utensils. A representation of the constellation of the Great Bear was, although rudely, carefully drawn on the slab. It may be remembered that some years ago a similar slab was found near Weimar.

THE additions to the Zoological Society's Gardens during the past week include a White-fronted Capuchin (*Cebus albifrons*) from Central America, presented by Mr. H. A. Blake; a Mississippi Alligator (*Alligator mississippiensis*) from Florida, presented by Miss Janet D. White; a Common Gannet (*Sula bassana*), British, presented by Mr. F. E. Hatfield; two Dominican Kestrels (*Tinnunculus dominicensis*), two Green Bitterns (*Bictorides virescens*), from West India, presented by Dr. A. Boon, F.R.C.S.; a Raven (*Corvus corax*), British, presented by Mr. Robert Galland; a Ring-tailed Coati (*Nasua rufa*), a Globose Curassow (*Crax globicera*), from Central America, a Clouded Iguana (*Cyclura carinata*), from Cuba, deposited; a Black-necked Swan (*Cygnus nigricollis* ?) from Chili, purchased; a Leopard (*Felis pardus*), born in the Gardens.

OUR ASTRONOMICAL COLUMN

NOTES ON VARIABLE STARS.—Mr. T. E. Espin, Observer to the Liverpool Astronomical Society, announces in the Society's *Circular*, No. 6, that the star D.M. + 8°·3780, stated in *Circular* No. 2 (NATURE, vol. xxxiv. p. 110) to be probably variable, passed its maximum about June 4, at which time its magnitude was 6·8. Since this date it has diminished in brightness, and on August 20 it was only 8·2. The star would seem to be a long-period variable. Its place for 1885 is R.A. 18h. 32m. 51s., Decl. + 8° 43′·5. Mr. Espin also states that he has detected variation in the red star D.M. + 47°·3031, which passed a minimum about the end of April. On May 14 it was only 8·9, since which it has increased, and is now 7·7. This star also is a long-period variable. Its place for 1885 is R.A. 20h. 5m. 58s., Decl. + 47° 28′·9. It precedes 32 Cygni by 5m. 57s., and is 9′ north of it.

Circular No. 7 states that—(1) The observations of 10 Sagittæ on sixty nights since 1885 November 28 give: Period = 8·32134d., Epoch of Max. 1886 July 17·56d. A minimum occurs on 1886 September 1·6d., and a maximum on 1886 September 5·5d. (2) The star D.M. + 17°·3940 was observed as 9·5 on April 26 last. From this date it increased, and on June 13 it was 8·3. Latterly it has diminished, and on August 20 it was 8·7. Vogel gives the spectrum as III*b*. ! Duner as III*a*. !! The star's place for 1885 is R.A. 19h. 16m. 33s., Decl. + 17° 26′·4.

WINNECKE'S COMET.—From the *Dun Echt Circular*, No. 124, we learn that this periodical comet has been found at Cape Town. It is described as circular, less than 1′ in diameter, as bright as a star of the 10th magnitude, and as having some central condensation but no tail. Its observed place was Greenwich M.T. Aug. 20, 5h. 47m. 54s., R.A. 13h. 10m. 21·5s., Decl. 1° 8′ 17″ S. The daily motion, according to Lamp's ephemerides (*Astronomische Nachrichten*, No 2731) is about *plus* 3·3m. and 32′ *south*.

THE OBSERVATORY OF YALE COLLEGE.—The report of the work done at this Observatory during the year ending June 1, 1886, has recently been issued. The chief astronomical work is that done with the heliometer in charge of Dr. W. L. Elkin. With this instrument considerable progress has been made with the triangulation of the Pleiades, completing the series obtained in the previous year. All the stars have now been observed on from ten to twelve nights, and a total of over 1600 measures of distance and 700 of position-angle are available for discussion. The principal observing work accomplished by Dr. Elkin, has, however, been in connection with the scheme for determining the average parallax of the first-magnitude stars as a step towards the more comprehensive plan proposed by Gill and Elkin in concert. It is proposed at present to take the ten brightest stars in the northern hemisphere and observe them each from sixteen to twenty times at epochs of maximum parallactic displacement, using a favourably situated pair of comparison stars—in some cases a double pair, or four stars. Arcturus, with its large proper motion, presents an object of especial interest, and it has been taken up in a more exhaustive manner with six pairs of comparison stars, five of which have been successfully followed up so far. The whole work is progressing satisfactorily, over 200 sets of measures having been made, and is rather more than half completed, the working plan extending until February 1887. Astronomers will await with interest the completion and publication of Dr. Elkin's important researches.

ASTRONOMICAL PHENOMENA FOR THE WEEK 1886 SEPTEMBER 5–11

(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 September 5

Sun rises, 5h. 21m.; souths, 11h. 58m. 34·8s.; sets, 18h. 36m.; decl. on meridian, 6° 45′ N.: Sidereal Time at Sunset, 17h. 35m.

Moon (at First Quarter) rises, 13h. 38m.; souths, 18h. 11m.; sets, 22h. 41m.; decl. on meridian, 17° 44′ S.

Planet	Rises h. m.	Souths h. m.	Sets h. m.	Decl. on meridian ° ′
Mercury ...	3 38	10 53	18 8	13 44 N.
Venus	3 8	10 34	18 0	15 33 N.
Mars	10 44	15 28	20 12	15 15 S.
Jupiter... ...	7 46	13 37	19 28	2 34 S.
Saturn	0 23	8 27	16 31	21 42 N.

Occultations of Stars by the Moon (visible at Greenwich)

Sept.	Star	Mag.	Disap. h. m.	Reap. h. m.	Corresponding angles from vertex to right for inverted image ° °
7 ...	B.A.C. 6536 ...	6½ ...	21 43 ...	22 33 ...	65 353
10 ...	B.A.C. 7487 ...	6½ ...	20 11 ...	21 12 ...	129 234

Sept. h.
7 ... 5 ... Mercury at least distance from the Sun.

Variable Stars

Star	R.A. h. m.	Decl. ° ′		h. m.	
U Cephei	0 52·2	81 16 N.	... Sept.	6, 20	6 *m*
			,,	11, 19	46 *m*
Algol	3 0·8	40 31 N.	... ,,	9, 2	0 *m*
			,,	11, 22	49 *m*
ζ Geminorum ...	6 57·4	20 44 N.	... ,,	8, 19	24 *m*
δ Libræ	14 54·9	8 4 S.	... ,,	7, 3	3 *m*
U Ophiuchi... ...	17 10·8	1 20 N.	... ,,	7, 2	8 *m*
				22	16 *m*
T Herculis	18 4·8	31 0 N.	... ,,	5,	*M*
U Sagittarii... ...	18 25·2	19 12 S.	... ,,	8, 0	0 *m*
R Scuti	18 41·4	5 50 N.	... ,,	6,	*m*
β Lyræ...	18 45·9	33 14 N.	... ,,	6, 0	0 *M*
η Aquilæ	19 46·7	0 43 N.	... ,,	6, 0	0 *M*
			,,	10, 19	0 *m*
R Delphini	20 9·4	8 45 N.	... ,,	7,	*M*
T Aquarii	20 43·9	5 34 S.	... ,,	6,	*m*
S Pegasi	23 14·8	8 18 N.	... ,,	5,	*M*

M signifies maximum; *m* minimum.

Meteor Showers

Meteors have been observed at this season from the following radiants:—Near *o* Eridani, R.A. 55°, Decl. 6° S.; from Camelopardus, R.A. 60°, Decl. 60° N.; from near μ Persei, R.A. 65°, Decl. 46° N.; from near μ Tauri, R.A. 65°, Decl. 6° N.; and near α Pegasi, R.A. 345°, Decl. 13° N.

SCIENTIFIC SERIALS

Journal de Physique, July.—Prof. Mascart, on magnetisation. A study of the secondary effect produced by the reaction of the polar surfaces on the magnetising field. The author calculates also the influence of the earth's magnetism in producing temporary alteration in the magnetisation of a needle during oscillation, an effect which he finds to have been often exaggerated, and not to exceed 1/1000 part of the whole magnetisation.—P. Duhem, on the calorific capacity of dissociable gaseous combinations. Discussion and expansion of the formulæ

of Willard Gibbs to explain the variations of specific heat of such bodies as nitric oxide and acetic acid. The results confirm the idea that such variations are due to the gradual dissociation of polymeric forms.—G. Lippmann, an absolute spherical electrometer. Two hollow metal hemispheres, one fixed, the other held by a trifilar suspension, when similarly electrified, repel one another, with a force actually proportional to the square of the potential. The displacements are read optically. —MM. Bichat and Blondlot, on an absolute electrometer with continuous indication. This is an apparatus of three concentric cylinders, the innermost of which is suspended from a balance. The theory of it is already known.—P. Janet, on the formula of Van der Waals, and its application to capillary phenomena.—F. and W. Kohlrausch, the electro-chemical equivalent of silver (abstracted from *Wiedemann's Annalen*).

SOCIETIES AND ACADEMIES

PARIS

Academy of Sciences, August 23.—M. Fizeau in the chair.—Elliptical elements of Brooks's Comet III. 1886, by Mr. J. R. Hind. The elliptical orbit, deduced from the observations made at Nice on May 25 and July 1, and at Algiers on June 3, is as under :—

T = 1886 June 6·57145 Greenwich Mean Time

π	229° 45′ 58″·0	Mean Equinox 1886·0
Ω	53 3 25·7	
ι	12 56 1·8	
ϕ	37 27 10·2	
log a ...	0·5329478	
μ	563″·0992	
Period ...	6^a·301	

—On the measurement of very strong pressures and on the compressibility of fluids, by M. E. H. Amagat. For the measurement of very high pressures the author has adopted the principle of the manometer with differential pistons. In order to obtain accurate results, the condition had to be realised of maintaining the pistons in complete action while keeping them perfectly air-tight. The reading of the volumes of compressed fluid was effected by the process already indicated by Prof. Tait, of Edinburgh. Water and ether have been studied at zero and at the two respective temperatures of 20° and 40° C. Respecting the variation with pressure, it is shown that the coefficient diminishes gradually with the increase of pressure, and this takes place throughout the whole scale of pressures, contrary to the opinion of some physicists. At 3000 atmospheres the volume of water was reduced one-tenth, and its coefficient of compressibility one-half. This coefficient between 2590 and 2981 atm. was 0·0000238, and that of ether between 1623 and 2002 atm. 0·000045. The study of ether will be continued and pushed to 3000 atm., and in a future communication will be given the coefficients of compressibility and of dilatation for several other fluids up to 3000 atm. A number of gases will then be examined with the same apparatus and within the same limits of pressure.—On the purple of the solar spectrum, by M. Camille Koechlin. The solar spectrum yields only two simple colours, blue and yellow. The third is blended with yellow and blue to constitute the reds on the one hand, the violet, on the other, purple being red deprived of yellow or violet deprived of blue, or simply the spectrum without yellow or blue. If on the red of one be projected the blue of another spectrums or on the violet of the first the yellow of the second, the result is purple. The red or the violet may again be restored by applying to the purple the yellow or blue of a third spectrum. And if these applications be made with reversed prisms, so that the complementary colours reciprocally cover each other, the spectrum will present at both extremities a purple region with yellowish-white interval. Purple, being a simple colour, will thus never be obtained by mixture, but only by extracting the yellow from a red or the blue from a violet. The solar spectrum contains the elements of all shades, either by mixtures or by diluting with white or extinction with black. In the latter case the colours containing blue preserve their tint, while those on the opposite side of the yellow become changed in character. Thus green, blue, and violet yield the so-called deep greens, blues, and violets, while the yellow, orange, red, and purple cannot be intensified, but pass over to olive, brown, garnet, or amaranth. —On the branchial apparatus and muscular and nervous systems of *Amaræcium torquatum*, by M. Charles Maurice. In this Compound Ascidian, which abounds at Villefranche-sur-Mer, the branchial apparatus presents thirteen rows of stigmata, and is otherwise characterised by three fundamental peculiarities connected with the transverse sinus.—On a larva of *Lampyris noctiluca* surviving the loss of its head, by M. François. This specimen, which had lost the whole of the cephalic region, was found in a perfectly healthy and normal condition, and although destitute of any buccal orifice, it showed on dissection an abundance of adipose tissue. The œsophagus, however, had changed its position, and contained no trace of alimentary matter.—On the cyclone that swept over the Gulf of Aden in June 1885, by Admiral Cloué. As supplementary to the previous statement on this subject, the writer has collected further details from the captains of some English and Dutch vessels overtaken by the storm, and from Obock regarding the caravan which was *en route* for Shoa when the whirlpool swept by.—Remarks on Dr. W. C. Gore's memoir on the "Projectiles of the Future," presented to the Academy, by M. Larrey. In the interests of humanity, which are above those of war, it is argued that the use of explosives should be more and more restricted, and replaced by projectiles calculated rather to wound than to kill the combatants. With this object it is proposed to substitute for the explosive bullets now in use the so-called "Lorenz" projectiles, which are described as "the missiles of the future."

BOOKS AND PAMPHLETS RECEIVED

"Report of the Entomologist C. V. Riley for 1885" (Washington).—"Bulletin of the U.S. National Museum, No. 30," by J. B. Marcou (Washington) —"Géologie de l'Ancienne Colombie, Bolivarienne Vénézuela, Nouvelle-Grenade et Ecuador," by H. Karsten (Friedländer, Berlin).—"Jahrbuch der Meteorologischen Beobachtungen der Wetterwarte der Magdeburgischen Zeitung." Jahrgang iii., 1884, by Dr. R. Assmann (Magdeburg).—"Reports on Insects injurious to Hop Plants, &c.," No. 3 "Insects injurious to Fruit Crops," by C. Whitehead (Eyre and Spottiswoode).—"Lectures to Kindergartners," by E. P. Peabody (Heath and Co., Boston).—"Transactions and Proceedings of the New Zealand Institute, 1885," vol. xviii., by J. Hector (Wellington).—"Philip's Planisphere, showing the Principal Stars visible for every Hour in the Year" (Philip).—"Catalogue of the Blastoidea in the Geological Department of the British Museum (Natural History)," by R. Etheridge, Jun., and P. H. Carpenter (London).—"Choice and Chance," 4th edition, by W. A. Whitworth (Bell and Son).

CONTENTS