

*Peloryctes inquilina*, by M. H. Zingera, will probably attract few English readers.—M. E. Regel publishes a portion of a second supplement to the enumeration of the plants collected by Sewerzow in 1857 in Central Asia. It includes the Ranunculaceæ, Berberidæ, Nymphæacæ, Papaveracæ, Fumariacæ, and Crucifereæ. Several new species are described.—Another botanical paper is an abridged French translation of part of the Introduction to a Flora of Moscow, by M. N. Kauffmann, the translation being made by Mr. G. O. Clerc. The Flora, which is a Catalogue of the vascular plants of the Government of Moscow, will appear in future numbers.—We find in this number two entomological papers, both on Coleoptera, and one of them of great importance, namely, a Monograph of the Graphipteridæ by the Baron Chaudoir. The other paper is a continuation, by M. Victor Motschoulsky, of his apparently interminable enumeration of the new species of Coleoptera collected by him in his journeys. It includes descriptions of species of Melasomata, and is illustrated with two plates.—M. G. Schweizer describes an easy method of approximately finding the meridian line; and M. A. Trautschold gives a short notice of some cretaceous fossils from Ssarotof and Ssimbirsk.

*Paleontographica*.—*Beiträge zur Naturgeschichte der Vorwelt*. Herausgegeben von Dr. W. Dunker und Dr. K. A. Zittel. Band xx. Lief 1., 1871. In this part of the well-known and most valuable "Palæontographica," Prof. Geinitz commences a monograph of the fossils of the Lower Quader and Lower Planer beds in the Saxon Elbe valley, which he regards as forming the lowest part of a great Quader-formation, including the Senonian, Turonian, and Cenomanian stages of the French geologists. His Lower Quader is equivalent to the Upper Greensand of English geologists. It is well known that sponges are among the most abundant and striking fossils of our Upper Greensand, and the corresponding beds in the valley of the Elbe seem to be equally rich in remains of this lowest class of animals. With the exception of a summary of the geology of the district, the whole of the present part of Prof. Geinitz's work is occupied by descriptions of sponges, the species of which are beautifully figured in the accompanying plates. Laying the reproaches of Oscar Schmidt to heart, Prof. Geinitz endeavours to arrange his fossil forms in accordance with the system of that author, although, as he justly remarks, it is impossible in the study of fossil sponges to have recourse to those minute characters derived from the spiculæ, which form the basis of recent attempts to classify the recent forms. He notices in all twenty-eight species, of which six appear to be new.

## SOCIETIES AND ACADEMIES

### LONDON

Royal Society, June 15, "On a Law in Chemical Dynamics." By John Hall Gladstone, F.R.S., and Alfred Tribe.

It is well known that one metal has the power of decomposing the salts of certain other metals, and that the chemical change will proceed until the more powerful metal has entirely taken the place of the other. The authors have investigated what takes place during the process.

The experiments were generally performed as follows:—72 cubic centimetres of an aqueous solution of the salt of known strength, and at 12° Centigrade, were placed in a tall glass; a perfectly clean plate of metal of 3,230 square millimetres was weighed and placed vertically in this solution without reaching either to the top or bottom; the action was allowed to proceed quietly for ten minutes, when the plate was removed, and the deposited metal was washed off. The loss of weight gave the amount of metal dissolved, and represented the chemical action.

The most complete series of results was with copper and nitrate of silver.

In the earlier terms of this series, *twice the percentage of silver-salt gives three times the chemical action*. The close agreement of the observed numbers with those calculated on this supposition continues as far as the 9th term. The law then breaks down, and after about 7 per cent. the increased action is almost in direct ratio with the increased strength.

The position of the plate in the solution was found to make no difference to this 2-3 law.

Similar series of experiments were made with zinc and chloride of copper, zinc and sulphate of copper, zinc and nitrate of lead, iron and sulphate of copper, and other combinations; and in every instance where the solution was weak and the action

simple, the law of three times the chemical change for twice the strength was found to hold good.

It was proved that the breaking down of the law at about 3.5 per cent. of salt in solution was irrespective of the quantity of the liquid, or of the time for which the plate was exposed. With 72 cub. centims. of a 1.41 per cent. solution of nitrate of silver, the rate of action remained sensibly the same for as long as twenty-five minutes, notwithstanding the constant deposition of silver. This apparently paradoxical result is due to fresh relays of the original solution being brought up to the plate by the currents produced, and that period of time elapsing before any of the products of decomposition are brought back again in their circuit.

When it was perceived that within easily ascertainable limits the chemical action is the same for similar consecutive periods of time, experiments were made in far weaker solutions. It was only necessary to lengthen the time of exposure. It was thus found that the law of three times the chemical action for twice the strength of solution holds good through at least eleven terms of the powers of 2; in fact, from a solution that could dissolve one gramme of copper during the hour, to a solution that dissolved only 0.000001 gramme, a million times less.

The manner in which the silver is deposited on a copper plate was examined, and the currents produced were studied. At first a light blue current is perceived flowing upwards from the surface of the plate, presently a deep blue current pours downwards, and these two currents in opposite directions continue to form simultaneously. A similar phenomenon was observed in every case where a metallic salt attacked a plate of another metal. The downward current was found to be a solution of almost pure nitrate of copper, containing about three times as much NO<sub>2</sub> as the original silver solution, while the upward current was a diluted solution of the mixed nitrates. Moreover, the heavy current took its rise in the entangled mass of crystals right against the plate, while the light current flowed from the tops of the crystalline branches. It was evident that when the fresh silver was deposited on these branches, and the fresh copper taken up from the plate, there was not merely a transference of the nitric element from one combination to another, but an actual molecular movement of it towards the copper plate, producing an accumulation of nitrate of copper there, and a corresponding loss of salt in the liquid that is drawn within the influence of the branching crystals. Hence the opposite currents.

The amount of action in a circuit of two metals and a saline solution must have as one of its regulating conditions the conducting-power of that solution. It appeared by experiment that a strong solution of nitrate of silver offers less resistance than a weak one; and it was also found, on adding nitrate of potassium to the nitrate of silver, that its power of attacking the copper plate was increased; that the augmentation of the foreign salt increased the action still further; and that the 2-3 law holds good between two solutions in which both the silver and potassium salt are doubled, though it does not hold good if the quantity of foreign salt be kept constant. Similar results were obtained with mixed nitrates of silver and copper.

While these later experiments offer an explanation of the fact that a solution of double the strength produces more than double the chemical action, they do not explain why it should produce exactly three times the effect, or why the ratio should be the same in all substitutions of this nature hitherto applied. The simplicity and wide range of the 2-3 law seems to indicate that it is a very primary one in chemical dynamics.

"On Cyclides and Sphero-Quartics." By John Casey, LL.D.

Royal Institution of Great Britain, July 3.—Sir Henry Holland, Bart., M.D., F.R.S., president, in the chair. William Amhurst Tyssen Amhurst and Lawrence Trent Cave were elected members.

Royal Geographical Society, June 26.—Major-General Sir Henry C. Rawlinson, K.C.B., president, in the chair. The following new fellows were elected: Thomas Brassey, M.P.; T. B. Baker, C.B.; D. Chinery (Consul-General for Liberia); Commander C. D. Inglis, R.N.; William Charles Jackson; G. W. Kennion; Alfred Morrison, William G. Margetts, Colonel R. Maclagen, R.E.; Captain G. S. Nares, R.N.; and James Rickards. A letter was read from Sir Roderick Murchison, giving Dr. Kirk's views of Dr. Livingstone's position, as communicated in a recent letter from Zanzibar, dated the 30th April last. It appeared that

no one at Zanzibar had been to Manime, the place where Livingstone was last heard of; but Dr. Kirk had ascertained that it was about a month's journey (200 or 300 miles) west of Lake Tanganyika, and was a thriving ivory-mart. Dr. Kirk expressed his hopes that, if Livingstone should have settled the problem of the outflow of Tanganyika, he would be satisfied, and leave all the rest of the work to future travellers, seeing that he has been out upwards of five years, and must sorely want rest. Abundant supplies were awaiting the great traveller's orders at Ujiji, on the shores of the lake.—Letters were read from Dr. J. D. Hooker to Sir Roderick Murchison, giving a description of his recent ascent of the Atlas Mountains, at two points south-west of the city of Morocco. On the first attempt, Dr. Hooker's party ascended to 12,000 feet; and on the second to the summit of a peak, further westward, 11,500 feet high. Storms of snow and hail were encountered near the crests; but the snow seemed to lie more compactly, and to a lower level (7,000 feet) further east. Constant humid and cold winds from the north are the cause of the low temperature, in consequence of which northern species of plants are found on the Atlas, to the exclusion of southern types.—A paper was read by Captain A. F. P. Harcourt on the districts of Kooloo, Lahoul, and Spiti, in Northern India; and a second one, by Major Sladen, on an exploration between the Irrawady and south-western China. Sir Donald MacLeod (late governor of the Punjab), Sir Arthur Phayre, General Fyche (Commissioner of British Burmah), Colonel H. Yule, Mr. T. T. Cooper, Sir John Bowring, and others took part in the discussion, which followed the reading of the two papers.—The President announced that the Council had renewed, for the year 1872, the offer of geological prize medals to the chief public schools; and that the special subject for the year, both in the physical and the political divisions, would be South America. A proposition from the president for a vote of thanks to the Chancellor and Senate of the London University, for the use of their great hall, met with unanimous approval. The president stated that, although the ordinary meetings of the session had terminated, it was likely that a special sitting would be held to receive the Emperor of Brazil, an honorary member of the Society, should his Majesty accept, on his arrival, the invitation the Council had forwarded.

Anthropological Institute, June 19.—Sir John Lubbock, Bart., president, in the chair. Mr. G. Latimer was elected a local secretary for Puerto Rico and Logan; Dr. D. H. Russell was elected a local secretary for Bonny, west coast of Africa.—Prof. Busk exhibited two human jaws of remarkable thickness found in the superficial deposit of a cave near Sarawak, Borneo.—Mr. Josiah Harris exhibited from Macabi Island, off the coast of Peru, wood carvings, pottery, and cotton rags. The rags extended many hundred yards at an average thickness of five feet, and below a deposit of several feet of guano. The wood and pottery were discovered at a depth in the guano of from fifteen to forty-five feet.—Mr. G. M. Atkinson communicated some interesting facts connected with the discovery of a kitchen-midden in Cork harbour.—Mr. H. W. Flower exhibited a large jade implement from New Zealand.—A paper by Mr. A. McDonald was then read, "On the Mode of Preserving the Dead among the Natives of Queensland."—Dr. Sinclair Holden contributed a paper "On Forms of Ancient Interments in Antim;," and Mr. Hodden M. Westropp read a paper "On Analogies and Coincidences among Unconnected Nations."

## DUBLIN

Royal Irish Academy, April 24.—The Rev. J. H. Jellett, president, in the chair. Mr. R. C. Tichbourne read a report on the molecular dissociation by heat of compounds in solution. The Rev. Dr. W. Reeves read a paper on the Irish tract by Onegus the Culdee, on the mothers of the saints of Ireland.

## PARIS

Académie Française.—This is the most ancient of the French Academies, its special object being the publication of a Dictionary of the French language, which is thus officially protected against innovations. No word is considered classical without being duly registered in the Dictionary of the French Academy. Several editions have appeared successively, each of them containing many alterations. The next edition will soon be published, and is just now in active preparation. On June 29 the French Academy elected its Perpetual Secretary. All the votes were taken by M. Patin, a member of the Institute for the last twenty-eight years, and Professor of Greek Literature at the Sorbonne. The principal work of M. Patin is a study of

the Greek tragedians, which is highly esteemed in France and abroad. The late Perpetual Secretary was the celebrated M. Villemain, a great friend of M. Guizot, and a former Minister of State in Louis Philippe's time. The election of M. Patin, although undisputed, was an event in the academical world, and many members left their residences, and even foreign lands, to vote for him. Amongst these learned travellers we must notice Father Gratry, of London, and the Marquis de Noailles, French Ambassador in London. MM. Guizot, Octave Feuillet, Nisard, &c., were present.

Académie des Inscriptions et Belles Lettres.—This Academy has also been engaged in filling the vacancies death had created in its ranks. M. Villemain was an ordinary member of this Academy. A scrutiny took place on the 30th ult., for the election of his successor. M. Charles Thurot was nominated by twenty-three votes against very few given to four other candidates. The Academy had also to vote for a successor to M. Alexandre, an inspector of the Academy, who was known merely by the publication of a Greek dictionary, which is the most useful in grammar schools. The succession to this office was more vigorously contested. M. de Rozière was elected only after a scrutiny, since a candidate must receive the actual majority of votes. A correspondent was also appointed. The successful candidate was M. Amari, an Italian learned antiquary of universal celebrity. All these nominations will be submitted to M. Thiers for approval, but it is a mere formality, and the assent of the Executive has never been refused for more than thirty years. M. Thiers himself is a member of the Institute, belonging to the Académie Française.

Académie des Sciences Morales.—The last sitting was occupied by a discussion raised by M. Egger on the degree of perception and intelligence in children. The question is to ascertain if infants are inferior or superior to ordinary animals in their mental condition. The reasoning of the learned member was grounded more on theoretical grounds than on actual observation of facts. None of the arguments offered were supposed to be conclusive, and the problem is left open for future investigations.

## BOOKS RECEIVED

ENGLISH.—Travels in Central America: Mrs. M. F. Squier (Trübner and Co.).—A Practical Treatise on the Manufacture of Soap: Dr. C. Morfit (Trübner and Co.).—Overland through Asia: T. W. Knox (Trübner and Co.).—Notes on the Food of Plants: C. C. Grundy (Simpkin and Marshall).—Transactions of the Woolhope Naturalists' Field Club for 1870.

FOREIGN.—(Through Williams and Norgate)—Bericht über die wissenschaftliche Leistungen im Gebiete der Entomologie während der Jahre 1867-68: Brauer u. Gerstaecker.—Lehrbuch der allgemeinen Zoologie: G. Jaeger.—Die Molecular-gesetze dargestellt: Dr. C. Wittwer.

## CONTENTS

	PAGE
SENSATION AND SCIENCE . . . . .	177
BASTIAN ON THE ORIGIN OF LIFE. By A. R. WALLACE, F.Z.S. . . . .	178
THE WORKSHOP. By W. M. MATTHEW WILLIAMS, F.C.S. . . . .	179
LETTERS TO THE EDITOR:—	
A New View of Darwinism.—CHARLES DARWIN, F.R.S.; ALFRED R. WALLACE, F.Z.S. . . . .	180
Our Natural History Museum . . . . .	181
Steam Lifeboats.—Lieut. JOHN FELLOWES, R.N. . . . .	181
The Internal Structure of the Earth.—H. HENNESSY, F.R.S. . . . .	182
Oceanic Circulation.—W. B. CARPENTER, F.R.S.; RICHARD A. PROCTOR, F.R.A.S. . . . .	183
Day Auroras.—JOHN LUCAS. . . . .	183
The Solar Parallax.—RICHARD A. PROCTOR, F.R.A.S. . . . .	183
Lee Shelter.—Dr. C. M. INGLEBY . . . . .	183
AFFINITIES OF THE SPONGES. By W. SAVILLE KENT, F.Z.S. . . . .	184
ON RECENT MOA REMAINS IN NEW ZEALAND. By Dr. J. HECTOR, F.R.S. . . . .	184
ON THE GASEOUS AND LIQUID STATES OF MATTER. ( <i>With Illustrations.</i> ) . . . . .	186
ON AN ADDITIONAL TRUE RIB IN THE HUMAN SUBJECT. By J. BESSWICK-PERRIN . . . . .	188
NOTES . . . . .	189
FIRST REPORT OF THE SCHEME OF EDUCATION COMMITTEE OF THE LONDON SCHOOL BOARD . . . . .	194
MR. BENTHAM'S ANNIVERSARY ADDRESS TO THE LINNEAN SOCIETY ( <i>Concluded</i> ) . . . . .	192
SCIENTIFIC SERIALS . . . . .	194
SOCIETIES AND ACADEMIES . . . . .	195
BOOKS RECEIVED . . . . .	196

ERRATA.—Vol. iv., p. 163, 2nd column, line 28 from bottom, for "the Rev. T. C. Maggs" read "Mr. T. C. Maggs"; p. 174, 2nd column, line 31 from bottom, for "Nicturation" read "Micturition."