between the number of tarsal receptors removed and the degree of antennal response. These results show that extreme caution is necessary in interpreting negative results in behavioral studies on location of receptors and that electrophysiological methods, which can be used to discover potential receptors, must be supported by tests with living animals to discover the actual behavioral results of stimulation of the receptors.

Reactions of the Spider, *Araneus Cavaticus*, To High Intensity Sounds

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Araneus cavaticus, an orb-weaving spider, which is very common under the eaves of the laboratory buildings, responds to high intensity (95-110 db) sounds from about 150 - 2000 c.p.s. by thrusting out the front legs. This reaction has been described previously for other species, and araneologists have generally agreed that it results from stimulation by vibrations of the web in the sound field. This was shown to be false by experiments in which the resonant properties of the webs were altered without affecting the thresholds of response and by tests with spiders removed entirely from their webs and fastened onto wax blocks without affecting the response. Furthermore, when the web itself was vibrated, without airborne sound being present, an entirely different reaction was elicited. The receptors involved are fine hairs on the bodies of the spiders. These are sensitive to air currents, and the passage of a continuous air-current over the body of a spider abolishes the response to sounds. The response seems, therefore, to be the result of the movements of the hairs by the high velocity movements of air particles in the high intensity sound fields. A review of the past work shows that this interpretation resolves the differences between the seemingly contradictory observation made previously. It is probable that sounds of such high intensities have little biological significance for these spiders.

Field Studies on Acoustical Behavior of Certain Chironomidae and Culicidae

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For three successive summers, 1955-57, attempts have been made to use recorded wing sounds and various types of artifical sounds to attract or repel mosquitoes, chiefly *Aedes vexans* and *A. stimulans*, in the field. The results have been uniformly negative for either males or females.

These results are in sharp opposition to earlier reported work on males, and laboratory investigations will be necessary to determine why.

Swarms of Chironomids (Tendipedids) were found to respond to certain frequencies of sound, either pure tones or human voices by gathering near the sound source. The reaction was elicited by frequencies of 125 and 250 c.p.s., the latter being the more effective. The intensities needed were low — about 5-10 db above the ambient noise level. The biological significance of the reaction was not discovered. Specimens of the Chironomid which was studied were sent to Dr. S. Roback for identification and proved to be a new species which he is describing.

Claspers and Siphon Sacs of the Spiny Dogfish, Squalus acanthias

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Electrical stimulation of the clasper muscles of *Squalus acanthias* with an inductorium reveals that, during copulation, the clasper is flexed medially, forming an angle of ca. 90° with the long axis of the body. The copulatory position is therefore similar to that in *Scylliorhinus canicula* in which species the male coils about the cloacal region of the female and inserts but one clasper at a time. Once the clasper enters the oviduct, its distal end bends sharply and causes a prominent spur to project outward in the opposite direction. Simultaneously a cartilaginous hook or claw, the flat surface of which had previously rested against the rhipidion of the clasper, now revolves through 90° and, together with the spur, penetrates the wall of the oviduct thus securely anchoring the clasper. In this position sperm pass from the urogenital papilla into the clasper groove and thence into the oviduct. Secretions from the siphon sacs not only lubricate the clasper during intromission but may also contribute to the seminal fluid.

The siphon sacs are paired, subcutaneous, muscular epithelium-lined bladders, situated on each side of the midline between the skin and belly musculature. Each sac ends blindly anteriorly and opens into the clasper groove posteriorly. In *Squalus acanthias* they are relatively small, measuring ca. 12% of the total body length and each is capable of holding a maximum of 6 to 15cc of fluid. When the muscular walls of the sac are stimulated electrically they contract to 85% of their original length. The siphon sacs normally contain a small quantity (0.2 cc) of clear, sticky fluid which is secreted by numerous large goblet-like cells present in the stratified epithelium lining the lumen of the sac. The secretion has a pH of 5.8, and contains urea (56 - 188 mM), Na^+ (204-362 mN), Cl^- (265-403 mN), K^+ (5.8 mN), and 4.42 mg N/ml. Paper chromatograms fail to detect glucose, fructose, or sucrose in the secretion. There is no evidence that the siphon sacs are normally filled with sea water.