

it can be tracked completely across the Atlantic to our islands, and eventually to central Europe on November 20. Several vessels keeping logs for the Meteorological Office, with standard instruments on board, have recorded observations on the storm during its passage across the Atlantic, and the Cunard steamship *Lucania* was under the influence of the disturbance during the whole of her passage from America to England. During the storm no fewer than 335 lives were reported as lost on or near our own coasts, this number being the result of reports received during the four weeks subsequent to the storm.

CHAS. HARDING.

#### PAUL HENRI FISCHER.

THE Museum of Natural History of Paris has suffered a great loss in the person of Dr. Paul Henri Fischer, the well-known zoologist and palæontologist, who died on November 29, after a long and painful illness. Born at Paris, on July 7, 1835, he received his early classical and medical education at Bordeaux. He became *Interne des Hôpitaux* of Paris in 1859, and obtained his degree of Doctor of Medicine in 1863. The study of medicine did not prevent him from devoting himself also to that of the natural sciences; for in 1861 he entered as Demonstrator in the Laboratory of Palæontology of the Museum of Paris, under the direction of M. d'Archiac. His researches chiefly concerned the living and fossil mollusca, and from 1856 he edited the *Journal de Conchyliologie* in collaboration with M. Crosse. From the position of Demonstrator he rose to be *aide-naturaliste* (assistant), and studied with great success the marine animals of the coasts of France, their geographical and bathymetric distribution. He indicated the depths at which a large number of foraminifera, cœlenterata, echinodermata, mollusca, bryozoa, &c. can be collected on the coasts of the west of France. In collaboration with the Marquis de Folin he undertook the study of the animals dredged in the extremely interesting region of the Gulf of Gascony, to which the name "Fosse du Cap Breton" has been given. The two savants discovered a large number of forms hitherto unknown, and many which recalled species only known in the fossil condition. With M. Delesse he made researches on the submarine sediments of the French shores. He was elected member of the Commission of Dredging, and took part from 1880 to 1883, on board the *Travailleur* and the *Talisman*, in the celebrated expeditions directed by Prof. Milne Edwards. In the course of these expeditions he noted the enormous extension of a cold fauna characterised by boreal and arctic species, and reaching as far as Senegal, where it lives beneath a superficial fauna with intertropical characters. Among the writings of Dr. Fischer, which number not less than 300 titles, including books, pamphlets and memoirs, we may cite: "Paléontologie de l'Asie mineure" (in collaboration with MM. d'Archiac and de Verneuil); "Mollusques de Mexique et de l'Amérique Centrale"; "Species général et iconographie des coquilles vivantes"; "Animaux fossiles du Mont Léberon" (in collaboration with MM. Gaudry and Tournouer); "Paléontologie de l'île de Rhodes"; "Cétacés du Sud-Ouest de la France"; "Catalogue et distribution géographique des mollusques terrestres, fluviatiles et marins d'une partie de l'Indo-Chine"; "Sur les caractères de la faune conchyliologique terrestre et fluviatile récemment éteinte du Sahara"; "Sur la faune conchyliologique de l'île d'Hainan"; numerous memoirs on the malacological fauna of Lord Hudson Island (Pacific Ocean), of Cambodge, of the islands of the Caledonian Archipelago, of Aleutian islands, of the Bay of Suez, &c. In collaboration with M. E. L. Bouvier he published papers on the anatomical peculiarities of certain groups of

molluscs. Finally, he wrote a remarkable treatise on conchology which has become classical ("Manuel de Conchyliologie et de paléontologie conchyliologique ou histoire naturelle des mollusques vivants et fossiles, suivi d'un appendice sur les Brachiopodes par Ehlert." In this manual the author showed that the classification of molluscs ought to be based not alone on the form of the shell, but primarily on the anatomical characters.

Dr. Fischer was *Chevalier de la Légion d'Honneur* and *Officier de l'Instruction publique*. He obtained several prizes at the Paris Academy of Sciences, and had been President of the Zoological and Geological Societies of France. He possessed deep erudition, was a charming conversationalist, and after having treated a subject belonging to the domain of the natural sciences or of medicine, he was far from embarrassed if he had to discuss philosophy, literature, or æsthetics. The death of this savant, who was as affable as he was modest, has been a cause for general regret and for deep mourning among his large circle of friends.

EDMOND BORDAGE.

#### NOTES.

THE Academy of Natural Sciences of Philadelphia has awarded the Hayden Medal to Prof. Huxley. The medal is of bronze, and, with the balance of the interest arising from a sum of 2,500 dollars given to the Academy by the widow of the late Prof. F. V. Hayden, is awarded annually "for the best publication, exploration, discovery, or research in the sciences of geology and palæontology, or in such particular branches thereof as may be designated." The recipient in 1892 was Prof. E. Suess, and in 1891, Prof. E. D. Cope. Prof. J. Hall had the distinction of receiving the first award of the medal in 1890.

SIR HENRY ROSCOE has been appointed to the vacancy in the Senate of London University caused by the death of Sir William Smith.

AN Elliott Cresson Medal has been awarded to Mr. Nikola Tesla, by the Franklin Institute, for his researches in high frequency phenomena.

M. GUYON has been elected a member of the Section de Géographie et Navigation of the Paris Academy of Sciences, in the place of the late Admiral Paris.

DR. E. ZACHARIUS, Extraordinary Professor of Botany in Strasburg University, has been appointed Director of the Ham-burg Botanical Gardens.

DR. J. K. HASSKARL, who introduced the cinchona plant into Java, died at Cleves, Germany, on January 5, at the age of eighty-two. In 1852 he was sent by the Dutch Government to South America to collect cinchona seeds and plants. He did not confine himself to collecting *Calisaya*, but gathered seeds and plants of other varieties, some of which were new. In 1854 he successfully carried about four hundred *Calisaya* plants to Java, but two years later he left Java, owing to differences between Dr. Junghuhn and himself on many vital principles of the system of cinchona culture. It is a singular fact, remarks the *Chemist and Druggist*, that the most valuable of all cinchonas, the *Ledgeriana* variety, was not introduced into the Indies by any of the collectors specially appointed by the British or Dutch Governments, but by a private trader in South America, the late Mr. Ledger.

THE annual general meeting of the Geologists' Association will be held at University College, London, on February 2. After the reading of the report and election of officers for the ensuing year, the President will deliver an address on "Geology in the Field and in the Study."

THE twenty-first annual dinner of the old students of the Royal School of Mines will be held on January 29. Among those who have promised to attend are Sir Lowthian Bell, F.R.S., Prof. Roberts Austen, C.B., F.R.S., Prof. Le Neve Foster, F.R.S., Prof. Thorpe, F.R.S., Prof. Rücker, F.R.S., Mr. P. C. Gilchrist, F.R.S., Mr. W. Topley, F.R.S., and other well-known authorities in the mining and metallurgical world.

If succeeding numbers of the *Psychological Review* are of the same high character as the first, there is little doubt that the journal will meet with the success it deserves. The presidential address, delivered by Prof. Ladd, in December last, before the American Psychological Association, is included in this new *Review*, and several interesting contributions from the Harvard Psychological Laboratory. Among the latter is a paper in which an account is given of an experimental study of memory. The results show that, when isolated, the visual memory surpasses by far the aural, but when combined the aural excels the visual—in other words, in the united action of the senses of sight and hearing, their relative strength is just the reverse of what it is when they act independently. Another contribution from the Harvard Laboratory deals with the intensifying effect of attention. It is usually held that when the attention is directed to an object, the impressions received are intensified. The experiments at Harvard lead, however, to the remarkable result that all stimuli appear relatively less when the attention is from the outset directed to them. In addition to these original papers, the *Review* contains discussions of psychological subjects, and a survey of recent literature upon the subject.

WRITING in the U.S. *Monthly Weather Review*, Mr. Mark W. Harrington remarks that the influences of the wind and tide, and possibly the low barometric pressure of a storm area, in causing an unusual rise of water, is the occasion of much of the damage and loss of life that attends the storms of the Atlantic and Gulf coasts. Observations tending to fix the extent of this high water, and the special causes that produce it are, therefore, always desirable. Mr. Harrington has brought together the records of water, wind, and pressure for two storms, viz. June 4-5, 1891, at Galveston, and October 12-13, 1893, at South Island, Winyah Bay, S.C. The results show that in Winyah Bay, under the influence of winds that were estimated at 90 miles, although doubtless the maximum velocity of the open sea exceeded this, the actual height of the water exceeded that due to the natural tide by 7 or 8 feet. At Galveston, under the influence of easterly winds, whose measured velocity attained 44 miles, the maximum gauge reading was less than 4 feet above the slight natural tide. At these two stations, therefore, the rise in the water surface attributable to the winds is in both cases about twenty times greater than the height of a column of water that can be sustained by such winds in statical equilibrium, as in the Lind anemometer, and this factor is only slightly diminished by making some allowance for the rise of water due to the diminished barometric pressure.

DR. S. C. HEPITES has published, in the *Analele* of the Meteorological Institute of Roumania, a valuable *résumé* of the climate of Sulina from observations taken during fifteen years, 1876-90. The meteorological station is situated on the left bank of the Danube, very near to the sea, and was established by the European Commission of the Danube. The mean annual temperature is 51°·6, the mean difference between the hottest month, July, and the coldest month, January, being 43°·2. The absolute maximum observed was 98°·4, and the minimum -11°·2, which gives an extreme range of 109°·6. The mean relative humidity of the air is 76·5 per cent.; the autumn is damper than the spring. The annual amount of rainfall is only 17·3 inches, on sixty-four days; the wettest

month being June, and the driest, February. The greatest fall in twenty-four hours was 2·59 inches. The prevalent wind is from north-east, the relative frequency from this direction being 20 per cent. Thunderstorms are not of frequent occurrence; they occur mostly in June and July, and not at all in winter. Fog occurs on about twenty-five days in the year; considering the position of the town, we should have expected a more frequent occurrence of this phenomenon. Falls of dust have several times been noted; they apparently come from the Russian Steppes.

MR. J. GLAISHER, F.R.S., contributes to the Quarterly Statement just issued by the Palestine Exploration Fund, a paper on the fall of rain at Jerusalem in the thirty-two years from 1861 to 1892. The average annual rainfall is 25·23 inches, that is, very nearly the same as the mean for London, though the fall is very differently distributed throughout the year. A somewhat remarkable point brought out in the discussion is an evident increase of the fall of rain in the later years of the series of observations. The mean annual fall in the sixteen years from 1861 to 1876 is 22·26 inches, whereas in the sixteen years from 1877 to 1892 the mean is 28·20; therefore the mean annual fall in the second half of the series is 5·94 inches greater than in the first half.

THE honour of being the "oldest fossiliferous rock in Europe" has been claimed for certain strata in Bohemia. Barrande first worked out the Silurian and Cambrian basin in Bohemia, and described a "primordial fauna" at the base of the Cambrian slates near Skrej. Some time later, Prof. Kusta, of Rakonitz, found fossils in the strata below, which had been ranked as pre-Cambrian or Azoic by Barrande. Great interest naturally attached to this discovery of a so-called "ante-primordial fauna," and Prof. Kusta and others wrote several papers upon the fossils. Dr. Jahn, of the Austrian Survey, went for three weeks last summer to the same district, and found that many of the fossils occurred in strata interbedded with the Cambrian series, and had no right to be called "ante-primordial." In a short preliminary note sent to the *Verhandlungen der k. k. geol. Reichsanstalt*, September 30, 1893, he writes that the oldest of the "ante-primordial" horizons of Kusta rests above Cambrian shales and interbedded with them, while the so-called "youngest ante-primordial horizon" is in reality the oldest, resting immediately below the Cambrian of Barrande, and containing a similar fauna. As Dr. Jahn's statements rest on good stratigraphical evidence, we can only conclude that the "oldest fossiliferous rocks in Europe" have yet to be found.

THE Geological Commission of the Natural Science Society of Switzerland has just published vol. xxi. part i. of the "Contributions to the Geological Map of Switzerland" ("Beiträge zur Geol. Karte der Schweiz." Bern, 1893.) This part embraces the wide district of the Bernese Oberland Alps. The author, Dr. Edmund von Fellenberg, was always an enthusiastic mountain climber, and between the years 1862-1872 distinguished himself as a pioneer of some of the most difficult ascents in the Bernese group. He was asked, in 1872, by the Geological Commission to make a systematic geological survey of the district, and now gives in this volume of the "Beiträge" the complete result of his scientific labours. The maps which he used in surveying were on the scale of 1 : 50,000; those have been reduced to the scale of the Dufour map, 1 : 100,000. The value of the work is greatly enhanced by an elaborate "Atlas," containing eighteen plates and a map showing the routes undertaken by the author. The plates include an important series of coloured geological sections through the Breithorn, the Aletschhorn, the Jungfrau and the Finsteraarhorn mountains, a great number of sketches from nature illustrating in detail the geological features of the landscape, and several prints from photo

graphs taken mainly for the purpose of demonstrating the intricate folding of the rocks and the varied effects of weathering in those glaciated Alpine areas. The "Atlas" merits a wider circle of admirers than merely the students of geology, for it reveals in the most effective manner the structure of one of the grandest regions of the Alps, a region which must be familiar to all English lovers of the Swiss lakes, Grindelwald, and the Rhone Valley.

THE *Electrician* of January 19 contains an interesting coloured map showing the electric-lighting districts of London. Our contemporary says that the chief alteration in the map, as compared with the one of last year, is the extension of the city mains. The Chelsea Company has run down the King's Road, but the London Company has followed it, and is in active competition. The Metropolitan Company and St. Pancras Vestry have thrown out a branch or two, but the additions to the mains have, on the whole, been made by "drawing in" additional conductors rather than by advance into new streets. In another place we read that the Owens College Physical Laboratory is prepared to test a limited number of electrical instruments free of charge. The testing will be carried out by qualified assistants, the electrical standards will be compared from time to time with those of the Board of Trade, and every effort will be made to ensure accuracy. All enquiries should be addressed to Prof. Arthur Schuster, Owens College, and headed "Physical Laboratory Testing Department."

THE recently published report of the Magnetic Observatory of Copenhagen for 1892 contains a description of the work which has been carried on in the "field," as well as tables containing the results of the observations made at the observatory. The tables given include the values of the declination, horizontal force, and vertical force for every hour for each day of the year (1892) as obtained from the self-recording instruments, the absolute value of the readings having been determined on five or six days in each month. There are also tables giving the diurnal variations which have been derived from measurements made on selected quiet days. Observations made in the island of Bornholm show that there exists considerable magnetic disturbance, for while if there were no disturbance the declination would vary between  $9^{\circ} 11'$  on the east side and  $9^{\circ} 29'$  on the west, it is found that at some places on the east shore the declination is  $11^{\circ}$ , and at one spot near the middle of the west shore values as low as  $7^{\circ}$  have been obtained. Observations which had been made in 1892 showed that the true lines of equal declination were in many cases closed curves, and thus the disturbances must extend to the surrounding water. With a view to tracing the isogonals after they leave the land, M. Hammer has made a series of declination observations on a raft which had been made without any iron, and a map showing the isogonals obtained is published in the report. The greater part of the island consists of granite containing iron, and a small piece of the rock when brought near the box containing the declination needle is found to give a deflection of from a few minutes to two degrees. A map showing by means of arrows the disturbances in horizontal force, indicates in a very clear and striking manner that there exists a strong centre of force a little to the north of the middle of the island. A special series of observations have enabled the magnetic effect of a number of dykes consisting of diabase to be shown and measured, a full account of which will be published in the *Bulletin de l'Académie Royale de Danemark*.

THE occurrence of true dropsical diseases of plants, not due to the activity of micro-organisms, has been placed beyond doubt by Mr. G. F. Atkinson, of Cornell University. Such a disease was noticed, as we read in a paper on the subject contributed to *Science*, in some tomatoes grown in the forcing-houses of

the University. The leaves were strongly curled, and the veins on the under side were swollen and whitened. The cells in the affected areas were stretched radially to an enormous extent. Finally they burst, giving out a large quantity of water, and leaving elongated, depressed, and blackened areas in various stages of decomposition. Inoculations of healthy plants with cultures from the diseased areas gave no result, and no fungi of ordinary dimensions could be discovered microscopically in the early stages of the trouble. The disease was purely physiological, and due to the preponderance of root-pressure over transpiration in the moist and warm atmosphere of the forcing-house, the leaves not being able to give out the moisture absorbed by the roots. The disease could be brought on artificially by subjecting healthy plants to pressure. Apple trees subjected to severe pruning during the winter suffered from a similar disease when growth began in the spring.

THE second part of vol. i. of "Contributions from the Botanical Laboratory of the University of Pennsylvania" is entirely occupied by a paper by Dr. J. W. Harshberger, entitled "Maize: a botanical and economic study." After a description of the anatomical and histological characters of *Zea Mays*, its origin is discussed at length, and this is followed by a treatise on its geographical distribution, and on its agriculture and economic value. The evidence appears to point, beyond a doubt, to the original home of the maize being Central Mexico, and not Asia, as some have supposed.

THE difficulty of satisfactorily differentiating between the typhoid bacillus and its constant companion the *B. coli communis* still remains, although numerous devices have from time to time been introduced, which have materially assisted in the separate diagnosis of these two bacilli. One of the most recent is that lately described by Dr. Schild (*Centralblatt f. Bakteriologie*, vol. xiv. p. 717), and is based upon the greater sensitiveness exhibited by the typhoid bacillus over the colon bacillus to the action of formalin vapour. Thus, whilst well-developed gelatine-cultures of the typhoid bacillus were destroyed when exposed for seventy-five minutes to the vapour derived from 5 c.c. of formalin, the *B. coli communis* was usually still alive after being similarly treated for two hours. The difference in this respect between these two organisms was still more strikingly brought out in their behaviour in broth to which formalin had been added, the typhoid bacillus being unable to grow in the presence of 1 : 15,000 parts of formalin, whilst the colon bacillus developed vigorously in broth containing 1 : 3000 parts. In order to turn this characteristic to practical account in the separate identification of the typhoid bacillus, Dr. Schild recommends that test-tubes containing 7 c.c. of sterile neutral broth should each receive 0.1 c.c. of a 1 per cent. solution of formalin, so that the formalin is present in the proportion of 1 : 7000; the inoculations are then made, and the tubes kept at  $37^{\circ}$  C. If typhoid bacilli are present, the solutions remain quite clear; but if the colon bacillus has been introduced, turbidity is apparent in twenty-four hours. By this method Dr. Schild states that he was able to separately identify the typhoid and colon bacilli in a sample of well water sent to him from a place where an epidemic of typhoid fever was prevailing.

A LARGE portion of the *Bulletin* of the Royal Gardens, Kew, Nos. 82 and 83, is occupied by an interesting report from Dr. King, of Calcutta, of a botanical exploration of the Sikkim-Tibet frontier, undertaken by Mr. G. A. Gammie. Other papers are on "Poling in Agave Plants," "Coffee Cultivation in the New World," and "The Resources of British Honduras."

A CATALOGUE has been issued showing the works on natural history, mathematical, and physical sciences, offered for sale by Mr. Bernard Quaritch.

THE number of the *Victorian Naturalist* for December, 1893, affords evidence of the activity of the study of various branches of natural history in that colony.

WE have received a paper, reprinted from the *Canadian Record of Science*, October, 1893, in which Mr. J. F. Whiteaves gives descriptions of two new species of ammonites from the Cretaceous rocks of the Queen Charlotte Islands.

DR. J. BERGBOHM has sent us a pamphlet entitled "Entwurf einer neuen Integral-rechnung," Heft ii., in which he develops a new method for the calculation of integrals, and deals with irrationals, exponentials, logarithmic and cyclometric integrals, using his system.

MESSRS. C. GRIFFIN AND CO. have published a "Pocket-Book of Marine Engineering Rules and Tables," for the use of all engaged in the design and construction of marine machinery, naval and mercantile. The authors of the book are Mr. A. E. Seaton and Mr. H. M. Rounthwaite.

TO those who propose a tour in the Bernese Oberland, we can specially recommend a series of papers published in the recent numbers (211-214) of *Europäische Wanderbilder* (Zürich, 1893.) They are written by F. Ebersold, and give a general sketch of the country, as well as information about the new mountain-railways.

*Bulletin* No. 46 of the U.S. National Museum contains the collected writings, both published and unpublished, of the late Mr. C. H. Bollman, on the Myriapoda of North America. The papers have been edited by Prof. L. M. Underwood, who has added some notes and an introductory review of the literature of the North American Myriapods.

WE are pleased to see that the *Yorkshire Weekly Post* is now publishing weekly a well-written and accurate article dealing with the different branches of natural history, and in which the subject of ornithology and entomology in relation to agriculture is dealt with in a practical manner; miscellaneous science notes are also included, and their sources properly acknowledged.

THE "School Calendar and Handbook of Examinations and Open Scholarships," published by Messrs. Whittaker and Co., is now in its eighth year of issue. The book contains a mass of information concerning the conditions of entrance scholarships and fees in all our Public Schools, Universities, and educational institutions, and is invaluable to the schoolmaster and teacher.

A SECOND edition, revised and enlarged, has been issued of the Guide to Museum No. III. of Economic Botany at the Royal Gardens, Kew. The collection in this museum chiefly consists of specimens of timber, arranged in groups according to the countries producing them. The Guide contains much useful information with regard to the scientific character and economic value of the specimens.

MESSRS. MACMILLAN AND CO. hope to publish in a few days "The Theory of Heat," by Mr. Thomas Preston, Professor of Natural Philosophy, University College, Dublin. In this volume the science of heat is treated in a comprehensive manner, both in its experimental and theoretical aspects. The whole subject has been kept in view rather than the requirements of a particular examination, and the method of exposition is such that the general reader will be interested as well as the specialist.

THE number of *Annuario publicado pelo Observatorio do Rio de Janeiro*, which we have recently received, is the ninth that has been published, and is for the year 1893. In addition to various ephemerides and astronomical data, the volume contains some useful meteorological tables with data relating to the climatology and physics of the globe, tables for calculating altitudes from barometric observations, vapour tension, and several others for the use of physicists and those engaged in

chemistry. The fifth and concluding part gives the latitude and longitude of the chief places in Brazil, with the heights in metres of the chief cities above the sea-level, terminating with a brief sketch of the climate of Brazil in general. The tables seem all to have been carefully constructed and brought up to date.

"A HISTORY OF SCANDINAVIAN FISHES," by B. Fries, C. U. Ekström, and C. Sundevall, with coloured plates by W. von Wright, made its first appearance in 1836, and though it was issued in an incomplete form, it gained a wide reputation. As several unpublished paintings by v. Wright were preserved in the archives of the Royal Swedish Academy of Science, and the text of the work could be brought up to date with comparatively slight alterations, Messrs. Sampson Low, Marston, and Co. have decided to issue a new edition. The work of revision and enlargement has been entrusted to Prof. F. A. Smitt, the present occupier of Sundevall's post at the Royal Zoological Museum. The former edition contained descriptions and figures of 64 species; the new one will comprise about 220 Scandinavian species, besides several forms from neighbouring parts, and of special interest to the Scandinavian faunist. Thus the great majority of the fishes of Europe as well as of the Arctic piscine species will be represented in the work, and the new edition will be about four times as comprehensive as the former one.

THE interesting di-nitro derivative of marsh gas,  $\text{CH}_2(\text{NO}_2)_2$ , has been isolated in the pure state by Dr. Paul Duden, in the chemical laboratory of the University of Jena. As might be expected, it is a substance of little stability, and many of its metallic derivatives or salts, for the parent substance is endowed with acid properties, are dangerously explosive. The compound itself cannot be preserved, even in sealed tubes, for many hours, becoming converted into gaseous products of decomposition, but its potassium salt,  $\text{CHK}(\text{NO}_2)_2$ , is much more stable, and may be kept unchanged for months. The preparation of the acid is best achieved from this potassium salt, by decomposing it at a low temperature with dilute sulphuric acid. The potassium salt may be readily obtained by reducing the di-bromine derivative of dinitromethane by means of an alkaline solution of arsenious oxide. The di-bromine derivative is a substance obtained by distilling tribromaniline with nitric acid. It is added in small portions at a time to the strongly-cooled aqueous solution of the alkaline arsenite, in order to mitigate the violence of the reaction. After the completion of the change the potassium salt is deposited in small bright yellow crystals, which by recrystallisation from hot water yield the salt in perfectly pure large monoclinic prisms. The aqueous solution of these crystals is neutral to litmus, the strong acid being neutralised by the introduction of one atom of potassium. At a temperature near  $205^\circ$  the crystals detonate loudly, evolving a mixture of nitrogen, nitric oxide, and carbon dioxide. Concentrated acids violently decompose the crystals with evolution of red nitrous fumes, but if they are suspended in iced water, and a layer of ether is spread over the surface, they are quietly acted upon by dilute sulphuric acid with liberation of free dinitromethane, as above mentioned. The latter substance is dissolved by the ether, and the dried ethereal solution yields it after evaporation of the ether as a yellowish liquid of peculiar acid odour, and which soon begins to effervesce, owing to the elimination of products of decomposition. The free compound may be preserved much longer in ethereal or benzene solution. The silver salt,  $\text{CHA}_g(\text{NO}_2)_2$ , is the most remarkable of its salts. It crystallises in bright green tabular crystals, which are extremely sensitive to light. Mere boiling of their aqueous solution is sufficient to produce deposition of metallic silver. Either upon warming or by contact with a drop of hydrochloric acid, the crystals explode with great violence. Upon reduction of the iced solution of the potassium salt by sodium amalgam, a curious

substance of the composition  $\text{CH}_2\text{N}_2\text{O}$  is produced, which explodes below the temperature of boiling water. An account of the work is contributed to the current *Berichte*.

A NEW mode of preparing methylamine and ethylamine, based upon the reduction of the remarkable ammoniacal compounds of formaldehyde and acetaldehyde, is described by MM. Trillat and Fayollat in the current issue of the *Bulletin de la Société Chimique*. When aqueous solutions of formaldehyde and ammonia are mixed, a vigorous reaction occurs with considerable rise of temperature, and the evaporated liquid deposits hexagonal needles of the ammoniacal compound, the composition of which has been given by several chemists as  $\text{N}_4(\text{CH}_2)_6$ . It is now shown that the reaction can be much more simply explained in the light of the behaviour of the compound upon reduction, by accepting the simpler formula  $\text{N}_2(\text{CH}_2)_3$ . By the direct union of equal molecules of formaldehyde and ammonia, the substance  $\text{CH}_2 : \text{NH}$ , methylene imide, is supposed to be produced, two molecules of which then combine with another molecule of formaldehyde to pro-

duce the compound in question  $\text{CH}_2 \begin{matrix} \text{N} : \text{CH}_2 \\ \text{N} : \text{CH}_2 \end{matrix}$  with elimina-

tion of a molecule of water. This substance is rapidly broken up upon treatment with zinc dust and hydrochloric acid, and subsequent addition of caustic alkali, with liberation of methylamine. It is probable that four atoms of hydrogen are taken up during the reduction, thus fully saturating the molecule and

forming the compound  $\text{CH}_2 \begin{matrix} \text{NH} \cdot \text{CH}_3 \\ \text{NH} \cdot \text{CH}_3 \end{matrix}$ ; this latter substance

then becomes converted into formaldehyde and methylamine by assimilation of water during the saponification with alkali. In order to prepare methylamine it is unnecessary to isolate the ammoniacal compound; formaldehyde and ammonia are simply mixed and immediately treated with zinc dust and dilute hydrochloric acid. The liquid is then saturated with caustic alkali, and the methylamine, together with excess of ammonia, expelled by a current of steam and received in dilute hydrochloric acid. Upon evaporation of the acid solution, a mixture of sal-ammoniac and methylamine hydrochloride is left, and the latter may readily be extracted by absolute alcohol. A second distillation of the methylamine hydrochloride with caustic alkali yields pure methylamine. Ethylamine may be similarly prepared by reduction and saponification of the well-known compound of acetaldehyde and ammonia.

THE additions to the Zoological Society's Gardens during the past week include a Himalayan Monkey (*Macacus assamensis*, ♀) from Sikkim, presented by Capt. Edmund A. Grubbe; a Bonnet Monkey (*Macacus sinicus*, ♀) from India, presented by the Rev. Thomas Rickards; two Japanese Pheasants (*Phasianus versicolor*, ♂ ♀) from Japan, presented by Mr. W. Rudge Rootes; two Spanish Terrapins (*Clemmys leprosa*) from Melilla, North Africa, presented by Mr. Bennet Burleigh; a Dwarf Chameleon (*Chameleon pumilus*) from South Africa, presented by Mr. E. Wingate; five Gigantic Salamanders (*Megalobatrachus maximus*) from Japan, deposited; a Cuvier's Podargus (*Podargus cuvieri*) from Australia, purchased.

#### OUR ASTRONOMICAL COLUMN.

REPORT OF THE WOLSINGHAM OBSERVATORY.—The Rev. T. E. Espin is to be congratulated upon the large amount of good work he is carrying on at the Wolsingham Observatory. The system he adopts of sending out circulars announcing any new or strange phenomenon observed by him, is one that could be followed with advantage in many other observatories, for

astronomers thus have their attention drawn to interesting objects that they might otherwise have overlooked. We have noted the contents of these circulars from time to time, and the report that has just been issued sums up the work done in 1893. Sweeps for stars with remarkable spectra were made on fifty-three nights during the year. The total number of stars detected was 578, of which 489 were found to be new to Argelander's Chart. A thorough examination was made of the Red Region in Cygnus, and several new objects detected. Many nebulous objects were also met with, fifteen of which are not contained in the New General Catalogue. The Compton 8-inch photographic telescope was used during the year for photographing stars suspected of variation. The variability of four stars was confirmed, and three new variables were detected. Mr. Espin points out that it is much to be desired that the Compton instrument should be mounted separately, so that the large telescope could be devoted exclusively to spectroscopic work. During the latter part of the year photographic work was almost entirely discontinued, on account of the necessity of using the large telescope for spectroscopic observations. Early in last year the Observatory sustained a severe loss in the sudden death of Miss Brook, who equipped the Observatory with meteorological instruments, and generously defrayed all the incidental expenses. We hope a new benefactor will soon spring up and supply the much-needed mounting for the photographic telescope.

#### ANOMALOUS APPEARANCE OF JUPITER'S FIRST SATELLITE.

—It will be remembered that in September 1890, Profs. Burnham and Barnard saw the first satellite of Jupiter, with the 12-inch telescope of the Lick Observatory, crossing the disc of the planet as a small dark double spot like a close double star (*Astr. Nach.* No. 2995). Various suggestions were made to account for this anomalous appearance, and it was even supposed for a time that the satellite was actually duplex. The explanation that found greatest favour in the eyes of astronomers, however, was that there was a permanent bright belt around the satellite, approximately parallel to Jupiter's belts, while the poles of this "Galilean star" are of a dusky hue. A repetition of the phenomenon was observed by Prof. Barnard, on September 25 of last year, with the 36-inch Lick telescope (*Astr. Nach.* No. 3206). The observations show that beyond doubt the second explanation is the true one. The satellite apparently rotates on an axis nearly perpendicular to the plane of its orbit. When it is over a portion of the Jovian disc as dark as its own polar regions, it appears more or less elongated, and parallel to the belts of Jupiter. But when it is projected on a brighter region it appears double, with the components in a line nearly vertical to Jupiter's equator, the dusky polar regions alone being visible. The smaller size of the southern component is very probably a perspective effect produced by a tilt towards Jupiter of the satellite's south pole.

ASTRONOMY AND ASTRO-PHYSICS.—The January number of *Astronomy and Astro-Physics* maintains the high reputation of that journal. Prof. W. H. Pickering describes a number of different telescope mountings in use in England and France, and compares them with some of those employed on the other side of the Atlantic. The history and work of the National Argentine Observatory forms the subject of a paper by Mr. J. M. Thorne, the director. The immense number of observations made in that Observatory testifies to the zeal of the astronomers as well as to the generally cloudless sky of Cordoba. Prof. S. W. Burnham gives a descriptive list of so-called double stars, of which the change of position is the result of proper motion. An important paper is contributed by Prof. F. H. Bigelow on the polar radiation from the sun, and its influence in forming the high and low atmospheric pressures of the United States. Prof. E. C. Pickering gives a brief account of the new star that appeared in the constellation Norma last summer, and was discovered by Mrs. Fleming on October 26, while examining a photograph of the spectra of the stars in its vicinity. An excellent plate accompanies the account, showing that the spectra of Nova Aurigæ and Nova Normæ were exactly alike, line for line. Among other articles of interest is one on Prof. Langley's recent progress in bolometer work at the Smithsonian Astro-Physical Observatory, and another on the object-glass grating, by Mr. L. E. Jewell. In the latter paper it is proposed to construct a photographic object-glass grating for use instead of the object-glass prism in obtaining photographs of stellar spectra. The plan suggested is to photograph a series of images of a long narrow slit. This