

No.	57	...	R.A.			N.P.D.	
			h.	m.	s.	h.	m.
	57	...	0	21	43	...	147 37'7
	1423	...	6	25	6	...	121 12'3
	1655	...	8	16	27	...	125 50'9
	2181	...	10	37	27	...	125 45'0

- No. 57.—Pretty bright, small, round, much brighter in the middle.  
 ,, 1423.—Pretty bright; considerably large, round, very little gradually brighter in the middle; 4'.  
 ,, 1655.—A double star = *h.* 4023 in a pretty small nebula, among some seventy stars.  
 ,, 2181.—Pretty faint, small, much extended in  $0^\circ \pm$ ; very suddenly, very much brighter in the middle; the first of three.

The photo-heliograph was used on every fine day possible, and 217 pictures were obtained in the year.

The necessary funds have been voted for a new transit-circle more in accordance with the modern requirements of astronomy, and its construction has been intrusted to Messrs. Troughton and Simms. Mr. Christie, the Astronomer-Royal, was invited to modify the specification sent to England, if he found reason to do so.

THE SUPPOSED VARIABLE  $\mu$  DORADUS—A SPURIOUS STAR.—Dr. B. A. Gould has made a very unexpected discovery, from which it appears that  $\mu$  Doradus of our catalogues, long supposed to be a variable star, was never observed by Lacaille in the position he assigns it in the Catalogue of the *Celum Australe Stelliferum*, and further, that by similar error, five other stars observed by Lacaille on the same day, which are found in the reduced catalogue published by the British Association, have no existence in the positions given. The case is a curious one, and as the *Celum Australe* of Lacaille is now a scarce work, we may be excused for transcribing the observations in question as they stand. They were made in Zone XI., 1751, December 16, *in parte inferiore* of Lacaille's rhomboid; the numerals are our own:—

No.	mag.	h.	m.	s.	No.	mag.	h.	m.	s.
No. 1	...	6	...	4 17 38	No. 6	...	6'7	...	4 46 27
				24 2					53 34
,, 2	...	7	...	4 39 51	,, 7	...	7	...	4 51 5
				47 9					54 33
,, 3	...	7	...	4 25 23	,, 8	...	5	...	4 59 22
				31 0					5 8 28
,, 4	...	6'7	...	4 30 16	,, 9	...	7	...	6 5 53
				32 38					9 8
,, 5	...	7	...	4 41 33					
				43 41					

Lacaille appears to have entered correctly the times of beginning and ending of describing the chord of his rhomboid for Nos. 1 and 2, but instead of 4h. 25m. 23s. for the third star, the time was really 5h. 25m. 23s., and this error of 1h. runs on up to No. 8 inclusive; No. 9 is correct. This will be readily seen by inspecting the above times. The star entered in the Catalogue as  $\mu$  Doradus is No. 8, called 5m. in the observations but 6m. in the Catalogue, which gives its place for 1750°0, R.A. 76° 11' 17", Decl. -62° 7' 4". The place given by the B.A. reductions is R.A. 5h. 4m. 44'3s., N.P.D. 152° 6' 57", which is correctly deduced from the transits as printed. With the correction of +1h. to the times, the position for 1750 becomes R.A. 6h. 4m. 44'2s., N.P.D. 152° 6' 49", and the star " $\mu$  Doradus" is seen to be identical with Brisbane 1172 = B.A.C. 2000 = Stone 2836, in Pictor. The other spurious stars introduced in the Catalogue by the error which Dr. Gould has brought to light are Nos. 1542, 1554, 1633, 1680, and 1706. The following identifications of the stars really observed may be useful:—

Spurious stars of the reduced Catalogue.		Stars really observed by Lacaille.	
No. 1542	Reticulum	7m.	= Stone 2497, Dorado 7'6m.
,, 1554	,,	6'7	= ,, 2532, ,, 6
,, 1633	Dorado	7	= ,, 2630, ,, 6'7
,, 1680	,,	6'7	= ,, 2707, ,, 6'7
,, 1706	,,	7	= Brisb. 1109, Taylor V. 516
,, 1766	( $\mu$ Doradus)	5	= Stone 2836, Pictor 5m.

Brisbane observed a star close upon Lacaille's erroneous position of his  $\mu$  Doradus, and according to his general custom gave it Lacaille's magnitude. Moesta (*Astron. Nach.*, No. 1545) stated that he had observed this star at Santiago de Chile from February, 1860, to January, 1865, and had found it  $8\frac{1}{2}$  or 9 of

Argelander's scale; he therefore considered it to be variable, and thought the period of variation would prove to be of long duration.

THE COMET OF 1812.—MM. Schulhof and Bosclet's sweeping ephemerides for this comet are continued in No. 2489 of the *Astronomische Nachrichten*.

INSECTS VISITING FLOWERS

THE interest arising out of the writings of Darwin, Lubbock, and Hermann Müller relative to the part played by insects in their oft-recurring visits to flowers has of late years attracted much attention. The subject, in fact, has created a taste for observation, and an incentive has been given to watch the frequency of visits of various species to certain flowers, and especially to the insects' choice of colours of flower. While the mere registering of visits may seem a comparatively simple one, the reason why insects should show a preference to alight upon flowers of a certain colour, or choose certain species of plants, is a much more complicated problem than at first sight it would appear. Sir John Lubbock has shown by experiment that blue is the bees' favourite colour; H. Müller avers that in the Alps bees are attracted to the yellow rather than the white flowers. However this may be, certain it is that a much larger number of observations are yet needed before a positive law can be deduced. Two papers read at the last meeting of the Linnean Society (March 1): one by Mr. Alf. W. Bennett, "On the Constancy of Insects in their Visits to Flowers," and the other by Mr. R. M. Christy, "On the Methodic Habits of Insects when Visiting Flowers"—point out that a strict watch and ward is being kept on the movements of the busy bee and its kindred. Mr. Bennett states that butterflies show but little constancy in their visits, citing only a few instances to the contrary; but according to him, to some extent they seem to have a choice of colour. The Diptera exhibit greater constancy, though by no means absolute. The Apidae, especially the hive-bee, manifest still greater constancy. From these data he infers that the ratio of increase is in proportion to the part performed by the insects in their carrying pollen from flower to flower. As respects preference for particular colours, in a series of observations Mr. Bennett has noted among the Lepidoptera that 70 visits were made to red or pink flowers, 5 to blue, 15 to yellow, and 5 to white; the Diptera paid 9 visits to red or pink, 8 to yellow, and 20 to white; Hymenoptera alighted 303 times on red and pink flowers, 126 on blue, 11 on yellow, and 17 on white flowers. Mr. Christy records in detail the movements of 76 insects, chiefly bees, when engaged in visiting 2400 flowers. He tabulates the same, and concludes therefrom that insects, notably the bees, decidedly and with intent confine their successive visits to the same species of flower. According to him, also, butterflies generally wander aimlessly in their flight: yet some species, including the Fritillaries, are fairly methodical in their habit. He believes that it is not by colour alone that insects are guided from one flower to another of the same species, and he suggests that the sense of smell may be brought into play. Bees, he avers, have but poor sight for long distances, but see well at short distances. Of 55 humble-bees watched, 26 visited blue flowers: of these 12 were methodic in their visits, 9 only irregularly so, and 5 not at all; 13 visited white flowers, whereof 5 were methodic and 8 the reverse; 11 visited yellow flowers, of which 5 were methodic and 6 not; 28 visited red flowers, 7 appearing methodic, 9 nearly so, while 12 were the contrary.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE

CAMBRIDGE.—In the last local examination 17 per cent. of those Juniors who sent up papers in Trigonometry obtained no marks, although some questions were of the very simplest nature. Among the Seniors Hydrostatics produced unsatisfactory answers. Many candidates had no ideas worth the name about pressure at a point, density, specific gravity, and weight. This is due partly to corresponding imperfections in some current text-books, and partly to the habit of teaching Hydrostatics apart from general physics or practical applications. The answers in Statics were the least satisfactory; yet according to the examiner there are few subjects in which good teaching tells more quickly than in elementary mechanics. Thus many who passed did very good papers.

Junior Chemistry obtained a favourable report; but the Seniors displayed lack of reasoning power, with great readiness to reproduce cut-and-dried statements from books. In Heat the results of the examination were encouraging and satisfactory. In Experimental Physics generally there was great lack of practical acquaintance with the subjects. Only one candidate did really well among the Seniors. In Botany the answers were weak throughout, showing great lack of teaching by real objects handled by the students. Zoology appears to have been too much studied by Juniors from older and worthless text-books. The Seniors did better, but spread themselves over too wide a field of work. The knowledge of Physical Geography was better than that of Geology, but neither was good.

The report recently made by Mr. R. D. Roberts of his visits to the centres where local lectures have been established, and on the present state of the local lectures' scheme, contains many most interesting facts regarding the high appreciation with which the intelligent working classes regard the lectures, and the difficulties which the cost of the lectures occasions. Of the results of a course of electricity at Newcastle, the examiner says that the work done in answer to a long and difficult paper of questions was fully equal to that attained in a scientific University course. The greatest difficulty that occurs is not lack of demand for or interest in education, but the provision of funds to meet the expenses. If a solution of this could be found, the scheme would be taken up largely in towns where it is now out of the question. The people who are eager for knowledge and travel long distances to obtain it, in all kinds of weather over the roughest roads, are just those who, if they must pay for the lectures, must have less bread for their families. This is certainly the case with the Northumberland and Durham miners. Whether the State will in some way assist in providing the knowledge and teaching which are so eagerly desired, must be again made a practical and urgent question.

The following are the lectures in Chemistry, Physics, and Mineralogy for the Easter Term (el. signifies elementary, ad. advanced):—

Elementary Course of Chemistry, by a Demonstrator; General Course, continued, Mr. Main, St. John's College; Non-metals, continued, and Organic Chemistry, el., Mr. Pattison Muir; General Principles, continued, and Organic Chemistry, ad., Mr. Muir, Caius College; Organic Chemistry, el., Mr. Scott (Prof. Dewar's assistant); Demonstrations in Gas Analysis, Mr. Scott; Sound, Lord Rayleigh; Heat, Mr. Trotter, Trinity College; Physics, el., Mr. Glazebrook, Trinity College; Physics, el., Mr. Shaw, Emmanuel College; Physics, ad., papers, Mr. Glazebrook and Mr. Shaw; Chemistry and Physics, el., papers, Mr. Pattison Muir and Mr. Shaw.

Practical Chemistry, University, St. John's, Caius, and Sidney College Laboratories.

Practical Physics, Cavendish Laboratory; Demonstrations in Light and Acoustics; and in Optics and Electricity, el.

Mineralogy, Course by Prof. Lewis, and Demonstrations for both parts of the Natural Sciences Tripos.

The following arrangements have been made by Prof. Hughes for lectures during the Easter term:—Local Stratigraphy, Prof. Hughes; Geology (General Course, continued), by Dr. R. D. Roberts, Clare College; Petrology, Mr. Harker, St. John's College; Palæontology, Mr. T. Roberts, St. John's College. Dr. R. D. Roberts will continue to set papers and superintend the course of reading of students in the Museum.

The Strickland Curatorship being about to become vacant, Mr. Salvin having completed his valuable catalogue, a new code of regulations for the Curatorship has been drawn up. The Strickland Curator is to be appointed by Mrs. Strickland, the foundress, during her lifetime; then by Mrs. Catherine Strickland in case she shall survive the foundress; and, after her decease, by the Superintendent of the Cambridge Museums of Zoology and Comparative Anatomy. In addition to caring for the Strickland Collection, the Curator is to take charge of any University ornithological collections, to catalogue them, to assist scientific-visitors in studying the ornithological collections, and to aid and promote the progress of ornithological science.

UNIVERSITY COLLEGE, LONDON.—Twenty lectures on Quantitative Analysis will be delivered by Richard T. Plimpton, Ph.D., on Mondays and Fridays at 3 o'clock, during the third term. The first lecture will be given on April 13.

PROF. STOKES, Lucasian Professor of Mathematics in the University of Cambridge, has been appointed to deliver the first

course of lectures on Natural Science under the auspices of the Burnett Literary Fund, Aberdeen.

THE Earl of Zetland has given 500*l.* to the Edinburgh Association for the University education of woman to found a bursary for the benefit of its students. This bursary will be known as the Earl of Zetland's Bursary.

## SOCIETIES AND ACADEMIES

### LONDON

Royal Society, March 8.—“Note on the Order of Reversibility of the Lithium Lines,” by Professors Liveing and Dewar.

In their communications on the reversal of the lines of metallic vapours, the authors have several times noticed (*Proc. Roy. Soc.* vol. xxviii. pp. 357, 369, 473) the reversal of the lithium lines, and concluded that the blue line is more easily reversed than the orange line. This, however, does not appear to be really the case. When much lithium is introduced into the arc, a second blue line is developed close to but slightly more refrangible than the well-known blue line. This second blue line produces with the other the appearance of a reversal, which deceived the authors until they became aware of the existence of the second line. The blue line (wave-length 4604) is really reversed without difficulty when sufficient lithium is present, but under these circumstances the orange line is also reversed. The latter line is also the one which first (of the two) shows reversal, and also the one which is more persistently reversed. Hence they place the lines in order of reversibility as follows: red, orange, blue, green, violet.

Mathematical Society, March 8.—Prof. Henrici, F.R.S., president (and subsequently Sir J. Cockle, F.R.S., vice-president), in the chair.—Mr. Alfred Lodge, Fereday Fellow of St. John's College, Oxford, was elected a Member, and Major Allan Cunningham and Mr. H. T. Gerrans were admitted into the Society.—Prof. Henrici feelingly announced, in a few well-chosen sentences, the loss the Society had sustained since its last meeting by the death of Prof. Henry Smith, one of its most distinguished ornaments, and who had been a Member almost from its commencement in 1865. The loss to mathematics in this country was almost irreparable, and it would be hard to find anywhere a fitting successor to him as an exponent of the higher geometry. It had been said that there were not half a dozen mathematicians in Europe who could breathe on the mathematical heights to which he was accustomed; it was further true that few were so fitted as he for introducing others to those heights. His charm of manner and power of fixing the attention of his hearers were wondrous, and were as strikingly exhibited at the December meeting of the Society (the last meeting at which he was present) as on any previous occasion. What Clifford once said when reading a paper by Hesse might be said with equal truth of Henry Smith's papers: “This is reading poetry.” [Perhaps this Society will miss him more than any other; he was always willing, if possible, to respond to the Secretary's request for a paper, and he was a true imitator of the Jewish king, for he never gave us of that which cost him nothing, “Everything that he did was as perfect as he could make it.” In a letter now before us the writer says truly: “Of all who ‘knew’ him, none knew or saw *him himself* as we did at the Mathematical Society.” “Very pleasant” was he to us, and his death has left a void in our ranks which time will hardly fill.] —Mr. J. W. L. Glaisher made a communication on the calculation of the hyperbolic logarithm of  $\pi$ .—Mr. Tucker read (in its entirety) a paper by Prof. Cayley entitled “On Monge's ‘Mémoire sur la Théorie des Déblais et de Remblais.’” —Mr. J. Hammond made a few critical remarks on a recent paper by Prof. Sylvester in the *American Journal of Mathematics*.

Zoological Society, March 6.—Osbert Salvin, F.R.S., vice-president, in the chair.—The Secretary exhibited, on behalf of the Rev. F. O. Morris, the drawing of a bird shot in Hampshire in November, 1882, which it was suggested represented a Tinamou of some species that had escaped from captivity.—Mr. J. E. Ady exhibited some microscopical preparations of bone, in one case showing the growth of blood-vessels into cartilage previous to ossification, and in another case presenting a hard section in which the lacunæ and canaliculi were extremely well shown.—Dr. Hans Gadow read a paper on the laryngeal muscles of birds, and pointed out first that the muscles of the syrinx are developed from the sterno-hyoid muscles; and,