Glossary of Morphological Terms

The glossary, illustrated by Figures 523–531, deals with morphological terms encountered in this survey. Some terms are merely defined but others are discussed in detail for the benefit of first-time users and others not well acquainted with ant morphology. The list is by no means exhaustive, as many specialized terms encountered in males and queens are not covered, nor are the extensive vocabularies applied to forms of sculpture, pilosity, internal anatomy, and morphometrics utilized below genus level. Terms are listed in alphabetical order, and acceptable alternatives are given in parentheses; for instance, alitrunk (= mesosoma). Abbreviations used in the figures are given here in *italic*. For a more general overview of hymenopterous morphology see Gauld and Bolton (1988).

Abdomen The classical third tagma of the insect body. The abdomen in worker ants consists of seven visible segments (Fig. 530; *A1–7*) and each bears a spiracle (Fig. 530; sp), which may be exposed or concealed. The first abdominal segment is the *propodeum* (Fig. 529, 530; *ppd* = *A1*), represented only by its tergite (the sternite has been lost) and immovably fused to the thorax. The tagma formed by the fusion of thorax plus propodeum is termed the *alitrunk* (= mesosoma) (Figs. 528, 529; *al* = *mes*). The second abdominal segment, the *petiole* (Figs. 528, 530; *pt, A2*), is always specialized. It is usually reduced in size, always separated from the preceding propodeum by a complex narrow articulation, and usually separated from the following abdominal segment by at least a constriction. In the vast majority of ants the petiole is distinctly isolated both anteriorly and posteriorly. Abdominal segments 2 to the apex are sometimes collectively called the *metasoma* (Fig. 530; *mt*), but this term, useful elsewhere in the Hymenoptera, has little to recommend it in the ants. Abdominal segment 3 is termed the first gastral segment when it is full-sized and broadly articulated to the following segment (Fig. 530; *G1* = *A3*), but when reduced and isolated it is called the *postpetiole* (Fig. 528; *ppt, A3*). Confusingly, it is sometimes also called the postpetiole when full-sized. Abdominal segment 3 articulates with the preceding petiole by means of the *helcium* (Figs. 528, 530, 531; *he*). The petiole alone, or the petiole plus postpetiole together, when the latter is also reduced and separated, may be termed the *waist* (Figs. 528, 530; *w*). [An older term, *pedicel*, should be abandoned, as it is used for a different body part elsewhere throughout the Hymenoptera.] Abdominal segment 4 is the first gastral segment when the waist consists of petiole plus postpetiole (Fig. 528; *G1* = *A4*), but it is the second gastral segment when the waist consists of petiole alone (Fig. 530; *G2* = *A4*). Abdominal segments 3 or 4 through to 7 are collectively called the *gaster* (Figs. 528, 530; *ga*), the enlarged apparent "abdomen" that comprises the terminal part of the body. In referring to parts of the gaster the term *gastral* is preferred, as this leaves the form *gastric* free for use in connection with the intestine.

Each abdominal segment behind the first consists of a pair of sclerites, a dorsal *tergite* (Figs. 528, 530; *tr*) and a ventral *sternite* (Figs. 528, 530; *st*). These may all be similar, or some may be specialized by fusion, reduction, or division into anterior and posterior portions (see **Presclerite**). Tergites and sternites may be referred to as abdominal or gastral (e.g., abdominal tergite 4 = second gastral tergite when the waist is of a single segment). In workers the last visible abdominal tergite, that of segment 7, is the *pygidium*, and the last visible sternite is the *hypopygium* (Fig. 530; *py, hy*).

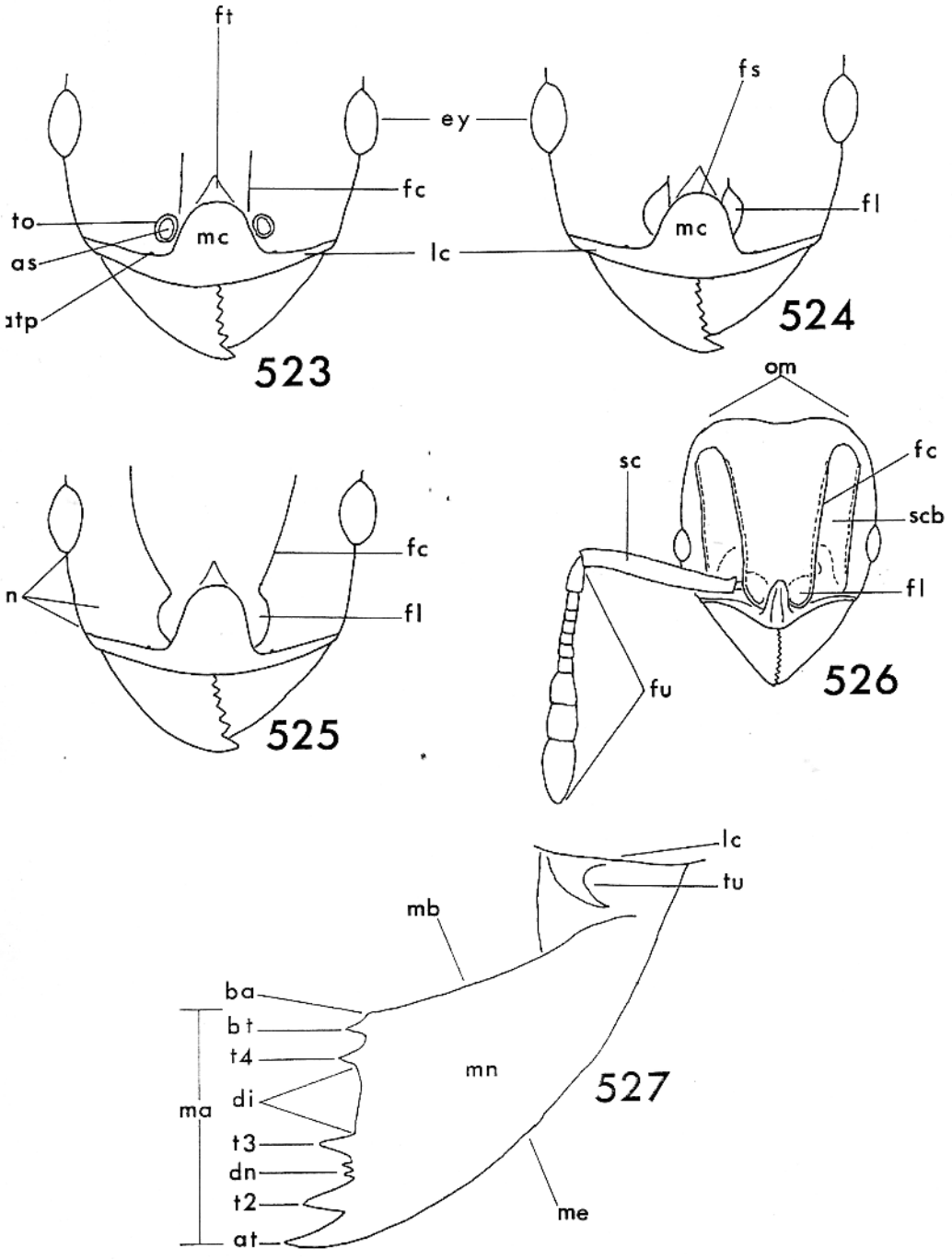
The terminology of the ant abdomen may at first seem confusing. This is because two different systems are superimposed and in places are not strictly compatible:

(1) A terminology based strictly on morphology, which numbers the abdominal segments as 1 to 7, from front to back (Fig. 530). This has the advantage of indicating homologous segments between different ant taxa, regardless of the specializations of individual segments or groups of segments.

(2) A more utilitarian terminology based on observed subdivisions of the abdominal segments, which names various specialized segments and groups of segments (Figs. 528 and 529). The advantage here is that the subdivisions and specializations are generally easily visible.

See also **Alitrunk, Helcium, Petiole, Postpetiole, Propodeum, Sternite, Tergite, Waist.**

Acidopore The orifice of the formic acid projecting system peculiar to, and diagnostic of, the ant subfamily Formicinae. It is formed from the apex of the hypopygium and is usually plainly visible, appearing as a short nozzle, generally with a fringe of short setae at its apex (Fig. 160). In most formicines the acidopore is always exposed, but in some it may be concealed by the posterior margin of the pygidium when not in use. In such groups the acidopore usually lacks a nozzle and takes the form of a semicircular to circular emargination of the apical margin of the hypopygium.



as antennal socket
at apical tooth of mandible
atp anterior tentorial pit
ba basal angle of mandible
bt basal tooth of mandible
di diastema
dn denticle
ey eye
fc frontal carina
fl frontal lobe
fs fronto-clypeal suture (= posterior clypeal margin)
ft frontal triangle
fu funiculus of antenna
gn gena
lc lateral portion of clypeus
ma apical (masticatory) margin of mandible
mb basal margin of mandible
mc median portion of clypeus
me external margin of mandible
mn mandible
om occipital margin of head
sc scape of antenna
scb antennal scrobe
t tooth number
to torulus
tu trulleum

Figures 523–527 Morphological features of ants. Drawings are composite, not based on any particular species; sculpture and pilosity omitted. Figs. 523–525, anterior halves of head in full-face view, antennae omitted. Fig. 526, whole head in full-face view, left antenna omitted. Fig. 527, fully opened triangular left mandible.

Aliform Shaped like a wing, approximately wing-like.

Alitrunk (= mesosoma) The second visible tagma of an ant's body, following the head. Morphologically the alitrunk consists of the three segments of the true thorax (pro-, meso-, and metathorax) to which is fused the propodeum, the tergite of the first abdominal segment, to form a single unit (Figs. 528, 529; *al* = *mes*). See also **Abdomen, Propodeum, Thorax.**

Anepisternum See **Pleurite.**

Annulus (pl. annuli) A simple, generally nonsegmental, ring of cuticle.

Antenna (pl. antennae) The antenna in ants consists of an elongate basal segment, the *scape*, followed distally by 3–11 smaller segments which together constitute the *funiculus* (= flagellum) (Fig. 526; *sc, fu*), giving a total antennal segment count (= antennomere count) of 4 to 12. The scape articulates with the head in the *antennal socket* (= antennal insertion) (Figs. 523, 528; *as*), a foramen located behind the clypeus. The antennal socket itself is encircled by a narrow annular sclerite, the *torulus* (Fig. 523; *to*), and may be overhung and concealed by the *frontal lobe* (Figs. 524, 525; *fl*). At the base of the scape is a ball-like *condylar bulb* (= articulatory bulb), the part which actually articulates within the socket. Just distal of the condylar bulb is a short constriction or neck, which may be straight or curved, beyond which the scape shaft proper commences. The funicular segments may be filiform or the apical 1–4 may be enlarged to form a *club*. See also **Frontal carinae, Torulus.**

Antennal scrobe A groove, impression, or excavation in the side of the head, which runs above or below the eye, to accommodate at least the antennal scape, but often the entire antenna, when the latter is folded back. Antennal scrobes vary in development from simple broad shallow grooves to extensive deep trenches (Figs. 526, 528; *scb*). Antennal scrobes are absent from most ant genera.

Antennal socket/insertion See **Antenna.**

Antennomere See **Antenna.**

Anterior tentorial pits A pair of pits or impressions located anteriorly on the dorsal surface of the head, at or very close to the posterior clypeal margin (Fig. 523; *atp*). The pits indicate the points of attachment of the anterior arms of the internal skeleton (tentorium) of the head to the head capsule. The termination of the posterior arms of the tentorium are marked by a pair of *posterior tentorial pits*, which are located close to the occipital foramen.

Apical margin/tooth (of mandible) See **Mandibles.**

Apophyseal lines Externally visible lines marking the internal track of cuticular processes for muscle attachment.

Basal angle/lamella/margin/tooth (of mandible) See **Mandibles.**

Basitarsal sulcus A longitudinal groove in the surface of the first (basal) tarsal segment of the leg.

Basitarsus (pl. basitarsi) The first, basal, of the five tarsal segments of the leg; the tarsal segment that articulates with the tibia.

Buccal cavity The anteroventral cavity of the head which contains the labium and maxillae.

Bulla (pl. bullae) See **Pleurite.**

Calyx See **Proventriculus.**

Carina (pl. carinae) A ridge or low, keel-like crest.

Carinula (pl. carinulae) Diminutive form of carina.

Cephalic Pertaining to the head.

CI (Cephalic Index) See **Standard measurements.**

Clavate/claviform (antenna) With the apical 1–4 funicular segments enlarged and forming a club (Fig. 526).

Claw See **Pretarsal claw.**

Club (antennal) See **Antenna.**

Clypeus Anterior sclerite of the dorsal head, bounded posteriorly by the fronto-clypeal suture (Fig. 524; *fs*), which is also very commonly called the posterior clypeal margin or border. The anterior clypeal margin usually forms the anterior margin of the head in full-face view (but a projection of the labrum may be anterior to the clypeus in some taxa). The body of the clypeus consists of a pair of lateral portions, or narrow bands of cuticle, on each side of a shield-like median portion (Figs. 523, 524; *lc, mc*). The median portion of the clypeus may be equipped with one or more longitudinal carinae, or may be variously specialized in shape. Posteriorly the median portion of the clypeus may end in front of the antennal sockets/frontal carinae or lobes, or may project backwards between them. In some taxa the clypeus is very reduced and extremely narrow from front to back.

Condylar bulb See **Antenna.**

Coxa (pl. coxae) The first, most basal, segment of a leg; the leg segment that articulates with the thorax (Fig. 529; *c1–3*).

Declivity (of propodeum) See **Propodeum.**

Dentate/denticle/denticulate See **Mandibles.**

Diastema (pl. diastemata) See **Mandibles.**

Dimorphic Occurring in two morphologically distinct forms; in the sense of the keys presented here, ants with two morphologically differentiated castes of worker.

Edentate See **Mandibles.**

Elongate-triangular See **Mandibles.**

Emarginate Having a notch, impression, or indentation in a margin, border, or edge.

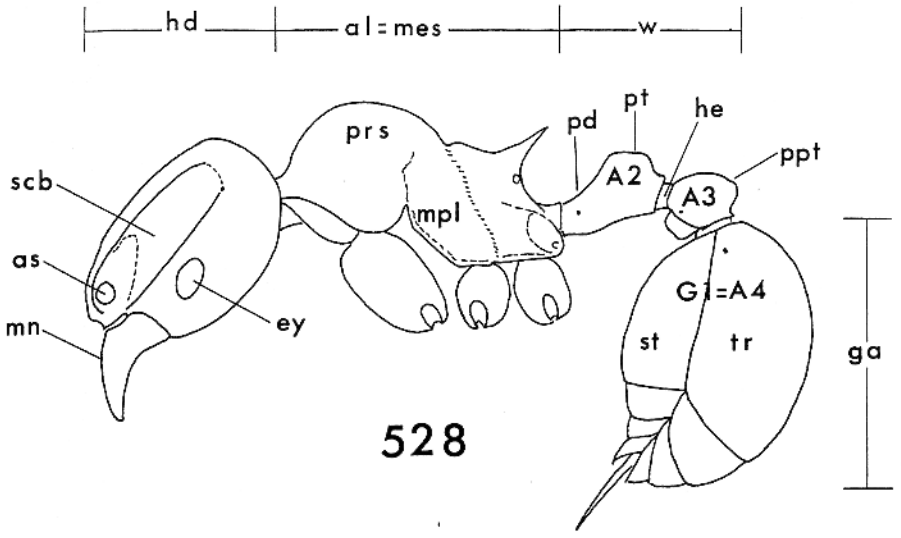
Endophragmal pit A pit in the lateral alitrunk wall which is an external indication of the position of attachment of part of the endoskeleton.

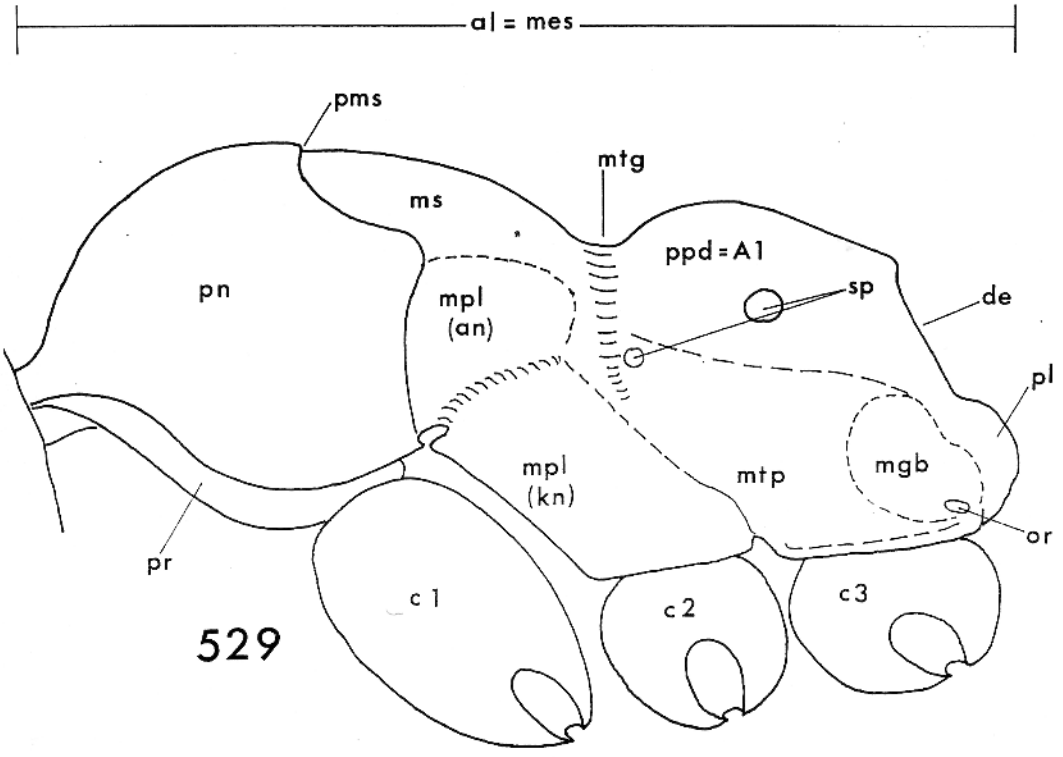
Epinotum An archaic name for the propodeum, used only by myrmecologists. Propodeum is the recommended term, because it is universally used elsewhere in hymenopterous morphology, and abandoning *epinotum* in favor of *propodeum* brings ant morphological nomenclature into line with the vast majority of the order.

External margin (of mandible) See **Mandibles.**

Falcate (mandible) See **Mandibles.**

Femur The third segment of any leg, counting from the basal coxal segment that articulates with the alitrunk. The femur is generally the





A	abdominal segment number
al	alitrunk
an	anepisternum
as	antennal socket
c	coxa number
de	declivity of propodeum
ey	eye
G	gastral segment number
ga	gaster
hd	head
he	helcium
kn	katepisternum
mes	mesosoma
mgb	metapleural gland bulla
mn	mandible
mpl	mesopleuron
ms	mesonotum
mtg	metanotal groove
mtp	metapleuron
or	orifice of metapleural gland
pd	peduncle of petiole
pl	propodeal lobe
pms	promesonotal suture
pn	pronotum
ppd	propodeum
ppt	postpetiole
pr	propleuron
prs	promesonotum
pt	petiole
scb	antennal scrobe
sp	spiracle
st	sternite
tr	tergite
w	waist

Figures 528–529 Morphological features of ants. Drawings are composite, not based on any particular species; sculpture and pilosity omitted. Fig. 528, whole ant in profile, legs below coxae omitted. Fig. 529, alitrunk (= mesosoma) in profile, legs below coxae omitted.

longest leg segment and is separated from the coxa only by a small segment, the *trochanter.*

Fenestra (pl. fenestrae) In the sense of the keys presented here, a translucent cuticular thin-spot.

Filiform (antenna) With the antennal funiculus thread-like, the segments all of approximately the same size. The contrasting antenual shape is club-like, with the apical segments of the antenna disproportionately enlarged.

Flagellum (= funiculus) See **Antenna.**

Foliaceous (outgrowths) Small to large roughly leaf-like cuticular projections.

Foramen (pl. foramena) An opening or perforation in a sclerite.

Fovea A depression or impressed pit.

Foveola Diminutive of the above; a small pit or depression.

Frontal carinae (sing. frontal carina) A pair of longitudinal ridges on the head, located dorsally behind the clypeus and between the antennal sockets. They are very variable in length and strength of development, frequently being short and simple (Fig. 523; *fc*) but sometimes extending back to the occipital margin of the head (Fig 525; *fc*). In some groups the frontal carinae are vestigial or absent, but elsewhere they may be strongly developed or form the dorsal margins of extensive antennal scrobes (Fig. 526; *fc, scb*). Commonly the frontal carinae anteriorly are expanded into projecting lobate extensions, the *frontal lobes* (Figs. 524–526; *fl*), which partially or entirely cover and conceal the antennal sockets. Frontal lobes may be the only expression of the frontal carinae in some groups. Sometimes the portion of the torulus closest to the cephalic midline is raised and expanded into a small, laterally projecting lobe, which may extend beyond the lateral margin of the frontal carina or lobe.

Frontal lobes See **Frontal carinae.**

Frontal triangle A small triangular patch of cuticle located mediodorsally on the head immediately behind the clypeus and approximately between the antennal sockets or anterior parts of the frontal carinae (Figs. 523–525; *ft*). Not apparent in many ant taxa.

Fronto-clypeal suture The suture forming the posterior margin or boundary of the clypeus (Fig. 524; *fs*); frequently referred to as the posterior clypeal margin.

Full-face view Orientation of the head in which the midpoint of the anterior clypeal margin, the midpoint of the occipital margin, and the midpoints of the sides are in focus at the same time (as Fig. 526).

Funiculus (= flagellum) See **Antenna.**

Gaster Morphologically, abdominal segments 3–7 when the waist is of a single segment (the petiole) (Fig. 530; *ga, G1–5*), or abdominal segments 4–7 when the waist is of two segments (petiole plus postpetiole) (Fig. 528; *ga*); functionally, the terminal, enlarged tagma of the body. See also **Abdomen, Waist.**

Gena (pl. genae) Area of front of head bounded in front by the posterior margin of the clypeus, behind by the anterior margin of the eye, and medially by the antennal socket (Fig. 525; *gn*). The gena thus includes part of the cephalic dorsum and the side of the head capsule between the eye and the clypeus.

Geniculate Bent like a knee-joint.

Girdling constriction A constriction or sudden and marked narrowing of an abdominal segment, which runs around the entire circumference of the segment (Fig. 530; *gc*). For convenience it is usually stated in keys that girdling constrictions are present between two segments. This is not strictly true as the constriction morphologically really represents the junction between the presclerites (see there) and postsclerites of the more posterior segment. The greater parts of these presclerites are usually inserted in the posterior end of the preceding segment and are invisible, leaving only the constriction visible externally (Fig. 531; *gc*).

Guard setae (= guard hairs) Specialized setae that traverse and protect the orifice of the metapleural gland (Fig. 529; *or*). See also **Pleurite.**

Gula Some authors have incorrectly used this term when referring to the ventral surface of the head capsule in ants. Morphologically, the gula is a separate medioventral sclerite of the head which is bounded anteriorly by the posterior tentorial pits. In ants the posterior tentorial pits are located near the occipital foramen and no gula is present.

Helcium The very reduced and specialized presclerites of abdominal segment 3, which form a complex articulation within the posterior foramen of the petiole (= abdominal segment 2) (Figs. 528, 530; *he*). In general the helcium is mostly or entirely concealed within the posterior orifice of the petiole, but in certain groups it is partly visible. Disarticulation of abdominal segments 2 and 3 is necessary to examine the structure and its variation in detail (Fig. 531; *he*). See also **Abdomen.**

Humeral angles (= humeri) The anterolateral dorsal angles of the pronotum.

Hypopygium The sternite of abdominal segment 7; the terminal visible gastral sternite (Fig. 530; *hy*).

Hypostoma The anteroventral region of the head; the area of cuticle immediately behind the buccal cavity and forming its posterior margin.

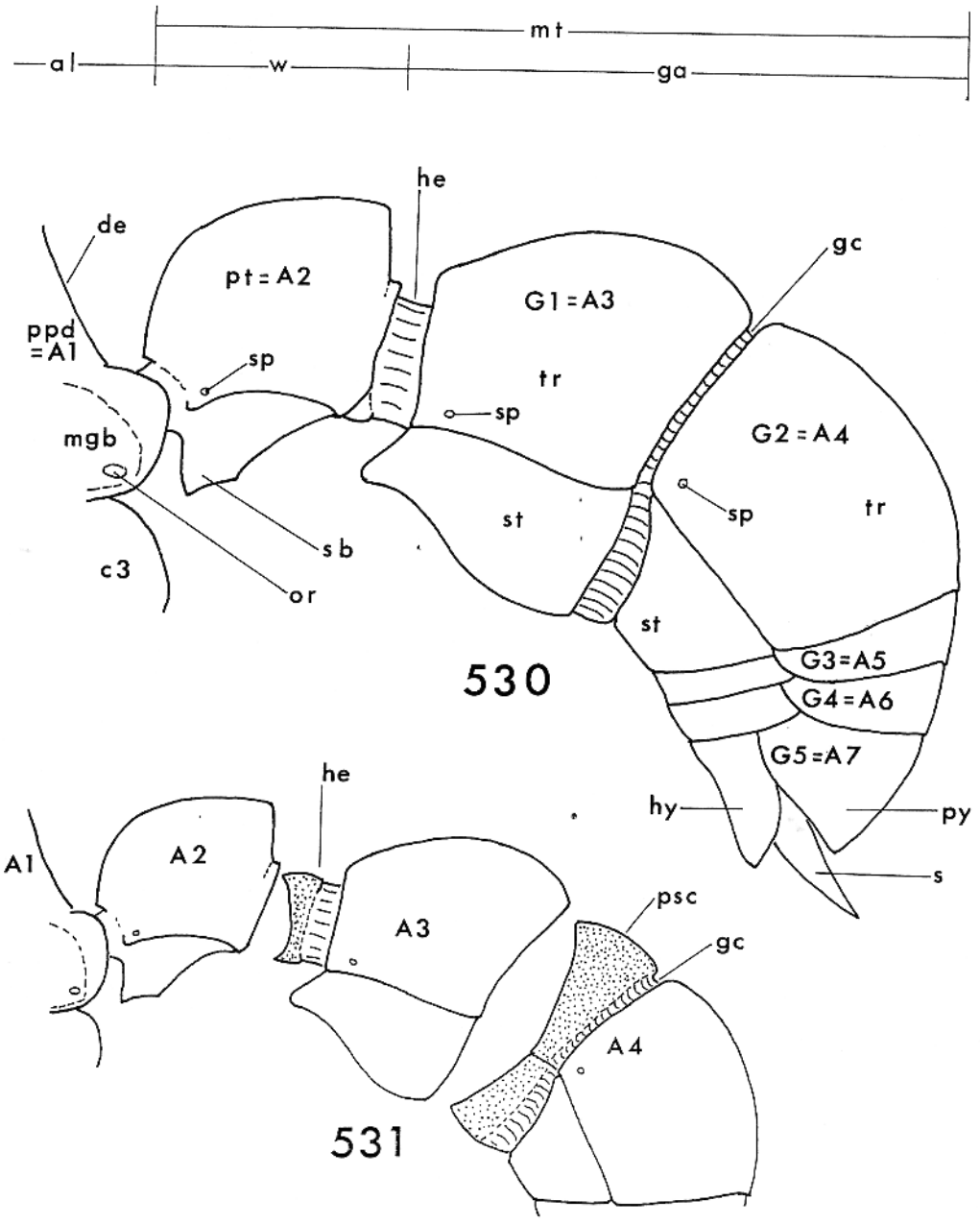
Hypostomal teeth One or more pairs of triangular or rounded teeth that project forward from the anterior margin of the hypostoma.

Intercalary (teeth) See **Mandibles.**

Katepisternum See **Pleurite.**

Labial palps (alternatively, labial palpus; pl. labial palpi) A pair of sensory palps, with a maximum of 4 segments, that arise anterolaterally on the labium. In ventral view the labium is longitudinal and situated centrally in the buccal cavity, flanked by a maxilla on each side. See also **Palp Formula.**

Labrum Mouthpart sclerite that hinges on the anterior margin of the clypeus and usually folds back and down over the apices of the maxillae and labium when the mouthparts are not in use. In most ants the labrum is a bilobed plate that is invisible in dorsal view, but in some taxa it projects forward from the anterior clypeal margin even when



A	abdominal segment number
al	alitrunk
c	coxa number
de	declivity of propodeum
G	gastral segment number
ga	gaster
gc	girdling constriction
he	helcium
hy	hypopygium
mgb	metapleural gland bulla
mt	metasoma
or	orifice of metapleural gland
ppd	propodeum
psc	presclerite
pt	petiole
py	pygidium
s	sting
sb	subpetiolar process
sp	spiracle
st	sternite
tr	tergite
w	waist

Figures 530–531 Morphological features of ants. Drawings are composite, not based on any particular species; sculpture and pilosity omitted. Fig. 530, waist and gaster in profile. Fig. 531, waist and gaster in profile with abdominal segments 2–4 disarticulated to show concealed portions of presclerites (stippled).

the mouthparts are at rest. Occasionally it is modified into one or more long, prominent labral lobes.

Leg segments Each leg consists of a basal *coxa* that articulates with the alitrunk, followed in order by a small *trochanter*, a long and generally stout *femur*, a *tibia*, and a *tarsus*, the last consisting of five small segments and terminating apically in a pair of claws. The prefixes *pro-*, *meso-*, and *meta-*, applied to any of these terms, indicate that segment on the leg of a particular thoracic segment. For example, the metatibia is the tibial segment of the metathoracic (hind) leg.

Linear (mandibles): See **Mandibles.**

Mandibles The appendages with which ants manipulate their environment. They are very variable in shape, size, and dentition, and extremely important in ant taxonomy.

Margins. In full-face view, with the mandibles closed, the inner margin or border (closest to an anterior extension of the midline of the head) of each mandibular blade is the *apical margin* (= masticatory margin) (Fig. 527; *ma*), and is usually armed with teeth. Proximally, close to the anterior margin of the clypeus, the apical margin usually passes through a *basal angle* (Fig. 527; *ba*) into a transverse or oblique *basal margin* (Fig. 527; *mb*). The two margins may join through a broad or narrow curve, or meet in an angle or tooth. When the mandibles are narrow or linear, the distinction between apical and basal margins may be lost by obliteration of the basal angle. The *external margin* (= lateral margin) (Fig. 527; *me*) of each mandible forms its outer border in full-face view and may be straight, sinuate, or convex.

Shape. In the vast majority of ants the mandibular margins form a *triangular* or *subtriangular* shape in full-face view (e.g., Figs. 7, 20, 136, 308, 452), but may be drawn out anteriorly while retaining the basic triangular shape and become *elongate-triangular* (e.g., Figs. 174, 246). In several discrete lineages the mandible has become *linear* (e.g., Figs. 146, 172, 202, 226, 426, 459, 470); the blade is long and narrow and the apical and external margins are approximately parallel or taper very gradually to the apex; the whole blade may be straight or curved. Linear mandibles may evolve in one of three ways:

(1) The base of the mandible narrows and the basal angle is obliterated so that the apical and basal margins form a single margin.

(2) The apical margin is elongated and the basal margin contracted.

(3) The basal margin is elongated and the apical margin reduced.

Extremely curved mandibles, usually quite short and with few or no teeth on the apical margin, are termed *falcate* (e.g., Figs. 106, 324, 420).

Dentition. The apical margin of each mandible is usually armed with a series of teeth (Fig. 527; *at*, *t2–t4*, *bt*) or denticles (short or very reduced acute teeth) (Fig. 527; *dn*) or both, which generally run the length of the apical margin. If teeth alone are present, or a combination of teeth and denticles, the mandible is *dentate*. If only tiny denticles occur the mandible is *denticulate*, and if the margin lacks armament it is *edentate*. A natural gap in a row of teeth (as opposed to a site where teeth have broken off or been worn down) is a *diastema* (pl. diastemata) (Fig. 527; *di*) and an elongate mandible with an uninterrupted series of teeth may be described as *serially dentate*. Teeth are usually sharp and triangular in shape but may be rounded *(crenulate)*; long, narrow, and spine-like (*spiniform*), or peg-like. Reduced teeth or denticles that occur between full-sized teeth are *intercalary*. In general the first, distalmost, or *apical tooth* (Fig. 527; *at*), the one farthest away from the anterior clypeal margin, is the largest on the apical (masticatory) margin, although in some taxa median or basal teeth may be the largest. The tooth at or nearest to the basal angle is the *basal tooth* (Fig. 527; *bt*). The tooth immediately behind the apical (Fig. 527; *t2*) may be termed the *preapical* (= subapical), though this term may also be applied more generally to include several teeth that are behind the apical but distal of the mandibular midlength. Similarly, the tooth immediately preceding the basal (Fig. 527; *t4*) may be termed the *prebasal* (= subbasal). In a few taxa teeth may occur on the basal margin of the mandible (Fig. 527; *mb*), but in most this margin is unarmed. Many dacetonine myrmicines have a *basal lamella*, a thin strip or plate of cuticle, on the apical margin proximal to any teeth that may be present.

Marginate Having a sharply defined rim, edge, or margin separating one face of a sclerite, segment, or tagma from another.

Masticatory margin/border (of mandible) See **Mandibles.**

Maxillary palps (alternatively, maxillary palpus; pl. maxillary palpi) The segmented sensory palps of the maxillae. Each palp may have at most 6 segments but these are variously reduced in number in different ant groups; only very rarely are maxillary palps absent. In ventral view the maxillae are situated in the buccal cavity, one on each side of the central labium (which itself possesses a pair of palps), and the palps are articulated to the maxilla anterolaterally on each side. See also **Palp Formula.**

Mesad Medially, toward the middle, towards the midline.

Mesonotum See **Tergite.**

Mesopleuron See **Pleurite.**

Mesosoma See **Alitrunk.**

Mesothoracic spiracle See **Spiracle.**

Mesothorax See **Thorax.**

Metacoxa (pl. metacoxae) The coxa of the metathoracic (= hind, = third) leg (Fig. 529; *c3*). The metacoxae insert posterolaterally in the ventral alitrunk, close to the median emargination in which the petiole articulates. The cavity of this median petiolar articulation may be separated from the cavities in which the metacoxae articulate (metacoxal cavities) by a bar or annulus of cuticle, or the cavities may be confluent. To observe these structures it is necessary to remove the hind legs and mount the ant ventral side uppermost. See also **Leg segments.**

Metanotal groove/metanotum See **Tergite.**

Metapleural gland See **Pleurite.**

Metapleural lobe See **Propodeal lobe.**

Metapleuron (pl. metapleura) See **Pleurite.**

Metasoma See **Abdomen.**

Metasternal process A paired cuticular projection of the posteroventral alitrunk. When present it is located astride the ventral midline, anterior to the apex of the cavity in which the petiole articulates and close to the level of the anterior margins of the metacoxal cavities. To

view the process clearly it is necessary to remove the middle and hind legs.

Metathorax See **Thorax.**

Metathoracic spiracle See **Spiracle.**

Metatibia The tibial segment of the metathoracic (= hind, = third) leg. See also **Leg segments.**

Metatibial gland A presumably exocrine gland located ventrally on the metatibia just posterior to the tibial spur in several ant subfamilies. When present it varies considerably in shape and size.

MI (Mandibular Index) See **Standard measurements.**

Monomorphic Occurring in only a single morphological form; in the sense of the keys presented here, having only one form of worker caste.

Node/nodiform See **Petiole.**

Nuchal carina A ridge situated posteriorly on the head that separates the dorsal and lateral surfaces from the occipital surface (Figs. 458, 460).

Occipital corners With the head in full-face view, the rounded to acute posterolateral angles, where the sides of the head curve in to the occipital margin (Fig. 526).

Occipital margin In common usage, the transverse posterior margin of the head in full-face view (Fig. 526; *om*); morphologically the term is incorrect, as the occiput proper usually begins behind this level, but the name is suitable for most purposes.

Ocular Pertaining to the eye.

Ommatidium (pl. ommatidia) A single optical component of the compound eye.

Palp Formula (PF) A standardized way of indicating the number of segments in the maxillary and labial palps. The number of maxillary palp segments is given first, the number of labial palp segments second; thus PF 6,4 indicates that the maxillary palp has six segments, the labial four.

Pectinate Comb-like.

Pedicel An old term used in ants for the isolated body segments between the alitrunk (= mesosoma) and gaster, namely the petiole or petiole plus postpetiole. The use of *pedicel* is not recommended as it is employed elsewhere throughout the Hymenoptera as the name for the first funicular segment of the antenna. Use of the term *waist* is recommended in referring to these isolated segments.

Peduncle (of petiole) The relatively narrow anterior section of the petiole which begins immediately behind the propodeal-petiolar articulation and runs back to the petiolar node or scale (Fig. 528; *pd*). It is very variable in length and thickness but when present in any form the petiole is termed *pedunculate*. When the peduncle is absent, so that the node or scale of the petiole immediately follows the articulation with the propodeum, the petiole is termed *sessile* (Fig. 530). If an extremely short peduncle occurs the petiole is termed *subsessile*.

Petiole Morphologically, the second abdominal segment; the segment immediately following the alitrunk (= mesosoma), which is usually reduced and always isolated (Figs. 528, 530; *pt* = *A2*). Generally the petiole takes the form of a node *(nodiform)* or of a scale *(squamiform)* of varying shape and size, but in some taxa it may be very reduced, represented by only a narrow, subcylindrical segment that may be overhung and concealed by the gaster. The petiole bears the second abdominal spiracle and usually consists of a distinct tergite and sternite. The former may have differentiated laterotergites low down on the side. In some groups the petiolar tergite and sternite have fused together. See also **Abdomen, Peduncle.**

Plectrum See **Stridulatory system.**

Pleurite/pleuron The lateral sclerites of the thorax proper, excluding the propodeum (Fig. 529; *ppd* = *A1*), which is morphologically the first abdominal tergite. The *propleuron* (pleuron of the prothorax) (Fig. 529; *pr*) is relatively small in ants and is mostly or entirely overlapped and concealed by the lateral part of the pronotum (Fig. 529; *pn*) when viewed in profile, but can be seen clearly in ventral view. The *mesopleuron* (pleuron of the mesothorax) (Figs. 528, 529; *mpl*) is the largest pleurite. It may consist of a single sclerite running almost the entire height of the mesothorax (Fig. 528) or may be divided by a transverse groove into an upper *anepisternum* and a lower *katepisternum* (Fig. 529; *an, kn*). The *metapleuron* (pleuron of the metathorax) (Fig. 529; *mtp*) is located posteriorly on the side of the alitrunk, below the level of the propodeum (Fig. 529; *ppd* = *A1*). The metapleuron bears, in most groups of ants, the *metapleural gland*. This is an exocrine gland whose orifice (Figs. 529, 530; *or*) is usually situated in the posteroventral corner of the side of the alitrunk, above the level of the metacoxa (Fig. 529; *c3*) and below the level of the propodeal spiracle (Fig. 529; *sp* on *ppd* = *A1*). The swollen *bulla* (Fig. 529; *mgb*) of the metapleural gland is often more conspicuous than the gland's orifice, taking the form of a shallow blister or convexity on the metapleuron and sometimes reaching almost to the propodeal spiracle. The orifice of the metapleural gland may be a simple pore, or may be protected by cuticular flanges or other outgrowths, or by guard setae traversing the orifice. See also **Sternite, Tergite.**

Polymorphic Occurring in more than two morphologically distinct forms; in the sense of the keys presented here, having more than two different forms of the worker caste.

Posterior tentorial pits See **Anterior tentorial pits.**

Postpetiole Morphologically, the third abdominal segment (Fig. 528; *ppt* = *A3*). In strict usage the term *postpetiole* should only be applied when the third abdominal segment is reduced and separated from the petiole in front and the fourth abdominal segment behind. See also **Abdomen.**

Postsclerite/poststernite/posttergite See **Presclerite.**

Preapical/prebasal teeth See **Mandibles.**

Presclerite A distinctly differentiated anterior section of an abdominal sclerite, separated from the remainder of the sclerite by a ridge, constriction, or both (Fig. 531; psc). In the ant abdomen it is usual for the posterior portion of each sclerite to overlap the anterior portion of the following segment. The overlapped area usually lacks sculpture and pilosity, but the absence of these features alone does not constitute a presclerite. Presclerites derived from tergites are termed *pretergites*, those from sternites, *presternites*. The remainder of each sclerite, posterior to these developments, is the *postsclerite* and may be termed *post-*

tergite and *poststernite*, repectively. The presclerites of abdominal segment 3 form a very specialized articulation with the posterior end of abdominal segment 2, termed the *helcium* (Figs. 528, 530, 531; *he*).

Presternite See **Presclerite.**

Pretarsal claws A pair of claws on the pretarsal (= apical or terminal) tarsal segment of the leg. Usually the inner curvature of each claw is a simple smooth concave surface, but in some taxa one or more preapical teeth may be present, or the claw may be pectinate (Figs. 514-516). See also **Leg segments, Tarsus.**

Pretergite See **Presclerite.**

Profile Orientation of part of the body (usually the alitrunk) in side (lateral) view so that the anterior, posterior, dorsal, and ventral outlines are in focus at the same time (Figs. 528, 529).

Promesonotal suture The transverse suture across the dorsal alitrunk (Fig. 529; *pms*, shown in profile) that separates the pronotum *(pn)* from the mesonotum *(ms)*. In some groups of ants the promesonotal suture is well developed and flexible. The pronotum slightly overlaps the mesonotum and the two sclerites are linked by intersegmental membrane so that they are capable of movement relative to each other. Elsewhere, and very commonly, the suture is reduced from this condition. Initially in the sequence of reduction the suture is present and distinct but inflexible, as the posterior pronotal margin has fused to the anterior mesonotal margin. Beyond this fused condition the suture shows a gradual morphoclinal reduction in size and degree of definition, eventually becoming nothing more than a faint line or impression across the dorsum, or often disappearing altogether. When fusion and obliteration of the suture is advanced, and there is little or no sign of separation of the original pronotum and mesonotum, the resulting sclerite is called the *promesonotum* (Fig. 528; *prs*).

Promesonotum See **Promesonotal suture.**

Pronotum See **Tergite.**

Propodeal lobe (= metapleural lobe, = inferior propodeal plate) See **Propodeum.**

Propodeal spiracle See **Propodeum.**

Propodeum Morphologically, the tergite of the first abdominal segment, fused to the thorax and forming most of the posterior section of the alitrunk (= mesosoma) (Fig. 529; *ppd* = *A1*). An older term for this sclerite, *epinotum* (see there), should not be used. The propodeal dorsum is usually unspecialized but frequently terminates posteriorly in a pair of teeth or spines. Confusingly, the propodeal dorsum is sometimes referred to as its base or basal surface. The dorsum is not basal to anything and the term should be abandoned. The sloping posterior surface is the *propodeal declivity* (Fig. 529; *de*), and may bear a number of specializations. Most common of these is the development of a pair of *propodeal lobes* (= metapleural lobes, = inferior propodeal plates) (Fig. 529; *pl*). When present they are situated at the base of the declivity, one on each side of the propodeal-petiolar articulation. These lobes, which vary considerably in shape and size, are frequently termed *metapleural lobes*, but this name should be abandoned as they are formed from the propodeum and not the metapleuron. The side of the propodeum bears the *propodeal spiracle* (Fig. 529; *sp* on *ppd* = *A1*), morphologically the first abdominal spiracle. Its shape, size, and location are variable and of considerable taxonomic value.

Prothorax See **Thorax.**

Proventriculus A muscular pump located in the intestine between the crop and the midgut. In all groups the proventriculus has a basal *bulb*, but in some the bulb is surmounted by a ring of four sclerotized *sepals*, collectively termed the *calyx*.

Psammophore A basket-like series of long and usually stout, curved setae arising on the ventral surfaces of the head and mandibles in deserticolous ants, used for carrying sand grains (Fig. 311).

Pubescence Small to minute hair-like cuticular projections which are not socketed basally. See also **Seta.**

Pygidium The tergite of abdominal segment 7; the terminal visible gastral tergite (Fig. 530; *py*).

Scale See **Petiole.**

Scape See **Antenna.**

Sclerite Functionally, a general term for any single plate of the exoskeleton (e.g., pronotal sclerite, abdominal sclerites); more specifically, an integumental plate in which the protein sclerotin has been deposited. In the case of ants the latter applies to all parts of the exoskeleton.

Scrobe (antennal) See **Antennal scrobe.**

Sepals See **Proventriculus.**

Serially dentate See **Mandibles.**

Sessile (petiole) See **Peduncle.**

Seta (pl. setae) Any stout hair that is socketed basally. Generally, as here, the terms *seta* and *hair* are interchangeable, but care must be taken to differentiate between setae and pubescence, as the latter may also sometimes be referred to as hairs.

Spiniform (teeth) See **Mandibles.**

Spiracle An orifice of the tracheal system by which gases enter and leave the body. Ants have 9 or 10 spiracles on each side of the body. The prothoracic spiracles have been lost, so the first opening occurs on the mesothorax. This spiracle is situated forward and quite high on the side of the segment, and is usually concealed by a backward-projecting lobe of the pronotum (Fig. 529). Metathoracic spiracles (Fig. 529; *sp* on *mtp*) may be dorsal (especially when the metathorax forms part of the dorsal alitrunk), lateral, concealed by a small backward-projecting lobe of the mesopleuron, or absent. The propodeal (first abdominal) spiracle is usually the largest on the body (Fig. 529; *sp* on *ppd* = *A1*). Spiracles are always visible on abdominal segments 2–4 (Figs. 528, 530; *sp*), but those on abdominal segments 5–7 are frequently concealed beneath the posterior margins of the preceding tergites. The spiracle of abdominal segment 8 is always hidden. The sclerite to which it belongs is internal and forms part of the sting apparatus (the spiracular plate).

Spongiform (tissue) Specialized sponge-like external cuticular tissue, distributed mainly about the waist segments in some groups of ants (e.g., Figs. 243, 399).

Spur See **Tibial spur.**

Squamiform In the form of a scale.

Standard measurements A series of external measurements and ratios of the body used in ant taxonomy. Different groups of ants may require different combinations of standard measurements. Any recent survey or revision of a group or genus will list and define the standards used. Some very commonly encountered standards include *head length* and *head width* (HL and HW), *mandible length* (ML), *scape length* (SL), *pronotal width* (PW), and *alitrunk length* (AL). Ratios of these, termed *indices*, serve to indicate relative dimensions. Commonly encountered indices include *mandibular index* (MI) = ML × 100 divided by HL; *cephalic index* (CI) = HW × 100 divided by HL; *scape index* = SL × 100 divided by HW. Multiplication by 100 is not essential but it serves to express the ratio as a whole number.

Sternite (= sternum, = sternal plate) The lower sclerite of a segment (the tergite is the upper; pleurites are the laterals on the alitrunk). The sternite may be a simple flat or curved plate, or may be specialized or subdivided on some segments. In the hymenopterous prothorax the sternite is very small. Sternites of the mesothorax and metathorax are reduced and internal, the ventral surface being made up of extensions of the pleurites to the mid-ventral line. The sternite of the propodeum (= abdominal segment 1) has been lost, but those of the remaining abdominal segments are usually distinct (Fig. 530; *st*), although the margins of some may be difficult to discern because of fusion to the tergite.

Stridulatory system A sound-producing system present in a number of ant subfamilies. The system consists of a *plectrum* (= stridulatory file), located on the posterior margin of the third abdominal segment (usually, but not always, on the tergite), and a finely grooved *stridulitrum* or sounding board on the anterior portion of the fourth abdominal segment.

Stridulitrum See **Stridulatory system.**

Subpetiolar process An anteroventral projection on the petiole or its peduncle; sometimes absent but when present very variable in shape and size (Fig. 530; *sb*).

Subsessile (petiole) See **Peduncle.**

Subtriangular (mandible) See **Mandibles.**

Suture Line of junction between sclerites.

Tagma (pl. tagmata) Unit of body; part or section of body separated from other body units.

Tarsal claws See **Pretarsal claws.**

Tarsus (pl. tarsi) Collective term for the five small apical segments of any leg. The first tarsal segment (first tarsomere) articulates with the tibia and is termed the *basitarsus*. The next three tarsomeres are not individually named but the apical (terminal) tarsomere is the *pretarsus* and bears a pair of *pretarsal claws*. See also **Leg segments.**

Teeth (mandibular) See **Mandibles.**

Tentorial pits (anterior) See **Anterior tentorial pits.**

Tergite (= tergum, = tergal plate) The upper sclerite of a segment (the sternite is the lower; the pleurites the laterals on the alitrunk). The tergite may be a simple flat or curved plate, or may be specialized or subdivided on some segments. The tergite of the prothorax is composed entirely of the *pronotum* (Fig. 529; *pn*); this sclerite extends across the dorsum and down the sides of the segment, mostly concealing the propleuron. The *mesonotum* (Fig. 529; *ms*), tergite of the mesothorax, may be separated from the pronotum by the *promesonotal suture* (Fig. 529; *pms*), or may be fused to it to form a single sclerite, the *promesonotum* (Fig. 528; *prs*). The *metanotum*, tergite of the metathorax, may be present on the dorsum, or reduced, or obliterated. The mesonotum and propodeum are often separated by the *metanotal groove* (Fig. 529; *mtg*), a transverse groove or impression representing the last vestige of the metanotum on the dorsal alitrunk. The propodeum (see there) is the tergite of the first abdominal segment. The remaining abdominal segments (2–7) have tergites that are usually simple but that may be subdivided or otherwise specialized (Fig. 530; *tr*).

Tergosternal fusion A condition of the abdominal segments where the tergite and sternite of a single segment fuse together so that they are not capable of movement relative to each other. This may occur in some or all abdominal segments from 2 (petiole) to 4. To investigate this feature properly it is best to disarticulate the specimen, then macerate the appropriate segments in sodium hydroxide to remove soft tissues. This is essential in dried specimens, though good results can be obtained by dissection of fresh material without maceration.

Thorax The second classical body tagma in the insects. In ants, and other Hymenoptera, the apparent thorax consists of the usual three body segments of the true thorax (pro-, meso-, and metathorax) to which the tergite of the first abdominal segment (the propodeum) is immovably fused (Fig. 529). This modification means that the system "true thorax plus propodeum" cannot strictly be called the thorax, as it is not homologous with the term as used otherwise throughout the Insecta. Several names have been proposed for true thorax plus propodeum, of which two, *alitrunk* and *mesosoma*, are currently in common use (Figs. 528, 529; *al* = *mes*). Both names are somewhat misleading as far as ants are concerned, but either is better than *thorax*, which is morphologically incorrect for describing the tagma "thorax plus propodeum." See also **Alitrunk.**

Tibia (pl. tibiae) The fourth segment of any leg, counting from the basal coxa that articulates with the alitrunk. See also **Leg segments.**

Tibial spur A socketed spur located at the apex of each tibia. The forelegs have a single pectinate tibial spur, modified into an antennal cleaning device, the *strigil*. The mesothoracic (middle) and metathoracic (hind) tibiae, also termed mesotibiae and metatibiae, may each have two, one, or no spurs present (Figs. 511–513). When present the spurs may be pectinate or barbed, or be simple cuticular spikes. If two spurs are present it is usual for one to be larger than the other, and in such cases the larger spur is usually pectinate while the smaller is simple. See also **Leg segments.**

Torulus (= torular sclerite, = antennal sclerite) The small annular sclerite that surrounds the antennal socket (Fig. 523; *to*). The torulus may be horizontal, or the part closest to the midline of the head may be elevated, in some cases to such an extent that the torulus is almost vertical. In the latter condition the highest part of its arc may form a laterally projecting small lobe. The lobe may or may not be covered by the frontal lobes; in some taxa where very narrow frontal lobes occur the torulus lobe projects beyond them. See also **Antenna.**

Triangular (mandibles) See **Mandibles.**

Trulleum A basin-shaped depression near the base of the mandible dorsally, bounded distally by the basal margin of the mandibular blade (Fig. 527; *tu*).

Tuberculiform Having the form or appearance or a tubercle.

Tubercle A small, rounded prominence or protuberance.

Tuberculate Bearing one or more tubercles.

Tumulus (pl. tumuli) A prominent, small, mound-like or rounded hill-like to subconical, but not acutely pointed, cuticular excrescence.

Waist Collective term for the one or two separated abdominal segments that occur between the alitrunk (= mesosoma) and gaster (Figs. 528, 530; *w*). When only the petiole (abdominal segment 2) is isolated the waist is said to be one-segmented, but in those subfamilies where the postpetiole (abdominal segment 3) is also separated the waist is said to be two-segmented (of petiole plus postpetiole). See also **Abdomen, Gaster, Pedicel.**

Xenobiosis A lifeway in which one eusocial species nests within the walls or in the nest chambers of another eusocial species. The *xenobiotic* species (xenobiont) not only nests within the nest of its host but also shares its trails and solicits and receives food from the host species.