tatus and *Sphærodorum peripatus*, the Isopod *Apseudes Latreillii*, the Schizopoda *Mysidopsis gibbosa* and *Hemimysis Lamornæ*, specimens of the Brachyuran *Hyas coarctatus* decked with weeds and compound Ascidians, the Lamellibranch *Arca tetragona*, and the Ascidian *Perophora Listeri*. In the floating fauna little change has been observed, but numbers of the Leptomedusan *Laodice cruciata* have been taken on the beds of Zostera. The following animals are now breeding:—The Hydroid *Coryne vaginata*, the Polychæte *Polycirrus aurantiacus*, the Amphipod *Corophium Bonellii*, the Decapod *Palæmon squilla* and the Lamellibranch *Arca tetragona*.

THE additions to the Zoological Society's Gardens during the past week include a Macaque Monkey (*Macacus cynomolgus*, ♀) from India, presented by Capt. R. D. Arnold; a Leopard (*Felis pardus*), a Striped Hyæna (*Hyæna striata*) from India, presented by Capt. Currie; a Malayan Bear (*Ursus malayanus*) from Malacca, presented by Mr. M. O. N. Rees-Webbe; four Prairie Marmots (*Cynomys ludovicianus*) from Texas, four Orbicular Horned Lizards (*Phrynosoma orbiculare*) from California, presented by Mr. G. B. Coleman; a Harnessed Antelope (*Tragelaphus scriptus*, ♂) from West Africa, presented by Mr. A. L. Jones; four Galapagan Doves (*Zenaida galapagensis*) from the Galapagos Islands, an Auriculated Dove (*Zenaida auriculata*) from Chili, presented by Capt. Hedworth Lambton, R.N.; a Guilding's Amazon (*Chrysotis guildingi*) from St. Vincent, W.I., three Boddaert's Snakes (*Coluber boddaerti*), three Carinated Snakes (*Herpetodryas carinatus*) from Grenada, W.I., presented by the Hon. Sir Walter F. Hely-Hutchinson, K.C.M.G.; two Red-tailed Buzzards (*Buteo borealis*) from Jamaica, presented by Mr. Charles B. Taylor; a Crested Porcupine (*Hystrix cristatus*) from Africa, an Australian Cassowary (*Casuarius australis*) from Australia, two Blyth's Tragopans (*Ceriornis blythi*, ♂ ♀) from Upper Assam, deposited; two African Tantalus (*Pseudotantalus ibis*) from West Africa, two Demoiselle Cranes (*Grus virgo*), six Moorish Tortoises (*Testudo mauritanica*) from North Africa, a Secretary Vulture (*Serpentarius reptilivorus*) from South Africa, two Common Rheas (*Rhea americana*, ♂ ♀) from South America, two Cabot's Tragopans (*Ceriornis caboti*, ♂ =) from China, four Crested Pigeons (*Ocyphaps lophotes*) from Australia, purchased; a Mule Deer (*Cariacus macrotis*, ♂), a Martineta Tinamou (*Calodromas elegans*), seven Summer Ducks (*Æx sponsa*), seven Mandarin Ducks (*Æx galericulata*), three Australian Wild Ducks (*Anas superciliosa*), six Magellanic Geese (*Bernicla magellanica*), three Peacock Pheasants (*Polyplectron chinquis*), three Cheer Pheasants (*Phasianus wallichii*), six Gold Pheasants (*Thaumalea picta*) bred in the Gardens.

OUR ASTRONOMICAL COLUMN.

EPHEMERIS OF THE NEW COMET.—Prof. E. Lamp gives the following elements for Quénisset's comet in *Astr. Nach.*, No. 3173:—

τ = 1893 July 7·3140, Berlin Mean Time.

ω = 47° 6′·72
Ω = 337 20·93 } 1893·0
i = 160 1·88

log q = 9·82948

From these elements the following ephemeris has been computed by Dr. Kreutz:—

1893		R.A. app. h. m. s.		Decl. app. ° ′
July 21	...	11 27 28	...	+25 19·1
22	...	11 32 44	...	24 1·0
23	...	11 37 19	...	22 49·8
27	...	11 50 50	...	18 59·8
31	...	11 59 24	...	16 12·8
Aug. 4	...	12 5 18	...	14 6·2

The comet is decreasing in brightness.

The following communication has been received from South Kensington:—

"The comet was observed by Mr. Shackleton as early as July 11, before any notice of it had been received, but owing to the unfavourable state of the sky he was unable to perfectly satisfy himself that it was a new object. Although the sky was partially clear on July 14, the comet could not be seen from the Observatory as it was unfortunately very low in the north-west, and fell within the glare of the illuminations of the Imperial Institute. On Sunday, July 16, the sky was much clearer, and the comet was easily picked up with a small telescope. Observations with the equatorial, however, were impossible. Its position was roughly estimated as R.A. 10h. 41m., Decl. 33° N., and it was about equal in brightness to a fourth magnitude star. On July 17 the sky was clear, and the comet was observed by Mr. Shackleton with a 6-inch telescope temporarily erected in an elevated position; a faint tail was then observed, extending further on the southern than on the northern side of the axis. Owing to the absence of an equatorial mounting to the telescope employed, spectroscopic observations were very difficult, but three bright bands—probably the well-known bands of carbon which so frequently appear in cometary spectra—were recognised. There was only a very feeble continuous spectrum."

COMET FINLAY (1886 VII.).—The ephemeris of this comet for the ensuing week is as follows:—

12h. *Paris. M.T.*

1893.		R.A. (app.) h. m. s.		Decl. (app.) ° ′ ″
July 20	...	4 30 54·16	...	+20 33 51·0
21	...	35 18·76	...	20 45 55·3
22	...	39 41·86	...	20 57 28·5
23	...	44 3·43	...	21 8 31·0
24	...	48 23·42	...	21 19 3·0
25	...	52 41·80	...	21 29 4·9
26	...	4 56 58·53	...	21 38 37·0
27	...	5 1 13·57	...	21 47 39·8

OBSERVATIONS OF THE PLANET VICTORIA.—Observations of this planet were specially undertaken in 1889 to determine the mean horizontal parallax of the sun, and afterwards to compare the calculated with the observed places of the planet with the object of proving the existence of a short periodic perturbation, as would occur if, for example, an erroneous value for the lunar equation had been adopted. The observations (*Bulletin Astronomique*, tome x., June 1893) were of three kinds, as Dr. Gill in this note informs us—(1) meridian observations of the planet and comparison stars, made at twenty-one observatories during the opposition in 1889; (2) heliometric triangulation of comparison stars, consisting of measures of the distances of the stars less than 2° apart and measures of the angles of position (these observations were made at the observatories of Yale College, Göttingen, Bamberg, and at the Cape during the year 1890); and (3) heliometric observations of the angular distance of the planet from two comparison stars, one above and the other below the apparent position of the planet in the sky. This work was accomplished by the same observatories with the addition of that at Leipzig.

In this preliminary note, Dr. Gill refers only to the general results of the discussion. The following table shows the values for the mean horizontal parallax of the sun as deduced from the discussion of the observations in groups:—

Group.	Limit of groups.	M.S. parallax.	Rel. weight.	Δα C−O.	Δδ C−O.
		″		″	″
I. ...	June 10–12	... 8·723	... 0·8	... —	... —
II. ...	,, 15–19	... 804	... 12·3	... −0·01	... +0·00
III. ...	,, 19–26	... 828	... 15·4	... +0·04	... +0·02
IV. ...	,, 26–July 3	... 872	... 29·2	... −0·02	... −0·07
V. ...	July 3–9	... 789	... 9·8	... −0·13	... +0·03
VI. ...	,, 9–12	... 857	... 17·5	... +0·09	... +0·04
VII. ...	,, 15–20	... 793	... 19·5	... +0·07	... +0·12
VIII. ...	,, 20–23	... 809	... 20·0	... −0·05	... +0·09
IX. ...	,, 23–25	... 742	... 14·0	... −0·03	... −0·03
X. ...	,, 25–28	... 806	... 11·2	... −0·07	... +0·02
XI. ...	,, 28–Aug. 4	... 777	... 33·4	... +0·01	... −0·12
XII. ...	Aug. 4–10	... 826	... 20·0	... +0·11	... −0·04
XIII. ...	,, 10–17	... 816	... 26·0	... −0·05	... 0·00
XIV ..	,, 17–22	... 819	... 19·9	... +0·04	... +0·06
XV. ...	,, 22–27	... 8·738	... 13·3	... −0·04	.. +0·01

The mean of these gives the value

π = 8″·809, with a probable error of ± 0″·0066.

The observed and calculated positions agree only in the limits of the errors of observations on the assumption "of a periodic term, the period of which is nearly identical with that of the lunar period, and whose maxima and minima occur at epochs when the longitude of the moon differs by 90° from that of the planet. Adopting 6″·40 in place of 6″·50 for the lunar equation, the residuals obtained from the corrected ephemeris and the observations are made very small, as can be seen from the last two columns of the above table.

The correction of −0″·1 in the lunar equation demonstrates, as Dr. Gill says, that the value adopted up to the present for the lunar mass ought to be diminished by one-hundredth.

DIFFERENCE OF LONGITUDE BETWEEN VIENNA AND GREENWICH.—In the fourth volume of the "Publicationem für die Internationale Erdmessung," entitled "Astronomische Arbeiten des k.k. Gradmessungs-Bureau," by Theodor v. Oppolzer, and after his death by Prof. Weiss and Dr. Robert Schram, we are presented with the results of the determination of the difference of longitude between Vienna and Greenwich, and with the Berlin time determinations and the personal equations of the separate observers relating to other longitude determinations, those between Vienna—Berlin—München—Greenwich. We may mention here that, with regard to the first-mentioned determination, another one, between the same places but after a method due to Döllen, by observations in the vertical of Polaris, will appear in a later volume.

The observations for the combined longitude determination between the above-mentioned places were commenced on July 7, 1876, and were completed on September 26 of the same year. Not only was the usual method of procedure adopted, but also that which we owe to Döllen, the instruments used being, for the former method those by Repsold, and for the latter those by Herbst. In the Vienna—Greenwich longitude determination at the beginning and at the end of the observations, time signals, both from Vienna and from Greenwich, were changed with Berlin; in the middle observations Vienna —Greenwich interchanged time signals; and towards the end München was included. In the following table, which gives the results for the single evenings, ΔL represents the longitude between the points of observation and $d\Delta L$ the deviations from the most probable value of the longitude difference :—

Date.	ΔL.	$d\Delta L$.
	h. m. s.	s.
17 July, 1876 ...	1 5 21·037 ...	+0·043
21 ,, ...	21·028 ..	+0·034
22 ,, ...	20·995 ...	+0·001
26 ,, ...	20·955 ...	−0·039
5 Aug. ...	20·832 ...	−0·162
7 ,, ...	21·107 ...	+0·113
17 ,, ...	21·146 ...	+0·152
21 ,, ...	20·845 ...	−0·149
27 ,, ...	21·016 ...	+0·022
5 Sept. ...	21·037 ...	+0·043
11 ,, ...	21·025 ...	+0·031
21 ,, ...	1 5 20·902 ...	−0·092

The result obtained, when the points of observations are reduced respectively to the centre of the Greenwich Transit Circle and to the centre of the large dome of the Vienna Observatory is

1h. 5m. 21·421s. ± 0·021s.

PHOTOGRAPHS OF THE MILKY WAY.—Prof. E. E. Barnard, who has recently been on a visit to Europe, has brought with him some wonderful photographs of the Milky Way, which are simply a revelation to many of us. These photographs (*The Observatory*, No. 203) were taken at the Lick Observatory with a lens made by Mr. Willard of New York in 1859, which is one of large aperture (6 inches) and short focus (31 inches). Such a lens tends to compress as well as intensify the characteristic features of these stellar clouds, the large field allowing one to embrace any of these forms as a whole, and not in detail, as is the case when they are viewed with a telescope. The first photographs, showing the cloud forms, were taken in August of 1890, the portion of the sky being that situated in Sagittarius, and the exposure 3h. 15m. A most interesting picture is that of a section of the constellation of Cygnus, near γ Cygni; this photograph shows some of those curious and almost weird dark spots and dark lanes the origins of which are very doubtful. Mr. Ranyard supposes them to be due to an obscuring medium between us and that part of the Milky Way, but Prof. Barnard's opinion is that they are real holes in the cloud structures themselves. Two photographs with different lengths of exposures (2h. 45m. and 4h. 30m.) of the region about M. 11 in the constellation of Sobeski raises an important point as regards the different structure of the Milky Way. The second picture exhibits details which considerably altered the configuration, not at all brought out in the first one. Not only in these photographs, but in several others of the Milky Way, this fact has been noticed, and Prof. Barnard suggests that there may be different orders or kinds of cloud structure implying distance or nearness, or possibly an entirely different order of stars in point of actual size.

THE INSTITUTION OF NAVAL ARCHITECTS.

THE summer meeting of the Institution of Naval Architects was held last week in Cardiff. This is only the fifth provincial meeting held by this Society since its foundation. The first was in Glasgow, the next in Liverpool, and the third in Newcastle. The fourth was held again in Glasgow. All these meetings were eminently successful, and it is somewat strange that the Council should not have made a point of holding a country meeting every year. We believe, however, that it is now the intention to follow that course, and certainly the great success of the meeting held in South Wales last week will support those who advocate two meetings a year.

We propose in our report dealing only with the sittings held for the reading and discussion of papers, but it may be stated that the excursions were very successful. Some of these were of a purely recreative nature, such for instance as that which occupied the whole of the last day, Friday, the 14th inst., when members were taken from Cardiff to Ilfracombe and back by the steamer *Lorna Doone*. The visit to Caerphilly Castle, with the luncheon in the ancient banqueting hall, could not by any means be construed as "business" for naval architects, and the same might be said of the visit to Lord Windsor's grounds at Penarth, illuminated for the occasion.

Mixed with these junkettings, however, there was a good deal of a more serious nature, as the following list of papers read will show :—

(1) "On points of interest in the construction and repair of vessels carrying oil in bulk," by B. Martell, chief-surveyor of Lloyd's Registry of Shipping.

(2) "On fast ocean steamships," by F. Elgar.

(3) Some experiments on the combination of induced draught and shot air, applied to marine boilers fitted with serve tubes and retarders," by J. D. Ellis.

(4) "On wear and tear in ballast tanks," by A. K. Hamilton, of Lloyd's Registry.

(5) "On the transmission of heat through boiler plates," by A. Blechynden, Barrow.

(6) "On water tube boilers," by J. T. Milton, chief-engineer-surveyor to Lloyd's Registry.

(7) "On the theory of thin plating and its applicability to calculations of the strength of bulkhead plating and similar structures," by G. H. Bryan, of Cambridge.

The last paper was not read, but distributed at the meeting, the discussion being deferred until the spring meeting of next year.

On the members assembling at the Town Hall, Cardiff, on the morning of Tuesday, the 11th inst., they were welcomed by the Mayor of Cardiff, and the chair was then taken by Sir Nathaniel Barnaby (late Director of Naval Construction), the President, Lord Brassey, not having arrived. Mr. Martell's paper dealt with various details involved in the construction of oil tank steamers. It would seem at first sight a simple matter to construct a steel vessel capable of carrying oil in bulk; but this is by no means the case, and in trying to solve the problem involved naval architects have been met by some altogether novel problems. One of these is the arrangement of riveting, and with this feature the author dealt at some length, going into details in the thorough manner which his unique position enabled him to do. Without diagrams it would be impossible to follow the author in his various lines of reasoning, more especially in the matter of arrangement of tanks, the disposition of stringers, brackets, and other parts of a ship's structure. We will therefore refer those of our readers interested in