

## CHAPTER 4

# THE ANATOMY OF THE FLEA IN RELATION TO ITS TAXONOMY

As in the case of all insects, the body of the flea is divided into head, thorax and abdomen. Each of these regions with its appendages is of taxonomic importance.

**HEAD:** The division of fleas into suborders is based upon the presence or absence of a dorsal sulcus, which when present divides the head into anterior and posterior parts with free movement between. This hinging point extends from the antennal grooves over the top of the head. The antennae, one on each side of the head, lie in the antennal groove. The nature of the antenna as well as the groove occasionally has importance in classification. The antennal grooves divide the head into a post-antennal region and a pre-antennal region. The bristles and spines found upon each are of taxonomic importance. The pre-antennal region is divided into a forward frons and a lower gena. Many fleas bear on their frons a small notch or tubercle which is known as frontal notch or frontal tubercle. In many cases the lower portion of the gena is modified into a series of black flat teeth which make up the genal comb or ctenidium. In at least one case (*Trichopsylloides*) the lower margin of the gena is studded with genal spinelets. In fleas, eyes may be absent or there may be vestiges of varying density or simple eyes, variously shaped and generally jet black. The bristles vary in nature. Generally these taper evenly from the base to the tip, but in *Stenistomera* they are fattened midway along the length. In some cases bristles are heavily pigmented and stout in which case they are called spiniforms. This condition is well expressed in *Ctenophyllus* and *Peromyscopsylla*. In case there are 2 rows of bristles on the gena the lower row is called the ocular or genal row and the bristle closest to the eye or eye position is called the ocular bristle.

Of the mouth parts, generally only the labial palpi are of systematic value, the length and number of segments appearing occasionally in descriptions. In the bat fleas, however, the shape of the maxillae is important. These may be truncate or acuminate.

**THORAX:** Considerable space has been devoted to the structure of the siphonapteran thorax but taxonomically the only portion which has any great significance is the pronotum and the absence or presence on it of the pronotal comb or ctenidium. When present this comb varies in the number of the stout black teeth and in one case (*Corypsylla*) "in-

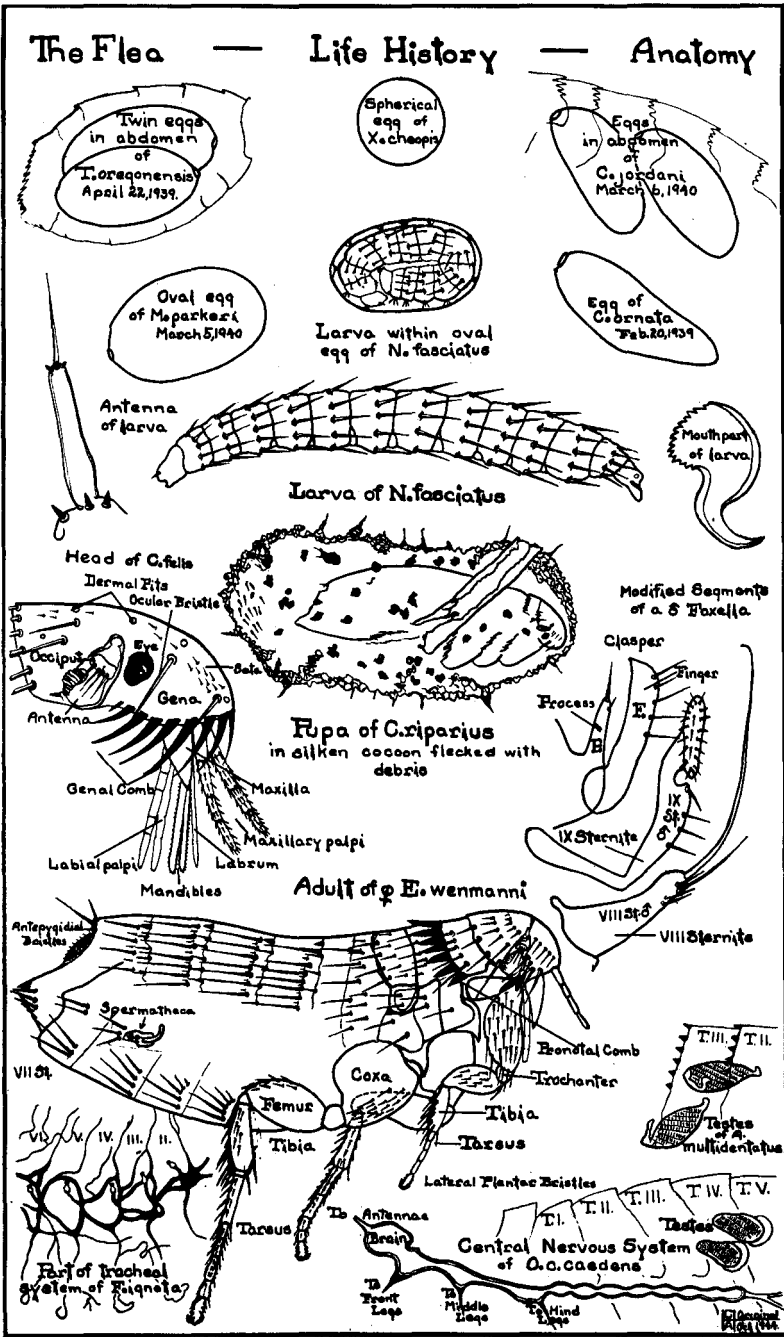


FIG. 3. Life cycle of the flea, and anatomical references used in illustrations following.

distinct pseudospines" are present, and yet in another (*Mioctenopsylla*) the teeth are short and no more heavily pigmented than the pronotum itself.

**LEGS:** The arrangement and number of the bristles on the tarsus of the flea leg is of considerable importance in generic delineation. Occasionally the armature on the inner surface of the hindcoxa is important. In *Conorhinopsylla* segments I and II of the hindtarsus are hairy and bear a number of long dorsal bristles. In *Tarsopsylla* segment I of tarsus III is longer than II, III, and IV taken together.

**ABDOMEN:** Three features of the flea abdomen make it of importance taxonomically; the number of rows of bristles on each segment, the presence or absence and the number of antepygial bristles, and the genitalia. Each segment consists of a dorsal tergite and a ventral sternite. The tergite may have its apical border denticulate as in *Doratomyssa* and this border may be armed with apical spinelets which may be pseudoctenidia as in some bat fleas, heavy and tooth-like as in *Atyphloceras* or just small pale teeth as in many other fleas. The VII tergite usually bears from 1 to 4 stout antepygial bristles of varying length on each side. These are of systematic importance.

Frequently as one becomes better acquainted with fleas, he has only to glance at the genitalia to make determinations. The genitalia are then of tremendous taxonomic importance. In the male the genitalia have evolved in part from the ninth abdominal segment, the tergite forming the clasper which consists of a broad plate, ventrally prolonged to form the manubrium and dorsally bears the protuberance called the process of the clasper. Hinged to the clasper is its movable process the finger (exopodite) whose shape, size and armature are very significant. Shape, structure and armature of the ninth sternite are also taxonomically important. The penis with its springs and paramere do occasionally have systematic value. In the female the apical outline of the seventh sternite is of tremendous importance. Once in a while the armature of this sternite is important taxonomically. Some investigators have had a tendency to minimize the importance of the shape and structure of the spermatheca (receptaculum seminis), a heavily sclerotized sperm holding body within the abdomen of the female, but the author has always stressed this organ with special illustrations. The organ consists of a body or head and a tail or appendix, the appendix often with a terminal appendage. In most fleas this organ is single but in *Atyphloceras* and *Hystrichopsylla* there are two of these organs in each female.