

illustrate the geographical distribution of butterflies, and three portraits of early naturalists of America; in all about 2000 figures on ninety-six plates, of which forty-one are coloured. The text contains 2000 pages, including an introduction of 104 pages, and an appendix, of 150 pages, which contains descriptions of such species concerned as have not been found within the limits of New England, and also descriptions of all known parasites of North American butterflies, by Messrs. Howard and Williston.

THE City of London College Science Society has issued its Report for 1888-89. We are glad to see that the session was one of increased activity, and, as the Committee are able to add, of continued success. Papers on subjects of great scientific interest were read, and there were many excursions to places suitable for geological study and for the collection of botanical and zoological specimens. The Society now publishes a monthly journal.

MR. PERCY LINDLEY is editing a series of "Holiday Handbooks." One of those sent to us deals with the Hartz Mountains, another with the Ardennes. They cost only a penny each, and are well done. For the same price one may now get a very good little illustrated Guide to London. It is published by Mr. J. P. Murray.

THE tenth part of Cassell's "New Popular Educator" has been issued. It is well illustrated, and has a good map of British North America.

A REMARKABLE series of experiments illustrating an extreme case of "mass" or "catalytic" action are described by Messrs. Morseand White of the University of Pennsylvania, Philadelphia, in the current number of the *American Chemical Journal* (p. 348). The sulphides and oxides of zinc and cadmium, which are so difficultly volatilizable when heated alone, are found to be readily volatilizable in presence of their respective metals, zinc or cadmium, owing to alternate dissociation and recombination. The pure sulphides were first prepared by dissolving redistilled zinc or cadmium in hydrochloric acid and precipitating with sulphuretted hydrogen. The washed precipitates were next dried in the ordinary way, and then heated to 300° C. in a current of pure dry sulphuretted hydrogen. They were finally repeatedly treated with carbon bisulphide to remove any traces of free sulphur. The sulphides as thus prepared were found to be perfectly stable in a vacuum, the exhausted tubes containing them being heated until the glass softened and collapsed without any signs of volatility of the sulphides being apparent. About 15 grams of either of the sulphides were then mixed with 40 grams of the corresponding metal and placed at the sealed end of a combustion tube, the other end being connected with a Sprengel pump. The end containing the mixture was placed in a furnace, and after the exhaustion was completed as far as possible, was gradually heated. As the temperature rose the metal began to fuse, and a yellowish white film of sulphur was formed in the cool portion of the tube projecting out of the furnace. The formation of this deposit is due to the fact that while the tube is comparatively free from the metallic vapour, the sulphur liberated by the dissociation of the sulphide, having a higher rate of diffusion than the vapour of the metal, partly escapes recombination, and is deposited in the free state in the cooler portion of the tube just outside the furnace. As the temperature still rises this deposit becomes converted into sulphide, and eventually a long line of crystals of the sulphide is formed along the bottom of the projecting part of the tube. Cadmium sulphide was found to be transported much further along the tube than zinc sulphide, and the crystals could be seen to form and fall in a manner resembling a fine rain. Indeed, so ready is the dissociation of cadmium sulphide under the influence of metallic cadmium that by rapidly raising the temperature the experiment becomes dangerous, the dissociation occurring with almost explosive

violence. On several occasions when the mixture was too tightly packed into the end of the tube, the whole contents were violently blown into the Sprengel pump. It is necessary to leave a very considerable free space along the top of the tube to insure a successful experiment. It was found that the oxides of zinc and cadmium behave similarly to the sulphides, oxide of zinc in this case dissociating most readily. The singular action of these metals in lessening the stability of their respective oxides and sulphides certainly forms one of the most extreme cases of "mass" or "catalytic" action on record; and that it is not a mere mechanical carrying action appears abundantly proved by the slight deposit of sulphur which is always noticed in the earlier stage of the experiment, and by the beautiful manner in which the sulphides themselves are afterwards deposited.

THE additions to the Zoological Society's Gardens during the past week include a Macaque Monkey (*Macacus cynomolgus* ♂) from India, presented by Mr. F. Dobbs; a Common Otter (*Lutra vulgaris*) from North Wales, presented by Mr. Chas. H. Wynn; two White Storks (*Ciconia alba*) from North Africa, presented by Mr. Thomas Hay; three Well-marked Tortoises (*Homopus signatus* ♂ ♀ ♀), four Rufescent Snakes (*Leptodira rufescens*), a Many-spotted Snake (*Psammodromus multimaculatus*), a Spotted Slowworm (*Acontias meleagris*), a Puff-Adder (*Vipera arictans*) from South Africa, presented by the Rev. G. H. R. Fisk; a Tesselated Snake (*Tropidonotus tessellatus*) from Italy, presented by Mr. H. D. Brocklehurst; two Common Toads (*Bufo vulgaris*), British, presented by Dr. J. J. Pitcairn; a Common Zebra (*Equus zebra* ♀) from South Africa, two Black-eared Marmosets (*Hapale penicillata*) from South-East Brazil, a Tovi Parrakeet (*Erotogerys tovi*) from Columbia, a Red and Blue Macaw (*Ara macao*) from Central America, deposited; a Peba Armadillo (*Tatusia peba*), a Pretre's Amazon (*Chrysolitis pretrei*), a — Snake (*Helicops leopardinus*) from Brazil, a White-throated Capuchin (*Cebus hypoleucus* ♂) from Central America, a Senegal Touracou (*Corythaix persa*) from West Africa, six Spotted Tinamous (*Nothura maculosa*) from Buenos Ayres, a Tesselated Snake (*Tropidonotus tessellatus*) from Italy, purchased; two Male Deer (*Cervus macrotis*), two Crested Pigeons (*Ocyphaps lophotes*), bred in the Gardens.

OUR ASTRONOMICAL COLUMN.

DISCOVERY OF A NEW COMET, 1889 *c*.—A telegram from Melbourne to Prof. Krueger announces the discovery of a bright comet by Mr. Davidson, of Queensland, on July 21. The following positions of this comet have been obtained:—

Place.	G.M.T.			R.A.			N.P.D.				
	h.	m.	s.	h.	m.	s.	h.	m.	s.		
Melbourne ...	July 22	23	3 50	...	12 46	9'0	...	122	29	6	
Rome ...	July 27	8	37	4	...	13 37	29'9	...	110	19	2

The comet is therefore coming north very rapidly.

COMET 1889 *d* (BROOKS).—The following elements and ephemeris for this comet are by Dr. H. Oppenheim:—

$$T = 1889 \text{ August } 3'40 \text{ G.M.T.}$$

$$\begin{aligned} \pi &= 339 \text{ }^{\circ} 37' \\ \varrho &= 28 \text{ }^{\circ} 13' \\ i &= 5 \text{ }^{\circ} 56' \\ q &= 0'3627 \end{aligned} \left. \vphantom{\begin{aligned} \pi \\ \varrho \\ i \\ q \end{aligned}} \right\} \text{Mean Eq. } 1889'0.$$

The comet probably has a short period.

Ephemeris for Greenwich Midnight.

1889.	R.A.	Decl.	Brightness.
	h. m.	° ' S.	
July 31 ...	0 4'2	7 3 S.	1'3
Aug. 4 ...	0 6'1	6 48	
8 ...	0 7'7	6 35 S.	1'4

The brightness at discovery is taken as unity.

COMETS 1888 *e* (BARNARD, SEPTEMBER 2) AND 1889 *b* (BARNARD, MARCH 31).—The following ephemerides are in continuation of those given in NATURE, 1889 July 11, p. 255:—

1889.	Comet 1888 <i>e</i> .			Comet 1889 <i>b</i> .		
	R.A.	Decl.		R.A.	Decl.	
	h. m. s.	°	'	h. m. s.	°	'
Aug. 2 ...	19 49 27	3	46'3 S.	5 3 35	9	23'3 N.
6 ...	37 3 ...	4	28 0	5 1 36	8	50'4
10 ...	25 34 ...	5	7'8	4 59 14	8	14'5
14 ...	15 3 ...	5	45'7	4 56 23	7	35'4
18 ...	5 34 ...	6	21'5	4 53 0	6	52'8
22 ...	18 57 4 ...	6	54'9	4 49 2	6	6'1
26 ...	49 32 ...	7	26'0	4 44 24	5	15'2
30 ...	42 54 ...	7	54'9 S.	4 39 4	4	19'6 N.

THE VIENNA OBSERVATORY.—We have received two volumes of the publications of this Observatory, viz. the Annals for 1885 and 1886 (*Annalen der k. k. Univ. Sternwarte in Wien, Währing*; Band v. and vi.). The former contains three sections, viz. (1) observations with the meridian circle in 1884, being Zones 119 to 198 of the observations of Santini's stars south of the equator; (2) corrections and notes to sundry catalogues, particularly to Oeltzen's catalogues of Argelander's zones and to the zone catalogues of Lamont and of the Washington Observatory; and (3) measures of double-stars made by Drs. Holetschek and Hepperger. The latter volume contains observations of minor planets and comets made with the Clark 11 $\frac{3}{4}$ -inch refractor, the Fraunhofer 6-inch, and the great Grubb telescope of 27-inch aperture, and meteorological observations made in the years 1885 and 1886. There is an apparently unobserved erratum on p. 115 of the former section. The observation on 1885 October 3, said to be of Klymene (No. 104) is really of Ilsa (No. 249). It is given correctly under the latter planet.

ASTRONOMICAL PHENOMENA FOR THE WEEK 1889 AUGUST 4-10.

(FOR the reckoning of time the civil day, commencing at Greenwich mean midnight, counting the hours on to 24, is here employed.)

At Greenwich on August 4

Sun rises, 4h. 31m.; souths, 12h. 5m. 50'1s.; daily decrease of southing, 5'6s.; sets, 19h. 41m.; right asc. on meridian, 8h. 58'8m.; decl. 17° 8' N. Sidereal Time at Sunset, 16h. 35m.
Moon (at First Quarter August 4, 13h.) rises, 12h. 50m.; souths, 18h. 1m.; sets, 23h. 1m.; right asc. on meridian, 14h. 55'1m.; decl. 12° 8' S.

Planet.	Rises.			Souths.			Sets.			Right asc. and declination on meridian.		
	h. m.	h. m.	s.	h. m.	h. m.	s.	h. m.	h. m.	s.	h. m.	°	
Mercury..	4	2	...	11	53	...	19	44	...	8	45'6	19 41 N.
Venus.....	1	0	...	9	0	...	17	0	...	5	52'3	21 0 N.
Mars.....	3	6	...	11	9	...	19	12	...	8	2'4	21 31 N.
Jupiter....	17	8	...	21	1	...	0	54*	...	17	56'0	23 2 S.
Saturn....	5	23	...	12	47	...	20	11	...	9	40'2	15 10 N.
Uranus... 10	47	...	16	16	...	21	45	...	13	9'4	6 44 S.	
Neptune..	23	29*	...	7	18	...	15	7	...	4	10'3	19 24 N.

* Indicates that the rising is that of the preceding evening and the setting that of the following morning.

Aug.	h.	
7	—	Occultation of the planet Jupiter by the Moon. Disap. at 19h. 4m. Reap. at 20h. 1m. Angles from vertex to right for inverted image 25° and 290° respectively. The Sun sets at 19h. 35m.
7	20	Mercury in superior conjunction with the Sun.
7	20	Jupiter in conjunction with and 1° 6' south of the Moon.

Meteor-Showers.

	R.A.	Decl.
The <i>Perseids</i> ...	44	56° N. ... Max. August 10.
Near 41 <i>Arietis</i> ...	44	25 N. ... Swift; streaks.
From <i>Camelopardus</i> ...	95	70 N. ... Slow.
Near ι <i>Cygni</i> ...	290	52 N. ... Slow.

Variable Stars.

Star.	R.A.		Decl.		h. m.
	h. m.	s.	°	'	
Algol ...	3	1'0	40	32 N.	Aug. 4, 22 39 <i>m</i>
δ <i>Libræ</i> ...	14	55'1	8	5 S.	8, 2 6 <i>m</i>
U <i>Coronæ</i> ...	15	13'7	32	3 N.	9, 22 3 <i>m</i>
U <i>Ophiuchi</i> ...	17	10'9	1	20 N.	8, 0 49 <i>m</i>
X <i>Sagittarii</i> ...	17	40'6	27	47 S.	5, 0 0 <i>M</i>
W <i>Sagittarii</i>	17	57'9	29	35 S.	7, 23 0 <i>m</i>
Y <i>Sagittarii</i> ...	18	14'9	18	55 S.	5, 0 0 <i>M</i>
β <i>Lyrae</i> ...	18	46'0	33	14 N.	8, 23 0 <i>m</i>
U <i>Aquilæ</i> ...	19	23'4	7	16 S.	10, 3 0 <i>m</i> ₂
S <i>Vulpeculæ</i>	19	43'9	27	1 N.	7, 23 0 <i>m</i>
η <i>Aquilæ</i> ...	19	46'8	0	43 N.	4, 3 0 <i>M</i>
S <i>Sagittæ</i> ...	19	51'0	16	20 N.	7, 23 0 <i>m</i>
δ <i>Cephei</i> ...	22	25'1	57	51 N.	7, 3 0 <i>M</i>
					8, 3 0 <i>m</i>

M signifies maximum; *m* minimum; *m*₂ secondary minimum.

THE NEWCASTLE MEETING OF THE BRITISH ASSOCIATION.

ACTIVE preparations are now being made for the Newcastle meeting of the British Association, and it is expected that the proceedings will be of more than usual interest. The meeting will be held from September 11 to 19. At the first general meeting, on September 11, at 8 p.m., Sir F. Bramwell, F.R.S., will resign the chair, and Prof. Flower, C.B., F.R.S., the President-elect, will assume the presidency, and deliver an address. The different Sections will assemble on the following morning for the reading and discussion of reports and other communications. The following are the Presidents of the Sections:—(A) Mathematical and Physical Science, Captain W. de W. Abney, R.E., C.B., F.R.S.; (B) Chemical Science, Sir I. Lowthian Bell, F.R.S.; (C) Geology, Prof. James Geikie, F.R.S.; (D) Biology, Prof. J. S. Burdon-Sanderson, F.R.S.; (E) Geography, Col. Sir F. De Winton, K.C.M.G.; (F) Economic Science and Statistics, Prof. F. Y. Edgeworth, M.A.; (G) Mechanical Science, Mr. William Anderson, M.Inst.C.E.; (H) Anthropology, Prof. Sir W. Turner, F.R.S.

On Thursday evening, September 12, there will be a *soirée*; on Friday evening, September 13, Prof. W. C. Roberts-Austen, F.R.S., will deliver a discourse on "The Hardening and Tempering of Steel"; on Saturday evening, September 14, Mr. B. Baker will deliver a discourse on "The Forth Bridge"; on Monday evening, September 16, Mr. Walter Gardiner will deliver a discourse on "How Plants Maintain Themselves in the Struggle for Existence"; on Tuesday evening, September 17, there will be a *soirée*; and the concluding meeting will be held on the afternoon of Wednesday, September 18.

Excursions to places of interest in the neighbourhood of Newcastle-on-Tyne will be made on the afternoon of Saturday, September 14, and on Thursday, September 19.

The first meeting of the General Committee will be held on Wednesday, September 11, at 1 p.m., for the election of the President and Sectional officers, and the despatch of business usually brought before that body. The General Committee will meet again on Monday, September 16, at 3 p.m., for the purpose of appointing officers for 1890, and of deciding on the place of meeting in 1891. The concluding meeting of this Committee will be held on Wednesday, September 18, at 1 p.m., when the Report of the Committee of Recommendations will be received. The Committee of Recommendations will meet at 3 p.m. on September 16 and 17, and (if necessary) on September 18, at 10 a.m.

The Local Secretaries for the Newcastle meeting are Prof. P. Phillips Bedson and Prof. J. H. Merival.

The Reception Room will be opened on Monday, September 9, at 1 p.m., and on the following days at 8 a.m., for the issue of tickets to Members, Associates, and ladies, and for supplying lists and prices of lodgings, and other information, to strangers on their arrival. No tickets will be issued after 6 p.m. In the Reception Room there will be offices for supplying information regarding the proceedings of the meeting. The Journal, containing announcements of the arrangements for each day, will be laid on the table on Wednesday, September 11, and the follow-