A BOOK entitled "Mœurs et Monuments des Peuples préhistoriques," by M. de Nadaillac, is about to be published in Paris. The text will be fully illustrated.

THE *Selborne Magazine* will in future be published by Mr. Elliot Stock.

THE new number of *Mind* opens with an article on the conditions of a true philosophy, by Mr. S. H. Hodgson. There are also articles on the nature and functions of a complete symbolic language, by Mr. S. Bryant; on Dr. Martineau and the theory of vocation, by the Rev. H. Rashdale; and on the unity of consciousness, by Mr. A. F. Shand.

WE have received a little pamphlet by Dr. G. Y. Cadogan-Masterman, Medical Officer of Health, Stourport, entitled "Dermepenthesis: Animal Skin-Grafting," in which the author gives several interesting cases of successful grafting of the skin of rabbits on wounds on the human body.

AN International Exhibition of farmyard poultry, rabbits, game raised for reserved shooting, machinery and engines for bird-culture, hunting-dogs, and sporting apparatus allowed by law, will be held in Rome, at the Botanical Garden, from April 25 to May 10. The Exhibition is being organized by a Committee of the Agricultural Society of Rome.

ACCORDING to the *Naturforscher*, Herr von dem Borne-Berneuchen has succeeded in breeding, in his piscicultural establishment, specimens of the fish known in America as the black boss.

THE additions to the Zoological Society's Gardens during the past week include two Striped Hyænas (*Hyæna striata*) from Algeria, presented by Capt. E. B. Pusey, R.N.; an Ortolan Bunting (*Emberiza hortulana*), British, presented by Mr. W. H. St. Quintin; a Moorish Gecko (*Tarentola mauritanica*) from Cannes, South France, presented by Mr. J. C. Warbury; two Poiret's Newts (*Molge poireti*) from Algeria, presented by Mr. G. A. Boulenger; a Greater Sulphur-crested Cockatoo (*Cacatua galerita*) from Australia, deposited; a Central American Agouti (*Dasyprocta isthmica*) from Central America, purchased.

OUR ASTRONOMICAL COLUMN.

THE PARIS CATALOGUE.—The first two volumes of the great work undertaken by Leverrier a third of a century ago,—the re-observation of the stars of Lalande's catalogue,—have recently been published. The first volume contains the first instalment of the catalogue, viz. stars from oh. to 6h. of R.A. observed during the years 1837 to 1881, whilst the second gives the separate observations. That this great undertaking has advanced so far towards completion is chiefly owing to the energy which has characterized the Paris Observatory under the directorship of Admiral Mouchez, and to the strength it has derived from the School of Practical Astronomy which was for several years connected with it. When Admiral Mouchez succeeded to the direction in 1878, barely one-third of the necessary observations had been secured, and the annual number of observations obtained was only about 6000 or 7000, a total which, however considerable in itself, was very inadequate in view of the 300,000 required to complete the original programme of a minimum of three observations in each element for the 47,390 stars of Lalande's catalogue. The gift by M. Bischoffsheim of the fine Eichens meridian-circle, and the assistance furnished by the pupils of the astronomical school have, however, raised the yearly average to 25,000 or 28,000 observations, and rendered it possible to commence the publication of results. As the observations include not only those made since Leverrier became Director, but also some 20,000 or 30,000 made between 1837 and 1854, under Arago's superintendence, but left unreduced by him, they have been divided into three periods, viz. 1837-53, 1854-67, and 1868-81, and severally reduced to the mean epochs 1845, 1860, or 1875. Observations subsequent to 1881, about one-fourth of the entire number, will be published separately, and a separate supplementary catalogue will also be formed of those stars which it has been found necessary to re-observe owing to the disproportion between the number of observations secured in the two elements, due to the R.A.'s in so many cases having been observed with the transit instrument, whilst the declinations were taken with the mural circle, the transit circles having been erected only in 1863 and 1877 respectively. The present section of the catalogue contains 7245 stars, and represents about 80,000 observations in both elements. It gives for each of the three periods the number of observations, the mean date, the R.A. and N.P.D. reduced to the mean epoch, and a comparison with Lalande. The precessions for 1875 are also added. The introduction, by M. Gaillot, who has superintended the reduction, contains a discussion of the probable errors of the observations, and is followed by a comparison of the present catalogue with Auwers' Bradley, and an important investigation by M. Bossert of the proper motions of a large number of stars, followed by a table of errors in Lalande's catalogue, which the present and other catalogues have brought to light.

ASTRONOMICAL PHENOMENA FOR THE WEEK 1888 *APRIL* 15–21.

(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 April 15

Sun rises, 5h. 5m.; souths, 11h. 59m. 53·6s.; sets, 18h. 55m.: right asc. on meridian, 1h. 36·2m.; decl. 10° 1′ N. Sidereal Time at Sunset, 8h. 32m.

Moon (at First Quarter April 19, 12h.) rises, 7h. 23m.; souths, 15h. 9m.; sets, 23h. 4m.: right asc. on meridian, 4h. 46·0m.; decl. 18° 18′ N.

Planet.	Rises.	Souths.	Sets.	Right asc. and declination on meridian.
	h. m.	h. m.	h. m.	h. m. °
Mercury..	4 41 ...	10 38 ...	16 35 ...	0 13·8 ... 1 21 S.
Venus.....	4 34 ...	10 36 ...	16 38 ...	0 12·6 ... 0 20 S.
Mars	18 6 ...	23 39 ...	5 12*...	13 16·9 ... 5 55 S.
Jupiter....	22 26*...	2 40 ...	6 54 ...	16 15·1 ... 20 14 S.
Saturn....	10 33 ...	18 31 ...	2 29*...	8 8·5 ... 20 46 N.
Uranus ...	17 40 ...	23 17 ...	4 54*...	12 55·3 ... 5 10 S.
Neptune..	6 28 ...	14 10 ...	21 52 ...	3 46·6 ... 18 15 N.

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

Occultations of Stars by the Moon (visible at Greenwich).

April.	Star.	Mag.	Disap.	Reap.	Corresponding angles from vertex to right for inverted image.
			h. m.	h. m.	° °
16 ...	χ^2 Orionis	... 6 ...	21 27 ...	22 26	... 139 300
19 ...	θ Cancri ...	... 6 ...	19 34 ...	20 45	... 70 308

April. h.
19 ... 13 ... Saturn in conjunction with and 1° 5′ north of the Moon.

Variable Stars.

Star.	R.A. h. m.	Decl. °			h. m.	
U Cephei	0 52·4	81 16	N.	Apr. 17,	3 41	*m*
Algol	3 0·9	40 31	N.	,, 18,	21 4	*m*
R Canis Majoris...	7 14·5	16 12	S.	,, 20,	22 14	*m*
δ Libræ	14 55·0	8 4	S.	,, 17,	22 30	*m*
U Coronæ	15 13·6	32 3	N.	,, 17,	3 31	*m*
U Ophiuchi... ...	17 10·9	1 20	N.	,, 16,	3 44	*m*
		and at intervals of			20 8	
X Sagittarii... ...	17 40·5	27 47	S.	Apr. 15,	4 0	*M*
Z Sagittarii... ...	18 14·8	18 55	S.	,, 15,	0 0	*m*
β Lyræ...	18 46·0	33 14	N.	,, 18,	22 0	m_2
R Lyræ	18 51·9	43 48	N.	,, 17,		*M*
S Vulpeculæ ...	19 43·8	27 1	N.	,, 20,		*M*
R Sagittæ	20 9·0	16 23	N.	,, 18,		*m*
T Cephei	21 8·1	68 2	N.	,, 16,		*M*
δ Cephei	22 25·0	57 51	N.	,, 19,	3 0	*M*
R Aquarii	23 38·0	15 54	S.	,, 17,		*M*

M signifies maximum; *m* minimum; m_2 secondary minimum.

Meteor-Showers.

	R.A.	Decl.		
Near β Serpentis	232°	17° N.	Very swift.	
From Hercules...	255	37 N.	April 12–25	Very swift.
	268	33 N.	*Lyrids*, April 18–20	
	272	20 N.	April 18–24	
From Vulpecula	300	24 N.	April 19–20. Swift.	

GEOGRAPHICAL NOTES.

THE Russian Geographical Society elaborated at its last meeting the following programme of work for the next summer. M. Kuznetsoff will continue his geo-botanical work on the northern slope of Caucasus, and M. Rossikoff will continue his survey of the Caucasian glaciers on the little-known southern slope of West Caucasus. M. Listoff will also resume his exploration of the caves containing layers of ice in Crimea. Pendulum measurements will be done by Prof. Sokoloff in Poland and West Russia ; and an Expedition of three persons will be sent out for the exploration of the Kola peninsula.

THE following details of the Brazilian Expedition, headed by Dr. von Steinen, have been received from Dr. Ehrenreich, one of the members of the Expedition. Their object was to investigate the Kuluene River, a tributary of the Xingu. Dr. Ehrenreich gives the following as the chief results of the Expedition : (1) the discovery of great Caribbean races in the centre of South America, named respectively the Bakairi and the Nahugua ; (2) the discovery of the Kanayura and Anite tribes, who still speak the ancient Tupi language, and use remarkable weapons, amongst which is the very peculiar arrow fling. Surveys of the Kuluene were made and many ethnographical specimens have been collected, forming a complete picture of the original culture of these Indians, who, even to-day, do not know the use of metal, but are still in the period of implements made of flint, bone, and fish teeth.

OUR ELECTRICAL COLUMN.

J. T. BOTTOMLEY showed that the temperature of a wire conveying electric currents varied with the air-pressures surrounding it, and that a wire which remained dull at ordinary atmospheric pressure incandesced when a moderate vacuum was obtained. M. Cailletet has been working in the opposite direction. He has shown that a current which would fuse a wire under ordinary pressure will scarcely raise it to redness when the pressure is sufficiently great. These experiments show how essential free convection as well as radiation is to the incandescence of filaments in glow-lamps, as well as to the heating of conductors.

LECHER (*Rep. der Physik*, xxiii. p. 795) has experimented on the much-vexed question of the counter-electromotive force of arc lamps, and he finds that its existence is not proved, that the observed difference of potential which is expressed by the formula $a + bl$ varies with temperature, and that it is probably due to discontinuity in the current.

CONSIDERABLE attention has lately been devoted to the potential difference between the various constituents of a voltaic cell by direct measurement, an operation facilitated by Helmholtz's capital observation that this difference between an electrode of mercury flowing in drops through a capillary tube and an electrolyte is *nothing*. The mercury thus acquires the potential of the electrolyte, and can be measured. Moser (*Beiblätter*, xi. p. 788) has thus measured the Daniell and Clark cells, and Miesler has been following it up. Thus in the Daniell cell—

$$\begin{aligned} Zn \mid ZnSO_4 &= +1{\cdot}06 \text{ volt} \\ ZnSO_4 \mid CuSO_4 &= +\ {\cdot}22 \ ,, \\ CuSO_4 \mid Cu &= -\ {\cdot}22 \ ,, \\ \text{Total PD} \ \ldots &\ 1{\cdot}06 \ ,, \end{aligned}$$

In the Grove cell—

$$\begin{aligned} Zn \mid H_2SO_4 &= +1{\cdot}06 \text{ volt} \\ H_2SO_4 \mid HNO_3 &= +\ {\cdot}36 \ ,, \\ HNO_3 \mid Pt &= +\ {\cdot}20 \ ,, \\ \text{Total PD} \ \ldots &\ 1{\cdot}62 \ ,, \end{aligned}$$

He makes the PD—

$$\begin{aligned} C \mid HNO_3 &= +\ {\cdot}38 \text{ volt} \\ C \mid H_2CrO_4 &= +\ {\cdot}62 \ ,, \\ H_2SO_4 \mid H_2CrO_4 &= +\ \ {\cdot}5 \ ,, \\ PbO_2 \mid H_2SO_4 &= +\ 1{\cdot}3 \ ,, \\ H_2SO_4 \mid Pb &= +\ \ {\cdot}9 \ ,, \end{aligned}$$

all the measurements, except that of the Grove cell, according fairly well with known and accepted measurements.

HERTZ, WIEDEMANN, AND EBERT have been experimenting on the influence of rays of high refrangibility on electrical discharges, and M. Hallwachs has been verifying their results. He finds that a well-insulated disk of zinc charged with electricity rapidly loses its charge when the rays of an arc lamp fall upon it. It is more rapid with negative than with positive charges.

PENDULUM SEISMOMETERS.

PENDULUM SEISMOMETERS are among the oldest forms of instruments employed to record earthquake motion upon a stationary plate. In 1841 crude forms of such seismometers were used to record shocks at Comrie in Scotland. The objections to the older forms of these instruments are that they are not provided with any arrangement to magnify the motion of the earth, the writing indices are not sufficiently frictionless, and the value of the records are destroyed because the pendulums almost invariably swing (see "Experiments in Observational Seismology," by J. Milne, Trans. Seis. Soc., vol. iii. p. 12). The first pendulum seismometer with which I am acquainted which has a multiplying index is the one described, constructed, and successfully employed by Dr. G. Wagener (see Trans. Seis. Soc., vol. i. p. 55). From Dr. Wagener's account of this instrument it was the inventor's intention to counteract any tendency of the pendulum bob to swing by the inertia of the multiplying index, and from his experience with the instrument, owing to frictional resistance or otherwise, it seems that even if the pendulum was set in motion it quickly came to rest.

The multiplying arrangement, or "indicating pendulum," in Wagener's instrument was a lever, which we will call *a b c*, 25 inches in length (Fig. 1) ; the upper end of this at *a* geared

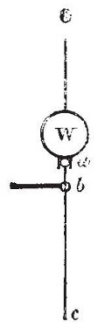

FIG. 1.

in the base of the main pendulum bob W by a ball-and-socket joint. One inch below, at *b*, a second ball-and-socket joint connected the lever with the earth. Now if *a* remained at rest, and *b*, being connected with the earth, moved backwards and forwards, a multiplied representation of this movement was produced at *c*, 24 inches lower down. The question which arises is whether W tends to remain at rest, and what effect the jointed system *a b c* exerts upon it.

Imagine that an impulse is received towards the right, so that the point of suspension of W at *o*, and the point *b*, move to the right. The tendency of W is therefore to move to the right. If the centre of oscillation of *a b c* relatively to *b* as a centre of percussion is *below b*, then *a* will move to the right and assist W in its swing ; if, however, the centre of oscillation is *above b* then W will be retarded in its motion. In Dr. Wagener's instruments the centre of oscillation was below *b*, and hence the index retarded W by its inertia and friction only. Still, the instrument was the first one where there was an attempt to use an "indicating