The refulgent patches of feathers are absent in some groups of humming birds, such as the "Hermits," but these have the habit of frequenting the gloom of the forests, and of catching the small insects that form their food from on, or beneath, the foliage, and these habits explain their absence.

Perhaps this suggestion may lead others to investigate the facts from a more strictly scientific viewpoint.

H. J. CHARBONNIER.

Rose Cottage, Olveston, nr. Bristol.

The Stinging Instinct in Bees and Wasps.

It is almost impossible to irritate a worker wasp or bumble-bee to the pitch that it will fly to attack, except when it is defending its home. The queen wasp or bumble-bee will not even defend her home. If she is disturbed when the nest is in a very early stage, she deserts it. When it is in an advanced stage she will return to it afterwards. Worker honeybees are also disinclined to attack except when defending their home. But in beating off a threatening bee as one walks through the apiary, one is very likely to get stung. The readiness to attack and the force of the attack are in proportion to the population of the colony. As soon as the nest or hive is removed, the returning bees or wasps that hover around the old place, vainly searching for it, cannot be induced to attack.

But recently I took a hive of bees out of its winter case and carried this case, which had a few of the bees crawling around the flight-holes, to a distant part of the apiary. Two hours later some of these bees still remained on the case, and I started to brush them off. They flew up angrily at me and gave me several stings. Hive-odour is evidently an important factor in the stimulation of the stinging instinct.

F. W. L. SLADEN.

Ottawa, Canada.

The American Astronomical Society.

SOME of your readers may have seen the erroneous statement in the issue of *Science* for May 9, 1919, p. 446, stating that at the next meeting of the American Astronomical Society there would be representatives from the observatories of Greenwich, Oxford, Cambridge, Vienna, and Potsdam. This statement was copied from a student publication, which confused the coming meeting with the attendance at previous meetings of the society. There will, of course, be no German or Austrian astronomers at any meeting of the society in the near future.

JOEL STEBBINS (Secretary).

Urbana, Illinois, June 11.

GRAIN PESTS AND THEIR INVESTIGATION.¹

A CONSIDERABLE number of different insects and mites occur in flour and stored grain, some of which bring about serious damage, while others are of com-

paratively little economic importance. Up to the year 1917 very little had been done in this country with the view of determining the best methods for dealing with grain pests. No trustworthy estimates were available as to the actual damage sustained by cereal crops while in storage, although there is abundant evidence that material injury is incurred to both wheat and maize, either before or after its arrival in Britain. In June, 1916, the Council of the Royal Society, as the result of a correspondence with the Board of Agriculture, appointed the Grain Pests Committee for the purpose of investigating the relative importance of grain insects, suggesting measures for combating them, and inquiring into the extent of the losses sustained. The Committee included Mr. J. C. F. Fryer (Board of Agriculture), Mr. O. E. Robinson (representing the milling trade), with Prof. Herdman as chairman. Representatives of the Liverpool grain trade and of the Incorporated National Association of British and Irish Millers were also added. Direct relations with the trades concerned were established, and problems observed in the mills and warehouses were investigated both on the spot and in the laboratory. It was decided to divide the work between several institutions in London and the Liverpool University, while further work was delegated to the zoological laboratory at Oxford.

The results obtained by the Committee's investigations are being issued by the Royal Society in two series: (1) Memoranda mainly of a provisional nature; (2) reports of the detailed investigations. Three reports and the same number of memoranda have appeared up to date. The first report, by Prof. Dendy, deals with the effect of air-tight storage upon grain insects. The earlier belief that grain weevils are almost independent of ventilation, and can live indefinitely in tightly closed vessels, is not borne out by Prof. Dendy's experiments, in which hermetically sealed vessels were used. By enclosing *Calandra granaria* and *C. oryzae* in hermetically sealed vessels containing wheat, the carbon dioxide evolved was observed to have a lethal effect upon the imprisoned insects. It was found that within the limits of a wide range of conditions as to temperature, moisture, and degree of infestation hermetical sealing is a very effective method for dealing with the weevil problem. The time taken to bring about the lethal effects appears to depend chiefly upon the relative volume of air present. In practice it is, therefore, of first importance to ascertain that hermetical sealing of the silos or other receptacles is effectively carried out.

The greater part of the second report is by Prof. Newstead and Miss Duvall on the Acarids of stored grain and flour. The most important species concerned is *Aleurobius farinae*, which is not infrequently accompanied by the predaceous mite *Cheyletus eruditus*. An excellent account of the structure and bionomics of the latter species is given: the authors express doubt whether it is ever sufficiently abundant in Nature to be effective

¹ Royal Society, Grain Pests (War) Committee. Report No. i., May, 1918. (1) Introductory Note. By the Chairman of the Committee. (2) Report on the Effect of Air-tight Storage upon Grain Insects. Part i. By Prof. A. Dendy. Report No. ii., 1918. (1) Bionomic, Morphological, and Economic Report on the Acarids of Stored Grain and Flour. By Prof. R. Newstead and H. Muriel Duvall. (2) Appendix i. By Prof. J. M. Beattie. (3) Appendix ii. By A. E. Humphries. Member of the Royal Commission on Wheat Supplies. Report No. iii., November, 1918. (1) Report on the Effect of Air-tight Storage upon Grain Insects. Part ii. By Prof. A. Dendy and H. D. Elkington. (2) Experiments with Two Secondary Grain Pests, showing their Inability to Attack Sound Wheat. By Prof. A. Dendy. (3) Observations on the Attraction of Certain Grain Beetles, especially Weevils, by Water. By Prof. A. Dendy. Memoranda Nos. i.-iii. Issued January 24, 1918.