LABORATORY EXERCISE 26:
Courtship and Reproduction, Part I: Pheromones, Touch & Sight

The study of courtship and mating in most insects reduces to a study of communication systems, by means of chemical, visual, tactile and acoustical cues exchanged in a courtship sequence that may be more or less complex and which may utilize one, several or all of the above-mentioned “media” of communication. Ideally, we should have living insects to use in this lab exercise, but even if we did there is no guarantee that the insects would perform as desired.

A. Chemical Cues:

Examine and handle a living cockroach: *Blaberus*, *Periplaneta*, *Gromphadorhina*, *Nauphaeta*; any one will do. Note the noticeable odor produced by most roaches: this is essentially the pheromone of sexual attraction, mixed in this case with some alarm substances to induce dispersal of other roaches away from the disturbing stimulus (i.e., you). It is thought to be produced primarily by the prothoracic glands, but may also be elaborated by glands present in the abdominal segments.

Examine the specimens from the Lepidoptera collection of the University; particularly the silkworm moths (Saturniidae). You should be able to tell males from females based solely on the size and complexity of the pectinate antennae: male antennae are large and bushy to receive very low concentrations of sexually attractive pheromones produced by the females.

B. Tactile Cues:

Many insects have elaborate organs of one sort or another for manipulating (seems like the best word) the opposite sex in an appropriate manner. In the dobsonfly (*Corydalus cornutus*, order Megaloptera), the mandibles of the male are greatly enlarged for seizing and carrying the female. The same dimorphism is true of many carabid (ground) beetles, notably staghorn beetles, but in these insects the enlarged mandibles of the males are used for sparring with rival males. Dermapterans (earwigs) display sexual dimorphism at the opposite end of the body, with asymmetrically enlarged and sclerotized cerci in the male and more symmetrically developed cerci in the female. Examine specimens and demonstrations of the above-mentioned insects. Make a drawing (**Drawing #49**), comparing the pincers of male and female earwigs. It should be mentioned that the functional significance of asymmetrical cerci in male earwigs is not totally understood; they appear to be involved in more efficient clasping during copulation.

C. Visual Cues:

Of course vision plays a primary role in the courtship sequences of many flying insects, and as a consequence the wings of many insects are dimorphically pigmented. Numerous day-flying Lepidoptera illustrate this spectacularly; see demonstrations (be careful of them). Note also the sexual dimorphism in the hind wings of Monarch butterflies (*Danaus plexippus*). The enlarged lump on the wing vein is a glandular mass from which the abdominal “hair pencils” of the male pick up sex pheromones to apply to the female’s antennae or palps.

Sexual dimorphism is also present in the compound eyes of many species of insects, with males possessing larger eyes than females. Examine this phenomenon in a dipteran or mayfly species, and draw (**Drawing #50**) the heads on the same page for comparison.