

## OUR ASTRONOMICAL COLUMN.

COMET 1906 $\epsilon$  (KOPFF).—Circular No. 91 from the Kiel Centralstelle contains a set of elements for comet 1906 $\epsilon$ , calculated by Herr M. Ebell from positions observed on August 23 and 31 and September 12.

These elements give the time of perihelion as May 3.09, 1906, and from them Herr Ebell has calculated an ephemeris from which the following is taken:—

## Ephemeris 12h. (M.T. Berlin).

1906	$\alpha$ (true) h. m.	$\delta$ (true)	1906	$\alpha$ (true) h. m.	$\delta$ (true)
Oct. 2 ...	22 27 ...	+6 30	Oct. 18 ...	22 28 ...	+4 58
6 ...	22 26 ...	+6 4	22 ...	22 29 ...	+4 41
10 ...	22 26 ...	+5 40	26 ...	22 31 ...	+4 26
14 ...	22 27 ...	+5 18			

At present the diminishing brightness of the comet is about half what it was on August 23, when its magnitude was about 11.5.

From the ephemeris it may be seen that this object is still in the constellation Pegasus, about half-way between  $\zeta$  and  $\beta$  Pegasi, and is observable throughout the evening.

Observing at Rome on September 12, Prof. Millosevich found it to be a faint object having a coma which was not symmetrical about the thirteenth-magnitude nucleus.

FINLAY'S COMET, 1906 $d$ .—M. Léopold Schulhof continues his ephemeris for Finlay's comet in No. 4122 of the *Astronomische Nachrichten*, from whence the following abstract is taken:—

## Ephemeris 12h. (M.T. Paris).

1906	$\alpha$ (app.) h. m.	$\delta$ (app.)	1906	$\alpha$ (app.) h. m.	$\delta$ (app.)
Oct. 4 ...	7 37 ...	+20 33	Oct. 16 ...	8 2 ...	+20 49
8 ...	7 46 ...	+20 39	20 ...	8 8 ...	+20 54
12 ...	7 54 ...	+20 44	24 ...	8 14 ...	+20 59

The comet, according to this ephemeris, is now in the constellation Gemini, travelling directly eastwards towards Cancer, and rises at about 11.30 p.m. It will be about one degree south of  $\mu$  Cancri on October 16.

Two photographs of this comet are reproduced in the September number of the *Bulletin de la Société astronomique de France*. They were taken at the Juvisy Observatory on August 21 and 22 respectively by M. Quéniisset, and show a well-marked nucleus; a rudimentary tail is also seen on the original negative. During the exposure on August 21 the comet passed over a tenth-magnitude star, the light of which was not perceptibly diminished by the interposition of the coma.

A NEW FORM OF WEDGE PHOTOMETER.—In No. 4120 of the *Astronomische Nachrichten* Herr H. Rosenberg describes, and gives a drawing of, a new form of wedge photometer which he has designed. In the ordinary photometer of the "wedge" type the observer is unable to eliminate the influence of the variation in the brightness of the general background of sky, and the eye, becoming fatigued, is unable to determine exactly the point of extinction.

In Herr Rosenberg's apparatus, however, the image of an artificial star, formed by a constant light source, is projected alongside the image of the natural star, and the wedge adjusted until the two images are equally bright. By adjusting the brightness of the artificial star, so that it is less than that of the faintest object which is to be examined, and determining its value in magnitudes, one may thus measure the brightness of any stars within the limits of about eight magnitudes. The error caused by the uncertainty as to the exact point of extinction is thus eliminated.

A postscript to Herr Rosenberg's description states that he finds the principle of a similar contrivance was described by Herr Müller in No. 3693 of the *Astronomische Nachrichten*, and an instrument was constructed at the Potsdam Observatory.

OCULTATION OF A STAR BY VENUS.—In a communication to the British Astronomical Association, published in No. 9, vol. xvi., of the *Journal*, Dr. Downing directs the attention of amateur astronomers in Australasia to the fact that on December 9 Venus will occult the third-magnitude

star  $\beta$  Scorpii. As it is such a rare occurrence for a planet to occult so bright a star, he gives the particulars of the occultation for Sydney, Brisbane, and Wellington in the hope that use may be made of them by observers suitably located.

RESULTS OF THE INTERNATIONAL LATITUDE SERVICE, 1902-1906.—In No. 4121 of the *Astronomische Nachrichten* Prof. Th. Albrecht discusses the results obtained by the six international latitude stations during the period 1902-0-1906-0. The variation of the position of the apparent pole is shown on a diagram, which includes the tenths of each year from 1900-0 to the beginning of the present year. The values given for the period 1902-0-1905-0 are final, but those for 1905-1-1906-0 are only provisory, although Prof. Albrecht states that they are probably correct to one two-hundredth of a second.

THE AMANA METEORITE.—An interesting description of the various meteoritic objects which fell at Amana, Iowa, U.S.A., in 1875, is given by Dr. G. D. Hinrichs in *Das Weltall* for September 15. Two plates accompanying the description show photographic reproductions of the meteorites, together with the names of the museums wherein they are now to be found. Other illustrations give charts of the locality in which these objects were discovered.

## BOTANY AT THE BRITISH ASSOCIATION.

THE work of Section K was not characterised by the announcement of any discovery of very exceptional interest, nor by any sensational feature. As has been usual in recent years, an effort was made to group the papers presented so that those dealing with allied topics were taken at the same session. The whole number of papers read was not large, and no less than three morning sessions were devoted to discussion of definite topics, the proceedings being opened in each case by one or more papers giving an account of the present position of the subject to be discussed, or presenting facts and conclusions likely to lead to debate. These discussions were to some extent organised beforehand; that is to say, the members most likely to contribute usefully to the discussion of a given topic were informed of the intention to hold the discussion some time before the meeting, and were invited to contribute, abstracts of the opening papers being distributed to them as early as possible, so that they were in possession of the lines to be taken before the meeting. Such of these members as were present and had signified their willingness to speak were called upon in succession by the chairman as soon as the papers were over, the discussion being afterwards open to any member of the section. Although it is true that very good discussions often arise quite spontaneously after papers which are not expected to provoke debate, it is believed that on the whole the best results are obtained by the method of semi-organised discussion described, though it is neither possible nor desirable to limit the sectional meetings entirely to proceedings of this type.

The success of such discussions depends very largely on the selection of topics of suitable scope. On the whole the tendency is to take too wide a subject, with the result that the different speakers are apt to deal with quite distinct aspects of it, and unless the opener has the exceptional power of drawing all the threads together in his reply the impression left on hearers is liable to be somewhat inconclusive and chaotic. On the other hand, if the subject chosen is too narrow, its treatment is apt to become excessively technical, the discussion is of limited interest, and may even languish owing to a lack of sufficiently instructed specialists.

Of the three discussions at the York meeting, the first was taken on Friday morning, August 3, and was really divided into two parts. Dr. D. H. Scott opened the session. Though his title was a wide one—"Some Aspects of the Present Position of Palaeozoic Botany"—considerations of time compelled Dr. Scott to limit himself to "the difficult question of the position of the ferns in the Palaeozoic flora," "the difficulty arising from the accumulation of evidence showing that most of the so-called

Palaeozoic ferns were in reality seed-plants." Dr. Scott showed, in his luminous address, that "a large body of true ferns of a simple type—the Primoflites of Mr. Arber—existed in Carboniferous times," while it is probable that true Marattiaceous ferns also existed side by side with these.

The second part of the discussion, dealing with the formation of the well-known calcareous nodules found in the coal seams of the Lower Coal-measures, though it might be thought to be purely technical and specialist interest, is in reality of great importance to everyone concerned with Palaeozoic botany, because the nodules in question contain the greater part of the plant remains showing histological structure that are known to us from Palaeozoic rocks, and their mode of formation is of the first importance as throwing light on the question of how these plants grew. Several geologists specially conversant with the occurrence of Coal-measure fossils had been particularly invited to take part in the discussion, which was an excellent instance of the fruitful concentration of two branches of science upon a special problem. Prof. Weiss opened the discussion with a short general paper stating the problems, and was followed by Miss Stopes, who gave an account of her recent work, which went to show that the nodules were formed *in situ*, the calcareous material being derived by solution and re-segregation from marine shells the remains of which are found in the roof of the same seam. A possible chemical process by which such a solution and re-deposition could be effected was indicated. The most clinching proof of this method of formation was shown in the case of two gigantic nodules lying side by side, in which the petrified remains of plants are found to be continuous from one to the other. It is clear that in such cases at least the plant must have been petrified where it was found. Mr. Lomax brought forward evidence which seemed to him to support the rival hypothesis, that these nodules were often carried by water transport to the situations in which they were found. Mr. Watson, who has worked with Miss Stopes, attacked the views of Mr. Lomax, while Mr. Bolton, of Bristol, Prof. Hull, and other geologists, including Dr. Teall, took part in the discussion.

The second discussion took place in joint session with Section D on Monday morning, August 6, and dealt with the nature of fertilisation. The opening paper was given by Mr. V. H. Blackman. This discussion is dealt with in the account of the proceedings of Section D (NATURE, September 27, p. 551). Here it need only be said that the danger already referred to, that of choosing too wide a subject for discussion, was to some extent apparent. The work bearing on fertilisation is now so varied in kind and occupies so many classes of workers, both zoological and botanical, that it is difficult to focus the interest in a single discussion.

The third discussion was on the phylogenetic value of the vascular structure of seedlings. Papers were read by Mr. Tansley and Miss Thomas, by Mr. T. G. Hill, and by Mr. A. W. Hill. Miss Sargent, Dr. Scott, and Prof. Jeffrey took part in the discussion. The work of Mr. Tansley and Miss Thomas and of Mr. T. G. Hill to some extent covered the same ground. In both cases the comparative anatomy of the vascular system of the hypocotyl in Gymnosperms and Dicotyledons was the subject of investigation. Mr. Tansley and Miss Thomas found that the type of symmetry of this structure had considerable phylogenetic value, thus confirming and extending Miss Sargent's conclusion relating to Monocotyledons, published some years ago. Without going into technical details, it may be stated that nearly all the cases met with fall naturally into a series, and the conclusion is reached that the more complex type, met with among the older Gymnosperms, and also among some Dicotyledons, is phylogenetically the older, while the simpler type, very widely prevalent among Dicotyledons, is derived by reduction, through various transitions, from this older type. Mr. T. G. Hill, while bringing to light many of the same facts, was not in agreement with this view, basing his opinion on the apparently primitive diarchy of the ferns. Mr. Hill showed that the anatomical evidence pointed to the cotyledons of the "polycotyledonous" conifers being derived by splitting, in some cases at least, from a primitive "dicoty-

ledonous" type, a conclusion with which the joint authors of the other paper concurred.

Mr. A. W. Hill sought to show, by a consideration of the seedlings of bulbous and rhizomatous species of Peperomia and Cyclamen, that clues may be obtained to the mode of evolution of the true Monocotyledons, the two cotyledons assuming different functions. Thus in his view the single cotyledon of the Monocotyledon represents only one of the two cotyledons of the typical Dicotyledon, the other being represented by the first foliage leaf. Miss Sargent found herself unable to accept Mr. Hill's suggestions.

Several interesting papers on the vegetation of different parts of the world were read. Mr. Seward communicated a paper by Prof. H. H. W. Pearson, of Cape Town, who is doing excellent work on the natural history of the indigenous Cycads. Mr. Hugh Richardson gave an outline account of the vegetation of Teneriffe, laying stress on its zonal distribution. Mr. C. E. Moss gave a general paper on the succession of plant formations in Britain, in which he dealt with succession from sand dunes, from salt marshes, in lowland and upland peat formations, and in certain types of forest, in all cases from his own observation. He used the term "formation" to mean "an historical series of plant associations," beginning as an "open" and ending as a "closed" association. All these papers were illustrated by lantern-slides.

Palaeontological papers of some importance were read by Prof. Jeffrey, of Harvard, and by Prof. Weiss. Prof. Jeffrey dealt with the structure and wound-reactions of the Mesozoic genus *Brachyphyllum*, a genus of hitherto doubtful affinity, which was now shown to be an undoubted member of the Araucarineae, mainly from the evidence of recently discovered material with the anatomical structure preserved. One of the most interesting points in the paper was the use the author made of the "traumatic" resin-canals found in *Brachyphyllum*. It appears that this plant produced definite resin-canals in its wound callus like the modern Abietineae, and unlike the ancient or modern Araucarineae. Largely, though not wholly, on this account Prof. Jeffrey concludes that this old genus connects the Araucarineae with the Abietineae, removing the former from their somewhat isolated position, and showing them as undoubtedly coniferous. Mr. Seward, in the discussion, while recognising the validity of Prof. Jeffrey's demonstration that *Brachyphyllum* was a member of the Araucarineae, found himself unable to accept the evidence of Abietinean affinity, and particularly that based on the occurrence of the traumatic resin-canals. Dr. Scott, on the other hand, saw no reason why such evidence should not be valid.

Prof. Weiss described an interesting new *Stigmara* possessing a considerable amount of centripetal primary wood, so that at first sight it has the appearance of a stem of *Lepidodendron*, though its characteristic periderm with the remains of rootlet cushions attached show that it is undoubtedly of stigmarian nature.

Dr. A. F. Blakeslee described some new results he had obtained in connection with the "physiological sex" which he discovered some time ago in the Mucorineae. In *Phycomyces nitens*, in addition to the heterothallic spores, homothallic mycelia may be obtained by special methods, but the sexual character of these is unstable, and no fixation of the homothallic character takes place. Dr. Blakeslee's paper was illustrated by a series of beautiful preparations showing the homothallic and heterothallic character respectively of various mycelia. The author also contributed a general paper on differentiation of sex in gametophyte and sporophyte. For the former he uses the terms *homothallic* and *heterothallic*, for the latter *homophytic* and *heterophytic*. Investigations are now proceeding as to the sexual differentiation in the sporophyte of the Bryophytes. The evidence shows that both "male" and "female" spores exist in the sporogonium of *Marchantia polymorpha*, and attempts are being made to determine at what point the segregation of sex occurs. Dr. Lang, Mr. V. H. Blackman, and Mr. R. P. Gregory took part in the discussion on these papers.

Of purely physiological papers, Prof. W. B. Bottomley contributed a very interesting account of his successful

attempt to inoculate papilionaceous plants with the root-nodule organisms belonging to non-papilionaceous Leguminosæ and to plants of quite different families, those of *Acacia* (Mimosæ) and of *Elæagnus* and *Alnus* being chosen. In another paper Prof. Bottomley showed that the long-known effect of sprinkling urine on the floors of green-houses in order to cause a more luxuriant growth of orchids is due to the presence of both nitrite and nitrate bacteria in the cells of the velamen, which are thus able to utilise the ammonia arising by decomposition of the urine and absorbed along with the water vapour normally condensed by the velamen.

Miss C. B. Sanders, of Oxford, described some experiments carried out in Prof. Gotch's laboratory on the local production of heat connected with the disappearance of starch in the spadices of various *Araceæ*. Remarks on this paper were made by Dr. F. F. Blackman.

Dr. Ellis, of Glasgow, described experiments to show that ciliation cannot be used as a taxonomic character among bacteria—as has recently been done by Migula—because under appropriate conditions all the members of such groups as *Coccaceæ*, *Bacteriaceæ*, and *Spirillaceæ*, in which this character has been used, can be made to acquire cilia.

The semi-popular lecture was delivered by Prof. Yapp, who took his hearers for a most pleasant excursion through some of the principal regions of South Africa, introducing them to the various types of vegetation met with by means of a series of beautiful lantern-slides from his own photographs.

The section met on Thursday afternoon, August 2, and for a short time on Monday afternoon, August 6. The other afternoons were left free for excursions, of which several were arranged by the local secretary, Dr. Burtt, of the British Botanical Association, and by other local botanists. Those to Askham Bog and to Skipwith Common may be specially mentioned as of great botanical interest.

#### THE ARCHÆOLOGICAL CONGRESS AT VANNES.

THE second congress of the Prehistoric Society of France was held from August 21–26 in the capital of the department of Morbihan, the classic land of Megalithic monuments, at any rate so far as France is concerned. The attendance exceeded that of the very successful first congress held at Périgueux last year.

The inaugural meeting at 10 a.m. on Tuesday, August 21, was graced by the presence of prominent citizens. Speeches were made by the Mayor of Vannes, Senator Riou, Prof. Adrien de Mortillet, president of the congress, and by Dr. Marcel Baudouin, the secretary, who insisted on the need of providing a special building to house the rich collections of the Société polymathique, and on the desirability of creating a national Megalithic park comparable to the Yellowstone National Park of the United States.

The president of the local committee, M. Morio, welcomed the congress in the name of the Société polymathique, the museum of which was much admired by the parties which visited it in the afternoon. It includes collections from the principal tumuli of the neighbourhood, excavated by the society during its many years of existence; there are, for example, the splendid necklaces of callais beads, a fine series of fibrolite axes, curious stone discs, scarcely found outside this area, and huge polished celts. In the evening M. Riou gave a reception at the Mairie, and various toasts were proposed.

The numerous papers and the lively discussions attest the success of the congress. M. Rutot, the curator of the Royal Museum of Brussels, led off with a consideration of the question of the Palæolithic bed of Havre; he maintained that there was no question of displacement; what had taken place was a falling in of the superincumbent earth and erosion of the cliff. Dr. Jousset then described a new prehistoric bed discovered at La Longère, near Nogent-le-Notrou (Eure-et-Loire), where objects of varying appearance and discutible age have been found, assigned by the author to the Flénusien age of Rutot. M. Hue brought forward a new method of measuring the skulls of *Canidæ*, which M. Baudouin urged all archæologists to

apply to the measurement of other animals. Dr. Guébard appealed to the archæologists of the world to bring into existence a map of prehistoric monuments, the preliminary steps towards which have been made by the Société pré-historique de Paris.

Two long sittings were held on the morning and evening of the second day. The first subject was the Palæolithic age of Brittany, introduced by M. Sageret, of Carnac, who was followed by MM. de Mortillet, Rutot, and Baudouin, who showed why beds of this epoch are rare: the Neolithic period has attracted more attention in Brittany (Mortillet); Brittany is only the central area of Quaternary Brittany, which was united to the British Isles until the Magdalenian period (Rutot), and to a south-western continent which survives in Belle-Ile, Quiberon, Houat, &c. (Baudouin). Some stones of this period were exhibited by M. Landren, of St. Nazaire, under the name of eoliths; the Rennes flints of M. Pavot were not regarded as of prehistoric character. Dordogne, the scene of the last congress, next claimed the attention of the meeting. M. l'Abbé Chastaing offered some remarks on the hammers for use with bones discovered in the cave of Le Moustier, and M. de Ricard directed attention to the new Magdalenian station of Rocheval, Drôme Valley. Finally, M. de Mortillet brought into prominence the Placard cave (Charente), and the various industries there practised; in this connection there arose a discussion on the pre-Solutrian age of M. l'Abbé Breuil, for which M. Rutot and M. l'Abbé Chastaing took up the cudgels.

M. Rutot spoke on the question of the Micoque beds, on the Vézère, after dealing with the Strépyien of France. He showed that the Chelles-Moustérien of Micoque was in reality Strépyien, and that this stage fell between the Chelléen and the Mesvinien, and not between the Chelléen and the Moustérien. M. Feuvrier (of Dôle) directed attention to a Magdalenian cave in the Jura, and M. J. Dharvent exhibited a sculptured flint of the Moustérien age.

On Wednesday evening Neolithic problems were approached; among the papers were those of Dr. Martin, on the false tumulus of La Motte-Budron (Deux-Sèvres); M. Goby, on the tumuli of the districts of St. Vallier de Thiay, St. Cézaire, and Grasse (Alpes Maritimes); and M. Roerich, of St. Petersburg, on sculptured Neolithic flints. M. Rutot then turned to the Flénusien, or lower Neolithic, in France, and showed that traces could be found from one end of France to the other. Dr. Montelius then gave a summary exposition of the Stockholm collections from the Robenhausen and other periods.

On the morning of Thursday the pottery of the dolmens came up for discussion; M. Fourdrignier, of Paris, showed that the study of finger-prints might be of value, but it was pointed out that the information could throw little light on questions of race. Other papers were those of M. Goby, on the dolmen pottery of the Grasse district, and the micaceous pottery of Camp du Bois-du-Rouret (Alpes Maritimes).

After a remarkable paper by Dr. Stjerna on the Scandinavian origin of the Burgundians came papers on Megalithic monuments, among them those of Dr. Jousset, on the Carnacean age of Perche; Dr. Couil, on Megalithic monuments in Normandy; M. José Fortès, on Megalithic sculptures in Portugal; M. Tavarès de Preença, on the classification of Portuguese dolmens; M. Couil, on his exploration and restoration of the tumulus of Fontenay-le-Marmion (Calvados) in 1904 and 1906. Important communications were read by Dr. Waldemar Schmidt, on Megalithic monuments in Denmark; by Dr. Montelius, on the same in Sweden; by Dr. Baudouin, on five years' excavations and restorations of the megaliths of Vendée. A popular evening lecture on the dolmens of Brittany, illustrated by lantern-slides, had already been given in the theatre on the previous evening.

On Thursday evening the subject of prehistoric gold in Brittany and Vendée was treated by Count Costa de Beauregard and Dr. Baudouin, and much was said on the significance of menhirs and of the alignments. For M. de Paniagua they are evidence of a phallic cult, for M. Rutot they are sign-posts, for M. Montelius and for Dr. Baudouin tombstones, and the last view finds support in the results of the excavations of Dr. Baudouin