

Street lighting by electricity made a new advance last week in the inauguration of Edison's incandescent lamps on the Holborn Viaduct. The whole length of the Viaduct from Hatton Garden to the Old Bailey is fitted up with these lamps, two of them in each of the gas lamps on both sides of the street. These, as well as a number of lamps in a railway station, an hotel, and several other establishments, making a total of about a thousand lamps, are all supplied by one gigantic dynamo at the office of the Edison Company in the centre of the Viaduct, another similar machine being kept ready to take its place in case of any interruption to its working. We were present at the inauguration, and considered the experiment a complete success. The gas was burning in immediate proximity to each pair of incandescent lamps in the street; and the electric light had very much the best of the comparison, not only as regards the quantity, but also the quality and steadiness of the light.

Mr. Edison's system of supplying a district with electricity from a central station is here being tried for the first time, the application of it in New York, which is to be on a larger scale, being yet in the future. The system consists in placing all the lamps in the district in parallel circuit between two great conductors, which extend all over the district. One of these conductors is kept positive and the other negative by the action of the dynamo or dynamos at the central station; and it is important to remark that the supplies of positive and negative electricity are given to these conductors, not at one point only of each, but at several points, unless the district be very small; supply wires of large diameter being led from the dynamo direct to several distant points of each, and the number and distribution of these points being so chosen as to give practically the same difference of potential between the two great conductors at all parts of the district. This is not difficult to do, as the resistance of each lamp is equivalent to a very great length of the wire of which the conductors are composed. Each of the two great conductors here mentioned consists of insulated wire laid in the main streets, with connexions through the cross streets, so as to form a network with the blocks of houses in its squares, and the positive and negative wires are laid side by side. Each lamp is protected by a lead wire, through which the current to it must pass, and which will melt before the current becomes strong enough to injure the lamp. A similar precaution is employed to prevent the over-heating of wires in houses, and thus to avert the danger of fire.

A meter is erected on the premises of each consumer, which, by means of the weight of zinc dissolved off one plate and deposited on another, shows how much electricity has been supplied. The meter is on a shunt, and only takes one four-hundredth part of the whole current. The current may be used either for lighting or for power, and will furnish the most economical means of obtaining anything under ten horse power.

Another electric novelty which possesses great public interest is the electric railway system of Profs. Ayrton and Perry, recently explained by the former at the Royal Institution and in Dublin with a working model. Each carriage of the train is to carry its own electro-motor, which will be actuated by a current passing from one rail to the other through the wheels. The difficulty of insulating a great length of rail is avoided by having main carriers for the current quite distinct from the rails, and putting only one section of the rails at a time—perhaps a mile long—in connexion with them, the different sections being insulated from one another. As soon as the foremost carriage comes on to a new section its wheels will depress a movable piece, which will throw on the current to this section and throw it off from the preceding one. The current cannot again be supplied to this preceding section until the train has reached the

next section but one, and thus an automatic block system will be provided.

When we can make railway journeys without smoke or steam, and can light our rooms with the pure, steady light of the incandescent electric lamp, which consumes no air and yields no fumes, electricity will have done much to promote the comfort of life.

#### ASTRONOMICAL NOTES.

WELLS'S comet ( $\alpha$ , 1882) is now nearly ten times as bright as at the time of discovery on March 18th. Next month this will increase much more rapidly, so that by the end of May the comet will probably have become a conspicuous object to the naked eye. The following approximate places from the ephemeris of Dr. H. Kreutz, of Vienna, calculated for midnight at Berlin (which corresponds to 11<sup>h</sup> 6<sup>m</sup> at Greenwich), will give a general idea of its path during the next few weeks:—

Date.	R.A.		N.P.D.
	h.	m. s.	
April 21	19 21	38	31 19
" 29	20 21	22	22 46
May 7	22 34	4	16 6
" 15	1 49	38	18 22
" 23	3 37	17	29 40
" 31	4 23	34	44 59

According to Dr. Kreutz the comet will be in perihelion on the 8th of June, at the distance from the sun of 0.04 in terms of the earth's mean distance, and will make its nearest approach to the earth about the 20th of May, at the distance 0.87 on the same scale, or about 80,000,000 miles. Combining the latest available (made by Prof. Tacchini at Rome) with the earlier observations, Mr. Hind has calculated an orbit for the comet and an ephemeris for next week, which will probably be found very accurate:—

Date.	R.A.		N.P.D.
	h.	m. s.	
April 22	19 25	49	30 29
" 23	19 31	27	29 26
" 24	19 37	33	28 23
" 25	19 44	10	27 20
" 26	19 51	22	26 16
" 27	19 59	14	25 13
" 28	20 7	51	24 10

The above places are for midnight at Greenwich. Mr. Hind's orbit assigns June 10th as the day of perihelion passage of the comet, and he thinks that at that time it will be bright enough to be visible even in daylight.

The planet Uranus passed its perihelion for the second time since its discovery (the first having been in 1798) on the 9th inst.

Venus and Saturn are very near together this week, their conjunction having taken place on the evening of the 19th. They are in the constellation Aries, and set a little after 8 o'clock.

Another small planet (No. 224) was discovered by Dr. J. Palisa at Vienna on the 30th of March, whilst searching for Callisto (No. 204). The planet, which was very faint—less than the eleventh magnitude—is the fourth discovery of the present year, all by the same astronomer.

#### GEOGRAPHICAL NOTES.

THE recent intelligence from Lake Nyassa was unfavourable: nineteen natives, engaged in constructing a road from Lake Nyassa to Lake Tanganyika under the direction of Mr. Stewart, C.E., had been massacred, and four of the caravan alone escaped. The prospects of the enterprise seemed thus gloomy. Later letters from Mr. Stewart—the latest dated January 2nd of this year—are more hopeful. The loss of nineteen natives is indeed confirmed, but Mr. Stewart is not certain whether some of them may not have been enslaved, as slave gangs have recently penetrated into the district, and have been using their influence against European enterprise. As regards reprisals the native chief Chiwinda was determined on measures of retaliation, as eight of his people were among the killed. Thanks to Mr. Stewart's efforts these reprisals were of the mildest character: the offending tribe in great measure escaped; only one of Mwembara's people seems to have been killed, but a number of huts

were burnt and some bananas destroyed. Mwembara, the offending chief, it appears, wishes to propitiate the white man by offering him cattle, and will not readily again venture on such atrocities. Mr. Stewart, undaunted in his enterprise, hopes to resume it in April or May, but he will make his basis, not inland, as Chiwinda, but Karonga on the Nyassa coast, advancing only as his road is made and not needing thus to engage porters. The error on this occasion seems to have been sending natives without a European to lead them. The road had been traversed before safely under such leadership, but Mwembara, finding the natives alone, and some of them raw and untutored, of Chiwinda's tribe, fell upon them and massacred them. The steamer for the Tanganyika cannot now be transported this year, as it was hoped, but by wise and prudent piloting, and by careful forbearance as regards the natives, the enterprise may yet be successfully achieved.

Capt. Burton writes from Axim under the date of March 13th:—"Many thanks for your kindly notice (January 7th) of our intended trip to the 'King Mountains.' But fortune has not favoured us. We landed here on January 25th instead of September 25th, and the long 'dries' threatened early and heavy rains. But we have learnt the proper line of direction, and if unable to follow it ourselves we shall be happy to point it out to others. Meanwhile, our short visit to the gold fields has shown that we have here a California like that of 1850. What we want for work goes under the names of 'hydraulicking' instruments, flumes, long-toms, and Norton's pumps. When from twenty to forty feet thick, yielding from one ounce to four per ton, of the sub-soil shall have been removed, then it will be time to put up such heavy and expensive machinery as stamps and steam engines. They have begun at the wrong end: the land, for the present at least, wants only 'washing.'" Capt. Burton and Commander Cameron are expected to be back in a very few days.

We are very glad to learn that Capt. Casati, of whom nothing had been heard for several months past, is doing well. Towards the close of December he was at Tangasi (?), to the south of Munza's old residence in the Monbuttu country, where Miani lies buried, and where he expected to meet Dr. Junker, who is likewise reported to be in safety. Capt. Casati travels with an Arab and four Akka, and is determined to trace the Welle into the Congo or to Lake Taad.

M. Drapeyron's *Revue de Géographie* publishes an interesting paper by M. Deloncle, on a ship canal across the Isthmus of Kera. The proposed line lies to the south of that advocated by General Trementhere. We hear that a body of French engineers is about to proceed to the spot in order to "study" this question more thoroughly. What are our Indian authorities doing?

In Cora's *Cosmos* for March will be found an abstract of an Italian Blue-Book recording the steps taken to ascertain the fate of Signor Giulietti, murdered in the Afar country, and a paper on the Russo-Turkish frontier in Armenia. The latter is illustrated by General Stebnitzki's map.

Dr. Danckelman, a competent meteorologist, is about to join Mr. Stanley on the Congo.

The *Mittheilungen* publishes a recomputation of Mr. Stanley's hypsometrical observations by Dr. Zöpferitz, who assigns the Victoria Nyanza an altitude of 4,058 feet.

The *Hefi* just published of the *Geographische Blätter* of Bremen possesses unusual interest. Herr Dahse supplies a readable article on the Gold Coast, in a large measure based upon personal experience. He speaks more hopefully of the mining ventures now in progress. Dr. Gumbel, Director of the Bavarian Geological Survey, who has examined the specimens of ore brought home by Herr Dahse, "doubts whether there exists any country in the world which holds out so fair a hope of a continuous supply of gold

do the inland districts of the Gold Coast." The likewise promises to become of importance, for a specimen of pegmatite was found to yield ten per cent. of cassiterite. The same *Hefi* contains a continuation of the report of the brothers Krause, which brings down the narrative to their arrival at Chilkoot in Alaska on December 23rd, 1881. Both papers are illustrated by maps.

Dr. Buchner, in a paper read before the Bremen Geographical Society, describes the territories of the Muata Yanvo as consisting in the main of wide upland savannas, intersected by valleys, portions of which are densely wooded. The fauna is remarkably poor. Neither lions nor elephants were seen by the explorer, and even antelopes were scarce, and never found in herds, as in the south. The Muata Yanvo is avaricious, like all these African kings, but he is not cruel. Only three executions took place during Dr. Buchner's six months' residence, and these for criminal offences. At the residence of King Tambu a Kabong Dr. Buchner met with a very superior description of native weapons and woven fabrics, a fact which, he thinks, points to the existence of highly civilized tribes in the interior which have not hitherto come into contact with Europeans.

Petermann's *Mittheilungen* for April contains a map of the lower Bahr-el-Ghazal, as surveyed by E. Marno in 1880; a map of the Russo-Turkish frontier, by Stebnitzki; and a variety of articles, amongst which that of Prof. Drude on the botanical exploration of Northern Africa is perhaps the most interesting. The author renders full justice to the labours of Hooker and Ball in the Atlas mountains, and more especially to M. Cosson's great work, now in course of publication. The latter, perhaps not uninfluenced by the example of the officers of the Survey of India, has largely availed himself of the services of native collectors, by whom several parts of the Atlas mountains and of the Moroccan Sahara have been successfully explored in search of plants.

SOCIETIES.

ASTRONOMICAL.—April 14.—Mr. E. J. Stone, President, in the chair.—Mr. R. T. Peff was elected a Fellow.—A paper was read by Prof. Newcomb, in which the author made some criticisms upon the instructions to observers of the coming transit of Venus which had been formulated by the Paris International Conference.—The President thought that Prof. Newcomb's objections were chiefly to the words in which the instructions had been drawn up; they would, however, receive the careful attention of the Committee, and he regretted that they had not been received earlier.—Mr. Green called attention to a recent drawing of the planet Mars by Prof. Schiaparelli, in which most of the fine lines or "canals" were represented double. Mr. Green had been unable to verify these by his own observations, and thought that in many cases the lines should rather be considered as the boundaries of faintly shaded regions.—The President read a paper upon some of the results obtained from the meridian observations of Mars made at the Cape of Good Hope, Melbourne, Leyden, and Washington.—The following papers were also read: 'On the Inclination of the Ring of Saturn to its Orbit, deduced from Washington Observations,' by Prof. E. S. Holden, 'Conjunctions of the Interior Satellites of Saturn,' and 'Observations of the Companion of Sirius,' by Prof. A. Hall, 'On the Best Mode of Undertaking a Discussion of the Observations of Contact to be made at the Approaching Transit of Venus,' by Mr. D. Gill, 'Errata in the First Melbourne General Catalogue of Stars,' by Mr. R. L. J. Ellery, 'The Variable Star  $\mu$  Ursæ Minoris,' by Mr. T. E. Espin, 'Note on Mr. Neison's Paper on the Corrections to Adams's Semi-Diameter of the Moon,' by Mr. E. Neison, and 'Alleged Errors in the Time Record of Observations of the Transit of Venus, 1874, at Hermitage, Rodriguez,' by Lieut. W. M. Moore.

GEOLOGICAL.—April 5.—Mr. J. W. Hulke, President, in the chair.—Mr. W. J. H. Myne was elected a Fellow, and M. A. Milne-Edwards, of Paris, a Foreign Correspondent of the Society.—The following communications were read: 'Geological Age of the Taconic System,' by Prof. J. D. Dana, 'On some Nodular Feltsites in the Bala Group of North Wales,' by Prof. T. G. Bonney, and 'On the Cambrian

(Sedgw.) and Silurian Rocks of Scandinavia,' by Mr. J. E. Marr.

ARCHAEOLOGICAL INSTITUTE.—April 6.—Mr. J. Hilton in the chair.—A paper by Mr. E. A. Freeman 'On Sens and Auxerre' was read.—Mr. E. Peacock sent a transcript, from the Episcopal Register at Lincoln, of a "Professio" made in the Benedictine nunnery of Little Marlow, Buckinghamshire, to Margaret Vernon, the last prioress, before John Longland, Bishop of Lincoln (1520-1547), by "suster Constance petronill Anne," who vows, offers, and fully gives herself to serve Almighty God during her natural life, and renounces for ever and utterly forsakes the world and property of temporal substance, &c., and takes upon herself wilful poverty, utterly forsaking her own proper will. The bringing to light of this document by the Rev. A. R. Maddison forms a small but interesting addition to the scanty published accounts of the nunnery of Little Marlow.—The Chairman exhibited a silver-gilt collar of SS, apparently Flemish work, and Mr. Hartshorne contributed some notes upon SS collars in general.—Mr. Hilton exhibited a collection of early keys, a bronze celt, and a large Italian fibula.—Mr. C. R. B. King sent some illustrations of the undercroft of the church of the Knights of St. John of Jerusalem at Clerkenwell, and drawings of a baldachino lately removed from the church of St. Mary, Totnes.

ENTOMOLOGICAL.—April 5.—Mr. H. T. Stainton, President, in the chair.—A box of Hymenoptera, mounted on glass, by Mr. J. R. Billups, a remarkable *Coccinella*, intermediate between *C. oblongoguttata* and *ocellata*, by the Rev. H. S. Gorham, and a very complete collection of British Trichoptera, by Mr. R. McLachlan, were exhibited.—Mr. A. G. Butler communicated a paper in continuation of his 'Heterocerous Lepidoptera collected in Chili by T. Edmonds, Esq.,' in which forty-five species of Noctua were noticed.

ANTHROPOLOGICAL INSTITUTE.—April 4.—Major-General Pitt-Rivers, President, in the chair.—The election of Mr. E. F. in Thurn was announced.—The President exhibited a series of carvings and painted masks from New Ireland.—A paper on the Papuans and Polynesians was read by Mr. C. S. Wake, who, from a consideration of the physical peculiarities of the Oceanic races, arrived at the following conclusions:—1. The eastern archipelago was, at a very early period, inhabited by a straight-haired race belonging to the so-called Caucasian stock, the present modern representatives of which are the Australians. 2. To this race belonged also ancestors of all the Oceanic races, including the Papuans, the Melanesians, the Micronesians, the Tasmanians, and the Polynesians, as shown by their common possession of certain physical characters. 3. The special peculiarities of the several dark races are due to the introduction of various foreign elements, the Negritos having influenced all of them in varying degrees. 4. The lighter Oceanic races show traces of the Negrito influence, but they have been affected at various periods by intermixture with peoples from the Asiatic area, giving rise on the one hand to the so-called "savage Malays," and on the other hand to the Polynesians, who have been specially affected by the Malays. 5. Traces of an Arab or Semitic element are apparent among both the dark and light Oceanic races, but chiefly among the Papuans and the Melanesians, the former of whom may also possibly possess a Hindoo admixture.—Mr. C. Pfoundes read a paper 'On Rites and Customs in Old Japan,' and exhibited a number of photographs and Japanese books and pictures.

NEW SHAKSPERE.—April 14.—Mr. F. J. Furnivall, Director, in the chair.—Dr. Bayne read a paper 'On Shakspeare's Characters contrasted with those of George Eliot,' and in conclusion observed that Shakspeare, had he lived now, would have preferred the novel to the drama as a mode of expression.—Mr. Furnivall said that Shakspeare as well as George Eliot had no heroes, the nearest being Brutus. He doubted whether novels could last so well as dramas.

MEETINGS FOR THE ENSUING WEEK.

- Mon. Antiquaries, 2.—Anniversary Meeting.
- Asiatic, 4.—'The Vaishnava Religion, with special Reference to the Siksha-patri of the Modern Sect called Swami Narayana,' Prof. M. Williams.
- Institute of Actuaries, 7.—'Adjustment of Mortality Tables,' Mr. J. A. Hignam.
- Geographical, 8.—'A Journey in the Atlas and the Northern Part of the Algerian Sahara,' M. V. de Gorfou.
- Tues. Horticultural, 11.—Scientific Committee, and Fruit and Floral Committees.
- Royal Institution, 3.—'History of Customs and Beliefs,' Dr. E. B. Tylor.
- Photographic, 8.
- Civil Engineers, 8.—'Theory of the Gas Engine,' Mr. D. Clerk.
- Harbours and Estuaries on Sandy Coasts,' Mr. L. F. Vernon Hartcourt.
- Anthropological, 8.—'Exhibition of Pottery from Situla, by General Pitt-Rivers,' 'Aboriginal Inhabitants of the Andaman Islands,' Part II, Mr. E. H. Man.
- Society of Arts, 8.—'Character and Social Industries of the Inhabitants of China, Japan, and Formosa,' Hon. N. Shore.
- Wed. Society of Arts, 8.—'Telephonic Communication,' Lieut.-Col. C. E. Webber.

- Wed. Geological, 8.—'Relations of the Eocene and Oligocene Strata in the Hampshire Basin,' Prof. J. W. Judd; 'Fossil Chitonaceous Bryozoa from Mount Gambier, South Australia,' Mr. A. W. Waters; 'Thamnicus: Permian, Carboniferous, and Silurian, and Occurrence of a New Species of *Phyllopora*,' Mr. G. W. Shrubsole.
- Thurs. Royal Institution, 3.—'The Metals,' Prof. Dewar.
- Royal, 4.
- Society of Arts, 8.—'Manufacture of Steel from Phosphoric Pig-Iron,' Messrs. S. G. Thomas and P. C. Gilchrist.
- Telegraph Engineers, 6.—'Attraction and Repulsion due to Sonorous Vibrations, and a Comparison of the Phenomena with those of Magnetism,' Mr. A. Stroh.
- Fri. Society of Arts, 8.—'National Necessities as the Basis of National Education,' Dr. Richardson.
- Quekett Microscopical, 8.
- Royal Institution, 9.—'Some Dangerous Properties of Dusts,' Prof. Abel.
- Sat. Royal Institution, 3.—'History of the Science of Politics,' Mr. F. Pollock.

Science Gossip.

Just as we are going to press we have received the news of Mr. Darwin's death. We can do no more now than express our great regret at the loss of the foremost of English men of science, one who has worked a revolution, not in the natural sciences only, but in every branch of human thought.

THE Darwin medal, founded by the Midland Union of Natural History Societies, has been cut by Mr. Joseph Moore, of Birmingham. It bears a likeness of Mr. Darwin on the one side, and on the reverse an inscription relating briefly the history of its foundation, together with a branch of coral, indicative of one of Mr. Darwin's most important and successful researches.

THE arrangements for the Friday evening meetings at the Royal Institution are as follows: April 28th, Prof. Abel, 'Some Dangerous Properties of Dusts'; May 5th, Prof. R. Grant, 'The Proper Motions of the Stars'; May 12th, A. G. Vernon Harcourt, Esq., 'The Relative Value of different Modes of Lighting'; May 19th, a paper by Sir Frederick Bramwell; May 26th, Sir Henry S. Maine, 'Sacred Laws of the Hindus'; June 2nd, H. H. Statham, Esq., 'The Intellectual Basis of Music'; June 9th, Prof. Burdon Sanderson, 'The Excitability of Plants.'

MR. WILLIAM EDWARD GAINE, C.E., died on the 20th of March, at the residence of his son at Blackburn, in the sixty-fifth year of his age. Mr. Gaine was the inventor of the process for treating paper with strong sulphuric acid, by which is produced the so-called parchment paper which has been manufactured for some years by Messrs. De La Rue & Co.

HERR UNGER, of the Imperial Post Office Service of Germany, has reviewed before the Electro-Technical Society at Berlin the present state of telephones in that empire. Dr. Stephan, the German Postmaster-General, christened the instrument "Fernsprecher" (far speaker), and now, after the lapse of only four years, 1,280 telephone offices are in action in Germany.

M. DE CHARDONNET brought before the Académie des Sciences on March 27th his observations 'On the Action of Telephonic Currents upon the Galvanometer.' If in a telephonic circuit there is placed a very delicate galvanometer, and if the transmitter be acted upon by an organ pipe, the voice, or a tuning fork, no deviation is observed while the sound preserves its intensity, but as it increases or diminishes the needle deviates.

M. L'ABBÉ MAILFERT has been studying the action of ozone upon organic matters and upon various metallic oxides and sulphides. He recently brought before the Academy of Sciences a statement of the results obtained, which show the important part played by this condition of oxygen in most chemical reactions.

MR. W. H. HUDLESTON, the President of the Geologists' Association, publishes in their *Proceedings* an account of deep-sea exploration. We desire to direct attention to this, since it is unquestionably the most satisfactory analysis of all the results obtained since Capt. Dayman's survey of the North Atlantic in 1857 to the termination of the Challenger expedition.

In the *American Journal of Science* Mr. Lawrence Smith has a note 'On the Magnetic