advance in the morphology of Infusoria by their recent researches.—Prof. Selenka contributes a concise but very interesting account of the development of *Phascolosoma elongatum* from impregnation to the fourth day, beyond which his specimens did not develop. The changes in the first few hours after impregnation are carefully figured at brief intervals; the formation of the alimentary canal by invagination was very clearly made out. Prof. Selenka contemplates publishing a monograph on the Gephyreans.—Prof. H. Nitsche gives a preliminary account of his researches on the structure and budding of *Loxosoma Kefersteinii;* the most important result he claims to have demonstrated is the exclusive origin of the bud from the ectoderm of the parent, so that there is a direct conversion of ectodermal elements of the parent into entoderm elements of the offspring.—Dr. Anton Dohrn gives a full account of the regulations and management of his zoological station at Naples.

The September number of the same journal opens with some very interesting observations made in the aquarium at the Naples Zoological Station by Prof. Kollmann, chiefly relating to the Cephalopods. The most notable paper is one by Dr. Malbranc on the lateral lines and their sense-organs in Amphibia. The positions in which these organs occur are described and figured for a number of species in each main division of Amphibia, the nerves which supply the lateral-organ system are traced, especially the distribution of branches of the vagus, and the microscropic structure of the organs is described and figured. He shows their intimate correspondence in structure with the taste-goblets of the Tadpole, the similarity of the characteristic cells being remarkable. The discovery of taste-goblets in many species of Amphibia is also recorded, and is to form the subject of another paper.—Prof. Kollmann contributes a paper describing his investigations on the circulation in Aplysiæ, Lamellibranchs, and Cephalopods. Among the most important of his conclusions are that Aplysiæ and Lamellibranchs have arterial hearts, and that there is not really any lacunar system in Cephalopods. He has also made very careful investigations as to the admission of water into the blood in many Mollusca.—O. Bütschli gives a brief contribution on the development of *Cucullanus elegans*, showing the formation of its embryo by a process of involution. It is connected in several important characters with the embryo of Sagitta.—Dr. Dohrn has a paper of fragmentary notices on Insect Development, devoted principally to points in the development of the Silkworm and the Mole-cricket.—One of Dr. von Willemoes-Suhm's letters from the *Challenger* concludes the number.

Reichert and Du Bois Reymond's Archiv, Nov. 1875.—This number includes a continuation of Robert Hartmann's contributions to the knowledge of the anthropomorphic primates, dealing with the osteology of a number of specimens of chimpanzee collected by Dr. Schweinfurth; the conclusion of Paul Mayer's elaborate account of the anatomy of *Pyrrhoeoris apterus;* and an article by L. Dittmer on the theory of double monsters.

SOCIETIES AND ACADEMIES

LONDON

Chemical Society, Jan. 20.—Prof. Odling, F.R.S., vice-president, in the chair.—Dr. Armstrong exhibited a specimen of pure crystallised glycerin from Messrs. Dunn and Co., of Stratford.—Mr. E. Neison then communicated a note on sebate of cobalt.—After which Dr. C. R. A. Wright gave an abstract of Part IV. of the researches by himself and Mr. G. H. Beckett on narcotine, cotarnine, and hydrocotarnine; on oxynarcotine, a new opium educt, and its relationship to narcotine and narceine.—The last paper was on a method for estimating bismuth volumetrically, by Mr. M. M. P. Muir.

Zoological Society, Jan. 18.—Mr. Robert Hudson, F.R.S., vice-president, in the chair.—Prof. A. H. Garrod read a paper on a peculiarity in the carotid arteries and on other points in the anatomy of the Ground Hornbill (*Bucorvus abyssinicus*).—Mr. Edward R. Alston read a paper on the classification of the order Glires. Lilljeborg's sub-orders *Glires simplicidentati* and *duplicidentati* were recognised, the former being divided into sections equivalent to Brandt's sub-orders *Sciuromorphi*, *Myomorphi*, and *Hystricomorphi*. A third sub-order was proposed for the reception of the fossil form *Typotherium*.—A communication was read from Mr. E. A. Liardet, containing notes on the Land Shells of Taviuni, one of the Fiji Islands, with descriptions of several new species.—Mr. E. A. Schäfer read a paper prepared by himself and Mr. D. J. Williams on the structure of the mucous membrane of the stomach in the kangaroos, in which he gave a minute description of the histological characters of the different portions of this organ.—A communication was read from Mr. W. H. Hudson, containing notes on the habits of the Rails of the Argentine Republic.—The Hon. W. H. Drummond read a paper on African Rhinoceroses, in which he gave reasons for believing in the existence of five species in Africa, including *R. oswelli*, which, however, might probably be merely a variety of *R. simus*.—A communication was read from Mr. E. Pierson Ramsay, containing a continuation of his remarks on the birds met with in North-eastern Queensland, chiefly at Rockingham Bay.—A communication was read from M. L. Taczanowski, containing the description of a spotted deer found in Southern Ussuri, district of Amoorland, for which he proposed the name *Cervus dybowskii*.—Mr. A. G. Butler communicated a revision of the Lepidopterous genus *Teracolus*, with descriptions of the new species.

Geologists' Association, Jan. 7.—Mr. Henry Woodward, F.R.S., vice-president, in the chair.—On the geology of New Zealand, with special reference to the drift of that country, by Dr. Hector, C.M.G., F.R.S. The author first drew attention to the geographical position of the islands, indicating on the South Polar chart their situation relative to known lands of the Antarctic area. Great ice-packs encumber the intervening ocean, circulating around the pole; travelling in a spiral, and thus increasing their distance from the centre. On the meridian of South Shetland, as low as 40° S. latitude, the seas are at all seasons crowded with icebergs, but there is an indentation of the ice-pack opposite Australia and New Zealand, though erratic masses escape sometimes. There are, however, five degrees of latitude off the extreme south of New Zealand, clear of the limit where icebergs are ever found. As regards latitude the islands occupy a position equivalent, in the Northern Hemisphere, to a line between Paris and Algiers. They lie parallel to Australia, 1,200 miles E. by S., and repose on a sub-marine plateau, which, along the west shores of the islands, is submerged to a depth of from 1,200 to 1,300 feet, but further westward terminates in water 6,600 feet deep. The edge of this plateau comes close in shore on the S.W. extremity of the Southern (middle) island. Thus New Zealand is a remnant of a once far more extensive land, whose eastern boundaries are not as yet clearly defined, but the author was disposed to include the Chatham Islands as a portion of it. *North Island.*—The eastern shore is the boldest; foul weather, and consequently denudation, coming from the N.E. The west side is more shelving; but the great volcanic boss of Mount Egmont, which rises at a gentle angle to a conical summit, protrudes its protecting buttresses of lava far into the western sea, and has thus been the means of preserving a great tract of Miocene tertiaries behind it; these constitute some of the best land in the country. *South Island.*—The denudation comes from the west: its western shores also approach nearer to the edge of the plateau, and the mountains of the south-west angle rise from a profound abyss to a height of from 4,000 to 5,000 feet. In the North Island a belt of hard rocks, consisting of the Upper Palæozoics, and the older Mesozoics, constitutes a sort of back-bone, occupying the east-central portions, against which the softer beds of more recent age recline. In the South Island this belt of Upper Palæozoic rocks, constituting the high mountain chain known as the Southern Alps, sweeps down through the centre with an incline towards the west, and then curves round towards the east again quite to the sea on that side. Against these also the Upper Mesozoics and Tertiaries recline. On the west and south of this easterly bend of the belt of the newer Palæozoics a great mass of foliated rocks occur in the province of Otago, constituting the well-known gold-field. In the far south-west we have only crystalline rocks, and these belong to a series which seems to reappear in much of the detached lands of the Southern Ocean, such as Kerguelen's Land, Auckland Islands, &c., where Miocene volcanic rocks also occur. The meteorology of the country, as having an important bearing on the denudation of the surface, was next considered. Referring principally to the Southern Island, we have here the mixing point of the N.E. and S.W. currents. On the west side, at Okitika, the annual range of temperature is 50°; on the east side, at Christchurch, 65°; moisture, west side, 90°, east side, 75°; rainfall, west side, 120 inches; east side, 25 inches; number of rainy days, west side, 202; east side, 91. Much of this enormous precipitation is deposited as snow in the Southern Alps, which

comb out the moisture from the westerly winds; hence the extensive glaciers of the mountain region and the comparative dryness of the Canterbury Plains. Mount Cook has an elevation of 14,000 feet; this is the principal snow area of the Southern Alps, and here the island is narrowest. In shape this snow-field is less compact than that of the Bernese Oberland and of the Mount Blanc region; their respective areas are: snow-field of Mount Cook, 160 square miles; Bernese Oberland, 140 square miles; Mount Blanc, 75 square miles. The crystalline mountains of the south-west do not contain nearly so much snow. The Tasman glacier is 18 miles long, and 2 miles wide at its terminal face; the terminal face of the Godley glacier is 3 miles across. The author then gave a description of the leading features of the glacier scenery, illustrated by very effective pictures; one of Milford Haven, with the half-snowed peaks of Mount Pembroke and its neighbours rising to a height of more than 5,000 feet, was very striking; he also demonstrated the erosive action of glaciers in cutting back cols—an action more energetic formerly, some of the cols having been worn down as low as 1,800 feet. The author pointed out on a map, specially constructed for the purpose, the immense extent of the snow area in former times as contrasted with that now existing. This is proved by the abundance of moraine matter. At present the glaciers on the west side of the Southern Alps are remarkably clean (as was well shown by a splendid series of sketches in colour by the Hon. Mr. Fox and lent for exhibition to the meeting), whilst those on the east side are largely charged with detritus. Following a given section in this direction away from the central ridges we find generally a rock basin, and still lower immense moraines extending to the Canterbury Plains, till they pass under the deposits of these plains, which are referred to Pliocene and Post-tertiary age. In further illustration of the former extent of the snow-fields, the author indicated old centres of glaciers in the north of the island. The reason for this contraction of the ice area is the great question for determination. Was it due to difference of climate the result of a great glacial period? The remains of the past fauna afford no evidence of this. We may, indeed, suppose that the whole fauna migrated to the north, but we must in that case invent the land and bring into play oscillations more extensive than those required for another alternative, viz., the alteration of level within the area itself. We might suppose a general alteration of level, even to the extent of 4,000 feet higher than at present, but the evidence afforded by the shore line is unfavourable to this view. There remains then the theory of unequal elevation, which, combined with a most enormous destruction of surface, the result of ages of glacier action, best explains the phenomenon. There can be no doubt that at present the south-west portion of the island, where the crystalline rocks prevail, is very much depressed in comparison with its position at some former period; the extraordinary depth of the sub-marine valleys proves this. The author was inclined to believe in a period of irregular elevation, the south-west portion having been elevated first, though possibly the Nelson region at a still earlier date. In conclusion, the author stated his belief that there had been no general change of climate, but many changes of relative level, resulting in a great destruction of surface, which had taken place in groups of peaks at different times; the areas of the crystalline rocks have been least affected in their relative changes of level, the oscillation having been greater in the other masses, which have been crumpled up against these.

MANCHESTER

Literary and Philosophical Society, Dec. 28, 1875.—Edward Schunck, F.R.S., president, in the chair.—The following communication from Dr. Joule, F.R.S., was read:—Unsuccessful attempts have recently been made for the purpose of utilising a modification of the common kite as a means of obtaining a view of the surrounding country. The machine in each instance rose only to fall violently to the ground after remaining in the air a very short time. These trials have brought to my recollection some experiments I made more than six years ago, but of which I did not publish the results, imagining that all such matters must have been thoroughly elucidated by the Chinese, if not by our own more juvenile kite flyers. The usual method of making the skeleton of a kite is to affix a rather slender bow to the top of a standard, tying the extremities of the bow to twine fastened to the bottom of the standard. The steadiness of the kite in the air depends on the fact that the wings yield with the wind. If the bow is too stiff and the surface nearly a plane, instability results. A kite ought to have a convex spherical surface for the wind to impinge upon. Such a surface I readily made by fixing two bows crosswise. The string was attached to a point a little above the centre of the upright bow, and a very light tail was fastened to the lower end. The kite stood in the air with almost absolute steadiness. I found that by pulling strings fastened to the right and left sides of the horizontal bow, the kite could be made to fly 30° or more from the direction of the wind, and hence that it would be possible to use it in bringing a vessel to windward. One great advantage of such a mode of propulsion over ordinary sails would be that the force, however great, could be applied low down, so as to produce no more careening than that desired by the seaman.—E. W. Binney, F.R.S., said that in the Isle of Man there had been a prevalence of easterly winds throughout the months of October and November, such as he had never experienced during a residence of ten years. This appears to have influenced the migration of swallows. In the beginning of September the chimney swallows and the house martins assembled in great numbers on his buildings on Douglas Head, as they were accustomed to do prior to their annual departure, and disappeared. On Nov. 5, between 10 and 12 A.M., he observed a dozen house martins (*Hirundo urbica*) in front of his house and between it and the sea, busily employed in pursuing their prey. During the summer months the swift and sand martin are frequently seen in the same locality, but seldom the swallow or house martin, and he was inclined to believe that the presence of the latter was due to their having been driven out of their course by the easterly gales.

Jan. 11, Edward Schunck, F.R.S., president, in the chair.—Note on a method of comparing the tints of coloured solutions, by J. Bottomley, D.Sc.—On explosions of fire-damp, by Mr. Robert Rawson.

CALCUTTA

Asiatic Society of Bengal, Dec. 1.—Mr. Wood-Mason exhibited an interesting collection of crustaceans, including the materials for his monograph of *Paratelphus*, an Indo-Malayan genus of freshwater crabs, all the Italian species of which occur in localities the fauna of which is largely leavened with Malay forms. The three papers read were all by Mr. W. T. Blanford. The first contained a description of some lizards from Western Sind, comprising new species of *Ptyodactylus*, *Stenodactylus*, and *Trapelus*. The species described are *Hemidactylus coctæi*; *H. Macullatus*; *H. Persicus*; *Ptyodactylus homolepis*, sp. nov.; *Gymnodactylus*; *Stenodactylus orientalis*, sp. nov.; *Agama agilis*; *Trapilus rubrigularis*, sp. nov.; *Stellio nuptus*; *S. Melanura*; *Mesalina pardalis*; *Acanthodactylus Cantoris*; *Ophiops Jerdoni*. Five are new to the fauna of India, and three of these have not, so far as Mr. Blanford could ascertain, been previously described. Two of the three represent genera of *Geckotidæ* not hitherto detected so far to the eastward, and it is doubtful whether either has before been found in Asia. In the second paper, a note on a large hare inhabiting high elevations in Western Thibet, the author shows that the hare previously identified with doubt as *L. pallipes* proves, on comparison with specimens of the latter received from Mr. Mandelli at Darjiling, to be distinct, and is described as new under the name of *Lopus hypsibius*, from its inhabiting very elevated regions. The description is taken from a specimen collected by Dr. Stoliczka, at an elevation of 15,500 feet, in the Changchenmo valley, Ladak. In the third paper Mr. Blanford states that a snake from Purneah with a local pit has been recognised as *Elachistodon*, a remarkable genus with angular teeth. *Platyceps semifasciatus* is identified with *Zamenis ventrimaculatus*, and *Ablepharus pusillus* is recognised as distinct from *A. agilis* (*Blepharosteres Agilis*, Stol.).

BERLIN

German Chemical Society, Jan. 10.—A. W. Hofmann, president, in the chair.—The President announced the formation of a German Committee to further the objects of the Loan Exhibition of Scientific Apparatus at South Kensington, and the decision of the committees of the German Chemical Societies to co-operate with this Committee.—R. Blindow described an improved method of burning diamonds for lecture purposes. He puts the diamond on a piece of magnesium foil, and the latter on a piece of porcelain, into a combustion-tube filled with oxygen. Ignition of the magnesium is produced by a Bunsen burner, and is easily communicated to the diamond.—G. Braylants described a lecture experiment to show the combination of oxide of nitrogen with oxygen.—Th. Zincke has added the following observations to his studies on the action

of zinc on benzol, C_6H_6, and chloride of benzyle, $C_6H_5.CH_2Cl$. Besides diphenyl-methan, $C_6H_5—CH_2—C_6H_5$, two isomeric hydrocarbons are formed of the formula :—

$$C_6H_5.CH_2—C_6H_4—CH_2.C_6H_5,$$

which by oxidation yield corresponding ketones :—

$$C_6H_5.CO—C_6H_4—CO.C_6H_5$$

(dibenzoylbenzol), and two isomeric acids, viz., benzoylbenzoic acid (1 : 4), and benzoylbenzoic acid (1 : 2) :—

$$C_6H_5CO—C_6H_4—COOH.$$

—W. Leppert has succeeded in oxidising dibenzyl :—

$$C_6H_5.CH_2—CH_2.C_6H_5.$$

It yields benzoic acid. Two isomeric dinitrodibenzyls yield both paranitrobenzoic acids. Assuming the position of $CH_2 = 1$ the position of the two nitro groups appears as 4 : 4 and 4 : 2 in the two isomeric dinitrodibenzyls.—H. Salkowsky proved the existence of a double salt of paranitrobenzoate and benzoate of barium, and thinks that Fittica's pretended fifth isomeride of nitrobenzoic acid may be a mixture of nitrobenzoic and benzoic acids precipitated from double salts like the above.—H. Abelganz has studied the action of potassium on benzol. It appears to yield two compounds, C_6H_5K and $C_6H_4K_2$. With water (as well as with bromide of ethyl) it yields diphenylbenzol, $C_6H_4(C_6H_5)_2$, and a small quantity of diphenyl; also an oil boiling at 222° of the composition $(C_6H_6)_n$.—E. Demole has tried the action of brominated ethylene, C_2H_3Br, on hypobromous acid, HBrO. The chief product appears to be $CHBr_2—CH_2OH$.—A. Hilger has studied hesperidine, to which he gives the improbable formula, $C_{18}H_{21}O_9$, and which he considers as a glucoside of an acid, $C_{12}H_{11}O_4$ (?).—A. Bannow showed a large specimen of solid formic acid in beautiful crystals of more than 5 cm. in length, obtained during the cold weather of the last days in Berlin. The fusing-point is + 2°.—E. Baumann has found in the urine of horses considerable quantities of phenol-sulphate of potassium.—Al. Saytzeff has produced the following interesting synthetical reactions: by the action of iodide of allyl and zinc on oxalic ether; diallyl-oxalic ether, $C(C_3H_5)_2OH—COOC_2H_5$, a liquid boiling at 210°; by the action of iodide of allyl and zinc on acetone; the tertiary alcohol, $C\left\{\begin{matrix}—CH_3\\—C_3H_5\\—C_3H_5\\—OH\end{matrix}\right.$, boiling at 119°; by the action of iodide of allyl and zinc on acetic ether the tertiary alcohol, $C\left\{\begin{matrix}CH_3\\C_3H_5\\C_3H_5\\OH\end{matrix}\right.$.

VIENNA

Imperial Academy of Sciences, Dec. 9, 1875.—The following (among other) papers were read :—On the different excitability of functionally different nerve-muscle apparatus, by M. Rollett. This contains myographic studies on antagonistic muscles, and replies to Fick's objections to former experiments.—Attempts to meet objections lately raised against an increase of temperature with depth in the earth, in connection with the low temperature at great depths in the ocean and in some bore holes, by M. Boué. The cold water must flow under the warmer, and the earth's crust under the sea-bottom must be equal to that in continents. As to the Speremberg hole, infiltration of cold water must be considered; also the fact that many chemical combinations produce cold, and such are very likely to occur in salt and gypsum regions with mineral springs.—On the growth and decrease of crystals in their own solution and in the solution of isomorphic salts, by M. Pfaundler. He discusses objections by Lecoq de Boisbaudran to his theory.—On nitroglycerine and the most important preparations from it, by M. Beckerhin. He determines the specific heat of nitroglycerine and of *Kieselguhr*. Another paper of his gives a determination of the efficiency of blasting agents in a theoretical way.—On the formation of a rational space-curve of the fourth order on a cone-section, by M. Weyr.—On the utilisation of solar heat for heat effects, by a new plane mirror reflector, by M. Güntner.—Discovery of a disorder in the bones analogous to hæmorrhagic infarction of other organs, by M. Chiari. The changes in the bones coincided with disorders in the lungs and the right kidney.—On the laws of nervous excitation, by M. Fleischl—(1) For chemical stimuli nerves are at all parts of their course alike sensitive. (2) For electric stimuli they are more sensitive at higher points than at lower, if the electric currents pass downwards; the case is reversed if they pass upwards. (3) The doctrine of an increase (*Anschwellen*) of stimulus in the nerves is untenable.—On phyllometric values as means for characterisation of plant leaves, by M. Pokovy.

PARIS

Academy of Sciences, Jan. 17.—Vice-Admiral Paris in the chair.—The following papers were read :—Experimental critique on the formation of saccharine matter in animals (continued), by M. Cl. Bernard.—On the *trombe* of Hallsberg (with general conclusions), by M. Faye. The author controverts M. Hildebrandsson's views on the subject.—Action of fuming sulphuric acid on the carburets of hydrogen, by M. Berthelot.—History of attempts at formation of an observatory on the summit of the Pic du Midi de Bigorre, by M. Sainte-Claire Deville. The first to conceive the idea was Plantade, who died on the mountain in 1741.—New considerations on the regulation of slide-valves (concluded), by M. Ledieu.—M. Nordenskjöld was elected correspondent for the section of Geography and Navigation in room of Mr. Livingstone.—Report on the work of M. Revy, English engineer, on hydraulics of great rivers, Parana, Uruguay, and the valley of La Plata.—Mission to Campbell Island, geological constitution of the island, by M. Filhol. During the Upper Jurassic and Lower and Middle Eocene, the land formed part of a large continent; in the Upper Eocene and Lower Miocene it was submerged; in the Middle Miocene it rose again (under volcanic influence), and has since been an island.—On the transit of Venus of December 1874, by M. André.—On a new analogy to the theorems of Pascal and of Brianchon, by M. Serret.—Transformation of cane-sugar in raw sugars and in sugar-cane, by M. Müntz. The reducing sugar in these bodies is generally formed by an inactive glucose, to which are often added variable proportions of normal glucose and of levulose.—On the optical inactivity of the reducing sugar contained in commercial products, by MM. Aimé Gerard and Laborde.—Observations on results already obtained in the magnetism of steels, by MM. Treve and Durassier.—Generalisation of the theory of an osculating radius of a surface, by M. Lipschitz.—On *trombes*, by M. Planté. In one experiment made, salt water is passed through a funnel into a shallow dish over the pole of an electromagnet; and the poles of a battery of 400 secondary couples are connected, one (+) with the water in the funnel, the other (−) with that in the dish. A luminous thread appears in the liquid vein; sparks pass at the bottom, and the water in the dish is put in rotation. This and other experiments described are thought to illustrate the action of *trombes*.—On the spectrum of nitrogen and that of alkaline metals in Geissler tubes, by M. Salet. We shall notice this at length next week.—On new derivatives of anethol, by M. Landolph.—On the synthesis of aniline black, by M. Coquillion (second note).—Crossing of nerve fibres which connect the brain with the spinal cord, by MM. Sappey and Duval.—On the embryogeny of the *Salmacina Dysteri*, Huxley, by M. Giard.—Undulations of the chalk in the north of France, second part; origin and general disposition of these undulations, by M. Hebert.

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