

values of ϵ and the mean intensities of the lines at the two stations. The scale of intensity is such that the C line = 10, and the line at 651.55 is unity.

Place of observation.	Altitude.	ϵ .	Intensities of the lines		
			A.	B.	α .
Bosco Nero ...	1623 metres ...	1046.2 ...	50	28	3.2
Rocciamelone ...	3538 ,, ...	846.2 ...	40	20	2.2

A comprehensive bibliography of the subject accompanies the paper.

SIMILARITY OF THE ORBITS OF CERTAIN ASTEROIDS.—In the *Publications of the Astronomical Society of the Pacific*, No. 15, 1891, Prof. Daniel Kirkwood gives a list of twenty-four asteroids arranged in ten groups, according to the similarity of their orbits. The following are the groups:—

I.	84 Clio.	VI.	3 Juno.
	115 Thyra.		97 Clotho.
II.	249 Ilse.	VII.	203 Pompeia.
	19 Fortuna.		200 Dynamene.
III.	79 Eurynome.	VIII.	278 Pauline.
	134 Sophrosyne.		116 Sirona.
IV.	193 Ambrosia.	IX.	1 Ceres.
	37 Fides.		245 Vera.
V.	66 Maia.	X.	86 Semele.
	218 Bianca.		106 Dione.
	204 Callisto.		121 Hermione.
	246 Asporina.		87 Sylvia.

Jupiter is held responsible for the perturbations necessary for the development of these groups of asteroid orbits from the primitive solar nebula.

ASTRONOMICAL AND PHYSICAL SOCIETY OF TORONTO.—The first number of the Transactions of this Society (1890-91), with which is also included the first Annual Report, has recently been issued. It contains abstracts of several interesting papers read at the meetings, among which is one on the disappearance of Saturn's rings, by Dr. Morrison, two by Mr. Shearman on coronal photography, and two by Mr. A. F. Miller on the spectroscope. A drawing of a sun-spot observed on November 30, and a hydrogen prominence measured on August 3, forms the frontispiece of the number.

A NEW ASTEROID (31).—On June 11 M. Charlois discovered the 311th asteroid. Its magnitude was 13.

THE ROYAL SOCIETY CONVERSAZIONE.

THE Ladies' Soirée of the Royal Society was held on the 17th instant, and was very numerously attended. The following were among the chief objects exhibited:—

Finger-prints as a means of identification, exhibited by Mr. Francis Galton, F.R.S. (1) Specimens showing the nature and character of the patterns that are formed by the papillary ridges on the bulbs of the fingers, as well as on the rest of the inner surfaces of the hands and feet. (2) Evidence of the persistence of the patterns in their essential details, however minute, from infancy to age. (3) Method of indexing a collection of finger-prints so that a determination may be quickly arrived at, whether the duplicate of a given specimen is contained in it or not. (4) Process of making finger-prints, exhibited in operation.

Registration of colours in numbers, and apparatus to show the greater sensitiveness of the eye to different colours, exhibited by Captain Abney, C.B., F.R.S., and General Festing, F.R.S. The registration consists in referring any mixed colour to a single wave-length, and a percentage of white light. With the apparatus to show the greater sensitiveness to the eye of different colours, a comparison is made by placing two colours side by side, which are at ordinary intensity of equal luminosity, and by then diminishing the intensity of each equally.

An optical illusion, exhibited by Prof. Silvanus P. Thompson, F.R.S. On two rotating disks, A and B, are spiral patterns in black and white, which seem to move radially inwards and outwards respectively. Let the observer gaze fixedly for about one minute at the centre of A, and then suddenly transfer his gaze to any object—say the face of a friend—he will see that object apparently enlarging from the middle outwards. After similarly gazing for a minute at B, and then looking at any object, he will see it apparently diminishing.

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Discharge without electrodes through gases, exhibited by Prof. J. J. Thomson, F.R.S. The discharge tube in these experiments is made to form the secondary of what is essentially an induction coil, and the discharge passes round a closed current in the gas. Experiments *a, b, c, d* show various forms of the discharge in tubes and bulbs. *e* shows the residual glow produced when the discharge passes through oxygen. *f* shows the action of a magnetic field on the discharge; along the lines of force the discharge is facilitated, while at right angles to them it is retarded. When the magnetic field is "off," the discharge takes place in the bulb, and not in the tube; when the field is "on," in the tube, and not in the bulb. *g* illustrates the stoppage of the discharge when a gas electrically weaker than that in the discharge tube is placed in the neighbourhood of the latter.

A nickel pendulum, illustrating the effect of heat upon the magnetic susceptibility of nickel, exhibited by Mr. Shelford Bidwell, F.R.S. Nickel, which at ordinary temperatures is a magnetic metal, becomes non-magnetizable at about 300° C. A copper disk, to which a projecting tongue of nickel is attached, hangs like the bob of a pendulum from a double thread, and is deflected to one side by a magnet which attracts the nickel tongue. The heat of a spirit-lamp placed beneath the tongue quickly destroys the magnetic quality of the nickel, so that the magnet can no longer hold it; the bob accordingly falls back and performs an oscillation. On its return to the neighbourhood of the magnet, however, the tongue has cooled sufficiently to be once more attracted, but after a momentary contact it is again released, and the process is repeated. Thus the bob can be kept swinging like the pendulum of a clock.

The meldometer, exhibited by Mr. J. Joly. This instrument is for determining the melting-points of minute quantities of substances, by comparison with bodies of known melting-point. The method consists in measuring the thermal expansion of a ribbon of pure platinum when a minute quantity of a substance, dusted on its surface (and observed through a microscope), is melting. The platinum is heated by a current, and the thermal value in degrees Centigrade of its expansion found by preliminary observations, using bodies of known melting-point. The expansion of the ribbon is read by an electric-contact method. The instrument shown reads a change of 2° C. Range up to 1600° C. about. Quartz may be melted on the meldometer, and most or all of the silicated minerals.

Facsimile drawings of paintings from tombs at Beni Hasan, Upper Egypt, exhibited by Mr. Percy E. Newberry (of the Egypt Exploration Fund). A series of facsimile drawings in colour, executed by Mr. M. W. Blackden, of some of the most interesting paintings on the walls of the tombs of Ameni and Khnumhotep (XII. Dynasty, circa 2500 B.C.), at Beni Hasan, in Upper Egypt. These drawings are the property of the Egypt Exploration Fund.

Instrument for examining the strains in bent glass beams, exhibited by Prof. C. A. Carus-Wilson. There is a steel straining frame in which the beam to be examined is placed; this frame can be moved in any direction in its own plane between two Nicol prisms. The Nicol prisms can be rotated through any required angle. When the beam has been supported in any given manner, load is applied by a screw, and the action of the strained glass on the polarized light enables the precise state of strain all over the beam to be ascertained. The instrument has been used to determine the action of "surface loading," and to show to what extent this action affects the state of strain in beams supposed to obey the Bernoulli-Eulerian theory of flexure.

Cup-micrometer, an instrument for measuring the rate of growth of a plant, exhibited by Mr. Francis Darwin, F.R.S. A thread is attached to the upper end of the plant, passes over a pulley, and is fastened to a weight. The descent of the weight (which is a measure of the growth of the plant) is estimated by adjusting a micrometer screw carrying a small cup of oil, until a needle point on the weight touches the surface of the fluid. The method, a modification of that used by physicists to measure the rise or fall of a fluid surface, was designed by Mr. H. Darwin, of the Cambridge Scientific Instrument Company.

Electrical volatilization of metals, exhibited by Mr. W. Crookes, F.R.S.

Living animals from the aquarium of the Marine Biological Association at Plymouth, exhibited by the Marine Biological Association.

Art metal work, from the factories of Messrs. Tiffany and Co.,

in New York, exhibited by Messrs. Tiffany and Co. Representative articles in wrought metals; amalgamation of metals; enamelling on silver and gold.

Photographs of living corals taken in Torres Straits, exhibited by Mr. W. Savile Kent.

Prof. J. Norman Lockyer, F.R.S., exhibited:—(1) Photographs of a group of sun-spots. A series of enlargements of a group of sun-spots shown on the 12-inch sun-pictures taken under the direction of Lieut-Colonel Strahan, at Dehra Dun, India, on December 16, 18, 19, 20, 21, 22, 23, 1887. The spots have been enlarged three times, and it will be seen that great changes took place during the period of visibility.—(2) Photographs of the temples at Karnak and Edfou. These are enlargements from photographs taken in January 1891, with reference to the orientation of the temples. The photographs show that, notwithstanding the elaborate details of the architecture, the principal axes of the temples were kept perfectly clear from one end to the other.

Prof. W. Roberts-Austen, C.B., F.R.S., exhibited a new, brilliantly coloured alloy of gold and aluminium, and facsimiles of medals asserted to be of gold and of silver, transmuted from base metal by the aid of alchemy. One of the medals bears on its reverse the statement that it was struck in 1675, by J. J. Becher, in silver transmuted from lead.

Mr. Ludwig Mond, F.R.S., exhibited:—(1) Nickel-carbon-oxide. (2) Pure nickel extracted from nickel ores by means of carbonic oxide. (3) Articles of pure nickel deposited from nickel-carbon-oxide, and goods plated with nickel by exposure to nickel-carbon-oxide $[\text{Ni}(\text{CO})_4]$. This unique chemical compound was obtained in 1890 by Mond, Langer, and Quincke, by passing a current of carbonic oxide over finely-divided metallic nickel at the ordinary temperature, and refrigerating the resulting gas. It is a colourless liquid, of high refractory power, boiling at 43°C ., and solidifying at 25°C ., and is split up again into nickel and carbonic oxide on heating its vapour to 180°C . It is highly poisonous; while according to Prof. McKendrick's researches it has, when injected subcutaneously in very small doses, a remarkable power of reducing the temperature of animals. The properties of this substance make it possible to volatilize nickel at a low temperature, and to extract it industrially in a perfectly pure state from all other substances with which it is found. Articles of pure nickel, and goods plated with pure nickel, are produced by exposing heated moulds or goods to nickel-carbon-oxide vapour, or to a solution of this compound in suitable solvents.

Specimens of Japanese metal work, including *Ojime*, or sliders, *Yanone*, or arrowheads, and *Tsuba*, or sword-guards, exhibited by Prof. A. H. Church, F.R.S.

Prof. A. Newton, F.R.S., exhibited a drawing, the first received in Europe, of *Notoryctes typhlops*, a new form of Marsupial of mole-like habit, and structure accordingly, sent by Prof. E. C. Stirling, of the University of Adelaide, South Australia. The first specimen of this remarkable mammal, one of the most unexpected discoveries for many years, was sent from the interior of South Australia by Mr. A. Molineux to Prof. Stirling, of Adelaide, who contributed to NATURE (vol. xxxviii. pp. 588, 589) such a notice of it as its imperfect condition admitted. He afterwards obtained other examples, which are fully described in a memoir communicated to the Royal Society of Adelaide. "Four or five of the cervical vertebrae are fused, and there is a keeled sternum. An enormously thick and short first rib, which serves the purpose of buttressing the sternum in lieu of coracoids. Eyes mere pigment spots, underneath the skin and temporalis muscle. It has a remarkable habit of burrowing for long distances in the sand with great rapidity." These specimens were obtained about 1500 miles north of Adelaide, but a telegram from Prof. Stirling, dated May 31, 1891, states that he has himself obtained others in the course of a journey, just completed, across the continent from Port Darwin.

Mr. Walter Gardiner, F.R.S., gave demonstrations of certain important phenomena associated with the absorption and the flow of the water taken up by plants:—(1) Root pressure. Water present in the soil, and containing minute traces of nutritive salts, is absorbed by the root-hairs so powerfully and in such quantities as to set up a considerable pressure in the interior of the plant. This "root pressure" may be demonstrated by attaching to the cut end of a stem a manometer containing mercury, or some coloured fluid. Here a solution of nigrocine in water is employed. (2) The transpiration current.

Among the more important factors which determine the flow and ascent of water from the root, upwards, is the sucking force induced by the modified evaporation or transpiration of water from the general free surface of the leaves. During transpiration the water escapes as vapour, and the salts are retained for food. In this experiment the existence of a "transpiration current" is shown by allowing a cut branch to suck up milk, when the movement of the fat globules registers the flow of the liquid. (3) The amount of water absorbed by the root. This may be estimated by simple measurement, employing some such form of apparatus as that exhibited.

Engravings to "Travels among the Great Andes of the Equator," exhibited by Mr. Edward Whympster. These illustrations are selections from Mr. Edward Whympster's forthcoming work upon the Great Andes of the Equator (in which he gives accounts of the first ascents of Chimborazo, Cayambe, Antisana, &c., &c.), and includes views on and about the equator at great elevations; incidents of travel; numerous examples of the new genera and species obtained on the journey; a facsimile reproduction of the map of Don Pedro Maldonado (upon which existing maps of Ecuador are based), and the original route survey, and map of Chimborazo, made by the author. The work, with 200 illustrations and four maps, will be published in the present year by Mr. John Murray.

Mr. W. Bateson exhibited (1) models of double supernumerary legs and antennæ in beetles; (2) mechanical model showing the usual symmetry of double supernumerary appendages in beetles. Supernumerary appendages in beetles nearly always spring as branches from a normal appendage, and are generally double, being made up of two limbs more or less compounded together. The two extra limbs are always a *complementary pair*, one being structurally a right limb, while the other is left. Commonly the symmetry of the parts is arranged as follows:—(a) The two extra limbs and the normal one stand in one plane, one of the extra limbs being nearer to the normal limb and one remoter from it. (b) The nearer is in structure and position an image of the normal limb in a mirror at right angles to the plane in which the three limbs stand; and the remoter is an image of the nearer in another mirror beyond and parallel to the first. Thus the relations of the parts in their several positions may be represented by the mechanical model exhibited, in which the extra legs, revolving round the normal leg, take attitudes proper to the positions which they occupy relatively to the normal leg.

Prof. A. C. Haddon exhibited the geographical distribution, and the progressive and retrogressive evolution, of art and ornament in British New Guinea. The exhibit is designed to show that savage art can be studied as a branch of biology, and that it is only when so treated that it yields its most valuable results. Most savage and barbaric designs have only a very limited geographical range, and those which have a wide distribution can, in the majority of cases, be proved to be homoplastic and not homogenetic. The evolution of a particular pattern must be sought in the district in which it occurs, and its developmental history can only be safely attempted when a comparison is made of numerous objects from the same locality. The foregoing propositions are illustrated by means of specimens, rubbings, photographs, and sketches of decorated objects from British New Guinea.

At intervals during the evening, the Edison loud-speaking telephone and Bell's receivers were connected with the performance of "The Gondoliers," at the Savoy Theatre, London; the Prince's Theatre, Birmingham; and with vocal and instrumental concert rooms at Liverpool and Birmingham.

Photographs of volcanic phenomena were exhibited by Dr. Tempest Anderson during the evening. These photographs of volcanic phenomena were taken last year during a visit to the Skaptá Jokul, and other volcanic districts in Iceland. The eruption of the Skaptá Jokul, in 1783, was one of the largest on record. A mass of lava, estimated to be equal in bulk to Mont Blanc, flowed out in two streams, each forty to fifty miles long. The actual craters situated in the desert interior of the island appear not to have been previously visited.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—The following are the speeches delivered by the Public Orator (Dr. Sandys, Fellow and Tutor of St. John's