

(*Coturnix californica*) from California, a Scarlet Ibis (*Eudocimus ruber*) from Para, deposited; a Roan Kangaroo (*Macropus erubescens*) from South Australia, an Eroded Cinixys (*Cinixys erosa*) from West Africa, a Merrem's Snake (*Liophis merremi*) from South America, purchased; an Axis Deer (*Cervus axis*), born in the Gardens.

OUR ASTRONOMICAL COLUMN

RELATION OF ASTEROID ORBITS TO THAT OF JUPITER.—Prof. H. A. Newton, in the *American Journal of Science*, April 1886, points out that the orbits of the asteroids should have a relation to that of Jupiter. For supposing the orbits of the asteroids to be distributed in any manner whatever, provided only that they make small angles with the plane of Jupiter's orbit, the action of Jupiter would give to each orbit a motion of its node which would differ for the different orbits, and eventually the orbits would come to be distributed somewhat symmetrically about the orbit of Jupiter. And as a matter of fact, the centre of gravity of the poles of the 251 known asteroid orbits, computed as for points of equal weight, lies only 30' from the pole of Jupiter's orbit; so that the plane of Jupiter's orbit lies nearer to the mean plane of all the asteroid orbits than any single asteroid orbit does, the nearest orbits being those of Medusa and Euterpe, inclined to it 46' and 49' respectively.

In the same periodical Dr. H. Geelmuyden, of Christiania, remarks, relative to Prof. Searle's deduction that the plane of the zodiacal light has some relation to the asteroid orbits (*NATURE*, February 11, p. 350), that "the most northerly point of Jupiter's orbit has the heliocentric longitude 188°, or with 60° east elongation 178°; and for matter in the same plane, but nearer the sun, the approximation to coincidence with 160° is still greater."

THE PROPOSED CHANGE IN THE ASTRONOMICAL DAY.—M. Raoul Gautier has recently published in the *Archives des Sciences Physiques et Naturelles* of Geneva an account of the proceedings of the International Meridian Conference held at Washington in October 1884. Remarking that the resolutions passed at Washington are similar in many respects to those of the Roman Conference of the preceding year, M. Gautier goes on to point out how they differ in the important particular of the manner of reckoning universal time, and that on this account a large number of astronomers have expressed their reluctance to conform to these recommendations, more especially to the sixth resolution (which proposed that the astronomical and nautical days should be arranged everywhere to begin at mean midnight of Greenwich), the adoption of which would involve considerable changes in the astronomical and nautical ephemerides, which are used by all observers and navigators. Astronomers, M. Gautier states, as well as sailors, begin the day at noon; the former to avoid changing the date in the middle of the night during a series of observations, the latter because they find it convenient to commence the day at the moment when they observe the sun on the meridian. Why then, he asks with some force, oblige them to modify their habits, now of long standing, considering that the fourth resolution passed at the Washington Conference expressly stipulates that the universal day ought not to interfere with the use of local or other standard time where the latter appears desirable?

THE PLEIADES AS SEEN AND AS PHOTOGRAPHED.—MM. Henry have recently compared their beautiful photographic map of the Pleiades with the map so carefully laid down by M. Wolf in 1873-75, and published in vol. xiv. of the *Mémoires de l'Observatoire de Paris*, and find that the photograph possesses the following advantages over the map made by direct eye-observation. The photograph shows faint objects which are lost to the eye through their proximity to bright stars; thus the Maia nebula, and another near Electra, have been made evident, as well as details recognised hitherto only by Mr. Common in the Merope nebula. A number of faint companions have also been detected close to several of the brightest stars of the group, and in several cases where M. Wolf had detected a faint companion to a bright star, the photograph has shown that the magnitude of the former was under-estimated. Many more stars are seen on the photograph than are given in M. Wolf's map, the former showing 1421 stars, the latter 625; the aperture of the instrument employed being about the same in both cases. A yet more striking instance of the superior sensitiveness of the plate is

seen in the fact that M. Rayet, in his revision of M. Wolf's map in the pure air of Bordeaux, and with a much more powerful instrument, added only 151 stars in a region where the photograph gave 338. All the stars observed by M. Wolf are seen in the photograph but ten, and these cannot be found in the sky.

The Brothers Henry, whilst laying stress on these facts as showing how indispensable a weapon photography has now become to the astronomer, disclaim the idea of criticising M. Wolf's great work, and completely assent to his opinion, expressed in the *Comptes rendus*, vol. cii., No. 9, that the eye of the observer must continue to work at the same time as the sensitive plate; the latter can never supersede the former.

ASTRONOMICAL PHENOMENA FOR THE WEEK 1886 APRIL 25—MAY 1

(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 25

Sun rises, 4h. 45m.; souths, 11h. 57m. 51' 4s.; sets, 19h. 10m.; decl. on meridian, 13° 15' N.: Sidereal Time at Sunset, 9h. 25m.

Moon (at Last Quarter April 26) rises, 0h. 57m.; souths, 5h. 28m.; sets, 10h. 2m.; decl. on meridian, 17° 22' S.

| Planet  | Rises<br>h. m. | Souths<br>h. m. | Sets<br>h. m. | Decl. on meridian |
|---------|----------------|-----------------|---------------|-------------------|
| Mercury | 4 16           | 10 37           | 16 58         | 3 29 N.           |
| Venus   | 3 25           | 9 6             | 14 47         | 4 21 S.           |
| Mars    | 13 19          | 20 21           | 3 23*         | 11 16 N.          |
| Jupiter | 15 20          | 21 37           | 3 54*         | 2 32 N.           |
| Saturn  | 7 51           | 16 3            | 0 15*         | 22 51 N.          |

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

Occlusions 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. |  |
| 28    | ε Aquarii  | 6    | 3 38   | 4 42  | 42 288   |
| 29    | 78 Aquarii | 6    | 2 49   | 3 8   | 139 175  |
| April |            |      |        |       |  |
| 28    | 6          |      |        |       | Mercury at greatest distance from the Sun.                   |
| 29    | 17         |      |        |       | Venus at greatest elongation from the Sun, 46° west.         |
| 30    | 5          |      |        |       | Venus in conjunction with and 0° 19' north of the Moon.      |

Positions of the Comet Fabry

| 1886     | R.A.     | Decl.    | Log Δ | Brightness |
|----------|----------|----------|-------|------------|
|          | h. m. s. | °        |       |            |
| April 25 | 1 45 25  | 31 18 N. | 9.420 | 315        |
| 27       | 2 29 43  | 24 51    | 9.355 | 400        |
| 29       | 3 20 22  | 15 22    | 9.309 | 465        |

Positions of the Comet Barnard

| 1886     | R.A.     | Decl.    | Log Δ | Brightness |
|----------|----------|----------|-------|------------|
|          | h. m. s. | °        |       |            |
| April 25 | 1 39 50  | 39 53 N. | 0.047 | 67         |
| 27       | 1 38 41  | 40 19    | 0.023 | 80         |
| 29       | 1 38 8   | 40 31    | 0.997 | 94         |

The comet positions are for Berlin midnight.

Variable-Stars

| Star         | R.A.    | Decl.    | h. m.                    |
|--------------|---------|----------|--------------------------|
|              | h. m.   | °        |                          |
| R Leporis    | 4 54.4  | 14 59 S. | Apr. 26, 0 0 <i>m</i>    |
| δ Libræ      | 14 54.9 | 8 4 S.   | " 25, 3 26 <i>m</i>      |
| U Coronæ     | 15 13.6 | 32 4 N.  | " 30, 1 53 <i>m</i>      |
| U Ophiuchi   | 17 10.8 | 1 20 N.  | " 25, 1 31 <i>m</i>      |
|              |         |          | and at intervals of 20 8 |
| X Sagittarii | 17 40.4 | 27 47 S. | Apr. 28, 2 20 <i>m</i>   |
|              |         |          | May 1, 0 0 <i>M</i>      |
| W Sagittarii | 17 57.8 | 29 35 S. | Apr. 25, 21 40 <i>m</i>  |
|              |         |          | " 29, 2 25 <i>M</i>      |
| U Sagittarii | 18 25.2 | 19 12 S. | " 26, 2 30 <i>m</i>      |
|              |         |          | " 29, 2 20 <i>M</i>      |
| β Lyræ       | 18 45.9 | 33 14 N. | " 29, 21 35 <i>M</i>     |
| η Aquilæ     | 19 46.7 | 0 7 N.   | " 29, 21 40 <i>M</i>     |
| R Vulpeculæ  | 20 59.3 | 23 22 N. | " 25, <i>m</i>           |
| δ Cephei     | 22 24.9 | 57 50 N. | May 1, 0 0 <i>M</i>      |

*M* signifies maximum; *m* minimum.

Meteor Showers

The principal shower of this week is that of the *Aquarids*, radiant R.A. 326°, Decl. 2° S. It is a strong shower, visible just before daybreak, from April 29 to May 2.

GEOGRAPHICAL NOTES

THE Geographical Society of Paris held last Friday its first general annual meeting. M. de Lesseps was in the chair, and delivered an address on the Panama Isthmus and Canal. Amongst the gold medallists are MM. Capello and Ivens, the Pandit Krishna, and Alfred Marche.

M. PELLET, a French explorer belonging to the cavalry, was murdered by an unfaithful guide on his way to Timbuctu, before reaching Insalah, the capital of Tuat.

THE Portuguese Legislature has, at the initiative of the Geographical Society of Lisbon, passed an act relating to MM. Capello and Ivens, of which the following are the main provisions:—(1) They are to receive a pension of 600,000 *reis* (135*l.*) per annum each, in addition to a similar pension granted to them after their first journey; (2) exemption from all taxes; (3) the Treasury is to bear the expense of printing an edition of the account of their last African journey, of which 5000 copies will be given to them, and the copyright will be their property; (4) confirmation of the rank conferred on them, and dispensing with the condition of serving the remainder of the term in Africa in consideration of which the rank was granted to them by law. Portugal, it would thus appear, knows how to honour officially, as a nation, her sons who have done honour to her. MM. Capello and Ivens's work is in the National Press at Lisbon, and the first volume is expected to be published in two months.

THE current number (Band v., Heft 1) of the *Mittheilungen* of the German African Society is full of interesting matter. The contents are divided into two parts: (1) the reports of the Society's explorers in the Congo region, and (2) those in the Western Soudan. The first part contains Dr. Büttner's diary of his journey during July, August, and September last year. Leaving Arthington Falls on July 3, he travelled eastward to the Quango, at its junction with the Quilo, which point he reached on the 21st of the same month. He then turned south along the right bank of the Quango for seven days, as far as Muene Putu, where he stayed for a fortnight, again returning northward, and crossing to the left bank near the spot where the Quilo joins it. Leaving this on August 21, he continued down the left bank to Kiballa, whence he turned westward to Stanley Pool. A map compiled by Dr. R. Kiepert accompanies the diary, and also tables of various measurements calculated by Dr. von Danckelman. The reports from the Expedition in the Western Soudan are written by Dr. Flegel (from Bakundi, on the Tarabba) and Dr. Semon.

THE last number of the *Mittheilungen* of the Geographical Society of Vienna, like so many similar publications just now, is mainly devoted to African geography. It contains, with a description, routes, &c., a map of the neighbourhood of Ango-Ango, by Herr Baumann, a member of Dr. Lenz's Austrian Congo Expedition. The topographical material was collected during a stay at Ango-Ango, and was put together in Vienna. Two further letters from Dr. Lenz are also published: the first describes the journey from Ngombe to Stanley Pool, and the second the journey to the Equator Station on the Upper Congo. It is satisfactory to learn that the Expedition reached this point in excellent health, and that the Free State officials gave it every assistance. The only other paper in the number is the conclusion of Dr. Diener's contribution to the geography of Central Syria. At the end he confesses that it is at present impossible to say whether the physical features of a great part of this region have altered since the days of the Romans. There are facts, historical, climatic, and geographical, which tend in favour of both sides, and the problem is one for solution in the future.

ACCORDING to a recent communication of M. Venukoff to the Geographical Society of Paris (to which we have already referred), the results of a survey of the basin of the Neva, executed in 1884-85, show that hitherto the levels generally accepted by geographers here have been totally incorrect. The following is a comparison of the levels now ascertained with those given by M. Reclus in his "Géographie Universelle" for Lakes Ladoga, Onega, and Ilmen:—

|        |     |             |     |           |
|--------|-----|-------------|-----|-----------|
|        |     | New Survey  |     | M. Reclus |
| Ladoga | ... | 5'01 metres | ... | 18 metres |
| Onega  | ... | 34'97 "     | ... | 72 "      |
| Ilmen  | ... | 17'97 "     | ... | 82 "      |

These figures, and others which might be quoted, show that the region watered by the Neva and its tributaries is much lower than was generally supposed. The new figures refer to the normal zero of Cronstadt, which is itself 0'66 m. above the level of the Baltic at Revel. The absolute heights of the lakes is thus slightly increased, but still the differences between the old and the new figures are very great. As the results of the new survey appear unquestionable, the former hypsometric details respecting the basin of the Neva must be dismissed as wholly incorrect.

THE French Topographical Society proposes that an International Exhibition of Topography should take place in the Palais de l'Industrie next year, under the patronage and with the assistance of the Government. The Committee of Organisation which has been appointed has addressed a circular to French topographers, geologists, geographers, and explorers, asking for their co-operation. The Society, the circular says, has for its aim the popularisation of the science of topography, especially by means of gratuitous lectures, and it is anticipated that an exhibition will give a spur to this work.

SOME RESULTS OF OBSERVATIONS WITH KITE-WIRE SUSPENDED ANEMOMETERS UP TO 1300 FEET ABOVE THE GROUND IN 1883-85

SINCE I had the honour of reading a paper on the first series of observations taken in 1883-84 before the Association in Montreal last year, I have made twenty-five fresh observations at heights above the ground varying from 300 to about 1300 feet, or double the greatest height before attained. I had hoped in have been able to make a greater number and variety of observations, but a pressure of private and other work has stood to the way.

Since, however, in ten of the new observations the upper anemometer was suspended at a height of over 1000 feet above the ground, or 1500 feet above the sea, I trust the results may be thought sufficiently novel and valuable to merit the brief discussion to which I have subjected them.

In dealing with the observations I have included fifteen of those made in 1883-84, and have thus been able to utilise forty observations in all. As the observations were intentionally made as nearly as possible at certain desired heights, so as to afford a regular progression upwards in the scale of height, I have been able to arrange forty-two pairs of observations at two different levels in six groups.

In order to present the results in a form in which they can be readily compared, as well as to exhibit the law of change of the velocity with the height, I have computed for each observation the value of the corresponding exponent in the empirical formula  $V = \left(\frac{H}{h}\right)^x$ , where  $V$ ,  $v$ ,  $H$ ,  $h$ , are the velocities and heights of the upper and lower instruments respectively. The several groups, together with their corresponding heights, mean velocities, and exponents, are given in the following table:—

TABLE I.

| Group | No. of observations | Mean height of instrument above ground, in feet |       | Mean height of both | Mean velocity at both heights in feet per minute | Mean upper and lower velocities |       | Mean value of $x$ |
|-------|---------------------|---|-------|---------------------|--|---------------------------------|-------|-------------------|
|       |                     | upper   | lower |                     |  | Upper                           | Lower |                   |
| * 1   | 7                   | 250   | 102   | 176                 | 1395   | 1617                            | 1174  | 0.372             |
| 2     | 3                   | 322   | 128   | 225                 | 1955   | 2232                            | 1679  | 0.307             |
| * 3   | 8                   | 407   | 179   | 293                 | 1545   | 1705                            | 1385  | 0.275             |
| 4     | 5                   | 549   | 252   | 400                 | 1940   | 2107                            | 1773  | 0.237             |
| 5     | 9                   | 795   | 481   | 638                 | 2074   | 2192                            | 1957  | 0.250             |
| 6     | 10                  | 1095  | 767   | 931                 | 2166   | 2236                            | 2096  | 0.194             |

The general and obvious conclusion to be drawn from this table, as well as from the individual observations (in which a reverse case has never occurred), is that the velocity of the wind

\* These two groups comprise observations made in 1883-84 only. The other groups those made in 1884-85 only.