

Perseids, but subsequent observations have convinced me that they had no relation with the great August shower. They probably formed the early members of a well-defined radiant of September Aurigids which I found at  $76^{\circ} + 56^{\circ}$  in 1879, and at  $77^{\circ} + 57^{\circ}$  in 1885.

It appears to me that observations of the Perseids, and of other meteor showers, are often undertaken and discussed while losing sight of a most important circumstance. I refer to the necessity of thorough training on the part of the observer, before he can possibly hope to attain a high degree of precision in recording meteor paths. Many months, if not years, of diligent practice are required to render the observer proficient, and even then there are many students who, being deficient in natural aptitude, will never succeed in the work. It seems to be the fashion at certain observatories to set a number of observers (some of whom have perhaps never registered a meteor path before) watching and recording meteors, and then to investigate their results as though they could be thoroughly depended upon. Such results are, however, practically useless when employed to test any complicated point in meteoric astronomy. It is similar to placing a man, who has never played in a cricket match before, as wicket-keeper to fast bowlers like Mold, Richardson, and Woods, and expect his performance to be creditable! In meteoric astronomy, as in many other spheres of action, skill is only to be acquired by long practice; indeed, it is difficult to single out any other branch of observation where the eye and the judgment have to be so quickly and accurately brought into play to afford the best results.

W. F. DENNING.

Bristol, January 27.

#### The Artificial Spectrum Top.

IN the interesting letters on the above subject, which have recently appeared in NATURE, there does not seem to have been any reference to the experiments of Helmholtz, as described in his "Handbuch der Physiologischen Optik," 1866, § 23. He describes the facts in minute detail, and illustrates them with numerous diagrams.

One important point not yet referred to, and described in detail by Helmholtz, is that if a disc, marked with black and white sections, be rotated with a certain rapidity, the field appears to be covered with a pattern composed of hexagonal spots; at the part of the field of vision corresponding to the yellow spot, a transverse oval figure is seen. In the centre of this figure is a dark spot surrounded by a black circle.

Each of the hexagonal spots is dark with a lighter spot in the centre, and surrounded by a red thread, which appears to be moving in minute drops. The field seems to be pervaded by a greenish hue, which flows towards the yellow spot.

These experiments, which I have verified on every point, have a very important bearing on the photo-chemistry of the retina and on colour vision.

Hendon, January 26.

F. W. EDWARDS-GREEN.

IN reference to your Belfast correspondents' interesting experiments with the artificial spectrum, which were long ago included in my own experiments, a little reflection will show that when the speed of rotation is increased, we do not retain unaltered the resultant proportion of stimulus and anti-stimulus on the retina. With a slow rotation we have simultaneously on the retina a persistence image of the lines and a real image of the white card. When the speed is greater, we get simultaneously these two, and in addition a persistence image of the white card. Hence, according to my theory, the rise in scale with increased rapidity of revolution.

Colchester, January 26.

CHARLES E. BENHAM.

#### Snake Cannibalism.

THE reading of a paragraph and a letter printed in the *Mail* for October 24 and 29, reminds me of a case of one snake swallowing another, the consequences of which I witnessed. While engaged in running a survey line for a railway across a wood in this district, I noticed a snake close to me, doing its best to get out of my way, but almost unable to do so. One of my men struck at its neck with his "macheti," and succeeded in cutting the snake's head clean off. Immediately, to our great surprise, another snake of the same species slowly emerged head first, and, after a few struggles to escape, remained

motionless on the ground; a gash in its cranium, which had been cut by the same stroke that killed the larger snake, being, no doubt, the cause of death, as the body was otherwise intact. A measuring tape showed that the larger snake was 6 feet in length, and the smaller 5 feet. In this case the snake was swallowed tail first, and therefore it seems highly probable that the larger snake simply devoured it, and did not commence by trying to dispute a portion of food, such as the pigeon and frog cited in other instances.

H. TSNAGAL.

Sancti Spiritue, Cuba, November 23, 1894.

#### More about Moths.

(Communicated by Prof. S. Garman, of the Museum of Comparative Zoology, Cambridge, U.S.A.)

IN NATURE for December 6, 1894 (p. 127), Mr. Henry Cecil publishes a criticism on a previous letter of mine, which I cannot accept without a few words of remonstrance. His explanation may be correct in part, but it certainly does not cover all the ground.

That resistance alone is not necessary for the expansion of the wings of moths, may be inferred from the fact that they will often expand after an interval of several days, when the moths have been prematurely released, the irregularity in outline arising, I think, from the evaporation of moisture from the wings, and in the consequent loss of elasticity. If the newly-hatched insects are confined in a warm moist box, this trouble seems to be obviated in a large degree, and the wings occasionally attain to nearly the normal dimensions.

In raising moths artificially, it cannot be assumed that the lack of proper pressure is entirely responsible for the frequent occurrence of cripples.

All the conditions of feeding, moisture, and heat, must first be carefully considered, since departures from the normal, on any one of these lines, might so lower the vitality of the insect, that perfect development would become impossible.

The writer also speaks of the wings of the moth in the cocoon as "folded and crumpled," a statement which is entirely at variance with my own observations. In all the cases which I have noticed, the wings are perfectly smooth and unfolded from the first, the increase in size resulting from a true expansion, the nature of which has, so far as I know, never been fully explained.

L. C. JONES.

Melrose, Massachusetts.

#### THE PHYSICAL SOCIETY'S ABSTRACTS OF PHYSICAL PAPERS FROM FOREIGN SOURCES.

THE days when learning meant dead languages, and science meant collecting beetles, have passed away; science has grown and spread until it is impossible for the most comprehensive intellect to grasp more than a few twigs on its numerous branches. Organised specialisation has become necessary to scientific progress. Each subject now has its special society, and each society has as much as it can do. Every sort of time-saving arrangement is necessary if the workers in any one branch of knowledge are to be kept informed as to what others are doing.

English chemists have long been supplied by the Chemical Society with excellent abstracts of the current literature of their subject, but up to the present the only available work of the same kind on Physics has been the *Beiblätter* of *Wiedemann's Annalen*. Admirable as these are, it is impossible that a German periodical can fully meet the wants of Anglo-Saxon physicists. It is therefore most desirable that abstracts of physical papers should be published in English. The Physical Society has now set itself to supply this want, and the first number of the new volume of "Abstracts" appeared early in the present month. The *Proceedings* of the Society will in future be issued monthly, and the abstracts of foreign papers on physics will be included under the same cover. They will, however, be paged separately, so that they can be bound separately at the end of the