

three Grass Snakes (*Cyclophis vernalis*), a Hog-nosed Snake (*Heterodon platyrhinos*) from Montreal, received in exchange; two Patagonian Cavies (*Dolichotis patagonica*), two Ypecaha Rails (*Aramides ypecaha*), bred in the Gardens.

OUR ASTRONOMICAL COLUMN.

NOVEMBER METEORS.—With the July number of *Monthly Notices R.A.S.* a circular is issued by G. Johnstone Stoney, calling the attention of astronomers to the approach of the great secular maximum of the Leonids, which is due about 1899 or 1900. It is probable that this swarm was drawn into the solar system by the planet Uranus about February or March A.D. 126, and careful observations during the next few years may furnish materials for confirming or rejecting this hypothesis. Photography should be employed as widely as possible, and wherever practicable the time of appearance of each meteor recorded. Accurate simultaneous observations from different stations will be of exceptional use. The radiant-points and times of apparition of all meteors should be exactly noted, commencing a few nights before, and continuing some nights after, November 14 and 15.

PLUMB-LINE DEVIATIONS.—M. Messerschmitt, who has been for some time engaged in the determination of latitude and azimuths of a series of points in the Swiss Triangulation, has communicated (*Ast. Nach.*, No. 3365) the results of his most recent investigations. It may be recalled that M. Messerschmitt's first determinations were made in West Switzerland, and these were followed by further researches in the north of the country, which corroborated his previous results. The present paper is concerned with observations made on a line drawn approximately north and south through the centre. Collecting his results into a table showing the difference between geodetic and astronomical latitude, and arranged in order of increasing distance from the equator, a systematic deviation from the vertical is clearly shown. In the midst of the mountains (around Andermatt for example) these deviations are quite small. Going south they increase rapidly, and attain a negative maximum of 20" (astronomical—geodetic) towards Lugano. A positive maximum occurs about Goschonen, the entrance to the Gotthard Tunnel; and still further north, the difference diminishes again, and changes sign about the latitude of Zürich. Schaffhausen shows again the position of negative maximum. The position of the mountain chains generally explains these variations.

An investigation, founded on these deviations of the plumb-line, of the form of the surface of the earth for a meridian length of about 200 km. through the Gotthard district, discloses the fact that the ellipsoid sinks everywhere below the geoid. Selecting as a zero point that position where no deviation from the vertical exists (47° 15' lat.), the greatest difference between the two surfaces occurs near Airole (the southern exit of the tunnel), where it amounts to nearly five metres. Going southwards from this point the surface sinks gradually, and approaches the ellipsoid below the valley of the Po is reached.

THE HAMBURG OBSERVATORY.—Prof. Rumker's report of the observatory work during the year 1895, shows that the activity of the various departments is fully maintained. The observations with the equatorial have mainly consisted in deriving the positions of small planets and comets, and of the fainter stars with which the nebulae, whose places have been published in a communication from the observatory, have been compared. With smaller instruments attention has been given by Dr. Hänig to variable stars and occultations by the moon. With the meridian instrument, in addition to observations required for the accurate distribution of time signals, arrangements have been made for observing stars in the degree 80–81 N. Decln. down to 9.3 mag. In addition to this varied work, the attention of the staff has been called by Dr. Auwers and others to discrepancies between the places of stars in the Hamburg catalogue, and those recently obtained in the "Astronomischen Gesellschaft" zone catalogue. This has necessitated much searching of old records, and in some cases the detection of errors, which will be published in a communication from the observatory.

THE DUNSINK OBSERVATORY.—The seventh part of the astronomical observations and researches made at Dunsink, and published under the direction of Prof. Rambaut, contains the meridian places of 717 stars, of which upwards of 2000 observa-

tions have been made. These stars have been selected on account of suspected large proper motions, and the observations, interrupted as they have been from several causes, have been spread over eleven years. But, nevertheless, the accuracy maintained throughout is of a very high degree. From an examination of the separate results, the probable errors in R.A. and Declination are, respectively, $\pm 0''.037$, and $\pm 0''.505$. This error is probably increased by the uncertainty of the proper motion in many cases, and does not fully express the accuracy of the work. The Pistor and Martin's meridian circle, with which the observations have been made, has been frequently reversed in the course of the work, and the determination of latitude, on which great care has been bestowed, is slightly different in the two positions. With Clamp West the resulting latitude is $53^{\circ} 23' 13''.05$, and with Clamp East three tenths of a second less. The value used in the final reduction is $53^{\circ} 23' 13''.00$, and the results, it is believed, coincide very closely with Auwers' fundamental system. The cause of this systematic difference in the latitude, however, has not been satisfactorily explained.

OBSERVATORY OF MOSCOW.—The last issue of the *Annals* of this Observatory (series 2, vol. iii. part 2, 1896) contains several papers of general interest. The director, W. Ceraski, contributes the following articles: (1) "Photometry of the star cluster χ Persei," in which he gives the measures of the magnitude of seventy stars of the group, determined with a Zollner photometer on a 10-inch refractor. One star he finds to be variable, and recommends its further study. (2) "Observations of eclipses of Jupiter's satellites without photometric appliances," using eye estimates of relative magnitude compared with some neighbouring star of known brightness. (3) "On the temperature of the sun," in which he gives the inferior limit to be about 3500° C. (4) "A new method for the electrical comparison of pendulums."—P. Sternberg discusses the photographs he obtained during the transit of Mercury on May 9, 1891, and also contributes an important description of his determination of the variation of latitude at Moscow.—B. Modestov gives a full description of the calculation of double-star orbits by the methods of Kowalski and Encke respectively.—S. Blajko, as the result of thirteen photometric measures of the magnitude of Mira Ceti during the winter of 1894–5, finds evidence of a secondary maximum in its light curve, occurring about a month previous to the highest maximum, the magnitudes at the secondary and principal maxima being about 3.5 and 3.16 respectively.

THE SOLAR ECLIPSE OF APRIL 16, 1893.

M. DESLANDRES has now issued his report on the work accomplished by the French expedition to Fundium, Senegambia, for observations of the total solar eclipse of April 16, 1893. Some of the results obtained have already been made known, and these are now brought into connected order and discussed. A full account is also given of the general objects and organisation of the expedition. The programme decided upon included the photography of the corona, a photographic study of the coronal spectrum, especially in the ultra-violet, and a spectroscopic study of the movements of the corona.

The report is of special importance in view of the approaching eclipse, for the reason that reference is made to several points which may serve as a guide in future operations. For example, M. Deslandres' experience indicates that for the corona pictures plates of moderate sensitiveness give better results than the plates of greater rapidity. Another practical suggestion is that at least two cameras should always be employed in the search for an intra-mercurial planet; M. Deslandres found it impossible to determine whether certain spots on the single plate which he obtained represented stars or photographic defects.

The general results relating to the coronal spectrum are thus stated: (1) The continuous spectrum of the corona, which forms the greater part of its light, is most intense on the red side, relatively to the spectrum of the disc, and the difference appears to become greater as the point considered is further removed from the photosphere. (2) The spectrum of dark lines, under very favourable conditions, did not appear at 5' from the sun's limb; at this height the light diffused by the coronal particles is still too feeble with respect to their own light. (3) The luminous gases of the corona, indicated by the fine lines, have not the same intensity or composition in different parts of