

liquid tar, which had been poured into tin boxes, and pieces of solid tar which had been placed in the ground near the vines. Large clouds of smoke quickly enveloped the vineyard. The fires lasted for about two hours, but the smoke did not clear off till a considerable time after. The object of the experiment was completely gained, as not one young shoot was destroyed by the frost.

THE American Institute of Electrical Engineers, organized three years ago, is making arrangements for the purchase of a suitable building in New York. It is proposed that there shall be an electrical library and museum, and, if space permits, an experimental laboratory. Suitable accommodation will be provided for council and general meetings, and the entertainment of members and their guests, and the house will be open "at all reasonable hours."

THE additions to the Zoological Society's Gardens during the past week include a Squirrel Monkey (*Chrysothrix sciurea*) from Guiana, presented by Miss Grace Williams; a Negro Tamarin (*Midus ursulus*) from Guiana, presented by Miss Julia Neilson; a Rhesus Monkey (*Macacus rhesus*) from India, presented by Miss R. M. Hurt; a Common Marmoset (*Hapale jacchus*) from South-East Brazil, presented by Mrs. Constance Hoendorff; a Common Raccoon (*Procyon lotor*) from North America, presented by Mr. G. F. Van Zandt; two Lanner Falcons (*Falco lanarius*), European, presented by Mr. William Thomson; two Scaly Ground Doves (*Scardafella squamosa*) from Brazil, presented by Mr. William de Castro; a Cockateel (*Calopsitta nove-hollandia*) from Australia, presented by Mr. H. H. James; a Ring-necked Parrakeet (*Palaornis torquatus*) from India, presented by Mrs. Hill; a Yellow-billed Sheathbill (*Chionis alba*) from Cape Town, presented by Mr. R. C. Ashton; nine Barbary Turtle Doves (*Turtur risorius*) from Africa, presented by Mr. E. L. Armbricht; a Red Brocket (*Cariacus rufus*), a Great American Egret (*Ardea egretta*) from Brazil, deposited; three Sandwich Island Geese (*Bernicla sandvicensis*) from the Sandwich Islands, a Wryneck (*Inyx torquilla*), European, purchased; a Wapiti Deer (*Cervus canadensis*), a Barbary Wild Sheep (*Ovis tragelaphus*), a Variegated Sheldrake (*Tadorna variegata*), nine Summer Ducks (*Aex sponsa*) bred in the Gardens.

OUR ASTRONOMICAL COLUMN.

THE GREAT SOUTHERN COMET (1887 a).—Dr. J. M. Thome, of the Cordoba Observatory, has published in the *Astronomical Journal*, No. 156, some interesting particulars as to the appearance and observed positions of the great comet which he discovered on January 18. On the 21st it became evident that the comet was, in effect, all tail, the head being much the fainter part of the object, and being at least 15' in diameter, very thin, and without nucleus or condensation of any kind. After various attempts at determining its co-ordinates, Dr. Thome adopted the plan of moving the telescope along the axis of the tail, until reaching a point beyond which nothing of a nebulous character could be distinguished, and determining its position. These points were approximately half a degree in advance of the true centre of the nebulousity, and nearly in its axis. The observations of position extend from January 21 to January 27. With regard to the appearance of the comet to the naked eye, Dr. Thome remarks that it was a beautiful sight—a narrow, straight, sharply-defined, graceful tail, over 40° long, shining with a soft starry light against the dark sky, beginning apparently without a head, and gradually widening and fading as it extended upwards.

The same number of the *Astronomical Journal* contains a discussion of the orbit of the comet by Mr. S. C. Chandler, Jun. The observations extend from January 20 to 29, and were made at Melbourne, Co. doba, the Cape, and Windsor, N.S.W. Two sets of elements—which do not materially differ, considering the extreme uncertainty of the observations—have been obtained; the first by taking the Cordoba observations as they stand, the

second by attempting to determine the true centre of the nebulousity from Dr. Thome's statement that the recorded positions are 30' in advance of the true centre and nearly in its axis. The elements are:—

T (G.M.T.)	I.	II.
1887 Jan. 9 <sup>o</sup> 08 <sup>o</sup>	1887 Jan. 9 <sup>o</sup> 08 <sup>o</sup>	1887 Jan. 8 <sup>o</sup> 73 <sup>o</sup> 0
$\omega$	173 36'2	174 48'6
$\Omega$	130 46'2	132 48'6
$i$	61 48'9	57 52'1
log $q$	8.30484	8.36280

Mr. Chandler points out that these elements are very unlike those of comet 1880 I., with which this comet was at first associated. In fact the orbit found resembles more those assigned to the comets of 1680 and 1689, than that of the group 1843-80-82.

NEW MINOR PLANETS.—A new minor planet, No. 267, was discovered by M. Charlois at Nice on May 27. Another, No. 268, was discovered by M. Borelly at Marseilles on June 9.

ASTRONOMICAL PHENOMENA FOR THE WEEK 1887 JUNE 19-25.

(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 June 19.

Sun rises, 3h. 44m.; souths, 12h. om. 58'8s.; sets, 20h. 17m.; decl. on meridian, 23° 26' N.; Sidereal Time at Sunset, 14h. 8m.

Moon (New on June 21) rises, 2h. 48m.; souths, 10h. 20m.; sets, 18h. 1m.; decl. on meridian, 15° 57' N.

Planet.	Rises.	Souths.	Sets.	Decl. on meridian.
	h. m.	h. m.	h. m.	
Mercury	5 21	13 39	21 57	23 39 N.
Venus	7 21	15 9	22 57	19 11 N.
Mars	2 50	11 2	19 14	22 50 N.
Jupiter	14 28	19 47	1 6*	8 50 S.
Saturn	5 43	13 47	21 51	21 41 N.

\* Indicates that the setting is that of the following morning.

June.	h.	
21	18	Sun at greatest declination north; longest day in northern latitudes.
23	5	Saturn in conjunction with and 2° 26' north of the Moon.
23	10	Mercury in conjunction with and 3° 27' north of the Moon.
23	19	Jupiter stationary.
25	0	Venus in conjunction with and 2° 1' north of the Moon.

Variable Stars.

Star.	R.A.	Decl.	h. m.
	h. m.		
U Cephei	0 52'3	81 16 N.	June 23, 0 14 <i>m</i>
R Virginis	12 32'8	7 37 N.	„ 21, <i>M</i>
$\delta$ Libræ	14 54'9	8 4 S.	„ 25, 1 0 <i>m</i>
U Ophiuchi	17 10'8	1 20 N.	„ 20, 1 46 <i>m</i>
			and at intervals of 20 8
W Sagittarii	17 57'8	29 35 S.	June 25, 2 0 <i>m</i>
U Sagittarii	18 25'2	19 12 S.	„ 25, 1 0 <i>m</i>
$\eta$ Aquilæ	19 46'7	0 43 N.	„ 20, 1 0 <i>M</i>
S Sagittæ	19 50'9	16 20 N.	„ 24, 23 0 <i>m</i>
R Capricorni	20 5'0	14 36 S.	„ 23, <i>M</i>
$\delta$ Cephei	22 25'0	57 50 N.	„ 21, 23 0 <i>m</i>

*M* signifies maximum; *m* minimum.

Meteor-Showers.

	R.A.	Decl.
Near $\beta$ Ursæ Majoris	168	55 N.
$\alpha$ Cephei	315	60 N.

GEOGRAPHICAL NOTES.

EMIN PASHA contributes to the Scottish Geographical Society's Journal an account of an exploration he made recently of part of Lake Albert Nyanza, which contains some data bearing on the probable origin and the physical geography of

the lake. Off the station of Mabagi, on the north-west shore of the lake, Dr. Junker found a long, low, sandy island, which he recognized as of quite recent formation; for in 1879 he noticed that the spot where it now lies was covered with shallow water. Its length is 1067 yards, and maximum breadth 99 yards. Tall grass and weeds grow at the water's edge, and a species of acacia (*A. mellifera*) on the higher parts. The island, Emin Pasha states, is due to the deposition of the detritus brought down by the two rivers which enter from the south-west. From what he observed on the lake, he is inclined to believe that the foreshore on the west is gradually encroaching on its waters; in other words, the lake in this part is gradually filling up. As for the lake itself, Emin Pasha attributes its origin solely to erosion. He thinks it more than probable that formerly a large stream may have made its way from between the two ranges to east and west of the lake, so that its erosive action, combined with that of inundations, heavy rains, caving-in, and the influence of the sun and weather, are quite sufficient to account for the result. The geological formation of both ranges is the same; their altitudes differ but little, and the terrace-like formation of their descent lakewards is in each case exactly alike. Emin Pasha hoped to examine the problem much more minutely. He landed at Kibiro, on the opposite side of the lake, and gives an interesting description of the valuable salt-mines of the region. Emin Pasha afterwards made two other journeys on the lake, during one of which he discovered what he believes to be a new river, called Kakibbi by the Wasongora, and Duéru by the Wamboga. It flows from the Ussongora Mountains, and is of considerable size, and enters the lake at the south, having a large island near its *embouchure*. It abounds with cataracts, and is therefore unnavigable. To the south-west, Emin Pasha was informed, there is a large river on the banks of which there is a colony of Akkas—called Balia by the Wanyoro people, but by themselves Betua; the latter a name suggesting the Batua recently discovered by Lieut. Wolf on the Sankuru, to the south of the Congo. Is it not possible that the Kakibbi is the same as the "red river" discovered by Mason Bey in 1877, entering the south extremity of Lake Albert?

In the *Bulletin* of the Lyons Anthropological Society will be found an interesting paper by M. Bertholon on the "Arab Colonization of France," in which the author, mainly on the basis of place-names, seeks to identify the existing effects of the Saracenic invasion of France. Dr. Collomb has also a useful paper on the peoples of the Upper Niger, their manners and their history.

M. ÉDOUARD DUPONT, Director of the Brussels Natural History Museum, is about to leave for the Congo, to make a geological investigation of the region along the south bank of the river, between Boma and Stanley Pool. He will endeavour especially to determine the epoch when the river broke through the coast range, and the age of these mountains. He will also explore any caves which may exist, in order to discover if there are any remains of a primitive population.

THE new number of Petermann's *Mitteilungen* is one of special scientific interest. The first paper gives the results of a series of researches by Japanese botanists on the botanical zones of Japan, in which the relation of these zones is shown to the configuration of the surface of the country. A much longer and perhaps more important paper in the same department is Herr Ernst Hartert's account of the botanical results of the expedition to the Niger under the late Herr Flegel; it abounds with detailed information on the plants collected by the expedition. Dr. Alex. Supan, the able editor of the *Mitteilungen*, who takes a special interest in meteorology, contributes a carefully elaborated paper on the mean duration of the chief heat periods in Europe. Then we have a series of extracts from Emin Pasha's letters, from 1883 down to 1886, much of which has already been published.

#### THE NEPHRIDIA OF "*LANICE CONCHILEGA*," MALMGREN.<sup>1</sup>

SEVERAL accounts of the nephridia of *Terebella conchilega* have been given. H. Milne-Edwards (*Ann. d. Sci. Nat.* (2) *Zoologie*, x., 1838, p. 220), in a paper published in 1838, on the circulation in Annelids, describes the vascular system in a species to which he gives this name, and gives a

<sup>1</sup> A Paper read before the Royal Society of Edinburgh by Mr. J. T. Cunningham, on Monday, May 16.

figure of the animal opened along the dorsal median line. In this figure four looped nephridia are distinctly shown, situated behind the branchial region. The representation of the position and character of these organs is perfectly correct so far as it goes: they are the upper parts of the four nephridia belonging to somites 6-9. But the paper I refer to does not describe the nephridia, as it deals with another subject: they are shown in the figure, and that is all; and in the description of the figure the organs are referred to as organs of generation.

Keferstein (*Zeitschrift für wiss. Zoologie*, Bd. xii., 1862) mentions that the structure and number of the nephridia in *T. conchilega* are the same as in *T. gelatinosa*, Kef.: in both cases he says there are six pairs, each organ consisting of a tube bent on itself, of which one half is darker, the other lighter: the organs belong to segments 3-9.

Cosmovici<sup>1</sup> gives an erroneous description of the organs: he says there are two pairs without internal openings, which he calls "organs of Bojanus," one of these situated in front of the cephalic diaphragm, the other immediately behind it, each organ having an external opening; and two other pairs, each of which has an internal as well as external opening, and is shaped like an urn: the internal opening is large, and surrounded with a circular lip. The gonad is attached to the posterior part of each of these latter organs, which Cosmovici calls segmental organs, and which he says serve as efferent excretory ducts.

The species referred to by these three authors is the *Nereis conchilega* of Pallas, *Terebella conchilega* of Gmelin; and this is called *Lanice conchilega* by Malmgren. My specimens were identified from Malmgren's description, and there is no doubt of the identity of my specimens with the species of that author; but there is room for some uncertainty regarding the specific identity of the specimens referred to by the authors I have mentioned. For instance, Cosmovici identified his species by means of Quatrefages' "Histoire des Annelés," 1865, and there it is stated that the tube of *Terebella conchilega* possesses no hollow fringes at its mouth: these fringes are always present in the tube of *Lanice conchilega*, Malmgren. This species is distinguished by some marked characters: two of them are the presence of a large vertical lobe on the 3rd somite (second branchiferous) and the coalescence of the ventral scutes usually present into a continuous ventral plate.

The true relations of the excretory system are as follow:—Enumerating the somites from before backwards, and counting the buccal as the 1st, we find that the branchiæ belong to somites 2, 3, and 4: the first notopodial fascicle of capillary setæ is on the 4th somite, the third branchiferous; the first neuropodial uncingerous torus is on the 5th: the neuropodial tori are repeated on every succeeding somite to the end of the body; the notopodial fascicles occur only on seventeen consecutive somites. There are traces of transverse septa behind the 1st, 2nd, 3rd, and 4th somites, but none in the rest of the thoracic region, which bears the notopodial fascicles. On dissection, four long double nephridial tubes are seen projecting dorsally with the body-cavity; the lower parts of these tubes are covered by strands of the oblique muscles which pass from the nerve-cord to the neighbourhood of the notopodial bristles: careful examination shows that these tubes belong to somites 6, 7, 8, and 9. Their internal openings can be found immediately behind the fascicle of bristles belonging to somites 5, 6, 7, and 8 respectively, but their efferent tubes are seen to pass down beneath the fascicles of somites 6, 7, 8, and 9. The lower parts of these efferent tubes are very wide, and it is impossible to separate them from one another. Beneath the fascicles of the following four somites (10-13 inclusive) are seen membranous nephridial sacs, which externally at least are inseparable from one another. These sacs are simple, that is, they are not composed of a tube bent on itself like the anterior nephridia: they scarcely extend above the level of the oblique muscles, and no internal opening or nephrostome can be found in them. In front of the most anterior nephridium, that belonging to somite 6, are seen traces of a rudimentary nephridium. In order to trace out the relations of these nephridia more accurately, the anterior part of a specimen was cut into a series of horizontal longitudinal sections, commencing with the ventral surface, and the reason why the successive nephridia could not be isolated from one another was seen on examination of these sections: the lower parts of the efferent limbs of the four anterior normal nephridia, in somites 6-9, and the whole of the nephridial sacs in somites

<sup>1</sup> "Glandes génitales et Organes segmentaires des Annelides polychètes" (*Arch. de Zool. Exp.*, t. viii., 1879-80).