

account of the explosive character of hydroxylamine, it is dangerous to employ even a small naked flame, which is liable to effect local superheating. The temperature of explosive decomposition lies in the neighbourhood of 130° ; by uninterrupted distillation in the manner indicated, and at a pressure not exceeding 22 m.m., the hydroxylamine passes over entirely at a temperature of $56-57^{\circ}$, and by maintaining the water bath at only a few degrees superior to this temperature all danger of explosion is avoided. The methyl alcohol is practically entirely removed by the pump. Instead of leading the distillate through a warmed condenser, as recommended by M. de Bruyn, a practice which materially diminishes the yield by decomposition of a portion of the product, Prof. Brühl finds it much more advantageous to feed the condenser with a constant supply of iced water; for although the melting point of hydroxylamine is 33° , it does not resolidify even at temperatures only a few degrees above zero, so that stoppage of the condensing tube does not occur. It solidifies instantly, however, in contact with a vessel immersed in ice and salt. The cylinder containing the receivers is therefore immersed in such a mixture, so that each drop of hydroxylamine solidifies the moment it enters the receiver. The hydroxylamine thus obtained in one operation is substantially pure. From thirty grams of the hydrochloride about ten grams of the base may be obtained in one hour, a yield of 66 per cent. of the theoretical, which is four times that obtained by the method of M. de Bruyn. In the case of hydroxylamine becoming a commercial preparation, on account of its extraordinarily great antiseptic power, it would be quite easy, by introducing suitable additional condensers, to recover the whole of the methyl alcohol employed.

The pure white crystalline hydroxylamine melts according to the mode of heating and the size of the containing tube at $32-34^{\circ}$, and its boiling point for a pressure of 22 m.m. is $56-57^{\circ}$. It may actually be cooled below 0° without solidifying, if allowed to remain at rest; but, like most other substances which exhibit the property of superfusion, it solidifies the moment it is agitated. In the solid state it does not appear to be liable to decomposition. Even in the liquid state at 0° indications of decomposition have not been observed. At 10° , however, bubbles commenced to form in the liquid, and at 20° a continuous evolution of gas, mainly nitrogen, occurs, becoming more and more violent as the temperature rises, until sudden explosion takes place. Hence in a warm summer hydroxylamine cannot be preserved in sealed glass tubes. Thus a specimen, after keeping for eight days in July, was found to be no longer capable of solidification even at -6° , although there was sufficient of the base left undecomposed to explode with a certain amount of violence upon heating, less, however, than in the case of freshly-prepared hydroxylamine. When just prepared one drop warmed in a test tube over a flame explodes with a report equal to that of a gun-shot. It is suggested that hydroxylamine might be safely preserved in metallic vessels, for it appears likely that the notable action of the liquid upon glass causes the commencement of the decomposition.

At the temperature of 23.5° the relative density of pure liquid hydroxylamine is 1.2044. Its refractive index at the same temperature varies from 1.4375 for light of the wave-length of the red lithium line to 1.4514 for light corresponding to the blue hydrogen line $H\gamma$. The substance thus exhibits a small refractive power and a surprisingly small dispersion. Indeed, its molecular dispersion is about the same as was found by Prof. Brühl for nitrogen itself in triethylamine, so that the atom of oxygen and the three atoms of hydrogen would appear to exert no dispersive action if the same value for nitrogen be assumed to be equally operative. The only possible explanation is that the nitrogen here united to

oxygen and hydrogen possesses a lower spectrometric constant than when attached to carbon in triethylamine. From a systematic study of the spectrometric constants of the free base, and of the methyl derivative $\text{CH}_3\text{NH.OH}$ prepared by his assistant Dr. Kjellin, an account of which was given in the Notes of NATURE of November 9, Prof. Brühl has been enabled to prove two important facts. The first is that the constitution of hydroxylamine can be none other than $\text{H} \begin{array}{l} \diagup \\ \text{N} \\ \diagdown \end{array} \text{O-H}$. The second is that the molecular refraction and dispersion of the nitrogen present in these compounds is the same as that of the nitrogen in ammonia gas, much lower than that of the nitrogen in triethylamine, and that the probable values of these constants of nitrogen linked in this manner, for sodium light, are respectively 2.495 and 0.072. This addition to our knowledge of the spectrometric constants of nitrogen will be of invaluable aid in unravelling the intricate subject of the constitution of the class of nitrogenous organic substances known as "oxims," a subject upon which Prof. Brühl is now concentrating his attention. A. E. TUTTON.

NOTES.

It is with much regret that we announce the death of Baron von Bülow, at Kiel. Von Bülow's Observatory, better known, perhaps, as Bothkamp Observatory, was the first in Germany devoted to astro-physical researches, and it stands as a splendid monument to his interest in astronomy. By his death astronomical physics has lost one of its most enthusiastic supporters.

THE meeting of the Vienna Academy of Sciences was adjourned on November 16, as an expression of regard for Dr. Alexander von Bach, who died on November 12.

THE memorial to Sir Richard Owen is to take the form of a full-length marble statue, executed by Mr. Thomas Brock, and placed in the Natural History Museum, South Kensington.

A BOTANICAL section has been added to the Zoological Station at Naples, with a small laboratory for algological studies and researches in vegetable physiology.

DR. OSWALD KRUCH has been appointed to the Conservatorship of the Royal Botanical Institute of Rome, recently resigned by Dr. A. Terracciano.

A REUTER'S telegram from Montreal announces that the worst earthquake ever experienced in Canada occurred there at noon on November 27. As far as has been ascertained, no lives were lost, but considerable damage has been done to property, and the walls of many buildings have been cracked.

A SEVERE earthquake was felt at Peshawur, and other places in the Punjab, about nine o'clock on the morning of November 5, but fortunately no very serious damage was done. The wave apparently extended over a large area, including the Tamrud plain and Nowshera.

AN international Photographic Exhibition will take place at Milan from May until October next year. There will be a section for professional photography, another for amateur photography, and a third for technical and industrial applications of photography.

THE Department of Science and Art has received, through the Foreign Office, a dispatch from her Majesty's Minister in Chili calling attention to an exhibition which it is proposed to hold next year at Santiago, dealing with the subjects of mining and metallurgy. The exhibition will be opened in the second

fortnight of April, 1894, but the exact date is not yet known. The eight sections of the exhibition will comprise electricity, mining machinery, mechanical preparation of minerals, metallurgy, chemical industries, statistics and plans, and mining and metallurgical products respectively.

THE Municipal Council of Lausanne has been considering a scheme for the electrical transmission of power (says *La Nature*). It is proposed to obtain work to the extent of about 1200 horsepower from the Grand-Eau river, at a distance of forty kilometres from Lausanne. This energy will be utilised to supply about 5000 lamps and 16 arc-lights during the night, while in the day it will furnish the motive power for electric trams, and motors for domestic use, besides pumping the town's water-supply to the proper level.

THE new examination laboratories of the Institute of Chemistry will be opened on Friday, December 8.

THE last of the Gilchrist lectures, in connection with the Bethnal Green Free Library, will be given on Thursday, December 7, by Dr. Andrew Wilson, on "Brain and Nerve and their Work."

PROF. BORNMULLER has returned from his extended botanical journey in Persia.

A COMMITTEE has been appointed by the Italian Botanical Society for the study of the flora of Italy, both phanerogamic and cryptogamic. The reports from the various members will be collated by Prof. Arcangeli, and published in the *Buletino* of the Society.

Bulletin No. 38 of the Experiment Station of the Kansas State Agricultural College is occupied by a preliminary report on rusts of grain, accompanied by three plates illustrating the mode of development of *Puccinia graminis*, *P. rubigo-vera*, and *P. coronata*. In Kansas the two former of these are found chiefly on wheat, while the last is apparently confined to oats.

EVIDENCES of the existence of man in Nicaragua during the early Neolithic age were discovered by the Spaniards about the beginning of the sixteenth century. They mainly consist of flint-heads of arrows and spears, stone statues of men, and numerous fragments of pottery made of clay, containing fragments of volcanic rocks, unadorned and originally unburned. Of these evidences, those indicating the geological time or epoch in which they were made are, according to Mr. J. Crawford (Proceedings of the Boston Society of Natural History, vol. xxvi. p. 49, 1893): (1) Several well-executed stone statues found in the same locality, and all of the same brachycephalic type, carefully sculptured from blocks of hard rock, with brittle tools of flint, jasper, and felsite; (2) oblong blocks of partly metamorphosed rocks, in their natural state or but slightly shaped by man, apparently forming the foundations for an oblong temple or observatory extending east and west; (3) fragments of unadorned pottery found near the stone images, cemented in the débris of a well-marked subsidence, all discovered in the small valley on the west face of the mountain island of Momotombito. This island is situated near the volcanic cone Momotombo, and an unobstructed view of the Pacific Ocean, about twenty-seven miles to the westward, can be obtained from the observatory or temple. Mr. Crawford's examination of the locality and the handiwork leads him to believe that "the aborigines of the sculptors of the stone images found on the island came from Polynesia, over the land route or chain of almost connected islands then existing across the Pacific Ocean, and that the latest subsidence of twenty-five feet, as recorded on the island and the western part of Nicaragua, and the consequent synchronous activity of all the volcanoes in

that region, both occurring during the time when the sculptors were carving stones into images of types of their own people, caused the sculptors and their tribe to migrate eastward (the only safe route) and seek a home on the side of the very fertile and non-volcanic Amerrique mountains, where their probable descendants—the Amerriques—now reside."

THE first of the three articles in the current number of the *Internationales Archiv für Ethnographie* (vi. parts 4 and 5) is by Prof. H. H. Giglioli. It is entitled "Notes on the Ethnographical Collections formed by Dr. Elio Modigliani during his recent Explorations in Central Sumatra and Engano." Dr. Modigliani published in 1890 a valuable book, "Un Viaggio a Nias," giving an account of his anthropological investigations in that little known island. Giglioli's communication, which is fully illustrated, appears to be a preliminary notice of a forthcoming work by Modigliani, and it gives to English readers a foretaste of the extremely interesting and important investigations made by that skilled observer and excellent collector. Modigliani was not allowed by the Dutch colonial authorities to remain long among their foes the Battaks of Lake Toba, but he made good use of his time, and also discovered a magnificent waterfall. Giglioli gives an admirable summary of the arts and crafts, habits and superstitions of these literally cannibals. The islanders of Engano remarkably resemble the Nicobarese, but the faces of some of them recall Polynesian and especially Micronesian types. Like other islands, the old order is rapidly changing, and the population of about 8,000, ten years ago, is now reduced to 840. Prof. A. C. Haddon has a paper on "The Secular and Ceremonial Dances of Torres Straits," illustrated by woodcuts and four admirably executed coloured plates. This is the first time that any Papuan dances have been adequately described. The dances are classified into festive dances, war dances, ceremonial dances (including initiation and seasonal dances), turtle processions, and funeral ceremonies. The descriptions of the dances and the decoration of the performers are given in great detail; the initiation and funeral ceremonies were carefully built up, so to speak, from the accounts of the natives. Here also so much change has taken place, that in a short time it will be impossible to gather any further information of any value. Prof. W. Joest has an illustrated paper on various toys ("Allerlei Spielzeug"). There are also the usual notes, reviews, and bibliography.

WE have received from Sgr. Arcidiacono a pamphlet containing the results of observations of the geodynamic phenomena which preceded, accompanied, and followed the Etna eruptions of May and June, 1886, carried out under the direction of the late Prof. Orazio Silvestri, of the University of Catania. This work forms a valuable addition to geodynamic literature, and contains a detailed account of the movements, both microscopic and sensible, observed in the various seismological stations around Etna from May 18 to June 11, a table of all the shocks recorded, with their general character, direction, and intensity, and a reproduction of the seismograph diagram in the form of a curve about 15 feet long, which shows the course of the phenomena as recorded between the dates May 8 and June 16. The general aspect of calm was first broken on May 12, where slight and slow perturbations are recorded. These were repeated more emphatically on May 14 and 15. The 17th was calm, but at 10.30 a.m. on the 18th the explosion of the central crater occurred, which threw the barometer stile right off the scale. This was followed by a continued succession of violent shocks during the same day, and by the eccentric explosion of the southern flank on May 19. The eruption then followed a regular course until May 26, the disturbances being much smaller and of nearly constant average amplitude for each hour. A steady diminution of the eruptive

force took place until May 31. This and the following day were visited by two considerable shocks, followed by another strong concussion on June 5, which marked the close of the eccentric eruption. The 9th witnessed some disturbances accompanying a mild eruption of the central crater, and calm was finally re-established on June 14. A coincidence worth noticing is that of the highest barometric pressure observed during all that time, a pressure of 771 mm., with that of the great central eruption on May 18. The greatest disturbances were produced along a line passing through the focus in a direction from east-north-east to west-south-west, this being at right angles to a radial line which was the seat of the 1883 eruption.

MEASUREMENTS of the amount of light absorbed by thin metallic films of various thicknesses are incapable of affording a true measure of the absorptive power of these films unless the films compared have the same reflecting power at normal incidence. M. Salvador Bloch has been for some time experimenting with collodion films coloured with fuchsine, and thus made to exhibit a metallic aspect. According to an account published in the *Comptes Rendus*, he has succeeded in obtaining films of different thicknesses and of equal reflecting powers. Two pellicles formed by pouring layers of different thickness over glass plates, and evaporating under the same conditions, show, if all goes well, a strong resemblance as to reflecting powers. This was tested by studying with a Babinet compensator the ellipticity of the green rays near the E line reflected from the pellicle. The employment of sunlight enabled the observer to measure differences of phase down to $\frac{1}{25}$ of a wave-length. For two such pellicles no difference of phase exceeding or even approaching that limit was observed in any portion of the films. Three such films, called A, B, and C, and of thicknesses 744, 1921, and 1964 μ , respectively, were used for determining the index of absorption for the yellow D rays. The index of absorption was taken as defined by the fact that a vibration progressing in the absorbing medium through a length $\frac{\lambda}{2\pi}$ has its amplitude reduced in the ratio 1 : $e^{-\gamma}$, where γ is the index of absorption. From A and C combined, γ was found to be 0.088, and from A and B 0.084. Films of such thickness were opaque to green, but another set of films, of thicknesses 353, 504, and 627 μ , respectively, were found thin enough for measurements in the case of green light. The two corresponding values found were 0.529 and 0.505. The spectrophotometer used was analogous to a half shadow polarimeter. A polarised beam of sunlight fell normally upon a biquartz. The light then passed through an analyser with divided circle, and then through a lens, which projected an image of the biquartz upon the slit of a spectroscope provided with an eye-slit. The spectrum then consisted of two superposed portions, each corresponding to one of the quartz plates. The film was then cut half off the glass, and placed so that the edge coincided with the junction of the biquartz, with the result that the light suffering absorption passed through one of the quartzes only. Equality was established by turning the analyser. A special advantage of this arrangement is that it requires only one source of light.

THERE exist at present numerous arrangements for "turning down" an electric light, the chief peculiarity of them all being that nearly as much electrical energy is consumed when the lamp is only glowing feebly as when it is giving its normal amount of light. An arrangement to which this objection does not apply is described in the Proceedings of the American Institute of Electrical Engineers for September, by Mr. F. Moore. In the circuit of the lamp there is placed an automatic interrupter, consisting of a small electromagnet and an armature held back by a spring; the contacts being so arranged that as the armature vibrates the current is interrupted during part of

the oscillation. By this means different amounts of current can be passed through the lamp, for by moving the electromagnet nearer to or further from the armature, the speed with which the latter vibrates can be varied. To avoid the destructive effect of the sparks at the contacts the whole armature is enclosed in a glass globe from which the air has been exhausted. Under these conditions it is found that platinum contacts remain good for a considerable time. When the interrupter is at work the sparks produce in the exhausted globe a phosphorescent glow which the author thinks may possibly be made use of for the purpose of giving light. Another application of the above is for running lamps on circuits of much higher voltage than they are intended for.

Wiedemann's Annalen der Physik und Chemie for November contains an interesting paper by R. Hennig, on the magnetic susceptibility of oxygen. The method employed, namely, the measurement of the displacement in a magnetic field of a short column of liquid in a slightly inclined capillary tube, due to the difference in the susceptibility of the two gases (oxygen and air) at the two ends of the liquid column, would hardly seem at first sight capable of giving very accurate values. The author, however, has obtained very fairly consistent results, and finds the value 0.0963×10^{-6} for the difference between the susceptibility of oxygen and air at a temperature of about 26° C., and at pressures varying from 75 cm. of mercury to 328 cm. In order to measure the strength of the magnetic field a small coil was suspended by a bifilar-suspension close to the capillary tube, and from the deflection, when a known current was passed through this coil, the strength of the field was calculated. The results obtained by this method were also compared with those found by the rotation of polarised light in a piece of heavy glass, and by means of a small induction coil which could be rapidly moved out of the field.

SOME interesting investigations on the vitality of the cholera organisms on tobacco have been made by Wernicke (*Hygien : Rundschau*, 1892, No. 21). Small pieces of linen soaked in cholera broth-cultures were rolled up in various kinds of tobacco, and the latter made into cigars. At the end of twenty-four hours only a few bacilli were found on the linen, and none on the leaf. On sterile and dry tobacco leaves, the bacilli disappeared in one-half to three hours after inoculation. On moist, unsterilised leaves they disappeared in from one to three days, but on moist and sterile leaves in from two to four days. When introduced into a five per cent. tobacco infusion (10 grams of leaves to 200 grams of water), however, they retained their vitality up to thirty-three days; but in a more concentrated infusion (one gram of leaves to two grams of water, they succumbed in twenty-four hours. When enveloped in tobacco smoke, they were destroyed, both in broth-cultures as well as in sterilised and unsterilised saliva, in five minutes. Tassinari, in his paper, "Azione del fumo di tabacco sopra alcuni microrganismi patogeni" (*Annali deli Istituto d'Igiene*, Rome, vol. i., 1891), describes a series of experiments in which he prepared broth-cultures of different pathogenic microbes, and conducted through them the smoke from various kinds of tobacco. Out of twenty-three separate investigations, in only three were the cholera organisms alive after thirty minutes' exposure to tobacco fumes. But in actual experience the apparent antiseptic properties of tobacco have not unfrequently been met with; thus, during the influenza epidemic in 1889, Visalli (*Gazetta degli Ospedali*, 1889) mentions the remarkable immunity from this disease which characterised the operatives in tobacco manufactories; that in Genoa, for example, out of 1200 workpeople thus engaged, not one was attacked; whilst in Rome the number was so insignificant that the works were never stopped, and no precautions were considered necessary.

THE *Deutsche Seewarte* has published No. xi. of the results of observations taken in the North Atlantic on ships supplied with instruments either belonging to that institution, or verified by it. Each part contains all the observations made in a ten-degree square, which is again subdivided into 100 one-degree squares, grouped in such a way that anyone can make use of them as they are, or they can be eventually combined with the observations made by any other institution. The tract now covered by these volumes extends from latitude 20°–50° N., and longitude 10°–50° west (with the exception of one square), and this district joins on to that for which the data were discussed some years ago by the Meteorological Council, and extending from 20° N. to 10° S. latitude; so that for nearly all that part of the North Atlantic which is traversed by long-voyage ships a large amount of useful data is available, either for scientific inquiry or for the purpose of navigation. The winds are tabulated under sixteen points, and storms under four quadrants, while the mean values of pressure, temperature, &c., are deduced from the total number of observations in each sub-square. This work is quite independent of the synoptic weather charts of the North Atlantic, which are regularly prepared by the Seewarte, in conjunction with the Danish Meteorological Institute.

THE *Kansas University Quarterly*, vol. ii. No. 2, contains three articles by Prof. S. W. Williston. In one of these, entitled "Kansas Pterodactyls," a previous article is referred to, in which the opinion was expressed that the genus *Pteranodon* occurs in Europe. Since then Prof. Williston has seen papers by Prof. Seeley, in which the same view is held, and an attentive examination of the evidence leads him to say: "I am satisfied that there can no longer be any reasonable doubt of the congenerousness of our species with those included in the genus *Ornithostoma*. Seeley, a generic name antedating *Pteranodon* Marsh by some five years."

MR. R. L. JACK, the Government Geologist at Brisbane, has prepared a report on the progress of the geological survey of Queensland during 1892. Attention has been confined to detailed mapping of small areas of economical importance. For a general colony map it is thought that the scale of sixteen miles to an inch permits sufficient detail to be shown. As visiting the different mines will occupy some considerable time, it is intended to publish, in the meantime, a map showing the geological features, which will also be useful in the hands of miners and the general public for its topography. On the map, which is now being drawn on stone, are shown the outcrops of most of the reefs, as at present understood. A subsequent edition will show the actual or inferred outcrops of all the reefs, the underground workings, and the geological information acquired in the course of the underground survey by the Geological Staff. On the completion of the work, it is in contemplation to construct a glass model, the surface of which will be coloured, and the outcrops of the reefs shown in the same way as in the geological map, and the extension of underground geological boundaries, so far as ascertained, will be represented. Its main advantage, however, will be that the exact position of the reefs with relation to the surface features and artificial boundaries will be understood at a glance, and the depth at which any given reef would be met with in any position could be ascertained by a simple calculation.

A PAPER read by Dr. V. Ball, before the Royal Irish Academy on January 23 of this year, has been reprinted from the "Proceedings" (3rd Ser. vol. iii. No. 1, pp. 151–169). The title is "On the Volcanoes and Hot Springs of India, and the Folk-Lore connected therewith." Dr. Ball shows how the evidences of past volcanic activity in India—the metamorphism of sedimentary rocks by the Deccan traps into porcellanic shales,

the agates, cornelians, &c. produced, the peculiar appearance of old craters, the "Lonar Lake," the natural caves and pillared temples of basaltic rock, &c.—have formed a nucleus of truth around which the religious spirit of the people has wrapped coil upon coil of myth and the marvellous. Sometimes undue credence has been given by travellers to native tales of smoke emanating in present times from peaks in Western Bengal and the Central Provinces. For these no better foundation could be discovered by Dr. Ball than the ordinary atmospheric effects of mist and cloud. Bhawani Patna, in the Central Provinces, is an example of a "mythical volcano." Hot springs have more especially appealed to the superstition of the people, and served the purposes of the native priesthood. Dr. Ball stated that the total number of recorded sites where hot springs occur in India is about 300. He gave then a concise account of the most important scientific phenomena associated with the hot springs, and details, in some cases, of the particular virtues, medical and spiritual, ascribed to them by the people. He called attention, in concluding, to the local character of the vegetation near hot springs, and of the fauna which are sometimes present in their waters, e.g. the famous Magar Pir, seven miles north of Karachi, with its numerous crocodiles.

THE August number of the *Records of the Geological Survey of India*, vol. xxvi. part 3, has been sent us. An important paper is the "Geology of the Sherani Hills," by Mr. T. D. La Touche, with a geological map of part of the Sulaiman Range and several sections and sketches (pl. i.–v.). The first part of the paper is devoted to the physical features. The stratigraphical geology of the Sherani Hills is not complicated; the deposits in the area examined range from Cretaceous to recent and sub-recent time, and a complete table of the succession and the relative thicknesses of the rocks is given on p. 82. Dr. Fritz Noetling describes "Carboniferous Fossils from Tenasserim"; good specimens of *Lonsdaleia salinaria*, and new species of *Lithostroton* and of *Schwagerina* are figured on the accompanying plate. Details are given by Mr. R. D. Oldham, Superintendent Geological Survey of India, of a deep boring at Chandernagore, and a "Note on Granite in the Districts of Tavoy and Mergui" (with plate), by P. N. Bose. Especial comment is made in the "Tri-Monthly Notes of the Geological Survey of India Department" upon the completion of the second edition of the "Manual of the Geology of India," by Mr. Oldham.

THE calendar for the year 1893–4 of the University College of North Wales has just been issued.

WE note with pleasure that the Oxford University Press has published two more editions of the "Oxford Bible for Teachers," containing the excellent "Helps to the Study of the Bible" reviewed in NATURE of October 5.

WE have received a "Record" of results of observations in meteorology and terrestrial magnetism made at the Melbourne Observatory and at other localities in the colony of Victoria, Australia, from July to December, 1892, under the superintendence of Mr. R. L. J. Ellery, the Government Astronomer. In the future this "Record" will be issued quarterly instead of monthly.

MESSRS. WILLIAM WESLEY AND SON have issued their 118th "Natural History and Scientific Book Circular." The catalogue includes a number of works from the library of the late Sir G. B. Airy, in addition to transactions of scientific societies, periodicals and serials, Government reports, and works dealing with the history of science. It should be in the hands of every bibliophile.

THE sixth edition of a book known to most chemists, viz. "Laboratory Teaching," by the late Prof. C. L. Bloxam, has

been published by Messrs. J. and A. Churchill. Mr. A. G. Bloxam, the editor of the new edition, has made several important additions and alterations, and these changes will doubtless enable the book to retain its high position among the many works that now exist on practical chemistry.

WHAT are happily termed "Drum-and-trumpet Histories" have not been so numerous since the publication of the late Mr. Green's famous narration of the development of the English people. A more pretentious work of a similar kind is "Social England," edited by Dr. H. D. Traill, and published by Messrs. Cassell and Co. In this history a section of each epoch is devoted to a description of the conditions of science and learning, and another to trade and industry. The departure cannot be too highly commended, for the truest epic of a nation's life is that in which the interests of all classes are recited.

LANTERNISTS will be glad to learn that Messrs. Perken, Son and Rayment have introduced a new oil-lamp, possessing three times the candle-power of those hitherto used for lantern projection. This gain of brilliancy is obtained by dividing the oil reservoir, so as to provide central air-shaft. The combustion is thus rendered more perfect, and the odour that usually accompanies ordinary lamps is correspondingly decreased. For small audiences the lamp will suit a lecturer's purpose quite as well as the lime-light. Doubtless the recent fatal result of the breaking of an oxygen cylinder at Bradford will considerably increase the demand for perfected lamps of this kind.

THE success of Sir John Lubbock's book on "The Beauties of Nature" has induced Messrs. Macmillan to issue a cheap edition, without illustrations. Though the book possesses a good table of contents, its value would be increased by the addition of an index. The author will be glad to have his attention called to one or two slips. On p. 207, Jupiter is said to have four satellites, whereas Prof. Barnard's discovery has brought the number up to five. Nitrogen should be removed from the list of elements in comets (p. 213), and *Clarke* (p. 223) should be *Clerke*. These slips, however, are but spots on the sun, for there are few books that will enlighten the general reader more than the one before us.

A REMARKABLE new substance, isocyanogen tetrabromide, $\text{Br}_2\text{C}=\text{N}-\text{N}=\text{CBr}_2$, has been obtained by Dr. Thiele in the laboratory of the Munich Academy of Sciences, and an account of it is contributed to the current *Berichte*. It was prepared by the reduction of azotetrazine, a new substance very rich in nitrogen (concerning which Dr. Thiele promises a further communication), and by treatment of the reduction product, hydrazotetrazine, with bromine. Isocyanogen tetrabromide is readily volatile in steam, insoluble in water, but soluble in organic solvents, particularly in ether. It crystallises from glacial acetic acid in large prisms, which rapidly lose their brilliancy, however, upon removal from the mother-liquor. The crystals melt at 42° , emitting a most pungent, irritating odour. The crystals normally in the cold evolve the same odour, although not so strongly as when warmed. Concentrated sulphuric acid, at the temperature of a water-bath, rapidly dissolves them with production of hydrazine and evolution of carbon dioxide, hydrobromic acid, and smaller quantities of free bromine and sulphur dioxide. Water precipitates from this solution a large quantity of hydrazine sulphate, which may easily be identified by its melting-point (256°), its reduction of silver solutions, and its formation of a difficultly soluble double sulphate with copper sulphate. The reaction for the decomposition by sulphuric acid is probably as follows:



Dilute hydrochloric and sulphuric acids only attack the tetrabromide after long-continued heating to 300° , the former then converting it into nitrogen and ammonia, and the latter oxidising

it. Its reaction with alkalis is specially interesting. It dissolves readily in them, and upon subjecting the alkaline liquid to distillation another new compound, which is probably isocyanogen oxide $\text{OC}=\text{N}-\text{N}=\text{CO}$ or a polymer of that substance, passes over with the last portion of distillate. If a reducing agent, such as alcohol, a ferrous, manganous or stannous salt, is added to the alkaline solution, a powerful odour of the well-known isonitrile kind is at once emitted. This same odour is produced when the alcoholic solution of the tetrabromide is decomposed with zinc dust and a little chloride of zinc. It appears most probable that the odour is due to the hitherto unisolated isocyanogen, $\text{C}=\text{N}-\text{N}=\text{C}$. The supposition is further justified by the fact that the strongly odourous substance is expelled by boiling in a current of carbon dioxide, and is capable of absorption by hot dilute sulphuric acid with formation of a solution of just such powerfully reducing proclivities as might be expected from a solution of hydrazine and formic acid.

THE first results of an important research in connection with the melting-points of the more refractory inorganic salts are likewise communicated to the current *Berichte* by Prof. Victor Meyer and Dr. Riddle. The observations have been made with the object of ascertaining the relations of the melting-points of definitely connected salts, those already investigated being the chlorides, bromides, and iodides of sodium and potassium, and the sulphates of those metals. The method adopted in order to measure such high temperatures with accuracy was essentially as follows:—The salt was heated considerably above its melting-point in a capacious platinum crucible, by means of a Perrot furnace. The crucible was then removed from the furnace, and an air thermometer, constructed of platinum and on the compensating principle, was inserted into the liquid salt. As soon as solidification of the latter commenced the temperature remained constant for some little time, quite sufficient to enable the air, or in the cases of very high melting-points, the nitrogen contained in the thermometer, to be displaced by hydrochloric acid gas, and its volume measured over water. The results obtained are the following:—The chloride, bromide, and iodide of sodium melt at 851° , 727° , and 650° , respectively; the analogous salts of potassium fuse at 766° , 715° , and 623° . In each case a lowering of the melting-point accompanies the increase of the atomic weight either of the halogen or of the metallic element. Potash (presumably the oxide) melts at 1045° , and soda at 1098° , the same rule again applying. In the cases of the sulphates, however, sodium sulphate is found to melt at 843° , and potassium sulphate at the much higher temperature of 1073° , a result contrary to the rule for the halogen salts, but which is quite in keeping with other well-known differences which the oxy-salts of sodium and potassium exhibit.

THE additions to the Zoological Society's Gardens during the past week include a Chacma Baboon (*Cynocephalus porcaricus*, ♂) from South Africa, presented by Mr. W. S. Cox; two Common Marmosets (*Hapale jacchus*) from Brazil, presented by Dr. S. Steggall; a Pallas' Goat (*Capra cylindricornis*, ♀) from the Caucasus Mountains, presented by Mr. H. H. P. Deasy; a Dwyker Bok (*Cephalophus meyersi*, ♂) from South Africa, presented by Miss Gertrude A. Winly; three Palm Squirrels (*Sciurus palmarum*) from India, presented by Mrs. S. W. MacIver; a Meyer's Parrot (*Psephenus meyeri*) from South Africa, presented by Mrs. B. Searelle; a Great Eagle Owl (*Bubo maximus*) from China, presented by Major Boyd Bredon; two Puffins (*Fratercula arctica*) British, presented by Mr. E. Hamond; a Brown Capuchin (*Cebus fatuellus*, ♂) from Brazil, a Rhesus Monkey (*Macacus rhesus*, ♀) from India, six Meyer's Parrots (*Psephenus meyeri*), an Alario Sparrow (*Passer alario*) from South Africa, deposited; two Redshanks (*Totanus calidris*), British, purchased.