A SHOCK of earthquake was felt in the district of Beira Alta on the 11th inst.

THE additions to the Zoological Society's Gardens during the past week include a Patas Monkey (*Cercopithecus patas*), from West Africa, presented by Mr. Thomas Baily; a Yellow Baboon (*Cynocephalus babouin*), from West Africa, presented by Capt. J. Henderson Smith, R.A.; two Goshawks (*Astur palumbarius*), European, presented by the Baron d'Epremesnil; a Hobby (*Falco subbuteo*), caught in the Indian Ocean, presented by Dr. Rivis Mead; two Java Sparrows (*Padda oryzivora*) from Java, four St. Helena Seed-Eaters (*Crithagra butyracea*), from South Africa, presented by Mrs. Conrad Pile; two Sing-sing Antelopes (*Cobus sing-sing* ♂ ♀), from West Africa, received in exchange; a Woodcock (*Scolopax rusticula*), European, purchased; an Ocelot (*Felis pardalis*) from America, a Bactrian Camel (*Camelus bactrianus* ♀) from Central Asia, two White-backed Piping Crows (*Gymnorhina leuconota*) from South Australia; a Banded Parrakeet (*Palæornis fasciatus* ♂), from India, deposited; a Vinaceous Turtle Dove (*Turtus vinaceus*), bred in the Gardens.

## *OUR ASTRONOMICAL COLUMN*

THE INFLUENCE OF ASTIGMATISM IN THE EYE ON ASTRONOMICAL OBSERVATIONS.—Prof. Seeliger has published, in the *Abhandlungen der k. bayer Akademie der Wiss.*, ii. Cl., xv. Bd., 3 Abth., an interesting paper on this subject. The paper is divided into four sections. The first part treats of certain details connected with the refraction of light which are used in the subsequent investigations. The second part gives the theory of the formation of images in an astigmatic eye, and its application to measures made with an altitude instrument. In the third and fourth parts the author treats of the application of his theory to the heliometer and wire-micrometer respectively. It appears, from Prof. Seeliger's researches, that this malformation in the eye, which is far from uncommon, exerts a larger influence on astronomical measurements than is commonly supposed. Thus, he shows that a systematic error in a series of observed declinations amounting to 0″·26 may very well be due to it. And it appears that the discordances in observed position-angles of double stars, depending on the inclination of the line joining the components to the vertical, with which the measures of some observers are affected, may in part be referred to the same cause. Prof. Seeliger's paper is one which may be profitably studied by those who aspire to the attainment of greater accuracy in astronomical observations.

THE KALOCSA OBSERVATORY.—Dr. C. Braun has recently published a report of this Observatory, founded by Cardinal Haynald, Archbishop of Kalocsa. The equipment of the Observatory consists of a refractor, by Merz, of 7 inches aperture; another of 4 inches; a transit by Cooke, aperture 2·3 inches; an altazimuth by Breithaupt, of Cassel; a chronograph, three clocks, and a chronometer; several spectroscopes, of which a large solar spectroscope with automatic adjustment to minimum deviation is the principal; a star photometer by Zöllner, and a spectro photometer by Vogel and Glan. The two most important works effected at the Observatory have been the determination of the geographical position of the Observatory, and the observation of sunspots. A special value attaches to the former, as hitherto the position of no place in Hungary had been fixed by direct astronomical methods. The latitude of the standard pillar of the Observatory was determined by geodetic observations to be 46° 31′ 41″·92; the astronomical methods made it 0″·07 greater. The longitude was found to be 1h. 15m. 54·343s. east of Greenwich. The observations of sunspots extend from May 14, 1880, to January 31, 1884, and form a useful record of an interesting period. The method of projection was employed in observing; the observations were reduced first by means of a projection of the sun, and secondly by calculation. In the latter method Dr. Braun employed an instrument of his own device, which he terms a trigonometer, for the direct solution of spherical triangles. From his observations Dr. Braun deduces the following expression for the velocity of rotation:—$865°{\cdot}33 - 209°{\cdot}86 \sin^2 \lambda$. He also shows the downward tendency in latitude of the mean spotted area, and points out the curious partial effort at recovery which shows itself at tolerably regular intervals. The observations of each rotation are grouped together and given in short tables, and diagrams similar to Carrington's, showing the spots of each rotation in shape and position, are also added. The volume concludes with full descriptions of a number of ingenious instrumental devices, some actually employed at Kalocsa, others still only projected. Amongst these is an ingenious transit micrometer for eliminating personal equation in the observation of transits.

ζ CASSIOPEIÆ.—The *Sidereal Messenger* reports, on the authority of Prof. Colbert of Chicago, that this star appeared to increase its brilliancy by quite half a magnitude on the night of August 20. The most remarkable point of the observation was the shortness of duration of the phenomenon: for, about half an hour after it was first noticed, the star began to return to its normal magnitude. It will be interesting to learn if the change was observed elsewhere.

NEW MINOR PLANETS.—Prof. Peters discovered a new minor planet, No. 261, on October 31, and Herr Palisa two—Nos. 262 and 263—on November 3.

COMET FINLAY.—The following ephemeris for Berlin midnight is in continuation of that given in NATURE for November 4 (p. 17):—

| 1886 | R.A. h. m. s. | Decl. ° ′ | log *r* | log Δ |
|---|---|---|---|---|
| Nov. 16 | 19 59 51 | 23 22·7 S. | 0·0697 | 0·0899 |
| 18 | 20 8 42 | 22 53·7 | | |
| 20 | 20 17 38 | 22 22·4 | 0·0689 | 0·0874 |
| 22 | 20 26 37 | 21 48·8 | | |
| 24 | 20 35 39 | 21 13·0 S. | 0·0693 | 0·0856 |

COMET BARNARD.—The following ephemeris for Berlin midnight is given by Dr. E. Lamp (*Astr. Nachr.*, No. 2753):—

| 1886 | R.A. h. m. s. | Decl. ° ′ | log *r* | log Δ | Brightness |
|---|---|---|---|---|---|
| Nov. 18 | 13 16 59 | 13 12·4 N. | 9·9433 | 0·0637 | 10·8 |
| 20 | 13 31 51 | 14 5·9 | 9·9306 | 0·0485 | 12·3 |
| 22 | 13 47 57 | 14 58·3 | 9·9180 | 0·0340 | 13·9 |
| 24 | 14 5 20 | 15 47·7 | 9·9055 | 0·0207 | 15·7 |
| 26 | 14 24 2 | 16 32·5 | 9·8934 | 0·0089 | 17·5 |
| 28 | 14 43 57 | 17 10·3 | 9·8817 | 9·9990 | 19·3 |

The brightness at the time of discovery is taken as unity.

GOULD'S "ASTRONOMICAL JOURNAL."—The first number of the new issue of this journal appeared on November 2. It contains the following papers:—On the light-variations of Sawyer's variable in Vulpecula, by S. C. Chandler, Jun., in which the elements of the star are given as Max. = 1885 Nov. 2d. 20h. 35m. G.M.T + (4d. 10h. 29·0m.) E. The minimum is 1·060d. earlier. The rapidity of the rise is a striking characteristic of this star.—A new short-period variable, by E. F. Sawyer. The star, 57 Sagittarii, has a period of not more than 6 days; the variation is from 5·6 mag. to 6·6. Place for 1875·0, R.A. 18h. 14m. 2s.; Decl. 18° 54′·8.—Elements and ephemerides and observations of Comets Finlay and Barnard, by Profs. Winlock, Boss, and Frisby.—Observations of U Ophiuchi, by E. F. Sawyer; and the first part of a paper on the lunar theory, by Prof. Stockwell.

## *ASTRONOMICAL PHENOMENA FOR THE WEEK* 1886 *NOVEMBER* 21–27

(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 November* 21

Sun rises, 7h. 31m.; souths, 11h. 46m. 3·1s.; sets, 16h. 1m.; decl. on meridian, 19° 58′ S.: Sidereal Time at Sunset, 20h. 3m.

Moon (New on November 25) rises, 1h. 37m.; souths, 8h. 4m.; sets, 14h. 18m.; decl. on meridian, 1° 57′ N.

| Planet | Rises h. m. | Souths h. m. | Sets h. m. | Decl. on meridian ° ′ |
|---|---|---|---|---|
| Mercury ... | 9 30 ... | 13 11 ... | 16 52 ... | 25 2 S. |
| Venus ... ... | 7 12 ... | 11 35 ... | 15 58 ... | 18 46 S. |
| Mars ... ... | 10 33 ... | 14 18 ... | 18 3 ... | 24 32 S. |
| Jupiter... ... | 4 15 ... | 9 34 ... | 14 53 ... | 8 45 S. |
| Saturn... ... | 19 34* ... | 3 36 ... | 11 38 ... | 21 22 N. |

* Indicates that the rising is that of the preceding evening.