How Spiders Hear

Zoology

T. H. SAVORY, in *The Biology of Spiders* (Macmillan):

The problem of the spider's ability to hear is more difficult than that of any other sense, and, since it is connected with the sense of touch, may be considered here.

Very simple experiments with spiders hanging in their webs seem to make it quite evident that they can hear, for they respond to all sorts of sounds by shooting out their forelegs as if reaching towards the origin of the sound. If the first pair of legs are missing, the second pair are held out in the same way, and this response can be elicited by a whistle, a cry, a sounding tuning-fork, a cough or the bark of a dog.

When we recall the many stories which have been told in illustration of the spider's apparent love of music; how they have emerged from their hiding-places at the notes of a violin; how they have come each night to sit upon a harmonium as often as it was played, and so on, there seems to be good enough reason for believing in their power to hear.

The subject must, however, be considered more fully, more experimentally. In the first place, the spider's reaction to sound is a very curious one, evoked in no other way and quite useless to the spider. If a spider, or any other animal, can hear in the same way as we can, it must be able to interpret the sensation received and to react in an appropriate way. This the spider does not do; its response is valueless.

Moreover, the response is not constant, even within the limits of the same family. The common *Epeira* responds when adult in the way described above, but young individuals of the same species generally drop from their webs at the end of a thread.

Spiders of the closely related genera *Meta* and *Cyclosa*, belonging to this same family, usually drop too in the same way, but *Zilla* scrambles home to its retreat along the free radius, which characterises its web, as quickly as possible.

When we extend our tests to spiders of other families we find contradictory results. All kinds of hunting spiders are apparently deaf and cannot be made to respond either to tuning-forks or to singing grasshoppers. A negative result of this kind can never be quite satisfactory, especially when dealing with spiders, for spiders show on occasions a stoical indifference to disturbances which do not interest or appeal to them. For example, sometimes a well-fed house-spider will not only pay no attention to a fly kicking about in the web, but will allow the fly to walk up to her, touch her, and even crawl over her without making any movement. The fact, then, that the spider "takes no notice" is not a definite proof that it does not hear, and we must fall back on other tests.

Where, for instance, are the spider's ears? From what has been said above, it will be obvious that the setae will be first suggested, and in 1883 Dr. F. Dahl found that some of them could be made to vibrate in response to the notes of a violin. These setae gained the name of Hörhaare from that date, and the fact that they are sometimes arranged in a graded series made it at least possible that setae of different lengths respond to notes of differet pitch. But even so the auditory capabilities of these setae is no proved, and Wagner, in 1888, failing to verify Dahl's results, took exactly the reverse view and insisted that the auditory hairs were only able to perceive sensations of touch. McCook's view, too, was that the sense of hearing is very rudimentary and not really distinguishable from that of touch.

We are thus led to consider the hypothesis that the delicacy of the spider's tactile sense enables it to feel the vibrations of the air which constitute sounds, in somewhat the same way as a deaf person can "hear" the Bourdon stop of an organ. It is possible that its response is a mechanical effect—exactly, in fact, what is implied by the term Barrows suggested in 1915—a positive vibrotaxis.

Science News-Letter, April 13, 1929

A Wonderful Bird

Ornithology

E. G. BOULENGER, in *Animal Mysteries* (Macaulay):

In the pelican we have a wonderful example of the manner Nature can combine not only the harpoon and rope, but also the landing net, up to 40 pounds of fish being occasionally held in the bird's enormous membranous throat-pouch before being transferred to its interior.

Ornithology
Science News-Letter, April 13, 1929

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912

Of SCIENCE NEWS-LETTER published weekly at Baltimore, Md., for April 1, 1929.
District of Columbia
Washington City
ss.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared Edwin E. Slosson, who, having been duly sworn according to law, deposes and says that he is the Publisher of the SCIENCE NEWS-LETTER and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher, Edwin E. Slosson, 21st and B Sts., N. W., Washington, D. C

Editor, Watson Davis, 21st and B Sts., N. W., Washington, D. C.

Managing Editor, Watson Davis, 21st and B Sts., N. W., Washington, D. C.

Business Manager, Watson Davis, 21st and B Sts., N. W., Washington, D. C.

2. That the owner is:

Science Service, Inc., 21st and B Sts., N. W., Washington, D. C., a non-profit making corporation and scientific institution.

3. That the known bondholders, mortgagees, and other security holders owning or holding one per cent or more of total amount of bonds, mortgages, or other securities are:

None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases were the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

Edwin E. Slosson,
Publisher.

Sworn to and subscribed before me this 25th day of March, 1929.

[SEAL]

Charles L. Wade.
(My commission expires April 6, 1933.)

There is an ever increasing number of human beings who do not develop an appetite, even when undernourished, a well-known physiologist declares.