georges Lemoine in the chair.—P. **Painlevé**: Classical mechanics and the theory of relativity. A vigorous criticism of the Einstein theory, and especially of the assumptions contained in the ds^2 equation.—E. **Picard**: Some remarks on the theory of relativity.—A. **Haller** and Mme. P. **Ramart**: The reduction products of dimethylcampholamide. This amide, reduced with sodium and absolute alcohol, instead of furnishing the alcohol with more or less of the corresponding amine, gives only small quantities of the base, together with a substance not identified. The latter, when distilled, gives water and the nitrile of dimethylcampholic acid.—A. **Lebeuf**: Observation of the partial eclipse of the moon of October 16, 1921, made at the Besançon Observatory.—L. **Fabry**: Observation of the eclipse of the moon of October 16, 1921, made at Marseilles.—G. **Julia**: The permutability of rational substitutions.—T. **Varapoulos**: Increasing functions.—P. **Fatou**: A group of algebraic substitutions.—J. **Andrade**: Spiral cylinders and the hypothesis called *des techniciens*. A discussion of the theory of the balance spring of the chronometer.—M. **Riabouchinski**: The equations of motion of a fluid referred to mobile axes.—D. **Eydoux**: The necessity of the existence of a vortex vector in the movements of liquids, when there is a variation of energy along the trajectories of the various particles.—E. **Belot**: Contribution to the study of the formation of double stars, multiple stars, clusters, and planetary nebulæ.—A. **Danjon**: Photometric study of the eclipse of the moon of October 16–17, 1921. Two hundred and twenty-three observations were made at Strasbourg under good conditions, the object being to determine the curve of brightness (e) of the moon at the interior of the umbra, and of the penumbra as a function of the distance to the axis of the core. Sufficient results are given to fix the form of the curve: the theoretical values of $\log e$ in the penumbra are in good agreement with the observed values.—J. **Guillaume** and H. **Grouiller**: Observations during the eclipse of the moon of October 16, 1921, made at the Lyons Observatory.—M. **Holweck**: Critical potentials relative to the K and L_1 discontinuities of the absorption of aluminium. New determination of Planck's constant, h. The values obtained are 1560 volts for the critical potential K, 64 volts for L_1, and for h, $6{\cdot}55 \times 10^{-27}$.—P. **Pascal**: Magnetochemical research on constitution in mineral chemistry. The sulphur acids. The method of magnetic analysis has been used with success in the study of the constitution of organic compounds, and has now been employed in the examination of sulphur compounds. From the examination of sulphones, sulphonates, sulphates, hydroxylamine sulphonates, sulphites, and thiosulphates, some conclusions are drawn, the most important of which is that the magnetic properties of the sulphites are inconsistent with the unsymmetrical sulphonic constitution.—M. **Travers**: A new method for the estimation of silica. The silica is converted into potassium fluosilicate, and this titrated with standard alkali. The method has the advantage over the one in common use that neither the presence of alumina nor fluorides interfere.—M. **Grandmougin**: The identity of the dibromoanthraquinone which served for the synthesis of alizarine. Graebe and Liebermann, in their historical synthesis of alizarine, made use of a dibromoanthraquinone, the exact constitution of which has not up to now been fixed. The four homonuclear dibromoanthraquinones, the 1 : 2, 1 : 3, 1 : 4, and 2 : 3 isomers were prepared, and the last (2 : 3) found to be identical with the Graebe and Liebermann material.—Ch. **Maugin**: The possible utilisation of the diffraction diagrams of the X-rays for the complete determination of the structure of quartz.—A. **Nodon**: Experimental researches on the relations between terrestrial electrical phenomena, the state of the atmosphere, and solar foci.—Mlle. Marcelle **Guéraud**: The re-establishment of the genus Chlorocrepis in the tribe of the *Chicoraceae compositae*. *Hieracium staticefolium* was placed by Grisebach in a new species Chlorocrepis. Schultz regarded it as belonging to the genus Tolpis, and Villars placed it in the genus Hieracium, and this has been generally accepted. From the characters of the internal structure the author agrees with Grisebach, and is of the opinion that the genus Chlorocrepis should be reinstated.—R. **Souèges**: The embryogeny of the Boragacæ. The first steps of the development of the embryo in *Myosotis hispida*.—G. **Kühnholtz-Lordat**: The genetic phytogeography of the dunes of the Gulf of Lyons.—M. **Stoquer**: The influence of the temperature on the absorbent properties of soils.—J. L. **Lichtenstein**: The biology of *Habrocytus cionicida*.—F. **Angel**: The development of *Molge Waltlii* and its habitat in French Guinea.—E. **Fauré-Fremiet**: The laws of growth of the tissues constituting the fœtal lung of the sheep.—E. F. **Terroine** and H. **Barthélémy**: The existence of biometrical relations between the red frog, *Rana fusca*, and its eggs at the period of laying.—L. **Léger** and S. **Stankovitch**: The coccidiosis of the young of the carp.—L. **Blum**: A new group of diuretics; interstitial diuretics. Diuresis by the displacement of ions.—T. **Jonnesco**: The treatment of facial neuralgia by the resection of the cervico-thoracic sympathetic nerve.

SYDNEY.

Royal Society of New South Wales, September 7.—Mr. E. C. Andrews, president, in the chair.—G. H. **Halligan**: The ocean currents around Australia. The South Australian current, sweeping the whole of the southern shore of Australia from Cape Leeuwin to Tasmania, the East Australian current, flowing southwards, the Arafura Sea current, and the currents of the north-west and west coasts are described and traced. Immediate and systematic investigation of the ocean currents around Australia is advocated in the interests of both commerce and the safety of the mercantile marine.—J. H. **Maiden**: Records of Australian botanists. Brief sketches were given of the following:—William Anderson, surgeon of Capt. Cook's third voyage from 1776 to 1779; F. M. Bailey, who for forty years (1875–1915) held botanical appointments in Queensland; E. Betche, who was connected with the Sydney Botanic Gardens from 1881 to 1916; H. H. Bradley, famous for his horticultural work; and W. R. Guilfoyle, who successfully remodelled the Melbourne Botanic Gardens.

Books Received.

A First Book in Algebra. By Dr. F. Durell and E. E. Arnold. Pp. v+339+xli. (New York and Chicago: C. E. Merrill Co.)

A Second Book in Algebra. By Dr. F. Durell and E. E. Arnold. Pp. v+330+xliii. (New York and Chicago: C. E. Merrill Co.)