

of that of political and social life, which, strangely enough, it never seems to occur to anybody to teach a child. I would have the history of our own country and of all the influences which have been brought to bear upon it, with incidental geography, not as a mere chronicle of reigns and battles, but as a chapter in the development of the race and the history of civilisation. Then with respect to æsthetic knowledge and discipline, we have happily in the English language one of the most magnificent store-houses of artistic beauty and of models in literary excellence which exists in the world at the present time. I have said before, and I repeat it here, that if a man cannot get literary culture of the highest kind out of his Bible, and Chaucer, and Shakespeare, and Milton, and Hobbes, and Bishop Berkeley, to mention only a few of our illustrious writers—I say if he cannot get it out of those writers, he cannot get it out of anything; and I would assuredly devote a very large portion of the time of every English child to the careful study of the models of English writing of such varied and wonderful kind as we possess, and what is still more important and still more neglected, the habit of using that language with precision and with force and with art. I fancy we are almost the only nation in the world who seem to think that composition comes by nature. The French attend to their own language, the Germans study theirs; but Englishmen do not seem to think it is worth their while. Nor would I fail to include in the course of study I am sketching translations of all the best works of antiquity or of the modern world. It is a very desirable thing to read Homer in Greek; but if you don't happen to know Greek, the next best thing is to read as good a translation of it as we have recently been furnished with in prose. You won't get all you would get from the original, but you may get a great deal, and to refuse to know this great deal because you cannot get all seems to be as sensible as for a hungry man to refuse bread because he cannot get partridge. Finally, I would add instruction in either music or painting, or if the child should be so unhappy, as sometimes happens, to have no faculty for either of these, and no possibility of doing anything in an artistic sense with them, then I would see what could be done with literature alone; but I would provide in the fullest sense for the development of the æsthetic side of the mind. In my judgment these are all the essentials of education for an English child." Prof. Huxley concluded by saying that if the educational time permitted, there were one or two things he should be inclined to add to these essentials (which fitted an Englishman to go anywhere or to enter on any career); among these additional subjects he mentioned Latin and German. Beyond that, let each man take up his special line.

NOTES

THE Emperor of Germany has raised Prof. Helmholtz to noble rank.

THE two English observers, Messrs. Lawrence and Woods, detailed to secure photographs of the total eclipse of the sun on May 6, left Southampton for Panama on Saturday last. The operations will be exclusively photographic. The Treasury only determined to grant the necessary funds some fifteen days before the last date on which the observers could sail; the instruments sent out, therefore, were most hurriedly put together; and the greatest praise is due to Messrs. Hilger and Meagher for their work against time. Detailed instructions and a time table stating the work to be done for every second from ten minutes before totality till ten minutes afterwards, have been sent with the observers. If all goes well more than fifty photographs will be secured.

In reply to the Memorial addressed to the Council of the British Association on the subject of the proposed meeting of the Association in Canada in 1884, signed by 144 members of

the General Committee, Mr. Bonney states that the Council of the British Association are fully alive to the difficulties which will attend the visit to Canada decided upon by the General Committee at Southampton in August last. As this decision was obtained in accordance with the usual forms and does not appear to contravene the express wording of the rules of the Association, the Council feel bound to recognise it as a valid one, and believe that they would not be justified in summoning a special meeting of the General Committee to reconsider the question. They have, however, in effect already taken steps to ascertain the general feeling of the members of the Association. In the month of November last, after a consultation with Sir A. T. Galt, the High Commissioner for Canada in this country, the officers of the Association addressed to their intending hosts in Montreal a number of questions, upon the answers to which the success of the projected visit must greatly depend. To these questions they are now daily expecting a reply. As soon as this is received, information will be given to the Members of the Association, and inquiries made as to their willingness to visit Canada. The replies will enable the Council to judge whether it will be possible to hold a successful and fairly representative meeting at Montreal.

M. RAOUL PICTET has recently tried, on the Lake of Geneva, a specimen of his "rapid vessel," the general idea of which was indicated a short time ago. The vessel is figured in *Archives des Sciences* for January, and M. Pictet gives details of the theory and working. With a length of about 67 feet, and a width of 13 feet, this vessel is peculiar chiefly in having a bottom that is of parabolic form lengthwise, the concavity downwards; transversely the bottom is nearly straight; the sides are vertical. A keel reaching from about the middle of the length, incloses a screw shaft. Among other results M. Pictet shows that the force of traction of this vessel is always less than that of an ordinary vessel of the same general form and going at the same rate. The advantages of the parabolic curve only become apparent at a certain speed, depending on the width, length, and tonnage, and the parameters of the parabolic curve. The force of traction passes through a maximum, at a certain velocity for each vessel; beyond that point, the work of the motor, and so the expenditure of fuel, diminishes, though the speed increases. Experiment has yet to decide the limits of this second period. The emergence of the vessel, very small for small velocity, grows very quickly when a speed of 5 metres (say 17 feet) per second has been reached; and it converges rapidly towards an upper limit. The recoil of the screw for different velocities increases to a maximum, then constantly diminishes and tends to become *nil* for an infinite velocity. For other features of the action we must refer to the original. The engine we note proved faulty, and in several of the experiments the vessel was towed by a steamer, at velocities rising to 27 kilometres (say 17 miles); when this last is reached, an economy of one-half is realised (growing from 16 kilometres).

THE recent death of the Rev. Titus Coan, an aged and much-esteemed missionary at Hilo, Hawaii (where he laboured nearly forty-eight years), has been announced (*Am. Journ. Sci.*). He took a deep interest in the volcanic mountain at whose foot he lived, and at each eruption was generally the first on the ground to observe and report on the movements. Three times he ascended to the scenes of the eruptions connected with the summit crater. Though not a geologist, his accounts (many of them in the journal named) have always been of geological value. He was the principal historian of the great eruption of Kilauea in 1840, and the summit eruption of 1843, when the flow was uninterrupted for twenty-five miles and continued six weeks. It was after the latter eruption that he made the very important observation (since confirmed) that

Kilauea, though 10,000 feet lower in level than the summit crater, showed no change, no signs of sympathy whatever.

A DEPUTATION from a number of the Scientific Societies of London had an interview with Sir John Lubbock on Tuesday, for the purpose of asking him to oppose the Bill to authorise the construction of a railway through Epping Forest. It was stated that the line would greatly destroy the natural beauty of the Forest, and that the existing means of access to it were abundant. Sir John Lubbock said he would be prepared to assist in opposing the Bill; but it was pointed out that, as the Corporation and the Verderers had given their sanction to the scheme, it would be difficult to secure its rejection.

THE death is announced of Herr Thomas Dickert, well known by his geographical relief-maps. He died on January 11 at Poppelsdorf, near Bonn, aged eighty-two. Also of Dr. Bohdalek, formerly Professor of Descriptive Anatomy at Prague University, who died at Leitmeritz on February 2.

AT a public meeting held in Glasgow last week, called at the suggestion of Sir William Thomson and Mr. John Burnes of Castle Wemyss, it was agreed to collect the money to establish a permanent and efficient observatory on Ben Nevis. The building will cost 2000*l.*, the instruments 1000*l.* In all 5000*l.* are required, and of that sum 1400*l.* has already been subscribed. The Government has refused to assist in the matter.

M. TRESKA read before the Paris Academy of Sciences on Monday his report on the experiments of M. Marcel Deprez; the distance being exactly 17,000 metres instead of 20,000 as at first asserted, and the motive-power 6·21 horse instead of 5, the percentage is exactly 0·326, a little less than one-third. It may be supposed that the percentage of primary engines, telegraph wires, and secondary engines is 0·70, so that the result obtained is just $(0·70)^3 = 0·343$, almost exactly the real value. The measurements have been taken with accuracy, and no error can be adduced. The number of revolutions of the primary machine was 588 in a minute. Others were tried on Monday with 814 revolutions, but it is too soon to judge of the result. M. Tresca having declined to do so, an Academical Commission has been appointed to report upon M. Deprez's theories. M. Tresca praised Mr. Hutchinson who made the electrical measurement with apparatus brought from London for measuring differences of potential and number of amperes. The electrical measures were verified with dynamometers.

DR. WARREN DE LA RUE has been elected by the Committee a Member of the Athenæum Club under Rule 2, which provides for the admission of persons eminent in literature, science, or the arts, or for public services.

THE usual sitting of the Congrès des Sociétés Savants will take place in Paris on March 27, 28, and 29 next. The Minister of Public Instruction will preside over the concluding meeting on the 30th. For the first time the Academy of Aërostation has been summoned to send delegates.

FROM the beginning of the next financial year Kew Gardens will be opened an hour earlier than at present, viz. at 12 o'clock instead of 1.

AT the Technical College, Finsbury, the introductory address was given by Mr. Philip Magnus, Director and Secretary of the Institute, on Monday evening last. Sir Frederick J. Bramwell, F.R.S., was in the chair.

WE are glad to see that the new and spirited Scottish quarterly, the *Scottish Review*, does not neglect science. In the February number, which is just out, there appears an article on Medical Reform and an appreciative estimate of the late James Clerk Maxwell.

THE *Journal Télégraphique du Bureau Central de Berne*, summarising the principal lacunæ in the universal system of telegraphy, notes as one the construction of a line to Iceland for recording the principal atmospheric events observed in the Polar regions.

A DISTINGUISHED Swedish entomologist, Gustaf Wilhelm Belfrage, has recently died in Texas, where he had been for some years residing. The deceased had collected and forwarded a number of entomological specimens to the Swedish Academy of Sciences in Stockholm, for which he had received a State grant.

AN International Exhibition of Garden Produce and a Botanical Congress will be held in St. Peter-burg this summer.

REPORTS from Lower Bavaria announce the discovery of auriferous and argentiferous sand deposits. They are confined to a layer of gneiss which occurs in the granitic rocks for a length of about fifteen or eighteen miles, between the villages of Innernzell and Zenting. It appears that 100 kilogrammes of the sand contain about 10 to 15 grammes of pure silver and between 2 and 10 grammes of pure gold; the sand from 4·6 metres depth is even richer. The weathered gneiss partly carries gold and silver and partly gold only; no special form is marked in the occurrence of the auriferous sand; there are deposits that seem to be alluvial, others which occur in the firm rocks, others again in distinct veins of mica slate, and still others in exposed gneiss which is many yards high.

IN a recent communication to the Vienna Academy, Prof. Graber, of Czernowitz, describes a long series of experiments with regard to the "skin-vision" of animals; affording exact proof that certain animals, without the aid of visual organs proper, can make not only quantitative but qualitative distinctions of light. These experiments relate chiefly to the earth-worm, as representing the eyeless (or "dermatoptic") lower animals, and to the *Triton cristatus*, as representative of the higher ("ophthalmoptic") eyed animals. In a table Prof. Graber presents columns of numerical "coefficients of reaction," indicating how many times more strongly frequented a space illuminated with bright red, green, or white without ultra-violet, is, than one illuminated dark blue, green, or white with ultra-violet respectively, the conditions being the same as regards light-intensity, radiant heat, &c. In one set of experiments, the animals were in the normal state; in another, the anterior end of the worm, and the eyes of the triton were removed.

"CATALOGUES of the New Zealand *Diptera*, *Orthoptera*, and *Hymenoptera*, with Descriptions of the Species," by F. W. Hutton, F.G.S., Professor of Biology at Canterbury College, N.Z., have been published by the Colonial Museum and Geological Survey of the Colony. They consist of reprints of the original descriptions of such species in the orders named as have been described from New Zealand, without, as a rule, critical remarks, and form an amplification of Lists already published in the *Trans. N.Z. Institute*. Only 227 species for the three orders are enumerated. Although this publication is dated 1881, it has only just been received in England. In some respects it is already obsolete, especially in *Hymenoptera*. Mr. Kirby in 1881 enumerated 81 species in this order, Prof. Hutton enumerates about 71, which should be still further reduced from synonymic considerations.

THE Belgian Academy offers a prize of 3000 francs (120*l.*) for the best treatise on the destruction of fishes by the pollution of rivers. Several points are to be treated of which relate to the impurities which find their way into rivers from the principal branches of trade and the manufactures, and also to the practical means for rendering these impurities harmless. The treatises

competing for this prize are to be sent in before October 1, 1885.

EARTHQUAKES are reported from Silesia and North-Eastern Bohemia. Two shocks were noticed on January 31, at 2.40 p.m., at Trautenau. Their direction was from south-west to north-east. They were also felt at Braunau, Jungbuch, Freiheit, Marschendorf, Grossaupa, Spindelmühle, and Johannisbad, and also at Görbersdorf and Landeshut. The motion was undulatory and lasted from three to five seconds. No damage was done.

THE Paris papers report the extraordinary run of a small hydrogen gas balloon, capacity about two gallons, which, having been liberated at Bercy, was discovered at Grodno in Poland, having travelled more than two thousand miles; it is the longest air journey on record for so small an object.

THE French gas companies have instituted at their common expense a laboratory for testing the several inventions reported in electric lighting, and proving whether they are valuable or not. After alluding to this foundation, and the much-spoken-of experiments tried at the French Great Northern Railway Station, a French scientific periodical says: "Mieux vaut un sage ennemi qu'un imprudent ami."

THE additions to the Zoological Society's Gardens during the past week include a Green Monkey (*Cercopithecus callitrichus* ♂) from West Africa, presented by Mr. J. F. Williams; a Punjab Wild Sheep (*Ovis cycloceros* ♂) from North-West India, presented by Lieut.-Col. C. S. Sturt, C.M.Z.S.; a Thar (*Capra jemtaiica*) from the Himalayas, presented by Lieut.-Col. Alex. A. Kinloch, A.Q.M.G., C.M.Z.S.; a Blyth's Tragopan (*Cerionis blythi* ♂) from Upper Assam, a Fythch's Partridge (*Bambusicola fytchii*) from Upper Assam, presented by Capt. Brydon; a Small Hill Mynah (*Gracula religiosa*) from South India, presented by Dr. Rogers W. Taylor; a Macaque Monkey (*Macacus cynomolgus* ♂) from India, a Common Cormorant (*Phalacrocorax carbo*), British, deposited; three Stump-tailed Lizards (*Trachydosaurus rugosus*) from Australia, purchased.

OUR ASTRONOMICAL COLUMN

THE GREAT COMET OF 1882.—The following places for Berlin midnight are derived from Dr. Kreutz's ellipse:—

1883.	R.A.	Decl.	Log. Distance from Earth.	Distance from Sun.
February 26 ...	5 52 10 ...	15 43'3 ...	0'4551 ...	0'5122
28 ...	5 51 43 ...	15 17'1 ...	0'4629 ...	0'5158
March 2 ...	5 51 23 ...	14 51'5 ...	0'4705 ...	0'5193
4 ...	5 51 8 ...	14 26'5 ...	0'4781 ...	0'5227
6 ...	5 51 0 ...	14 2'1 ...	0'4856 ...	0'5261
8 ...	5 50 57 ...	13 38'4 ...	0'4930 ...	0'5295
10 ...	5 51 0 ...	13 15'4 ...	0'5003 ...	0'5329

Mr. E. E. Barnard, of Nashfield, U.S., reports that on the morning of October 14 he found to the south of the comet a large, distinct cometary mass, fully 15' in diameter, and a similar but less bright object close beside this, their borders touching, and on the opposite side of the first a third fainter mass: the three were almost in a line, east and west. More of these cometary masses were found towards the south-east: there were at least six or eight within about 6' south by west of the head of the great comet. Their appearance was that of distinct comets with very slightly brighter centres, several being in the field at once. They were not seen again after being obscured by daylight on the morning of October 14.

Dr. Julius Schmidt's observations of a cometary mass near the head of the great comet are already published in No. 2468 of the *Astronomische Nachrichten*.

On the 5th inst., with the large refractor at Strasburg, the comet had two stellar nuclei, the fainter of the two on an angle of 246', and 38" distant from the brighter, which was observed for position. On January 27, Mr. Ainslie Common, of Ealing,

with his large reflector, saw the nuclear part of the comet larger but less bright than previously, and resolved into a string of brightish points, the second and third of which were much the brightest. The position-angle was 240° 20', and the distance between the brighter points was 31''5, so that they doubtless correspond to the two "fixternartige Kerne" observed at Strasburg. In a sketch with which Mr. Common has favoured us, five points of condensation are shown; it was made at 9 p.m. on January 27.

VARIABLE STARS.—Dr. Julius Schmidt has published his usual summary of results of observations of variable stars, made at Athens in 1882. Minima of Ceraski's variable U Cephei occurred on November 25 at 8h. 57'2m, mean time at Athens, and on November 30 at 8h. 36'5m. Minima of Algol on November 29 at 11h. 30'4m., and December 2 at 8h. 7'1m., the first determined from observations extending over 5'4h., and the second from an interval of 7'5h. R Hydræ was at maximum on March 8, when it attained 4'3m. Mira Ceti at minimum on February 4, magnitude 9.5; the statement in some of our popular treatises on astronomy, that this star disappears at minimum is erroneous; its average brightness at that time is about 9m. on Argelander's scale, according to the most experienced observers. χ Cygni was at maximum September 1'5, the predicted date being August 25. The variations of α Herculis during the year were small, but well fixed by numerous observations; the period, as usual, irregular; the same may be said of δ Herculis. T Cephei at maximum on January 11, 6'7m., the increase of light much quicker than the decrease; V Coronæ at maximum September 15'6; the fine variable R Leonis was at maximum on May 20, 6'5m., and at minimum on November 6, 9m.; R Piscium at maximum on December 5'3, the increase of light slower than previously; Palisa's variable in Scorpio at maximum July 9'7, 12m.; of R Scuti, a maximum occurred October 11, well-determined minima, on June 21 and December 6; Harding's variable R Virginis was at maximum April 16'6, and at minimum June 30'5, the limits of brightness being 7m. and 11'7m.

It is much to be desired that the number of observers of these interesting objects should be largely increased; their observation opens up a field of useful work, even to an amateur with the most modest of optical appliances. At present our knowledge of the subject is mainly due to the systematic labours of the indefatigable director of the Observatory at Athens.

A NEW NEBULA.—Mr. Barnard notifies his discovery of a new nebula 1° 48' north, and 5m. 39. west of ϕ Virginis. It was observed with the 15-inch refractor at Harvard College by Mr. Wendell, and described as "rather diffuse and faint, but gradually a little brighter in the middle"; its position for the beginning of 1882 is in R.A. 14h. 16m. 19'6s., Decl. +0° 9' 14". This nebula is not found in the Harvard Zones, Nos. 53 and 54, observed on May 9 and 11, 1853, and which would overlap its place, though three new and faint nebulae were first detected in those Zones, viz. Nos. 33-35 of Prof. Auwer's Catalogue of new nebulae in the Königsberg observations. This object may be worth watching, on the score of possible variability.

GEOGRAPHICAL NOTES

IN NATURE last week we announced that an Arctic expedition this summer had been decided on in Sweden. This expedition, which has been promoted by the well-known Swedish Mæcenas, Dr. Oscar Dickson, will be in command of Baron Nordenskjöld, whose intention it is on this occasion to explore the east and north-east coast of Greenland. It was originally his intention to have proceeded this summer into the Siberian seas, but seeing the delay caused to the Danish Polar Expedition, which will now be there during the summer, this idea was abandoned and Greenland decided on instead. Baron Nordenskjöld, having formerly visited the country, is of the opinion that some kind of "break" or oasis, is to be found in the interior of Greenland. He proposes to proceed along the east coast of Greenland, as far as the ice will allow, and then to penetrate into the interior, some 300 miles across the inland ice. The country inland is nearly the whole year covered by ice and snow, which, during the summer months, render it almost entirely one bog. The enormous stretch of inland ice has also always been a barrier to exploration. Another object in view by Baron Nordenskjöld is to attempt to find traces of the Norse colonies, which existed in Greenland