identically the same. It produces either a temporary acceleration, such as is due to alcohol, or else a remarkably steady and high rate of growth. On the action of this reagent we hope to make further observations.

Quinine Chloride.—Extremely dilute solutions acted poisonously, and produced a shortening of the tissues. When contraction took place it was manifested within a remarkably short time. In one case contraction seemed to begin simultaneously with the exposure to the poison, and was certainly well marked in less than one minute.

Conclusion.—The most interesting fact which we have established is the possibility of stimulating turgescent tissues to increased elongation by such reagents as alcohol, ether, and hydrocyanic acid. And we incline to think that our results may help to direct attention to a factor in the problem of cell-mechanism—namely, the protoplasmic element, rather than the purely osmotic side of the question.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, February 24.—"On the Relation between Tropical and Extra-Tropical Cyclones." By the Hon. Ralph Abercromby. Communicated by Mr. R. H. Scott, F.R.S.

All cyclones have a tendency to assume an oval form; the longer diameter may lie in any direction, but has a decided tendency to range itself nearly in a line with the direction of propagation. Tropical cyclones have less tendency to split into two, or to develop secondaries than those in higher latitudes. A typhoon which has come from the tropics can combine with a cyclone that has been formed outside the tropics, and form a single new, and perhaps more intense, depression. There is much less difference in the temperature and humidity before and after a tropical cyclone than in higher latitudes. The quality of the heat in front is always distressing in every part of the world.

The wind rotates counter-clockwise round every cyclone in the northern hemisphere, and everywhere as an ingoing spiral. The amount of incurvature for the same quadrant may vary during the course of the same cyclone; but in most tropical hurricanes the incurvature is least in front, and greatest in rear; whereas in England the greatest incurvature is usually found in the right front. Some observers think that broadly speaking the incurvature of the wind decreases as we recede from the equator. The velocity of the wind always increases as we approach the centre in a tropical cyclone; whereas in higher latitudes the strongest winds and steepest gradients are often some way from the centre. In this peculiarity tropical cyclones approximate more to the type of a tornado; but the author does not think that a cyclone is only a highly developed whirlwind, as there are no transitional forms of rotating air.

The general circulation of a cyclone, as shown by the motion of the clouds, appears to be the same everywhere. All over the world, unusual coloration of the sky at sunrise and sunset is observed, not only before the barometer has begun to fall at any place, but before the existence of any depression can be traced in the neighbourhood. Cirrus appears all round the cloud area of a tropical cyclone, instead of only round the front semicircle, as in higher latitudes. The alignments of the stripes of cirrus appear to be more radial from the centre in the tropics, than tangential, as indicated by the researches of Ley and Hildebrandsson in England and Sweden respectively. Everywhere the rain of a cyclone extends farther in front than in rear. Cyclone rain has a specific character, quite different from that of showers or thunderstorms; and this character is more pronounced in tropical than in extra-tropical cyclones.

Squalls are one of the most characteristic features of a tropical cyclone, where they surround the centre on all sides; whereas in Great Britain, squalls are almost exclusively formed along that portion of the line of the trough which is south of the centre, and in the right rear of the depression. As, however, we find that the front of a British cyclone tends to form squalls when the intensity is very great, the inference seems justifiable that this feature of tropical hurricanes is simply due to their exceptional intensity.

A patch of blue sky, commonly known as the "bull's-eye," is almost universal in the tropics, and apparently unknown in higher latitudes. The author's researches show that in middle latitudes the formation of a "bull's-eye" does not take place when the motion of translation is rapid; but as this blue space is not observed in British cyclones when they are moving slowly, it would appear that a certain intensity of rotation is necessary to develop this phenomenon.

The trough phenomena,—such as a squall, a sudden shift of wind, and change of cloud character and temperature, just as the barometer turns to rise, even far from the centre—which are such a prominent feature in British cyclones,—have not been even noticed by many meteorologists in the tropics. The author, however, shows that there are slight indications of these phenomena everywhere; and he has collated their existence and intensity with the velocity of propagation of the whole mass of the cyclone.

Every cyclone has a double symmetry. One set of phenomena, such as the oval shape, the general rotation of the wind, the cloud ring, rain area, and central blue space, are more or less related to a central point. Another set, such as temperature, humidity, the general character of the clouds, certain shifts of wind, and a particular line of squalls, are more or less related to the front and rear of the line of the trough of a cyclone. The author's researches show that the first set are strongly marked in the tropics, where the circulating energy of the air is great, and the velocity of propagation small; while the second set are most prominent in extra-tropical cyclones, where the rotational energy is moderate, and the translational velocity great. The first set of characteristics may conveniently be classed together as the rotational, the second set as the translational, phenomena of a cyclone.

Tropical and extra-tropical cyclones are identical in general character, but differ in certain details, due to latitude, surrounding pressure, and to the relative intensity of rotation or translation.

Linnean Society, February 17.—Mr. W. Carruthers, F.R.S., President, in the chair.—The Rev. A. Johnson exhibited drawings of an abnormal *Begonia Veitchii* grown by him the preceding autumn. The peculiarity consisted in the flower having a single, large, flask-shaped, ovarian-like organ (?) placed centrally, and surmounted by a single, simple, straight style; thus, though doubtless a male, indicating an hermaphrodite condition, while presenting resemblances to the normal female organs of *Laurus nobilis*.—Mr. E. M. Holmes exhibited some irregularly-developed lemons, in which the carpels were more or less separated at the apex; the arrest of the normal union of the carpel being attributed to the bite of an insect in the early stage of the growth of the fruit.—There were exhibited, for Mr. J. G. Otto Tepper, a new *Stylidium* (*S. Tepperiana*, F. Muell.), collected in November 1886 on Mount Taylor, Kangaroo Island, Victoria, Australia. It was found in the interstices of a Tertiary limestone. Other trees which grew in the neighbourhood were stunted Eucalypts, Hawkeas, and an Acacia somewhat resembling *A. pycnantha*.—Sir J. Lubbock drew attention to examples of *Peziza coccinea* from Ilfracombe.—A dried specimen of *Primula imperialis*, Jungh., collected by Dr. Sydney Hickson in Java, was exhibited from the Royal Gardens, Kew. This species is a giant form of *Primula*, being over 3 feet in height. Plants of this Himalayan and Malayan species are now under cultivation at Kew, and form an interesting addition to this popular group of garden plants.—Mr. G. Maw showed two rare Narcissi, both known under the name of *N. cernuus*. The daffodil discovered by Mr. Buxton in the Pyrenees at 7000 feet altitude is interesting as the only white form known in a wild habitat. A diminutive, orange-coloured species, flowered by the Rev. C. Wolley Dod from bulbs collected by Dr. Henriques, of Coimbra, appears to be allied to *N. triandrus*.—Sir J. Lubbock read the second part of his paper on phytobiological observations, and on the leaf of *Liriodendron*. In *Œnothera biserta* the seed-leaves are linear, terminating in a large round expansion. There is nothing to account for it in the seed, nor does it appear to be of any advantage to the young plant. On watching the growth, however, and comparing it with that of other allied species, the explanation appears to be as follows: the cotyledons are at first round, but a growth takes place at the base of the cotyledon, which closely resembles that of the subsequent leaves, hence their peculiar figure in this species. In allied species the seed-leaves consist of two parts, a terminal portion—the true or original cotyledon—and a subsequent growth resembling in each species their true leaves. With reference to seed-leaves in which the stalks are connate, *e.g. Smyrnium*, the union seems clearly advantageous as giving additional strength. Other characters in various species, *Plantago*, *Tilia*, *Heliophila*, *Cardamine*, &c., were instanced. As to the tulip-tree (*Lirio-*

dendron), for long a puzzle by the peculiar saddle shape of the leaves, after testing various other suggestions which had proved untenable, Sir John described the structure of the bud and the manner in which the young leaves were packed in it, and showed that the peculiar manner in which the young leaves are arranged, satisfactorily accounts for the well-known and very remarkable form of the leaf.—A paper was read on *Dichelaspis pellucida*, by Dr. Hoek, of Leyden. The cirripede in question was got from the scales of a water-snake in the Mergui Archipelago by Dr. J. Anderson, and this is believed to be the first record of the species since Charles Darwin wrote his classic monograph on the group thirty-five years ago.

Zoological Society, February 15.—Prof. W. H. Flower, F.R.S., President, in the chair.—The Secretary read a report on the additions that had been made to the Society's Menagerie during the month of January 1887, and called special attention to two Blakiston's Owls (*Bubo blackistoni*) from Japan, presented by Mr. J. H. Leech; three Hooker's Sea-Lions (*Otaria hookeri*), presented by the Hon. W. J. M. Larnach, Minister of Marine of New Zealand; and a Blue Penguin (*Eudyptu'a minor*) from Cook's Straits, New Zealand, presented by Mr. Bernard Lawson.—Prof. F. Jeffrey Bell read a report on a collection of Echinodermata made in the Andaman Islands by Colonel Cadell. The collection was stated to contain 100 examples referable to 50 species.—Mr. G. A. Boulenger read a paper on a collection of Reptiles and Batrachians made by Mr. H. Pryer in the Loo Choo Islands. The author observed that exceptional interest attached to this collection, seeing that it was the first herpetological collection that had reached Europe from that group of islands. Two new species were described, viz. *Tachydromus smaragdinus* and *Tropidonotus pryeri*.—Mr. Oldfield Thomas read a paper on the small Mammals collected in British Guiana by Mr. W. L. Sclater. The collection contained thirteen specimens belonging to eight species, of which one was new; this the author proposed to describe as *Hesperomys* (*Rhipidomys*) *sclateri*.—Mr. G. A. Boulenger pointed out the characters of a new Geckoid Lizard from British Guiana. The specimen in question was contained in a small collection of Reptiles made by Mr. W. L. Sclater on the Pomeroon River. The author described it as *Gonatodes annularis*.—A communication was read from Mr. Charles O. Waterhouse, containing an account of a new parasitic Dipterous Insect of the family Hipposcidæ. The author stated that this insect had been found on a species of Swift (*Cypselus melanoleucus*), by Dr. R. W. Shufeldt, at Fort Wingate, New Mexico. It was closely allied to *Anapera pallida*, a European dipterous parasite found on *C. apus*, and was proposed to be named *Anapera fimbriata*.—Mr. John H. Ponsonby communicated, on behalf of Mr. Andrew Garrett, the first part of a paper on the Terrestrial Mollusks of the Viti or Fiji Islands.—Mr. F. E. Beddard read a paper on the structure of a new genus of Lumbricidæ (*Thamnodrilus*) discovered by Mr. W. L. Sclater in British Guiana, which he proposed to characterise as *Thamnodrilus gulielmi*.

Anthropological Institute, Feb. 8.—Mr. Francis Galton, F.R.S., President, in the chair.—A paper was read by Sir Charles Wilson on the tribes of the Nile Valley north of Khartoum. Sir Charles Wilson opened his paper by remarking on the extraordinary way in which the various races inhabiting the Nile Valley—with many of whom he had come in contact in the course of the Nile Expedition—had become mixed up, and how completely the indigenous population had in certain cases lost its nationality while absorbing its Arab conquerors. The tribes of the Nile Valley north of Khartoum might be divided into three groups, the Hamitic, the Semitic, and the Nuba, all alike claiming descent from the Koreish of Mecca. Sir C. Wilson then proceeded to give briefly a history of the different tribes from the earliest times, describing in detail the peculiarities and physical characteristics of each race. A number of Soudanese weapons, lent by Sir Allen Young, were exhibited.

PARIS

Academy of Sciences, February 21.—M. Gosselin, President, in the chair.—Determination of the constant of aberration: first method of observation, by M. Lœwy. In this paper the author proceeds to explain successively the geometrical properties on which depend the various methods of estimating the constant of aberration. The first of the two processes is here dealt with, which, although somewhat less rigorous than the general method, practically yield results of the greatest precision, while also enabling the observer to determine two other physical constants—the variation of refraction caused by change either of temperature or of atmospheric pressure.—Note on M. Faye's recent communication regarding waterspouts, by M. Mascart. M. Faye having again raised this question in connection with M. Weyher's experiments, the author returns to his original contention that the great body of observed phenomena are directly opposed to M. Faye's theory of cyclones.—On the development of the Pennatulæ (*Pennatula grisea*), and on the favourable biological conditions presented by the Arago Laboratory for zoological studies, by M. H. de Lacaze-Duthiers. A visit paid to the Arago station last October suggests some remarks on the flourishing condition of the Alcyonaria and Pennatulæ, which have become thoroughly acclimatised in this district. A general description is given of the laboratory and reservoir at the Fontaulé headland, which has been enlarged to a capacity of 130 cubic metres, offering every facility for the study of sponges, star-fish, tritons, and many other lower forms of marine life.—On the Alpine flora surviving in the Paris district, by M. A. Chatin. The author discusses the various hypotheses which trace this already described flora either to the Scandinavian or Swiss Alps or to the Pyrenees, and concludes generally that the Parisian highland flora is independent of all, and truly aboriginal. It is also contended that most of the present European vegetation goes no further back than the Quaternary formations, and that for plants there has been independent succession and plurality of centres of creation rather than widespread diffusion from a single centre.—On the orthobutyrate and isobutyrate of lime, by MM. G. Chancel and F. Parmentier. An exhaustive study of these substances shows that M. le Chatelier's approximate relation—

$$\frac{dx}{x} : \frac{k}{\delta}\,\varrho\,\frac{dt}{T^2},$$

giving the variation of solubility of different bodies, with their heat of solution at saturation, cannot be regarded as the expression of a general law from which fresh deductions may be safely drawn.—On the red fluorescence of alumina (second notice), by M. Lecoq de Boisbaudran. Here are treated two highly calcined aluminas + Cr_2O_3 and + Bi_2O_3, and a moderately calcined alumina + Bi_2O_3.—On the incubation of Phylloxera during the winter season, by M. A. L. Donnadieu. In reply to M. Balbiani, who holds that the Phylloxera of the oak completes the entire cycle of its evolution in a single year, the fertilised eggs hibernating during the ensuing winter, the author's researches lead to the conclusion that the activity of this organism is not interrupted during the period of suspended vegetation of the plant on which it lives. A like conclusion is arrived at as regards the Phylloxera of the vine, which on this plant continues without interruption, but with a somewhat diminished intensity, the biological evolutions of its summer life throughout the winter season.—Observations of Brooks's comet made at the Observatory of Toulouse, by M. Baillaud.—On Gauss's quadrature formula, and on Hermite's formula of interpolation, by M. P. Mansion.—On the orthogonal systems formed by the θ functions, by M. F. Caspary.—On the movements of the air, by M. Ch. Weyher. A series of experiments are described which have been carried out by means of a jet of air or vapour a demi-millimetre in diameter and inclined 45° to the horizon, holding in suspense two spheres, one of cork with a diameter of 20 mm., the other of caoutchouc inflated with air. The centre of gravity of the spheres is below the axis of the jet, which thus causes them to revolve round each other, while their weight is balanced by the attraction produced by the series of little eddies developed along the sides of the jet.—On a method of determining the induction flux traversing an electro-magnetic system, by M. R. Arnoux. A simple method is described, by means of which this quantity may be accurately determined without the aid of the ballistic galvanometer, which is not available for practical purposes.—On the causes determining the phosphorescence of the sulphuret of calcium, by M. A. Verneuil. From the author's researches, which are still in progress, it appears that the violet sulphuret of calcium prepared from shells owes its bright phosphorescence to the salt of bismuth, the carbonate of soda, the sea-salt, and the sulphate of lime formed during the reaction.—Action of some metals on weak solutions of the nitrate of silver, by M. J. B. Senderens. It is shown that by acting on such solutions lead reduces the nitric acid while the silver is precipitated; also that analogous phenomena are presented by zinc,

iron, tin, cadmium, antimony, and aluminium.—Action of sulphuric acid on the solubility of the sulphates, by M. R. Engel. Sulphuric acid, acting on solutions of sulphates incapable of combining with it to form acid sulphates, determines a diminution of the solubility of the salt. But this is shown to take place according to a law different from that observed for the chlorides in presence of hydrochloric acid.—On the reproduction of the micas, by MM. P. Hautefeuille and L. Péan de Saint-Gilles. In this preliminary paper the authors confine themselves to some of their researches on the fusion of the elements of the micas with the fluosilicate of potassa.—Remarks on M. Boutroux's note regarding the action of nitric acid on sugar, by M. E. Maumené. M. Boutroux's statement that by the action of sugar and nitric acid he obtained saccharic acid and oxalic acid, but not hexepic acid, is shown to be erroneous.—On the treatment of new wines with sugar, by MM. D. Klein and E. Fréchou. The authors' experiments show the possibility of obtaining with alcohol of about the theoretic quantity right fermentations by means of which poor vintages may henceforth be converted into good wines capable of preservation.—A contribution to the study of the alkaloids, by M. Oechsner de Coninck.—Researches on the mode of action of colchicine taken as a therapeutic, and on the mechanism of this action, by MM. A. Mairet and Combemale. The authors' experiments show that this substance has the same diuretic or purgative action on men as on animals, but the former are three times more sensitive to its action than the latter.—Fresh studies on the embryogeny of the Nematodes, by M. Paul Hallez.—On the development of the Nematodes of the beetroot during the years 1885 and 1886, and on their modes of propagation, by M. Aimé Girard.—On the oscillations produced during the Eocene period in the Lavaul basin, by M. D. Œhlert.—On the geological constitution of la Montagne-Noire, Castelnaudary district, by M. J. Bergeron.

BERLIN

Physical Society, January 21.—Prof. von Bezold in the chair.—Dr. König spoke of the disadvantages of the hydro-oxygen lamps, and demonstrated a new lamp constructed by Herr Linnemann, in which the unsteadiness in the light, arising from the fact that in the common lamp the flame burned now in the burning tube and now outside of it, was avoided. In the new lamp the coal-gas or the hydrogen issued from a ring-shaped opening in the burner, while the oxygen in the centre was admitted through a capillary tube and did not come into contact with the burning gas till outside of the burner. In the middle of the blue flame was seen a bright point which gave the heat-maximum. Instead of the lime cylinder, Herr Linnemann used in his lamp zircon plates, which, at the place of the bright point, gave a highly intense constant light. The speaker made use of this light in order, with the aid of the optical bench of Prof. Paalzow, to demonstrate by projection a long series of phenomena in connection with the doctrine of the polarisation of light. For all teaching purposes and demonstrations this method of representing the most important optical phenomena could not be surpassed by any other.—Dr. Lummer described the experiments of M. Macé de Lepinay, who by a new method had determined the wave-length of the ray of light D_2, ascertaining, as he had done, by weighing, the volume of a quartz cube, the size of which was determined in units of the wave-lengths, and from the volume of the cube finding the length of the light-wave. The speaker showed a series of inaccuracies in the measurements of M. de Lepinay, and, in view of the fact that the wave-lengths of the rays of light were now measured with a precision of 1/60,000, whereas the determination of the centimetre was affected with an uncertainty of 1/4000, he purposed inversely ascertaining the length of the centimetre from the wave-length. The mode of procedure should be the same as that made use of by M. de Lepinay, yet several improvements in the measuring and weighing were stated, such as the speaker hoped to be able to effect later on.—Dr. Dieterici showed an apparatus designed by Prof. Köppen which enabled one to fill a barometer free of air very rapidly. An upright standing communicating-tube open at one end for the admission of the quicksilver issued at the other end in a capillary tube passing at the bottom into a vessel. The open leg of the siphon was longer than the other. On pouring in the quicksilver it rose uniformly in both legs, forced up the air in the closed leg and through the capillary outwards. When the closed leg was entirely filled with quicksilver, and yet more continued to be poured in, it drained itself off through the capillary, bearing along with it all the air, in the same manner as did the Sprengel pump. The quicksilver became collected in the lower vessel and closed the lower opening of the capillary. The vacuum was thus established, and in the closed leg of the communicating-tube the quicksilver sank to barometer height.—Prof. H. W. Vogel presented photographs of coloured objects which in the distinctness of their *nuances* perfectly corresponded with the impression conveyed by the objects themselves to the eye. The speaker had, in conjunction with Herr Oberneth, succeeded in finding in eosin-silver a substance rendering the photographic plates most highly sensitive for the yellow-green rays, corresponding with the utmost sensitiveness of the retina for those rays. The photographs of solar spectra and different landscapes attested the excellence of this "sensibilisator."

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