be made in Regnault's determinations of the weight of a litre of the elementary gases, by M. J. M. Crafts. The error already pointed out by Lord Rayleigh is here corrected for air, N, H, O, and CO_2.—Experiments with a non-oscillating pendulum, by M. A. Boillot. It is shown that the oscillating pendulum, which in Foucault's experiment demonstrates the movement of the globe, may be used for the same demonstration by suppressing the oscillatory action and operating in a room.—Measurement of the velocity of etherification by means of electric conductors, by M. Negreano. A process is explained for measuring the rapidity of the chemical reactions which take place between certain resisting bodies at the moment their electric resistances become varied. These resistances have been measured according to the method indicated by Lippmann.—On a diamantiferous meteorite, which fell on September 10/22, 1886, at Novo-Urei, in the Government of Penza, Russia, by MM. Ierofeieff and Latchinoff. Analysis of this specimen, weighing 1762 gr., shows that it contains 1 per cent. of very fine carbonado, or diamond dust, besides 1·26 of amorphous carbon. The other chief substances were—peridot, 67·48; pyroxene, 23·82; and nickled iron, 5·45.

BERLIN.

Physical Society, June 1.—Prof. von Helmholtz, President, in the chair.—Dr. Lummer gave an account of experiments which he had made on the determination of the focal length of lenses by the method of Abbe in Jena. The method is based upon the equation $f = \frac{a}{\beta_1 - \beta_2}$; where f is the focal length, a the distance of two objects from the lens, and β_1 β_2 the respective magnifications of their images. The speaker discussed first the way by which Abbe had arrived at the above equation, and then went thoroughly into an explanation of the methods for measuring the amount of magnification of the images. It must suffice here to say briefly that the magnification was measured by a microscope directed along the principal axis of the lens, and at right angles to its surface, the microscope then being moved backwards and forwards, until the upper and lower ends of the image were visible. Prof. von Helmholtz explained that during his physiological-optical researches he had already determined the focal lengths of lenses by the measurements of the magnification, in accordance with the formula given above, admitting at the same time that his methods were perhaps less exact.—Dr. Lummer then gave an abstract of a paper on the movement of air in the atmosphere, which he had recently read before the Academy of Sciences. In solving the problem, he had made use of the principle of mechanical similarities. When the hydrodynamic equation for a given motion is known, it is only necessary to multiply all the factors by n in order to represent the motion in much larger dimensions. Accordingly if the conditions of the occurrence of air currents, such as take place in the atmosphere, have been experimentally determined in the laboratory for 1 cubic metre of air, and if the atmosphere is assumed to be 8000 metres high, then the space, time, and moment must be multiplied by 8000, while on the other hand the internal friction must be taken as being only 1/8000 of that which has been determined by experiment. It follows from this that the internal friction is of very small account; but as against this, the friction of the earth's surface has a considerable influence and cannot be neglected. Supposing a mass of air moving horizontally is considered, then a series of particles of air, which were at the outset vertically each above the other, will finally place themselves along a curve of sines as the result of friction at the earth's surface. Calculation shows that it would require a period of 42,000 years before the motion was reduced to one-half as the result of internal friction. The speaker then considered the atmosphere as made up of rings of air which surround the earth in coincidence with the parallels of latitude: each of these rings of air has its own moment of rotation, which depends on its radius, and is therefore greatest at the equator and least at the poles. If the air which is streaming upwards at the equator were to stream down again to the earth in higher latitudes, it would be moving with a velocity far exceeding that of any known storm, even at the latitude of 30°. Since the internal friction of the air is so small that it may be neglected, the speaker proceeded to point out the other factors which have an influence in slowing down the air as it falls. He regards them as being the vortex motions which take place in the atmosphere at the discontinuous surfaces of two masses of air moving with different velocities. These vortex motions cause the adjoining layers of the two masses of air to mix, and thus diminish their velocity. This is the explanation of the calms, trade-winds, sub-tropical rains, and other phenomena which occur in the atmosphere. It would occupy too much space to give even a brief statement of how these conclusions are arrived at.

BOOKS, PAMPHLETS, and SERIALS RECEIVED.

A Course of Practical Instruction in Botany, Part 1, 2nd edition: Prof. F. O. Bower (Macmillan).—Lessons in Elementary Mechanics, Stage 2: W. H. Grieve (Longmans).—Observations on the Embryology of Insects and Arachnids: A. T. Bruce (Baltimore).—Smithsonian Report, 1885, Part 2 (Washington).—Birdsnesting and Bird-skinning, 2nd edition: M. Christy (Unwin).—An Elementary Treatise on Mensuration: E. J. Henchie (School Books Publishing Co.)—First Elements of Experimental Geometry: P. Bert; translated (Cassell).—Introductory Inorganic Analysis: E. H. Cook (Churchill).—Origin and Growth of Religion as illustrated by Celtic Heathendom: Prof. J. Rhys (Williams and Norgate).—Sierra Leone; or the White Man's Grave: G. A. Lethbridge Banbury (Sonnenschein).—Explorations and Adventures in New Guinea: Capt. J. Strachan (Low).—Longmans' School Geography for Australasia: G. G. Chisholm (Longmans).—On the Dicotylinæ of the John Day Miocene of North America: E. D. Cope.—On the Mechanical Origin of the Dentition of the Amblypoda: E. D. Cope.—The Theory of the Tides: J. Nolan (Dulau).—The Perissodactyla: E. D. Cope (Philadelphia).—The Mechanical Origin of the Sectorial Teeth of the Carnivora: E. D. Cope (Salem).—Recent Advances in our Knowledge of the Law of Storms: F. Chambers (Bombay).—Causation of Pneumonia: H. B. Baker (Lansing).—Quarterly Journal of the Royal Meteorological Society, April (Stanford).—Quarterly Weather Report, Part 3 (Eyre and Spottiswoode).—Hourly Readings, 1885 (Eyre and Spottiswoode).—Travaux de la Société des Naturalistes de St. Pétersbourg, vol. xix. 1888, Section de Géologie et de Minéralogie (St. Pétersbourg).—Notes from the Leyden Museum, vol. x. Nos. 1 and 2 (Brill, Leyden).—Madras Journal of Literature and Science, Session 1887–88 (Madras).—Proceedings of the Academy of Natural Sciences of Philadelphia, Part 1, 1888 (Philadelphia).—Internationales Archiv für Ethnographie, Band i. Heft 3 (Trübner).

CONTENTS.

	PAGE
The Steam-Engine	169
The Animal Alkaloids	170
Practical Forestry	171
Our Book Shelf:—	
Drummond: "Tropical Africa"	171
Wormell: "Plotting, or Graphic Mathematics"	172
Gallatly: "The Elements of Logarithms"	172
Letters to the Editor:—	
Thunderstorms and Lightning Accidents.—**H. Newman Lawrence**	172
Nose-Blackening as Preventive of Snow-Blindness.—**A. J. Duffield**	172
The *Lethrus cephalotes*.—**Arthur E. Shipley**	172
Proposed Fuel-testing Station for London.—**Bryan Donkin, Jun.**	172
The Geometric Interpretation of Monge's Differential Equation to all Conics—the Sought Found.—**Prof. Asutosh Mukhopadhyay**	173
Personal Identification and Description. I. (*Illustrated.*) By **Francis Galton, F.R.S.**	173
Soap-Bubbles. (*Illustrated.*)	177
The Paris Observatory	179
The Photographic Chart of the Heavens	180
The Incurvature of the Winds in Tropical Cyclones. By **Henry F. Blanford, F.R.S.**	181
Notes	182
Our Astronomical Column:—	
The Constant of Aberration	185
The Markings on Mars	185
Comet 1888 *a* (Sawerthal)	186
Astronomical Phenomena for the Week 1888 June 24–30	186
Geographical Notes	186
Technical Instruction. By **Sir Henry Roscoe, M.P., F.R.S.**	186
The International Geological Congress	188
University and Educational Intelligence	189
Scientific Serials	189
Societies and Academies	190
Books, Pamphlets, and Serials Received	192