6 feet below its 1871 level, or 2225 feet above the sea. It appears, therefore, that in 7 years, 1871 to 1878, the lake lost 6 feet; and again, from May, 1878, to February, 1885, say seven years, the lake again lost 6 feet by evaporation, and this of course in addition to all the rain which fell during that period. Taking the records at Goulburn and Gungahleen, near the lake, the average rainfall for the first 7 years was 27·95 inches, and during the next 7 years 23·68 inches. One would expect to find more evaporation during the drier years, but this is not borne out by observations. From the rainfall and recorded evaporation the lake, therefore, lost by evaporation at least 3 feet per annum. I say at least, because some rain water must have run into the lake in addition to that which fell into it directly, but its amount cannot be determined. In future the recording gauge will determine this, and perhaps then we may apply the experience gained to estimating how much ran in during the past fourteen years. Lake George is called a fresh-water lake, and some have even gone so far as to propose to use it as a reservoir for the supply of towns. When there I ascertained that no one could use the water on account of its purgative properties, one glass full being quite enough to satisfy those who made use of it; and it is there said that the water running into the lake from the Currawang copper mine had poisoned all the fish. This is not literally true, for there are still fish in the lake; but very many were killed some years since, presumably by the cause mentioned. I obtained some of the water, and am indebted to Mr. Dixon, of the Technical College Laboratory, for the following interesting information as to what the water contains:—It is quite evident that with 187·5 grains of mineral matter per gallon the water cannot be used for domestic purposes, and from the fact that this matter is constantly being added to, it cannot improve, unless it were possible to withdraw large quantities of the water, and supply its place with rain-water; but during by far the greater number of years during which the lake has been known, viz., 64 years, the supply of rain-water going into it annually has not been equal to the evaporation, and there is no other outlet. After the great flood of 1870 the lake, during the last 14 years, has gradually decreased by nearly a foot per annum, and similar conditions existed before; and it is therefore obvious that it would not be possible to wash out the salts with rain-water and artificial drainage except in wet years—perhaps once in 20 years. Extract Mining Department's report, 1880:—'Three samples of water from the Currawang Copper mines were sent for analysis, with special reference to their poisonous action on the fish in Lake George, and were therefore only examined with regard to the metals in solution. The metals were present as sulphates, and are stated below:—Water from the creek contains: Sulphate of copper, 1·12 grains per gallon; sulphate of zinc, 16·78 grains per gallon; sulphate of iron, 0·43 grains per gallon. Water from the working shaft: Sulphate of copper, 17·67 grains per gallon; sulphate of zinc, 53·54 grains per gallon; sulphate of iron, 1·42 grains per gallon. Water from the old shaft: Sulphate of copper, 6·42 grains per gallon; sulphate of zinc, 7·20 grains per gallon; sulphate of iron, 0·98 grains per gallon.' This water would necessarily be poisonous to fish, and flowing into a lake without outlet, would ultimately render the whole water poisonous. 'Technical College Laboratory, Sydney, 2nd May, 1885. My dear Mr. Russell,—The water from Lake George contains 187·5 grains per gallon of solid matter dried at 212° F. The residue has a strongly alkaline reaction, effervesces with acid, blackens much on ignition, but does not show the presence of nitrates in doing so. The metals present are aluminium, calcium, and magnesium; the acids chlorine, carbonic acid, sulphuric acid, and phosphoric acid, the last two in small quantity. The salts are probably arranged as chloride of sodium, sulphate of sodium, phosphate of sodium, carbonate of sodium, and carbonates of calcium and magnesium. The purgative properties of the water are probably due to the salts as a whole, and especially the carbonate of magnesia. It should be borne in mind, however, that waters containing much organic matter frequently have a purgative effect.—Signed, W. A. DIXON. P.S.—Zinc and copper are entirely absent.'"

UNIVERSITY AND EDUCATIONAL INTELLIGENCE

SCIENCE AND ART DEPARTMENT.—The following Prizes, Scholarships, Associateships, &c., have been awarded in connection with the Normal School of Science and Royal School of Mines, South Kensington.

First Year's Scholarships: — James Rodger, Andrew McWilliam, Tom. H. Denning, John Richards.

Second Year's Scholarships:—Arthur E. Sutton, Thomas Rose.

The following Prizes were also awarded:—Alfred V. Jennings, the "Edward Forbes" Medal and Prize of Books for Biology; Arthur E. Sutton, the "Murchison Medal" and Prize of Books for Geology; and the "Tyndall Prize" of Books for Physics, Course I.; Henry G. Graves, the "De la Beche" Medal for Mining; John C. Little and James Allen, "Bessemer" Medals with Prizes of Books from Prof. W. Chandler Roberts for Metallurgy; Arthur W. Bishop and Peter S. Buik, the "Hodgkinson" Prizes for Chemistry.

Associateships, Normal School of Science:—Isaac T. Walls (Chemistry, 2nd Class); Alfred Fowler (Mechanics, 1st Class); George H. Wyatt (Physics, 2nd Class); Martin F. Woodward (Biology, 1st Class).

Associateships, Royal School of Mines:—John C. Little (Metallurgy, 1st Class); Thomas A. Rickard (Metallurgy, 1st Class); Percy E. O. Carr (Metallurgy, 1st Class); Walter A. A. Dowden (Metallurgy, 2nd Class); Henry G. Graves (Mining, 1st Class); Ernest Woakes (Mining, 1st Class).

DR. REDWOOD has retired as Emeritus Professor from the Chair of Chemistry at the Pharmaceutical Society. The vacancy has been filled by the appointment of Mr. Wyndham Dunstan, Demonstrator of Chemistry in the University Museum of Oxford.

SCIENTIFIC SERIALS

Rendiconti del Reale Istituto Lombardo, May 21.—A science of criminal legislation in connection with the projected Italian Penal Code, by E. A. Buccellati.—Note on the inscribed Etruscan arms and mirrors in the Fol Museum, Geneva, by Prof. E. Lattes.—The system of projected homogeneous co-ordinates for the elements of ordinary space, by Prof. F. Aschieri.—On the separation of cream from milk, and the conditions tending to accelerate the process, by Prof. G. Morosini.—Further researches on the functions that satisfy the differential equation $\Delta^2 u = 0$, by Prof. Giulio Ascoli.—Remarks on the Mexican skulls deposited in the Civic Museum, Milan, by E. A. Verga.—Meteorological observations made at the Brera Observatory, Milan, during the month of May.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, June 18.—"A Memoir introductory to a General Theory of Mathematical Form." By A. B. Kempe, M.A., F.R.S.

The object of the memoir is the treatment of the "necessary matter" of exact or mathematical thought as a connected whole; the separation of its essential elements from the accidental clothing—algebraical, geometrical, logical, &c.—in which they are usually presented for consideration; and the indication of that to which the infinite variety which those elements exhibit is due.

The memoir opens with the statement of certain fundamental principles, viz.:—Whatever may be the true nature of things and of the conceptions which we have of them (as to which points we are not concerned in the memoir to inquire) in the operations of reasoning they are dealt with as a number of distinct entities or *units*.

These units come under consideration in a variety of guises—as points, lines, statements, relationships, arrangements, intervals or periods of time, algebraical expressions, &c., &c.—occupy various positions, and are otherwise variously circumstanced. Thus, while some units are undistinguished from each other, others are by these] peculiarities rendered distinguishable. For example, the angular points of a square are distinguishable from the sides, but are not distinguishable from each other. In some instances where distinctions exist they are ignored as not material. Both cases are included in the general statement that some units are distinguished from each other and some are not.

In like manner some *pairs* of units are distinguished from each other while others are not. Pairs may be distinguished even though the units composing them are not. Thus the angular points of a square are undistinguishable from each other,

and a pair of such points lying at the extremities of a side are undistinguishable from the three other like pairs, but are distinguishable from the two pairs formed by taking angular points at the extremities of a diagonal, which pairs again are undistinguishable from each other. Further, a pair, *ab*, may sometimes be distinguished from a pair, *ba*, though the units *a* and *b* are undistinguished. Thus if *a*, *b*, *c* be the angular points of an equilateral triangle, and barbs be drawn on the sides pointing from *a* to *b*, from *b* to *c*, and from *c* to *a* respectively, the angular points *a*, *b*, *c* will be undistinguished from each other; each has an arrow proceeding from it and to it, but the pair *ab* is distinguished from the pair *ba*, for an arrow proceeds from *a* to *b*, but none from *b* to *a*.

In the same way we have distinguished and undistinguished triads, tetrads, &c.

Every collection of units has a definite *form*, due—(1) to the number of its component units, and (2) to the way in which the distinguished and undistinguished units, pairs, triads, &c., are distributed through the collection. Two collections of the same number of units, but having different *distributions*, will be of different forms. The angular points of a cube and of a regular plane octagon furnish examples of two systems of eight units, having different distributions. In the former case there are three sorts of pairs, in the latter four.

Each of the forms which a system of *n* units can assume owing to varieties of distribution is one of a definite number of possible forms, and the peculiarities and properties of the collection depend, as far as the processes of reasoning are concerned, upon the particular form it assumes, and are independent of the dress—geometrical, logical, algebraical, &c.—in which it is presented; so that two systems which are of the same form have precisely the same properties, although the garbs in which they are severally clothed may by their dissimilarity lead us to place the systems under very different categories, and even to regard them as belonging to "different branches of science."

It may seem in some cases that other considerations are involved besides "form," but it will be found on investigation that the introduction of such considerations involves also the introduction of fresh units, and then we have merely to consider the form of the enlarged collection.

Taking these principles as a basis, the memoir, which is a lengthy one of 426 sections arranged under 42 heads, discusses the various forms which systems can assume, and gives some general modes, graphical and literal, of representing them. The genesis of algebras is considered, and the nature of the particular forms dealt with in geometry, ordinary algebra, formal logic, and other cases, is specified.

Zoological Society, June 16.—Prof. W. H. Flower, President, in the chair.—The Secretary read some extracts from a letter addressed to him by Mr. J. Buttikofer, of the Leyden Museum, calling attention to a paper published in 1857 by the late Dr. Bernstein, concerning the material of which the edible birds' nests of *Collocalia esculenta* are composed.—A letter was read from Major-General Sir Peter Lumsden, K.C.B., giving details of the place and time of capture of two young Snow-Leopards sent down from the Afghan frontier to Quettah, and intended for the Society's collection.—Mr. Oldfield Thomas exhibited and remarked on a specimen of a rare burrowing Rodent (*Heterocephalus glaber*) procured by Mr. E. Lort Phillips during his recent expedition in Somaliland, remarkable for having an almost completely naked skin, and for its extraordinary habits.—Dr. Guillemard exhibited a series of eight skulls of the Kamtschatkan Wild Sheep (*Ovis nivicola*), pointing out the difference existing between it and *O. canadensis*.—Mr. W. T. Blanford exhibited the skull and an imperfect skin of a supposed new species of *Paradoxurus* from the Pulnai Hills, Southern India.—A communication was read from Dr. G. Hartlaub, F.M.Z.S., giving an account of a new species of Parrot of the genus *Psittacula* recently received from Barranquilla, U.S. of Colombia, which he proposed to describe as *Psittacula spengeli*.—Dr. Guillemard, F.Z.S., read the sixth part of his report on the collection of birds formed during the voyage of the yacht *Marchesa*. The present communication treated of the birds collected in New Guinea and the Papuan Islands.—Dr. Guillemard also exhibited a very fine series of Paradiseidæ obtained during the yacht's voyage.—Mr. G. A. Boulenger read a paper containing a description of the German River-Frog (*Rana esculenta*, var. *ridibunda*, Pallas).—Mr. P. L. Sclater read the description of a new species of *Icterus*, obtained by Mr. Hauxwell on the Upper Amazons, which he proposed to name *I. hauxwelli*.—A second paper by Mr. Sclater contained notes on the way in which *Lemur macaco* carries its young, as observed in a specimen living in the Society's Gardens.—Mr. A. D. Bartlett read some notes on the female Chimpanzee now living in the Society's Gardens, which he showed to be different from the ordinary Chimpanzee, and to be probably the *Troglodytes calvus* of Du Chaillu.—Dr. Gadow, C.M.Z.S., communicated a memoir by Miss Beatrice Lindsay, of Girton College, Cambridge, upon the Avian Sternum. The different theories held as to the origin of the sternum having been reviewed, the author proceeded, after an explanation of the various types of structure examined, to give an account of her own views. Miss Lindsay came to the conclusion that the keel is an apophysis of the two halves of the sternum, and is not produced by the clavicles or any other parts belonging to the shoulder-girdle; also that the part of the sternum whereof the keel is an outgrowth is itself of secondary origin, and that the various processes of the sternum are produced by addition and not by resorption of bony matter.—Col. J. Biddulph read a paper on the Rocky Mountain Sheep, in reference to the new geographical race lately named by Mr. Nelson *Ovis montana dalli*, and confirming the view that there are two distinct types or races of this sheep in North America.

Geological Society, June 10.—Prof. T. G. Bonney, F.R.S., President, in the chair.—Dr. A. G. Nathorst, of Stockholm, was proposed as a Foreign Correspondent of this Society.—The following communications were read:—Note on the sternal apparatus in *Iguanodon*, by J. W. Hulke, F.R.S., V.P.G.S.—The Lower Palæozoic rocks of the neighbourhood of Haverfordwest, by J. E. Marr, F.G.S., and T. Roberts, F.G.S.—On certain fossiliferous nodules and fragments of hæmatite (sometimes magnetite) from the (so-called) Permian breccias of Leicestershire and South Derbyshire, by W. S. Gresley, F.G.S.

SYDNEY

Linnean Society of New South Wales, April 29.—Dr. James C. Cox, F.L.S., Vice-President, in the chair.—The following papers were read:—Revision of the genus *Lamprima*, with descriptions of new species, by William Macleay, F.L.S.—Notes on the zoology of the Maclay Coast, New Guinea, by N. de Miklouho-Maclay. This paper consists of a carefully detailed account and description of a rare species of *Macropus*, to which the Baron gives the specific name of *Tibol*, the native name for the animal. A plate accompanies the paper.—On two new species of *Dorcopsis* from the south coast of New Guinea, by N. de Miklouho-Maclay. This contains descriptions and illustrations of *Dorcopsis macleayi* and *D beccari*, two new species in the Macleay Museum. This brings the number of known species of the genus up to five.—The Australian sponges recently described by Carter, by R. von Lendenfeld, Ph.D.—On the fertilisation of *Goodenia hederacea*, by Alex. G. Hamilton.—Notes on the habits of *Falco subniger* and *Glareola grallaria*, by K. H. Bennett.—The geology of Dubbo, by the Rev. J. Milne Curran.—Dr. J. C. Cox exhibited a sandstone nodule, the outer crust of which to a considerable depth was stained with iron, the original colour, as shown by the central portion, having been white. Also a large *Cephalopod*, belonging to the family *Sepiidæ* and genus *Sepia*, which had been recently presented to the Australian Museum by the Hon. William Macleay. This unique specimen is about three feet long from the hinder part to the apex of the arms; the body is about eighteen inches long, and eighteen inches broad, deeply notched at the lower margin, and peaked in the centre at the neck, and arched on each side; the head is about eighteen inches from the body to the apex of the arms. It is of a dark brown olive colour, quite smooth, the tentacles are about two feet long, the cups on the arms do not correspond with any known species, nor do the cups on the tentacles; it is very like *Sepia tuberculata* of Lamarck, but no tubercles exist on the surface, and it is much longer. *Sepia vermiculata* of Quoy and Gaim. is very like it, but is only fifteen inches long; most of the species, however, of the genus have been described from the shell.

PARIS

Academy of Sciences, June 29.—M. Bouley, President, in the chair—Remarks on Poinsot's theory, and on two movements corresponding to the same polhodie, by M. G. Darboux.—On Palmieri's experiments relative to atmospheric electricity, by M. Faye.—Remarks on the same subject by M. Mascart.—Researches on isomery in the aromatic series. Heat of neutralisation of the oxybenzoic acids, by MM. Berthelot and Werner.

—Note on the monument to be erected to the memory of Nicolas Leblanc, inventor of artificial soda, by M. Eug. Peligot. For various reasons it has been decided to place in the Conservatoire des Arts et Métiers the statue raised by international subscription to Leblanc. In the report of the Committee it is stated that the illustrious savant was born, not at Issoudun, as is generally supposed, but at Yvry-le-Pré, Department of the Cher, on December 6, 1742.—Note on the peculiar properties of Poinsot's "herpolhodie" curve, by M. J. N. Franke.—Remarks on the same subject, by M. Darboux.—On the reduction of the problem of the brachistochrones to canonical equations, by M. Andoyer. —On the secular variation of the magnetic declination at Rio de Janeiro, by M. Cruls.—On the crepuscular light, by M. P. J. Denza. These after-glows, which seem to have become nearly extinct during the past winter, have again begun to appear about the beginning of this summer. At Moncalieri, and in other parts of Italy and Sicily, they became very intense towards the end of May, and their brilliancy was even increased during the first days of the month of June. On the 13th especially the effects were most surprising, rivalling those witnessed during the winter of 1883. The phases of the phenomenon have also closely resembled those so often described during the periods of its greatest intensity. The author considers that all this tends more and more to confirm his own theory, that the crepuscular lights are due, not to the Krakatoa eruption, but mainly to the vapour of water disseminated throughout the higher regions of the atmosphere.—On the reappearance of the crepuscular glows, by M. A. Boillot. The author describes the effects seen at Paris on June 12 and subsequently, and also considers that their reappearance can scarcely be brought into connection with the Krakatoa eruption of August, 1883.—On the nacreous crystals of sulphur, by M. D. Gernez.—On the properties of the persulphuret of hydrogen, by M. P. Sabatier.—On the nitrate of anhydrous ammoniacal ammonia on iron, zinc, and some other metals, by M. G. Arth.—Note on the reduction of the hexatomic alcohols, by MM. J. A. Le Bel and M. Wassermann. —On a new method of preparing pyrocatechine, by M. J. Meunier.—On the action of chlorine and iodine on pilocarpine, by M. Chastaing.—Note on the quantitative analysis of the phosphoric acid present in the natural and mineral phosphates employed for manuring the soil, by M. E. Aubin.—On the development of the vascular glands in the embryo, by M. Retterer.—On a new type of Sarcosporidies, by M. R. Blanchard.—Calorimetric observations on children, by M. Ch. Richet.—New researches on the regeneration of the nerves in the periphery of animal organisms, by M. C. Vanlair.—A note on the influence of the attraction of the moon on the creation of the Gulf Stream was submitted, by M. Ch. Dufour.

BERLIN

Meteorological Society, June 2.—Dr. Neuhauss communicated meteorological observations instituted by him during a voyage around the world from April to December last year. During the whole passage through the Mediterranean Sea, the Suez Canal, the Red Sea, the Indian and Pacific Ocean, he had regularly every day made observations with a compared thermometer, aneroid barometer, and psychrometer, of the temperature and the atmospheric pressure every two hours from 6 a.m. till 8 p.m., and three times a day determinations of the humidity. His attention was specially directed to determine these meteorological conditions within the tropics and more particularly in the neighbourhood of the equator. Among the more noteworthy results of these observations he showed that the daily range of temperature over the Suez Canal amounted to 29°·2 F., from a maximum of about 86°·0 to a minimum of 56°·8, while the range of temperature on the Red Sea was only about 6°·8 to 9°·0, and that on the Indian Ocean in the neighbourhood of the equator was still less. The maximum temperature under the equator amounted nearly to 99°·5, and always coincided with the culminating point of the sun. The opinion that the maximum temperature in the tropics occurred at 10 a.m. was not confirmed by the observations. What was observed on this point was simply that the maximum temperature frequently began in the region of the tropics at 10 a.m., and lasted two hours, when, from some secondary cause or other, a small abatement of only a few tenths of a degree might be observed just at 12 noon. Squalls and rain-showers were always accompanied by a sinking of temperature which occasionally showed a range of 4°·5. On his voyage from New Zealand to Hawaii in June and July Dr. Neuhauss daily observed within the tropics a constant rising of the temperature till evening, reaching the maximum between 6 and 8 p.m. On the open sea he nowhere found higher temperatures than those he had observed on first crossing the equator. The registrations of the barometer within the tropics exhibited the well-known daily oscillation of the atmospheric pressure with two maxima and two minima. The first maximum showed itself at 10 a.m., the second at 6 p.m. It was remarkable that the squalls and rain-showers did not affect the regular march of the barometer. The hygrometric observations in the tropics on the Indian Ocean yielded considerably less daily amplitudes than on the Mediterranean Sea and on the Suez Canal. The phenomena of the twilight on the Indian Ocean, whose magnificence of colour was described, were particularly beautiful. Very noteworthy were the observations on the duration of the twilight, but a regular difference between the evening and the morning twilight was not established. Their respective durations on particular days were, on the other hand, very unequal. The astronomical twilight—*i.e.* the time from sunset till the last evanescence of light in the western sky—usually lasted from an hour to an hour and a quarter. The end of the twilight at sea could be precisely determined to a second. A great charm was afforded in the observations of the zodiacal light, which Dr. Neuhauss was able to watch every morning before sunrise on the Indian Ocean. In the evening with fatigued eyes the observation of the zodiacal light was not successful. In the morning, on the other hand, the bluish-white light pyramid could be followed by the eye to the zenith. Its brightness excelled that of the brightest parts of the Milky Way; its light was quite steady without any quiverings, and thus showed no polarisation. This phenomenon, still so little understood, was recommended as an object of observation to marine officers.—Prof. Spörer described a whirlwind observed at Potsdam on April 15 at 12 noon. The air was quite still, the sky perfectly clear, when, from a grassy sward begirt by bush, an eye-witness observed the whirlwind arise. He first heard a rustling in the leaves of the shrubs, and then observed a column of dust, of about the height of the surrounding inclosures, which, on its continued movement, split into two vortices. One of these, or perhaps only a branch of one, moving onward, without leaving any traces on its way, arrived at a neighbouring garden, where, at a particular spot, it tore up and carried aloft in a whirling manner to a considerable height the windows of several hot-beds, rending them in pieces. The weight of each of these windows was about 30 lbs. Thence the whirlwind advanced towards a neighbouring garden and tore off the windows, which were open in the direction from which the whirlwind was coming. On its further course, which was marked out by a powerful rushing noise and by a very high dust-column, the whirlwind inflicted no more destruction. Prof. Spörer was of opinion that the whirlwind originated and grew in intensity over ground which was greatly heated, just as happens in volcanic outbursts and high protuberances of the sun, when in the one case ashes and in the other hydrogen are swept aloft over highly heated surfaces.

Physiological Society, June 5.—Prof. Brieger, following up his communications of a year ago, reported on his further investigations into the ptomaïnes. In his former communications the speaker had described five well-characterised bases —neurine, muscarine, neuridine, and two other diamines—extracted from the ptomaïnes, which were developed in putrefying nitrogenous substances, and in the form of beautiful crystallised salts, and had subjected them to precise chemical and physiological analysis. As the result of this analysis, neurine, muscarine, and a base similar to, but not identical with, trimethyldiamine had were found to be very violent poisons, while the two others showed themselves to be less poisonous. Seeing that the ptomaïnes must here be regarded as products of the putrefactive bacteria, Prof. Brieger set himself the task of studying the products of pathogenic bacteria. He proceeded, however, beforehand to investigate the ptomaïnes which developed under natural putrefaction in the case of human corpses, and found that here quite different bases came to light than those which appeared under artificial putrefaction. Immediately after death lecithin decomposed itself, and large quantities of choline became developed, and, along with this base, neuridine appeared on the third day of putrefaction, increasing in quantity with the progress of putrefaction. From the seventh day after death there came to view an entirely new base, which, with hydrochlorate of platinum, yielded very

beautiful crystals, and, both in this connection as also in the form of hydrochlorate of gold and in its conjunction with hydrochloric acid, had been searchingly examined. This base, altogether different both in its quantities and in its composition from the bases hitherto known, was named "cadaverine." It increased in quantity with time while choline and neuridine diminished. Later on there appeared another new base which was also characterised by its hydrochlorates of platinum and gold, as likewise by its chemical composition, which the speaker called "putrescine" and was able to show in the form of beautiful crystals, both in a pure state and in the hydrochlorates of platinum and gold. Both these new bases, cadaverine as well as putrescine, acted but weakly on the animal organism. The first possessed the well-known smell of coniine, which former observers had already noticed in putrefying bodies. Besides these weakly acting nitrogenous bases, there were found in the later stages of putrefaction two diamines of very powerfully poisonous effect, which, injected even in small doses in animals experimented on, produced death under paralysis. These two were presented in distinct crystals and isolated. A survey of the whole series of isolated ptomaïnes taken from corrupting nitrogenous substances showed that, contrary to the former assumption, they were all simply compound, that they were all diamines belonging to the series of fats. Their great resemblance to vegetable alkaloids rendered it necessary that in the case of chemical investigations only such alkaloids and bases should be deemed demonstrated to exist in a dead body which had been isolated and had been presented in their characteristic salt-crystals. In the endeavour to study the bases produced by pathogenic bacilli Prof. Brieger had examined artificial cultures of bacilli, and first the typhoid bacillus on peptone. This led to no positive result. It was the culture of the typhoid bacillus on meat infusion and meat jelly which first led to the isolation of two new intensely poisonous bases, one of which, being injected in small quantities into animals, acted similarly to neurine, producing death under a strong flow of saliva, paralysis and diarrhœa, while the other produced only violent exhausting diarrhœa. The small quantities of these poisons did not yet, however, allow them to be sufficiently characterised chemically. They appeared to be triamines, and should be further investigated. The method adopted in the course of this investigation promised additional important results.—Dr. H. Virchow communicated the observations he had made on the cells of the vitreous humour, regarding which the opinion had hitherto been entertained that they were lymph cells which had emigrated from the blood-vessels, and which, by reason of their amœboid movements, presented the most various forms either on the surface or in the interior of the vitreous body. Dr. Virchow had first examined the vitreous body of very different species of fish, and in the case of these animals, which were provided with vessels of the vitreous humour, he had established that the cells were perfectly fixed, invariable formations, which manifested themselves so characteristically that it was possible to distinguish the particular species by the particular form of the cells of the vitreous humour. This conclusion determined the speaker to examine the vitreous humour of other cold-blooded animals, and he chose frogs for this purpose, and had, besides, examined the vitreous body in an Alpaca sheep and in the fowl. After a description of the methods of examination he had adopted, he described minutely the forms of the cells of the vitreous body he had found in these different animals. In the case of the sheep he found them ranged only on the surface in perfectly definite order; they here consisted of small, round nuclei surrounded by large masses of protoplasm manifoldly sinuated and branched. In the case of the fowl the cells likewise lay on the surface of the vitreous body in regular arrangement. The protoplasm surrounding the nuclei was, however, in part drawn out lengthwise and branched at the ends, in part stellate, divided into thin rays, in part irregularly arranged. In the case of the frogs the greatest multiplicity of forms was met with. The cells lay either between the blood-capillaries or on them, and in this case were to be recognised only with great difficulty. The nuclei were mostly longish, and around these nuclei extended the delicate protoplasm, often spun out in fine lines of fibres between the vessels, or covering them. In the case of a few cells long processes extended from the protoplasm, of which single pieces had detached themselves. In the case of others the protoplasm had spread itself out into a very wide, uncommonly delicate film covering the vitreous body. Other cells, again, had granular protoplasm, and were either round, with a large round nucleus, or were more or less lengthened to the degree even of a filiform shape. To relate these different forms of the cells of the vitreous humour each to an integral characteristic difference in the species to which it belonged, was more than the speaker had been able to accomplish. Towards the solution of this problem further investigations would be required.—Herr Aronsohn communicated the further experiences which, in conjunction with Herr Sachs, he had collected relative to the heat-centre in the cerebrum, discovered by him last year. When on a perfectly definite part of the cerebrum he pricked with a needle so deeply as to touch the parts lying under the cortex, then he observed a rise of temperature in the rectum, in the muscles, and in the skin of from about 1° to 2° C. The prick had to touch the corpus striatum in order to produce a rise of temperature, and in point of fact it was only the median part of the corpus striatum which, on being touched, gave rise to this result. No other part, however nearly situated to this spot, could, on being touched, produce this rise of temperature. The increase of temperature continued for about three hours after the prick, and affected the two sides even when the wounding of the brain was only one-sided. Electrical stimulation of the same limited spot produced a similar result. Whether there were ganglions lying on the spot in question, which influenced the production of warmth, or whether only definite nerve-tracts were touched, was a question which could not be decided. In order to ascertain the immediate cause of the increase of temperature, experiments regarding the respiration, and determinations of the urea were simultaneously carried out. These experiments showed that immediately after the corpus striatum was pricked the inhalation of oxygen and the exhalation of carbonic acid were increased, and that the secretion of urea was augmented. It was therefore clear that an increase in the metabolism generally followed the prick, an increase which, in the opinion of the speaker, was due to the heightened innervation of the muscular system caused by the prick or the electrical stimulation.

CONTENTS