

well known British species, mark the Ordovician age of certain black slates; a new species of *Receptaculites* comes from Silurian rocks, while some Devonian fossils are re-described.

THE frequent association of the acid igneous rock granophyre with the basic gabbro has attracted the attention of many geologists, and two explanations have been offered—(1) that the two rocks have been differentiated, during slow consolidation, out of a uniform magma of intermediate composition; and (2) that one of them represents the unaltered original magma, while the other has been formed by part of it absorbing and assimilating foreign material. Mr. R. A. Daly, of the International Boundary Commission, describes (*Amer. Journ. Sci.*, 4th ser., vol. xx., No. 117, September) cases he has observed in British Columbia and elsewhere which appear to him to prove conclusively the second theory to be correct. Gabbro-sills, intrusive in a quartzite, have been converted into an acid rock along the upper contact by absorption of silica from the quartzite, the other rock constituents retaining very nearly their original proportions.

WE have received the report on rainfall registration in Mysore for 1904 prepared by Mr. J. Cook, director of meteorology in that province; it contains valuable statistics relating to the seasonal and geographical distribution over that extensive area. The number of Government stations is now 201; but with regard to a few of the stations the director has to lament culpable inattention on the part of the officials concerned, who have allowed the gauges to lie for months without being suitably fixed. Among the heavy falls in twenty-four hours may be specially mentioned 20.67 inches in June, in the Shimoga district, and 13.70 inches in July, in the Kadur district. The geographical distribution is plainly exhibited by two maps, one for the year 1904, and another showing the average for thirty-five years, 1870-1904; the abnormality of the distribution owing to the failure of the north-east monsoon rains is strikingly represented. The thirty-five years' average for the whole province is 37.12 inches; the average for the Kadur district is 74.26 inches, and for the Chitaldrug district 21.46 inches.

PROF. STOUT'S paper on "Things and Sensations," read to the British Academy in May, has been published by Mr. Henry Frowde. Prof. Stout maintains that the problem for philosophy is not, Is there an external world? but *What* is the external world, and how do we know it? He points out that in one aspect the thing and its sensible appearance are regarded as entirely one, and in another aspect as separate and independent. He rejects the solution that the sensible appearance is merely the thing itself appearing, examines hastily but suggestively the views of Locke and Kant, and comes to the conclusion that there is an actual existence other than sensation. This he calls the independent not-self, and he describes it as not unknowable and as not matter, but only one constituent of the complex unity which we call matter. In the concluding section of his admirable essay he argues that we must apprehend this independent not-self as another self, or as a partial aspect of another self more or less like our own.

THE fifth volume of the new series of the *Proceedings of the Aristotelian Society* has been published by Messrs. Williams and Norgate at 10s. 6d. net. The volume includes the papers read before the society during the session 1904-5, an abstract of minutes of the proceedings, and the report of the executive committee.

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THE first two parts of a "Three Years' Course of Practical Chemistry," by Messrs. George H. Martin and Ellis Jones, science masters of the Bradford Grammar School, have been published by Messrs. Rivingtons at 1s. 6d. each. The second part, dealing with the work of the second year of the course, was originally published privately, and was reviewed in our issue for December 1, 1904 (vol. lxxi. p. 100). An introduction to each volume has been provided by Prof. J. B. Cohen.

AMONG the articles in the current number of the *Quarterly Review* is one dealing with the aborigines of Australia, written by Mr. Andrew Lang. This article reviews the work of the chief observers of the primitive peoples of Australia, examining exhaustively the researches of Mr. A. W. Howitt, Mr. F. J. Gillen, and Prof. Baldwin Spencer. Mr. Lang differs from all these on some points of theory, though he is profuse in his admiration of the matter and manner of their work, except as regards linguistic and philological research. The hypothesis put forward by Mr. Lang is the converse of that apparently entertained by Messrs. Spencer and Gillen. To quote the concluding paragraph of the article:—"they probably regard the Arunta lack of religion as primitive, just as they think the totemism of the Arunta most archaic. They do not indulge in the comparative method in either case; and it is the comparative method that leads us to our conclusions." The same number of the review contains an article on food supply in time of war.

#### OUR ASTRONOMICAL COLUMN.

##### ASTRONOMICAL OCCURRENCES IN NOVEMBER:—

- Nov. 3. 13h. 35m. to 14h. 56m. Transit of Jupiter's Sat. III. (Ganymede).  
 ,, 5. 10h. 59m. to 12h. 4m. Moon occults  $\sigma$  Aquarii (mag. 4.8).  
 ,, 9. 15h. 52m. to 16h. 51m. Moon occults  $\nu$  Piscium (mag. 4.7).  
 ,, 13. 6h. 35m. to 7h. 16m. Moon occults  $\alpha$  Tauri (mag. 1.1).  
 ,, 13. 9h. 7m. Minimum of Algol ( $\beta$  Persei).  
 ,, 14-16. Epoch of Leonid shooting stars (Radiant  $151^{\circ} + 23^{\circ}$ ).  
 ,, 15. Venus. Illuminated portion of disc =  $0.930$ . Of Mars =  $0.879$ .  
 ,, 16. 5h. 56m. Minimum of Algol ( $\beta$  Persei).  
 ,, 17-21. Epoch of Andromedid shooting stars, with probable maximum November 18 (Radiant  $25^{\circ} + 43^{\circ}$ ).  
 ,, 20. Saturn. Major axis of ring =  $39''.62$ , Minor axis =  $7''.88$ .  
 ,, 23. 21h. Jupiter in opposition to the Sun.  
 ,, 24. 18h. Venus in conjunction with the Moon. Venus  $3^{\circ} 42' S$ .  
 ,, 26. 17h. Mercury at greatest elongation,  $21^{\circ} 41' E$ .  
 ,, 27. 18h. Mercury in conjunction with the Moon. Mercury  $6^{\circ} 33' S$ .

WAVE-LENGTHS OF SILICIUM LINES.—Because of their especial utility in radial-velocity determinations, Prof. Frost and Mr. J. A. Brown have re-measured the wave-lengths of the silicium lines at  $\lambda\lambda$  4553, 4568, and 4575, which were simultaneously identified by Sir Norman Lockyer and Mr. Lunt, and designated "group iii." by the former observer.

The three spectra measured in this new determination were obtained by passing a strong spark between poles containing metallic silicium and titanium, the sharp titanium lines providing useful standards of wave-length in the subsequent calculation. As a titanium line occurs near enough to the silicium line at  $\lambda$  4553 to interfere with the measures of the latter, only those photographs were used on which the faintness of the other titanium lines showed that this possible source of error might be neglected.

As a result of this research the following values were obtained for the wave-lengths sought:— $\lambda$  4552.64,

$\lambda$  4567.90, and  $\lambda$  4574.79. The values obtained by previous observers are given below for comparison:—

	$\lambda$	$\lambda$	$\lambda$
Gill (from stars) ... ..	4552.79	4567.90	4574.68
McClean (from stars) ... ..	4552.6	4567.5	4574.5
Lockyer (spark) ... ..	4552.8	4568.0	4574.9
Exner and Haschek (spark) ..	4552.75	4567.95	4574.9

The importance of having the exact wave-lengths of these lines in stellar radial-velocity determinations is shown by the differences which would be introduced into Prof. Frost's recent work on the *Orion* stars by the change from Exner and Haschek's values, as given above and previously used by Prof. Frost, to the new wave-length values. They are as follow:—

$\lambda$	Correction (Frost and Brown.—Exner and Haschek)	
	In $\lambda$	In kilometres
4553	—0.114 tenth-metres	= —7.51
4568	—0.053 „	= —3.48
4575	—0.109 „	= —7.14

REPORT OF THE YERKES OBSERVATORY.—Prof. Hale's report of the work performed at the Yerkes Observatory during the year ended June 30, 1904, has just been received, and shows that, during that period, neither the results obtained nor the private pecuniary support accorded to the institution fell below the average of previous years.

The Carnegie Institution of Washington has renewed the grant of 4000 dollars made to the observatory for the previous year, and the money is to be employed in furthering the investigations of stellar parallaxes, the observations of variable stars, and the reduction of the solar photographs obtained with the spectroheliograph of the Kenwood Observatory during the years 1892–5.

The Snow telescope, which was destroyed by fire in December, 1902, has been rebuilt from a gift of 10,000 dollars made by Miss Snow, and has since been erected at the Mount Wilson Solar Observatory.

A gift of a further 10,000 dollars from the Carnegie Institution provided for an expedition, for solar research, to Mount Wilson, where an independent observatory has since been erected under the direction of Prof. Hale, who thus severs his more immediate connection with the Yerkes Observatory.

The Bruce telescope having an aperture of 10 inches and a focal length of 50 inches has now been completed, and, under the direction of Prof. Barnard, is yielding splendid results. This telescope gives sharp definition over a field about 9° in diameter.

The 40-inch refractor is used for the Rumford spectroheliograph, the Bruce spectrograph, and several other attached instruments, and continues to give increased satisfaction.

After describing the above, Prof. Hale gives a somewhat detailed account of the excellent work performed in each department, and thereby shows what an important place in the astronomical world is filled by the Williams Bay observers and observatory.

OBSERVATIONS OF JUPITER'S SIXTH SATELLITE.—The results of a series of photographic observations of Jupiter's sixth satellite, made at Greenwich with the 30-inch reflector of the Thompson equatorial during August, September, and October, are published in No. 4051 of the *Astronomische Nachrichten*. Thirteen photographs were obtained on eight nights, and the time and length of each exposure, and the position-angle and distance determined therefrom, are given in the table published. So far as possible, the two latter quantities have been compared with those given by Dr. Ross's ephemeris which appeared in No. 4042 of the *Astronomische Nachrichten*, and the differences are appended.

In order to facilitate the measuring process, the over-exposed image of Jupiter, on each plate, was reduced with ferricyanide of potassium, leaving an easily measurable reversed image, but the present results are to be considered as only provisional.

THE SPECTRUM OF NOVA PERSEI No. 2.—No. 3, vol. lvi., of the Harvard College Observatory Annals contains a

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detailed *résumé* of the spectroscopic results obtained at the observatory in connection with Nova Persei No. 2.

Particulars of the photographs obtained are first given, and then each plate is discussed in order, and a description of the spectral changes and of the principal lines in the spectrum given. Special remarks are made in reference to any peculiar appearance or changes in the spectrum, such as took place when the star was rising to its maximum brightness and subsequently when its magnitude was oscillating. In this connection an interesting comparison is drawn between the changes which take place in the spectrum of Mira Ceti during the light-variations of that star and those which were observed in the Nova spectrum. From this comparison it is deduced that both in the case of Novæ and variable stars of long period the hydrogen lines do not become bright until the star has attained a large portion of its light.

REDUCTION TABLES FOR EQUATORIAL OBSERVATIONS.—Appendix No. 3 to vol. iv. of the Publications of the U.S. Naval Observatory contains a series of tables for the reduction of equatorial observations.

These tables have been compiled by Mr. C. W. Frederick, who, in the introduction to them, develops the formulæ for the construction of the tables of differential refraction for micrometer observations made with an equatorial, describes a method of determining the instrumental constants, and explains the use of the six tables included in the work.

The first three tables show the corrections for differential refraction, for the latitude of the Washington Observatory, to be applied separately according to the method of observation pursued.

Tables iv., v., and vi. give the instrumental constants of the 26-inch equatorial, of the Naval Observatory, for use under analogous conditions.

PHOTOGRAPHIC STAR CATALOGUE.—From a communication made by M. Lœwy to the Paris Academy of Sciences, we learn that the first volume of the "Catalogue photographique du Ciel" has been published by the Bordeaux Observatory, relating to the region dec. +16° to +18°, which they undertook to observe. This volume contains the rectilinear coordinates of 49,772 stars, and completes the set of four similar publications undertaken by the French observatories (Algiers, Paris, Toulouse, and Bordeaux) as part of the international cooperative scheme (*Comptes rendus*, October 9).

## GEOGRAPHY AT THE BRITISH ASSOCIATION.

IN arranging the programme of work for the South African meeting, the organising committee of Section E tried to secure papers summarising the geographical conditions of the "subcontinent," as it is locally called, or those dealing with general geographical problems. The number of papers by South Africans was smaller than might have been expected, the local committee discovering that geography was the subject for which it was most difficult to secure papers. South Africa is in the position of having many specialists interested in geographical aspects of their specialisms, but has as yet no geographers giving all their time and energy to the subject.

In spite of this, the programme of the section was a full one, and it would have been difficult to dispose of more business than was accomplished.

It will be most convenient to consider first those papers which deal with Africa.

Mr. H. C. Schunke Hollway, vice-president of the section, communicated a paper on the outlines of the physical geography of the Cape Colony. This was illustrated by a new orographical map specially prepared by the Surveyor-general, Mr. Cornish-Bowden, showing contour lines at 1500, 3000, 4000, 6000, and 8000 feet. Unfortunately, sufficient data for plotting the 500-foot contour line—one of the most interesting of all—do not exist; and even the lines shown on this map are only approximations. Here, at the outset, the lack of a good topographical map was bewailed, and throughout the wanderings of the members in South Africa this deficiency was felt at every