

## OUR ASTRONOMICAL COLUMN.

COMET 1913f (DELAVAN).—Delavan's comet is now a more prominent object in the evening sky, and can be picked up by anybody without an ephemeris: it has a tail of considerable length and brightness. The comet is rapidly moving in declination covering about  $3^{\circ}$  in four days. It is also visible as a morning object. The comet passes perihelion on October 26, and in the meantime should become brighter. The following is a continuation of Prof. Biesbroeck's ephemeris up to the end of the present month:—

		R.A.			Dec.
		h.	m.	s.	
Oct. 22	...	13	56	0	... +29 33
26	...	14	12	0	... 26 27
30	...	14	26	36	... 23 25

We are indebted to Prof. David Todd for a print, here reproduced, of a photograph of the comet taken



Delavan's Comet, September, 1914. Photographed at Stockholm Observatory. Exposure, one hour.

last month by Dr. Karl Bohlin at the Stockholm Observatory.

ENCKE'S COMET.—The October number of the *Observatory* publishes the elements and ephemeris of Encke's comet as computed by M. L. Matkewitsch, of Pulkova. The latter for the present month are as follows:—

		R.A.			Dec.
		h.	m.	s.	
Oct. 20	...	8	29	44	... +61 37
22	...	9	26	3	... 60 28
24	...	10	20	21	... 57 42
26	...	11	7	51	... 53 27
28	...	11	46	43	... 48 7
30	...	12	17	33	... +42 10

The corrections to this ephemeris on about October 27 are given as R.A. +8s., declination  $-6'$ . It is stated that the comet will be nearest the earth on October 27, and is generally a fairly conspicuous object when perihelion occurs in winter. It has sometimes been glimpsed with the naked eye.

THE RECENT ECLIPSE EXPEDITIONS.—Further news is to hand regarding the experiences of some of the recent eclipse expeditions (the *Observatory*, October). The party from the Solar Physics Observatory, Cambridge, seems to have had particularly bad luck, for not only did a thick detached cloud completely hide

the whole of the total phase, but even the telegrams announcing the complete failure of the observations never reached home. Prof. Newall, who writes this account, draws the moral of "the importance of spreading the camps of observing parties even in the restricted area chosen for a station of observation." Prof. Perrine set up his instruments in the same camp as the Cambridge party, and suffered a similar fate. While this camp was about four kilometres from Theodosia, on a site one kilometre nearer Theodosia, MM. Beljowsky and Neujmin obtained observations for about 30 seconds. At Theodosia the eclipse was seen in blue sky between patches of cloud, and observations were made during the whole total phase. Among the observers there were Signor Ricco, Count de la Pluvinel, Dr. Donitch, Prof. Sternberg (Moscow), M. Crétien (Nice), and M. Ascarza (Madrid). Dr. Backlund's expedition to Riga met with success, and Prof. Newall refers to "the beautiful photographs of the corona" secured by M. Kostinsky, who was of that party. Prof. Campbell and his party, who observed at Kiev, had adverse weather conditions.

An interesting account of the Greenwich Eclipse Expedition is given by Mr. H. S. Jones, one of the official observers. This party, at Minsk (Russia), had a narrow escape, for "when totality commenced a long cloud was approaching the sun, but fortunately did not reach it until the last second of totality." The whole programme was thus carried out. The corona he describes as "comparatively bright, and of a steely-blue whiteness, with no trace of yellow—it was of the intermediate type, with four streamers, resembling somewhat the 1898 corona."

SOCIETÀ DEGLI SPETTROSCOPISTI ITALIANI.—The July and August numbers of the *Memorie della Società degli Spettroscopisti Italiani* contain numerous contributions of interest on various subjects. In the July number the variable R. Leporis is dealt with by E. Padova, who publishes some new observations and a calculation of the period, which he gives as 438.93 days. This is Hind's famous crimson star, which in 1845 was described by him as "of the most intense crimson, resembling a blood-drop on the background of the sky. . . ." Some new observations and a discussion of them relating to the variable ST Ursæ Majoris are communicated by G. Silva. A preliminary note by E. Paci describes the observations made for the determination of the latitude of the centre of the cupola of the Etna Observatory. The observations were secured during 1913 by the Horrebow-Talcott method, and the value derived was  $+37^{\circ} 44' 8.392''$ . The last-mentioned author contributes two papers to the August issue, the first dealing with a study of the Ertel meridian circle of the Catania Observatory, and the second with the difference of longitude between Catania and Palermo as determined by telegraph by Ricco and Zona in 1894. After giving the details of the observations, he derives the value  $6m. 54.7826s. \pm 0.0055$ , as being the difference of longitude between the two observatories. This number concludes with the obituary notices and portraits of Giuseppe Lorenzoni and Edward S. Holden, written by A. Antoniazzi and W. W. Campbell respectively.

## ANTHROPOLOGY AT THE BRITISH ASSOCIATION.

THE Australian meeting of 1914 will always occupy a prominent place in the annals of the British Association, if only on account of the interest attaching to the proceedings of its Anthropological Section. Not only did the representatives of this rapidly developing branch of science muster in full strength, but their

discussions, bearing as they did largely on Australian problems which are concerned with the most primitive of existing human types, were throughout directed to fundamentals. Needless to say, the shadow of the great war raging in Europe cast a chill over the spirits of all concerned, and it needed a certain moral effort to carry through a programme in which, at least as originally designed, business and pleasure claimed equal shares. As it was, the inclination of the balance towards the side of seriousness was not without its advantage for those students who found the allotted time all too short to enable them to cope with Australia's magnificent ethnological collections. These must be seen before one is in a position to assign to Australian culture its true place in the evolutionary scale.

In Western Australia certain anthropologists of the advance party got into touch with aboriginals, and again in South Australia Prof. Stirling organised a most successful expedition of the whole section to Milang, where a large group of the Narrinyeri tribe were on view, so that everyone was presently hard at work, spurred on by the discovery that, even if degeneration has gone far, there still exists plenty of valuable lore to be garnered. It must be added that in the Adelaide Museum Prof. Stirling has amassed wealth untold in the way of ethnological material, special value attaching to the spoils from the central deserts, illustrative as they are of the life of the now famous Arunta and their congeners. At Adelaide, too, Prof. Sollas gave an evening lecture on prehistoric man, which delighted his large audience.

Formal proceedings opened at Melbourne on Friday, August 14, Prof. G. Elliot Smith leading off with a remarkable comparison of certain customs and inventions of the ancient Egyptians with those of primitive peoples of the Far East, the full development of his argument being unfortunately somewhat hampered by want of time. After Dr. A. Low had described the finding of certain curious cists of the Bronze age in the north-east of Scotland, the section adjourned to the museum. Here, first of all, Messrs. A. S. Kenyon and D. J. Mahony exhibited and explained a very rich series of aboriginal stone implements, extending from the well-polished adze at one end of the scale to the roughest Palæolithic and even Eolithic types at the other. Then Prof. Baldwin Spencer showed all manner of specimens of native handiwork, including a remarkable series of drawings on bark from the Alligator River, Northern Territory.

On Tuesday, August 18, Mr. Balfour gave forth the results of his investigations into the remains of an early Stone age in South Africa. He was followed by Dr. Marett, who, as chairman of the committee that has undertaken the recent excavation of a Mousterian cave habitation in Jersey, was able to report a rich harvest of discoveries. Prof. G. Elliot Smith and Prof. J. Symington then engaged in a discussion, scarcely less impassioned than it was profound, concerning the possibility of deducing the shape of the human brain from that of the inner surface of the cranial wall, with special reference to the primitive characters that have been attributed on these grounds to the Piltdown skull. Major A. J. N. Tremearne, who was returning next day to Europe on military duty, wound up the morning with a well-illustrated account of the Bori, or disease-spirit, ceremonies of certain Hausa colonies in North Africa. In the afternoon Prof. Felix von Luschan, of Berlin, delighted a large audience with a discourse dealing with the question, "Are we degenerate?" and embodying various more or less startling proposals of a practical nature in the interest of eugenics.

On Wednesday, August 19, the whole morning was devoted to a debate, initiated by Dr. Rivers, on the

subject, "Is Australian Culture Simple or Complex?" The section listened with the greatest interest to Dr. Graebner, who holds strong views on this particular topic, and the ball was kept rolling by Prof. Sollas, Prof. Berry, Prof. von Luschan, Prof. Haddon, Rev. J. Mathew, Mr. Balfour, Mr. A. R. Brown, Dr. Malinowski, Dr. Marett, and others. The discussion as a whole was most profitable, though perhaps it raised more problems than it solved. It remains to add, in reference to proceedings in Victoria, that, besides enjoying unlimited facilities for study at the museum, and in Prof. Berry's well-equipped department of anatomy, the anthropologists had the opportunity of visiting an aboriginal quarry at Fisherman's Bend, near Melbourne, and, again, of making further acquaintance with aboriginals, since the Colanderrk station near Healesville provides types from several parts of the continent, the older members of the native community preserving considerable traces of their former culture, as witness their corroboree songs which Prof. von Luschan was careful to record by means of the phonograph.

Arrived at Sydney, the section on Friday, August 21, was treated by Sir Everard im Thurn to a presidential address which summed up in telling fashion his impressions of the character of the so-called "savage" in the shape of the primitive Fijian. He emphasised "the enormous, scarcely conceivable difference in habit of thought which separates the savage from the civilised man," and showed on the strength of his experience as an administrator that the process of mutual adjustment, so far as it is possible at all, must necessarily be slow, demanding, too, on our part much patience, good will, and anthropological science. Dr. Ashby followed with an account of various archæological discoveries of his own at Malta. Then a most sensational announcement was "sprung" on the meeting. It appears that, just about the time that the pioneers of the British Association were setting foot on Australian soil, a highly petrified skull was found on the Darling Downs, Queensland, such as may very well prove to be assignable to Pleistocene times, Pleistocene man in Australia having hitherto existed only in the sphere of pure hypothesis. Profs. David and Wilson, who exhibited the specimen to the much-moved section, were careful to state the case for the attribution of a high antiquity to the specimen with the greatest caution, the chief argument, pending a full study of the anatomical characters, resting on the fact that the state of petrification which the skull displays corresponds closely to that observable in regard to the remains of Diprotodon and other extinct animals from the same district. The Rev. Dr. George Brown then read extracts from an interesting paper on Samoan folk-lore, which he has offered to *Folk-Lore* for publication.

On Tuesday, August 25, the morning session opened with a discussion, led by Dr. Haddon, on the importance of the study of anthropology for the administrator. The president lent the weight of his great authority to the plea for a more thorough instruction of those who are set over natives in the mental habits and culture of their charges, and something was said by other speakers of what is being done by some of the British universities to provide an education in anthropology, both theoretical and applied. Dr. Rivers next spoke of gerontocracy in its bearing on marriage in Australia, showing how the old men's tendency to appropriate all available wives has in certain cases left its mark on the permanent structure of society. Mr. A. R. Brown followed with an account of the varieties of totemism in Australia, his classification covering several new types recently discovered by himself in Northern Territory, or by Mrs. Bates in the Eucla district. In the afternoon the section repaired to the

museum, where local experts provided a full programme. Mr. R. Etheridge commented on various ethnological exhibits from Australia and New Guinea, being part of the rich collection over which he presides. Mr. S. A. Smith dealt with various anatomical peculiarities of the Australian aborigines. Messrs. Flashman, Hedley, Enright, and Elmore were also to thank for interesting contributions and exhibits, while a great debt is due to Prof. J. T. Wilson, who, despite the severe duties of military censor, managed to arrange for so strongly supported and well-organised a sectional meeting as that of the anthropologists at Sydney.

It has proved quite impossible to do justice here to the multitudinous experiences which, altogether apart from the formal proceedings of the section, have served to make the Australian visit of the association, and of the anthropologists in particular, at once pleasant and profitable in a quite unique way. The unflinching kindness and hospitality shown by our overseas brethren one and all make it a too invidious task to assign special thanks, and it must suffice, by way of showing due gratitude, to see to it that, in the way of science, Australia's myriad wonders and excellences are henceforth rated at their proper worth. As for the anthropologists in particular, they cannot be accused of having neglected Australia, since it has ever been the happy hunting-ground of the theorist seeking to reconstitute the life of primitive man; but at any rate it is likely that henceforth the study of Australian problems will proceed more intensively, inasmuch as the astonishing wealth of the Australian museums has been realised from near at hand. Moreover, we come away feeling that we have left on the spot plenty of men capable of carrying out the best kind of anthropological work, if only those in control of ways and means can be induced to make proper provision for a branch of study in which Australia might well aspire to lead the world.

#### THE IRON AND STEEL INSTITUTE.

ONE of the most noteworthy of the papers which was to have been presented at the Paris meeting, abandoned on account of the war, describes a new method of heating blast-furnace stoves. It appears from experiments on a stove carried out at the Neunkirchen works of Messrs. Stumm Brothers that, in their ordinary practice, of the total heat put into the stove about 26 per cent. was carried away in the waste gases and 18 per cent. was lost by radiation. Accordingly the efficiency of the stove was not more than 56 per cent.

As the author, Dr. Spannagel, points out, it is almost the universal practice to heat the stove for three to five hours and then send the blast through for one to one and a half hours. Messrs. Pfoser and Strack set themselves the task of finding out why the chequer work gives up its heat to the blast in a so much shorter time than is required to collect the heat from the waste gases, and they found that it was due to the fact that the velocity of the gases is different in the two cases. Under present conditions, when the temperature of the stoves is required to be raised the velocity of the gas is increased, and this causes the temperature of the waste gas to rise. Hence the waste gas losses are increased and the efficiency is reduced. The experimenters found, however, that this rule only holds up to a certain point, and that if the velocity is increased still further the temperature of the waste gas not only ceases to rise but begins to fall. The reason for this is probably that with a low velocity gas the molecules flow almost parallel to each other and the friction with the bricks is inconsiderable and consequently it is only the molecules which flow

close to the chequer brick which transmit their heat by direct contact, whereas the remainder impart their heat slowly by radiation. If now the velocity is increased to the usual extent, the friction of the gas molecules against the brick causes some eddying in the outer layer of gas, and the inner particles are partly drawn into movement. The heat transmission is more rapid, but since the gas velocity is greater more heat is carried off unused. By raising the velocities still more the friction between the gas molecules and the brick becomes so great that the particles rebound and impart their rapid movement to those even in the centre of the current. Accordingly, the violent eddying produced brings all the molecules rapidly in contact with the chequer brick, and they give up their heat rapidly. Hence the temperature of the waste gas falls. The principle of the method, therefore, is precisely the same as that of the high-speed boiler designed by the late Prof. Nicholson, and indeed the authors say, "Experiments which have already been made in boiler firing have given particularly favourable results."

In heating the stoves the velocity of the gas is brought up to the necessary point by blowing in compressed air at a pressure of about 16 in. of water. At the first trial the heating period was reduced to 1½ hours, "the temperatures of the waste gases and of the blast being 350° C. maximum, and 800° C. respectively, as compared with the former heating period of 4½ to 5 hours, and a waste gas temperature of about 700° C. maximum, the blast temperature being the same." The experimenters have found it advantageous to use highly cleaned gas, since it enables the cross section of the heating passages to be reduced and the surface of the chequer brick to be substantially increased.

One of the outstanding problems, both of the iron-maker and the steel-maker, has always been the utilisation of the heat contained in slags. It is not so many years ago that the slags themselves were wasted. At the present day the uses of the various types of slags are many and various, but hitherto their sensible heat has been unutilised. Accordingly, the paper by Mr. W. L. Johnson, of Messrs. Bell Brothers, on this enormously important industrial problem, recording as it does the results of tests that have been in progress for four years, is well worth studying. The principle of the method has been to generate steam by allowing the molten slag to flow into a suitable generator and to utilise it in an exhaust steam turbine. In the first tests the steam was utilised direct from the generator, but these were abandoned in favour of an indirect method in which a water heater and a heat exchanger were introduced between the primary generator and the turbine. The calandria used was a "Kestner single-effect climbing film evaporator," and consists of two parts, the calandria proper and the separator. A certain amount of sulphur was deposited, but there seems to have been very little corrosion of the tubes of the heater. A vacuum of about 9 in. of mercury was maintained in the separator so that the water boiled at 90-91° C. "With steam from the slag at 100° C. and keeping a temperature in the calandria of 91°, the mean of twenty-two experiments gave 173 gallons of water evaporated per hour, and the average steam per hour condensed in the calandria and heater was 190.2 gallons. The feed water entered the heater at an average temperature of 24.6° C., and entered the calandria at an average temperature of 89°, i.e. 91 lb. of clean water was evaporated for every 100 lb. of steam from the slag." The amount of available steam from the slag was determined by condensing and measuring it. Seven experiments gave as a mean 1017 lb. per ton of slag. Deducting 6.6 per cent. for escape with the incondensable gases, 950 lb.