

## A Mosquito Taxonomic Glossary

## IX. The Larval Cranium\*

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For a full explanation of this project see Part I (Knight 1970). As before, terms recommended for standardized use are given fully capitalized. Synonyms or terms used in error are in lower case and underlined. Standardized abbreviations are also suggested. An appendix presenting supplementary information is included.

Readers are reminded that this is a preliminary presentation and that when all parts are completed, they will be thoroughly revised and issued under a single cover. Because of this, all individuals interested in mosquito systematics are urged to comment fully on any portion of the included text with which they take exception.

Part VIII of this series dealt with the larval chaetotaxy (Knight and Laffoon 1971).

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accessory eye. - See STEMMA.

accessory gill. - See CEPHALIC PAPILLA.

accessory tracheal gill. - See CEPHALIC PAPILLA.

adult eye. - See COMPOUND EYE.

anlagen of the adult eye. - See COMPOUND EYE.

ANTACORIA (An). - In arthropods, the antenna-bearing membrane covering the antennal socket. See appendix.

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ante-clypeus. - See MEDIAN LABRAL PLATE.

anteclypeus. - See MEDIAN LABRAL PLATE.

ANTENNA (A). - In insects and myriapods, the anteriormost paired segmental appendage of the head. In culicid larvae, inserted anterolaterally on the head, with a slender basal segment which may be the scape and a distal structure (seta 6-A of Knight and Laffoon 1971, 162; antennal sensory cone of Zacharuk, Yin and Blue 1971, 273) which may be the equivalent of the antennal parts distal to the scape.

antennal foramen. - See ANTENNAL SOCKET.

antennal peduncle. - See ANTENNAL PROMINENCE.

ANTENNAL PROMINENCE (APr). - In culicid larvae (Christophers 1960, 188), the anterolateral antenna-bearing lobe of the cranium; a part of the ocular lobe of certain authors. (Syn.: antennal peduncle, Lewis 1949, 63.)

ANTENNAL PUNCTURE (APu). - In culicid larvae, a small dorsal cuticular break in the continuity of the exocuticle just beyond the base of the antenna, circular in surface view, apparently the terminal part of a sensillum. (Syn.: basal sensillum, Belkin 1962, 560.) See appendix.

ANTENNAL RIDGE (AR). - In culicid larvae, the thickened rim around the outer margin of the antennal socket. See appendix.

antennal shaft. - See SCAPE.

ANTENNAL SOCKET (AS). - In arthropods having the cranial wall sclerotized close to the antennal base, the unsclerotized membrane-covered area supporting the antenna. In culicid larvae (DuPorte 1946, 394). (Syn.: antennal foramen, Cook 1944b, 40.)

ANTENNIFER (Af). - In many arthropods, an attached or detached pivot on the sclerotized rim of the antennal socket on which the antenna articulates. In some culicid larvae, two detached presumed antennifers are present. See appendix.

anterior arm. - See ANTERIOR TENTORIAL ARM.

anterior arm of the tentorium. - See ANTERIOR TENTORIAL ARM.

anterior articulation. - See ANTERIOR MANDIBULAR ARTICULATION.

anterior articulation of mandible. - See ANTERIOR MANDIBULAR ARTICULATION.

anterior articulation of the mandible. - See ANTERIOR MANDIBULAR ARTICULATION.

anterior bar. - See TORMA.

anterior inter-tormal bar. - See ANTERIOR PALATAL BAR.

anterior intertormal bar. - See ANTERIOR PALATAL BAR.

ANTERIOR MANDIBULAR ARTICULATION (AMA). - In culicid larvae (Cook 1944b, 50) and most other insects, the junction line along which the preartis and precoila come into contact during mandibular movements; the mandibular articulation associated with the clypeus. (Syn.: anterior articulation, Snodgrass 1959, 17; anterior articulation of mandible, Menees 1958b, 128; anterior articulation of the mandible, Farnsworth 1947, 138; dorsal articulation, Snodgrass 1959, 17.) See appendix.

ANTERIOR PALATAL BAR (APB). - In culicid larvae, a transverse labropalatal structure formed of a pair of well-sclerotized lateral parts articulating on the mesal tormal processes and a short, pale, flexible interposed mesal unit. (Near syn., originally used for one pigmented lateral part only: epipharyngeal bar, Snodgrass 1959, 13; trabecula palatina, Shipitsina 1936, 354; transverse postpalatal bar, Pao and Knight 1970, 122.) Syn.: anterior inter-tormal bar, Menees 1958b, 131; anterior intertormal bar, Pucat 1965, 45; anterior palatal crossbar, Cook 1944b, 48; post-palatal bar, Christophers 1960, 202; postpalatal bar, Christophers 1960, 198; transversal girdle, Bekker 1938, 439; transverse bar, Shalaby 1956, 146; transverse girdle, Farnsworth 1947, 141.) See appendix.

anterior palatal crossbar. - See ANTERIOR PALATAL BAR.

anterior process. - See LATERAL TORMAL PROCESS.

anterior process of apodeme. - See LATERAL TORMAL PROCESS.

anterior process of the labral apodeme. - See LATERAL TORMAL PROCESS AND MESAL TORMAL PROCESS.

anterior shelf. - See MEDIAN LABRAL PLATE.

ANTERIOR TENTORIAL ARM (ATA). - In most insects and myriapods, the usually elongate apodeme extending posteriad from the anterior pit, ending free (myriapods and some insects) or in contact with end of posterior tentorial arm (most insects); sometimes with secondary arms. In culicid larvae (Cook 1944b, 40), apex in contact with posterior tentorial arm. (Syn.: anterior arm, Cook 1944b, 47; anterior arm of the tentorium, Christophers 1960, 203; tentorial arm, DuPorte 1946, 394.)

anterior tentorial invagination. - See ANTERIOR TENTORIAL PIT.

ANTERIOR TENTORIAL PIT (ATP). - In most insects and myriapods, the circular to elongate sector of the epistomal suture aligned with the outer end of the anterior tentorial arm. In culicid larvae (Cook 1944b, 40), near the dorso-lateral end of the cibarial bar close to its junction with the postantennal buttress. (Syn.: anterior tentorial invagination, DuPorte 1946, 412; tentorial invagination, DuPorte 1946, 394.)

antero-median lobe. - See ANTEROMEDIAN PALATAL LOBE.

ANTEROMEDIAN PALATAL BRUSH (APBr). - In most culicid larvae, the distal, unpaired brush formed by some of the long hairs attached to the anteromedian palatal lobe. (Syn.: median tuft of bristles, Jones 1960, 459.) See PALATAL BRUSH.

ANTEROMEDIAN PALATAL HAIR (APH). - In culicid larvae, any labropalatal hair between the inner edges of the lateral palatal penicular areas. (Syns. and terms covering particular kinds of anteromedian palatal hairs: ental palatal hair, Shalaby 1957a, 148; median bristle, Farnsworth 1947, 147; palatal hair, Shalaby 1956, 143; palatal spine, Shalaby 1957b, 272; supra-palatal hair, Shalaby 1957a, 148; suprapalatal hair, Shalaby 1957b, 272.) See appendix.

ANTEROMEDIAN PALATAL LOBE (APL). - In most culicid larvae, the distal, unpaired, labropalatal lobe; usually bearing a brush of hairs. (Syn.: antero-median lobe, Bekker 1938, 439; labrum of Patton and Evans 1929 and of Salem 1931, 393, but not of other authors; median brush, Pucac 1965, 50; median labral brush, Pucac 1965, 50; median lobe, Farnsworth 1947, 140; palatum of Raschke 1887, 139 and some other culicid authors but not other entomologists.)

ANTEROMEDIAN PALATAL PENICULAR AREA (APPA). - In many culicid larvae, the specialized cuticular area bearing the brush on the anteromedian palatal lobe.

apodeme. - See TORMA.

apodeme of feeding brush. - See TORMA.

apodeme of the external messorial muscle. - See LATERAL INTERTORMAL APODEME.

apodeme of the feeding-brush. - See TORMA.

apotome. - See DORSAL APOTOME.

aulaeum. - See VENTROMENTUM.

auleum. - See VENTROMENTUM.

basal plate of the flabellum. - See LATERAL PALATAL PENICULAR AREA.

basal sensillum. - See ANTENNAL PUNCTURE.

BLACK-SPOT AREA (BA). - In culicid larvae, (Thompson 1905, 167) the darkly pigmented, ventromesally directed middle division of the paraclypeal lobe.

bordering line of larval head. - In culicid larvae, applied by Thompson (1905, pl. 15) to a "line" which we believe is an effect given by seeing the clypeolabral ridge through the part of the clypeus which overlaps it. (Syn.: border line, Thompson 1905, 169.)

border line. - See bordering line of larval head.

brush sclerite. - See LATERAL PALATAL PLATE.

cephalic apotome. - See DORSAL APOTOME.

cephalic cleavage line. - See EPICRANIAL ECDYSIAL LINE.

cephalic fan. - See LATERAL PALATAL BRUSH.

cephalic gill. - See CEPHALIC PAPILLA.

CEPHALIC PAPILLA (CPa). - In certain culicid larvae (Lewis 1949, 66), one of one or more paired protruding vesicular expansions of cephalic articulatory membranes; in at least some cases serving as a gill. (Syn.: accessory gill, Komp 1923, 125; accessory tracheal gill, Komp 1923, 134; cephalic gill, Lewis 1949, 62; cephalic tracheal gill, Lewis 1949, 65; gill, Komp 1923, 134; head gill, Lewis 1949, 66.) See appendix.

cephalic tracheal gill. - See CEPHALIC PAPILLA.

cervical collar. - See COLLAR.

chisel-shaped spine. - See MIDPALATAL BRUSH HAIR.

chitinous apodeme of epipharynx. - See appendix and TOMA.

chitinous bar. - See CIBARIAL BAR.

CIBARIAL BAR (CB). - In culicid (Cook 1944b, 41) and some other nematoceros larvae, a paired cranial element of the cibarial wall just anterior to the mouth, its dorsolateral part being a narrow process of the clypeus in front and lateralia behind, its ventromesal part being an arm of uncertain homology extending dorsolaterad from the labiohypopharynx. When this bar is present, the precoila, anterior tentorial pit, lateral oral bar and outer end of the epistomal suture are often or always associated with it. (Syn. for culicids: chitinous bar, Christophers 1960, 202; hypopharyngeal bar, Snodgrass 1959, 11; suspensorium, Christophers 1960, 202.) Shalaby (1956, 149; 1957a-c except 1957a, 147 and 1957c, 430) applied the term mandibular apodeme to a part of the cibarial bar. See appendix.

cleavage line. - See ECDYSIAL LINE.

clypeal suture. - In certain insects, used either (1) in the sense of our epistomal suture, or (2) in the sense of a transverse suture dividing the clypeus into an anteclypeus or preclypeus and a postclypeus. In culicid larvae, incorrectly applied by Shalaby; see appendix entry on CLYPEUS.

clypeofrons. - See FRONTOCLYPEUS and DORSAL APOTOME.

clypeo-frontal suture. - See FRONTAL ECDYSIAL LINE.

clypeofrontal suture. - See FRONTAL ECDYSIAL LINE.

clypeo-labral suture. - See CLYPEOLABRAL SUTURE and MEDIAN LABRAL PLATE.

clypeolabral inflection. - See CLYPEOLABRAL RIDGE.

CLYPEOLABRAL RIDGE (ClR). - In most insects, the internal ridge associated with the clypeolabral suture when this suture is not wholly membranous. In culicid larvae, apparently normally or always continuous in association with the full length of the clypeolabral suture between the apices of the

opposite clypeolabral straps, generally appearing slightly to much darkened partially because the observer usually sees two layers of cuticle (this ridge and the overlapping part of the clypeus) at once. (Syn.: clypeolabral inflection, DuPorte 1946, 394.) See appendix. Compare postclypeus and bordering line of larval head; see appendix entry on CLYPEUS.

CLYPEOLABRAL STRAP (CStr). - In culicid larvae, a paired straplike cranial process made up of the end of the clypeolabral ridge and the adjacent lateral corners of the paraclypeal lobe and median labral plate, articulating distally with the base of the torma. See appendix.

clypeolabral sulcus. - See CLYPEOLABRAL SUTURE.

CLYPEOLABRAL SUTURE (CIS). - In most insects, the transverse facial suture between the labrum and clypeus or frontoclypeus. In culicid larvae (Cook 1944b, 40), sometimes difficult to trace mesally because of the curvature of the head in this area; terminating at apex of clypeolabral strap, difficult to distinguish from other parts of this strap. (Syn.: clypeal suture, Shalaby 1956, 140; clypeo-labral suture, Patton and Evans 1929, 232; clypeolabral sulcus, Snodgrass 1959, 5.) The clypeo-labral suture of Salem (1931, 394) is apparently the median labral plate, because he equated it to the anterior shelf of Thompson (1905).

CLYPEOPALATUM (Cp). - In insects, the part of the palatum between the lower margins of the clypeus; forming the roof of the cibarium. In culicid larvae and in some other insects, the part of the palatum behind the tormae and inter-torma. (Syn.: epigusta, Patton and Evans 1929, 238; post-epipharyngeal lobe, Christophers 1960, 198; post-epipharynx, Patton and Evans 1929, 238.) Compare LABROPALATUM and PALATUM. See appendix.

CLYPEUS (Clp). - In insects a median facial sclerite (sometimes transversely divided into two sclerites; sometimes continuous mesally with the labrum or frons) basal to the labrum, giving origin to the dorsal cibarial muscles, usually bounded anteriorly by the clypeolabral suture and posteriorly by the epistomal suture. If the transverse part of the epistomal suture is lacking, the frons and clypeus are continuous and thus form a frontoclypeus; in larval insects the dorsal apotome, if present, is commonly formed from parts of the frons and clypeus. Often misidentified in culicid larvae. See appendix. Compare FRONTOCLYPEUS and DORSAL APOTOME.

COLLAR (Col). - In many animals, a circular or semicircular strip or band at the back of the head or front of the trunk or thorax, the morphological makeup varying with the taxa. In culicid larvae (Cook 1944b, 43), the modified, usually heavily pigmented, posterior rim of the cranium, including much of the postocciput, the back edge of the gula and a band just in front of the main part of the postoccipital suture. (Syn. in culicids: cervical collar, Christophers 1960, 197; occiput, Shalaby 1956, 141; postocciput of some authors.)

COMPOUND EYE(CE). - In most insects and in some other arthropods, a paired cephalic organ composed of many (or sometimes a few, rarely only one) closely associated ommatidia, each ommatidium being a set of photoreceptor cells; apparently rarely functional in endopterygotous larvae; sometimes

divided into two units, as in gyrenids. In culicid larvae (Hurst 1890, 170), apparently present in a developing state during all instars, becoming prominently pigmented and perhaps functional in older larvae. (Syn. for culicid larvae: anlagen of the adult eye, DuPorte 1946, 393; imaginal eye, Russell et al 1943, 14; primordia of imaginal eye, Farnsworth 1947, 147; primordia of the compound eye of the imago, Imms 1907, 292; primordia ommatidia of the adult, Farnsworth 1947, 138.) Shalaby (1957a-c) used the term larval eye for both the compound eye and the stemma. Similarly, Wesenberg-Lund (1921,10) used the term lateral eye for both the compound eye and the stemma.

connective plate. - See LATERAL PALATAL PLATE.

CORONAL ECDYSIAL LINE (CEL). - In many immature arthropods, the median unpaired posterior part of the epicranial ecdysial line, considered absent if the paired frontal ecdysial lines reach the posterior cranial margin separately. In culicid larvae, sometimes absent, sometimes short and ending posteriorly in the coronal gap in later instars. (Syn.: coronal suture, Cook 1944b, 52, though some culicid workers have included the entire coronal gap as a part of the coronal suture; occipital stem, Pucac 1965, 49.)

CORONAL GAP (CG). - In many nematoceros larvae, the narrow or broad emargination in the posterodorsal edge of the cranium to which the epicranial ecdysial lines extend. In culicids, present in later larval instars. Sometimes regarded as part of the coronal ecdysial line. (Syn.: occipital cleft.) See appendix.

coronal suture. - See CORONAL ECDYSIAL LINE.

CRANIUM. - In arthropods, the sclerotized parts of the head, excluding the segmental appendages. (Syn.: head capsule.)

cross bar. - See LATERAL PALATAL CROSSBAR.

cross-bar. - See LATERAL PALATAL CROSSBAR.

DORSAL APOTOME (DAp). - In many larval insects (Hinton 1963, 41), the cranial area bounded laterally by the frontal ecdysial lines and apically by an imaginary line between the most apical parts of the frontal ecdysial lines; there is no necessary homology between the cranial areas included in the dorsal apotome of different insects. (Syn. for larval culicids; cephalic apotome, Snodgrass 1959, 6; facial apotome, DuPorte 1957, 67; scutum of the third metamere, Farnsworth 1947, 139. At least partial synonyms as used by some culicid authors: clypeofrons, clypeus, epistoma, frons, frons-clypeal area, front, frontoclypeus.)

dorsal articulation. - See ANTERIOR MANDIBULAR ARTICULATION.

dorsal articulation of the mandible. - See PRECOILA.

DORSAL ECDYSIAL LINE. - In arthropods, any dorsal preformed line of weakness along which the cuticle splits (usually) or bends during ecdysis. See appendix entry on ECDYSIAL LINE.

dorsal labral sclerite. - See MEDIAN LABRAL PLATE.

dorsal sclerite of labrum. - See MEDIAN LABRAL PLATE.

DORSOMENTAL TOOTH (DT). - In nematoceros larvae, the distal teeth or serrations of the dorsomentum. (Syn. for culicids: mental tooth of authors; submental serrations, Pucat 1965, 61.) See appendix.

DORSOMENTUM (Dm). - In some culicid and chironomid larvae, the upper and more distal of the two transverse subdivisions produced when the mentum is completely (culicids) or incompletely (chironomids) divided by a transverse inflection of membrane. The lower subdivision is the ventromentum; in chironomids the two subdivisions are confluent mesally (Saether 1971, 1237). (Syn.: hypochile, Chaudonneret 1962, 475; hypochilum, Gouin 1959, 199; hypostomial lobe, Snodgrass 1959, 21; Hypostomium [German,] Anthon 1943, 22; hypostomium, Snodgrass 1959, 8; labial plate, Felt 1904, in part, 264; mental plate, Howard, Dyar and Knab 1913, 87; mental sclerite, Thompson 1905, 168; mentum, Patton and Cragg 1913, 199, and many other authors; submental plate, Pucat 1965, 59; submentum, Cook 1944b, in part [culicines], 45; under lip, Nuttall and Shipley 1901, 55.)

ecdysial cleavage line. - See ECDYSIAL LINE.

ECDYSIAL LINE. - In immature arthropods, any preformed line of weakness of the cuticle involved in opening or folding at ecdysis. (Syn.: cleavage line, Snodgrass 1959, 5; ecdysial cleavage line, Matsuda 1965, 58; ecdysial suture, DuPorte 1946, 394.) See appendix.

ecdysial suture. - See ECDYSIAL LINE.

egg breaker. - See EGG-BURSTER.

egg-breaker. - See EGG-BURSTER.

egg-breaker spine. - See EGG-BURSTER.

egg burster. - See EGG-BURSTER.

EGG-BURSTER (EBu). - In many insects, a specialized structure of the embryonic or first-instar larval cuticle, thought to aid in opening the egg chorion during hatching. In culicids (Howard, Dyar and Knab 1913, 97), a specialized median oval area of the dorsal apotome, consisting of a pale peripheral area and a dark, central conelike area. (Culicid syn. including terms apparently intended for the central dark area only: egg-breaker, Hearle 1929, 96; egg-breaker, Marshall 1938, 11; egg-breaker spine, Christophers 1960, 162; egg burster, Landis 1923, 29; egg-tooth, Gater 1934, 26; hatching spine, Harwood and Horsfall 1957, 556.)

egg-tooth. - See EGG-BURSTER.

endoskeletal arch. - See INTERTORMA.

ental palatal hair. - See ANTEROMEDIAN PALATAL HAIR.



EPICRANIAL ECDYSIAL LINE. - In many immature arthropods, any part of the dorsal ecdysial line extending onto the cranium, usually made up of an unpaired coronal ecdysial line and paired frontal ecdysial lines. (Syn. for culicid larvae: cephalic cleavage line, Snodgrass 1959, 5; epicranial suture, Patton and Evans 1929, 234.) Early culicid authors generally failed to distinguish between the parts of the epistomal suture and epicranial ecdysial line which parallel each other. See appendix entry on ECDYSIAL LINE.

epicranial plate. - Applied by Marshall (1938, 40) to the culicid larval cranium exclusive of the dorsal apotome.

epicranial suture. - See EPICRANIAL ECDYSIAL LINE.

EPICRANIUM. - In insects, the upper and lateral parts of the cranium, indefinitely delimited laterally from the hypocranium when the latter is formed. Often defined in other ways, for example, as the entire cranium or as the cranium except the clypeus, eyes, postmentum and gula. In culicid larvae (Thompson 1905, 170), loosely the top of the cranium about as far laterally as the lower margin of the eyes.

epigular suture. See HYPOCRANIAL ECDYSIAL LINE.

epigusta. - See CLYPEOPALATUM.

epipharyngeal apparatus. - In culicid and dixid larvae, the midpalatal lobe together with the midpalatal brush. Used loosely and in somewhat different ways by some writers. (Syn.: epipharynx apparatus, Clements 1963, 34.) See appendix entry.

epipharyngeal bar. - See ANTERIOR PALATAL BAR and INTERTORMA.

epipharyngeal brush. - See MIDPALATAL BRUSH.

epipharyngeal hair. - See MIDPALATAL BRUSH HAIR.

epipharyngeal process. - See MIDPALATAL SENSILLAR ROD, MESAL INTERTORMAL APODEME, and appendix entry on epipharyngeal process.

epipharyngeal sclerite. - See INTERTORMA.

epipharyngeal spine. - See MIDPALATAL BRUSH HAIR.

epipharynx. - See PALATUM, MIDPALATAL LOBE and appendix entry on epipharynx.

epipharynx apparatus. - See epipharyngeal apparatus.

epistoma. - See DORSAL APOTOME.

EPISTOMAL RIDGE (ER). - In insects, the cranial inflection associated with the epistomal suture. In culicid larvae, discontinuous mesally, well developed just lateral to the part of the frontal ecdysial line posteromesal to the antennal socket, less prominent on the upper part of the cibarial bar, and terminating near the precoila as the long arm known as the anterior tentorial arm. See falciform apodeme, paraclypeal phragma, and appendix entry for frontogenal inflection.

EPISTOMAL SUTURE (EpS). - In insects, the suture marking the boundary between the frons and clypeus, associated with the epistomal ridge, bearing at its lateral ends the anterior tentorial pits, often incomplete. In culicid larvae, incomplete mesally, prominent just lateral to the part of the frontal ecdysial line posteromesal to the antennal socket, continuing ventromesad along the cibarial bar and ending at the anterior tentorial pit. Early authors generally failed to distinguish between the posterior part of the epistomal suture and the part of the frontal ecdysial line it parallels. See paraclypeal fold.

EYE. - In animals, any photoreceptor organ composed of many photoreceptor cells, along with accessory parts such as lenses. In culicid larvae (Nuttall and Shipley 1901, 52), two specific types of eyes are present; see STEMMA and COMPOUND EYE. (Syn.: eye spot, Peterson 1951, 223; larval eye, Shalaby 1957a, 146.)

eye spot. - See EYE and STEMMA.

facial apotome. - See DORSAL APOTOME.

falciform apodeme. - Christophers (1960, 198) coined this term for that portion of the epistomal ridge posterior to a point just mesad of the antennal socket, that is the part which parallels the frontal ecdysial line. (Syn.: scythe-shaped area, Thompson 1905, 168; scythe-shaped thickening, Thompson 1905, 3rd unnumbered page after p. 202.)

fan. - See LATERAL PALATAL BRUSH.

feeding brush. - See LATERAL PALATAL BRUSH.

feeding-brush. - See LATERAL PALATAL BRUSH.

fimbria. - See LATERAL PALATAL BRUSH HAIR.

flabella. - See appendix.

flabellar apodeme. - See TORMA.

flabellar bar. - See TORMA.

flabellar hair. - See LATERAL PALATAL BRUSH HAIR.

flabellar inner retraction insertion. - See appendix.

flabellar outer retraction insertion. - See appendix.

flabellar plaque. - See LATERAL PALATAL PENICULAR AREA

flabellar plate. - See LATERAL PALATAL PENICULAR AREA.

flabellum. - See LATERAL PALATAL BRUSH and appendix entry on flabella.

**FLAGELLUM.** - The third segment of the insect antenna, usually consisting of several flagellomeres. In culicid larvae, presence as a functional larval structure questionable. Patton and Evans (1929, 235 ) applied this term to the scape.

frons. - In the insect head, a dorsal topographic area behind (or "dorsal" to) the clypeus, delimited posteriorly and laterally in various ways by different authors and in different insects and stages and thus not morphologically equivalent except in limited cases. Usually bearing the origins of the dorsal pharyngeal muscles and of most labral muscles. In culicid larvae, arbitrarily regarded as the posterior part of the dorsal apotome behind the undeveloped transverse part of the epistomal suture. (Syn.: front. Used by some culicid authors for the entire dorsal apotome.) Compare frontoclypeus.

frons-clypeal area. - See DORSAL APOTOME.

front. - See DORSAL APOTOME and FRONS.

**FRONTAL ECDYSIAL LINE (FEL).** - In many immature arthropods, the paired portion of the epicranial ecdysial line; course varying widely among insects, often not homologous between different insects. In culicid larvae, apparently normally ending in the lateral part of the clypeus about opposite the antennal socket; some authors have failed to distinguish the apical part of this line and the part of the epistomal suture lying parallel and slightly lateral to it. (Syn.: frontal suture, Patton and Evans 1929, 234; clypeo-frontal suture, Foote 1952, 448; clypeofrontal suture, Cook 1944b, 40; frontoclypeal suture, Belkin 1962, 559.) See appendix entry on ECDYSIAL LINE.

frontal pit. - In insects, conceptually a synonym of anterior tentorial pit. Patton and Evans (1929, 232) misapplied it to a point by the black-spot area (which they misidentified as the "pretentorium") distal to the anterior tentorial pit.

frontal suture. - See FRONTAL ECDYSIAL LINE.

fronto-clypeal suture. - An alternate styling of frontoclypeal suture, which see.

frontoclypeal suture. - In insects, a conceptual synonym of epistomal suture; apparently it has never been applied to the culicid larval epistomal suture as we interpret it. See appendix entry.

frontoclypeus. - In some insects, the dorsal topographic area combining the frons and clypeus; usually used for cases in which the transverse part of the epistomal suture is not developed. Not morphologically equivalent in all insects possessing it because the posterior and lateral limits are arbitrary (see frons). In culicid larvae and in many other immature insects, most of its area is included within the dorsal apotome. (Syn.: clypeofrons, Matsuda 1965, 58.)

frontogenal inflection. - See appendix entry.

frontogenal sulcus. - See paraclypeal fold.

frontogenal suture. - See paraclypeal fold.

fronto-postclypeal suture. - In culicid larvae, a term used by Shalaby (1957a, 146) for the "suture" between the parts he called the frons and postclypeus; it thus fits his concept (1956, 140) of fronto-clypeal suture. See appendix entry on CLYPEUS.

fronto-postclypeus. - In culicid larvae, applied by Shalaby (1957a, 146; 1957b-c) to a sclerite he thought was formed in certain species and instars by the fusion of the parts he called the frons and postclypeus. See appendix entry on CLYPEUS.

gena. - In insects, a loosely defined paired part of the cranium, applied in various ways in different insects, most commonly to the area between the eye and mandible. See postgena and subgena, both of which are arbitrarily separated from the gena and often said to be parts of it. In culicid larvae, used by DuPorte (1946, 394) and several later authors for ill-defined lateral parts of the cranium.

gill. - See CEPHALIC PAPILLA.

glossa. - See VENTROMENTUM.

GULA. - In some insects, the sclerotized part of the gular area. This term has been defined in somewhat different ways by some authors. In culicid larvae, applies in general to the midventral rear border of the cranium. Compare LABIOGULA and gular area.

gular apodeme. - See POSTERIOR TENTORIAL ARM.

GULAR AREA. - In most insects, the midventral rear part of the head and midventral part of the cervical wall; bounded anteriorly by the preular suture (if present) or by an imaginary line between the front edges of the posterior tentorial pits, laterally by the gular suture (if present) and a line projected posteriad from it or (if the gular suture is absent) by a line projected posteriad from the back edge of the posterior tentorial pit, and posteriorly by the prosternum. May consist entirely of gular membrane or, especially in prognathous insects, of membrane and one or more sclerites (the gula). In culicid larvae, includes the midventral rear edge of the cranium and a large area of gular membrane.

GULAR MEMBRANE. - In insects, the unsclerotized part of the gular area.

GULAR SUTURE. - In culicid larvae and in certain other insects, the paired suture lateral to the gula; a part of the postoccipital suture. Frequently misidentified along with the gula; consequently it has been used in several different ways in different insects. The gular suture of Dodge (1945) includes the present gular suture and the part of the hypostomal suture bordering the submentum. The gular suture of Patton and Evans (1929, 238) includes the present gular suture and the hypostomal suture as far forward along the submentum as the point which they misidentified as the gular pit.

hair-bearing sclerite. - See LATERAL PALATAL PENICULAR AREA. Also used by Salem (1931, 396) for the set of parts we call the LATERAL PALATAL PENICULAR AREA, LATERAL PALATAL PLATE and, probably, the LATERAL PALATAL TESSELLATED AREA. See appendix entry for flabella.

hair-brush. - See LATERAL PALATAL BRUSH.

hairbrush. - See LATERAL PALATAL BRUSH.

hairtuft. - See LATERAL PALATAL BRUSH.

hatching spine. - See EGG BURSTER.

head capsule. - See CRANIUM.

head gill. - See CEPHALIC PAPILLA.

hypochile. - See DORSOMENTUM.

hypochilum. - See DORSOMENTUM.

HYPOCRANIAL ECDYSIAL LINE (HEL). - In many immature insects, any ecdysial line extending anteriorly from the posteroventral margin of the cranium. In some instars of some culicid larvae, such a line occurs medially. (Syn.: epigular suture, Menees 1958a, 27; median postgenal suture, Crosskey 1960, 7; median suture, Cook 1944b, 44.) See appendix entry on ECDYSIAL LINE.

HYPOCRANIUM. - In insects with cranial parts on the ventral aspect, the part of the cranium facing ventrad; indefinitely delimited laterally and often not homologous among different insects. In culicid larvae (Howard, Dyar and Knab, 1913, 86), including the labiogula and the lateralia about as far laterally as the lower margins of the eyes.

hypopharyngeal bar. - See CIBARIAL BAR.

hypostoma. - See LABIOGULA.

hypostomal area. - In culicid larvae, used by Christophers (1960, 200) to designate the part of the cranium lateral to the hypostomal suture and mesal to a line along the postcoila continued posteriorly toward the occipital foramen; he considered this area to represent the base of the maxilla.

HYPOSTOMAL RIDGE (HR). - In many insects, the internal cranial ridge associated with the hypostomal suture. In culicid larvae, faint or undeveloped from the postcoila to near the point where the lateralia approach the anterolateral corner of the submentum, then well-marked for at least a short distance posteriorly along the border between the lateralia and the submentum, sometimes clearly marked to its termination at the posterior tentorial pit, often faint or absent posteriorly.

HYPOSTOMAL SUTURE (HyS). - In many insects, the sector of the subgenal suture between the postcoila and the posterior tentorial pit. In culicid larvae, faint or undeveloped from the postcoila to near the point where the lateralia approach the anterolateral corner of the submentum, then distinct for at least a short distance posteriorly forming the border between the lateralia and the submentum, sometimes traceable to the posterior tentorial pit, often faint or absent posteriorly. (Syn. in culicid larvae: maxillary suture, premaxillary suture, Cook 1944b, 52; submental-postgenal suture, Shalaby 1956, 140.) Compare GULAR SUTURE.

hypostomial lobe. - See DORSOMENTUM.

hypostomium. - See DORSOMENTUM.

imaginal eye. - See COMPOUND EYE.

INTERTORMA (In). - In some insects, a labropalatal sclerite at or near the posteroventral boundary of the labrum between the tormae, sometimes incomplete laterally or mesally. In culicid larvae, complete and with one or two pairs of labral retractor muscles inserted on it. (Syn.: endoskeletal arch, Bekker 1938, 440; epipharyngeal bar, Shipitsina 1936, 361; epipharyngeal sclerite, Salem 1931, 395; palatal bar, Cook 1944b, 54; post-epipharyngeal bar, Christophers 1960, 205; posterior inter-tormal bar, Menees 1958b, 131; posterior intertormal bar, Pucat 1965, 45; posterior palatal bar, Cook 1944b, 42; trabecula epipharyngealis, Shipitsina 1936, 354; trabecula labri posterior, Shipitsina 1936, 354.)

knife-shaped spine. - See MIDPALATAL BRUSH HAIR.

knob-like process of apodeme. - See knoblike process of lateral apodeme.

knoblike process of lateral apodeme. - Pao and Knight (1970, 121), applied this term to the basal part of the torma abutting the apex of the clypeolabral strap and including the adjacent swollen area to a point just beyond the insertion of seta l-MP, though not including any posterior arm of the torma. Salem (1931, 396) called this same basal part of the torma the knob-like process of apodeme. We do not feel that a formal term is needed for this part.

labial area. - See LABIOGULA.

labial plate. - See DORSOMENTUM and LABIOGULA

labial sclerite. - See LABIOGULA.

LABIAL SEGMENT. - In insects, the sixth and most posterior of the head segments; includes the labium.

LABIOGULA (Lg). - In certain prognathous insects including culicid larvae, a sclerite formed by the fusion of the gula and the submentum. (Syn., as used by these culicid authors, not necessarily by other authors: gula, Dodge 1945, 163; hypostoma, Pao and Knight 1970, 118; labial area, Christophers 1960, 200; labial plate, Belkin 1962, 559; labial sclerite, Belkin 1962, 559; maxillary plate, Cook 1944b, 44; subgena, Pucat 1965, 46; submentum, Patton and Evans 1929, 238.) See POSTMENTUM. See appendix.

LABIUM. - In insects, the posterior median cephalic appendage (prelabium) along with the sternal and (or) pleural areas (post labium) of the labial segment closely associated with the appendage as far proximad as the posterior tentorial pits; formed by fusion of the ancestral second maxillae. In culicid larvae its proximal limit is the imaginary pregular suture (see gular area), its lateral margin is arbitrarily taken as the hypostomal suture, and its anterior limit as an imaginary transverse line just behind the salivary orifice.

labral apodeme. - See TORMA.

labral brush. - See LATERAL PALATAL BRUSH.

labral brush apodeme. - See TORMA.

labral brush sclerite. - See LATERAL PALATAL PLATE.

labral flap. - See MEDIAN LABRAL PLATE.

labro-clypeal suture. - In some insects, sometimes used for the frontoclypeal suture. In culicid larvae, misapplied in at least two different ways by Shalaby (1956, 1957a-c). See appendix entry on CLYPEUS.

LABROPALATUM (Lp). - In insects, the part of the palatum forming the ventral wall of the labrum. In culicid larvae, the entire labral wall except the median labral plate; including within its posterior margin the paired tormae and the intertorma. Compare CLYPEOPALATUM and PALATUM. See appendix.

LABRUM (Lr). - In arthropods, the median preoral head lobe articulated on the distal margin of the clypeus, sometimes immovably fused with the clypeus; morphological significance much-disputed. Some authors apply labrum to the entire preoral lobe including the part commonly distinguished as the clypeus or epistoma. In culicid larvae, the surface of the labrum is divided into the median labral plate and the labropalatum. The culicid larval labrum of Patton and Evans (1929, 232) and of Salem (1931, 396) is the anteromedian palatal lobe. The labrum of Belkin (1962, 559) is the median labral plate.

labrum-epipharynx. - In culicid larvae, applied by Patton and Evans (1929, 232) and by Salem (1931, 393) to the mesal part of the labropalatum, apparently from the anteromedian palatal lobe to the intertorma, inclusive.

lamina infraflabellaris. - See LATERAL PALATAL PLATE.

lamina infraflabellaris anterior. - See LATERAL PALATAL PLATE.

larval eye. - See EYE, STEMMA and COMPOUND EYE.

larval ocellus. - See STEMMA.

lateral apodeme. - See TORMA.

lateral brush. - See LATERAL PALATAL BRUSH.

lateral eye. - See COMPOUND EYE and STEMMA.

lateral flabella. - See LATERAL PALATAL BRUSH.

LATERAL INTERTORMAL APODEME (LIA). - In some insects, the paired apodeme on which one of the lateral labral retractor muscles is inserted laterally on the intertorma. In anopheline larvae, distinct and inserted at the extreme lateral end of the intertorma. In culicine larvae, apparently not developed as an independent apodeme, but possibly an element of the tormal apodeme, the latter serving for insertion of both lateral labral retractor muscles. (Syn. in culicids: apodeme of the external messorial

muscle, Farnsworth 1947, 147; messorial apodeme of Cook 1944b, 48, in part.) See posterior process and posterior process of the apodeme. See appendix entry for INTERTORMA.

lateral labral brush. - See LATERAL PALATAL BRUSH and appendix entry for flabella.

lateral labral plate. - See LATERAL PALATAL PLATE.

lateral mouth brush. - See LATERAL PALATAL BRUSH.

lateral ocellus. See STEMMA.

lateral oral apodeme. - See LATERAL ORAL BAR.

LATERAL ORAL BAR (LOB). - In culicid larvae, a curved sclerite at the lateral angle of the mouth, articulated anteriorly on the cibarial bar just mesal to the precoila and posteriorly on a sclerite of the pharynx wall. (Syn.: lateral oral apodeme, Christophers 1960, 188; U-shaped sclerite of the pharynx, Farnsworth 1947,147.)

LATERAL PALATAL BRUSH (LPB). - In certain nematoceros larvae, the paired palatal brush anterolaterally on the labrum distal to the median labral plate and the torma; sometimes reduced to a few hairs. In culicid larvae, with a few to hundreds of hairs, these supported by the lateral palatal crossbars. (Syn.: cephalic fan, Puri 1931, 7; fan, Puri 1931, 25; feeding brush, Patton and Cragg 1913, 197; feeding-brush, Salem 1931, 395; flabellum, Christophers 1960, 198; hair-brush, Wesenberg-Lund 1921, 17; hairbrush, Wesenberg-Lund 1921, 16; hairtuft, Wesenberg-Lund 1921, 16; labral brush, Cook 1944b, 52; lateral brush, Howard, Dyar and Knab 1913, 86; lateral flabella, Pao and Knight 1970, 120; lateral labral brush, Pucac 1965, 45; lateral mouth brush, Farnsworth 1947, 147; lateral tuft of labrum, Wesenberg-Lund 1921, 37; lateral tuft of the labellum, Wesenberg-Lund 1921, 126; maxillary brush, Smith 1904, 184; maxillary fan, Smith 1903, 311; mouth brush, Smith 1904, 18; mouth-brush, Howard, Dyar and Knab 1913, 35; mouthbrush, Foote 1952, 449; mouth whorl, Forrest 1901, 127; rotary mouth brush, Smith 1904, 19; rotatory organ, Nuttall and Shipley 1901, 56; vortex organ, Nuttall and Shipley 1901, 56; whirling organ, Nuttall and Shipley 1901, 56; whorl organ, Theobald 1901, 30.) Compare flabella and PALATAL BRUSH.

LATERAL PALATAL BRUSH HAIR. - In culicid and some other nematoceros larvae, any hair in the lateral palatal brush. (Syns. and terms which have been used for particular types of these hairs: fimbria, Cook 1944b, 43; flabellar hair, Christophers 1960, 200; pectinate hair, Shalaby 1957a, 147; simple hair, Pao and Knight 1970, 121.) See appendix.

LATERAL PALATAL CROSSBAR (LPC). - In many culicid larvae, one of the specialized sclerotized rods extending transversely across the lateral palatal penicular area; each rod bearing a number of lateral penicular brush hairs. (Syn.: cross-bar, Christophers 1960, 204; cross bar, Pucac 1965, 51.) See appendix.



LATERAL PALATAL PENICULAR AREA (LPPA). - In certain nematoceros larvae, the specialized cuticular area bearing the lateral palatal brush. (Syn. for culicids: basal plate of the flabellum, Christophers 1960, 200; flabellar plaque, Christophers 1960, 203; flabellar plate, Christophers 1960, 198; hair-bearing sclerite of Shalaby 1956, 142, but not of Salem 1931, 396; lateral penicular area, Cook 1944b, 54; penicular area Cook 1944b, 41; tessellated membranous area, Pao and Knight 1970, 120, in part.)

LATERAL PALATAL PLATE (LPP). - In culicid and dixid larvae (Cook 1944b, 42), a sclerite intercalated between the torma and the lateral palatal penicular area. (Syn.: brush sclerite. Pucat 1965, 52; connective plate, Snodgrass 1959, 14; labral brush sclerite, Pucat 1965, 52; lamina infraflabellaris, Bekker 1938, 432; lamina infraflabellaris anterior, Bekker 1938, 432; lateral labral plate, Shalaby 1956, 146; scallop, Christophers 1960, 198; subflabellar sclerite, Bekker 1938, 439; torma of Pao and Knight 1970, 120, but not of other authors.) See hair-bearing sclerite. Also, see appendix entry.

lateral penicular area. - See LATERAL PALATAL PENICULAR AREA.

lateral process. - See LATERAL TORMAL PROCESS.

lateral process of apodeme. - See LATERAL TORMAL PROCESS.

lateral process of the lateral apodeme. - See LATERAL TORMAL PROCESS.

LATERAL TORMAL PROCESS (LTP). - In culicid larvae, a laterally directed triangular process borne distad to the middle of the torma, giving rise to the tormal apodeme or part of it. (Syn.: anterior process, Shalaby 1956, 145; anterior process of apodeme, Shalaby 1956, 147; anterior process of the labral apodeme, Shalaby 1956, 164; lateral process, Salem 1931, 399; lateral process of apodeme, Salem 1931, 396; lateral process of the lateral apodeme, Pao and Knight 1970, 121; medial process of the labral apodeme, Shalaby 1957b, 273.) See appendix.

lateral tuft of labrum. - See LATERAL PALATAL BRUSH.

lateral tuft of the labellum. - See LATERAL PALATAL BRUSH.

LATERALIA (plural only). - In most immature insects, those lateral and ventral areas of the cranium lateral to the epicranial ecdysial lines, excluding any ventral apotomes and the submentum or labiogula if either can be distinguished from the adjacent cranial parts. See appendix.

longitudinal lever. - See TORMA.

lower triangular plate. - See POSTTORMA.

mandibular apodeme. - See CIBARIAL BAR and POSTCOILA.

maxillary apodeme. - See POSTCOILA for maxillary apodeme of Shalaby 1957a (part, figure 1 only) (other culicid larval usages refer to parts of the maxilla).

maxillary brush. - See LATERAL PALATAL BRUSH.

maxillary fan. - See LATERAL PALATAL BRUSH.

maxillary plate. - See LABIOGULA.

MAXILLARY SEGMENT. - In insects, the fifth head segment; includes the paired maxillae.

maxillary suture. - See HYPOSTOMAL SUTURE.

medial process. - See MESAL TORMAL PROCESS.

medial process of apodeme. - See MESAL TORMAL PROCESS and TORMAL APODEMAL BAR.

medial process of the labral apodeme. - See LATERAL TORMAL PROCESS and MESAL TORMAL PROCESS.

medial process of the lateral apodeme. - See MESAL TORMAL PROCESS.

median bristle. - See ANTEROMEDIAN PALATAL HAIR.

median brush. - See ANTEROMEDIAN PALATAL LOBE.

median labral brush. - See ANTEROMEDIAN PALATAL LOBE.

MEDIAN LABRAL PLATE (MLP). - In culicid larvae (Cook 1944b, 60), the dorsal sclerite of the labrum, separated from the dorsal apotome by the clypeolabral suture. (Syn.: ante-clypeus, Puri 1931, 17; anteclypeus ["possibly"], DuPorte 1946, 394; anterior shelf, Thompson 1905, 169; clypeo-labral suture, Salem 1931, 394; clypeus, Howard, Dyar and Knab 1913, 84; dorsal labral sclerite, Christophers 1960, 418; dorsal sclerite of labrum, Pucat 1965, 53; labral flap, Belkin 1951, 684; labrum, Belkin 1962, 559; pre-clypeus, Gater 1934, 11; preclypeus, Puri 1931, 17; shelf, Thompson 1905, 168.)

median lobe. - See ANTEROMEDIAN PALATAL LOBE.

median palatal lobe. - See MIDPALATAL LOBE.

median postgenal suture. See HYPOCRANIAL ECDYSIAL LINE.

median process. - See MESAL TORMAL PROCESS.

median suture. - See HYPOCRANIAL ECDYSIAL LINE.

median tuft of bristles. - See ANTEROMEDIAN PALATAL BRUSH.

mental plate. - See DORSOMENTUM and MENTUM.

mental sclerite. - See DORSOMENTUM.

mental tooth. - See DORSOMENTAL TOOTH.

MENTUM. - In many insects, the part of the postmentum distad to the submentomental suture. In some nematocerans including most culicid larvae, the proximal part is produced distad as a transverse fold, the ventromentum, under the distal triangular part, the dorsomentum. (Syn.: mental plate, Patton & Cragg 1913, 198, but not all authors; metastoma, Nuttall & Shipley 1901, 74; submentum, Imms 1907, 293, Cook 1944b, in part [*Anopheles*], 47, and Pucat 1965, 42, but not other authors; under lip, Nuttall and Shipley 1901, 55; under-lip, Nuttall and Shipley 1901, 74.) See appendix.

MESAL INTERTORMAL APODEME (MIA). - In some insects, the paired apodeme of the intertorma on which the medial labral retractor muscle is inserted. In anopheline larvae, these apodemes are fused forming one mesal secondary apodeme; in culicine larvae they apparently are very short and separate (if present). (Syn. in culicids: epipharyngeal process of Shalaby 1957a, 152, in part - only the most mesal pair.) See appendix entry for INTERTORMA.

MESAL TORMAL PROCESS (MTP). - In culicid larvae, a mesally directed process borne distad to the middle of the torma. (Syn.: anterior process of the labral apodeme, Shalaby 1957b, 273; medial process, Shalaby 1956, 145; medial process of apodeme, Shalaby 1956, 147; medial process of the labral apodeme, Shalaby 1957a, 151; medial process of the lateral apodeme, Pao and Knight 1970, 121; median process, Shalaby 1957a, 168.) See appendix.

messor. - See TORMA.

messorial apodeme. - See LATERAL INTERTORMAL APODEME and TORMAL APODEME.

metastoma. - See MENTUM.

MIDPALATAL BRUSH (MB). - In culicid larvae, a paired brush of variously shaped hairs attached to the midpalatal lobe. (Syn.: epipharyngeal brush, Pao and Knight 1970, 123; palatal brush, Foote 1952, 449.) See PALATAL BRUSH.

MIDPALATAL BRUSH HAIR. - In culicid larvae, any hair in the midpalatal brush. (Syns. and terms which have been used for particular types of these hairs: chisel-shaped spine, Shipitsina 1936, 362; epipharyngeal hair, Shipitsina 1936, 362; epipharyngeal spine, Christophers 1960, 198; knife-shaped spine, Shipitsina 1936, 362.) See appendix.

MIDPALATAL LOBE (ML). - In culicid larvae, a labropalatal lobe between the tormae, behind the anterior palatal bar, ending posteriorly in the intertorma; guarding the entrance of the cibarium, bearing the midpalatal brushes. (Syn.: epipharynx of certain authors, see epipharynx in appendix; median palatal lobe, Cook 1944b, 42; post-palatal lobe, Christophers 1960, 202; postpalatal lobe, Christophers 1960, 198.)

MIDPALATAL PENICULAR AREA (MPA). - In culicid larvae, the specialized cuticular area bearing the midpalatal brush. (Syn.: palatal penicular area, Cook 1944b, 42.) Compare penicular area.

MIDPALATAL SENSILLAR ROD (MSR). - In culicine larvae, either of two paired rodlike projections of sensilla situated on the labropalatum between the midpalatal brushes. (Syn.: epipharyngeal process of Shalaby 1957a-b in part - not the most mesal pair.) See appendix.

mouth brush. - See LATERAL PALATAL BRUSH.

mouth-brush. - See LATERAL PALATAL BRUSH.

mouthbrush. - See LATERAL PALATAL BRUSH.

mouth whorl. - See LATERAL PALATAL BRUSH.

NECK (N). - In insects, the membranous tube attaching the thorax to the margins of the occipital foramen.

ocellus. - See STEMMA.

occipital cleft. - See CORONAL GAP.

OCCIPITAL FORAMEN (OF). - In insects, the posterior opening of the cranium; the neck attaches to the edge of this opening.

occipital stem. - See CORONAL ECDYSIAL LINE.

occiput. - See COLLAR.

ocular lobe. - In insects, applied by some authors to the part of the cranium including the compound eye, stemmata, and an ill-defined adjacent area. In culicid larvae, applied by some authors to most of the lateralia behind the antennal socket.

palatal bar. - See INTERTORMA.

PALATAL BRUSH. - In nematoceros larvae, any brush of close-set hairs of the palatum. See ANTEROMEDIAN PALATAL BRUSH, LATERAL PALATAL BRUSH, and MIDPALATAL BRUSH. Previously applied by Foote (1952, 449) but to the midpalatal brush only.

palatal hair. - See ANTEROMEDIAN PALATAL HAIR.

palatal penicular area. - See MIDPALATAL PENICULAR AREA.

palatal spine. - See ANTEROMEDIAN PALATAL HAIR.

PALATAL TESSELLATED AREA (PTAr). - In culicid larvae, the bossed membranous surface intervening between the median labral plate and the anteromedian palatal and lateral palatal penicular areas. (Syn.: tessellated membrane of Christophers 1960, 204, but not of Pucat 1965, 50.) Compare TESSELLATED MEMBRANE and tessellated membranous area.

**PALATUM (Pal).** - In insects, the ventral wall of the labrum and the dorsal wall of the cibarium, bounded posteriorly by the mouth, limited arbitrarily laterally by the lateral margins of the clypeus and by the usual dorsal sclerite(s) of the labrum; divided into the labropalatum and clypeopalatum. In culicid larvae, the entire labral wall except the median labral plate is considered to be palatal, as is the roof of the cibarium between the lower lateral margins of the clypeus. Palatum has been used in various other ways; compare ANTEROMEDIAN PALATAL LOBE, CLYPEOPALATUM, LABROPALATUM. (Syn.: epipharynx of certain authors.)

**paraclypeal fold.** - Used by Cook (1944b, 40) to designate what we interpret as a part of the epistomal suture, specifically the part in culicid larvae parallel to and just lateral to the frontal ecdysial line. (Syn.: frontogenal sulcus, DuPorte 1946, 394; frontogenal suture, DuPorte 1957, 68.)

**PARACLYPEAL LOBE (PL).** - In those immature insects in which the frontal ecdysial line extends into the clypeus, that paired portion of the clypeus lateral to the ecdysial line; confluent anteriorly with the median area of the clypeus if the ecdysial line does not reach the clypeolabral suture; not strictly homologous among insects because of the variable location of the frontal ecdysial line. In culicid larvae, with three ventrolateral lobes, the most anterior closely associated with the clypeolabral suture and lateral part of the median labral plate, followed by the black-spot area and posteriorly by the clypeal portion of the cibarial bar; with a narrow dorsal posterior strip between the frontal ecdysial line and the epistomal suture, this strip confluent posteriorly with the frons; forming a part of the lateralia. See appendix entry on frontogenal inflection.

**paraclypeal phragma.** - Cook (1944b, 40) coined this term and first applied it to the clypeal larval parts we call the epistomal ridge and cibarial bar. The cibarial bar is not a phragma or part of one although the lateral end of the epistomal ridge is associated with it in culicids. Paraclypeal phragma has since been applied to the epistomal ridge or part of it, sometimes in combination with other adjacent parts, in various fly larvae and adults.

**PARACOILA (Pla).** - In most insects, the part of the cranium articulating with the parartis, a maxillary structure, specifically the articulating surface and the adjacent specialized (usually thickened) cranial cuticle; usually condyloid. In at least some culicid larvae, developed as a slender, nearly vertical rod projecting almost perpendicularly to the hypostomal ridge just behind the outer edge of the mentum. (Syn.: rod of submentum, Menees 1958a 30; rod of the submentum, Menees 1958a 28.) See appendix.

**pectinate hair.** - See LATERAL PALATAL BRUSH HAIR.

**PENICULAR AREA.** - In arthropods, any specialized cuticular area bearing a brush of non-socketed hairs; limited peripherally by the attachment points of the marginal elements of the brush. In culicid larvae, (Cook 1944b, 41) several specific penicular areas occur; see ANTEROMEDIAN PALATAL PENICULAR AREA, LATERAL PALATAL PENICULAR AREA, MIDPALATAL PENICULAR AREA. See appendix entries for flabella and penicular area.

post-antennal buttress. - See POSTANTENNAL BUTTRESS.

POSTANTENNAL BUTTRESS (PB). - In culicid and some other nematoceros larvae (Cook 1944b, 41), a wide cranial inflection extending from near the base of the cibarial bar to behind the antennal foramen. (Syn.: in culicid larvae probably including the subgenal inflection of DuPorte 1946, 394; post-antennal buttress, Lawson 1951, 563.)

post clypeus. - An alternate styling (Shalaby 1956, 140) of postclypeus, which see.

postclypeus. - In some insects, the proximal sclerite of the clypeus when the clypeus is transversely divided by a suture. In culicid larvae, misapplied by Shalaby (1956, 1957 a-c); see appendix entry on CLYPEUS.

POSTCOILA (Pot). - In most insects, the part of the cranial surface articulating with the postartis (a mandibular structure), including the adjacent specialized (usually thickened) cranial cuticle; often forming an acetabulum. In culicid larvae, a small anteroventral marginal cranial process along with the adjacent short longitudinal apodemalous ridge; the maxillary palpus is secondarily associated with it basally. (Syn.: mandibular apodeme, Shalaby 1957a in part, 1947 only, and Shalaby 1957c in part, 430 only; maxillary apodeme, Shalaby 1957b in part, 271 only; posterior articulation of mandible, Snodgrass 1959, 20; posterior mandibular articulatory process, Cook 1944b, 44; submaxillary apodeme, Christophers 1960, 198; ventral articulation of the mandible, Foote 1952, 449.) See appendix entry.

post-epipharyngeal bar. - See INTERTORMA.

post-epipharyngeal lobe. - See CLYPEOPALATUM

post-epipharynx. - See CLYPEOPALATUM.

posterior articulation. - See POSTERIOR MANDIBULAR ARTICULATION.

posterior articulation of mandible. - See POSTERIOR MANDIBULAR ARTICULATION and POSTCOILA.

posterior articulation of the mandible. - See POSTERIOR MANDIBULAR ARTICULATION.

posterior inter-tormal bar. - See INTERTORMA.

posterior intertormal bar. - See INTERTORMA.

POSTERIOR MANDIBULAR ARTICULATION (PMA). - In culicid larvae (Cook 1944b, 49) and most other insects, the junction line along which the postartis and postcoila come into contact during mandibular movements. (Syn.: posterior articulation, Cook, 1944b, 43; posterior articulation of mandible, Menees 1958b 128; posterior articulation of the mandible, Farnsworth 1947, 147.)

posterior mandibular articulatory process. - See POSTCOILA.

posterior palatal bar. - See INTERTORMA.

posterior process. - See TORMAL APODEMAL BAR. Shalaby (1956, 167) applied posterior process in Anopheles to a structure we cannot identify from his information; it is probably a part of either the lateral intertormal apodeme or the tormal apodeme.

posterior process of the apodeme. - See TORMAL APODEMAL BAR. Shalaby (1956, 146) applied posterior process of the apodeme in Anopheles to a structure we cannot identify from his information; it was probably a part of either the lateral intertormal apodeme or the tormal apodeme.

posterior process of the labral apodeme. - See TORMAL APODEMAL BAR.

posterior process of the lateral apodeme. - See TORMAL APODEME BAR.

POSTERIOR TENTORIAL ARM (PTA). - In most insects, the usually elongate apodeme extending anteriorly from the posterior tentorial pit, its apex ending free in some insects, but contacting the apex of the anterior tentorial arm at a visible point in most insects (including culicid larvae and adults); sometimes with secondary arms. (Syn.: gular apodeme.)

POSTERIOR TENTORIAL PIT (PTP). - In most insects, the spot at which the posterior tentorial arm is inflected into the head, situated at the junction of the hypostomal and postoccipital sutures when these are present.

posterior tormal apodeme. - See TORMAL APODEMAL BAR.

postgena. - In insects, a loosely defined part of the cranium, applied in various ways in different insects, most commonly for an indefinite ventrolateral part of the lateralia between the gena and the postoccipital suture. Sometimes considered as part of the gena, sometimes as a separate area. In culicid larvae, used by several authors (for example, Snodgrass 1959, 4) in various ways for ill-defined parts of the lateralia and sometimes including the labiogula.

POSTLABIUM. - In insects, the proximal, non-appendicular portion of the labium, apparently derived from pleural and/or sternal elements of the labial segment. See POSTMENTUM. In culicid larvae, extending anteriorly to the base of the prementum, laterad to the hypostomal suture and posteriorly to the level of the posterior tentorial pits.

POSTMENTUM. - In insects, the sclerite or sclerites collectively, of the postlabium. In culicid larvae and in many other insects, divided transversely by the submentomal suture into the submentum and mentum. In culicid larvae, the sclerotization of the postmentum is continuous with that of the gula. See LABIOGULA.

POSTOCCIPITAL RIDGE (PoR). - In most insects, the internal ridge associated with the postoccipital suture. In culicid larvae, apparently faint or absent in part of its course, seemingly continuous with a ridge coursing to the midventral line.

postoccipital sulcus. - See POSTOCCIPITAL SUTURE.

POSTOCCIPITAL SUTURE (PtS). - In most insects, the posterior submarginal suture roughly paralleling the occipital foramen dorsally and laterally to the level of the posterior tentorial pit where it terminates; sometimes partially or wholly undeveloped, marking the anterior boundary of the postocciput. In culicid larvae, faint and sometimes only partly developed, interrupted dorsally by the coronal gap in late instars, coursing through the collar for most of its length, seemingly branching ventrolaterally into a suture continued to the ventromeson and the true postoccipital suture which continues anteriorly as the gular suture to the posterior tentorial pit. (Syn.: postoccipital sulcus, Snodgrass 1959, 4.)

POSTOCCIPUT (Pos). - In most insects, the dorsal cranial sclerite behind the postoccipital suture, extending ventrad to the level of the posterior tentorial pit. In culicid larvae, the narrow posterior part of the collar, interrupted dorsally by the coronal gap, ventrally continuous with the gula. Compare COLLAR.

post-palatal bar. - See ANTERIOR PALATAL BAR.

postpalatal bar. - See ANTERIOR PALATAL BAR.

post-palatal lobe. - See MIDPALATAL LOBE.

postpalatal lobe. - See MIDPALATAL LOBE.

POSTTORMA (Ptt). - In culicid larvae, a small triangular sclerite of the clypeopalatum, intercalated between the black-spot area of the paraclypeal lobe and a posterior arm of the torma; bearing seta 2-MP. (Syn.: lower triangular plate, Salem 1931, 396; triangular plate, Pao and Knight 1971, 122.) See appendix.

pre-clypeus. - See MEDIAN LABRAL PLATE and preclypeus.

preclypeus. - In some insects, the distal sclerite of the clypeus when the clypeus is transversely divided by a suture. In culicid larvae, misapplied by Puri (1931, 17) and some other authors to the median labral plate and by Shalaby (1956, 1957a-c) in at least two different ways; see appendix entry on CLYPEUS.

PRECOILA (Pc). - In most insects, the part of the clypeal cuticular surface articulating with the preartia (a mandibular structure), along with the adjacent specialized (usually thickened) cuticle; often forming an acetabulum. In culicid larvae, the terminal part of the clypeal element of the cibarial bar. (Syn.: dorsal articulation of the mandible, Foote 1952, 449.)

premaxillary suture. - See HYPOSTOMAL SUTURE.

pretentorium. - In insects, conceptually a synonym of anterior tentorial arm. Patton and Evans (1929, 232) misapplied it to the black-spot area of culicid larvae.



primordia of imaginal eye. - See COMPOUND EYE.

primordia of the compound eye of the imago. - See COMPOUND EYE.

primordia ommatidia of the adult. - See COMPOUND EYE.

pupal eye. - See STEMMA.

rod of submentum. - See PARACOILA.

rod of the submentum. - See PARACOILA.

rotary mouth brush. - See LATERAL PALATAL BRUSH.

rotatory organ. - See LATERAL PALATAL BRUSH.

scallop. - See LATERAL PALATAL PLATE.

SCAPE (Sca). - The first or basal segment of the insect antenna. In culicid larvae, possibly the elongate principal portion of the antenna. (Syn. for larval scape: antennal shaft; flagellum, Patton and Evans 1929, 235; shaft.)

scutum of the third metamere. - See DORSAL APOTOME.

scythe-shaped area. - See falciform apodeme.

scythe-shaped thickening. - See falciform apodeme.

SENSILLUM. - Defined by Snodgrass (1935, 549) as "a simple sense organ, or one of the structural units of a compound sense organ," and by Schneider (1964, 107) as "a specialized area of the integument, consisting of formative cells, the sensory nerve cells, and, in some cases, auxiliary cells..."

shaft. - See SCAPE.

shelf. - See MEDIAN LABRAL PLATE.

side piece. - See side-piece.

side-piece. - Used by Howard, Dyar and Knab (1913, 85) for a vague area probably including the lateral palatal plate and perhaps also the lateral palatal penicular area. Cited without a hyphen by Cook (1944b 42) as a synonym of lateral palatal plate and by Shalaby (1956, 146) as a synonym of lateral labral plate.

simple eye. - See STEMMA.

simple hair. - See LATERAL PALATAL BRUSH HAIR.

spindle osselet. - See TORMA.

STEMMA (plural: stemmata) (St). - In many endopterygotous larvae, any one of the one to several paired lateral ocelli of the lateralia; composed of a few large ommatidia of a type unlike those in compound eyes. In culicid larvae (Christophers 1960, 325), one pair somewhat posteroventral to the compound eye, persisting into the pupa and adult. (Syn. for culicids: accessory eye, Howard, Dyar and Knab 1913, 84; eye-spot, Puri 1931, 17; larval eye, Nuttall and Shipley 1901, 74; larval ocellus, Christophers 1960, 325; lateral ocellus, Clements 1963, 14; ocellus, Hurst 1890, 174, pupal eye, Marshall 1938, 54; simple eye, Hurst 1890, 170.) Shalaby (1957a-c) called both the stemma and the compound eye the larval eye. Similarly, Wesenberg-Lund (1921, 10) used the term lateral eye for both the compound eye and the stemma.

stirrup. - See TORMAL APODEMAL BAR.

stirrup apodeme. - See TORMAL APODEMAL BAR.

SUBANTENNAL RIDGE (SuR). - In culicid larvae, the inner supporting ridge of the subantennal suture.

SUBANTENNAL SUTURE (SSt). - In insects, applied to certain sutures ventral to the antennal socket; probably used for several sutures not all homologous with each other. In culicid larvae, the suture associated with the post-antennal buttress, appearing as a short line laterally below the antennal prominence.

sublabellar sclerite. - See LATERAL PALATAL PLATE.

subgena. - In some insects, the ventral portion of the lateralia below the subgenal suture. Applied by Pucac (1965, 46) to the labiogula.

subgenal inflection. - See POSTANTENNAL BUTTRESS.

submaxillary apodeme. - See POSTCOILA.

submental plate. - See DORSOMENTUM.

submental-postgenal suture. - See HYPOSTOMAL SUTURE.

submental serrations. - See DORSOMENTAL TOOTH.

SUBMENTOMENTAL SUTURE (SSu). - In many insects, the transverse suture dividing the postmentum into a distal portion, the mentum, and a proximal portion, the submentum; often weak or absent; probably not homologous among all insects said to have it. In culicid larvae, a transverse membranous area just distal to the labiogula, often hidden from below by the projecting front part of the labiogula. In anopheline larvae, distal edge limited by the well-sclerotized base of the ventromentum. In culicine larvae, not well demarcated from ventromentum, but perhaps arbitrarily the ventromentum is regarded as the hair-bearing and the submentomental suture as the nonhairy part of this area.

**SUBMENTUM (Sm).** - In many insects, the part of the postmentum behind the submentomental suture. In culicid larvae, delimited basally only by an imaginary line between the front edges of the posterior tentorial pits and laterally the posterior part of the hypostomal suture; forming, along with the gula, the labiogula. Past authors have interpreted the culicid larval submentum in several ways; see DORSOMENTUM, VENTROMENTUM and MENTUM. See the appendix.

supra-palatal hair. - See ANTEROMEDIAN PALATAL HAIR.

suprapalatal hair. - See ANTEROMEDIAN PALATAL HAIR.

suspensorium. - See CIBARIAL BAR.

tentorial arm. - See ANTERIOR TENTORIAL ARM.

tentorial invagination. - See ANTERIOR TENTORIAL PIT.

**TENTORIUM.** - In most insects and myriapods, the set of one (myriapods) or two (insects) pairs of apodemes inflected from the cranial wall at the anterior and posterior (insects only) tentorial sutures in the lower parts of the epistomal and postoccipital sutures, respectively, as specialized extensions of the epistomal and postoccipital ridges, the apodemes ending free in myriapods and some insects, but with the anterior and posterior apodemes contacting each other in most insects; the apodemes sometimes with secondary arms, a mesal pair of which often make contact in the midline. The tentorium serves for attachment of certain muscles. Adjacent parts of the epistomal and postoccipital ridges are conventionally excluded from the tentorium in spite of their morphological and functional relationships to the tentorium. In culicid larvae, the tips of the anterior and posterior tentorial arms make contact.

**TESSELLATED MEMBRANE.** - In arthropods, any membrane with a surface resembling mosaic. Christophers (1960, 200) used this term for a specific membrane in culicid larvae; see PALATAL TESSELLATED MEMBRANE. Pucat (1965, 50) used "tessellated membrane" for an area composed of our palatal tessellated area, anteromedian palatal penicular area, and the membranous portion of our lateral palatal penicular area.

tessellated membranous area. - Used by Pao and Knight (1970, 120) for an area composed of our palatal tessellated area, lateral palatal penicular area, and anteromedian palatal penicular area. Compare TESSELLATED MEMBRANE.

**TORMA (To).** - In most insects, a sclerotized area in the posterolateral deflexed part of the main labral sclerite; normally bearing the lateral labral retractor muscle insertions; often extending well onto the palatum; sometimes detached from the main labral sclerite. In culicid larvae (Schremmer 1949, 181, as Torma, German), an elongate, detached, usually very dark sclerite transmitting movement to the lateral palatal brush; shallowly apodemalous anterolaterally; bearing the tormal apodeme. Applied to certain other culicid larval parts by some authors; see

appendix. (Syn.: anterior bar, Shipitsina 1936, 362; apodeme, Thompson 1905, 169; apodeme of feeding brush, Salem 1931, 396; apodeme of the feeding-brush, Salem 1931, 398; chitinous apodeme of epipharynx, Pucat 1965, 44; flabellar apodeme, Christophers 1960, 198; flabellar bar, Shipitsina 1936, 361; labral apodeme, Shalaby 1956, 145; labral brush apodeme, Pucat 1965, 45; lateral apodeme, Pao and Knight 1970, 121; longitudinal lever, Bekker 1938, 439; messor, Cook 1944b, 40 [of culicids but not chironomids]; spindle osselet, Crawford 1933, 25; trabecula flabellaris, Shipitsina 1936, 354; trabecula labri anterior, Shipitsina 1936, 354.)

TORMAL APODEMAL BAR (TAB). - In at least some culicine larvae, the darkly pigmented, prominent, well-sclerotized, curved barlike unit of the tormal apodeme, connecting to the lateral tormal process by a pale flexible portion of the tormal apodeme and probably similarly connected to the intertorma; serving for attachment of the lateral labral retractor muscles. (Syn.: medial process of apodeme, Salem 1931, 396; posterior process, Shalaby 1957a, 162; posterior process of the apodeme, Shalaby 1957b, 275; posterior process of the labral apodeme, Shalaby 1957a: 150, 1957b: 281; 1957c: 433; posterior process of the lateral apodeme, Pao and Knight 1970, 121; posterior tormal apodeme, Pucat 1965, 45; stirrup, Christophers 1960, 205; stirrup apodeme, Christophers 1960, 200.)

TORMAL APODEME (ToA). - In insects, any apodeme of a torma. In culicid larvae, one is present. (Syn.: messorial apodeme, Cook 1944b 42, but compare LATERAL INTERTORMAL APODEME.) See TORMAL APODEMAL BAR, posterior process, and posterior process of the apodeme. See appendix.

tormal plate. - In culicid larvae, used by Jones (1960, 460) as a generic term for the sclerites we call the torma and intertorma.

tormal sclerite. - In culicid and chironomid larvae, used by Menees (1958b 136), apparently to apply to any one of the sclerites we call the torma, intertorma and anterior palatal bar.

trabecula epipharyngealis. - See INTERTORMA.

trabecula flabellaris. - See TORMA.

trabecula labri anterior. - See TORMA.

trabecula labri posterior. - See INTERTORMA.

trabecula palatina. - See ANTERIOR PALATAL BAR.

transversal girdle. - See ANTERIOR PALATAL BAR.

transverse bar. - See ANTERIOR PALATAL BAR.

transverse girdle. - See ANTERIOR PALATAL BAR.

transverse postpalatal bar. - See ANTERIOR PALATAL BAR.

triangular plate. - See POSTTORMA.

triangular sclerite of posterior tentorial bar. - Presently, we are considering this an unendorsed term. Applied by Farnsworth (1947, 141) to a pair of triangular-shaped structures arising from the posterior edge of the posterior palatal bar just lateral of the midventral line, we have not been able to confirm their presence.

under lip. - See DORSOMENTUM and MENTUM.

under-lip. - See MENTUM.

U-shaped sclerite of the pharynx. - See LATERAL ORAL BAR.

ventral articulation of the mandible. - See POSTCOILA.

VENTRAL ECDYSIAL LINE. - In arthropods, any ventral preformed line of weakness along which the cuticle splits (usually) or bends during ecdysis. See HYPOCRANIAL ECDYSIAL LINE and appendix entry on ECDYSIAL LINE.

VENTROMENTUM (Vm). - In some culicid and chironomid larvae, the lower and more proximal of the two transverse, usually projecting, specialized subdivisions produced when the mentum is completely (culicids) or incompletely (chironomids) divided by a transverse inflection or membrane. The upper division is the dorsomentum; in chironomids the two divisions are confluent mesally, thus dividing the ventromentum into paired "ventromental plates" (Saether 1971, 1237). In anophelines, developed as a well-sclerotized, apically dentate projection. In culicines, hardly distinguishable from the adjacent membranes, but somewhat arbitrarily considered to be the narrow or broad, transverse, apparently lightly sclerotized, hair-bearing area distal to the hairless membrane which is regarded as the submentomental suture. (Syn.: aulaeum, Cook 1944b, 45; auleum, Foote 1952, 449; glossa, Shalaby 1956, 154, but not other authors; submentum, Salem 1931, 407, and some but not most other authors.)

VERTEX. - In insects, the highest point of the cranium as seen in side view, along with an indefinite surrounding area. A topographic, not a morphological, term. Delimited in various ways by different authors, we deliberately have left the limits vague. In culicid larvae, DuPorte (1957, 67) applied the term to the posterior part of the dorsal apotome behind the ends of the epistomal suture, along with a vaguely defined dorsolateral part of the cranium; we recommend against using vertex in his sense.

vortex organ. - See LATERAL PALATAL BRUSH.

whirling organ. - See LATERAL PALATAL BRUSH.

whorl organ. - See LATERAL PALATAL BRUSH.

Fig. 45. Aedes (Ochlerotatus) fulvus pallens. Head of fourth-instar larva. In figures a and c, setal alveoli shown but most setae omitted.

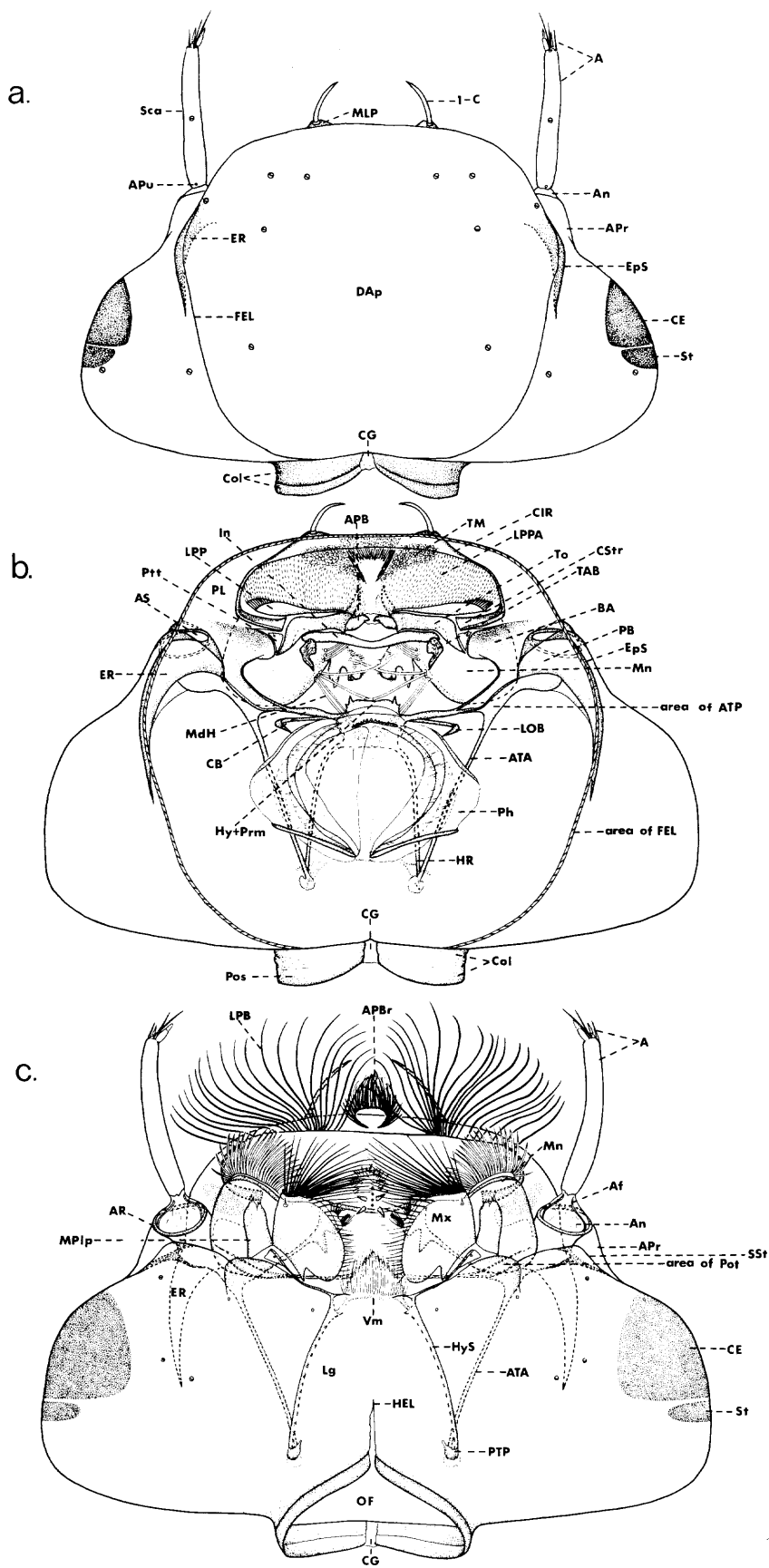
- a. Anterodorsal aspect. External except for epistomal ridge and compound eyes.
- b. Anterodorsal aspect as seen with dorsal apotome removed. Antennae, eyes, maxillae and most setae omitted.
- c. Posteroventral aspect. External. Some internal sclerotized structures indicated by dashed lines and stippling. Tormae and most associated structures omitted.

#### ABBREVIATIONS

|      |   |                            |       |   |                                |
|------|---|----------------------------|-------|---|--------------------------------|
| A    | - | antenna                    | Lg    | - | labiogula                      |
| Af   | - | antennifer                 | LOB   | - | lateral oral bar               |
| An   | - | antacoria                  | LPB   | - | lateral palatal brush          |
| APB  | - | anterior palatal bar       | LPP   | - | lateral palatal plate          |
| APBr | - | anteromedian palatal brush | LPPA  | - | lateral palatal penicular area |
| APr  | - | antennal prominence        | *MdH  | - | mandibular hair                |
| APu  | - | antennal puncture          | MLP   | - | median labral plate            |
| AR   | - | antennal ridge             | *Mn   | - | mandible                       |
| AS   | - | antennal socket            | *MPlp | - | maxillary palpus               |
| ATA  | - | anterior tentorial arm     | *Mx   | - | maxilla                        |
| ATP  | - | anterior tentorial pit     | OF    | - | occipital foramen              |
| BA   | - | black-spot area            | PB    | - | postantennal buttress          |
| CB   | - | cibarial bar               | Ph    | - | pharynx                        |
| CE   | - | compound eye               | PL    | - | paraclypeal lobe               |
| CG   | - | coronal gap                | Pos   | - | postocciput                    |
| ClR  | - | clypeolabral ridge         | Pot   | - | postcoila                      |
| Col  | - | collar                     | *Prm  | - | prementum                      |
| CStr | - | clypeolabral strip         | PTP   | - | posterior tentorial pit        |
| DAP  | - | dorsal apotome             | Ptt   | - | posttorma                      |
| EpS  | - | epistomal suture           | Sca   | - | scape                          |
| ER   | - | epistomal ridge            | SSt   | - | subantennal suture             |
| FEL  | - | frontal ecdysial line      | St    | - | stemma                         |
| HEL  | - | hypocranial ecdysial line  | TAB   | - | tormal apodemal bar            |
| HR   | - | hypostomal ridge           | TM    | - | tessellated membrane           |
| *Hy  | - | hypopharynx                | To    | - | torma                          |
| HyS  | - | hypostomal suture          | Vm    | - | ventromentum                   |
| In   | - | intertorma                 | l-C   | - | head seta l-C                  |

\*Structures to be defined in Part 10.

Fig. 45



*Shuling Song*

Fig. 46. Aedes (Ochlerotatus) fulvus pallens. Head of fourth-instar larva.

- a. Posteroventral aspect. Mouthparts, details of palatum, and most setae omitted.
- b. Lateral aspect. Some internal sclerotized structures indicated by stippling. Cibarial bar and mandible slightly displaced.
- c. Distal aspect. Eyes, antennae, anteromedian and lateral palatal brushes, and articulating membranes omitted. Mandibles and maxillae shown in cross-section only.

## ABBREVIATIONS

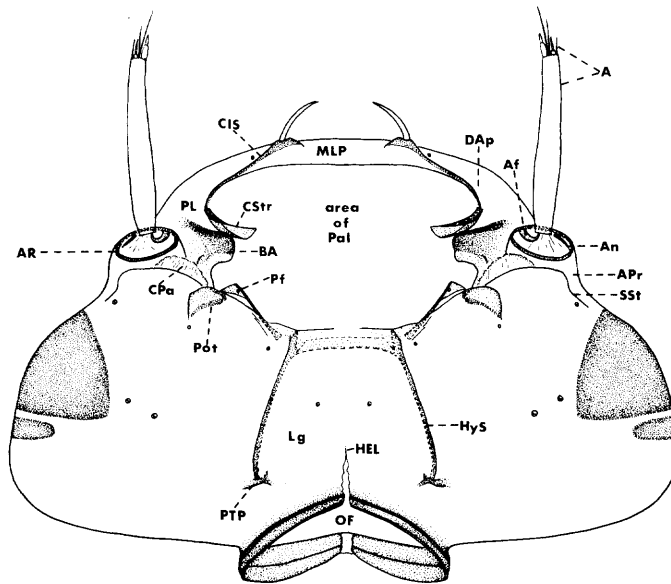
|      |   |                                  |       |   |                                   |
|------|---|----------------------------------|-------|---|-----------------------------------|
| A    | - | antenna                          | In    | - | intertorma                        |
| Af   | - | antennifer                       | Lg    | - | labiogula                         |
| An   | - | antacoria                        | Lp    | - | labropalatum                      |
| AMA  | - | anterior mandibular articulation | LPB   | - | lateral palatal brush             |
| APB  | - | anterior palatal bar             | MLP   | - | median labral plate               |
| APr  | - | antennal prominence              | *Mn   | - | mandible                          |
| AR   | - | antennal ridge                   | *MPlp | - | maxillary palpus                  |
| ATA  | - | anterior tentorial arm           | *Mx   | - | maxilla                           |
| BA   | - | black-spot area                  | OF    | - | occipital foramen                 |
| CB   | - | cibarial bar                     | Pal   | - | palatum                           |
| CE   | - | compound eye                     | PB    | - | postantennal buttress             |
| CIR  | - | clypeolabral ridge               | Pc    | - | precoila                          |
| CIS  | - | clypeolabral suture              | *Pf   | - | palpifer                          |
| Col  | - | collar                           | PL    | - | paraclypeal lobe                  |
| Cp   | - | clypeopalatum                    | Pla   | - | paracoila                         |
| CPa  | - | cephalic papilla                 | PMA   | - | posterior mandibular articulation |
| CStr | - | clypeolabral strap               | Pot   | - | postcoila                         |
| DAP  | - | dorsal apotome                   | Prm   | - | prementum                         |
| Dm   | - | dorsomentum                      | PTA   | - | posterior tentorial arm           |
| EpS  | - | epistomal suture                 | PTP   | - | posterior tentorial pit           |
| ER   | - | epistomal ridge                  | SSt   | - | subantennal suture                |
| FEL  | - | frontal ecdysial line            | SSu   | - | submentomal suture                |
| HEL  | - | hypocranial ecdysial line        | St    | - | stemma                            |
| HR   | - | hypostomal ridge                 | To    | - | torma                             |
| *Hy  | - | hypopharynx                      | Vm    | - | ventromentum                      |
| HyS  | - | hypostomal suture                |       |   |                                   |

\*Structures to be defined in Part 10.

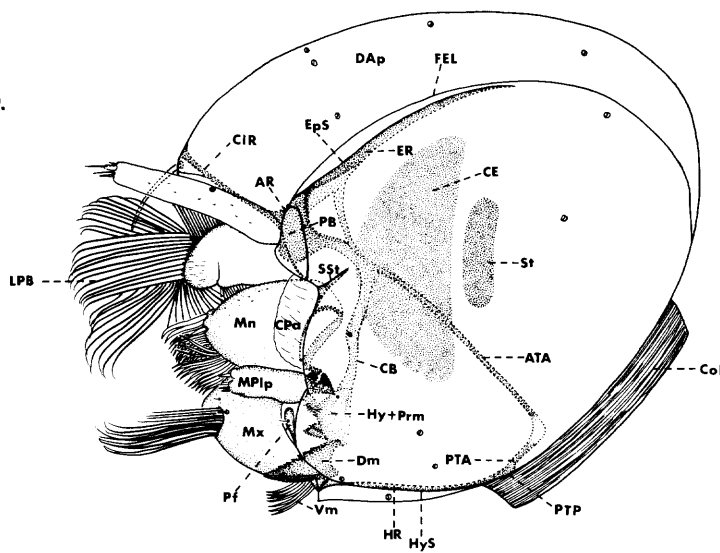


Fig. 46

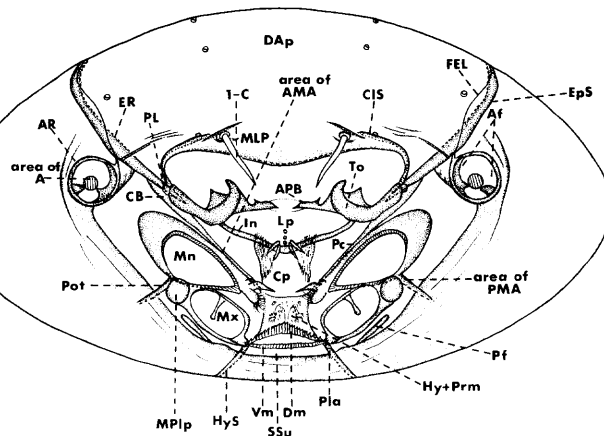
a.



b.



c.



*Y. C. Lee*

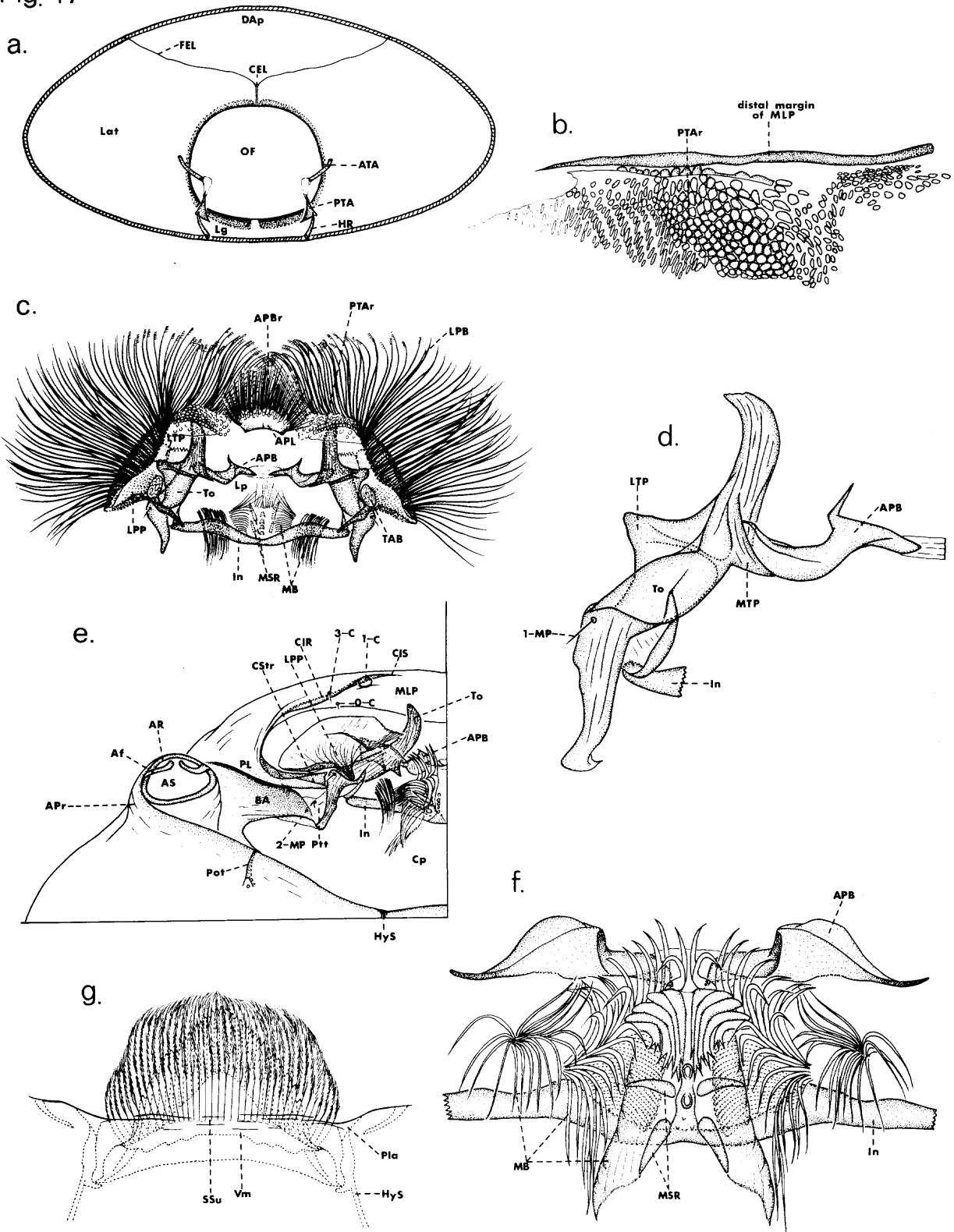
Fig. 47. Aedes (Ochlerotatus) fulvus pallens. Head structures of fourth-instar larva.

- a. Transverse section showing ental aspect of proximal portion.
- b. Palatal tessellated area. Ectal aspect.
- c. Palatum. Seen through the dorsal apotome. To promote clarity, many hairs omitted from palatal brushes.
- d. Anterior palatal bar and torma. Posteroventral aspect.
- e. Larval cranium. Distal portion of lower surface. Anteromedian palatal lobe, lateral palatal brush, lateral palatal penicular area, antenna, mandible and maxilla removed.
- f. Anterior palatal bar and midpalatal lobe. Simplistic view of midpalatal brush.
- g. Ventromentum. Lower surface. Dorsomentum visible through ventromentum.

#### ABBREVIATIONS

|      |   |                            |      |   |                          |
|------|---|----------------------------|------|---|--------------------------|
| Af   | - | antennifer                 | LPP  | - | lateral palatal plate    |
| APB  | - | anterior palatal bar       | LTP  | - | lateral tormal process   |
| APBr | - | anteromedian palatal brush | MB   | - | midpalatal brush         |
| APL  | - | anteromedian palatal lobe  | MLP  | - | median labral plate      |
| APr  | - | antennal prominence        | MSR  | - | midpalatal sensillar rod |
| AR   | - | antennal ridge             | MTP  | - | mesal tormal process     |
| AS   | - | antennal socket            | OF   | - | occipital foramen        |
| ATA  | - | anterior tentorial arm     | PL   | - | paraclypeal lobe         |
| BA   | - | black-spot area            | Pla  | - | paracoila                |
| CEL  | - | coronal ecdysial line      | Pot  | - | postcoila                |
| ClR  | - | clypeolabral ridge         | PTA  | - | posterior tentorial arm  |
| ClS  | - | clypeolabral suture        | PTAr | - | palatal tessellated area |
| Cp   | - | clypeopalatum              | Ptt  | - | posttorma                |
| CStr | - | clypeolabral strap         | SSu  | - | submentomental suture    |
| DAP  | - | dorsal apotome             | TAB  | - | tormal apodemal bar      |
| FEL  | - | frontal ecdysial line      | To   | - | torma                    |
| HR   | - | hypostomal ridge           | Vm   | - | ventromentum             |
| HyS  | - | hypostomal suture          | O-C  | - | Seta 0 of head           |
| In   | - | intertorma                 | 1-C  | - | Seta 1 of head           |
| Lat  | - | lateralia                  | 3-C  | - | Seta 3 of head           |
| Lg   | - | labiogula                  | 1-MP | - | Seta 1 of mouthparts     |
| Lp   | - | labropalatum               | 2-MP | - | Seta 2 of mouthparts     |
| LPB  | - | lateral palatal brush      |      |   |                          |

Fig. 47



*G. C. Lee*

Fig. 48. Anopheles (Anopheles) quadrimaculatus.

Head of fourth-instar larva. Setal alveoli shown but setae omitted.

- a. Dorsal aspect. External except for epistomal ridge and ridges supporting the antenna. To promote clarity, many hairs omitted from lateral palatal brushes. Mandibles and maxillae removed.
- b. Anterodorsal aspect as seen with dorsal apotome removed. Antennae, eyes, lateral palatal brushes and maxillae (except for the palpi) are omitted.

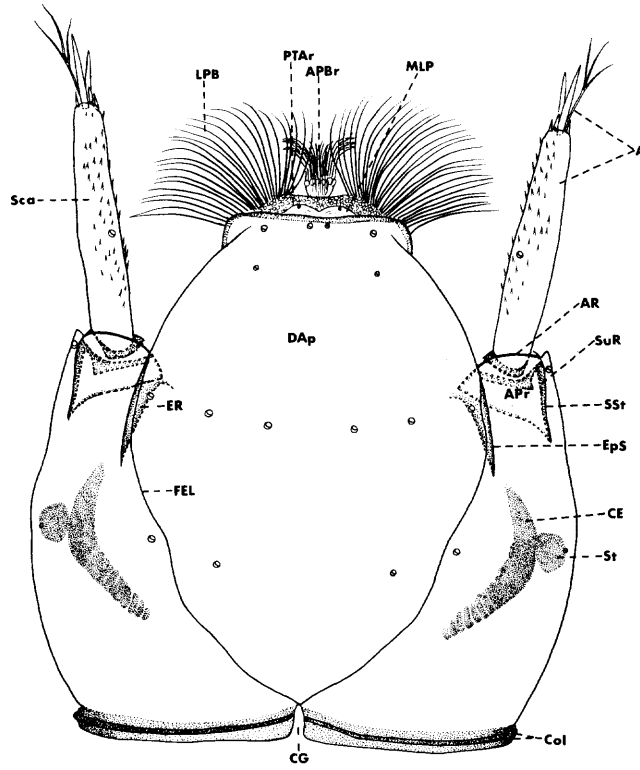
## ABBREVIATIONS

|      |   |                            |       |   |                             |
|------|---|----------------------------|-------|---|-----------------------------|
| A    | - | antenna                    | *MAdA | - | mandibular adductor apodeme |
| APBr | - | anteromedian palatal brush | *MdH  | - | mandibular hair             |
| APr  | - | antennal prominence        | MLP   | - | median labral plate         |
| AR   | - | antennal ridge             | *Mn   | - | mandible                    |
| ATA  | - | anterior tentorial arm     | *MP1p | - | maxillary palpus            |
| ATP  | - | anterior tentorial pit     | PB    | - | postantennal buttress       |
| CB   | - | cibarial bar               | *Ph   | - | pharynx                     |
| CE   | - | compound eye               | PL    | - | paraclypeal lobe            |
| CG   | - | coronal gap                | PTA   | - | posterior tentorial arm     |
| Col  | - | collar                     | PTAr  | - | palatal tessellated area    |
| DAP  | - | dorsal apotome             | Ptt   | - | posttorma                   |
| EpS  | - | epistomal suture           | Sca   | - | scape                       |
| ER   | - | epistomal ridge            | SSt   | - | subantennal suture          |
| FEL  | - | frontal ecdysial line      | St    | - | stemma                      |
| HEL  | - | hypocranial ecdysial line  | SuR   | - | subantennal ridge           |
| In   | - | intertorma                 | To    | - | torma                       |
| LOB  | - | lateral oral bar           |       |   |                             |
| LPB  | - | lateral palatal brush      |       |   |                             |

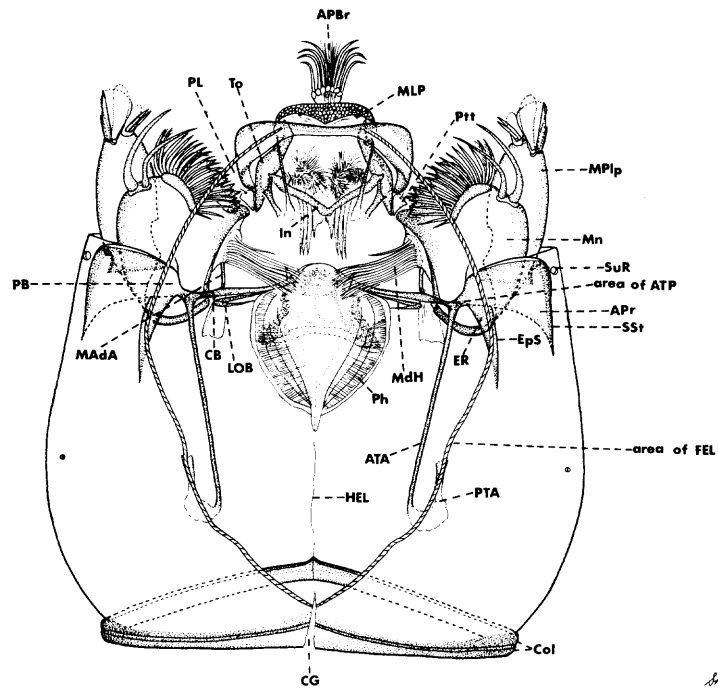
\*Structures to be defined in Part 10.

Fig. 48

a.



b.



Shuling Jang

Fig. 49. Anopheles (Anopheles) quadrimaculatus. Head of fourth-instar larva. Setal alveoli shown but most setae omitted. Eyes omitted. To improve clarity, many hairs are omitted from palatal brushes.

- a. Posteroventral aspect. Mandible shown through the maxilla.
- b. Posteroventral aspect. Mandibles and maxillae removed. Some internal structures shown.

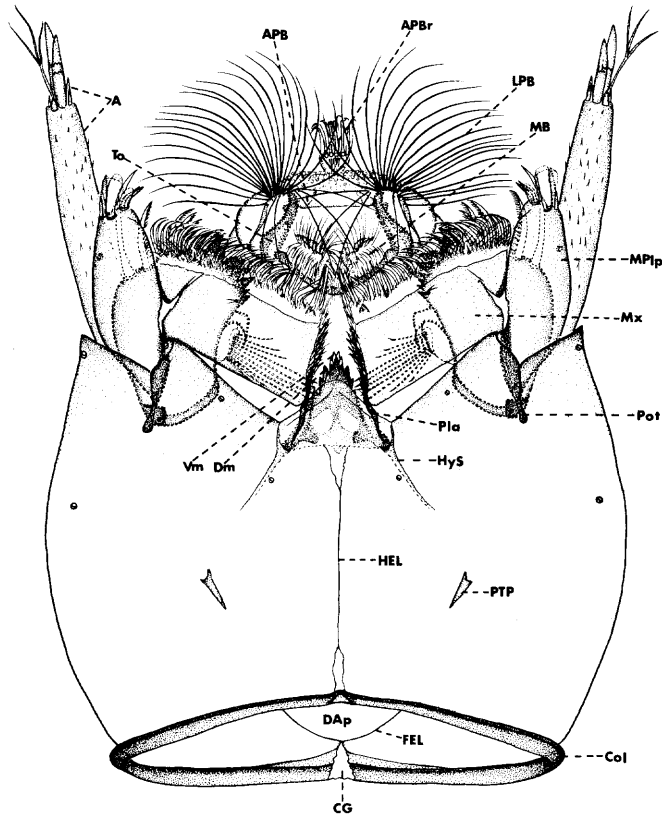
#### ABBREVIATIONS

|      |   |                            |       |   |                         |
|------|---|----------------------------|-------|---|-------------------------|
| A    | - | antenna                    | Lat   | - | lateralialia            |
| APB  | - | anterior palatal bar       | Lp    | - | labropalatium           |
| APBr | - | anteromedian palatal brush | LPB   | - | lateral palatal brush   |
| ATA  | - | anterior tentorial arm     | LPP   | - | lateral palatal plate   |
| ATP  | - | anterior tentorial pit     | MB    | - | midpalatal brush        |
| BA   | - | black-spot area            | *MdH  | - | mandibular hairs        |
| CB   | - | cibarial bar               | *MPlp | - | maxillary palpus        |
| CG   | - | coronal gap                | *Mx   | - | maxilla                 |
| Col  | - | collar                     | Pla   | - | paracoila               |
| Cp   | - | clypeopalatum              | PL    | - | paraclypeal lobe        |
| CStr | - | clypeolabral strap         | Pot   | - | postcoila               |
| DAP  | - | dorsal apotome             | *Prm  | - | prementum               |
| Dm   | - | dorsomentum                | PTA   | - | posterior tentorial arm |
| FEL  | - | frontal ecdysial line      | PTP   | - | posterior tentorial pit |
| HEL  | - | hypocranial ecdysial line  | Ptt   | - | posttorma               |
| Hy   | - | hypopharynx                | To    | - | torma                   |
| HyS  | - | hypostomal suture          | Vm    | - | ventromentum            |

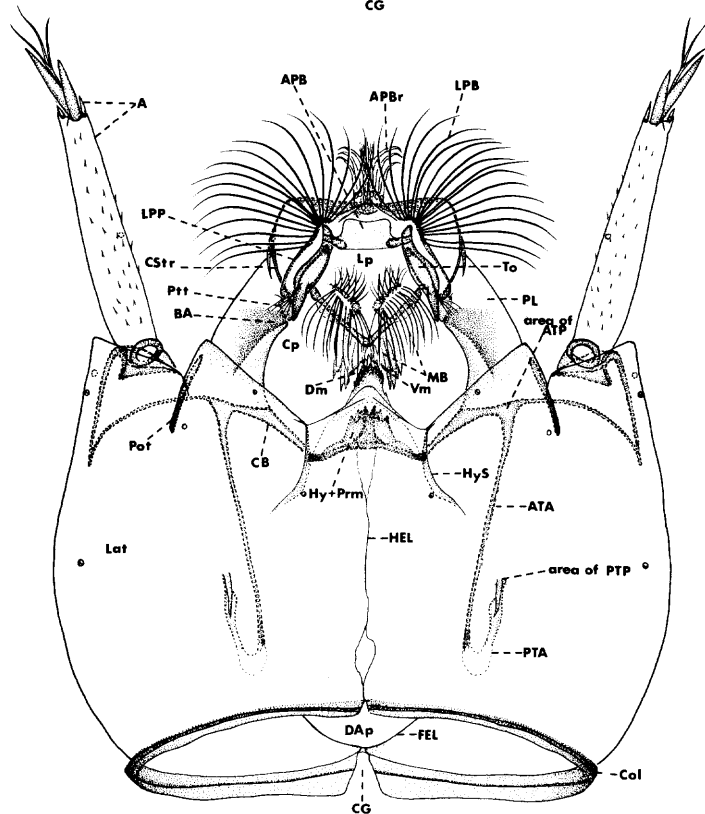
\*Structures to be defined in Part 10.

Fig. 49

a.



b.



Zy. C. Lee

Fig. 50. Anopheles (Anopheles) quadrimaculatus. Head of fourth-instar larva. Setal alveoli shown but most setae omitted.

- a. Ental aspect of head cut longitudinally to left of midline.
- b. Lateral aspect. Left portion of head shown in a. Eyes omitted. Most fine details of mandibles and maxillae omitted.
- c. Distal aspect.

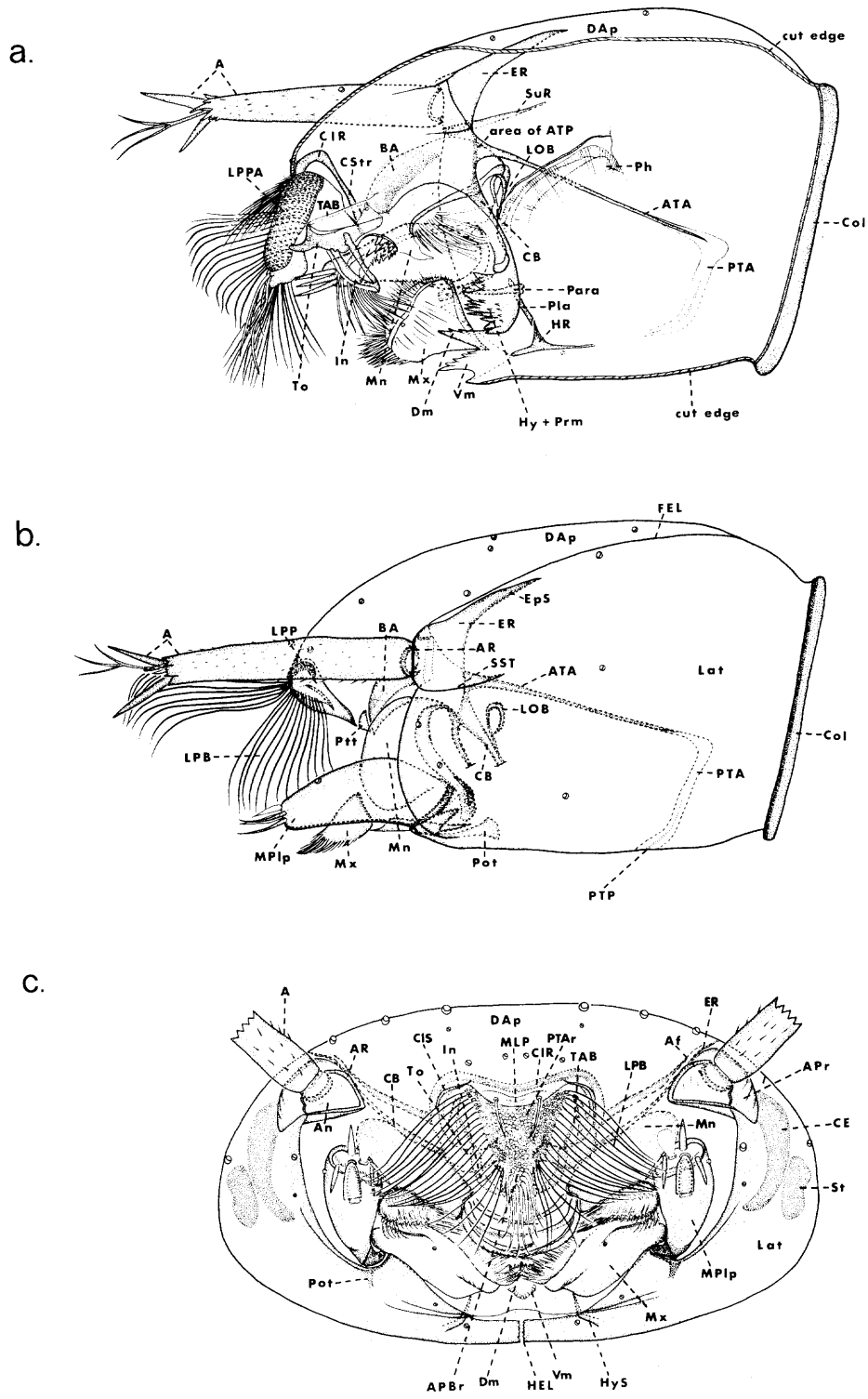
#### ABBREVIATIONS

|      |   |                            |       |   |                                |
|------|---|----------------------------|-------|---|--------------------------------|
| APBr | - | anteromedian palatal brush | Lat   | - | lateralia                      |
| A    | - | antenna                    | LOB   | - | lateral oral bar               |
| Af   | - | antennifer                 | LPB   | - | lateral palatal brush          |
| An   | - | antacoria                  | LPPA  | - | lateral palatal penicular area |
| APr  | - | antennal prominence        | LPP   | - | lateral palatal plate          |
| AR   | - | antennal ridge             | MLP   | - | median labral plate            |
| ATA  | - | anterior tentorial arm     | *Mn   | - | mandible                       |
| ATP  | - | anterior tentorial pit     | *MP1p | - | maxillary palpus               |
| BA   | - | black-spot area            | *Mx   | - | maxilla                        |
| CB   | - | cibarial bar               | *Para | - | parartis                       |
| CE   | - | compound eye               | *Ph   | - | pharynx                        |
| ClR  | - | clypeolabral ridge         | Pla   | - | paracoila                      |
| ClS  | - | clypeolabral suture        | Pot   | - | postcoila                      |
| Col  | - | collar                     | *Prm  | - | prementum                      |
| CStr | - | clypeolabral strap         | PTA   | - | posterior tentorial arm        |
| DAP  | - | dorsal apotome             | PTAr  | - | palatal tessellated area       |
| Dm   | - | dorsomentum                | PTP   | - | posterior tentorial pit        |
| EpS  | - | epistomal suture           | Ptt   | - | posttorma                      |
| ER   | - | epistomal ridge            | SSt   | - | subantennal suture             |
| FEL  | - | frontal ecdysial line      | St    | - | stemma                         |
| HEL  | - | hypocranial ecdysial line  | SuR   | - | subantennal ridge              |
| HR   | - | hypostomal ridge           | TAB   | - | tormal apodemal bar            |
| HyS  | - | hypostomal suture          | To    | - | torma                          |
| *Hy  | - | hypopharynx                | Vm    | - | ventromentum                   |
| In   | - | intertorma                 |       |   |                                |

\*Structures to be named in Part 10



Fig. 50



*Jy. C. Lee*

Fig. 51 Anopheles (Anopheles) quadrimaculatus. Head of fourth-instar larva.

- a. Distal aspect, focused inward to level of the hypopharynx and prementum. Most setae omitted. Maxillae removed except for maxillary palpi.
- b. Distal portion of lower surface. Mandible and maxilla removed. Only a portion of the midpalatal brush hairs are shown.
- c. Midpalatal lobe structures. Lower surface.
- d. Mentum and associated structures. Lower surface.

## ABBREVIATIONS

|      |   |                            |       |   |                             |
|------|---|----------------------------|-------|---|-----------------------------|
| Af   | - | antennifer                 | Lat   | - | lateralia                   |
| An   | - | antacoria                  | Lg    | - | labiogula                   |
| APB  | - | anterior palatal bar       | LPB   | - | lateral palatal brush       |
| APBr | - | anteromedian palatal brush | LPP   | - | lateral palatal plate       |
| APL  | - | anteromedian palatal lobe  | MB    | - | midpalatal brush            |
| APr  | - | antennal prominence        | *MdAp | - | mandibular adductor apodeme |
| AR   | - | antennal ridge             | *Mn   | - | mandible                    |
| BA   | - | black-spot area            | *MP1p | - | maxillary palpus            |
| CB   | - | cibarial bar               | PL    | - | paraclypeal lobe            |
| Cp   | - | clypeopalatum              | Pla   | - | paracoila                   |
| CStr | - | clypeolabral strap         | Pot   | - | postcoila                   |
| DAP  | - | dorsal apotome             | Prm   | - | prementum                   |
| Dm   | - | dorsomentum                | PTAr  | - | palatal tessellated area    |
| HEL  | - | hypocranial ecdysial line  | Ptt   | - | posttorma                   |
| HR   | - | hypostomal ridge           | To    | - | torma                       |
| *Hy  | - | hypopharynx                | Vm    | - | ventromentum                |
| In   | - | intertorma                 |       |   |                             |

\*Structures to be named in Part 10.

Fig. 51

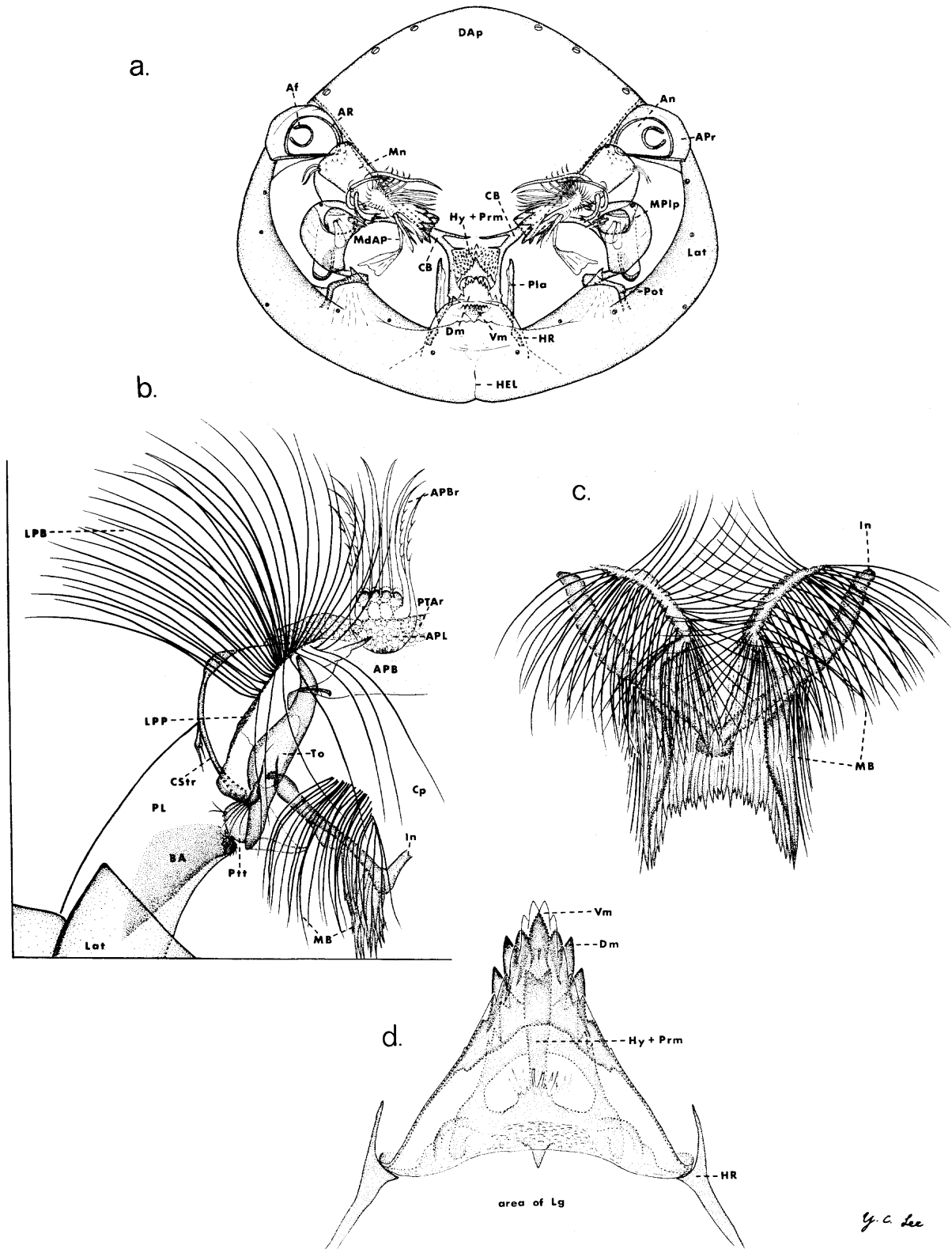


Fig. 52. Toxorhynchites (T.) brevipalpis

Head of fourth-instar larva. Setal alveoli shown but setae omitted. Eyes omitted.

- a. Anterodorsal aspect. Some internal structures shown.
- b. Posteroventral aspect. Some internal structures shown. Antennae omitted.

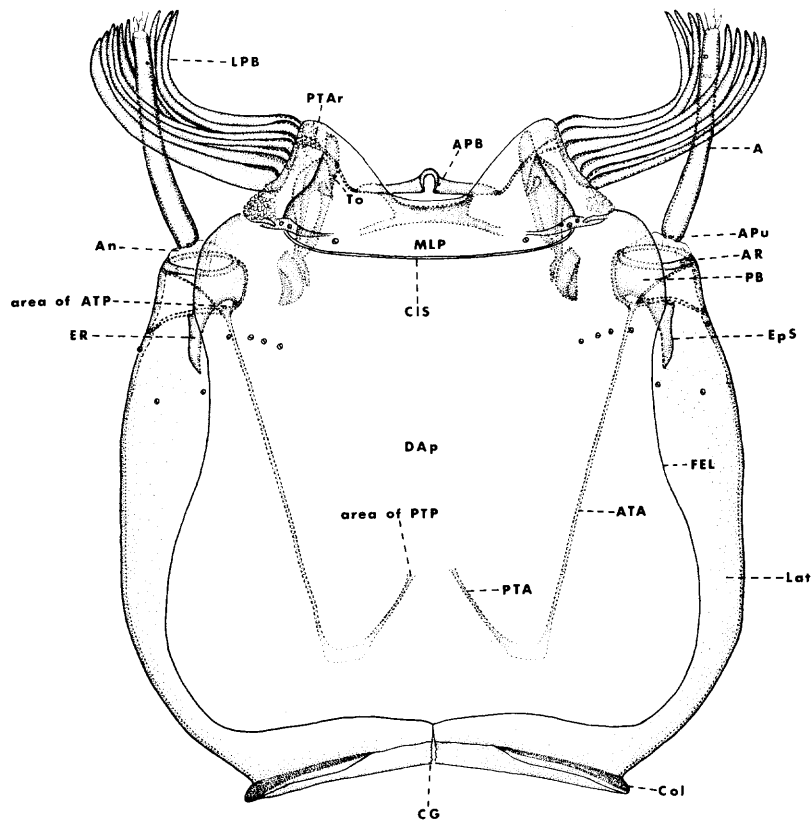
## ABBREVIATIONS

|     |   |                           |       |   |                             |
|-----|---|---------------------------|-------|---|-----------------------------|
| A   | - | antenna                   | HyS   | - | hypostomal suture           |
| An  | - | antacoria                 | Lat   | - | lateralia                   |
| APB | - | anterior palatal bar      | LPB   | - | lateral palatal brush       |
| APu | - | antennal puncture         | *MABa | - | mandibular abductor apodeme |
| AR  | - | antennal ridge            | MB    | - | midpalatal brush            |
| ATA | - | anterior tentorial arm    | *MdAp | - | mandibular abductor apodeme |
| ATP | - | anterior tentorial pit    | MLP   | - | median labral plate         |
| CB  | - | cibarial bar              | *Mn   | - | mandible                    |
| CG  | - | coronal gap               | *MP1p | - | maxillary palpus            |
| CLS | - | clypeolabral suture       | *Mx   | - | maxilla                     |
| Col | - | collar                    | PB    | - | postantennal buttress       |
| CPa | - | cephalic papilla          | Pot   | - | postcoila                   |
| DAP | - | dorsal apotome            | PTA   | - | posterior tentorial arm     |
| Dm  | - | dorsomentum               | PTAr  | - | palatal tessellated area    |
| EpS | - | epistomal suture          | PTP   | - | posterior tentorial pit     |
| ER  | - | epistomal ridge           | SSt   | - | subantennal suture          |
| FEL | - | frontal ecdysial line     | SuR   | - | subantennal ridge           |
| HEL | - | hypocranial ecdysial line | To    | - | torma                       |
| HR  | - | hypostomal ridge          | Vm    | - | ventromentum                |

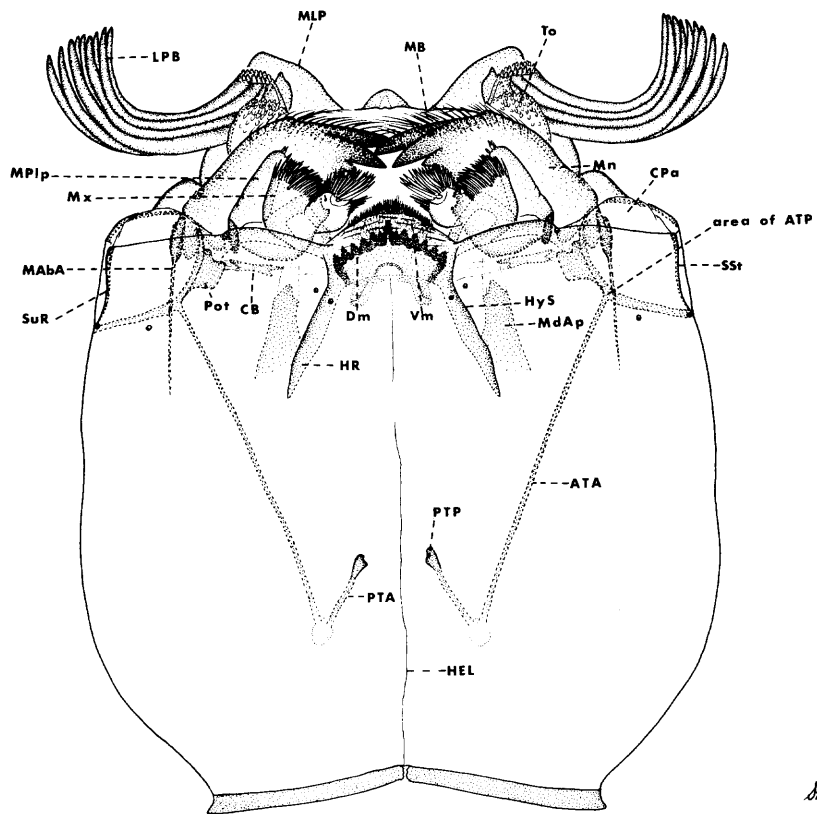
\*Structures to be defined in Part 10.

Fig. 52

a.



b.



*Hsueh Jung*

Fig. 53. Toxorhynchites (T.) brevipalpis. Head of fourth-instar larva. Setal punctures shown but setae omitted. Eyes omitted.

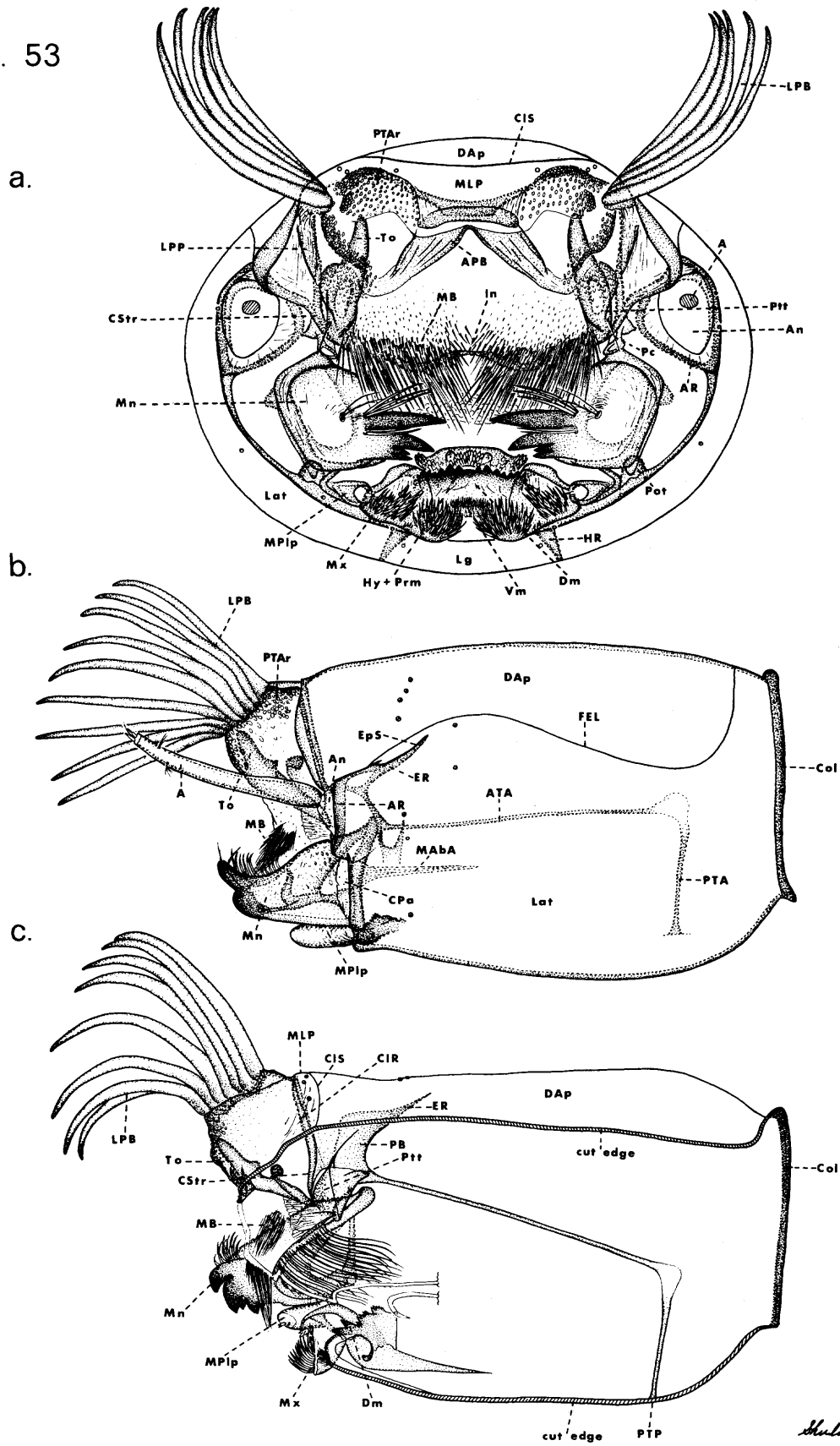
- a. Distal aspect. Antennae omitted.
- b. Lateral aspect. Left section of head shown in a.
- c. Ental aspect of longitudinal section cut near midline.

#### ABBREVIATIONS

|      |   |                        |       |   |                             |
|------|---|------------------------|-------|---|-----------------------------|
| A    | - | antenna                | Lg    | - | labiogula                   |
| An   | - | antacoria              | LPB   | - | lateral palatal brush       |
| APB  | - | anterior palatal bar   | LPP   | - | lateral palatal plate       |
| AR   | - | antennal ridge         | *MabA | - | mandibular abductor apodeme |
| ATA  | - | anterior tentorial arm | MB    | - | midpalatal brush            |
| ClR  | - | clypeolabral ridge     | MLP   | - | median labral plate         |
| ClS  | - | clypeolabral suture    | *Mn   | - | mandible                    |
| Col  | - | collar                 | *MP1p | - | maxillary palpus            |
| CPa  | - | cephalic papilla       | *Mx   | - | maxilla                     |
| CStr | - | clypeolabral strap     | PB    | - | postantennal buttress       |
| DAP  | - | dorsal apotome         | Pc    | - | precoila                    |
| Dm   | - | dorsomentum            | Pot   | - | postcoila                   |
| EpS  | - | epistomal suture       | *Prm  | - | prementum                   |
| ER   | - | epistomal ridge        | PTP   | - | posterior tentorial pit     |
| FEL  | - | frontal ecdysial line  | PTA   | - | posterior tentorial arm     |
| HR   | - | hypostomal ridge       | PTAr  | - | palatal tessellated area    |
| *Hy  | - | hypopharynx            | Ptt   | - | posttorma                   |
| In   | - | intertorma             | To    | - | torma                       |
| Lat  | - | lateralia              | Vm    | - | ventromentum                |

\*Structures to be defined in Part 10.

Fig. 53



*Shuling Jung*

## APPENDIX

As pointed out in previous issues, this section is appended for the purpose of explaining the recommendation of terms not widely accepted for use in the Culicidae and for explaining where appropriate, the derivation of terms in the glossary.

ANTACORIA. - Yuasa (1920, 253) introduced this term in a study on orthopteroids. Apparently not previously used for culicids, but Tokunaga (1930, 7) applied it to a larval tipulid.

ANTENNAL PUNCTURE. - This new term, which merely signals the general location and appearance of the part, replaces Belkin's "basal sensillum," which he (1962, 560) defined as "a small dorsal basal pitlike or alveoluslike structure." While it may well be the terminal part of a sensillum, this cuticular structure could hardly be a complete sensillum. "Sensillum" was defined by Snodgrass (1935, 549) as "a simple sense organ, or one of the structural units of a compound sense organ," and by Schneider (1964, 107) as "a specialized area of the integument, consisting of formative cells, the sensory nerve cells, and, in some cases, auxiliary cells..."

A similar (?homologous) structure occurs in many chironomid larvae in which it is not subbasal but rather occurs from about 0.2 to 0.7 of the distance from the base to the apex of the scape. In chironomids, this structure has been variously termed "Ringorgan," "ring organ of antenna," "ring organ," "organe annulaire," and "annular organ." It may be noted that this cuticular structure is not by itself an organ.

ANTENNAL RIDGE. - Proposed because we know of no previous suitable term for this ridge. It is not a separate sclerite, there being no suture between it and the adjacent parts of the cranium. Thus it presumably is not an antennaria (Yuasa 1920, 256) or antennal sclerite (Snodgrass 1935, 107), terms used mainly in orthopteroids but occasionally in Diptera other than culicids. Used for adult Calliphora by Lowne (1890, 121) but for a more extensive area than applied here.

ANTENNIFER. - Applied here for the first time in culicid larvae; applicability to the structures present in the antacoria of culicid larvae presently uncertain.

ANTERIOR MANDIBULAR ARTICULATION. - This term is shorter than its synonyms and it seems to have been used more frequently than they.

ANTERIOR PALATAL BAR. - Cook (1944c, 71) introduced this culicid term rather casually in a paper on chironomids and suggested this structure "may be homologous" to a slender bar he figured in a chironomid. This structure has been named repeatedly, and we select Cook's name as being perhaps the most suitable of those proposed. We list as "near synonyms" certain terms used for just one of the paired dark units of the whole structure; some of the other terms have at times been treated as if they applied only to one such unit.



ANTEROMEDIAN PALATAL HAIR. - This new term shows clearly the approximate location of the hairs. Terms previously used are less concise and some could as easily be applied to the lateral palatal brush hairs or to the midpalatal brush hairs.

CEPHALIC PAPILLA. - We endorse this term rather than any of its synonyms because the latter all include the word "gill" and it is likely that some culicids have no membrane on the head that would qualify as a gill. The cephalic papillae known to us are all in the membrane lateral to the mandible or close to the base of the maxilla. Defining cephalic papilla is difficult because the membrane lateral to the mandible probably bulges out in all culicid larvae when the mandible is abducted.

chitinous apodeme of epipharynx. - Incorrectly attributed by Pucat (1965, 44) to Imms as his name for the torma. Imms (1908, 104) did describe the torma as "a chitinous apodeme of the epipharynx," but did not name it "chitinous apodeme of epipharynx."

CIBARIAL BAR. - We prefer Cook's term to the rejected synonyms because it suggests the nature and location of the structure better than they do. We believe that Shalaby's usual use of mandibular apodeme was for a part of the cibarial bar extending from the anterior mandibular articulation ventromesad. This judgment is based on the size, shape, and spatial relations of this structure as shown in his drawings of mandibles.

CLYPEOLABRAL RIDGE. - We know of no use of this term in entomological literature; perhaps we have overlooked it. We introduce it here so that the name of this ridge will parallel that of the suture associated with it.

CLYPEOLABRAL STRAP. - This projection is a prominent landmark of the culicid head and we feel it will be convenient to have a name for it. We do not know of a comparable projection in other insects unless it is the equivalent of the torma of some insects.

CLYPEOPALATUM. - Wenk (1962, 91), in a study on the adult simuliid head, coined the germanized Latin term Clypeo-Palatium for the roof of the cibarium. We endorse the anglicized Latin form clypeopalatum for use with both larval and adult culicids.

CLYPEUS. - Apparently first used (as "Clypeus" in a Danish paper) for culicid larvae by Meinert (1886, 376); the limits he intended for his Clypeus are not clear to us but it seems certain he meant to include an anterior area of the clypeus, the median labral plate and part of the labropalatum including the lateral palatal penicular area but not the anteromedian palatal lobe. Nuttall and Shipley (1901, 56) wrote that the "'clypeus' of Meinert" "is hinged on to the rest of the head" and thus apparently excluded the median labral plate and any part of the clypeus even though Meinert had included these in his concept of "Clypeus." The clypeus of Howard, Dyar and Knab (1913, 84) and Salem (1931, 397) apparently includes only the median labral plate; that of Cook (1944b, 40) and Farnsworth (1947, 138) is the dorsal apotome plus, just distal to this apotome, the area of the clypeus between imaginary extensions of the frontal ecdysial lines along the margins made by the abrupt deflection of the clypeus on each side; that of DuPorte (1946, 394; 1957, 67) is the part of the

clypeus distal to a line between the anterior mandibular articulations; that of Menees (1958b, 128) and apparently of Snodgrass (1959, 6) and Christophers (1960, 198) is the clypeus as we interpret it.

Shalaby (1956, 1940; 1957a-c) interpreted the dorsal apotome plus the anterior median area of the clypeus as being the frons, and he called the median labral plate and (1957a, 146; 1957b-c) the "paraclypeal phragma" the clypeus. He regarded the "clypeus" as being divided into a preclypeus and a postclypeus by a clypeal suture. When ordinary permanent mounts of cleared culicid larvae or larval exuviae are studied, four transverse lines can be seen in the area of the median labral plate by careful observation and focussing; these are, in the proximal-to-distal sequence in which they are usually seen: the inner edge of the clypeolabral ridge, the outer edge of this ridge (which is along the course of the clypeolabral suture), the edge of the median labral plate bordering the labropalatum, and the edge of the bulge of this plate as seen in profile. It is difficult to know which of these four lines are the three transverse lines of Shalaby (his fronto-clypeal suture or fronto-postclypeal suture, clypeal suture, and labro-clypeal suture) in his interpretations of this area in the four culicid species he studied, particularly as it appears he was not consistent in his application of these terms.

Except in larval instars 2-4 of Psorophora ciliata, it is probable that the fronto-clypeal suture of Shalaby is sometimes the inner and sometimes the outer end of the clypeolabral ridge, that his clypeal suture is sometimes the outer end of the clypeolabral ridge and sometimes the edge of the median labral plate bordering the labropalatum, and that his labro-clypeal suture is probably the edge of the distal bulge of the median labral plate seen in profile. The nature of his preclypeus and postclypeus vary according to his identification of his sutures; in three of his papers (1957a-c) he considered the "paraclypeal phragmata" to be parts of his preclypeus.

Shalaby (1957a, 146) referred to his fronto-clypeal suture as the fronto-postclypeal suture, but reported that it was absent in Aedes aegypti, apparently because the clypeolabral ridge of this species is relatively inconspicuous. Thus he thought a "fronto-postclypeus" was formed in A. aegypti by fusion of his postclypeus and frons.

Shalaby (1957c, 430) studied Psorophora ciliata, which like other species with late-instar larvae preying on relatively large animals, has a labropalatum somewhat different from the usual culicid type. Shalaby's labro-clypeal suture, preclypeus, clypeal suture and postclypeus in the last three instars of this species all seem to be thin sclerotized labropalatal areas or boundaries of such areas.

**CORONAL ECDYSIAL LINE.** - For the rationale behind the introduction of this new term see the appendix entry for ECDYSIAL LINE.

**CORONAL GAP.** - This new term is believed to be better than occipital cleft since it specifies which surface of the head is involved.

**DORSOMENTAL TOOTH.** - Applied by Saether (1971, 1257) to this structure in the family Chironomidae and selected for use with culicid larvae.

**DORSOMENTUM.** - Introduced by Saether (1951, 1237) for use in chironomids. It is a useful term and we suggest its application in culicids even though the part is probably not strictly homologous with the chironomid structure.

**ECDYSIAL LINE.** - Hinton (1963, 40) listed the main synonyms for this term and gave reasons for using ecdysial line in preference to its synonyms. He also (1963, 40) introduced the terms dorsal ecdysial line and ventral ecdysial line, primarily for those lines as they occur on the head. We use all these terms in a collective sense to include such lines not only on the head but also on other body regions, including the cephalothorax of the pupa. For convenience we introduce four new terms for particular ecdysial lines. Three incorporate the same adjectives used for old terms when these lines were regarded as sutures. Thus the epicranial ecdysial line has been known as the epicranial suture, while its subdivisions, the coronal ecdysial line and frontal ecdysial line, have been called the coronal suture and frontal suture. We call any ventral ecdysial line of the head a hypocranial ecdysial line, employing the adjectival form of hypocranium as a convenient counterpart of epicranial.

**epipharyngeal apparatus.** - Schremmer (1949, 202) applied the German term Epipharynxapparat to the combination of the intertorma, midpalatal brush, and, judging from his discussions (1949, 1950a-b), to the midpalatal lobe. He (1950b, 484) erroneously equated the Epipharynxapparat and Cook's (1944a) palatum but Cook included parts (anteromedian palatal lobe, torma, etc.) not included in the Epipharynxapparat by Schremmer. Epipharynxapparat has been anglicized as epipharyngeal apparatus (Snodgrass 1959, 15) and epipharynx apparatus (Clements 1963, 34). These and later authors have used the terms loosely so that it is often difficult to know if an author included the midpalatal penicular areas, the sensillar rods, the intertorma and midpalatal penicular areas, the general cuticular area near these parts, a lobe supposedly restricted to the posteromesal portion of the midpalatal lobe, the entire midpalatal lobe, or some combination of the preceding parts. Probably usually the combination of the midpalatal lobe and midpalatal brush was intended.

**epipharyngeal process.** - Apparently first applied to a culicid larval structure by Shalaby (1957a). He reported three pairs in *Aedes aegypti* (1957a) and *Culex quinquefasciatus* (1957b). We interpret from his descriptions two of the three pairs to be midpalatal sensillar rods while the third, described as H-shaped, to be the mesal intertormal apodemes and part of the intertorma between them. He reported (1956c) that *Psorophora ciliata* second-to fourth-instar larvae had epipharyngeal processes, the numbers varying from 3 pairs in the second to 5 or 6 pairs in the fourth instar. His description indicates that these were large midpalatal brush hairs.

**epipharynx.** - Used in at least three separate ways in culicid larvae: (1) for all, or nearly all, of the palatum (Menees 1958b, 133; Schremmer 1949, 180, fig. 1, as German Epipharynx; Chaudonneret 1962, 474, as French epipharynx); (2) for the midpalatal lobe (Raschke 1887, 143, as German Epipharynx; Thompson 1905, 168; Imms 1907, 296; Salem 1931, 395; Bekker 1938, 439); and (3) for the set of parts made up of the intertorma, the midpalatal brush, and, when present, the midpalatal sensillar rods (Shalaby 1956, 1957a-c; Christophers 1960, 202). None of these usages could be morphologically equivalent to the original use of epipharynx for a particular lobe of the bee clypeopalatum nor to the common use in adult Diptera for the lower side of the labrum.

flabella. - Thompson (1905, 169) and Wesenberg-Lund (1921, 16) used flabella (plural, flabellae), a misspelling of flabellum (plural, flabella) collectively for the lateral palatal brush and a lobe of indefinite extent bearing it, not merely the lateral palatal penicular area. Bekker (1938, 439) restricted flabella to this brush and penicular area only. Certain later authors have considered flabella as rejected synonym, either of the lateral palatal penicular area (as a penicular area, Cook 1944b, 41; as hairbearing sclerite, Shalaby 1956, 144) or the lateral palatal brush (as lateral labral brush, Pucac 1965, 44-45).

flabellar inner retraction insertion. - Introduced by Pucac (1965, 44), who attributed it to Thompson (1905) and regarded it as a rejected synonym of torma. Thompson did not use this term though he did label (1905, fig. 31) one end of the tormal apodemal bar as "insertion inner retractor flabellae," perhaps not meaning to create a term and certainly not intending even to describe the entire tormal apodemal bar in this manner. See next entry.

flabellar outer retraction insertion. - Introduced by Pucac (1965, 44), who attributed it to Thompson (1905) and regarded it as a rejected synonym of her posterior tormal apodeme (our tormal apodemal bar). Thompson did not use the term though he did label (1905, fig. 31) one end of the tormal apodemal bar as "insertion outer retractor flabellae," perhaps not meaning to create a term and certainly not intending to even describe the entire tormal apodemal bar in this manner. See preceding entry.

frontoclypeal suture. - Applied variously in culicid larvae according to the users' interpretations of the frons and clypeus. Patton and Evans (1929, 234, as fronto-clypeal suture) said it is an "imaginary line drawn across the head, joining the two frontal pits," but they said the pretentorium "marks the position of the frontal pit" and they misidentified the black-spot area as the pretentorium; thus they located this suture somewhat distal to the epistomal suture. Shalaby (1956, 140; 1957b-c) apparently applied "frontoclypeal suture" to a part of the clypeolabral ridge; see the appendix entry on clypeus. DuPorte (1957, 68) indicated that Cook (1944b) interpreted the culicid "cleavage lines" (our frontal ecdysial lines) as the frontoclypeal suture; actually Cook called them the clypeofrontal suture. Belkin (1962, 559) did call these lines the frontoclypeal suture.

frontogenal inflection. - DuPorte (1946, 394) applied this term in the culicid larva to the developed part of the epistomal ridge along with at least a part of the paraclypeal lobe and indicated that the "frontogenal inflection extends ventrally from this point [anterior tentorial pit] along the lateral edge of the clypeal area to the clypeolabral...inflection." This lateral edge of the clypeal area would be the paraclypeal lobe which is an external, lateral part of the clypeus and not an internal inflection or ridge. DuPorte used frontogenal inflection in some other insects in the same way as in culicid larvae, in some other insects for the lateral part of the epistomal ridge only, and in still others for a different internal ridge.

INTERTORMA. - This culicid structure appears to be homologous with the intertorma of certain other insects. The term was apparently first used in Orthoptera and soon applied in Diptera (Crampton 1930a in Stenopelmatus and 1930b in Protoplasa). Terms previously used for it are less appropriate. Menees (1958b) and Chaudonneret (1963) suggested that the chironomid messor or premandible is equivalent to the lateral part of the culicid structure. We believe they were correct and suggest that intertormite would be an appropriate name for this paired sclerite. This term, newly applied here to culicids, also serves as the basis for two other terms used here for the first time: LATERAL INTERTORMAL APODEME and MESAL INTERTORMAL APODEME.

labial plate. - Apparently Felt (1904, 264) first used this term for culicid larvae. In some cases (e.g., his figs. 7 and 44) his labial plate included the entire mentum as he clearly figured both the dorsomentum and the ventromentum. In other cases (e.g., his figs. 19 and 72) his labial plate is the dorsomentum only. The labial plate of most later culicid workers has similarly been either the dorsomentum or the whole mentum, though Landis (1923, 29) and Belkin (1962, 559) appear to have used it for the part we call the labiogula.

LABIOGULA. - This term has been derived by us from "labiogular plate" as first used by Snodgrass (1960, 26) for Coleoptera: "...As the gula enlarges, the tentorial pits (B, C, D. pt) maintain their primary relations to the base of the labium, but the gula and the labium become sclerotically continuous. The labiogular plate has been termed the 'gulamentum,' but the labial part involved is either the postmentum or the submentum, ..." His term has been modified to labiogula by us to parallel the way in which gula is handled in this glossary. All other previously applied terms were judged to be inappropriate for one reason or another.

LABROPALATUM. - Wenk (1962, 91), in a study on the adult simuliid head, coined the germanized Latin term Labro-Palatum for the oral surface of the labrum. We endorse the anglicized Latin form for use with both larval and adult culicids.

LATERALIA. - DuPorte (1946, 394), Snodgrass (1947, 7), and Hinton (1963, 39) showed that the ecdysial lines of the head are secondary lines that vary widely in position among insects and can not be used to define homologous cranial areas. The convenient terms dorsal apotome and ventral apotome were proposed to designate the dorsal and ventral cranial areas partly or fully delimited by ecdysial lines. We believe that a parallel term for the lateral cranial areas would be useful. Bischoff (1922, 5) designated them in germanized Latin as Lateralía (also in German as Lateralplatten, a term apparently introduced by de Meijere 1916) in various Nematocera larvae, apparently applying this word to the same areas we regard as the lateralía, even though he did not seem to realize the significance of the ecdysial lines. The anglicized Latin equivalent, lateralía, was used in this sense by Fuller (1935, 293) and perhaps earlier. Several other authors have used the term. We now recommend its use in culicid larvae and in other appropriate insects. Robineau-Desvoidy (1830, 8) used lateralía for a different structure of adult flies, but his term seems to appear in recent literature mainly as a rejected synonym. Some authors have called the larval lateralía the epicranial plate, but this term, if used, should be available for any sclerite of the epicranium, including the dorsal apotome. Crampton (1921, 71) called a restricted dorsal portion of the

lateralia the parietals, parietal region, or parietal area. Snodgrass (1928, 36) apparently misread Crampton's work, because he inferred he was adopting the Crampton concept of the parietal area, yet he included the gena as part of it, even though Crampton had explicitly excluded the gena. Thus, the parietal area of Snodgrass includes most of the same parts we include in the lateralialia. Ventromesally, we exclude from the lateralialia any ventral apotomes present and also the postmentum and labiogula, when these can be distinguished.

LATERAL ORAL BAR. - We introduce this new term to replace two earlier terms we consider unsatisfactory. We reject lateral oral apodeme because this structure is not an apodeme. We reject U-shaped sclerite of the pharynx because of the length of the term and because the structure is not limited to the pharynx. Possibly homologous to the part of the hypopharyngeal suspensorial bar that is at the lateral angle of the mouth in generalized insects. See the discussion by Snodgrass (1959, 11). Chaudonneret figured and described this culicid part as the "arc de liaison" (1962, 476) and "arc chitineux du angle buccal" (1962, 483).

LATERAL PALATAL BRUSH. - We prefer this new term to the many terms previously applied to this part. The rejected terms are objectionable to us for various reasons. Many give either no clue or a misleading clue to the location of this structure or could as reasonably be applied to some other part. Some, such as all those including the words organ or maxillary, are based on mistaken interpretations of the nature or location of this structure. Some, such as fan and flabellum, apply reasonably well to this structure as it occurs in some nematocerans, but not in others. Our term is objectionable in being rather long and in that the part is only remotely brushlike in some cases, but we feel its advantages in showing the location and usual nature of the part outweigh such objections.

LATERAL PALATAL BRUSH HAIR. - This new term shows clearly that the structure is a part of the lateral palatal brush. The previous terms applied to these hairs do not show this and some apply only to particular hairs of this brush.

LATERAL PALATAL CROSSBAR. - This term has been newly created to provide a more definitive descriptor for the "cross-bar" of Christophers (1960, 204). Pucat (1965, 41) provides a detailed description of the lateral palatal crossbars of culicid larvae.

LATERAL PALATAL PLATE. - We feel this term more accurately describes this structure than does any of its rejected synonyms; also it has been used more often.

LATERAL TORMAL PROCESS. - We propose this new term because previous terms for this part are either insufficiently distinctive (anterior process and lateral process) or allude to rejected synonyms of the torma (all other synonyms).

MENTUM. - Apparently first applied by Raschke (1887, 142) in culicid larvae; his interpretation of mentum included the entire postmentum and perhaps the gula as well. The mentum of many authors is the part we call the dorsomentum. Cook (1944b, 45) inferred that the mentum has been lost in culicid larvae. Snodgrass (1959, 19) stated that "the labium of the mosquito larva is evidently the prementum;" thus indicating the loss of the mentum and submentum.

MESAL TORMAL PROCESS. - This new term replaces terms that are either too general (medial process and median process) or allude to rejected synonyms of the torma (the other synonyms).

MIDPALATAL BRUSH HAIR. - This new term shows clearly the position of these hairs. Previous terms for these hairs apply only to particular kinds of the hairs or employ the adjective epipharyngeal for these palatal structures.

MIDPALATAL SENSILLAR ROD. - This is the external projection of one of the "epipharyngeal sensilla" of Burgess and Rempel (1966). We suggest the term "midpalatal sensillum" for the sensillum itself, in line with our rejection of the term epipharynx. These sensilla do not seem to have been described in any anopheline larvae. Perhaps their homologs are present in anophelines, but without rodlike projections.

PALATUM. - The first usage seen for this term with culicids is Raschke (1887, 139). The Linné original reference mentioned by Raschke could not be located. For a discussion of this term and its meaning, see Cook (1944b, 41).

PARACOILA. - Yuasa (1920, 259) introduced this term in a study on orthopteroids. Ours is probably the first direct use for larval culicids. The paracoila is presumably derived from the maxillary segment, thus the synonyms incorporating submentum, a labial part, are unsuitable.

PENICULAR AREA. - This term, meaning brush-bearing, was proposed in culicids by Cook (1944b, 41) specifically for the specialized cuticular area bearing the lateral palatal penicular area. We have expanded its use here to apply in arthropods to any specialized cuticular area bearing a brush of non-socketed hairs.

POSTCOILA. - Yuasa (1920, 258) introduced this term in a study on orthopteroids; MacGillivray (1923, 30) applied it in several orders. Our use is probably the first direct application to larval culicids. We do not restrict the term postcoila to the articulating surface, or to any process or acetabulum that may be associated with that surface, but include along with such parts any additional adjacent cranial cuticle obviously specialized in relation to the articulation. Thus, as we use the term for a more extensive area, at least in some insects, than did Yuasa and MacGillivray, we are amending the term. In culicid larvae, we regard as a part of the postcoila the prominent streak of thick cuticle extending from the posterior mandibular articulation for a short distance toward the occipital foramen; we suspect that Yuasa and MacGillivray would have called this streak the crassa. Some of the terms we list as rejected synonyms may have been intended for the distal end of our postcoila. The synonyms we reject are awkwardly long or represent misapplications of terms; the postcoila is neither an apodeme nor an articulation, though it may be partially apodematous and it is associated with an articulation. The uses of maxillary apodeme by Shalaby (1956, 1957a-c) not listed as synonyms of postcoila apply to certain parts of the maxilla.

POSTERIOR MANDIBULAR ARTICULATION. - This term is more suitable than are its synonyms and it has been used more often than they have been.

POSTTORMA. - We suggest this new term to replace the longer terms lower triangular plate and triangular plate. The posttorma is behind the base of the torma, though a presumably secondary arm of the torma projects posteriad just mesal to the posttorma. We regard it as a part of the clypeopalatum and the torma as a part of the labropalatum, but concede that these assignments are open to challenge. We are not aware of any comparable sclerite in other insects.

PRECOILA. - Yuasa (1920, 257) introduced this term in a study on orthopteroids. MacGillivray (1923, 30) applied it to many insects, including adult tabanids. Our use is probably the first direct application to larval culicids. Dorsal articulation of the mandible is unsatisfactory for this part, because it is not an articulation, though associated with one.

STEMMA. - We prefer this term because of the impression we have that it has almost never been used for anything except this structure. Lateral ocellus is not appropriate because some entomologists, including some dipterists use this term for the paired dorsal ocelli as contrasted to the unpaired dorsal ocellus which then goes by the name of median ocellus or central ocellus. While stemma has had comparatively little use in Diptera, it is frequently used in some other insects, especially beetles.

SUBMENTENTAL SUTURE. - Apparently here applied to culicid larvae for the first time. Matsuda (1965, 88) used this term (as "submentental suture") and suggested that this suture might be "purely a mechanical device" in many immature insects.

SUBMENTUM. - We think that past workers have incorrectly applied this term in culicid larvae. Our interpretation is based partly on the embryological evidence given by Menees (1958a, 27) though we differ with him in that we follow Das (1937, 71), DuPorte (1960, 655; 1962, 38) and Matsuda (1965, 88) (authors who did not mention culicids in the discussions cited) in considering the base of the submentum to be level with the front ends of the postoccipital suture at the posterior tentorial pits. The submentum of Menees is our labiogula; he regarded the gula to be part of the submentum, as did Snodgrass (1928, 130) in Coleoptera. Snodgrass (1959, 7) thought the culicid larval labium was greatly reduced and represented only by the part we call the prementum; he did not identify a submentum. Other authors have applied submentum to various parts, that of Patton and Evans (1929, 232) being the labiogula, that of Shalaby (1956, 140) being the labiogula less a transverse anterior area he called the mentum, that of Cook being the dorsomentum in culicines (1944b, 44) and the mentum in anophelines (1944b, 47), that of Imms (1907, 293) and Pucat (1965, 43) being the mentum, that of Puri (1931, 7) being the mentum, and that of Salem (1931, 407) and some other authors being the ventromentum.

TORMA. - Peterson (1916, 189) introduced this term. Confusion about the nature and extent of the torma began with him and has continued to the present. He applied it in orthopteroids to the "chitinized pieces which belong to the lateral portions of the epipharynx in the region of the clypeo-labral suture and connect with the clypeus or labrum at the lateral ends of the suture." Peterson's paper was mainly on the head of Diptera adults and he appears to have



used the term torma in Diptera in at least three different ways, perhaps none of them representing a homologue of his orthopteroid torma. His torma in adult Simulium (fig. 497) includes a dorsolateral and a ventrolateral bar later interpreted by Wenk (1962, 92) as a "Querstäbchen" and the "Torma." Peterson's torma in adult Tabanus (fig. 494) includes a distal part Bonhag (1951, 187) called "proximal sclerite of labrum" and paired proximal parts Snodgrass (1953, 8) considered to be ridges which "represent the beginning of paraclypeal phragmata in other flies." Peterson's torma in adult Musca includes an exposed part (fig. 72) called the clypeus by Snodgrass (1953, 3) and paired hidden ridges (fig. 600) interpreted by Snodgrass (1953, 7) as paraclypeal phragmata in Calliphora and by MacGillivray (1923, 145) as the paratormae in "specialized Diptera." Later interpretations of the torma in insects other than Diptera have generally been in harmony with Peterson's use in orthopteroids (e.g., Yuasa 1920, 261; Crampton 1921, 31; Yuasa 1923, 336; MacGillivray 1923, 31; Snodgrass 1928, 97; Hayes 1930, 106; Das 1937, 42; Cook 1944a, 4; Hinton 1958, 186). Occasional workers have used torma for adult Diptera, applying it to part or all of one of the parts Peterson called the torma in Diptera (e.g., MacGillivray 1923, 54, Tabanus; Jobling 1926, 329, hippoboscids; Jobling 1928, 212, Cuicoides). The term torma (or German Torma) has been used for various nematoceros larvae by Crampton (1930b, 245, Tanyderidae); Tokunaga (1930, 5, Tipulidae; 1932, 10, Chironomidae); Cook (1944a, 7, Bibionidae; 1944c, 70, Chironomidae); Anthon (1943, 18, Anisopodidae); Hennig (1948, 30, many nematoceros families; 1950, 9, additional nematoceros families); etc. Most of these authors on Diptera larvae applied torma to an individual sclerotized part of the labrum. Torma has been applied to culicid larvae by Patton and Evans (1929, 232), Hennig (1948, 36), Schremmer (1949, 181), Hennig (1950, 55), Menees (1958b, 131), Snodgrass (1959, 12), Jones (1960, 459), Chaudonneret (1963, 369), Matsuda (1965, 231), Pucat (1965, 45) and Pao and Knight (1970, 120). Of these authors, Schremmer, Menees, Snodgrass, Matsuda, and Pucat all used torma ("Torma" in Schremmer) in culicid larvae in the same sense we do. Patton and Evans referred to the culicid median labral plate as "fused tormae" and, in discussing the "feeding brushes," indicated that the "plates to which the hairs are attached are probably a part of the fused tormae." Hennig (1948 and 1950) referred to the "Mundbürsten" as "Tormae," though possibly intending to include one or more of the associated paired sclerites. The "torma (sensu lato)" of Chaudonneret includes the sclerotized areas collectively on which the labral retractor muscles are inserted; thus our culicid intertorma, as well as our torma, would be included. But his "torma (sensu stricto)" is the sclerite on which one (the most anterior in culicids) of the lateral labral retractor muscles is inserted via an apodeme; thus his anopheline torma s. str. is our torma while his culicine torma s. str. is, in his view, only the anterolateral part of the sclerite we call the torma. Pao and Knight used torma for our lateral palatal penicular area. The criteria for recognition of the insect torma are vague. Several authors have restricted it to a sclerotized posterolateral extension of the main dorsal sclerotized area of the labrum. Usually a lateral labral retractor muscle is inserted on it, but Hinton (1958, 186) listed several Mecoptera families in which the larval torma is "well developed" but the muscle is absent. In most insects, the torma extends only a short distance onto the palatum, but in some it is long and even branched. It is then a problem as to whether the entire sclerotized extension should be called the torma. This problem is especially difficult in those Nematocera larvae with one to several paired and unpaired sclerites on the labropalatum. We have elected to follow the conventional practice of restricting

the term torma in culicid larvae to the paired sclerite on which one or two lateral labral retractor muscles are inserted via apodemes. When the labropalatum has been more carefully studied, it may be necessary to revise the terminology. Possibly the torma should be extended in Nematocera to include the intertorma because the median labral retractor muscles are inserted on the intertorma. Or, perhaps it should be extended to include any labropalatal sclerite.

TORMAL APODEMAL BAR. - This new term replaces several terms already applied to this structure. We object to the old terms for various reasons. Some refer to the torma by one of its rejected synonyms. Some infer that the tormal apodemal bar is an apodeme; it is only part of an apodeme. Stirrup infers it is stirrup-shaped; it is probably not stirrup-shaped in any culicid. This culicine structure may be equivalent to a hypothetical fusion of the flared terminal parts of the lateral intertormal apodeme and tormal apodeme of anophelines.

VENTROMENTUM. - Saether (1971, 1237) coined this term for use in chironomids. It is a convenient one and we introduce it into use for culicids even though the part is probably not strictly homologous among all culicids and certainly not from culicids to chironomids.

VERTEX. - Kirby (1802, 90) introduced this term for the "portio faciei inter occiput et oculos." Perhaps his use stemmed from the use of the word by Bladh (1767) in defining stemma ("STEMMA...in vertice capitis.") Subsequent definitions have usually been vague, most commonly referring to the part of the head between the eyes and occiput, often with an anterior limit at the back edge of the front as supposedly marked off by the "frontal suture" or the paired ocelli or both. Definitions have varied from the one extreme of considering the vertex to be a single point at the top of the head (Lowne 1891, 120, adult Calliphora) to the other extreme of including the gena and "all of the dorsal and cephalic aspects of the epicranium except the front" (Peterson 1916, 13, adult Diptera), Rarely applied to Diptera larvae.

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