

total value is made for the benefit of the Office. The valuation of European plants is settled by the director, who is willing to receive Vascular Cryptogams and Bacteria in addition to the groups mentioned above. Descriptions of some new species of Fungi are published in the current Catalogue.

DR. RICHARD HERTWIG'S "Lehrbuch der Zoologie," which was reviewed in NATURE in June 1893 (vol. xlvi. p. 173), has reached a fourth edition. The section on the Sporozoa has been revised, and some additions have been made in the section on the Vertebrates. The work is published by Gustav Fischer, Jena.—Messrs. Blackie and Son have published what is nominally a fourth edition of Mr. Jerome Harrison's "Text-Book of Geology"; but the additions and changes are so numerous that the work is practically a new one, the type having been entirely re-set. The book is "intended as an introduction to the study of rocks and their contents," and it will, we believe, be the means of adding to the number of outdoor students of geology, notwithstanding the fact that it belongs to the class of examinational text-books. The text is clearly printed, and the illustrations are numerous and generally instructive.—Messrs. J. and A. Churchill have published the second edition of "A Manual of Botany," by Prof. J. Reynolds Green, F.R.S. Very few changes have been made in the work.

WE have upon our table a number of important geological memoirs and reports lately published. Geologists will be glad to have their attention drawn to these publications. From the Geological Survey of India we have received the first memoir of a new series (Series xvi.) of the Palæontologia Indica, intended to comprise a description of the fossils found in Baluchistan. The first part of the new series comprises the Jurassic Fauna of Baluchistan, and in the present memoir, Dr. Fritz Noetling deals with the fauna of the Kellaways of Mazár Drik. The geology of the Bellary district, Madras Presidency, is described by Mr. R. Bruce Foot in vol. xxv. of the memoirs of the Survey; and the geology of Hazara and the Black Mountain is dealt with by Mr. C. S. Middlemiss in vol. xxvi. of the same memoirs. Both of these papers are full of details referring to the geology of the district surveyed by the authors, and each of them throws light upon problems of more than local interest.

A REPORT on explorations in the Labrador Peninsula along the East Main, Koksoak, Hamilton, Manicuegan, and portions of other rivers, made by Mr. A. P. Low in 1892-95, has been published by the Geological Survey of Canada (Part i., Annual Report, vol. viii.). This is an interesting account of exploration, containing much new information in regard to the geology and natural history of the Labrador Peninsula. A concise and readable summary of the observations made, and the conclusions reached from them, takes up one part of the report, and the remainder consists of detailed descriptions of the routes, the rocks noted, and other observations for the use of future explorers in the region traversed. Lists and notes on the fauna and flora of Labrador, and a meteorological record are printed as appendices to the report. We have also received Part R of the same annual report (vol. viii.) containing an account of the work carried out in the Laboratory of the Survey during 1896, by Dr. G. C. Hoffmann. In this report reference is made to several interesting and, in some instances, valuable minerals, not before known in Canada. Two other recent publications of the Geological Survey of Canada are: "Report on the Country between Athabasca Lake and Churchill River," by Mr. J. Burr Tyrrell, assisted by Mr. D. B. Dowling; and "Palæozoic Fossils," by Mr. J. F. Whiteaves. The latter paper is the third part of the third volume on Palæozoic Fossils now in course of publication by the Canadian Survey.

THE twenty-second and twenty-third annual reports of the Geological and Natural History Survey of Minnesota, referring to the work done during 1893-94, have been received from the State Geologist, Mr. N. H. Winchell. The latter report contains a paper by Mr. Winchell on "The Origin of the Archean Greenstones." The paper is a critical examination of a paper by Dr. G. H. Williams, tending to the conclusion that the greenstones, as a body, may be referred to dynamic metamorphism of massive eruptive rocks. Mr. Winchell believes "that the great bulk of the 'greenstones' as an Archean terrane, ought to be classified as pyro-clastic, *i.e.* that they originated from eruptive agencies, as tuff and all kinds of volcanic débris, sometimes very coarse, and were distributed and somewhat stratified by the waters of the ocean into which the materials fell."

THE additions to the Zoological Society's Gardens during the past week include two Vervet Monkeys (*Cercopithecus lalandii*, ♂ ♀), two Crested Porcupines (*Hystrix cristata*) from South Africa, presented by Mr. J. E. Matcham; a Brown Bear (*Ursus arctos*), European, presented by Mr. William Forbes; a Black-necked Grackle (*Gracupica nigricollis*) from China, presented by Mr. B. H. Jones; a Ring-necked Parrakeet (*Palæornis torquata*) from India, presented by Mrs. Doyne; five Common Chameleons (*Chamaleon vulgaris*) from Egypt, presented by Dixon Bey; a Ring-tailed Lemur (*Lemur catta*), two Black-headed Lemurs (*Lemur brunneus*) from Madagascar, two Korin Gazelles (*Gazella rufifrons*, ♂ ♀) from Senegal, a Fennec Fox (*Canis cerdo*), six Egyptian Foxes (*Canis niloticus*), a Pale Genet (*Genetta senegalensis*), three Leith's Tortoises (*Testudo leithi*) from Egypt, a Harnessed Antelope (*Tragelaphus scriptus*, ♀) from West Africa, deposited; a Californian Sea Lion (*Otaria californiana*, ♀) from the North Pacific Ocean, two Ostriches (*Struthio camelus*, ♂ ♀) from Africa, purchased; a Long-legged Jackal (*Canis variegatus*) from North-east Africa, three North African Jackals (*Canis anthus*), a Striped Hyæna (*Hyæna striata*) from Egypt, received in exchange; an Eland (*Orias canna*, ♂), a Patagonian Cavy (*Dolichotis patachonica*), born in the Gardens.

OUR ASTRONOMICAL COLUMN.

THE LATITUDE OF THE ROYAL CATANIA OBSERVATORY.—The Italian Royal Geodetical Commission have just published a detailed account of the determination of the latitude of the Royal Astronomical Observatory of Catania by Dr. T. Zona, of the Royal Observatory of Palermo. All the observations were made during the year 1894, and the method adopted was that of Talcott. The pairs of stars used amounted to twenty-three in number, and their places were obtained from each of the three separate catalogues, viz. Respighi, Bradley-Auwers, and the British Association Ten-Year.

Dr. Zona has not attempted to amalgamate the positions of each star as given by the three separate catalogues, by using a mean value, but has preferred to determine three values for the latitude, basing each on the separate catalogue star positions for the pair employed.

In this way computation has given for the final values of the latitude, based on the star positions of each catalogue, the following results:—

Respighi	...	...	...	37° 30' 13"·239 ± 0"·115
Bradley-Auwers	...	...	...	13'·216 ± 0"·132
Ten-Year	...	...	...	13'·302 ± 0"·108

The final value adopted for the latitude of the transit instrument of the observatory was

$$37^{\circ}30'13''\cdot254 \pm 0''\cdot068.$$

PHYSICAL AND MICROMETRICAL OBSERVATIONS OF VENUS.—The amount of detail visible on the disc of Venus is not so very prominent, according to the observations recently recorded by Prof. Barnard (*Astrophysical Journal*, vol. v. No. 5). Those observers who up to the present time have only made out dusky

patches on her surface will feel satisfied that this well-known observer has not yet detected such tracings as have been put before us by Lowell. Venus was frequently observed by him with the 12-inch refractor of the Mount Hamilton Observatory during the years 1888-95, but as he says he "never could (with but one exception) satisfactorily see the markings. Vague indefinite spots were often visible, but it was not possible to see them well enough to identify them for rotational purposes." With these facts before us, it is not then surprising that the observed periods of the planet should vary from twenty-three or twenty-four hours to 225 days. The exceptional case of good seeing mentioned above was "when the air was thick with smoke and dust. . . . I was struck with the remarkably perfect definition. There was not the slightest tremor. The markings on the surface of the planet were distinctly seen, though they were difficult and very delicate." The drawing which accompanies Prof. Barnard's description shows the crescent of Venus with four large hazy patches very much foreshortened in their position near the limb.

To continue his series of measurements of the diameters of all the planets with the 36-inch, Prof. Barnard, in May, June and July of 1895, undertook that of Venus. The mean of all his measures reduced to unit distance gave a diameter of  $17''\cdot397$ , corresponding to an actual diameter of 7826 miles.

This value seems to be very satisfactory when compared with the mean of all previous determinations, as will be seen in the following table.

Hartwig ... Breslau heliometer ... ..	17 <sup>''</sup> 67
" ... Reduction of Oxford measures ... ..	17 <sup>''</sup> 582
" ... Double image observations by Kaiser ... ..	17 <sup>''</sup> 409
" ... Nine measures in Bahia-Blanca ... ..	17 <sup>''</sup> 406
Peter ... Two measures in Bahia-Blanca ... ..	17 <sup>''</sup> 216
Küstner ... Two measures in Punta Arenas ... ..	17 <sup>''</sup> 312
Auwers ... Measures during transit ... ..	16 <sup>''</sup> 801
Ambronn... Göttingen heliometer ... ..	17 <sup>''</sup> 711
	Mean 17 <sup>''</sup> 389
Barnard... 36-inch Lick refractor... ..	17 <sup>''</sup> 397

NEBULÆ UNRECORDED IN CATALOGUES.—In the current number of the *Observatory*, Dr. Roberts gives a list of several nebulae which have not found a place in catalogues, but which have been recorded on the plates used in his photographic survey. These photographs were taken with his fine 20-inch reflector at Crowborough, and a comparison between these and the recorded places of nebulae in the "New General Catalogue," and the "Index Catalogue," by Dr. Dreyer, has been fruitful of many discoveries. Of the seventeen new nebulae, we extract the following description of the largest:—

Region of  $\mu$  I. 157 Trianguli, N.G.C. 672; Nova, R.A. 1h. 39m. 39s. N.P.D.  $63^{\circ} 22' 3''$ .—It is nearly as large and prominent as  $\mu$  I. 157, and distant from centre to centre  $8'$  only; nucleus consists of six faint stellar condensations forming a straight line in the direction south, following to north preceding, and there are six or seven very faint condensations of nebulosity near the preceding margin; 15th mag. star on the north preceding margin, and a 16th mag. star at the south following end of the nucleus, 1896 November 29.

It is remarkable that this object should have escaped detection by the many keen-eyed observers who have examined the nebula  $\mu$  I. 157, which is only four minutes of arc distance from it; and it appears to me that we are justified by the evidence in inferring that this nebula has come into the state of visibility during the past half-century. Lord Rosse, in 1896, made several observations of the nebula adjoining, but does not refer to this one. It is remarkable also that the nuclei of the two nebulae are straight lines of faint nebulosity stars immersed in nebulosity, and they are so clearly depicted on the photograph that I think they should be visible to the eye by the aid of telescopic power.

Dr. Roberts finds further, by examining his negatives, that two classes of stars, which he terms "faint" and "small," attract notice. The former have small bright nuclei surrounded by nebulosity, and are quite distinct from the latter, which appear as small round spots without a nucleus. These, he states, would, if they were classified, come under the heading, "small circular nebulae with small bright stellar nuclei."

HARVARD COLLEGE OBSERVATORY ZONE OBSERVATIONS.—Volume xxxvi. of the *Annals of the Astronomical Observatory of Harvard College* contains the journal of the zone observations of stars between  $49^{\circ} 50'$  and  $55^{\circ} 10'$  of North Declination. These

observations were made with the meridian circle during the ten years 1875 to 1885 by Mr. William Rogers, under the direction of the successive directors Joseph Winlock and E. C. Pickering. The present volume completes the journal begun in volume xxxv., and in this review all doubtful cases have been re-examined.

### THE ROYAL OBSERVATORY, GREENWICH.

THE Astronomer Royal presented his annual report on Saturday last to the Board of Visitors of the Royal Observatory, Greenwich. Among the numerous guests were many astronomers and men of science, who inspected the buildings and instruments, especially those which have been erected since the visitation last year, namely, the Thompson equatorial and the new altazimuth. The following extracts from the report contain a brief *résumé* of the year's work.

#### Buildings.

The building of the north wing and central dome of the Physical Observatory was finished in September 1896, with the exception of the vane on the central dome, which was completed last March.

An observing floor and gallery have quite recently been fitted up in the dome to facilitate work with the new Thompson equatorial, now mounted there. The completion of the Physical Observatory by the building of the east and west wings has been further delayed, though provision was made for commencing the work in the last financial year.

#### The Transit Circle.

With regard to this instrument, it has been found that the apparent correction for discordance between the nadir observations and stars observed by reflexion has been gradually increasing yearly, the difference for the present year being  $-0''\cdot44$ , the greatest negative value recorded since 1888.

The increase in this discordance in 1896, following on the systematically negative values since 1891, led to a re-examination of the screws of the microscope-micrometers, of the screw of the telescope-micrometer, and of the errors of those divisions of the circle which are used in observations of the nadir, with a view to the discovery of the source of this discordance.

The microscope-micrometers showed signs of wear, but the reversal of three of the screws has successfully eliminated the effect of wear from the mean of the six microscopes.

#### The New Altazimuth.

This instrument was erected in May 1896, but it was not practicable to make observations with it till the completion of the observing floor in September. It was then found that there were serious discordances in the readings of the circles under the different microscopes, depending on the direction in which the instrument was last turned. Experiments indicated flexure in the axis, which has now been corrected by stiffening the axis by means of a strong diaphragm of special form fitted in the central part of the axis. The friction-rollers for taking the weight of the instrument have also been modified, the position being changed to bring them close to the pivots, and a system of levers has been substituted for springs. These changes reduced the discordances greatly in amount. Quite recently Mr. Simms has discovered a cause of error, arising from a tendency in the pivots to act as a screw, a longitudinal force being thus introduced, its direction depending on the direction in which the telescope is turned. This force had the effect of slightly moving the iron standards carrying the bearings and the microscopes, thus changing the position of the microscopes relatively to the graduated circles. This action of the pivots was found to arise from the method adopted in grinding them of giving a helical twist to the grinder, and it was cured by a few circular turns of the same tool.

#### The Thompson Equatorial.

This new instrument, presented by Sir Henry Thompson, forms a handsome addition to the Observatory, and it has been mounted in the Physical Observatory under the Lassell Dome. Its erection there was commenced early in November, but it was not ready for use till April, and there are still certain accessories which have to be supplied. The adjustment of the polar axis and of the 26-inch object-glass were at once taken in