

by M. G. Adolphe Borel.—On the variations of “écrouissage” of metals, by M. Faurie.—On punching, by M. Ch. Fremont. An experimental inquiry into the conditions affecting the amount of play necessary between a punch and its bed. The results lead to the conclusions: (1) That the maximum effort in punching metals is independent of the clearance space in the ordinary practical conditions; (2) that the clearance space or play is a function of the thickness of the metal to be punched, and not of the diameter of the punch; (3) that it is also a function of the elongation of the metal, but in a less proportion; (4) that the play allowed ought to be about a fifth of the thickness of the metal punched. A figure is given illustrating the form of punch best adapted for piercing perfect holes.—Properties of solid carbonic acid, by MM. P. Villard and R. Jarry. Carbon dioxide solidifies and melts under a pressure of 5.1 atmospheres at  $-56^{\circ}7$  C. In free air, the solid has the temperature  $-79^{\circ}$ ; ether does not lower this temperature, as has been hitherto supposed, but methyl chloride and solid carbon dioxide produce a temperature of  $-85^{\circ}$  C. At a pressure of 5 mm. the solid has reached a temperature of  $-125^{\circ}$ .—On M. Guye’s hypothesis, by M. A. Colson.—On the alcohols derived from a dextro-rotatory turpentine, eucalyptene, by MM. G. Bouchardat and Tardy.—Condensation of the unsaturated alcohols of the fatty series with dimethylketone.—Synthesis of aromatic hydrocarbons, by MM. Ph. Barbier and L. Bouveault.—Double compounds of the fatty and aromatic nitriles with aluminium chloride, by M. G. Perrier.—Action of the air on raisin must, by M. V. Martinand.—On the preservation of wheat, by M. Balland.—On the sexual dimorphism of the Nautilus, by M. A. Vayssière.—On the variations of apparent clearness with the distance, and on a law of these variations as a function of the luminous intensity, by M. Charles Henry.—Seismic observations made at Grenoble, by M. Kilian.—On the dissolved gases at the bottom of Lake Geneva, by MM. André Delebecque and Alexander Le Royer.—The effects of the synodic and anomalous revolutions of the moon upon the distribution of pressures in the season of winter, by M. A. Poincaré.—On the subject of the treatment of the bites of venomous serpents by chloride of lime and by antitoxic serum, by M. A. Calmette.

## AMSTERDAM.

**Royal Academy of Sciences, May 25.**—Prof. Van de Sande-Bakhuyzen in the chair.—Prof. J. C. Kapteyn showed how the following three laws may be deduced from observations: (1) the law according to which the linear velocities of the stars are distributed; (2) the law according to which the number of stars per unit of volume varies with the distance from the sun; (3) the law according to which the absolute stellar magnitudes (magnitude at unit of distance) are distributed. The hypotheses on which the author’s conclusions were based were as follows: (a) the real movements of every degree of magnitude of the stars in space are equally numerous in every direction; (b) the law of the distribution of stellar velocities does not vary with the distance from the sun; (c) the function representing this law has but a single maximum.—Prof. Engelmann treated of reciprocal and irreciprocal conductivity of muscles, with special relation to the theory of the heart.—Prof. Van der Waals treated of the relation between the critical temperature and the critical pressure for a mixture (tacnodal curve).—Prof. H. Behrens described some cases of artificial dichroism. Strong dichroism were observed on flax and hemp fibres after having been dyed with congo-red or benzo-azurine. A similar result was obtained with the majority of the tetrazo-dyestuffs used for dyeing cotton; whereas, by the application of naphthol orange, croceine scarlet, and other similar dyestuffs, no dichroism was developed. Only three basic dyestuffs were found to be capable of making flax dichroic. Among other fibres the straw fibre comes next to flax and hemp; the cotton and the wood fibres stand lower in the scale; silk requires to be dyed a deep blue with an acidulated solution of benzo-azurine, and on wool the phenomenon of artificial dichroism has not been produced by any of the colouring matters named above. Flax and hemp are strongly polarising, and can be rendered strongly dichroic, while in cotton these two qualities are found in a smaller degree; but silk, ranging above straw in polarisation, falls far below cotton as to artificial dichroism. The phenomenon seems to be of a complex nature, not explained by assuming a combination of ordinary absorption with ordinary double refraction.—Prof. Van der Waals presented a paper by Prof. W. H. Julius, entitled “On an arrangement for protecting

measuring instruments from the ordinary vibrations of the ground.”—Prof. Kamerlingh Onnes presented, (1) on behalf of Prof. W. Einthoven, an isolation arrangement against vibrations of contiguous bodies; (2) on behalf of Dr. J. P. Kuenen, the influence of gravitation upon the critical phenomena of simple substances and mixtures.

## BOOKS, PAMPHLETS, and SERIALS RECEIVED.

**Books.**—A Manual of Botany: Prof. J. R. Green. Vol. 1. Morphology and Anatomy (Churchill).—Architecture for General Readers: H. H. Statham (Chapman).—The Manufacture of Explosives, 2 Vols.: O. Gutt-mann (Whittaker).—The Cell: Dr. O. Hertwig, translated by M. Campbell, and edited by Dr. H. J. Campbell (Sonnenschein).—Studies in the Evolution of Animals: Dr. E. Bonavia (Constable).—Electrical Laboratory Notes and Forms: Prof. J. A. Fleming (Electrician Company).—Ostwald’s Klassiker der Exakten Wissenschaften, Nos. 60, 61, 62 (Leipzig, Engelmann).—A Manual of Book-keeping: J. Thornton (Macmillan).—Geographical Journal, Vol. v. (Stanford).

**PAMPHLETS.**—Il Porto di Venezia: Prof. L. Primo (Verona, Drucker).—The Genesis of California’s First Constitution (1846-49): R. D. Hunt (Baltimore).—Enumeración Sistemática y Sinonímica de los Peces de las Costas Argentina y Uruguay: Dr. C. Berg (Buenos Aires).—Origine e Diffusione della Stirpe Mediterranea: G. Sergi (Roma, Società Editrice Dante Alighieri).

**SERIALS.**—Journal of the Royal Microscopical Society, June (20 Hanover Square).—Chambers’s Journal, July (Chambers).—Good Words, July (Isbister).—Sunday Magazine, July (Isbister).—Humanitarian, July (Hutchinson).—English Illustrated Magazine, July (198 Strand).—Zeitschrift für Physikaische Chemie, xvii. Band, 2 Heft (Leipzig, Engelmann).—National Review, July (Arnold).—Natural Science, July (Rait).—Bulletin de l’Académie Impériale des Sciences de St. Pétersbourg, March and April (St. Pétersbourg).—The Reliquary and Illustrated Archaeologist, July (Bemrose).—Contemporary Review, July (Isbister).—Geographical Journal, July (Stanford).—Journal of the Royal Agricultural Society of England, Vol. 6, Part 2 (Murray).—Fortnightly Review, July (Chapman).

## CONTENTS.

	PAGE
The Moluccas. By Dr. Hugh Robert Mill . . . . .	217
Mill Engineering. By N. J. L. . . . .	218
Lectures on Darwinism. By E. B. P. . . . .	219
Our Book Shelf:—	
Mummery: “My Climbs in the Alps and Caucasus.”	
Prof. T. G. Bonney, F.R.S. . . . .	219
Freudenreich: “Dairy Bacteriology” . . . . .	220
Beard and Telfer: “Longmans’ School Algebra” . . . . .	220
Babington: “Fallacies of Race Theories as Applied to National Characteristics” . . . . .	220
Sharpe: “A Chapter on Birds” . . . . .	220
Swann: “Nature in Acadie” . . . . .	220
Letters to the Editor:—	
The Size of the Pages of Scientific Publications.—G. H. Bryan, and Prof. S. P. Thompson, F.R.S. . . . .	221
On the Minimum Theorem in the Theory of Gases.—Prof. Ludwig Boltzmann . . . . .	221
Argon and the Kinetic Theory.—Colonel C. E. Basevi . . . . .	221
Romano-British Land Surface.—Flint Flakes Replaced. (Illustrated.)—Worthington G. Smith . . . . .	222
The Bifilar Pendulum at the Royal Observatory, Edinburgh.—Thomas Heath . . . . .	223
Migration of a Water-Beetle.—Rose H. Thomas . . . . .	223
Argon and Helium in Meteoric Iron. By Prof. W. Ramsay, F.R.S. . . . .	224
Subterranean Faunas. By W. G. . . . .	225
Proposed Balloon Voyage to the Pole. By W. . . . .	226
Thomas Henry Huxley . . . . .	226
Notes . . . . .	229
Our Astronomical Column:—	
Variable Stars . . . . .	231
The Temperature of the Sun . . . . .	232
The Rotation of Saturn . . . . .	232
The Visibility of Ships’ Lights . . . . .	232
The Relative Powers of Large and Small Telescopes in showing Planetary Detail. By W. F. Denning . . . . .	232
Subjective Visual Sensations. By Dr. W. R. Gowers, F.R.S. . . . .	234
High-Level Meteorological Stations. By A. Lawrence Rotch . . . . .	236
University and Educational Intelligence . . . . .	237
Scientific Serials . . . . .	237
Societies and Academies . . . . .	237
Books, Pamphlets, and Serials Received . . . . .	240