

Fasc. vi. and vii.—On the convenience of forming national nurseries of vines resistant to phylloxera, by S. Trevison.—On the chronological determination of Lukanese porphyries, by Prof. Tararelli.—On the fundamental equation in the theory of linear differential equations, by Prof. Casorati.—Representation on punctuated space of some forms of the third species composed of straight lines, by S. Archieri.—On the institution of two new genera of arachnida, by Prof. Pavesi.—Electricity and earthquakes, by S. Serpieri.—List of algæ of the province of Pavia, by Dr. Cattaneo.—Second case of peritoneal transfusion with good success in an oligocitæmic insane person, by Profs. Colgi and Raggi.—On a transformation of the fundamental equations of hydrodynamics, by Prof. Paci.

THE *Revue Internationale des Sciences biologiques*, May, contains:—E. A. Schaefer, on the development of animals.—Carl Hoberland, infanticide among the ancients and the moderns.—L. Pasteur, on the cholera morbus in fowls; on virulent maladies and on vaccination.—M. Debievre, man before and on the threshold of history, a study of palæontological facts and of comparative archæology and philology.—Notice of learned societies.—The Academy of Sciences, Paris.—The Academy of Sciences, Amsterdam.—The Anthropological Society of Paris.

Morphologisches Jahrbuch, vol. vi., part 2.—Dr. A. Rauber continues his articles on the evolution of form and its transformations in the development of vertebrata, reaching its second section, on the multiplication of axes, pp. 56, with four plates and seven woodcuts illustrating various early stages of monstrous double-axial structures in various species of Salmo and Gallus.—Dr. J. Brock occupies 112 pages, illustrated by two plates, in endeavouring to establish a satisfactory phylogeny of the dibranchiate cephalopods.—Dr. H. von Thering contributes, on the vertebral column of *Pipa*, to the homology of its individual vertebrae and nerves with those of other anura.—Smaller contributions by Prof. Gegenbaur and by C. Rabl (on Planorbis development).—Reviews of German text-books of anatomy.

Gazetta Chimica Italiana, Fasc. iii. and iv.—On the ulmic matter obtained from sugar by action of acids, by S. Sestini.—On some derivatives of β -chlorobutyric acid, by S. Balbiano.—The diffusion and physiological state of copper in the animal organism, first announced by Bartolomeo Bizio, and elucidated by Prof. Giovanni Bizio.—Notice on the chemical constituents of *Stereocaulon vesuvianum*, by S. Paterno.

Bulletin of the United States Geological and Geographical Survey of the Territories, vol. v. No. 3, November 30, 1879.—J. A. Allen, on the species of the genus *Bassaris*.—W. H. Patton, the American Bembecidæ tribe Stizini; list of a collection of Aculeate Hymenoptera from North-Western Kansas; Generic arrangement of the bees allied to Melissodes and Anthophora.—George B. Sennett, further notes on the ornithology of the Lower Rio Grande of Texas, made during 1878, with annotations by Dr. E. Coues.—Henry Gannett, additional lists of elevations. Among these is a list of the mountain-peaks forming the Cordilleras of North America and of their passes.—Dr. Morris Gibbs, annotated list of the birds of Michigan.—Dr. Le Conte, the coleoptera of the Alpine Rocky Mountain Regions, Part 2.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, May 27.—“On the Structure and Development of the Skull in the Batrachia. Part III.” by W. K. Parker, F.R.S. (Abstract.)

Some of the work brought forward in this paper was in hand before the first part was in print. That initial piece of work dealt only with the formation of the skull in the common frog, but it was followed by another which appeared in the *Philosophical Transactions* in 1876, which treated of the skulls of the common and of the “aglossal” toads.

Of the latter types only two kinds are known, viz., the nailed toad of the Cape (*Dactylethra*), and the monstrous toad of Surinam (*Pipa*). All the bulk of the Batrachia are included in the sub-group “Opisthoglossa.” These have a tongue, and in most cases it is free behind and not in front; the “Proteroglossal” Batrachia are very few in number, and the character itself (as Dr. Günther informs me) is not well pronounced.

I have now worked out the skull, in one or more stages, in about a *tithe* of the known species, and in my second paper in

both of the aberrant (“aglossal”) types; in them this was done in various stages.

I am not aware that there is any “order” of any “class” in the Vertebrata where so large a percentage of species has been, or indeed *need be*, worked out, either in the skull or in any other part of their organisation.

That which calls for it here is the great and unlooked-for polymorphism of the species; I may explain this by saying that the skull, in really important modifications, differs more in the species of some of the genera than it does in the orders of some of the classes. As an instance, it would be no easy thing to find a malacopterous fish differing from an acanthopterous type, in deep-seated essential matters, so much as the common toad does from the other native species, viz., the *Natterjack*; and the common frog has only about half as many cranial elements as the bull-frog of North America.

If the metamorphosis of a single species be worked out exhaustively, it gives a range of structural characters which rises up from a larval creature on the level of the lampreys to a reptilian form not far below the Chelonia, and evidently related (obliquely, not genetically) to that “order.”

Moreover, whilst the “opisthoglossa” have larvæ with suctorial mouths, and a quasi-petromyzine structure altogether, the larvæ of the “aglossa” need only to be arrested as larvæ and to acquire a dense bony armature to be very close counterparts of the most *bizarre* forms of the ganoids of the “old red sandstone,” such as *Pterichthys* and *Coccosteus*.

The Batrachia show some remarkable things in their metamorphosis, both as to the *size* their larvæ obtain and the *time* during which metamorphosis is taking place.

In the bull-frog (*Rana pipiens*) the larvæ attain the length of about 5 inches, and take two or three years for their transformation; they may be hindered in this, and be made to take twice that time. In these the larvæ bear a moderate relation, as to size, to the adult form, which may be 7 inches long, although tailless.

But in a frog from the neotropical region (*Pseudis*) scarcely larger than our native form, the tadpole attains the length of nearly a foot, the tail acquiring a breadth of 4 inches.

As zoologists well know, it is easy to procure tadpoles of this species, but very hard to get an adult. I am of opinion that the adult condition is not attained until after many years; and it suggests itself to me that this species may be the not remote descendant of a type which did not finish its *anural* metamorphosis.

On the other hand, some of the neotropical forms have very small tadpoles. *Bufo chilensis*, a large toad, has them about half the size of those of our common native Batrachia, and the newly-metamorphosed individuals are no larger than a house-fly.

But in *Pipa* the small larvæ are thoroughly metamorphosed in the maternal dorsal pouches, and at first only do they show a trace (and only a trace) of branchial tufts.

These tadpoles, which never see the light as such, have wide mouths (not suctorial), and so also have the tadpoles of the other wraith of the sub-order “Aglossa,” viz., *Dactylethra*. In that kind, however, the larvæ become large, and are a long while undergoing their transformations, which take place in the water, according to rule.

In the skull of the adults much variation is evidently due to the different *size* to which the species attains; some, as the bull-frog, are as large as the common Greek tortoise; others grow scarcely larger than a bluebottle fly. As a rule these small kinds show two kinds of modification: they are apt to retain certain larval characters, and they are apt to acquire generalised characters such as do not normally appear in this group, which is very remarkable for the *fewness* of the parts or elements composing the adult skull.

Some of the large forms, as *Rana pipiens*, have many investing bones in their skull, such as must be looked for again in archaic and extinct types, whilst others, as *Ceratophrys* and *Calyptocephalus*, have a cranial armature that is dense, extended, and almost “ganoid;” this kind of skull, however, is found in middle-sized types also, as in *Pelobates* and *Nototrema*.

In the terminal suctorial mouth of the larva of the Opisthoglossa the mandibular pier and its free “ramus” are carried to the front of the head. After transformation, in the larger kinds, the gape is carried behind the head, as in the crocodile; it can be guessed how much modification such a change as this will necessitate.

But it is evident that a low suctorial fish, such as the *tadpole*

is, must have altogether a totally different kind of skull and skeleton to that of an active, noisy, intelligent, more or less terrestrial reptile, such as the frog becomes.

This necessarily great change involves some very curious and instructive *anachronisms*, so to speak, in the appearance of various parts and organs.

A low suctorial fish would have no fenestra ovalis or stapes, and in the tadpole it is some time before these appear.

The low (urodelous) Amphibia have, in most cases, the upper hyoid element suppressed, sometimes it is present, serving as a rudimentary "*columella auris*."

In most Batrachia this part does not appear until after transformation, and in some kinds not at all. This part especially shows how the *individual* is gradually changed, and makes it clear why so many variations should occur in genera and even species.

With regard to the geographical distribution of the Batrachia, there are many things of importance which I have rather hinted at than expressed in this paper.

There is a sort of *facies* or character about the allied types of any great geographical region which makes me satisfied that certain external characters repeat themselves again and again in different parts of the world.

Thus the types of frogs that have dilated toes are evidently more nearly related to those with pointed toes of the same region than they are even to the broad-toed types of some distant region.

I should be inclined to derive the *narrow-backed tree-frogs* of Australia from the sharp toed frogs of the same region; the same with those of India, and the same with those of the nearctic and neotropical territories.

The *true frogs* ("Ranidae") of India have many things in common, as also have the true frogs of North America; the same may be said of the sub-typical frogs, or "Cystignathidae."

On the whole the European and Indian territories yield the highest kinds; Australia and South America the lowest and most generalised.

Mathematical Society, June 10.—Mr. C. W. Merrifield, F.R.S., president, in the chair.—The following communications were made:—On a binomial biordinal and the arbitrary constants of its complete solution, by Sir J. Cockle, F.R.S.—On the focal conics of a bicircular quartic, by Mr. H. Hart, M.A.—Preliminary note on a generalisation of Pfaff's problem, by Mr. H. W. Lloyd Tanner, M.A.—On the resultant of a cubic and a quadric binary form, by Prof. Cayley, F.R.S.—On the theory of the focal distances of points on plane curves, by Mr. W. J. Curran Sharp, M.A.—Geometrical note, by Mr. H. M. Taylor, M.A.

Linnean Society, June 3.—Prof. Allman, F.R.S., president, in the chair.—The secretary read a paper on the specific identity of *Scomber punctatus*, Couch, with the *S. scomber*, Linn., by Dr. Francis Day. The specimen on which this opinion is founded was captured on the coast of Cornwall in April last.—In a note on the anal respiration in the zoea larva of the decapods, by Marcus M. Hartog, he shows from an examination and study of living larvæ of *Cancer* that the terminal part of the rectum is slightly dilated, and possesses a rhythmic contraction and expansion duly associated with opening and closing of the anus. A clue to the ultimate transference of branchial respiration may perhaps be found in the Entomostraca, where in certain forms food is obtained by a current from behind forwards due to the movement of the setose or flat limbs immediately behind the mouth. Prof. Claus has shown that in *Daphnia* the said limb processes have a respiratory function, while this animal also possesses a well-marked anal respiration.—Mr. G. Murray made a communication on the application of the result of Pringsheim's recent researches on chlorophyll to the life of the lichen. Summarising Pringsheim's labours and taking into consideration the views of Vines, Geddes, and Lankester, Mr. Murray arrives at the following conclusion:—That we have in lichens fungal tissues as the body of the thallus and the chlorophyll screen in the gonidial layer; that is, the chlorophyll is in one system of cells and the protoplasm apparently affected by it in another, which is in contact. The light which traverses the chlorophyll-containing gonidial layer excites in the fungal tissues the decomposition of carbonic acid.—Mr. P. Herbert Carpenter, in giving the results of some researches of his in the form of a paper on the genus *Solanocrinus*, Goldfuss, and its relations to recent *Comatula*, stated that Schlüter was perfectly justified in uniting *Solanocrinus* with

Antedon. The latter author does the same with *Comaster*, though to Mr. Carpenter, Goldfuss's description of this type appears to differ so much from all other *Comatulae* that he prefers provisionally to regard it as distinct. Mr. Carpenter's researches on the crinoids in question are based on material obtained from the *Challenger* Expedition and a study of the fossil forms contained in the Woodwardian (Cambridge) and British Museums; he thus finds, on comparison of the living with past Jurassic, Cretaceous, and Tertiary forms, that variations in the development of the basals are useless as generic distinctions.

Chemical Society, June 3.—Prof. H. E. Roscoe, president, in the chair.—It was announced that a ballot for the election of Fellows would take place on June 17. The following papers were read:—On some products of the oxidation of paratoluidine, by W. H. Perkin. The present paper contains a study of the action of chromic acid on the above substance. Some beautifully crystallised products were obtained; one having the composition $C_{21}H_{21}N_3$, melting at $216 - 220^\circ$, and giving a magnificent blue colour with sulphuric acid; it has the characters of a base; a second base, rather less soluble, melting at 175° was also separated; it has the formula $C_{23}H_{27}N_3$. By using glacial acetic as a solvent for the chromic acid in the above reaction paratoluene was formed.—On the detection of foreign colouring matters in wine, by Dr. A. Dupré. The true colouring matter does not dialyse; all the artificial colouring matters except alkanet dialyse freely, so that cubes of gelatine jelly soaked in the wine for forty-eight hours become scarcely tinged below the surface if the wine is pure, but if coloured with magenta, &c., the cube is stained to the middle. Alkanet is easily recognised by its absorption spectrum.—On the action of organozinc compounds upon nitrites and their analogues. I.—Action of zinc ethyl on azobenzene, by E. Frankland and D. A. Louis. In this reaction anilin is formed, much gas being evolved, consisting of 3 vols. of ethylene to 1 vol. of ethylic hydride. 70 gm. of anilin were obtained from 80 gm. of azobenzene.—II. On the action of zinc ethyl upon benzonitrile, by E. Frankland and J. C. Evans. Cyaphenine was the principal product of this reaction; this substance, by the action of strong hydrochloric acid in a sealed tube at 250° , is converted into benzoic acid and ammonia.—On the relation between the molecular structure of carbon compounds and their absorption spectra, by Prof. W. N. Hartley. The author has photographed the spectra of various substances; he concludes that no molecular arrangement of carbon atoms causes selective absorption, *i.e.*, gives absorption bands, unless three pairs of carbon atoms are doubly linked together in a closed chain. The most remarkable substance in this respect is anthracene, which, when diluted one in 50,000,000, gives a considerable and distinct absorption.—On a simple method of determining vapour densities in the barometric vacuum, by C. A. Bell and F. L. Teed. It consists of a modification of Hofmann's apparatus.—Mr. C. T. Kingzett made a verbal communication to the effect that he had recently investigated the question of the slow oxidation of moist phosphorus in air, and had obtained evidence that both ozone and hydroxyl were formed.

Zoological Society, June 1.—Prof. W. H. Flower, F.R.S., president, in the chair.—Mr. Sclater made some remarks on the principal objects he had noticed during a recent inspection of the Zoological Gardens of Berlin, Hamburg, Amsterdam, the Hague, and Antwerp.—The Secretary exhibited a spider of the genus *Tegenaria*, which had been forwarded to him from Cape Town by Mr. J. H. Payne, of that place. It had been taken within three miles of Cape Town, on the back of a horse, which had subsequently died, as it was said from the effects of the bite.—Mr. G. E. Dobson exhibited some new and rare species of bats, amongst which was an example of a new species of the genus *Megaderma*, from Australia, proposed to be called *Megaderma gigas*, and remarkable for its large size.—Mr. Dobson made some further remarks as to the date of the receipt of the Dodo bones exhibited by him at a former meeting.—Lord Lilford exhibited and made remarks on some nests and eggs of the Flamingo, which had been taken in the marshes of the Guadalquivir, below Seville, in April, 1879.—Lord Lilford also exhibited some fine hybrid pheasants, between males of Reeves's pheasant and hens of the common pheasant.—Mr. E. W. H. Holdsworth read a note on the distribution of the crayfish (*Asiaticus*) in Spain.—Prof. F. Jeffrey Bell read a paper on some species and genera of the Temopleuridae, in course of which he described the method he had adopted in comparing different species, and species at different stages in growth; he also directed

especial attention to the differences in the size of the generation pores in *Amblyneustes formosus*, and discussed the specific characters of *Salmacis globator*.—A communication was read from Dr. A Günther, F.R.S., containing notes on a collection of mammals from Japan.—Mr. G. E. Dobson read a description of a new species of bat, of the genus *Natalus*, from Jamaica, which he proposed to name *N. micropus*.—Mr. A. W. E. O'Shaughnessy read the description of a new species of lizard of the genus *Uromastix*, from Zanzibar, which he proposed to call *U. princeps*.

Geological Society, May 26.—Robert Etheridge, F.R.S., president, in the chair.—Prof. Frederick Guthrie, F.R.S., Rudolf Hænsler, Ph.D., James Hulme, William Jolly, Charles Myhill, and Alfred George Savile, were elected Fellows of the Society.—The following communications were read:—The pre-carboniferous rocks of Charnwood Forest (Part III.; conclusion), by Rev. E. Hill, M.A., F.G.S., and Prof. T. G. Bonney, F.R.S.—In their former communications the authors had paid less attention (from want of time) to the northern part of the forest than to the rest. This district has during the last two years engaged their special attention. They had provisionally retained the name quartzite for the rocks exposed about Blackbrook, &c., probably the lowest visible on the forest. This name proves to be inappropriate, and they propose to call the group, which contains much fine detrital volcanic material, the Blackbrook Series. They have also reason to believe that the anticlinal fault is less than was supposed, and that we have here a fairly unbroken base for the forest rock already described. In this case there ought to be representatives of the great agglomeratic masses on the western side of the anticlinal (High Towers, &c.). The authors believe that they have found these, though as much finer and more water-worn detritus, in the greenish grits above Longcliff and Buckhill. The authors also believe that they have succeeded in tracing a coarse agglomerate with slate fragments round about three-fourths of the circumference of the forest. Further notes upon the district of Bardon Hill, Peldar Tor, and Sharpley are given, and the origin of the remarkable rock of the last, so like some of the Ardennes porphyroids, is discussed; the authors believe it to be a volcanic tuff, altered by the passage of water or of acid gases. Descriptions of the microscopic structure of some of the rock-fragments included in the coarse agglomerate and of some of the slates are given. Also a notice of two small outbursts of igneous rock of the northern syenite type, previously unnoticed, are mentioned.—On the geological age of Central and West Cornwall, by J. H. Collins, F.G.S. The author divided the stratified rocks of this district into four groups, as follows:—1. *The Fowey Beds*, mostly soft shales or fissile sandstones, with some beds of roofing-slate; no limestones or conglomerates. These beds cover an area of not less than eighty square miles, and contain numerous fragmentary fish-remains and other fossils, many as yet undetermined, the whole, however, indicating that the beds are either Lower Devonian or Upper Silurian. The strike of the beds is north-west to south-east, and they are estimated to be not less than 10,000 feet thick. 2. *The Ladoch Beds*, consisting of slaty beds, sandy shales, sandstones, and conglomerates; no limestones and no fossils. They cover an area of more than 100 square miles to the west and south of St. Austell, strike from east to west, and overlie Lower Silurian rocks unconformably. They are estimated at from 1,000 to 2,000 feet thick. 3. *The Lower Silurians* consist largely of slates and shales, with some very thick conglomerates (one being at least 2,000 feet thick), some quartzites, and a few thin beds of black limestone. The quartzites and limestones have yielded fossils (chiefly Orthidæ) which are pronounced to be of Bala or Caradoc age by Davidson and others. The total thickness of these beds is estimated at 23,000 feet, and the fossils are found in the upper beds only. Instead of occupying only about twelve square miles, as shown on the Survey maps, they extend over nearly 200 square miles, and reach southward beyond the Helford River, and westward to Marazion. The strike of these rocks is from north-east to south-west. 4. *The Ponsanooth Beds* occur beneath the Lower Silurians, and unconformable with them (strike north-west to south-east); they are often crystalline, and are estimated at 10,000 feet thick. Each of these formations has its own set of intrusive rocks; each has been contorted and in part denuded away before the deposition of its successor. The various granitic bosses have been pushed through this already complex mass of stratified rocks without materially altering their strike, which does not in general coincide with the line of junction. The

chemical effects of the igneous intrusions are generally considerable, and somewhat proportioned to their relative bulk.—On a second pre-Cambrian group in the Malvern Hills, by C. Callaway, D.Sc. F.G.S.

Anthropological Institute, May 25.—Edward B. Tylor, F.R.S., president, in the chair.—Dr. H. Woodward read extracts from a paper by Prof. J. Milne, F.G.S., of the Imperial College of Engineering, Yedo, on the Stone Age in Japan. The author described, from personal examination, many of the archaeological remains in Japan. Kitchen-middens are abundant, and are ascribed to the Ainos, the ornamentation on the pottery resembling that still used by the Ainos of to-day. The shells and bones found in the middens were enumerated and described. The stone implements found in Japan include axes, arrow-heads, and scrapers. Many of these occur in the middens. The axes are formed generally of a greenish stone, which appears to be a decomposed trachytic porphyry or andesite. The Ainos used stone implements up to a comparatively modern date. Tumuli occur in many parts of Japan, as well as caves, both natural and artificial. Prof. Milne had opened one of the latter, and found the interior covered with inscriptions. The Japanese themselves make valuable collections of stone implements, old pottery, &c., the favourite notion among them being that such things were freaks of nature. Several fragments of pottery, shells, and other remains from kitchen-middens were exhibited.—Mr. C. Pfoundes read an interesting paper on the Japanese people, their origin, and the race as it now exists. Passing over the fabulous period, we find the Japanese commence their era and history about the same time as that of Rome, B.C. 660; the first Emperor, Mikado, or Ruler, established himself in the vicinity of Kioto, not very far from the present treaty ports Osaka-Kiogo. For centuries history teems with accounts of efforts to civilise the people, and the wild and intractable aborigines were gradually driven northward, until they settled in the North Island, where they still exist and form the bulk of the present inhabitants. Mr. Pfoundes exhibited a valuable collection of photographs and drawings in illustration of his paper, together with articles of Japanese manufacture and some fine specimens of tapestry.

Entomological Society, June 2.—Sir John Lubbock, Bart., F.R.S., president, in the chair.—Miss Georgiana Ormerod, of Isleworth, and Mr. Hy. Lupton, of Chapel Allerton, Leeds, were elected Ordinary Members.—Mr. M. J. Walhouse exhibited a collection of moths from Mangalore, on the Malabar coast, many of the species of which resembled palæarctic forms.—Mr. J. A. Finzi exhibited, on behalf of Mr. Lowrey, a bred specimen of *Arctia fuliginosa* which possessed only one antenna. The President stated that he had occasionally bred ants with only one antenna, and on one occasion had possessed a specimen with no antennæ at all.—The President also exhibited specimens of a new Australian ant received from Mr. Waller, which agreed with the genus *Myrmecocystus*, of Wesmæl, in having an immensely distended abdomen, so that the insect actually serves as an animated honeypot.—The Rev. H. S. Gorham communicated the concluding portion of his Materials for a Revision of the *Lampyriæ*.

Victoria (Philosophical) Institute, June 8.—Annual Meeting.—The Right Hon. the Earl of Shaftesbury, K.G., in the chair.—Prior to the delivery of the address by Bishop Cotterill, D.D., F.R.S.E., the honorary secretary, Capt. F. Petrie, read the report, from which it appeared that the total number of Members was now 835.—The subject of the annual address was one aspect of the relation between the scientific and the religious view of the universe.

VIENNA

Imperial Academy of Sciences, February 19.—The following among other papers were read:—On the relation of the muscle-current to local chemical changes of the muscle substance, by Dr. Biedermann.—On orthoethylphenol, by Drs. Suida and Plohn.—Theory of conic surfaces of the fourth degree with a double conic section, by Herr Ameseden.—Changes of form of electrical figures by magnets, by Prof. Reitlinger and Dr. Wächter.—On ventilation in schoolrooms, by Herr Nachtmann.—On the decomposition of nitrososulphhydantoin with bases, and on a new acid, nitrosothioglycolic acid, by Prof. Maly and Herr Andreash.

March 4.—On the orbit of the planet Ino (173), by Dr. Becker.—Determination of the absolute velocity of current electricity from Hall's phenomenon, by Prof. v. Ettingshausen.

—On a law of the stimulation of terminal nerve-substances, by Prof. Mayer.—Contributions to the photochemistry of bromide of silver, by Dr. Eder.—Notices on the formation of free sulphuric acid, and some other chemical relations of gasteropoda, especially of *Dolium galea*, by Prof. Maly.—On the theory of normal surfaces, by Prof. Peschka.—On cinchomeric acid, by Dr. Skraup.—On aldehyde resin, by Herr Ciamician.—On an extension of the limits of validity of some general propositions of mechanics, by Prof. Simony.—On oxyumic acid and on the action of nitrous oxide on organic compounds, by Prof. Lippmann and Herr Lange.

March 11.—The orthogonal-axometric contraction circle, by Prof. Pesar.—Electrolysis of organic substances in aqueous solution, by Prof. Habermann.—Action of oxalic and sulphuric acid on naphthol, by Herr Hönig.—On dipropylresorcin and some of its derivatives, by Herr Kariof.—On idryl, by Dr. Goldschmiedt.—On direct introduction of carbonyl groups into phenols and aromatic acids, by Herr Senhofer and Herr Brunnen.—Remarks on Cauchy's theory of double refraction, by Prof. v. Lang.—Determination of path of comets discovered at Pola in 1879, by Herr Palisa.

March 18.—Heliotropic phenomena in the plant kingdom (second part), by Prof. Wiesner.—On the projective construction of curves of the second order, by Prof. Binder.—On Sturm's series, by Prof. Gegenbauer.—A hydraulic motor, by Herr Kauer.—The alteration of molecular weight and molecular refractive power, by Prof. Janovsky.—On the tannic acid of oak-bark, by Herr Etti.—On some tertiary echinida from Persia, by Herr Fuchs.—Sulphur compounds of chromium, by Prof. Lieben.—Behaviour of bone gelatine in dry distillation, by Dr. Weidel and Herr Ciamician.—On the determination of the halogens in chlorates, bromates, and iodates, by Herr Fleissner.

April 8.—The following among other papers were read:—Theory of motion on developable surfaces, by Herr Wittenbauer.—The inflorescences of Marchantiaceæ, by Prof. Leitgeb.—On the magnetic action on fluorescent light excited by the negative discharge in a vacuum space, by Prof. Domalip.—On discrete vortex lines, by Dr. Marguiss.—Contributions to the photochemistry of bromide of silver, by Dr. Eder.

PARIS

Academy of Sciences, June 7.—M. Edm. Becquerel in the chair.—The following papers were read:—On a bromised derivative of nicotine, by MM. Cahours and Etard. The formula is $C_{20}H_{14}N_2Br_4$.—Geological history of the English Channel (first part), by M. Hébert.—M. Daubrée gave a résumé of a study entitled "Descartes, one of the creators of cosmology and geology." Descartes considered all celestial phenomena as simple deductions from laws of mechanics, affirmed the unity of composition of the physical universe, perceived the capital rôle of heat in formation of our globe, &c.—M. du Moncel presented a third edition of his work on the telephone, microphone, and phonograph.—M. Chancel was elected correspondent in chemistry in place of the late M. Favre.—Theorems on the decomposition of polynomes, by M. Carrère.—Result of treatments of vines attacked with phylloxera, by M. Boiteau. The vines treated for three years past (with sulphide of carbon) are thriving beautifully. Infected vines over fifteen to twenty years old, which cannot renew their radicular system, should be replaced by young plants. The best method of application is that in parallel lines, with doses of 20 gr. per square metre applied in two or three holes. The sulphide even seems to stimulate the vine.—New generation of the surface of the wave and various constructions, by M. Mannheim.—On ternary cubic forms, by M. Poincaré.—On irreducible functions according to a prime modulus, by M. Pellet.—Remark relative to two integrals obtained by Lamé in the analytical theory of heat, by M. Escary.—On the partition of numbers, by M. David.—Direct measurement of the interior resistance of magneto-electric machines in motion, by M. Carnellas. The induction of the electro-magnets and the metallic cheeks is obviated by rotating the (Gramme) ring mounted carefully with its brushes on wooden supports, and the effects of terrestrial induction are avoided by opposing to each other these effects in two similar Gramme rings, mobile under the same conditions, with axes parallel. The ring (at rest or rotating) is made the fourth side of a Wheatstone bridge formed by Siemens' universal galvanometer. The resistance of the ring in motion (450 turns per minute) shows an increase of 25 per cent. on that of the ring at rest.—Transformation of gunpowder in the metallic cases

of infantry cartridges, by M. Pothier. A diminished velocity of balls of cartridges that have been long charged, and diminished accuracy of fire, are accounted for by a proved chemical decomposition of the powder in contact with the metallic case, the quantity altered varying according to atmospheric influences, especially moisture, at the time of manufacture or during storage. Experiment proved zinc to have most action, then followed copper. Lead, tin, and iron affect the powder less. High temperature accelerates the transformation if the powder is moist.—Optical arrangement for firing within covered batteries, by M. de Frayssé. By means of a lens and screen the artilleryman is enabled to take better aim. M. Ed. Becquerel called attention to previous devices of the same kind.—On colloidal oxide of iron, by M. Magnier de la Source. The composition of the soluble ferric hydrate is that of the normal hydrate.—On a new sulphate of alumina (sesquibasic sulphate of alumina), by M. Marguerite. One method of preparation is decomposition of alum of ammonia by heat. Three others are indicated.—Action of chlorine on sesquioxide of chromium, by M. Moissan.—On a combination of allylic alcohol with anhydrous baryta, by MM. Vincent and Delachanal.—On the fixity of composition of plants; ratio between the fecula, phosphoric acid, and mineral substances in potato, by M. Pellet. While these show constant ratios there are great differences in the proportions of the chief alkalis, lime and potash; but there is equivalent substitution of these alkalis, so that the quantity of sulphuric acid necessary to saturate all the bases is sensibly the same. Silica and nitrogen vary pretty largely.—Analysis of the seeds of beet, by MM. Pellet and Liebschutz.—Disinfection and conservation, from an agricultural point of view, of animal matters, and notably blood, by use of bisulphate of alumina and nitric acid, by M. Vauteler. They act by coagulation, &c.—On the physiological effects of erythrophleine, by MM. Lee and Boichfontaine. It acts both on the heart and the respiratory apparatus, and may prove a useful clinical agent.—On some anatomical characters of Chiroptera of the genus *Cynonycteris*, by M. Robin.—On the metamorphosis of *Perosopstoma*, by M. Vayssiére.—On a peculiar modification of a parasitic Acarian, by M. Megnin. The eggs of a *Cheyletus*, on an American Grosbeak, were found protected by fine tissue, like that furnished by certain Arachnides.—Helminthological observations and experimental researches on the disease of workmen in the St. Gothard, by M. Perroncito. The numerous workers who have become anæmic have been preyed upon by certain small worms, and this quite explains the anæmia. A similar malady was observed in making the Mont Cenis tunnel.—M. d'Abbadie presented a work by Mr. Knipping on the cyclones of 1878 in the China Seas.

CONTENTS

	PAGE
TWO DARWINIAN ESSAYS. By ALFRED R. WALLACE	141
NATURE'S HYGIENE	142
OUR BOOK SHELF:—	
Holmes' "Science of Voice Production and Voice Preservation for the Use of Speakers and Singers"	143
Hughes' "Ceylon Coffee Soils and Manures: a Report to the Ceylon Coffee Planters' Association"	144
LETTERS TO THE EDITOR:—	
Cloud Classification.—Rev. W. CLEMENT LEY	144
The Motion of Fluids.—HORACE LAMB	145
On the Physical Aspects of the Vortex Atom Theory.—W. L.	145
The Aurora Borealis and its Colours.—T. W. BACKHOUSE	145
A New Audiphone.—THOS. FLETCHER	145
Crystal-Ice.—R. H.	145
The Stone in the Swallow.—JOHN LOCKE	146
Stags' Horns.—E. W. CLAYPOLE	146
ON SOME POINTS CONNECTED WITH TERRESTRIAL MAGNETISM. By Prof. B. STEWART, F.R.S.	146
ON A NEW JELLY-FISH OF THE ORDER TRACHOMEDUSA, LIVING IN FRESH WATER. By Prof. E. RAY LANKESTER, F.R.S.	147
NOTES FROM JAVA	148
ON THE FERTILISATION OF COBÆA PENDULIFLORA (HOOK. FIL.). By Dr. A. ERNST	148
EXPERIMENTAL RESEARCHES IN ELECTRICITY. By WARREN DE LA RUE, M.A., D.C.L., F.R.S., and HUGO W. MÜLLER Ph.D., F.R.S. (With Illustrations)	149
A FOURTH STATE OF MATTER. By W. CROOKES, F.R.S.	153
NOTES	154
OUR ASTRONOMICAL COLUMN:—	
Faye's Comet	156
The Great Southern Comet of 1880	156
Minima of Algol	156
PHYSICAL NOTES	156
GEOGRAPHICAL NOTES	156
THE ROYAL OBSERVATORY	157
INTERCOLONIAL METEOROLOGICAL CONFERENCE AT SYDNEY	158
UNIVERSITY AND EDUCATIONAL INTELLIGENCE	160
SCIENTIFIC SERIALS	160
SOCIETIES AND ACADEMIES.	161