unacquainted with astronomy, we fail to recognise the need for, or the suitability of, it. Having attempted too much in too little space, the author is in places forced to be dogmatic, in others he is inexplicit, and the beginner will find tabular statements which, without external assistance, will puzzle him.

To a fair extent the book consists of quotations from well-known writers fitted together with such statistics as one usually finds in popular articles; where the writer's personality appears, we find either dogmatic statements or information which is too loosely or too briefly explained. For example, on p. 28 the reader is told that in 1882, 1893 and 1905, "the disc of the sun was covered with spots"; the subsequent explanation of spot zones will but tend to confuse the beginner. In the next paragraph we read that Sir Isaac Newton showed that if "light" be passed through a prism, a band of coloured light, "known as the solar spectrum," is produced, a statement which can only convey the truth when the beginner either assumes, or knows, that it was the light of the sun that Newton employed. These examples will suffice to show that, in attempting too much, the author has occasionally lost sight of the fact that he was intending to write a book for beginners. Seven reproductions of celestial photographs and drawings illustrate the volume, some of them being from Prof. Max Wolf's beautiful originals.

W. E. ROLSTON.

LETTERS TO THE EDITOR.

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of NATURE. No notice is taken of anonymous communications.]

Large Magnetic Storm.

ON September 11-12 a large magnetic storm was experienced at Kew. There were minor disturbances earlier in the month, from September 4-6 and from September 8-10, and the magnetic traces were by no means absolutely quiet when the storm began. The commencement is, however, clearly indicated in the horizontal force curve (not reproduced). Starting at about 9h. 47m. p.m. on September 11, there was a very sudden change in the force. The movement of the horizontal-force magnet was of a type which not unusually ushers in large storms, but it was exceptionally large, representing an increase of about 112 γ in H ($1\gamma \equiv 0.00001$ C.G.S. unit) in less than two minutes of time. At the end of this movement H had reached its maximum during the storm. The first movement was followed by oscillations. A very rapid fall exceeding 300 γ took place between 11h. 35m. p.m. and midnight; followed by an equally rapid but smaller recovery. The other principal changes in H occurred between 1 a.m. and 2 a.m., and between 4.40 a.m. and 6 a.m. on September 12. Between 4.40 a.m. and 5.7 a.m. there was a fall of 300 γ . The extreme range was not shown on the curve, which went off the sheet, but it exceeded 500 γ . Later on September 12, between noon and 7 p.m., there was further disturbance of a much less striking character, but this was probably from a distinct origin, and the storm commencing on September 11 may be regarded as terminating about 9.30 a.m. on September 12. On this view, the immediate result was a diminution of about 100 γ in the value of H. Such temporary depressions in H are the usual legacy of magnetic storms, but the depression in the present instance seems above the average.

The declination curve, of which a tracing is reproduced on a reduced scale, shows the commencement about 9.47 p.m. on September 11 much less prominently. A small but sharp upward movement, representing an increase of about 1' in westerly declination, is, however, visible, followed in the course of the next twelve minutes by an easterly movement of about 13'. The most salient features

are the four peaks or turning points, where a prominent movement to the west terminated, and was followed by a similarly prominent movement to the east. The approximate times answering to these peaks are 11.4 p.m. and 11.44 p.m. on September 11, and 1.46 a.m. and 5.14 a.m. on September 12. The extreme easterly position was reached at about 2.53 a.m., and the extreme westerly position at about 5.14 a.m. on September 12, the total range of declination being about 1° 27'. The movements on September 12 were the most rapid. Between 1.24 a.m. and 1.46 a.m. there was a westerly movement of about 51', followed in the course of the next eight minutes by an easterly movement of about 35', while between 2.58 a.m. and 3.28 a.m. there was a westerly movement of about 53'. There were no large movements after 6 a.m.

The vertical force disturbance was of a somewhat unusual type. Whilst there was a certain amount of oscillation, the principal feature was that during the whole duration

of the storm—from 9.47 p.m. on September 11 to 9.30 a.m. on September 12—the vertical component, V, was depressed below its normal value. The extent of the depression may be judged from the fact that from 11.45 p.m. on September 11 to 6.10 a.m. on September 12—i.e. for more than six hours—V did not rise to within 150 γ of the value which it possessed when the storm commenced. By 9 a.m., however, on September 12, V had returned to its normal value. Owing to loss of trace, the extreme range of the vertical force disturbance was not recorded.

C. CHREE.
Observatory Department, National Physical
Laboratory, September 14.

Bouvet Island and the Solar Eclipse of 1908 December 22-23.

A QUESTION having been raised as to whether the total phase of this eclipse will be visible at Bouvet Island, I have asked the Hydrographic Department for the most trustworthy coordinates of the island with the view of a settlement of the matter.

The position adopted for Bouvet Island on the Admiralty chart of the region is 54° 22' S., 5° 21' E.

Adopting the elements of the *Nautical Almanac*, the eclipse of next December for this position is a partial one, the magnitude (sun's diameter=1) being 0.988. The island is about 10' south of the southern limit of the zone of totality.

A. M. W. DOWNING.
H.M. Nautical Almanac Office, September 17.

Ruthless Extermination.

HAVING noticed in your issue of September 3 a most interesting article on the subject of the extermination of animals in Africa, I cannot say how indignant I feel that there should be persons who actually advocate the wholesale destruction—by international consent—of the many wonderful species which have been built up in their perfection during countless ages of evolution.

How happy should I be if the news were conveyed to me, that the man who is the ringleader of this diabolical scheme had himself fallen beneath the vengeance of a lion or a crocodile.

Even if there were sufficient proof that the sleeping sickness is propagated by the large mammals and reptiles, there are many other means of checking it besides the extermination of these animals. The increase of various birds should be encouraged which devour the flies which propagate the disease, and every other means should be taken of a reasonable character.

Although I recognise the undisputed fact that the wild species of Africa must be kept in due bounds in the more thickly populated districts, I am convinced that every State of that vast continent, should never cease to preserve a sufficient number of all the indigenous local species, and that in the near vicinity of all the principal towns national parks should be established for the preservation of these wonderful forms of life; so that future generations may not be deprived of the pleasure of beholding them.

RALPH DE TUNSTALL SNEYD.

Fairview, Leek, Staffs, September 8.

Instincts that are not Inherited Memories.

If, as is not improbable, the presidential address to the British Association has the effect of reviving the dying embers of the use-inheritance discussion, it may not be out of place at this juncture to direct attention again to the fact that it is impossible to regard some of the instincts of insects as inherited memories.

Not only do the instincts of the neuters among the social Hymenoptera stand like a "lion in the path," but there are the less prominent but equally important section of instincts connected with oviposition, where, as in the case of some spiders, the female protects her eggs after deposition, with no possibility of the action being transmitted to the offspring so protected.

A bug, *Tectocoris lineola*, var. *banksi* (Don.), is recorded by Mr. Frederick F. Dodd (Transactions of the Entomological Society, 1904, pp. 483-5) as protecting its egg patch, laid on twigs of its food plant, by standing over them for a period of three weeks.

Females of some species of Psychid moths block the entrance of the larval case, which serves both as a puparium and place to deposit the eggs, with their bodies after depositing their ova.¹ Various species of Hymenoptera carefully block the entrance to the burrows where their eggs are laid, &c.

A. BACOT.

154 Lower Clapton Road, N.E., September 8.

Meteors and the Comet.

SEPTEMBER 13, 8h. 32m., mag. 1, rapid, streak, $343^{\circ}+26^{\circ}$ to $332\frac{1}{2}^{\circ}+12^{\circ}$. Radiant, $71^{\circ}+52^{\circ}$.

September 14, 9h. 19m., mag. 1, slowish, yellow, $336^{\circ}+38^{\circ}$ to $330\frac{1}{2}^{\circ}+48^{\circ}$. Radiant, $343^{\circ}+24^{\circ}$ or $347^{\circ}+15^{\circ}$.

On September 14, at 9 p.m., the comet was seen at Bristol in a 2-inch field-glass just north of 50 Cassiopeiæ as a misty patch, perhaps about equivalent to an eighth-magnitude star.

W. F. DENNING.

Bristol.

Meteors.

THE observation of meteors forms one of the most attractive branches of astronomy. No instruments are needed. The observer only requires patience, a pretty good eye, and experience, which, of course, must be learned.

Meteors fall on every night of the year. The sky may be lit with the moon, it may be murky, it may be cloudy, but still there are the meteors going on unceasingly. For every one seen by human eyes there are no doubt thousands, probably tens of thousands, unseen. Yet this branch, involving as it does star-gazing pure and simple, is a most attractive one, and in the bright years of the future it will no doubt occupy a very prominent place.

Bristol.

W. F. DENNING.

¹ "Brit. Lepidoptera," Tutt, vol. ii., p. 367.

SURVEYING FOR ARCHÆOLOGISTS.¹

III.

Instruments for the Measurement of Magnetic Azimuth alone.

THE most inefficient instrument to employ in measuring magnetic bearings is the ordinary mariner's compass, showing the compass points only.

FIG. 7.—The "points" of the mariner's compass.

But there are now mariner's compasses available in which the bearings are stated in degrees, and in many ways, the degrees running from N. and S. to E. and W., and so on. The best form of card, however, is represented in Fig. 8, in which the degrees run from N. through E., S., W. to N. again.

FIG. 8.—Compass with the circle of the horizon divided into 360 degrees, the N. point being 0°.

The magnetic bearings thus obtained should at once be changed into true bearings; this can be done approximately by reference to the appended maps, which bring together the recent results obtained by the Ad-

¹ Continued from p. 445.