

A JOINT commission appointed by the Royal Society and the London School of Tropical Medicine has been investigating the African sleeping sickness. This disease, endemic in the Congo basin, has recently been spreading eastwards with great rapidity, causing a terrible mortality. Of the commissioners, Dr. Christie and Dr. Low (Craggs research student of the London School of Tropical Medicine) are returning home, but Dr. Castellani is remaining to complete his investigations. The latter has isolated a streptococcus which seems to be the specific cause of the disease. The rôle of the *Filaria perstans* as the causative agent has been disproved by the commission.

A NUMBER of cases of serious anæmia having occurred in the Dalcoath mine, Cornwall, an inquiry was instituted by the Home Office into the cause of the affection. Dr. Haldane, with whom was afterwards associated Dr. Boycott, made the interesting discovery that the condition was one of ankylostomiasis, which is due to the presence of an intestinal parasite, the *Ankylostomum duodenale*. This disease is almost confined to tropical countries, though it was met with among the navvies employed in the piercing of the St. Gothard tunnel. Doubtless, in the present instance, some of the miners who had been working abroad contracted the disease and brought the infection home with them.

IN the December number of the *Entomologist*, Mr. E. Bagwell-Purefoy gives further information with regard to the successful introduction of the brimstone butterfly into Tipperary, which was accomplished in 1894, after its feeding-plants had been planted a few years previously in the county. This butterfly—the *Gonepteryx rhamni* of some authors and the *Colias rhamni* of others—is found at Killarney and has been reported from Wicklow, but is not a native of any other part of Ireland. In 1896, the colony of Tipperary was found to be in a flourishing condition, and in 1901 and the present year had still further multiplied. During the past summer, Mr. Purefoy has attempted to introduce the handsome Mediterranean brimstone *G.* (or *C.*) *cleopatra* into the same district—an experiment which will be watched with interest.

IN the September issue of the *Proceedings* of the Philadelphia Academy, Miss A. M. Fields records the results of experiments made with a view of ascertaining the cause of the hostility to one another displayed by different colonies of ants of the same species, and likewise the influence of light of different colours on these insects. The chief cause of the hostility of one colony to another appears to be a difference of odour accompanied by a difference in the age of the individuals composing the two colonies. As regards colours, it is inferred that ants are able to distinguish some of these, but may have no preference for one more than another. Also that these insects gradually lose their natural dislike of light by exposure to its influence.

THE remarkable differences in the life-history of different colonies of an American land-planarian (*Planaria maculata*) form the subject of a paper by Mr. W. C. Curtis in a recent issue (vol. xxx. No. 7) of the *Proceedings* of the Boston (U.S.A.) Natural History Society. In certain localities, the creature apparently reproduces its kind exclusively by fission, while in others sexual reproduction occurs. There are yet other districts in which both modes take place. It is suggested that the asexual may replace the sexual mode of reproduction in the same individuals, but to confirm or disprove this, an extended period of observation is essential.

THE third volume of Mr. W. S. Taggart's "Cotton Spinning" (Messrs. Macmillan and Co., Ltd.) has reached a second edition. The first two volumes deal with the preparing processes in cotton spinning, while this part takes up the subject of spinning and the preparation of yarns. Necessary additions have been made to the new edition so as to bring the book up to date.

NO. 1729. VOL. 67]

IN the Christmas number of *Photography*, Messrs. Iliffe and Sons, Ltd., have presented us with an excellent and inexpensive publication, printed on good paper and studded with numerous fine illustrations by various processes. This number has set itself the task of reviewing and displaying the most choice samples that have been shown to the public at the two great exhibitions held at the New and Dudley Galleries this year. A short but interesting monograph accompanies each illustration, drawing the reader's attention to the chief points. The publishers seem to have spared no pains to make the production, as a whole, high class in every respect, and the book will be found useful and valuable as illustrating types of subjects and treatments which are utilised and cultivated at the present time.

THE additions to the Zoological Society's Gardens during the past week include a Ring-tailed Coati (*Nasua rufa*) from South America, presented by Mr. E. Bieber; a Banded Ichneumon (*Crossarchus fasiatus*) from Mozambique, presented by Mr. F. D. Samuel; a Raven (*Corvus corax*) British, presented by Mrs. Rose Haig Thomas; a Douglass's Horned Lizard (*Phrynosoma douglassi*) from the Rocky Mountains, presented by Mr. C. W. H. Doubler; a Hog Deer (*Cervus porcinus*) born in the Gardens.

ERRATUM.—In letter on p. 126, col. 2, l. 45, for "red out" read "red."

OUR ASTRONOMICAL COLUMN.

COMET 1902 *b* (GIACOBINI).—Further observations of this comet have been communicated to the *Astronomische Nachrichten* (No. 3833).

Mr. C. F. Pechule, of Copenhagen, made the following observation on December 3:—

14h. 38m. 20s. M.T. Copenhagen. $\Delta\alpha = -1m. 22s. 00.$ $\Delta\delta = +1' 53''.7.$ α (app.) = 7h. 17m. 26s. 756. δ (app.) = $-1^\circ 51' 18''.0$, faint, 12th magnitude, small, diffuse.

NEW VARIABLE STARS.—*Algol Variable*, 20, 1902, *Cygni*.—From photographs obtained by M. S. Blakjo, Madame Ceraski has found that the star having the position (1855) $\alpha = 21h. 0m. 44s. 6.$ $\delta = +45^\circ 11' 53''$, is a variable, and a further examination of ten plates indicates that it is a variable of the Algol type.

18, 1902, *Coronae*.—Mr. Thomas Anderson has observed that the star having the approximate position R.A. = 16h. 10m. 3, Dec. = $+38^\circ 8'$, (1855), has been rapidly decreasing in brightness during November.

The following magnitudes have been observed:—November 1, 8.5; November 7, 8.7; November 18, 9.2; November 21, 9.3.

19, 1902, *Pegasi*.—Mr. Anderson also records the variability of the star having the position R.A. = 21h. 57m. 8, Dec. = $+34^\circ 25'$ (1855). At maximum, its magnitude is midway between 9.1 and 9.9, whilst at minimum it is only 0.2m. brighter than a neighbouring 11th-magnitude star. Its period is seven months (*Astronomische Nachrichten*, No. 3831).

HERSCHEL'S NEBULOUS REGIONS OF THE HEAVENS.—Dr. Isaac Roberts has recently completed his photographic survey of the fifty-two regions of the heavens described by William Herschel, in his paper "The Construction of the Heavens" (*Phil. Trans.*, 1811), as exhibiting extensive diffused nebulosity, and has communicated the results of this survey to the Royal Astronomical Society (*The Observatory*, No. 325).

Using a 20-inch reflector and a 5-inch Cooke lens to obtain simultaneous photographs, he has obtained negatives showing stars of magnitude 16–17 with the former, and of magnitude 14–15 with the latter instrument, thus securing images of objects at least as faint as those shown by Herschel's telescopes.

These photographs show that in forty-eight cases out of the fifty-two there is no trace of the extensive diffused nebulosity described by Herschel. On the remaining four, there is nebulosity which forms parts of three extensive nebulous clouds, which, however, Herschel could not have seen in so complete a form as they are shown on the photographs.

NEW MINOR PLANETS.—Prof. Max Wolf announces, in No. 3831 of the *Astronomische Nachrichten*, the discovery of

nine new minor planets. Three of these were found on a plate taken by Prof. Wolf on November 20, three others on a plate taken by Mr. Dugan on November 21, and the remaining three were found on a plate secured by Prof. Wolf on November 21.

ELEMENTS AND EPHEMERIS OF COMET 1902 *d*.—M. G. Fayet, of the Paris Observatory, has computed the following elements and ephemeris for the orbit of the new comet, from observations made on December 3, 5 and 8 :—

T = 1903 March 13^h 9^m 7^s6 M.T. Paris.

$$\left. \begin{aligned} \pi &= 119\ 52\ 40 \\ \delta &= 117\ 39\ 21 \\ i &= 43\ 53\ 9 \\ \log q &= 0.45401 \end{aligned} \right\} 1902$$

Ephemeris 12h. M.T. Paris.

1902	a			δ			log Δ	Brightness.
	h.	m.	s.	h.	m.	s.		
Dec. 11	7	14	47	...	0	39.1	...	0.3339 ... 1.1
15	7	12	58	...	+0	4.5	...	0.3255 ... 1.2
19	7	10	52	...	+0	52.8	...	0.3179 ... 1.2
23	7	8	33	...	+1	45.8	...	0.3110 ... 1.3
27	7	6	1	...	+2	43.3	...	0.3049 ... 1.3
31	7	3	18	...	+3	45.1	...	0.2999 ... 1.4

Brightness at time of discovery = 1.

An observation was made on December 10d. 13h. 37m. 0 at Heidelberg by M. Courvoisier, and gave the following position for the comet:—108° 47' 12", - 0° 48' 15", and this gives a correction to Fayet's ephemeris of -2s. and +0.6 (Kiel *Circular*, No. 55).

"COMPANION TO 'THE OBSERVATORY,' 1903."—This annual collection of elements and ephemerides, just published, contains its usual excellent list of tables and information in regard to the astronomical phenomena which will take place during the coming year.

The information concerning the various meteor showers and double stars is supplied by Messrs. Denning and Maw respectively, and M. Loewy has again contributed advance proofs from which the variable-star ephemerides have been compiled. The latter show a considerable increase in number this year.

JUPITER AND HIS GREAT RED SPOT.

THOUGH Jupiter has been unfavourably placed for European observers during the present year, his surface markings have been extremely interesting, of great variety and in plentiful numbers. The English climate, even at its best, can scarcely be said to suit astronomical work in an eminent degree, but its characteristics in 1902 have proved unusually bad, in fact, atmospheric conditions have combined with the low position of the planet to render observations difficult, and they have generally had to be pursued with definition of very inferior quality. The seeing has been recorded as "very good" on six nights only out of seventy-five, and in 1901 the result was equally disappointing, for the image was really sharp and satisfactory on five nights only out of seventy-one; but in 1901 the planet was about 5° lower (Dec. 23° S.) than in 1902 (Dec. 18° S.), and though the difference is not great, it ought to have operated strongly in favour of the present year had other circumstances been equal.

The most noteworthy incident in connection with recent studies of Jupiter is to be found in a very pronounced acceleration of motion in the great red spot. This first made itself evident in 1901, but it has been intensified during the past summer. For about twenty-three years, uninterruptedly, this singular marking had exhibited a constantly increasing retardation, which caused its rotation period to lengthen from about 9h. 55m. 34s. to nearly 9h. 55m. 42s. But in 1901 it declined to 9h. 55m. 41s., and during the present year the rate has been about 9h. 55m. 39½s. And this increase of velocity has been contemporary with the outbreak of a large, irregular or multiple marking of a dusky hue, in the same latitude of the planet. This new object, apparently first seen in May, 1901, has shown a rotation period of 9h. 55m. 18s., which corresponds with that of the south temperate current. It seems a probable conjecture that the presence of the marking just referred to may have forced the red spot along at a more rapid rate than that which it

exhibited in previous years. In June, July and August of the present year, the red spot was almost surrounded by the material of the new marking, and the quicker motion of the latter may well have accelerated the movement of the former. But no certain conclusion can be arrived at, though the facts are significant and suggestive. Possibly the phenomena alluded to may have been practically coincident in date, but devoid of any physical relationship. And in this connection it will be useful to remember that the red spot has always been situated in a stream flowing along with much greater celerity than the rate of its own motion.

In September, the material of the new marking had passed to the preceding (W.) side of the red spot, and hence it was expected that the accelerated motion of the latter would cease, but the differences in motion have been comparatively slight, so that errors of observation make it unsafe to form definite conclusions. It will be advisable when the planet disappears from the evening sky in January next to collect all the transit times of the red spot recorded during the present apparition, as it may then be possible to determine with accuracy the extent of the acceleration and the variation in its rate, if any, during the summer and autumn. If a large number of observations are forthcoming, it will be desirable to group them into monthly or bi-monthly periods and ascertain the mean longitude of the spot for each of these, when the rate of its drift will be seen and the errors of individual transits practically obliterated.

At Bristol, the following estimated transits have been obtained with a 10-inch reflector and a power of 312 :—

Date.	G.M.T.	Longitude.
1902.	h. m.	°
April 28	16 14	45.9
May 20	14 23	44.7
June 20	14 56	44.8
" 27	15 37	42.2
July 2	14 49	45.1
" 7	13 54	43.9
" 9	15 33	44.5
Aug. 8	10 8	40.2
" 12	13 29	41.7
" 15	10 57	42.5
" 20	10 3	41.7
" 25	9 7	39.6
Sept. 1	9 50	38.0
" 13	9 48	40.3
" 18	8 56½	40.5
" 28	7 9	37.9
Oct. 3	6 18	37.9
" 10	7 9	40.2
" 15	6 13	37.1
" 22	7 1	37.1
Nov. 8	6 8	36.9
" 18	4 31½	39.4
" 23	3 36	36.1
" 25	5 20	39.1

During the present year, a number of white and dark spots have been visible on the north side of the north equatorial belt, and the mean rotation period of these has been about ten seconds less than that shown by the red spot. A new belt has lately formed on the northern side of the spots alluded to. The equatorial current of the planet has been moving, as nearly as possible, at the same rate as during 1901, for the mean rotation of twenty-four spots is about 9h. 50m. 29s. There has been an abundance of slow-moving N. and N.N. temperate markings, but these have seldom been well seen owing to the confused definition.

W. F. DENNING.

SOME LIMITS IN HEAVY ELECTRICAL ENGINEERING.¹

IT is customary for a presidential address to be a review of the development of the science with which the Institution is particularly concerned. Such a review is especially beneficial in the case of such a rapidly growing industry as electrical engineering, as the outlook changes considerably during a year. Instead of a review of the past, a dream of the future may take the form of a presidential address. This form has great

¹ Abridged from the inaugural address by the president of the Institution of Electrical Engineers, Mr. James Swinburne.