SOCIETIES AND ACADEMIES

LONDON

Royal Society, April 16.—"Note on an Experiment by Chladni." By Charles Tomlinson, F.R.S.

Lord Rayleigh, in a memoir "On the Circulation of Air in Kundt's Tubes," &c., remarks (*Phil. Trans.*, 1884, part 1, p. 1) that "it was discovered by Savart that very fine powder does not collect itself at the nodal lines, as does sand in the production of Chladni's figures, but gathers itself into a cloud, which, after hovering for a time, settles itself over the places of maximum vibration.

In Savart's memoir, "Sur les Vibrations Normales" (*An. de Ch. et de Ph.* for 1827, xxxvi. 187), the author distinctly claims the above-named discovery. At p. 190 he refers to the nodal lines of Chladni, but adds that by mixing with the sand a finer dust, such as lycopodium, "la poussière fine se réunit pour tracer d'autre lignes circulaires que ce physicien n'a pas connues," &c.

Faraday, in his critical examination of Savart's memoir (*Phil. Trans.*, 1831, p. 299) apparently takes it for granted that Savart started with an original observation.

But this interesting discovery, which has been so fruitful in beautiful results, is really due to Chladni. In his "Traité d'Acoustique," Paris, 1809, he remarks, p. 125:—"Si un peu de poussière fine est mêlée au sable, elle pourra mieux servir pour faire voir aussi les centres des vibrations, c'est-à-dire, les endroits où les parties vibrantes font les plus grandes excursions: les molécules les plus petites de la poussière s'accumuleront sur ces endroits."

Chladni is even more explicit in his "Neue Beyträge zur Akustic" (4to, Leipzig, 1817). At p. 7 he recommends "etwas *Pulvis lycopodii*" as the fine dust to be mixed with the sand; and at p. 69 he remarks that when fine dust accumulates on the centres of vibration, it is in heaps more or less round or long, &c., according to the form assumed by the vibrating part.

When Wheatstone reproduced Chladni's figures on square plates (*Phil. Trans.*, 1833, p. 593) he did not notice the remarkable figures produced by mixing a fine powder with the sand. This was the less necessary because Faraday's memoir had been so recently published, and its conclusion was so satisfactory, namely, that when a plate is vibrating, currents are established in the air lying upon the surface of the plate, which pass from the nodal lines towards the centres of maximum vibration, and then, proceeding outwards from the plate to a greater or less distance, return towards the nodal lines.

With the exception of a very few elementary specimens on a small scale, as given by Chladni and Faraday, this class of figures has been neglected by writers on physics. The author then gives directions for the production of these figures when sand and lycopodium, flowers of sulphur, &c., are used, and in a folding sheet twenty-one are represented of plates of various material and form.

April 16.—"On the General Characters of *Cymbulia*." By John D. Macdonald, R.N., M.D., F.R.S.

The Pteropoda being so purely pelagic in their habit places them out of the reach of zoologists in general; and even systematic writers, as in other cases, are often misguided by incorrect figures and descriptions made up probably from scanty or defective data, but which have, nevertheless, been handed down to us with a show of truth.

The author was impressed with the idea that the figures and descriptions of the species of *Cymbulia* extant were not reliable; and having had an opportunity of examining some specimens taken in the Indian Ocean, he found that such was really the case. In the natural position of the animal the toe of the hyaline slipper of *Cymbulia* should be taken as posterior, and the broadly-notched heel as anterior. Both animal and shell are reversed in Mr. Adams's figure of *Cymbulia proboscidea*, but this is, after all, an error of less importance than that in De Blainville's figure, in which, although the shell is represented in its proper position, the animal is reversed. A pair of eyes are also given in a position where ears alone would be possible, while there is no more evidence of the existence of eyes in *Cymbulia* than in any other genus of Pteropods. The notion of a ventral connecting lobe between the fins is a mistake, though these organs are connected above and behind so as to form a broad, continuous plate.

Zoological Society, April 21.—Prof. W. H. Flower, LL.D., V.P.R.S., President, in the chair.—Mr. Sclater exhibited and remarked on a pair of pheasants from Bala Murghab, Northern Afghanistan, belonging to H.R.H. the Prince of Wales.—Mr. G. E. Dobson, F.R.S., exhibited some skulls of *Crocidura aranea*, and pointed out that they possessed supernumerary teeth (premolars) in the upper jaw.—The Secretary exhibited, on behalf of M. George Claraz, an egg of Darwin's Rhea; and read some notes by M. Claraz on the habits and distribution of this Rhea.—Mr. G. A. Boulenger exhibited a specimen of a Brazilian Snake which had partly swallowed an Amphisbænoid Lizard. The lizard had in its turn partly eaten its way out through the body of the snake.—A communication was read from Sir Richard Owen, K.C.B., containing remarks on the structure of the heart in *Ornithorhynchus* and in *Apteryx*.—Mr. Oldfield Thomas read a paper on the characters of the different forms of the *Echidna* of Australia, Tasmania, and New Guinea, all of which he was inclined to refer to one varying species.—Dr. St. George Mivart, F.R.S., read a memoir on the anatomy, classification, and distribution of the Arctoidean Carnivorous Mammals. The author, after briefly noticing the papers of other naturalists who have of late years treated of this subject, described the main facts concerning the anatomy of the various Arctoid genera, especially as regards their osteology and dentition, and gave detailed comparisons of the proportions of the various parts of the skeleton, comparing them with those of the Æluroids and Cynoids.—Dr. F. H. H. Guillemard, F.Z.S., read the second part of his report on the collection of birds made during the voyage of the yacht *Marchesa*. The present paper gave an account of the birds collected in Borneo. It also contained notes on some birds obtained on the island of Cagayan Sulu, on the north-east coast of Borneo.

Royal Microscopical Society, April 8.—The Rev. Dr. Dallinger, F.R.S., President, in the chair.—Mr. Crisp exhibited a model of an old microscope described in an Italian work published in 1686.—Mr. H. G. Madan exhibited and described Bertrand's polarising prism. He also exhibited a modification of Ahren's double-image prism.—Mr. Dowdeswell exhibited some septic microbes from high altitudes, and detailed experiments as to bacterial germs found at various heights, notably upon the Neisen, at an elevation of about 7500 feet.—Mr. A. D. Michael gave a summary of his paper on "New British Oribatidæ." He first called attention to the nymph of *Cepheus bifidatus*, which he had just discovered; the species is very rare, and the immature stages were not known. Last September, at Keswick, Mr. Michael found two or three specimens, and instead of preserving them as examples, determined to try and breed from them. He isolated them, and after some weeks obtained a few eggs; from which he reared four larvæ; these he has carefully watched for six months until they had changed to nymphs and become full grown; he then killed and preserved two specimens of the hitherto unknown nymph, reserving the two others to rear to the imaginal condition. One was lost just before the final change, the other lived. The nymph which was exhibited was a very remarkable and beautiful creature, surrounded with concentric rows of curved serrated spines longer than the body. Mr. Michael then called attention to a new species of *Hypochthonius*, proposed to be called *H. lanatus*. The abdomen is segmented, and the segments are to a certain extent retractile, as in many insects; this enables the creature to erect or lower the long spines attached to the edges of the segments at will.—An interesting new species, to be called *Notaspis serratus*, abundantly provided with long serrated hairs, and a curious nymph of a *Damæus*, to be called *D. tenupes*, which carries its cast dorsal skins in a pyramid on its back, like a pile of dish covers, and has a central projection on each skin, forming a column to support the whole, were also shown and described, besides other new species.—Mr. Crisp called attention to some very interesting experiments by Dr. Nussbaum and Dr. Gruber, on the artificial division of infusoria. Dr. Nussbaum divided an *Oxytricha* into two halves, either longitudinally or transversely, and found the edges at the point of division were soon surrounded with new cilia. Dr. Gruber artificially divided *Stenter cæruleus* with similar results.—Mr. C. H. Kain's letter on the use of balsam of Tolu was read.—Mr. H. Mills's note on the filamentous projections on the margin of the diatom (*Stephanodiscus niagaræ*) was read, and slides in illustration were exhibited.—Mr. G. C. Karop remarked on an examination he had recently made of the saliva in a case of hydrophobia. The specimens presented the following characters.—Epithelium in large masses, most of the cells crowded with micrococci; bacilli of various lengths, and very variable in diameter. A few showed evidence

of spore formation, and were surrounded by a capsule. Micrococci abundant in masses, diplococci and short chaplets. He also exhibited a drawing of the bacilli.—Mr. J. Mayall, jun., exhibited the diamonds belonging to the ruling machine of the late F. A. Nobert, a typical one being shown under the microscope by Mr. Powell. They had been submitted to various diamond experts and workers with conflicting results, but the careful examination made by Mr. L. Fletcher of the British Museum with the goniometer, showed that in nearly every instance the edges were formed by one natural fracture and one polished face.—Mr. Hardy exhibited a colony of Vorticellæ, having the stalks agglutinated in a bundle, and covered with transparent gelatinous matter. It was found erect on leaves in colonies of 50 to 100, and appearing when loose very like large conochilus.—Mr. Cheshire exhibited a remarkable slide showing conductive nerve-threads escaped from the sheath of the ganglionic chain running through the first three segments of the abdomen of *Vespa vulgaris*.

Chemical Society April 16.—Dr. W. H. Perkin, F.R.S., Vice-President, in the chair.—The following papers were read:—A crystalline tricupric sulphate, by W. H. Shenstone.—A modified Bunsen burner, by W. H. Shenstone.—Note on the history of Thionyl Chloride, by C. Schorlemmer, F.R.S.—On the reactions of selenious acid with hydrogen sulphide and of sulphurous acid with hydrogen selenide, by E. Divers and T. Shimidzu.—On a new and simple method of quantitative separation of tellurium and selenium, by E. Divers and M. Shimosé.

PARIS

Academy of Sciences, April 20.—M. Boulcy, President, in the chair.—Account of a new process for liquefying oxygen, by M. L. Cailletet. This process, the result of experiments recently conducted in the Physical Laboratory of the Sorbonne, is so simple and of such easy application that it may henceforth be introduced into the ordinary practice of the laboratory, and even repeated at lectures and before public audiences.—On the various hypotheses regarding the true nature of the purple of Cassius, by M. H. Debray.—Remarks on M. Poincaré's theory respecting the influence of the lunar tides on the trade winds, by M. Faye. It is suggested that M. Poincaré should be invited to give wider scope to his studies in this branch of meteorology, with a view to more fully testing the law that he has already deduced from his remarkable observations.—Note on the differences apparently presented by the various regions of the gray cerebral substance known as psycho-motor centres, as regards their different degrees of excitability, by M. Vulpian. The author rejects Pflüger's hitherto generally accepted theory, and, from further experiments carried out on the dog, arrives at totally different results.—Nebulæ discovered and recorded at the Observatory of Marseilles, by M. E. Stephan. The nebulæ observed at this observatory during the years 1883-84 are here arranged in tables showing the order and date of their discovery, right ascension, and mean polar distance for 1885.—Experiments recently made in Holland on an application of the system of large movable tubes of the pumping apparatus constructed at the sluice-gates on the Aubors River, by M. A. de Caligny.—Explorations of the mission sent to report on the recent earthquakes in the south of Spain, by M. Fouquet. Pending the publication of a complete memoir, a summary is here given of the observations made on the scene of the disturbances, with a view to determining their extent, effects, and probable origin.—On the geological constitution of the Serrania de Ronda, which occupies the western section of the region chiefly affected by the earthquake of December 25, 1884, in Andalusia; report by MM. Michel Lévy and J. Bergeron.—On the Secondary and Tertiary formations of Andalusia (provinces of Grenada and Malaga), report by MM. M. Bertrand and W. Kilian.—On the geological constitution of the Sierra Nevada, the Alpujarras, and Sierra de Almijara, report by MM. Ch. Barrois and Alb. Offret.—On the rotation of a heavy body suspended by a point of its axis, by M. Halphen. In this paper the author completes Jacobi's theory that the rotatory movement of a heavy body around a point of its axis may be replaced by the relative movement of two bodies on which no accelerating force is exercised.—On the equilibrium of a liquid mass to which a rotatory movement has been communicated, by M. H. Poincare.—Application of the empirical formula of mutual forces to the mechanical laws of solids and the general properties of bodies, by M. P. Berthot.—Note on two new indicators for taking the quantitative analysis alkalimetrically of the caustic bases in the presence of the carbonates, by MM. R. Engel and J. Ville.—On the volatile property of the oxygenised nitrites, by M. L. Henry.—On the formation of the alkaloids in pulmonary and other maladies, by M. Villiers.—On the part played by the winds in agriculture, their influence a chief cause of the fertility of Limagne d'Auvergne, by M. Alluard.—Note on the relation between the lunar declination and the mean latitude of the starting-points of the trade-winds, by M. A. Poincaré.—On the anatomical characters of the leaf and on epharmonism in the family of the Vismiæ, by M. J. Vesque.—On the variations in the respiration of plants at the different stages of their development, by MM. G. Bonnier and L. Mangin.—On the origin of the loam of the plateaux of Western Europe, by M. A. de Lapparent.—Note on a new method of defence against mildew in the French vineyards, by M. Minière.

ROME

Reale Accademia dei Lincei, December 14, 1884.—Influence of magnetism on embryogeny. Prof. Maggiorani made a communication to the Academy regarding his own researches on the influence of magnetism on embryogeny, and in one of the last sittings of the last academical session he made a statement as to some of the results at which he had arrived. He explained how the observations had up to that time been made on adult animals developed from magnetised eggs; in his more recent researches Prof. Maggiorani has studied the effect of magnetism on the formation of the embryo. In this case also he found that magnetism has a retarding action on the development of the embryo. In the experiments which he made in conjunction with Dr. Magini eggs that had been subjected to the action of magnets of different powers, and others that had not been so treated, were placed in an incubator. The eggs used were fresh, and every external source of disturbance was avoided. None of the eggs escaped the retarding action of the magnetism, the effect of which was found to be proportional to the strength of the magnet employed and the duration of its action. Greater activity seems to be manifested during the first ten days than during subsequent periods. In the first few days there was likewise observed the curious phenomenon of an exceptional energy in the vital functions of the embryo, an energy which contrasts with the subsequent retardation which the embryo undergoes in its own development. According to Prof. Maggiorani this last fact is a direct consequence of the initial increased energy of the vital processes, that increase of energy injuriously affecting the general nourishment of the embryo. The author concludes by proposing another explanation of the phenomenon, by means of interference, and he adduces some interesting analogies between the so-called vital force and magnetism.—On the fossil ziphioid found in the Pliocene sands of Fangonero near Siena. Signor G. Capellini read a paper on the Ziphioid (*Choneziphius planirostris*) found in the Pliocene sands of Fangonero near Siena. Two portions of the skull of this interesting delphinoid were found at Antwerp in 1809 and 1812, but hitherto no other remains of it had been discovered anywhere. Last year Prof. C. d'Ancona having acquired for the Florentine Museum portions of a skull and some other bones excavated near Siena, Prof. Capellini recognised that the fossil remains belonged to the same species of Ziphioid which had been illustrated by Cuvier in 1823 under the name of *Ziphius planirostris*. The portion of the specimen found at Siena supplies what was wanting in those obtained at Antwerp, and removes all doubt as to the true position of this singular cetacean; and enables us to establish correlations between the Upper Tertiary of Italy and Belgium, the sands of Montpellier, and the crag of England. According to Prof. Capellini, the fossil cetacean discovered near Siena is closely allied to the *Ziphius cavirostris* of the present day, a cosmopolitan species captured on several occasions even in the Mediterranean.—The English sunshine-recorder and the Italian lucimeter applied to agrarian meteorology. Prof. G. Cantoni drew the attention of the members of the Academy to the fact that at the beginning of the year Hirn had brought forward an actinometer of his own invention founded on the principle applied by the Italian Bellani to a small instrument which he reproduced, afterwards devoting himself to finding out a method for making out of it a *lucimeter* capable of being used by agriculturists. Prof. Cantoni has made numerous experiments on the lucimeter of Bellani, comparing its indications with those of the sunshine-recorder. Employing these two instruments together he

ascertained by means of the lucimeter the duration of sunshine at a given place, its intensity with relation to the height of the sun and the clearness of the air; and then by means of the sunshine-recorder the periods during which the sun shone more or less were recorded. The author advises students of vegetable physiology and agriculturists to make use of both instruments.—On the physio-pathology of the supra-renal capsules. Prof. G. Tizzoni has continued his ob ervations on animals from which he had removed the supra-renal capsules. The result of the last experiments shows that those animals which survived the operation suffered no change in health, in nutrition, or development. In those cases in which an abnormal bronze coloration was seen in the lips and the mucous secretions of the mouth and nose, it was ascertalned that this coloration stopped short at a certain point, and only in exceptional cases began to increase again so as to attain vast proportions; but there was observable a diminution, or even entire disappearance, of these pigmental spots. In none of the rabbits experimented on was there any impoverishment of the blood discoverable; the proportion of hæmoglobin appeared to be quite normal. The important fact in this communication of Prof. Tizzioni's consists in this, that the supra-renal capsules may be renewed, and that when that takes place the new capsule arises at a position situated at some distance from that occupied by the old capsule which had been removed. The tissue giving rise to the new organ is that of the sympathetic nervous system, and hence the capsules belong to the nervous system of organic life. We have thus the demonstration not only of the possibility of the reproduction of an entire organ, but also of the nature of that process; and the bases for further investigations as to the functions of the organ are now fixed.—On the Columbite of Craveggia in Valvigezzo. Signor Strüver laid before the meeting the result of his crystallographic investigations of the columbite which he found in some specimens of pegmatite forming an extensive deposit near Craveggia in Valvigezzo (province of Ossola). In these masses of pegmatite Prof. Spezzia had already discovered a new variety of beryl. The columbite investigated by Prof. Strüver is a new mineral, not only for Italy, but even for the whole chain of the Alps. The degree of hardness of its crystals was found to be 6, and under the blowpipe the presence of iron and manganese was revealed.—On sylvic acid. Dr. L. Valente has succeeded in obtaining from colophony (common rosin) a well-determined acid, called sylvic acid. This is the only well characterised acid that has been extracted from colophony since the researches instituted by Lieberman, and the reactions obtained by him by means of a supposed sylvic acid show by the approximate results that he was only operating with a mixture. Dr. Valente intends to continue his researches, the incomplete results of which he presented on this occasion on the ground of his priority. Other communications:—Drs. Ricini and Marino-Zuco reported on the reactions obtained by them by means of nitrites on ferrous salts.—Dr. Mendini reported on the results obtained in studying the action of bromine on pyrotartaric and citicemic imide.

BERLIN

Physiological Society, March 13.—Dr. Goldscheider gave a short sketch of his investigations respecting points of sensation of warmth, coldness and pressure, in connection with the sense of feeling. The doctrine of the specific energies of the nerves, according to which each nerve-fibre was able to conduct only a definite quality of stimulations and sensations, had to encounter, as was known, great difficulties in connection with the sense of smell and the sense of touch, seeing that the number of smells was very manifold, and that, consequently, very many essentially different sensations were taken up and conducted by the primitive fibres of the nerves of smell, while, again, the stimuli acting on the cutaneous nerves were also qualitatively diverse. In the case of the sense of smell the difficulties would perhaps only be resolved when the very various smells were satisfactorily reduced to a few simple fundamental sensations. With respect to the sense of feeling, on the other hand, a sense which comprised the five different qualities of pain, pressure, tickling, warmth, and cold, the latest researches went to show that here in point of fact were different nerve-terminal apparatuses to be distinguished, each endowed with its own specific energy. In examining the sense of temperature in the skin by means of rounded metallic points, the speaker found that there were a very large number of points which were sensitive to cold, and also a number of other points which were sensitive to warmth. These were unequally distributed over the body, and decreased in number and density towards the periphery. They appeared to stand in a certain contrast to the fineness of the sense of touch, being found more rarely where the sense of touch was very delicate. On a more minute study of these points it was shown that they were ranged together in the form of chains, and that there were always several chains of cold or of warm points, as the case might be, radiating from one spot of the skin. These radiating centres lay, in the majority of cases, to the number of about 80 per cent., each at the root of a hair, though all hairs did not cover radiating centres of such chains, while, on the other hand, there were radiating points not situated at the roots of hairs. The chains of cold points, again, never coincided with those of warm points; but these two sets of chains lay adjacent to each other. The cold points were alone capable of generating cold impressions, while all other points of the skin never excited such cold sensations. There were, however, differences among the cold points, inasmuch as some always gave rise to the exclusive feeling of coolness, while others, even under weak stimulations, always produced only an intense feeling of cold. Entirely analogous to this arrangement was the arrangement of the warm points. Some generated the single feeling of lukewarmness, others that of warmth, and others, again, that of severe heat, no matter what the degrees of stimulation in the three different cases. Not only oscillations of temperature, but also mechanical and electrical stimulations, produced the feeling of cold at the cold points, and at the warm points the feeling of warmth. On the other hand, neither at the cold nor at the warm points did the prick of a fine needle cause a painful sensation. The cold and the warm points were anatomically sharply defined, and were constantly found respectively at the same spots of the skin. On further investigation it was, however, ascertained, after taking observations several times of small sections of the skin, that, in consequence of fatigue and habituation due to repeated stimulations, the points very soon ceased to act; but, on being left for a considerable time in repose, they came decisively into operation again at the same spots. The localisation of the sense of temperature was a highly developed one. When one measured the least distance at which two cold impressions were felt distinctly from each other, it was found at spots which contained few cold points to attain a maximum of from 4 to 6 mm., while the minimum was 0·8 mm. Dr. Goldscheider had made minute topographical studies on his own body in respect of the distribution of the points of temperature, and in general he had established that the number of warm points was less than that of cold points, that there were parts of the skin where neither cold nor warm points occurred, and that other parts contained indeed a few cold but no warm points—the glabella, for example. On the other hand, there was no spot on the surface of the body where warm points were found without the presence of cold points. In the outspreading areas of the sensory nerves, especially in those of the facialis, warm and cold points were numerous; but they were sparingly found in the middle lines of the body, as also over the bones. In regard to the theory of the sensations of temperature, Dr. Goldscheider ranged himself on the side of Weber's view, and assumed that a rise of temperature in the skin generated the feeling of warmth—that is, excited the warm points, while a depression of temperature created the feeling of cold, by stimulating the cold points. The experiments on the contrasting effects of temperature were very easily explained by this theory, when it was considered that each stimulation of the cold or warm points blunted them a little, and so rendered them more insensible to the next stimulation. Dr. Goldscheider, after the greater part of his experiments were concluded, received information that, previously to him, Herr Blix had demonstrated the existence of cold and warm points, and their electrical excitability; and, so far as these two independent series of observations covered each other, they completely coincided with each other in their results. After the speaker had thus conclusively established the specific energy of the sense of feeling in respect of the sense of temperature, he applied himself to examine the sense of pressure by means of fine cork points attached to a spiral spring. He found the sense of pressure likewise distributed over the skin in the form of points; and the points of pressure, which coincided neither with the cold nor with the warm points, but occupied altogether special spots of the skin—the sites of special nerve-apparatuses—were also arranged in chain-like rows, these rows likewise radiating from particular points. On the whole, the results in respect

of the pressure points were found to correspond with those in respect of the temperature-points both as regards their distribution and the mode of their specific activity. The localisation of the sensation of pressure was still finer than that of the sense of temperature. The smallest distance at which two neighbouring points of pressure could be recognised as distinct amounted to 0·1 mm. For the sense of pressure, therefore, just as much as for the sense of cold and warmth, the existence of specific nerve terminal apparatuses provided with specific energies was demonstrated. In reference to the sensation of pain, Dr. Goldscheider was of opinion that no special nerves were to be assumed. On the other hand, he thought that between the cold, warm, and pressure-points lay the terminal apparatuses of those nerves of feeling which produced specially the sensations of touch.—Dr. Tichomirow reported first on earlier morphologic investigations he had made into the embryological development of *Bombyx mori*, and brought out specially his observations on the process of segmentation of the Bombyx ovum, on the first development of the heart, and on the occurrence of an inner skeleton in the head of this insect. He then passed to the chemical examination of the ova of the Bombyx, which he had just finished in the chemical division of the Physiological Institute. The weight of the ova was not a constant quantity, 100 ova giving weights ranging from ·02 to ·06 gr. The firm membrane of the ova had hitherto been universally regarded as consisting of chitin. The easy solution, however, of this membrane in solution of potash proved the inaccuracy of this assumption. It consisted, on the contrary, of a peculiar substance distinguishable from chitin, not only by its ready solubility in potash, but also by a perceptible ingredient of sulphur. Chemically, this substance had most relation to keratin, yet it contained less carbon than the latter, and had therefore received a special name, "chorionin." A comparison of the chemical composition of winter ova which had undergone but a partial transformation with the Bombyx ova developed into caterpillars, showed that in the latter the dry weight had suffered a little diminution, and that the high glycogenous contents of the undeveloped eggs had almost entirely disappeared in the process of development, but, on the other hand, that chitin, which was wanting in the ova, was present in perceptible quantities in the caterpillars; while the nitrogenous bases (nucleïn, probably) were also present in greater quantity in the developed ova than in the undeveloped winter ova.

Meteorological Society, April 7.—Prof. Fischer spoke on metallic thermometers, and described the different kinds of thermographs which had been constructed for the measurement of temperatures by the expansion of the metals for meteorological purposes. At first only one metal was used, either in the form of a long pole fastened at one end and bearing a permanent register of temperatures attached to the other free end, or several pieces of metal were joined together in the form of a lever, to increase the thermal expansion. Later on, two or three metals in the form of plates were bound together, and the difference in the expansions of the different metals was employed as a measure of the temperature. Thermographs of this kind, composed of different metals, were still in use, especially in Switzerland. Several years ago Prof. Fischer had instituted an investigation for geodetic purposes into the rate of movement with which metals followed the atmospheric variations of temperature. The experiments were carried out with two metal points of a base instrument, and their temperatures measured with thermo-electric elements. The result of the experiment was that on a rise of atmospheric temperature the temperature of the metal was found to be constantly lower than that of the air, whereas under a fall of atmospheric temperature the temperature of the metal was warmer than that of the air. These differences were all the greater the greater was the variation of temperature, and especially when the change of temperature occurred rapidly. In consequence of these results, Dr. Maurer, of Zurich, had instituted more thorough comparisons between the readings of the metallic and quicksilver thermometers, and had arrived at results not only completely confirming those of the speaker, but further demonstrating that the differences between the registrations of the metallic and mercurial thermometers did not remain the same at all times, thus showing that the former were not to be relied on for meteorological observations.—Dr. Hellmann discussed a proposal for an inquiry into the requirements for correctly ascertaining the rainfall over a particular district or region. In order to determine how close ought to be the network of stations of observation in the lowlying plain of North Germany for the purpose of obtaining an accurate representation of the distribution of rain there, he proposed the erection of twelve rain-gauge stations over an area of about thirty-seven square kilometres, to be provided with similar rain-gauges, at which observations should continue to be taken for a number of years. One year's, and, still better, several years' observations would suffice to show what was the minimum of rain-stations necessary for the plain. The Society adopted the proposal, and empowered the Committee to carry it out.—Prof. Börnstein laid before the Society three barometric curves traced by self-registering barographs at three different points of the town on March 10. All three showed distinctly a fitful rising of the pressure—at the station situated most to the north at 3h. 28m. in the morning, at that situated south-south-east from the previous one at 3h. 40m., and at that to the south-east at 3h. 42m. From these exactly determined points of time and the distances of the three places, which were ascertained with equal precision, Prof. Börnstein calculated the velocity of propagation of the squall-like atmospheric impulse at 4 metres per second, the breadth of the wave-front at about 2900 metres, and the depth of the squall at 962 metres. From this observation it appeared how desirable it was for the study of atmospheric currents to have many barographs set up at stations situated near each other.

[In the report of the Berlin Physical Society, March 20 (NATURE, vol. xxxi. p. 596, line 29, 2nd column), for *sulphates* of iron, read *salts* of iron.]

STOCKHOLM

Academy of Sciences, April 15.—Prof. C. Malmsten communicated the results of some researches by himself on the theory of numbers.—Prof. Edlund gave a demonstration of the incorrectness of the now prevalent theory on unipolar induction.—Prof. Gyldén presented a paper by Herr K. Bohlin on the element of the orbit of the third moon of Saturn (Tethys).—The Secretary presented a paper by Prof. G. Dillner on the inversion of an algebraic integral as the expression for the radix of an algebraic equation, part 2.

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