Britanniae chirurgi per tot annos quasi penates suos posuerunt. Medicinae studiosis nota sunt scripta eius per seriem longam edita, in quibus pars ea medicinae quae manu curat illustratur, et litterarum monumentis mandatur. Neque silentio praeterire possumus quaecumque de pathologia praesertim, quam quondam profitebatur, accuratissime scripsit; scilicet mortem ipsam, quae aliis tacet, huic velut rerum naturae vati et interpreti constat esse eloquentem. Neque prorsus intacta relinquimus quicquid de morborum contagione disputavit. Medicorum nemo fortasse Horatii verba in re medica saltem eruditius illustravit:—

delicta maiorum immeritus lues.

Duco ad vos Regii Chirurgorum Collegii praesidem, chirurgum illustrem, JONATHAN HUTCHINSON.

Archaeologiae studia nonnulli certe arida mentis nutrimenta arbitrantur. Hic autem etiam difficili in materia ingenii sui non minus facilis quam felicis alimentum invenit, qui etiam silices duros diu habuit in deliciis, ex ipsoque saxo doctrinae scintillam saepenumero excudit,

suscepitque ignem foliis atque arida circum
nutrimenta dedit, rapuitque in fomite flammam.

Quicquid lapidis, quicquid aeris, quicquid auri et argenti Britannia antiqua usurpabat, assidue conquisivit; conquisitum erudite illustravit. Britanniae nummorum investigator acerrimus, propterea etiam ultra fretum Britannicum numismate aureo honoris causa donatus est. Neque antiquis tantum thesauris operam dedisse videtur, sed etiam Societatis Regiae praefectus aerario, tot scientiis auxilium quotannis certatim flagitantibus, pecuniae publicae dispensator providus, aequus, benignus exstitit. Quondam Geologicae, iamdudum Numismaticae Societati praepositus, nunc etiam Antiquitatis peritorum Societati maximae summa cum dignitate praesidet. Quot scientiarum trans provincias aquilas suas felices tulit! Quid si non (velut alter ille quem hodie expectabamus)—quid, inquam, si non "nomen ab Africa lucratus rediit," tamen laudes eius Musae nullae "clarius indicant, quam Calabrae Pierides, neque

si chartae taceant quod bene feceris
mercedem tuleris.

Audite igitur ipsum Ennium viri huiusce praeconia praesagientem:—

doctus, fidelis,
suavis homo, facundus, suo contentus, beatus,
scitus, secunda loquens in tempore . . .
multa tenens antiqua.

Duco ad vos virum de antiquitatis studiis praeclare meritum, JOANNEM EVANS.

Plusquam tres et quinquaginta anni sunt elapsi, ex quo Academiae nostrae inter silvas adulescens quidam errabat, populi sacri antiquissima stirpe oriundus, cuius maiores ultimi primum Chaldaeorum in campis, deinde Palestinae in collibus, caeli nocturni stellas innumerabiles, prolis futurae velut imaginem referentes, non sine reverentia quadam suspiciebant. Ipse numerorum peritia praeclarus, primum inter Londinenses Academiae nostrae studia praecipua ingenii sui lumine illustrabat. Postea trans aequor Atlanticum plusquam semel honorifice vocatus, fratribus nostris transmarinis doctrinae mathematicae facem praeferebat. Nuper professoris insignis in locum electus, et Britanniae non sine laude redditus, in Academia Oxoniensi scientiae flammam indies clariorem excitat. Ubicunque incedit, exemplo suo nova studia semper accendit. Sive numerorum θεωρίαν explicat, sive Geometriae recentioris terminos extendit, sive regni sui velut in puro caelo regiones prius inexploratas pererrat, scientiae suae inter principes ubique conspicitur. Nonnulla quae Newtonus noster, quae Fresnelius, Iacobius, Sturmius, alii, imperfecta reliquerunt, Sylvester noster aut elegantius explicavit, aut argumentis veris comprobavit. Quam parvis ab initiis argumenta quam magna evolvit; quotiens res prius abditas exprimere conatus, sermonem nostrum ditavit, et nova rerum nomina audacter protulit! Arte quali numerorum leges non modo poetis antiquis interpretandis sed etiam carminibus novis pangendis accommodat! Neque surdis canit, sed "respondent omnia silvae," si quando, inter rerum graviorum curas, aevi prioris pastores aemulatus,

Silvestrem tenui musam meditatur avena.

Duco ad vos Collegii Divi Ioannis Socium, trium simul Academiarum Senatorem, quattuor deinceps Academiarum Professorem, IACOBUM IOSEPHUM SYLVESTER.

Claudit seriem viri eiusdem aequalis, qui doctrinae rudimentis primum Salopiae, deinde Etonae, denique Trinitatis in Collegio maximo imbutus, eadem in Academia isdem e studiis lauream suam primam reportavit. Sed ne his quidem finibus contentus, etiam musices mysteria perscrutatus est, et philologiae provinciam satis amplam sibi vindicavit. Quanta perseverantia etiam contra consuetudinem, ut Quintiliani verbis utar, "sic scribendum quidque iudicat, quomodo sonat"! Quanta subtilitate de linguae Graecae et Latinae vocalibus disputat; quam minuta curiositate etiam patrii sermonis sonum unumquemque explorat! A poetis nostris antiquioribus exorsus, non modo saeculorum priorum voces temporis lapsu obscuratas oculis et auribus nostris denuo reddidit, sed etiam nostro a saeculo in dialectis variis usurpatam litterarum appellationem, signis accuratis notatam, posteritati serae cognoscendam tradidit. Venient anni (licet confidenter vaticinari) quibus dialectorum nostrarum tot varietates, non minus quam Arcadum et Cypriorum linguae antiquae, hominum e cognitione prorsus obsolescent; tum profecto viri huiusce scriptis cura infinita elaboratis indies auctus accedet honos.

Mortalia facta peribunt,
nedum sermonum stet honos et gratia vivax.

Interim a nobis certe sermonis Britannici conservator anim, grati testimonium, honoremque diu debitum, diu duraturum accipiet.

Duco ad vos philologum insignem, ALEXANDRUM JOANNEM ELLIS.

At the annual election at St. John's College, on June 16, the following awards in Mathematics and Natural Science were made:—

Mathematics—Foundation Scholarships continued or increased: Bennett (£100), Reeves (£80), Alexander (£70), Dobbs (£60), Finn (£50), Gedge (£40), Hough (£80), Chevalier (£60), Pocklington (£80), Rosenberg (£50). Foundation Scholarships awarded: Wills (£60), Owen (£50), Schmitz (£40), Pickford (£40), Maw (£40). Exhibitions: Dobbs, Wills, Finn, Owen, Schmitz, Pickford, Maw, Robertson, Bloomfield, Spaight, Ayers, Morton. Proper Sizarship: Le Sueur. Natural Science—Foundation Scholarships continued or increased: Groom (£60), Hankin (£40), Horton-Smith (£40), Hewitt (£80), Lehfeldt (£80), Woods (£40). Foundation Scholarships awarded: Blackman (£40), MacBride (£60), Cuff (£40), Whipple (£40). Exhibitions: Woods, Baker. Proper Sizarship: Baker. Hutchinson Studentship for Pathological Research, Hankin. Wright's Prizes: Mathematics, Hough; Natural Science, Hewitt, Lehfeldt, MacBride. Hughes Prize for most distinguished student of the third year, Bennett (Mathematics). Hockin Prize for Experimental Physics, Lehfeldt.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, June 12.—"A Record of the Results obtained by Electrical Excitation of the so-called Motor Cortex and Internal Capsule in an Orang Outang (*Simia satyrus*)." By Charles E. Beevor, M.D., F.R.C.P., and Victor Horsley, B.S., F.R.S. (From the Laboratory of the Brown Institution.)

Having been engaged for some time in investigating the representation of motor function in the cortex of the bonnet monkey, we thought it advisable to perform the same in an anthropoid as likely thereby to gain a closer insight into the modes of representation in man.

We first describe the peculiarities noticeable in the configuration of the convolutions in the orang.

As in the bonnet monkey, after narcotization with ether, we divided the cortex into squares of 2 millimetres side, and excited the same with minimal stimuli from the secondary coil of an inductorium; a remarkably high intensity of the stimulus being required.

General Results.—The mode of representation of motor function was found to be highly specialized. The general plan was identical with that seen in the bonnet monkey in that the representation of each segment and part of the body in the orang was arranged in the same order as that according to which we found the representation of the primary movements to be grouped in the macacque monkey.

In addition to this, the areas for the representation of the different parts of the body we found not to be continuous with each other, but that between the areas of representation (for instance, of the face and the upper limb) there were regions of inexcitable cortex showing a degree of differentiation not obtained in the lower monkey.

A further remarkable evidence of specialization was noticeable in the fact that excitation of any one point elicited rarely more than one movement, and only of one segment, *e.g.* simple flexion of the elbow. Consequently, any sequence of movement or march was conspicuously infrequent.

Finally, the character of each movement and its localization was recorded.

After the cortex had been removed, we proceeded to stimulate the fibres of the internal capsule, and the results obtained confirmed those obtained from the bonnet monkey, and at the same time showed the relative position of the cortical areas.

The internal capsule was exposed by removing half of one hemisphere by a horizontal section; the outlines of the basal ganglia were then transferred to paper ruled with squares of 1 millimetre, and the resulting movement obtained by stimulating each of these squares contained in the internal capsule was recorded. The movements obtained correspond generally with the results which we have in another paper presented to the Royal Society, and read on December 12, 1889.

Physical Society, May 16.—Prof. W. E. Ayrton, F.R.S., President, in the chair.—Lord Rayleigh exhibited and described an arrangement of Huyghens's gearing in illustration of electric induction. This gearing consists of two loose pulleys mounted on the same axle, with an endless cord laid over them, the loops or bights of which carry weighted pulleys whose planes are parallel to the axis on which the upper pulleys turn. If one of the latter pulleys be started to rotate, the other one turns in the opposite direction until such time as the speed of the first one becomes constant. Whilst this constant speed is maintained, the second pulley remains stationary, one weight being raised and the other lowered, but on retarding the motion of the first pulley, the second begins to turn in the same direction as the first. It will be noticed that the phenomena are analogous to those which occur in electric induction, where starting or increasing a current in one circuit induces an opposite current in a neighbouring circuit, whilst decreasing or stopping a current induces one in its own direction. Lord Rayleigh pointed out that in this apparatus there is nothing strictly analogous to electric resistance, for the friction does not follow the same law. The analogy, he said, was complete as regards there being no change of potential energy, and the mathematical equations for the kinetic energy of the system are precisely the same as those given by Maxwell for electric induction.—Dr. S. P. Thompson made a communication on Dr. Kœnig's researches on the physical basis of music, in the course of which Dr. Kœnig performed numerous novel and interesting experiments, clearly illustrating the subject to a crowded audience. After referring to the classical researches of the great mechanician, and to the remarkable precision with which his ingenious and unique acoustical apparatus is constructed, Dr. Thompson said the subject with which he wished to deal could be divided into two parts, the first relating to *beats*, and the second to the *timbre* of sounds. On the question of beats considerable discussion had taken place as to whether they formed independent tones if they were sufficiently rapid. Different authorities had come to different conclusions on the subject, the disagreement probably arising from the impure tones used in their investigations. Dr. Kœnig, however, had succeeded in making tuning-forks whose sounds are very nearly pure tones, and by the aid of such forks had conclusively answered the question in the affirmative. Before proceeding to show experimentally the truth of the conclusions arrived at, Dr. Thompson said it was necessary to define exactly the meaning of the term "harmonics." By this he meant tones whose frequencies are *true integral multiples* of their fundamental. This, he said, might seem to be identical with the "upper partial tones" of Helmholtz or the "overtones" of Tyndall, but such was not the case, as the upper partial tones of piano-wires, &c., are not true integral multiples of the fundamentals, for the rigidity of the wire comes into play, and prevents the subdivision being exact. According to Helmholtz's theory, two tones harmonize when they do not produce beats of sufficient slowness to grate upon the ear, and the frequency of the two sets of beats were supposed to be equal to the difference and the sum of the frequencies of the two fundamental tones. In investigating the subject, Kœnig finds it necessary to distinguish between primary and secondary beats, and also that primary beats belong to two categories. These categories he calls "inferior" and "superior" respectively, and the frequencies of the two sets correspond respectively to the positive and negative remainders obtained by dividing the number representing the number of vibrations in the tone of lowest pitch into the corresponding number for the higher tone. For example, two forks of 100 and 492 vibrations produce beats having 92 and 8 as their vibration frequencies, for

$$492 = 100 \times 4 + 92,$$

and also

$$492 = 100 \times 5 - 8.$$

A set of "superior" beats of 8 per second and an "inferior" beat-tone of 92 per second may be heard when two such forks are sounded together. These primary beats or beat-tones act as independent tones and produce secondary beats. Tertiary ones may also be obtained. To demonstrate the existence of beats to the large audience assembled, Dr. Kœnig had provided two large tuning-forks with resonators about 4 feet long. One of the forks gave 64 vibrations per second, and the other 128, but the latter had sliding weights, whereby its frequency could be made anything between 128 and 64. Adjusting the weights so as to give 72, and bowing both forks, the beats of about 8 per second were distinctly heard at the extremity of the room. By varying the weights so that the fork gave 80, $85\frac{1}{3}$, 96, $106\frac{2}{3}$, 112, 120, and 128 vibrations successively, beats of various frequencies were produced, and it was remarkable to note that tones of 64 and 120 produced 8 beats a second exactly like 64 and 72. When the forks made 64 and 96 vibrations—*i.e.* at an interval of a fifth—then the inferior and superior beats agree in frequency, viz. 32, and by careful observation a low tone of about this pitch could be heard. If the tones sounded simultaneously differ by more than an octave, the same law for the numbers of beats holds good, whilst Helmholtz's difference and summation tones law, is inapplicable. This was shown by sounding a fork and its double octave slightly mistuned by weighting; slow beats were quite evident, although the difference in the frequencies of the primary notes was large. Similarly forks vibrating approximately at rates in the proportions 1 : 5 and 1 : 6 gave slow beats. Coming to the main question, as to whether beats when sufficiently rapid blend into tones just as primary shocks do, Dr. Thompson briefly recalled the various arguments for and against such an effect, and then Dr. Kœnig proceeded to experimentally prove the affirmative. Taking two forks tuned to 2048 and 2304 vibrations respectively (ratio 8 : 9) and sounding them simultaneously, the middle C of the piano (256) was distinctly heard. The same beat tone resulted from forks having frequencies in the ratio of 8 : 15, whose negative remainder was 256. Various other tones were sounded simultaneously in pairs, and in all cases the corresponding beat-tone was quite distinct. In these experiments the existence of nodes and loops in air was particularly noticeable, for as Dr. Kœnig turned the tuning-forks in his hand, the intensity of the beat-tones heard at a particular spot varied enormously. The experiments were carried a step further by impressing vibrations of different frequencies on one and the same body: the beat-tones in this case were quite perceptible. In carrying this out, Dr. Kœnig had constructed steel bars of approximately rectangular section, whose periods of vibrations were different in two directions at right angles. Striking one face of the bar a certain note resulted, whilst a blow on an adjacent face produced a different one. When the bar was struck on the edge joining the two faces, both the notes could be heard as well as the beat-tone resulting therefrom. The experimenter had gone still further, and made such bars so short that neither of the fundamental notes are within the limits of audition, but the resulting beat-tone can be heard quite distinctly. In all cases the frequency of the beats agrees with that calculated from Dr. Kœnig's formula, and secondary beats follow the same law. It was then pointed out that not only beats, but the maxima of a series of pulsations varying in intensity will, if isochronous and sufficiently rapid, give tones, just as a series of primary shocks do. This was illustrated by tuning-forks, and by directing a stream of air issuing from a slit against a notched rim of a rotating disk. A further confirmation was given by a modified disk siren; in this the holes, instead of being of the same size all round a circle, increase to a maximum and then decrease again, there being several sets of such holes in one circumference. When this was put in operation, notes corresponding in pitch to the number of holes and also to the number of sets of holes, could be heard. A wave siren was also used to illustrate the same fact. The matter was further illustrated by moving a tuning-fork towards a wall or other reflecting surface at various velocities. According to Doppler's principle, as the fork recedes from the observer and approaches the wall, the frequency of the direct waves is less and that of the reflected waves greater than that of the fork, and these two series of waves produce beats. By sufficiently increasing the velocity and using a fork of high pitch, the beats blend into tones. Coming to the second half of Dr. Kœnig's researches, Dr. Thompson said that Helmholtz contended that the *timbre* of musical sounds was not affected by differences of phase amongst the component tones; on this point, however, Kœnig had come to the opposite conclusion. To illustrate graphically why phase should affect *timbre*, a number of diagrams were exhibited, some showing the resultant wave-form produced by combining a tone with its harmonics of equal intensity, when the differences of phase between them were 0, $\frac{1}{4}$, $\frac{1}{2}$, and $\frac{3}{4}$ respectively; whilst others represented the wave-forms when the harmonics and the fundamental were of different intensities. The effect of phase on the shape of the wave-form was very marked. The subject was treated experimentally by means of a wave siren, against which a stream of air issuing from a slit could be directed. By inclining the slit to one side of the radius or the other, the phases of the component waves could be altered, and this had a marked effect on the character of the sound produced. Illustrations of Kœnig's multiple wave sirens, both of the cylinder and disk forms, were next shown, and the results of investigations made with the apparatus described. From these results it appears to be impossible to produce the *timbre* of instruments such as trumpets, clarionets, &c., by any combination of a tone and its pure harmonics. This led to the investigation of impure harmonics. By plotting and combining curves it was shown that the wave-form obtained from a tone and impure harmonics changes in successive periods; this peculiarity was observed to exist in a record taken from a vibrating string. Various disks with wavy edges of different form were spun before an air slit, and the varying character of the resulting sounds as the slit was turned, demonstrated. Before concluding, Dr. Thompson remarked that the word "*timbre*" requires to be re-defined, for the rigidity of strings, wires, &c., and the interference of the wood and metal parts of organ pipes and other wind intruments generally, prevent the formation of pure harmonics. A model consisting of vibrating strips placed vertically or inclined was exhibited to show the different kinds of *timbre*. The differences between mixtures and compounds of tones was pointed out, and the inability of the ear to distinguish between pure and impure sounds referred to. Lord Rayleigh thought more information was required on the important subjects brought forward, and asked in what class of musical sounds are the overtones strictly harmonious. He could admit that in piano wires they may not be so, but he was not quite so clear about organ pipes. He said he was filled with admiration by the perfection of the apparatus displayed, and expressed a wish that such mechanical acousticians could be found on this side of the Channel. Mr. Bosanquet said he had been carefully over the ground investigated by Dr. Kœnig. He believed Dr. Kœnig was the first to get at the facts concerning beats, but it was difficult to admit all that had been said about them. However, the chief difference between authorities seemed to be one of language. Owing to the lateness of the hour he could not discuss the question fully, and so asked to be allowed to reserve his opinion on the matter. As regards *timbre*, he thought the experiments on the effects of phase were not conclusive. The sounds of wind instruments such as trumpets, he said, depended greatly on who produced them. It was no easy matter to bring out their full sweetness, and it was comparatively few persons who could ever attain perfection. He ventured to think that in a properly used instrument none of the harmonics are out of tune. Mr. Blaikley agreed with Lord Rayleigh about piano wires, and as regards wind instruments he could hardly think that the overtones were so inharmonious as Dr. Thompson would have him believe. In fact, Mr. Stroh had obtained wave-forms for him from various instruments, but in none of them was there any discontinuity such as shown on one of the diagrams exhibited. However, he was of opinion that there is something in *timbre* not accounted for by the ordinary theory. The President said that in view of the production of audible sounds by the beats from notes beyond the range of audition, it might be possible to demonstrate that insects produce sounds inaudible to the human ear by putting several together in a box, and listening for the beat-tones. Dr. Kœnig acknowledged the most cordial vote of thanks accorded to himself and Dr. Thompson.

Zoological Society, June 3.—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 May 1890, and called special attention to a pair of Hartebeests (*Alcelaphus caama*), and a pair of Swainson's Long-tailed Jays (*Calocitta formosa*), acquired by purchase; and to a pair of Beatrix Antelopes (*Oryx beatrix*), presented by Colonel E. C. Ross, Consul-General for the Persian Gulf.—Mr. Sclater exhibited and made remarks on two young specimens of Darwin's Rhea (*Rhea darwinii*), obtained by Mr. A. A. Lane in the province of Tarapacà, Northern Chili, and forwarded to Mr. H. H. James.—Mr. Sclater exhibited and made remarks on a flat skin of a Zebra, received from Northern Somaliland, which appeared to be referable to Grévy's Zebra (*Equus grevyi*).—Mr. A. D. Michael read a paper on a collection of non-parasitic *Acarina* lately made in Algeria, where he had found the *Acarina* less abundant than in England, and, indeed, almost absen t from the true southern vegetation. The species met with were not of larger size than the British. The collection consisted almost entirely of Oribatidæ, and contained examples of 46 species belonging to 15 genera. Amongst them were 8 species new to science, 27 were British, and the rest South European. Amongst the new species were a remarkable new *Cæculus*, there being previously only one known species of this curious genus, which forms a separate family. There was also a new *Notaspis*, which had not been found in Europe, but had been received from the shores of Lake Winnipeg, in Canada. There were likewise some very singular new species of the genus *Damæus*, and a triple-clawed form of *Nothrus anauniensis*.—Mr. Frank E. Beddard read a paper on the anatomy of the Fin-foot (*Podica senegalensis*). The paper dealt chiefly with the myology and osteology of this doubtful form. The conclusion arrived at was that it showed most resemblance to the Rails, but that in its muscular anatomy it agreed in many particulars with the Grebes and Divers.—Mr. O. Thomas read some notes on the specimens of Mammals obtained by Dr. Emin Pasha, during his recent journey through Eastern Africa, as exemplified in the specimens contained in two collections presented to the British Museum and the Zoological Society respectively.—Mr. G. A. Boulenger read a paper containing the descriptions of two new species of the Siluroid genus *Arges*, from South America.—A communication was read from Mr. James Yate Johnson, containing descriptions of five new species of fishes from Madeira.

Linnean Society, May 24.—Anniversary Meeting.—Mr. W. Carruthers, F.R.S., President, in the chair.—The Treasurer presented his Annual Report, duly audited; and, the Secretary having announced the elections and deaths of Fellows during the past year, the President proceeded to deliver his annual address. In this he dealt with the distribution of British plants both before and after the Glacial period, making special allusion to the discoveries of Mr. Clement Reid amongst the vegetation of the Cromer Forest Bed, and showed that the forms which have come down to us at the present day do not differ in any respect from the same species found in the Glacial beds.—A vote of thanks was moved by Sir Joseph Hooker and seconded by Mr. Stainton to the President for his excellent address, with a request that he should allow it to be printed, and carried unanimously.—On a ballot taking place for new Members of Council, the following were declared to be elected:—Dr. P. H. Carpenter, Dr. J. W. Meiklejohn, Mr. E. B. Poulton, Mr. D. Sharp, and Prof. C. Stewart. On a ballot taking place for President and Officers, the following were declared to be elected:—President: Prof. Charles Stewart. Secretaries: B. D. Jackson and W. P. Sladen. Treasurer: Frank Crisp.—The Linnean Society's gold medal for the year 1890 was then formally awarded and presented to Prof. Huxley for his researches in zoology.

Entomological Society, June 4.—The Right Hon. Lord Walsingham, F.R.S., President, in the chair.—The Secretary exhibited, on behalf of Mr. J. Edwards, Norwich, two specimens of *Ilybius subæneus*, Er., and a single specimen of *Bidessus unistriatus*, Schr. Mr. Champion alluded to the fact that the only recorded British specimens of the first-mentioned beetle had been taken many years ago at Peckham. Lord Walsingham, in alluding to the exhibit, referred to the list of Norfolk

Coleoptera compiled some years ago by Mr. Crotch, which appears to have been lost sight of.—Mr. McLachlan alluded to the damage done by insects to orange-trees in Malta, and stated that the Rev. G. Henslow had lately been studying the question; one of the chief depredators was the widely-spread "fly," *Ceratitis citriperda*, well known as devastating the orange. He found, however, that another and more serious enemy was the larva of a large Longicorn beetle (*Cerambyx miles*, Bon.), which bores into the lower part of the stem and down into the roots, making large galleries; in all probability the larva, or that of an allied species, is the true *Cossus* of the ancients. Lord Walsingham stated that a species of *Prays* allied to *P. olcellus* and our common *P. curtisellus* was known to feed in the buds of the orange and lemon in Southern Europe.—The following papers were communicated, and were read by the Secretary:—Notes on the species of the families *Lycidæ* and *Lampyridæ* contained in the Imperial Museum of Calcutta, with descriptions of new species, and a list of the species at present described from India, by the Rev. H. S. Gorham.—A catalogue of the Rhopalocerous Lepidoptera collected in the Shan States, with notes on the country and climate, by Dr. N. Manders, Surgeon, Medical Staff. The latter paper contained a very interesting description of the chief physical features of the Shan States and neighbouring parts of Burmah.

Mathematical Society, June 12.—J. J. Walker, F.R.S., President, in the chair.—The President announced that the Council had unanimously awarded the De Morgan Memorial Medal to Lord Rayleigh, Sec.R.S., for his writings on mathematical physics.—The following papers were read:—On simplicissima in space of n dimensions (third paper), by W. J. C. Sharp.—Rotatory polarization, by Dr. J. Larmor.—Parabolic note, by R. Tucker.—Prof. Greenhill, F.R.S., communicated a paper by Prof. Mathews on the expression of the square root of a quartic as a continued fraction, and one by R. Russell on modular equations.—The President gave a brief sketch of a paper by A. R. Johnson, on certain concomitants of a system of conics and quadrics, and on the calculation of the covariant S of the ternary quartic.

PARIS.

Academy of Sciences, June 9.—M. Hermite in the chair.—On the movement of a prism, resting on two supports, submitted to the action of a variable normal force following a particular law, applied at a determined point of the axis, by M. H. Resal.—Theory of the state produced near to the wide opening of a fine tube where the threads of a liquid which flows there have not acquired the normal inequalities of velocity, by M. J. Boussinesq.—Action of the alkalies and alkaline earths, alkaline silicates, and some saline solutions on mica: production of nepheline, sodalite, amphigene, orthoclase, and anorthite, by MM. Charles and Georges Friedel.—On the fauna of deep parts of the Mediterranean around Monaco, by the Prince of Monaco. Some dredging operations carried on at various depths up to 1650 metres show that, at certain parts at least of these regions, the Mediterranean Sea is by no means devoid of inhabitants as has been previously asserted.—Observations of Brooks's comet (a 1890), made with the *coudé* equatorial of Algiers Observatory, by MM. Rambaud and Renaux. The observations of position extend from May 10 to 31.—Photographic observation of Brooks's comet made at Algiers Observatory, by M. Ch. Trépied (see "Our Astronomical Column").—On a particular case of the movement of a point in a resisting medium, by M. A. de Saint-Germain.—Propagation of light in gold-leaf, by MM. Hurion and Mermeret.—On the amplitude of the diurnal variation of the temperature, by M. Alfred Angot. The author shows how the diurnal temperature variation in any station on the earth may be expressed by the formula—

$$a = \frac{K}{r^2}(A + B \sin l + C \cos 2l),$$

in which K is a function of cloudiness, and = 1 when the sky is clear, A, B, and C are coefficients depending only upon the geographical position of the station and its climatological characters, l the sun's longitude, and r the distance of the earth from the sun.—Electrolysis of fused aluminium fluoride, by M. Adolphe Minet. The author finds a mixture of 40 parts of the double fluoride of aluminium and sodium with 60 parts of sodium chloride to give him the best results yet obtained.—On the isomeric states of chromium sesquibromide: the blue sesquibromide, by M. A. Recoura. A method of preparing the solid hydrated bromide, $Cr_2Br_6, 12H_2O$, corresponding to the violet solutions is given. It is shown that the grey-blue solid obtained is less stable than the green crystals formerly described, whereas the violet solutions corresponding to the blue solid salt are more stable than the green solutions; thermochemical data are given in confirmation.—On the estimation of zinc in the presence of iron and manganese, and its separation from those metals, by M. J. Riban. The zinc is separated as sulphide from a solution to which has been added an excess of sodium thiosulphate.—On the composition of clays and kaolins, by M. Georges Vogt.—On the synthesis of the fluorides of carbon, by M. C. Chabrié.—On the products of saccharification of amylaceous matters by acids, by M. G. Flourens.—On the decomposition of organic manures in the soil, by M. A. Muntz.—On the anatomy of horny sponges of the genus *Hircinia*, and on a new genus, by M. H. Fol.—On the circulatory system in the carapace of decapodous Crustacea, by M. E. L. Bouvier.—On two new species of Coccidia, parasitic on the stickleback and sardine, by M. P. Thélohan.—Interesting nuclear modifications of the nucleolus which may ultimately throw some light on its signification, by M. E. Bataillon.—On a hymenopterous insect injurious to the vine, by M. E. Olivier.—On the diversities and similarities in some dentary systems of mammifers, by M. Heudes.—Researches on the development of the seminal integuments of Angiosperms, by M. Marcel Brandza.—On the nature of the phosphate beds of Dekma (département de Constantine), by M. Bleicher.—On the existence of marine deposits of the Pliocene age in the Vendée, by M. G. Vasseur.

BOOKS, PAMPHLETS, and SERIALS RECEIVED.

Japan and the Pacific: M. Inagaki (Unwin).—The Mineral Resources of Ontario (Toronto).—A Treatise on Practical Chemistry and Qualitative Analysis, 5th edition: Dr. F. Clowes (Churchill).—Primo Resoconto dei Risultati della Inchiesta Ornitologia in Italia; Parte Seconda, Avifauna Locali: E. H. Giglioli (Firenze).—The Species of Ficus of the Indo-Malayan and Chinese Countries, Appendix: Dr. G. King (Calcutta).—Sammlung von Vorträgen und Abhandlungen, Dritte Folge: W. Foerster (Berlin, Dümmler).—Lehrbuch der Verg. Entwicklungsgeschichte der Wirbellosen Thiere, Specieller Theil, Erstes Heft: Dr. E. Korschelt and Dr. K. Heider (Jena, Fischer).—The Life and Letters of the Rev. Wm. Sedgwick, 2 vols.: J. W. Clark and T. McK. Hughes (Cambridge University Press).—The Forest Flora of South Australia, Part 9: J. E. Brown (Adelaide).—Les Bactéries, 2 vols.: A. V. Cornil and V. Babes (Paris, Alcan).—Physiological Botany: Dr. G. L. Goodale (Macmillan).—An Elementary Treatise upon the Method of Least Squares: G. C. Comstock (Arnold).—The Lepidopterous Fauna of Lancashire and Cheshire: J. W. Ellis Leeds (McCorquodale).—La Révolution Chimique Lavoisier: M. Berthelot (Paris, Alcan).—Beiträge zur Geologie Syriens, Die Entwickelung des Kreidesystems in Mittel- und Nord-Syrien; eine Geognotisch-Paläontologische Monographie: Dr. Max Blanckenhorn (Berlin, Friedländer).—Zur Kenntniss der Fauna der "Grauen Kalke" der Sud-Alpen: Dr. L. Tausch v. Gloeckelsthurn (Wien, Hölder).—The Law and Practice of Letters Patent for Inventions: L. Edmunds and A. W. Renton (Stevens).

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