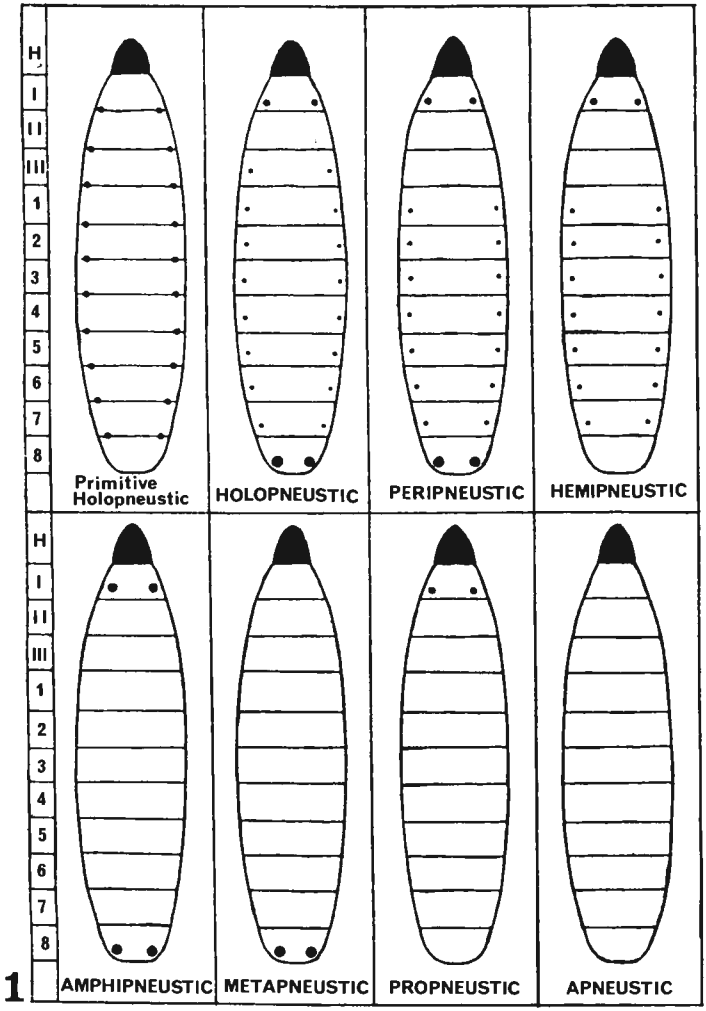
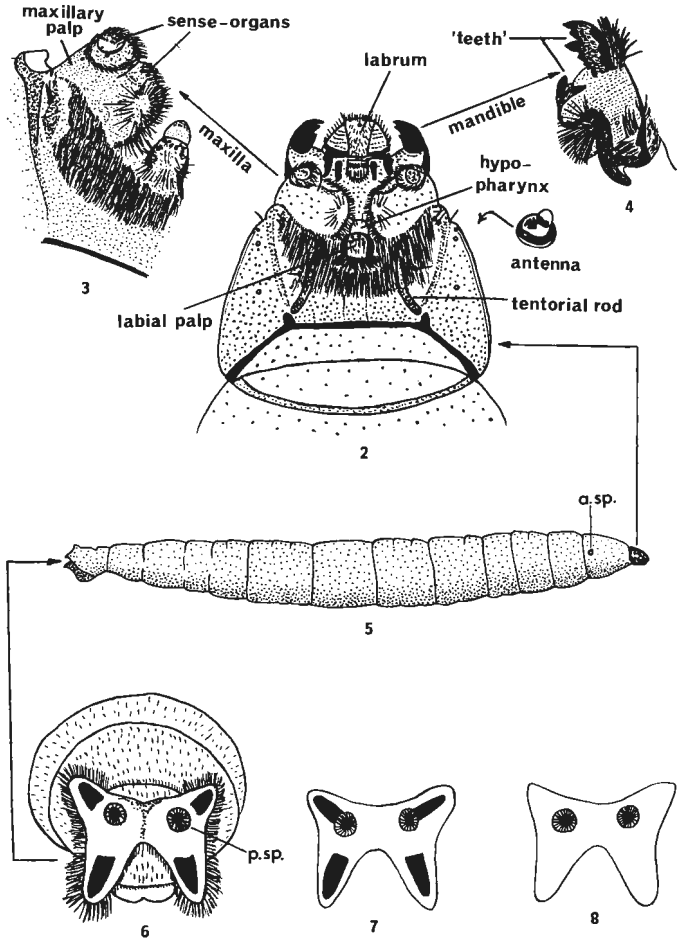
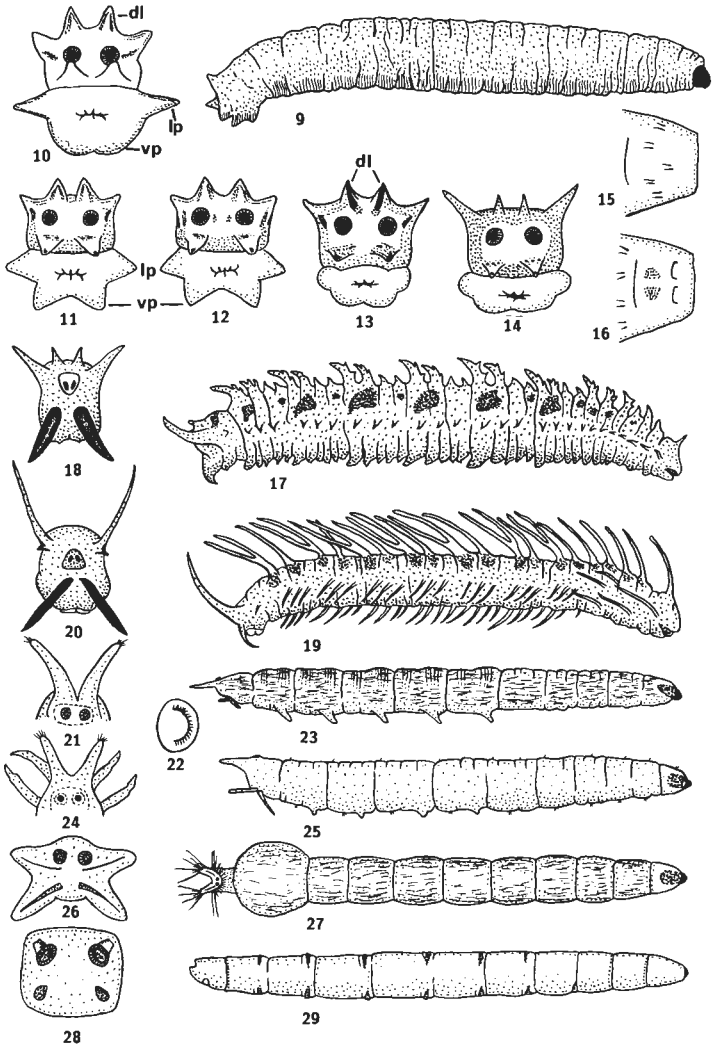


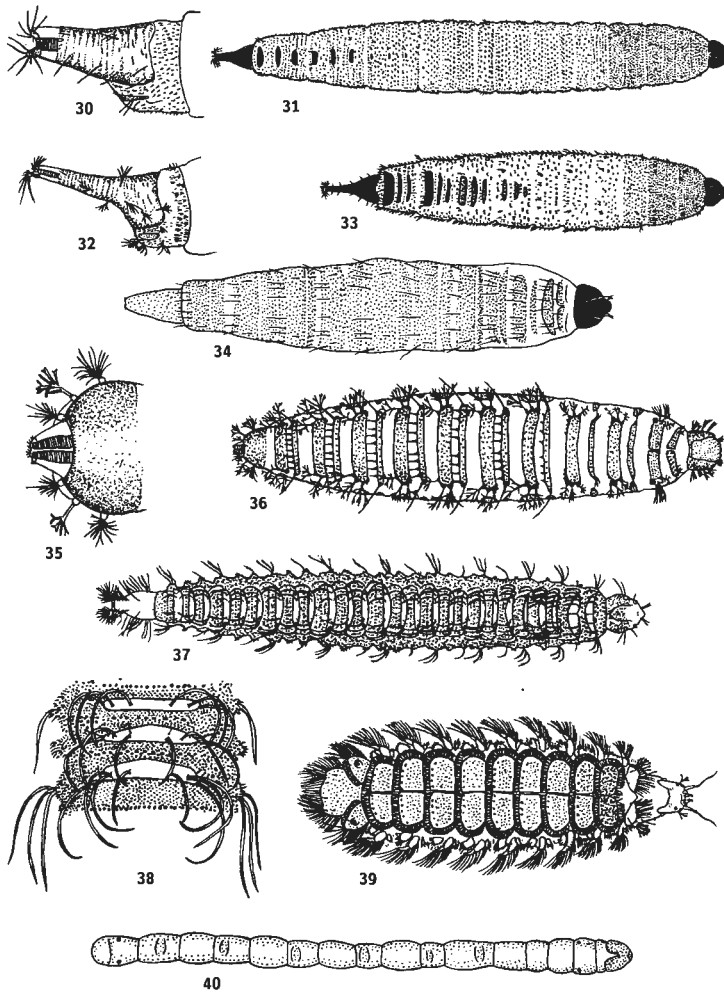
Fig. 1. Schematic representation of respiratory systems in dipterous larvae showing only functional spiracles: H = head; I–III = three thoracic segments (pro-, meso- and metathorax); 1–8 = eight abdominal segments (after Keilin, 1944).



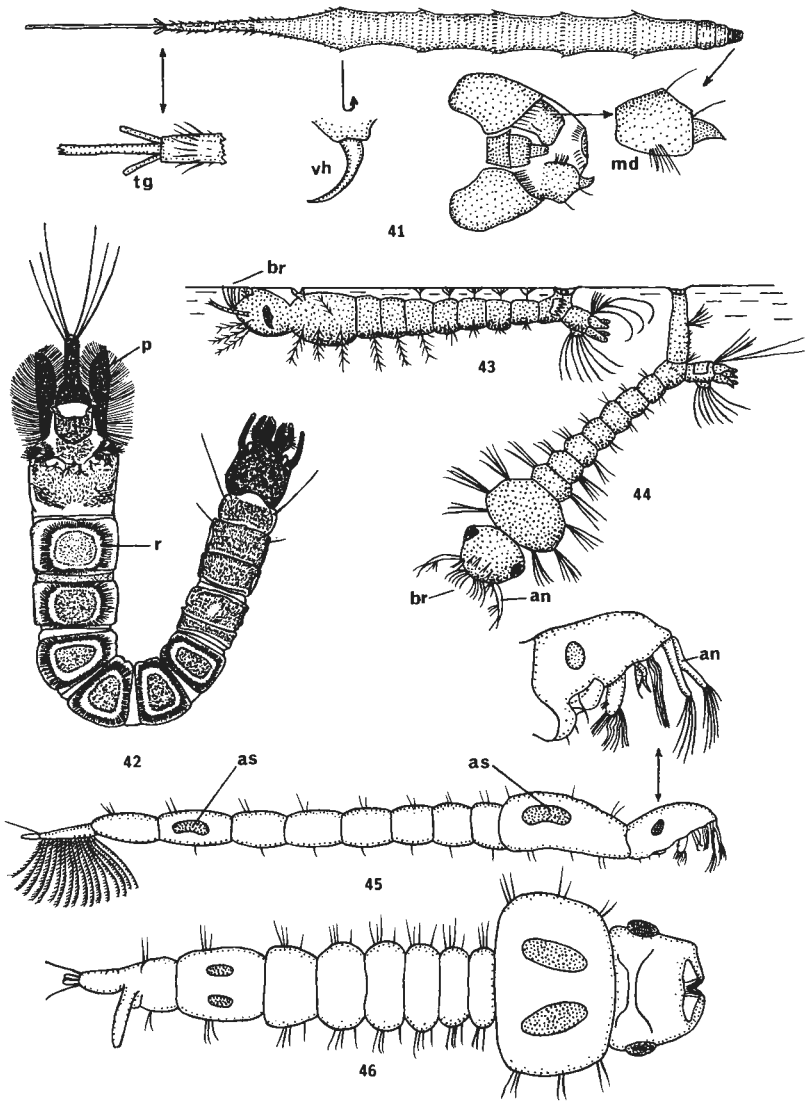
Figs 2–8. Trichoceridae larvae: 2, *Trichocera hiemalis* head, ventral view; 3, the same, right maxilla external view and labium ventral view; 4, the same, mandible, ventral view; 5, the same, whole larva lateral, a.sp. = anterior (prothoracic) spiracle; 6, the same, anal segment, end view, p.sp. = posterior spiracle; 7, *T. saltator* anal segment, end view; 8, *T. maculipennis*, the same. N.B. pigmented areas on anal lobes appear much paler in alcohol preserved specimens.



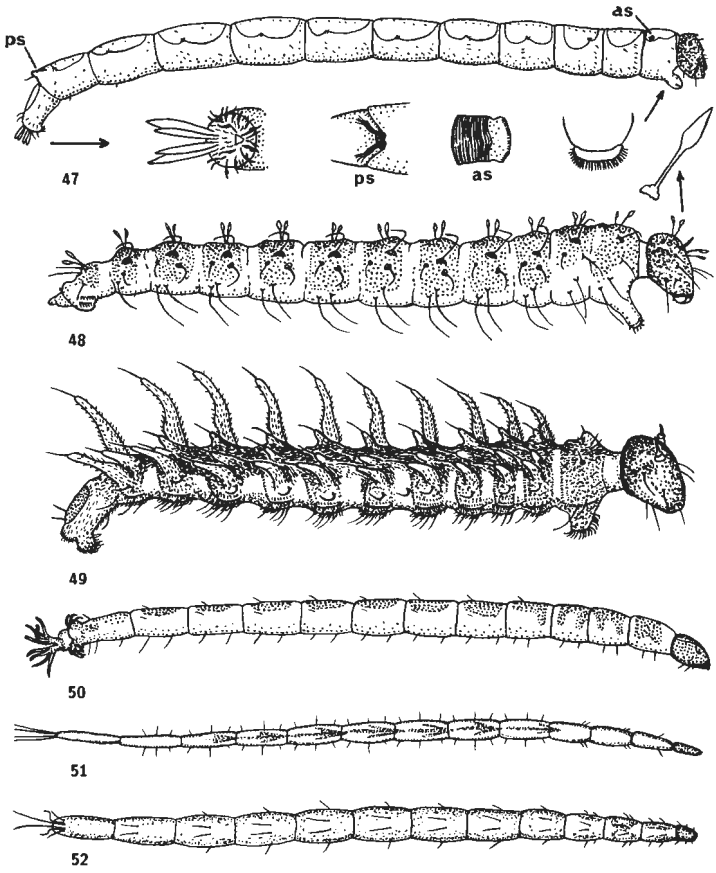
Figs 9–29. Tipulidae larvae: 9, *Tipula paludosa,* lateral; 10, the same, end view (dl = dorsal lobe lp = lateral papilla, vp = ventral papilla); 11, *T. oleracea,* end view; 12, *T. czizeki,* the same; 13, *T. vernalis,* the same (dl = dorsal lobe); 14, *Nephrotoma,* the same; 15, *Tipula,* dorsum of prothorax; 16, *Nephrotoma,* the same; 17, *Diogma glabrata,* lateral; 18, the same, end view; 19, *Phalacrocera replicata,* whole larva, lateral; 20, the same, end view; 21, *Dicranota robusta,* anal segment, dorsal; 22, the same, tip of pseudopod; 23, the same, whole larva, lateral; 24, *Pedicia rivosa,* anal segment, dorsal; 25, the same, whole larva, lateral; 26, *Hexatoma bicolor,* anal segment, end view; 27, the same, whole larva dorsal; 28, *Limonia nubeculosa,* anal segment, end view; 29, the same, whole larva, lateral (after Brindle).



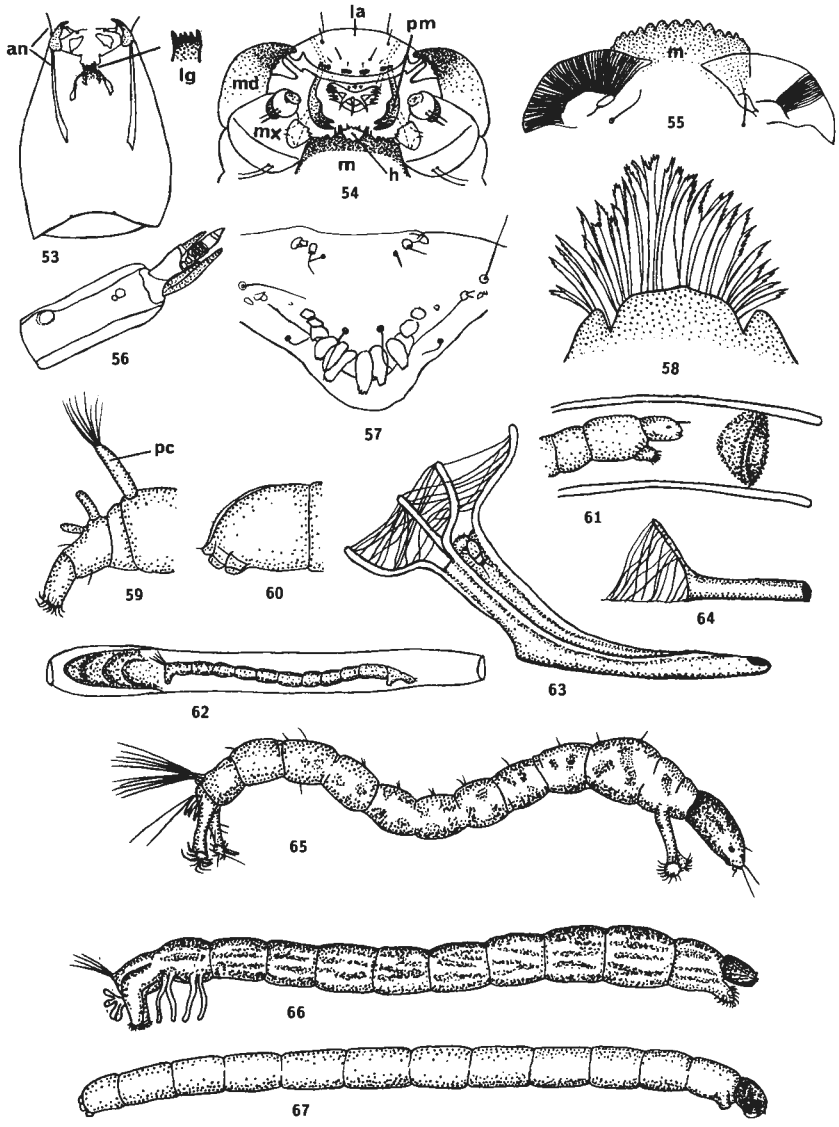
Figs 30–40. Psychodidae larvae: 30, *Psychoda alternata,* siphon, lateral; 31, the same, whole larva, dorsal; 32, *Ps. albipennis,* siphon, lateral; 33, the same, whole larva, dorsal; 34, *Philosepedon humeralis,* whole larva, dorsal; 35, *Psychoda brevicornis,* siphon, dorsal; 36, the same, whole larva, dorsal; 37, *Pericoma trivialis,* dorsal; 38, the same, fourth abdominal segment, dorsal; 39, *Sycorax silacea,* dorsal; 40, *Trichomyia urbica,* ventral.



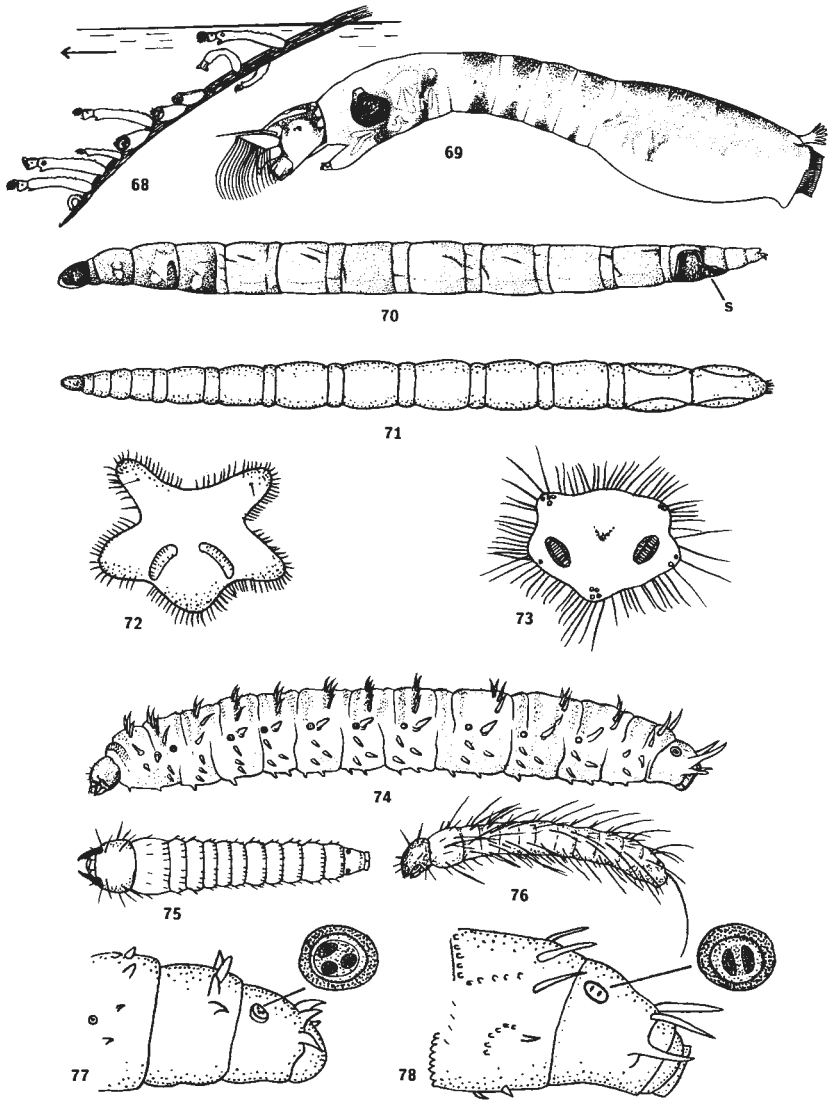
Figs 41–46. Larvae. 41, Ptychopteridae, *Ptychoptera* larva, dorsal, with enlarged detail, tg = tracheal gills, ventral hook (vh) lateral view; head, dorsal, md = mandible; enlarged. 42, Dixidae, *Dixa* larva, dorsal—live attitude, p = paddle, r = ring of setae. 43–44, Culicidae: 43, *Anopheles*, lateral, in living attitude at water surface, br = mouth brushes; 44, *Culex*, dorsal—living attitude at water surface, br = mouth-brush, an = antenna. 45–46, Chaoboridae: 45, *Chaoborus*, larva, lateral, as = air sacs and enlarged detail of head (lateral), an = antenna. 46, *Mochlonyx*, larva, dorsal.



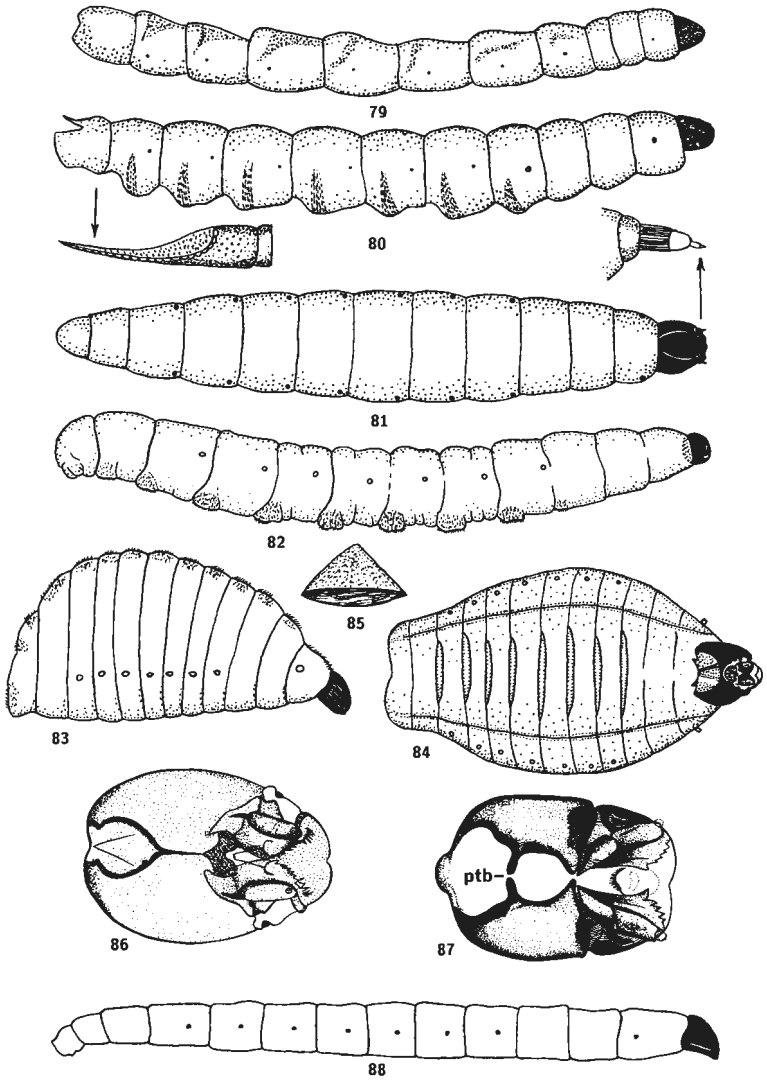
Figs 47–52. Larvae. 47, Thaumaleidae, *Thaumalea testacea,* lateral with enlarged detail of anal segment (dorsal), posterior spiracles (ps) (dorsal), anterior (prothoracic) spiracle (as) (lateral), and prothoracic pseudopod (lateral). 48–52, Ceratopogonidae: 48, *Forcipomyia bipunctata,* lateral; 49, *Atrichopogon* sp., lateral; 50, *Dasyhelea* sp., lateral; 51, *Bezzia* sp., dorsal; 52, *Culicoides* sp., dorsal.



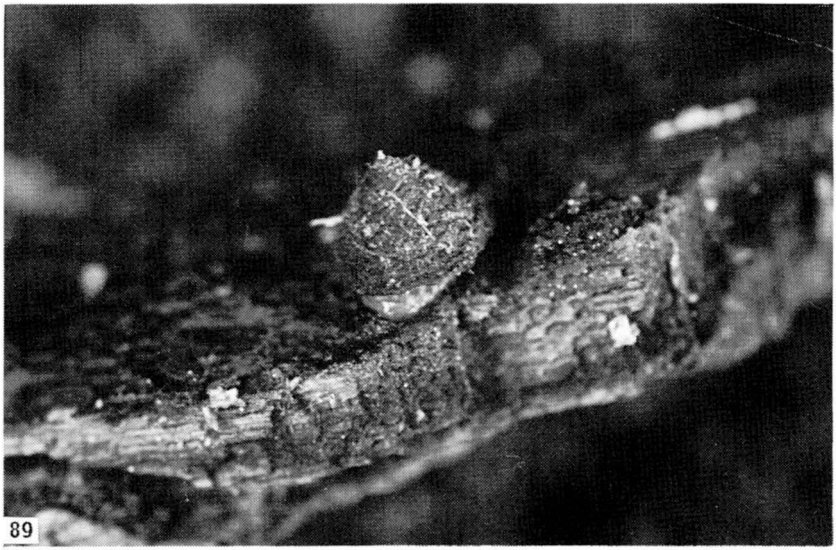
Figs 53–67. Chironomidae larvae: 53, Tanypodinae, *Ablabesmyia,* head, ventral, an = antenna, lg = ligula; 54, Orthocladiinae, *Prodiamesa,* head, la = labrum, md = mandible, mx = maxilla, pm = premandible, m = mentum, h = hypopharynx; 55, Chironominae, *Polypedilum,* mentum (m) and ventromental plates (ventral); 56, Diamesinae, *Diamesa,* antenna; 57, Diamesinae, *Protanypus,* labrum, dorsal; 58, Telmatogetoninae, ventral view of median mental teeth overlying hypopharynx; 59, Podonominae, terminal abdominal segments, lateral, pc = procerci; 60, Orthocladiinae, *Camptocladius stercorarius,* the same; 61–64, Chironominae: 61, *Chironomus plumosus* larva in tube with net; 62, *Endochironomus* in tube irrigating salivary net; 63, *Rheotanytarsus rivulorum,* larval case and salivary net, lateral; 64, the same, young larva; 65, Tanypodinae, *Ablabesmyia monilis*, lateral; 66, Chironominae, *Chironomus dorsalis*, lateral; 67, Orthocladiinae, terrestrial type.

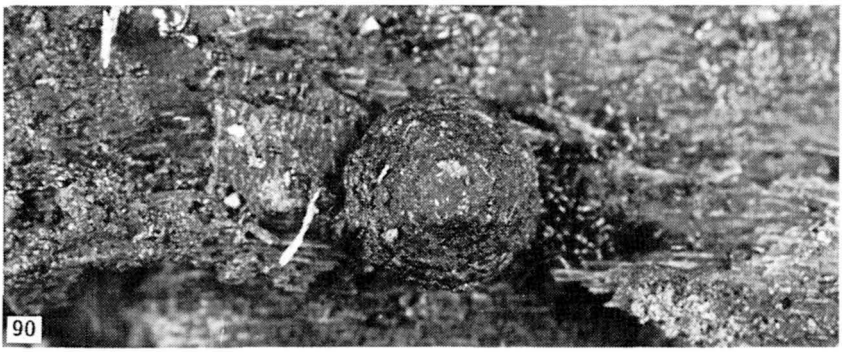


Figs 68–78. Larvae and pupae. 68–69, Simuliidae: 68, larvae and pupae of *Simulium* on submerged grass-blade, arrow indicates direction of current (after Crosskey); 69, *Simulium* larva, lateral. 70–73, Anisopodidae larvae: 70, *Sylvicola*, lateral; 71, *Mycetobia pallipes*, dorsal; 72, *Sylvicola*, last segment, end view; 73, *Mycetobia*, ditto. 74–78, Bibionidae larvae: 74, *Bibio*, lateral; 75, *Dilophus*, first instar, dorsal; 76, *Bibio*, first instar, lateral; 77, *Dilophus*, fully grown, terminal segments, lateral, showing spiracle enlarged; 78, *Bibio*, the same.

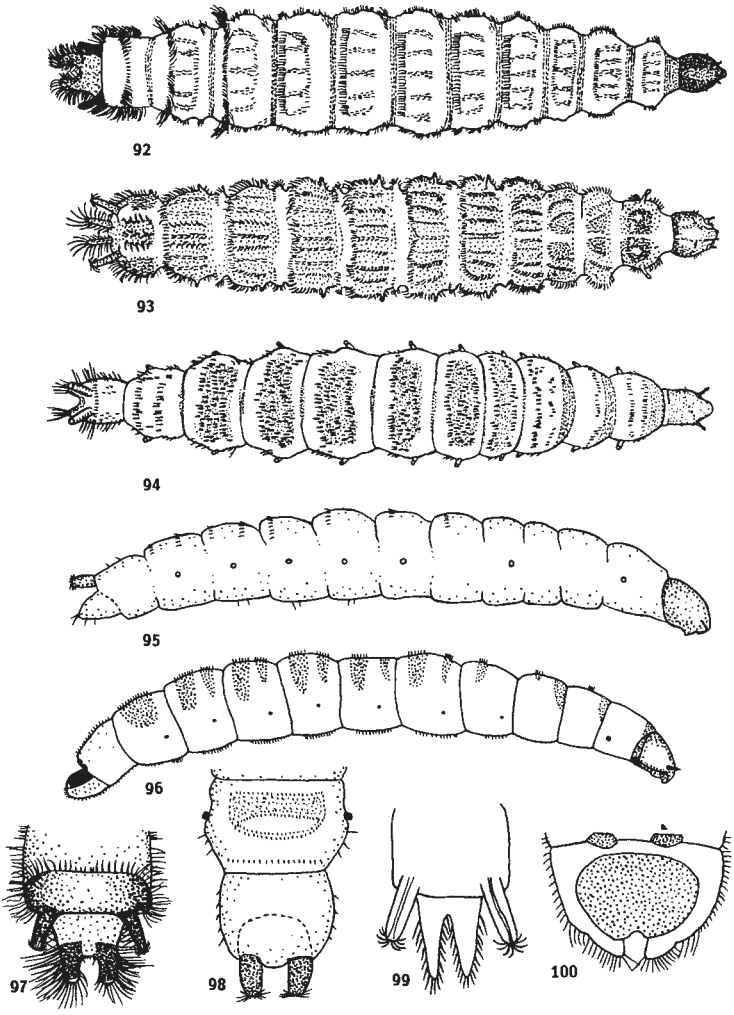


Figs 79–88. Fungus gnat larvae. 79–86, Mycetophilidae: 79, *Symmerus annulatus*, lateral; 80, *Ditomyia fasciata*, lateral, with enlarged detail of posterior spiracular horn below; 81; *Bolitophila saundersi*, dorsal, with enlarged detail of antenna above; 82, Mycetophilinae, lateral; 83, *Phronia annulata*, lateral; 84, *Phronia flavicollis*, ventral; 85, the same, test or case of larva, lateral (see also Figs 89, 90); 86, *Leia bimaculata*, head, ventral; 87–88, Sciaridae: 87, *Bradysia* head, ventral; 88, *Bradysia*, lateral.

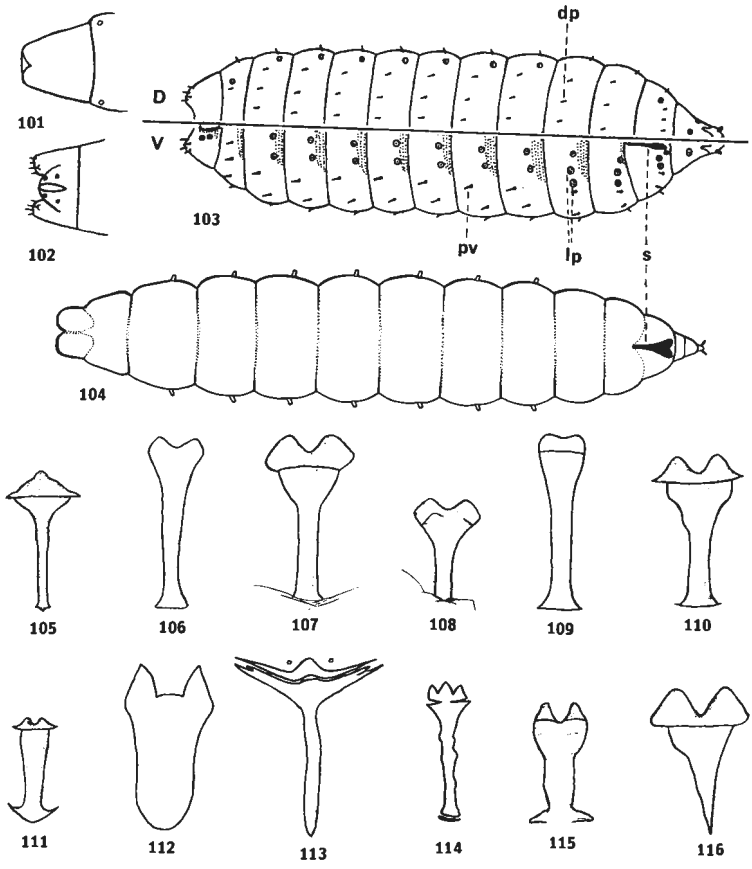




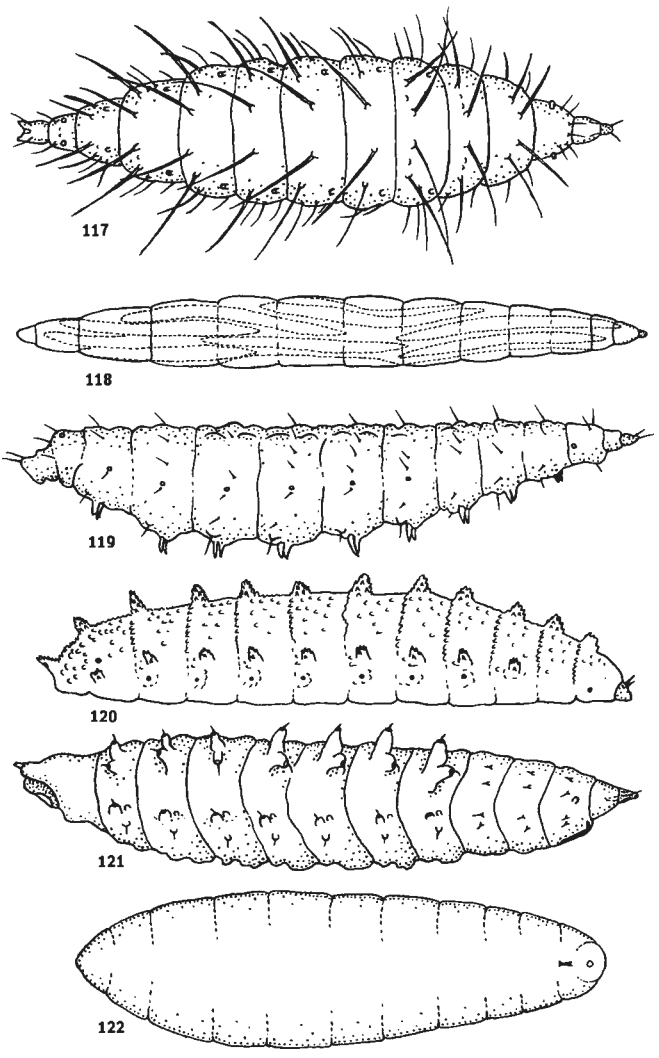
Figs 89–91. Mycetophilidae: 89, *Phronia* spp, case-bearing larva, lateral; 90, the same, dorsal; 91, another sp. living under a mucilagenous blob (Photos A.E.McR. Pearce).



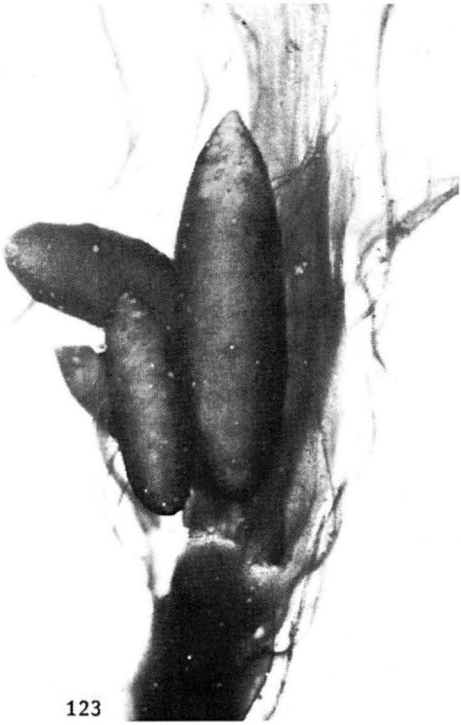
Figs 92–100. Scatopsidae larvae: 92, *Scatopse notata*, dorsal; 93, *Rhexosa* sp., dorsal; 94, *?Coboldia fuscipes*, dorsal; 95, *Parascatopse litorea*, lateral; 96, *Ectaetia platyscelis*, lateral; 97, *Scatopse notata*, terminal segment, dorsal; 98, *Parascatopse litorea*, the same; 99, *Reichertella pulicaria*, the same; 100, *Ectaetia platyscelis*, the same.



Figs 101–116. Cecidomyiidae larvae: 101, terminal rounded anus of Lestremiinae and Heteropezini, dorsal; 102, slit like anus of Cecidomyiinae and some Porricondylinae, ventral; 103, Cecidomyiidae larva (diagrammatic) divided into dorsal (D) and ventral (V) view, dp = dorsal papillae, lp = lateral papillae, pv = posteroventral papillae, s = spatula; 104, typical larva of Cecidomyiidae in ventral view showing position of spatula (s). 105–116, sternal spatula: 105, *Campylomyza ormerodi;* 106, *Contarinia nasturtii;* 107, *C. pisi;* 108, *C. tritici;* 109, *Dasineura brassicae;* 110, *D. leguminicola;* 111, *D. trifolii;* 112, *D. alopecuri;* 113, *Lestremia cinerea;* 114, *Mycophila speyeri* (sexual form); 115, *Mayetiola destructor;* 116, *Sitodiplosis mosellana.*

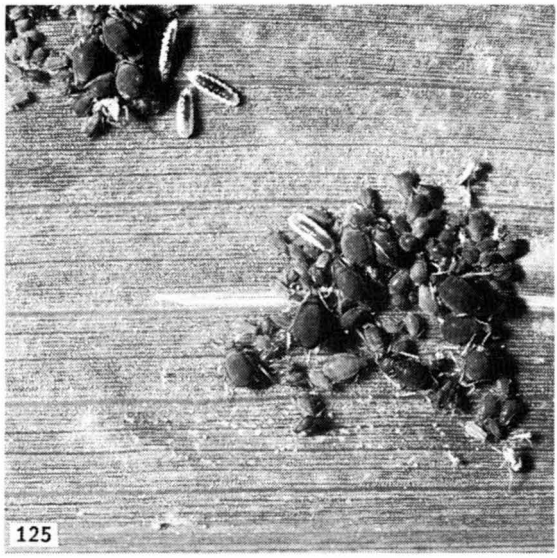


Figs 117–122. Cecidomyiidae larvae: 117, *Parepidosis*, dorsal; 118, *Miastor*, dorsal (showing daughter larvae inside); 119, *Lestodiplosis*, lateral; 120, *Peromyia*, lateral; 121, *Cecidomyia pini*, lateral; 122, *Mayetiola destructor*, ventral.



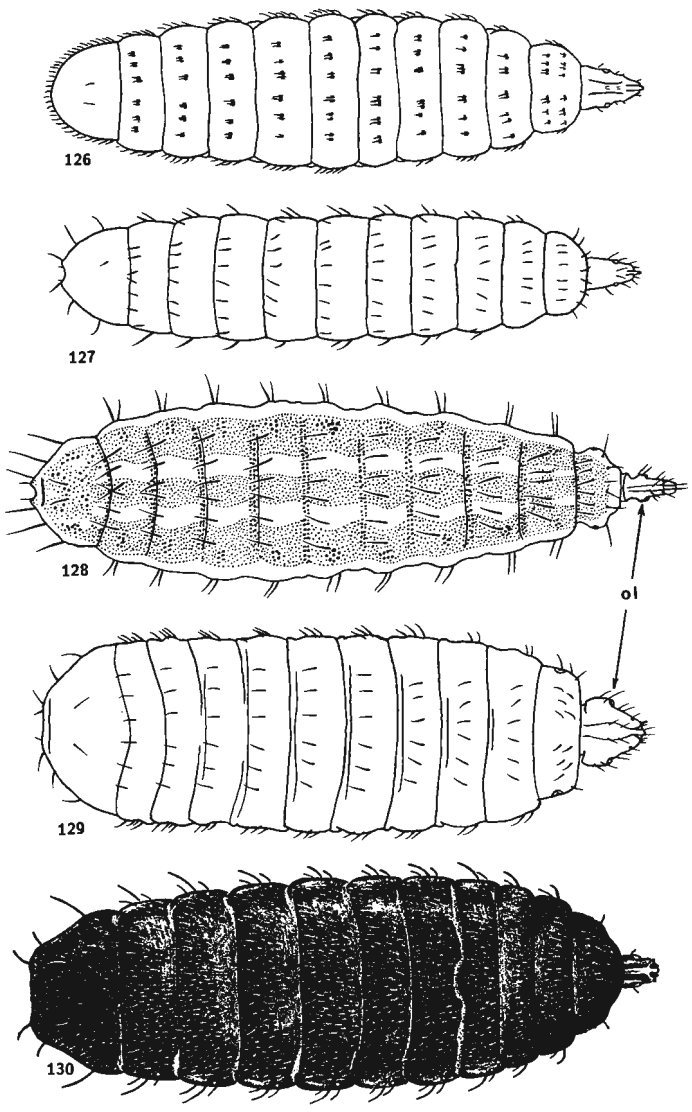
123

124

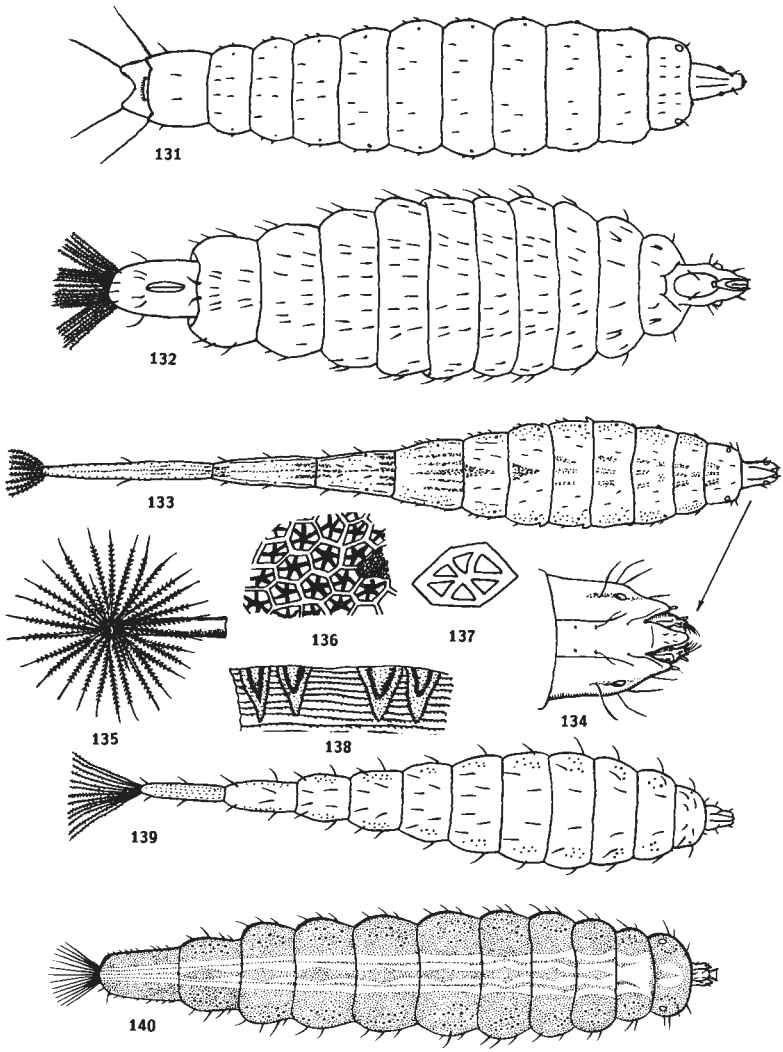


125

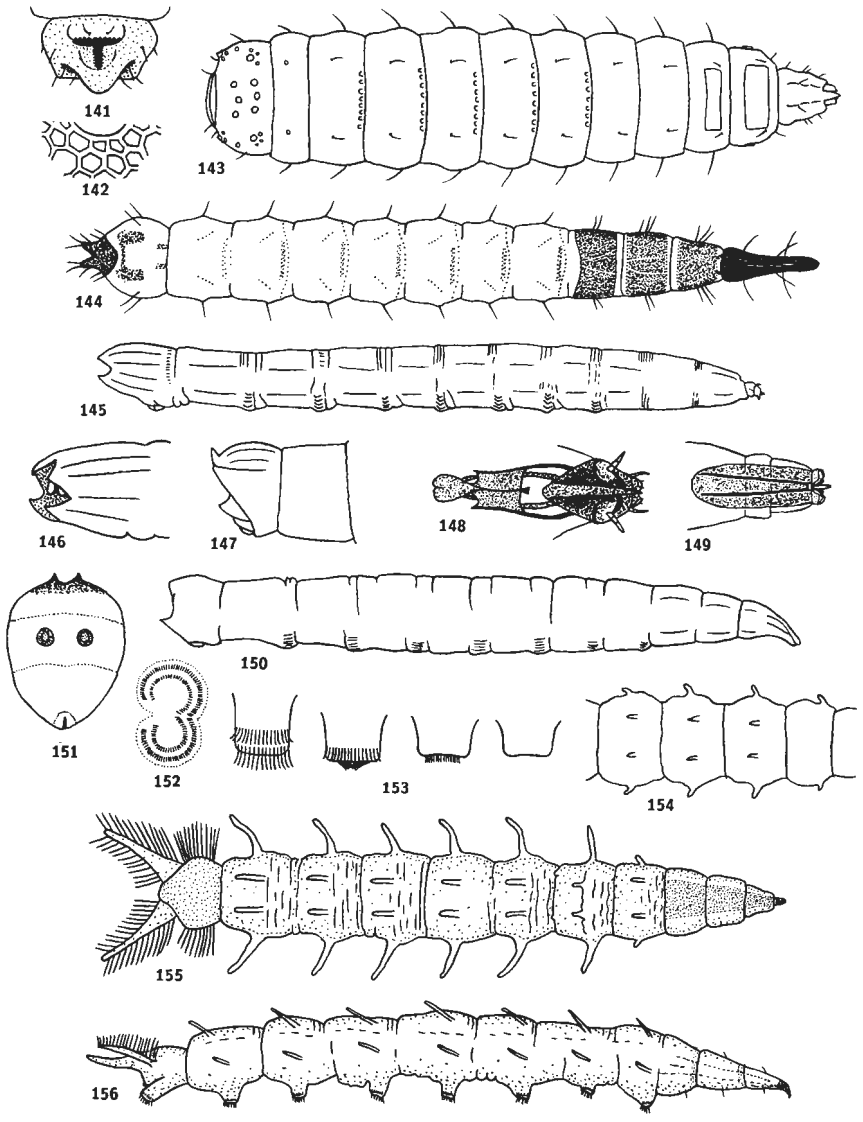
Figs 123–125. Cecidomyiidae: 123, group of *Mayetiola* (not *destructor*) pupae in last larval skin on *Poa;* 124, single specimen of same; 125, four larvae of *Aphidoletes aphidimyza* attacking colonies of *Aphis fabae* on maize (Photo K. M. Harris and J. Brown).



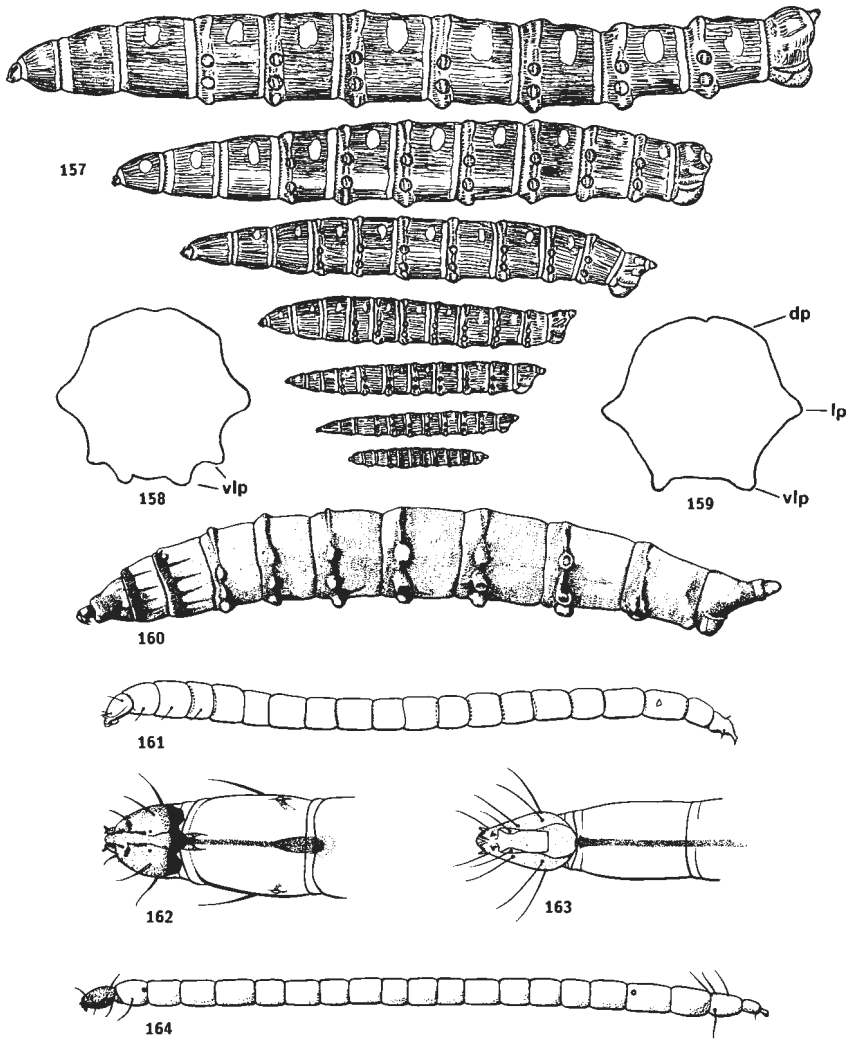
Figs 126–130. Stratiomyidae, terrestrial larvae: 126, *Beris morrisii;* 127, *Neopachygaster meromelaena;* 128, *Microchrysa polita;* 129, *Sargus cuprarius;* 130, *Hermetia illucens.* All dorsal, surface details shown only on Figs 129 and 130; ol = ocular lobes.



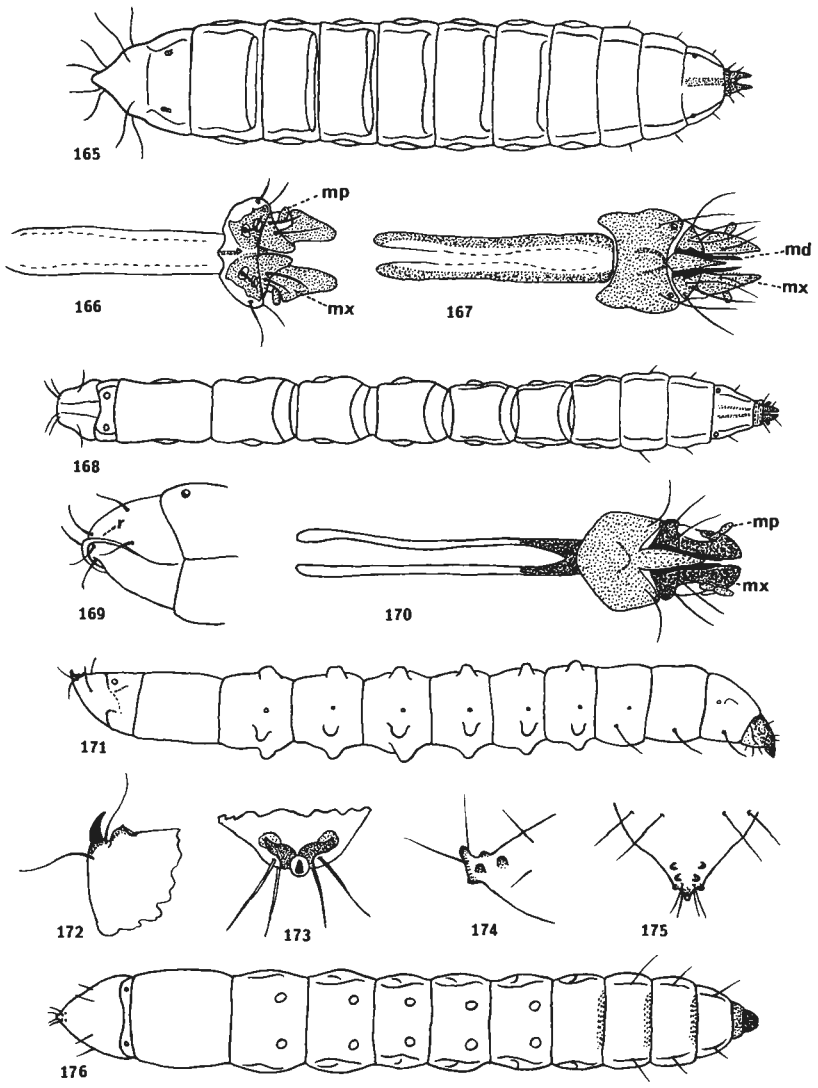
Figs 131–140. Stratiomyidae, aquatic larvae: 131, *Nemotelus pantherinus*, dorsal; 132, *Oxycera*, ventral; 133, *Stratiomys singularior*, dorsal; 134, the same, head, enlarged; 135, *S. chamaeleon*, coronet of hairs at tip of respiratory siphon as seen on the surface of the water; 136, *S. chamaeleon*, surface detail of integument; 137, *S. chamaeleon*, a single calcareous element; 138, *S. chamaeleon*, section of integument showing calcareous 'nails'; 139, *Odontomyia ornata*, dorsal; 140, *Odontomyia* sp., dorsal. Surface detail shown only on Figs 133 and 140.



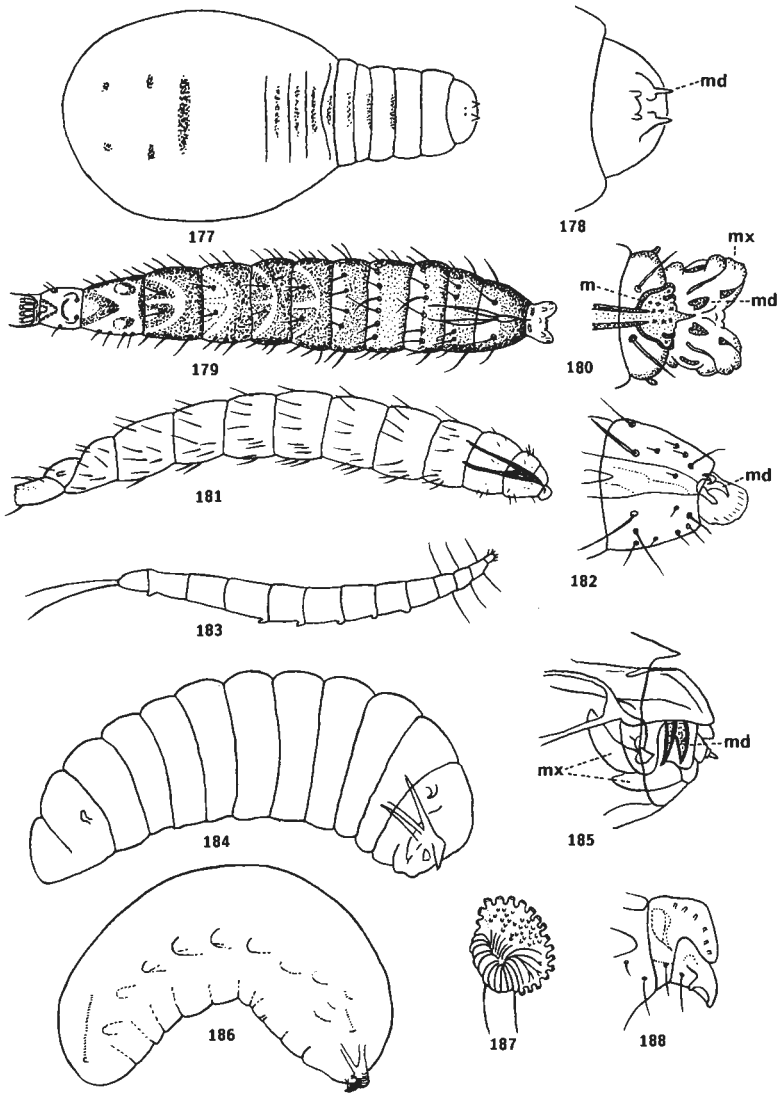
Figs 141–156. Larvae. 141–143, Xylomyidae: 141, *Xylomya maculata*, anal segment, ventral view; 142, *X. maculata*, surface detail of anal segment, dorsal; 143, *Xylomya* dorsal. 144, Xylophagidae, *Xylophagus cinctus*, dorsal. 145–151, Rhagionidae: 145, *Rhagio*, lateral; 146, *Rhagio*, anal segment, oblique lateral showing spiracles; 147, *Ptiolina*, the same, lateral; 148, *Rhagio*, head capsule and mouthparts, dorsal; 149, *Chrysopilus*, the same; 150, *Chrysopilus*, lateral; 151, *Ptiolina obscura*, anal segment, posterior view. 152–156, Athericidae: 152, *Atherix ibis*, ventral pseudopod almost full expanded, ventral view; 153, *A. ibis*, stages in the retraction of pseudopod; 154, *A. ibis*, first three abdominal segments, dorsal; 155, *A. marginata*, dorsal; 156, *A. marginata*, lateral.



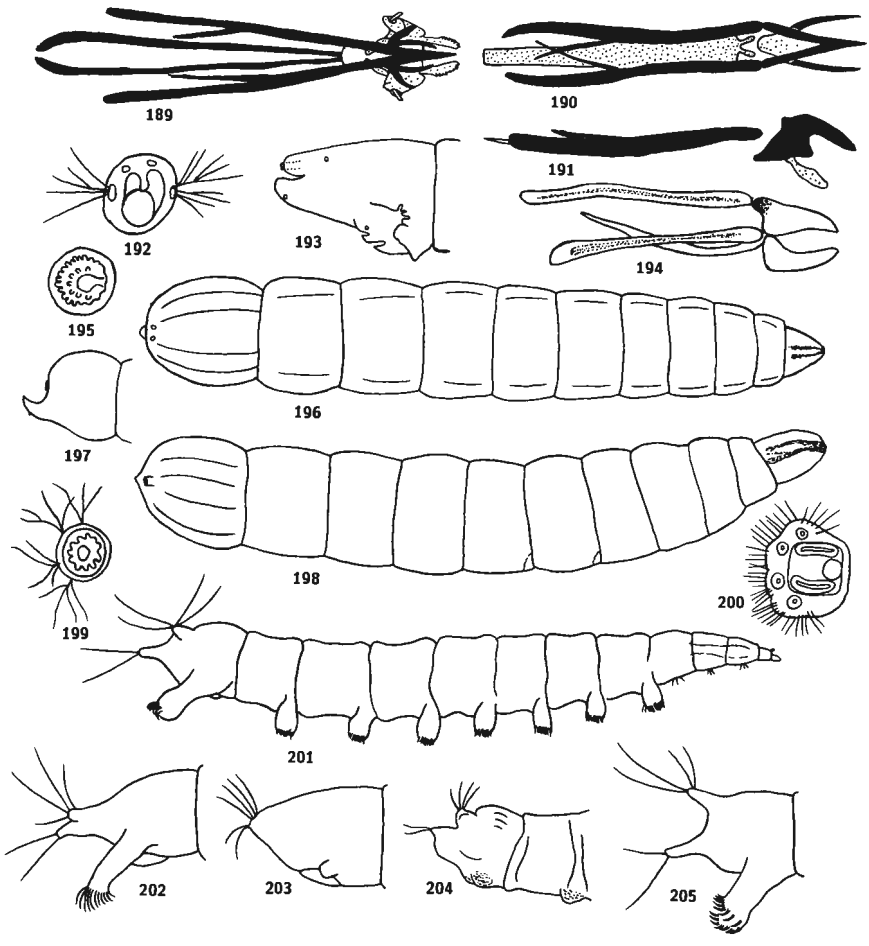
Figs 157–164. Larvae. 157–160, Tabanidae: 157, *Haematopota pluvialis*, all seven larval instars showing comparative size, lateral (after Cameron); 158, *Tabanus montanus*, diagrammatic section of fifth abdominal segment, vlp = ventrolateral pseudopod; 159, *Chrysops caecutiens*, the same, dp = dorsal pseudopod, lp = lateral pseudopod, vlp = ventrolateral pseudopod; 160, *Tabanus*, lateral. 161–162, Therevidae: 161, *Thereva* larva, lateral; 162, *Thereva*, head capsule, dorsal. 163–164, Scenopinidae: 163, *Scenopinus*, head capsule, dorsal; 164, *Scenopinus*, lateral.



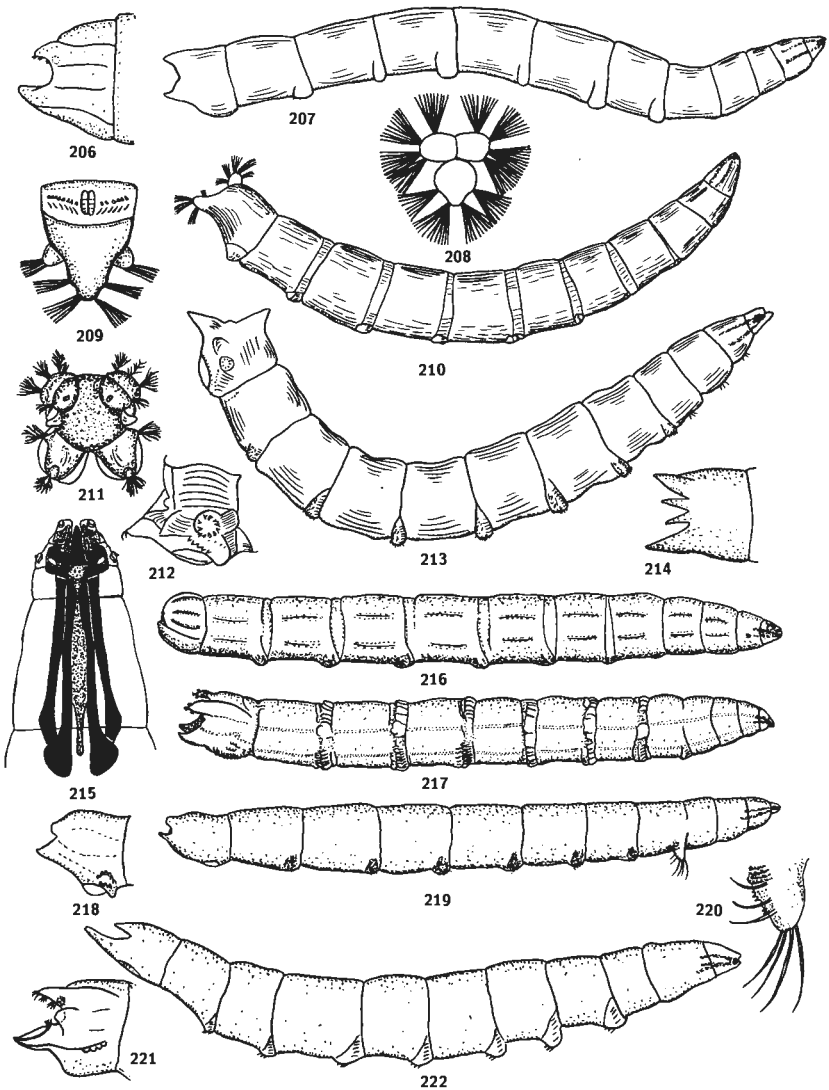
Figs 165–176. Asilidae larvae: 165, *Leptogaster cylindrica*, dorsal; 166, the same, mouthparts, dorsal; 167, *Pamponerus germanicus*, mouthparts, dorsal; 168, *P. germanicus*, dorsal; 169, *Machimus atricapillus*, anal segment, lateral; 170, *Lasiopogon cinctus*, mouthparts, dorsal; 171, *Laphria* sp., lateral; 172, *L. flava*, apex of anal segment, lateral; 173, *L. flava*, the same, dorsal; 174, *Dioctria rufipes*, the same, lateral; 175, *D. rufipes*, the same, dorsal; 176, *D. rufipes*, dorsal. (mp = maxillary palp; mx = maxilla, md = mandible).



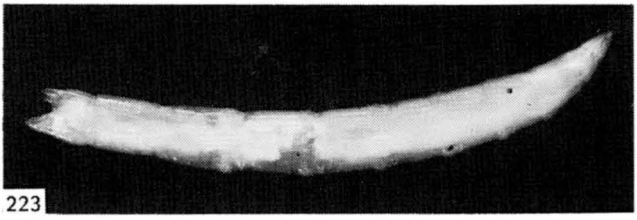
Figs 177–188. Larvae. 177–182, Acroceridae: 177, *Acrocera;* 178, the same, head and mouthparts; 179, *Ogcodes,* first stage larva; 180, *Ogcodes,* the same, mouthparts; 181, *Ogcodes,* first stage larva, lateral; 182, *Ogcodes,* mouthparts, lateral. 183–188, Bombyliidae: 183, *Bombylius,* first instar; 184, *Bombylius,* lateral; 185, *Bombylius,* mouthparts; 186, *Thyridanthrax fenestratus,* lateral; 187, *T. fenestratus,* anterior spiracle; 188, *T. fenestratus,* mouthparts. (m = mentum, md = mandible, mx = maxilla).

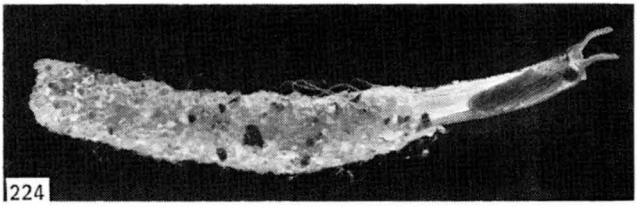


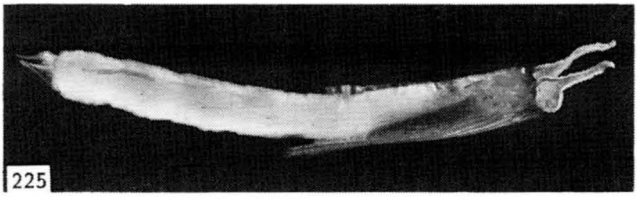
Figs 189–205. Empididae larvae: 189, *Drapetis assimilis*, mouthparts, dorsal; 190, *Crossopalpus curvipes*, mouthparts, dorsal; 191, the same, lateral; 192, *C. curvipes*, posterior spiracle; 193, *Ocydromia glabricula*, anal segment, lateral; 194, *Empis tessellata*, mouthparts, lateral; 195, the same, posterior spiracle; 196, the same, whole larva; 197, *Hilara maura*, anal segment, lateral; 198, *Rhamphomyia anomalipennis*, lateral; 199, the same, posterior spiracle; 200, *Hilara maura*, posterior spiracle; 201, *Clinocera nigra*, lateral; 202, *Hemerodromia unilineata*, anal segment, lateral; 203, *Chelifera stigmatica*, the same; 204, *Dolichocephala ocellata*, the same; 205, *Wiedemannia hygrophobia*, the same.

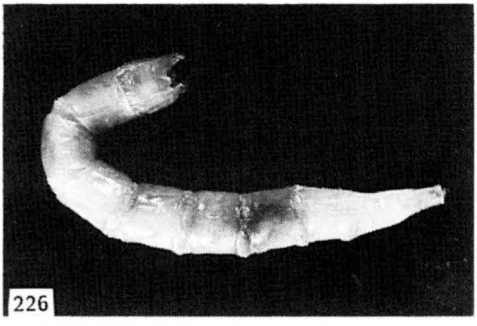


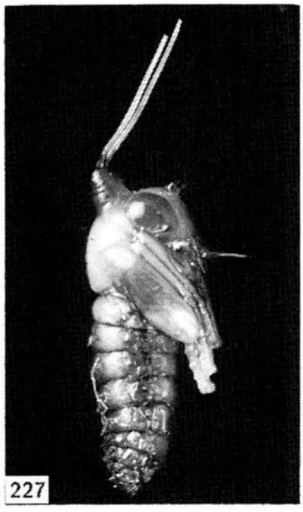
Figs 206–222. Dolichopodidae larvae: 206, *Dolichopus plumipes*, anal segment, lateral; 207, *D. plumipes*, lateral; 208, *Hydrophorus oceanus*, anal segment, end view; 209, *H. oceanus*, anal segment, ventral view; 210, *H. oceanus*, lateral (see also 223); 211, *Liancalus virens*, anal segment, end view; 212, the same, lateral; 213, *L. virens*, lateral; 214, *Aphrosylus* sp., anal segment, lateral; 215, *Hydrophorus oceanus*, mouthparts, dorsal; 216, *Medetera*, lateral; 217, *Rhaphium* sp., lateral; 218, *Systenus pallipes*, anal segment, lateral; 219, *S. pallipes*, lateral; 220, *S. pallipes*, proleg; 221, *Campsicnemus armatus*, anal segment, lateral; 222, *C. armatus*, lateral.

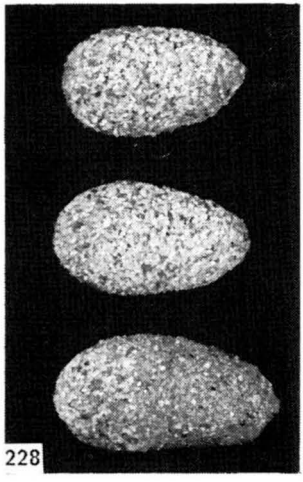




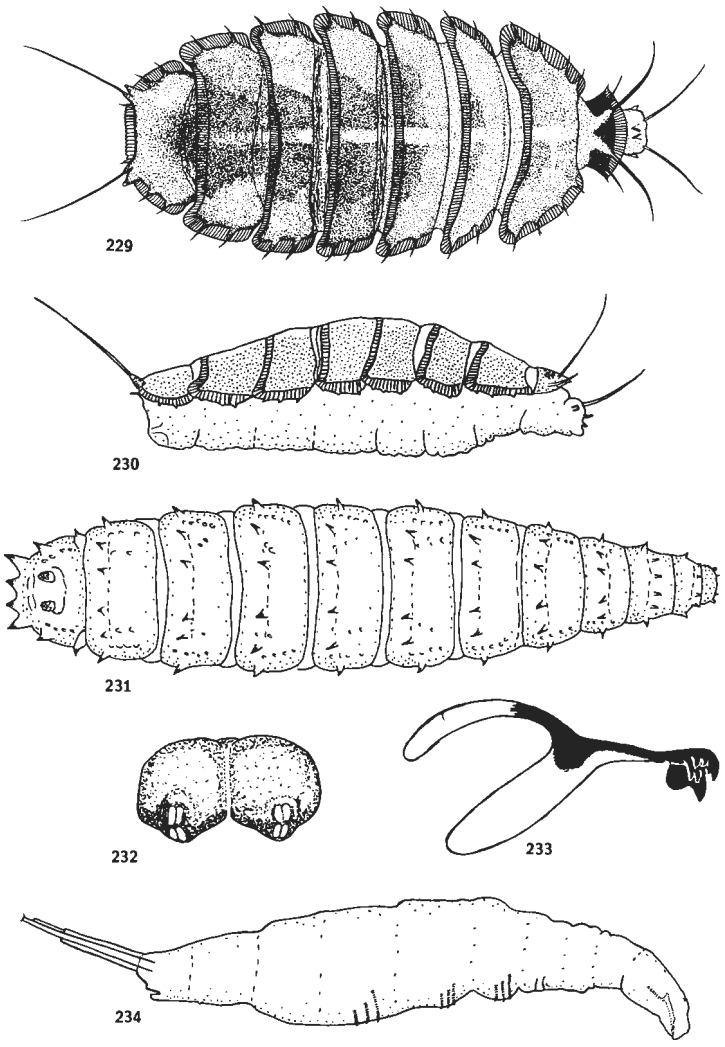




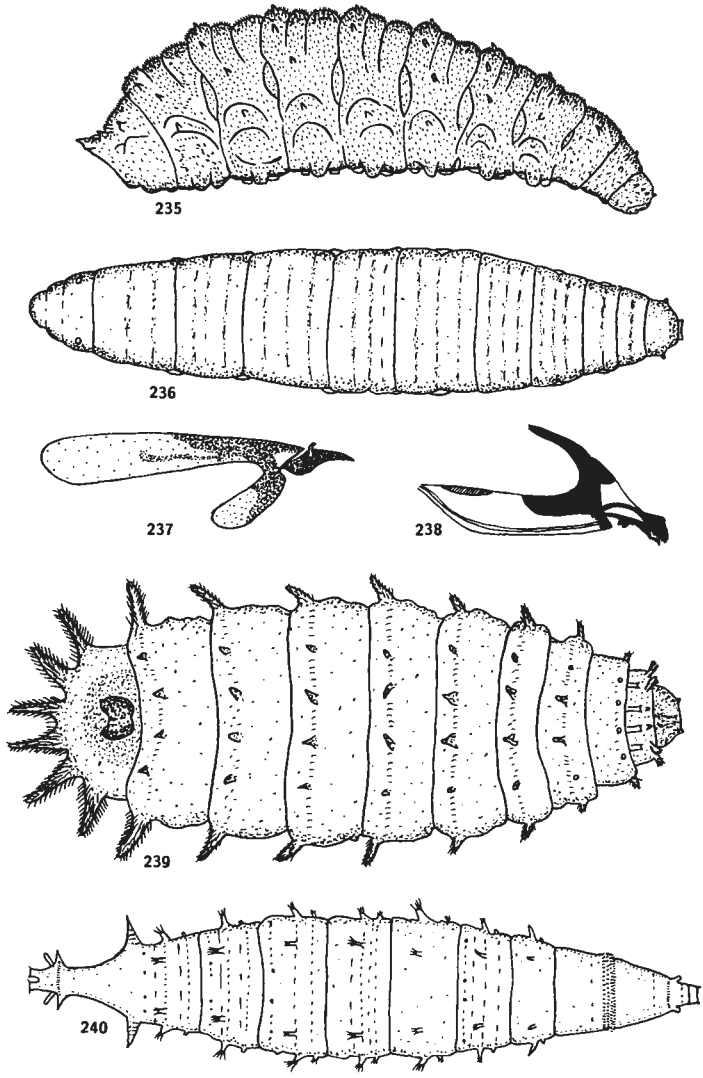




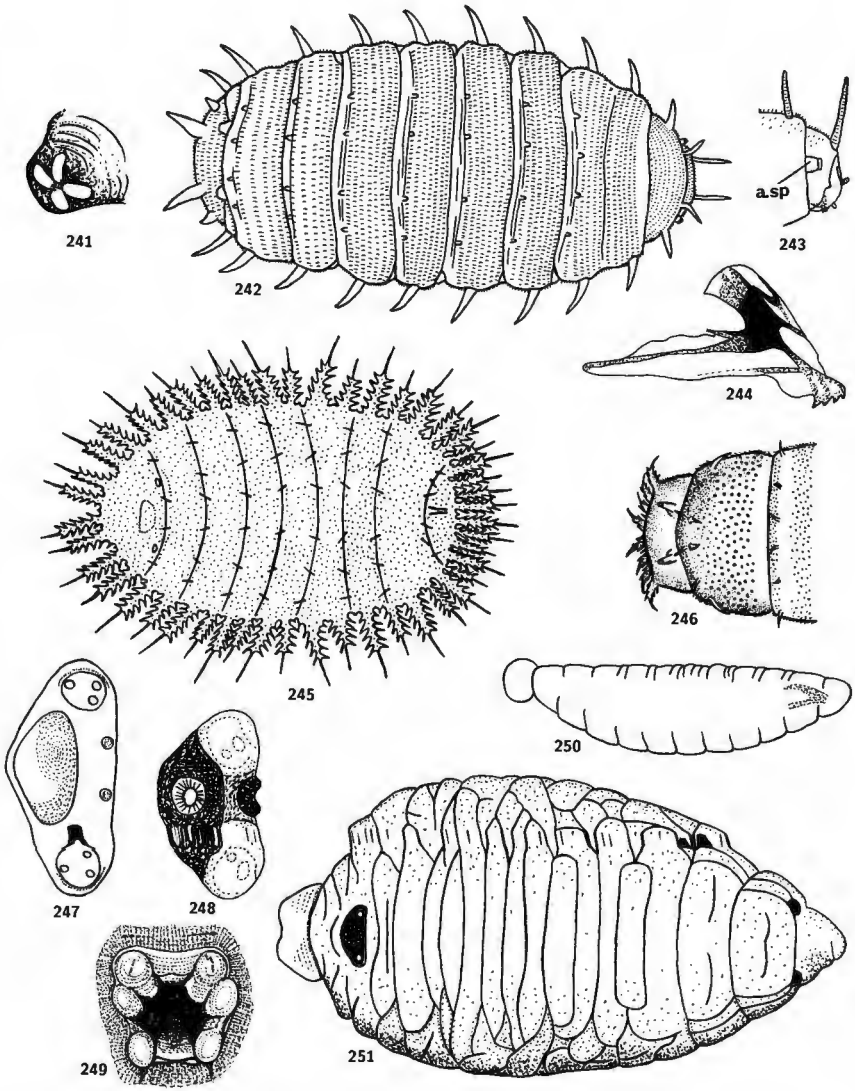
Figs 223–228. Dolichopodidae of the seashore: 223, *Hydrophorus oceanus,* larva, lateral (see also 210); 224, the same, cocoon and emerging pupa; 225, the same, pupa; 226, *Machaerium maritimae,* larva lateral; 227, the same, pupa, lateral; 228, the same, cocoons.



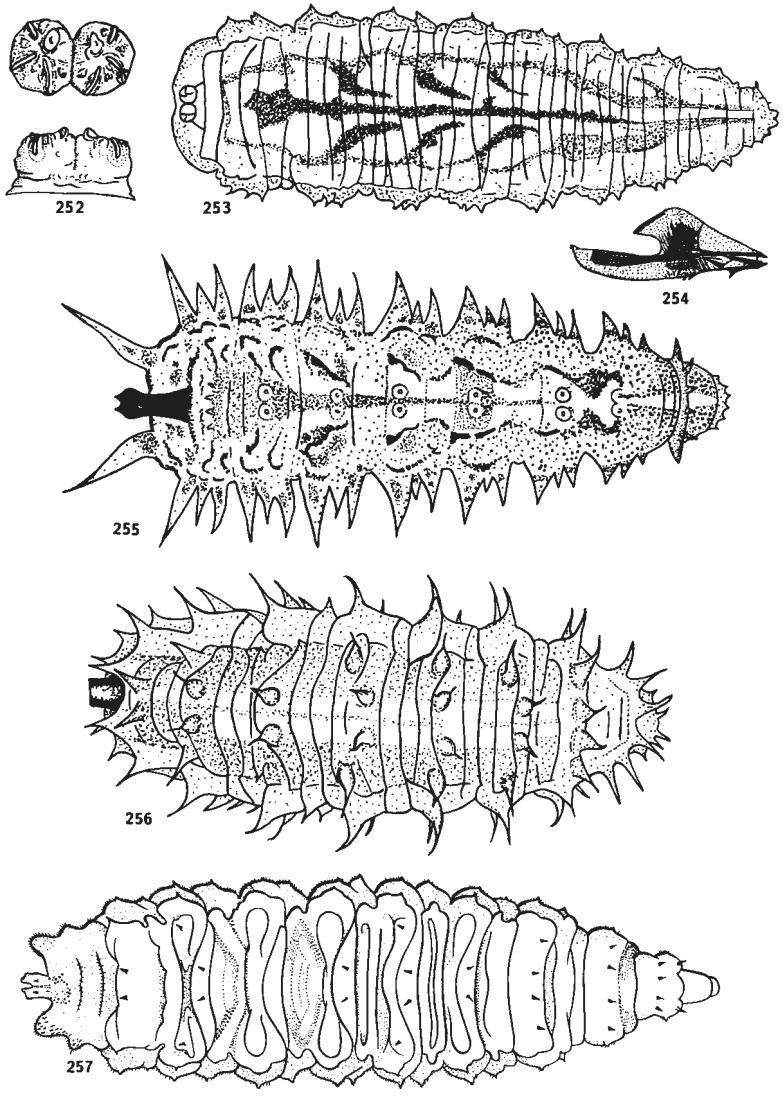
Figs 229–234. Larvae. 229–230, Lonchopteridae: 229, *Lonchoptera,* dorsal; 230, *Lonchoptera,* lateral: 231–234, Phoridae: 231, *Megaselia,* dorsal; 232, *Megaselia,* posterior spiracles, end view; 233, *Megaselia,* mouthparts, lateral; 234, *Chonocephalus,* lateral.



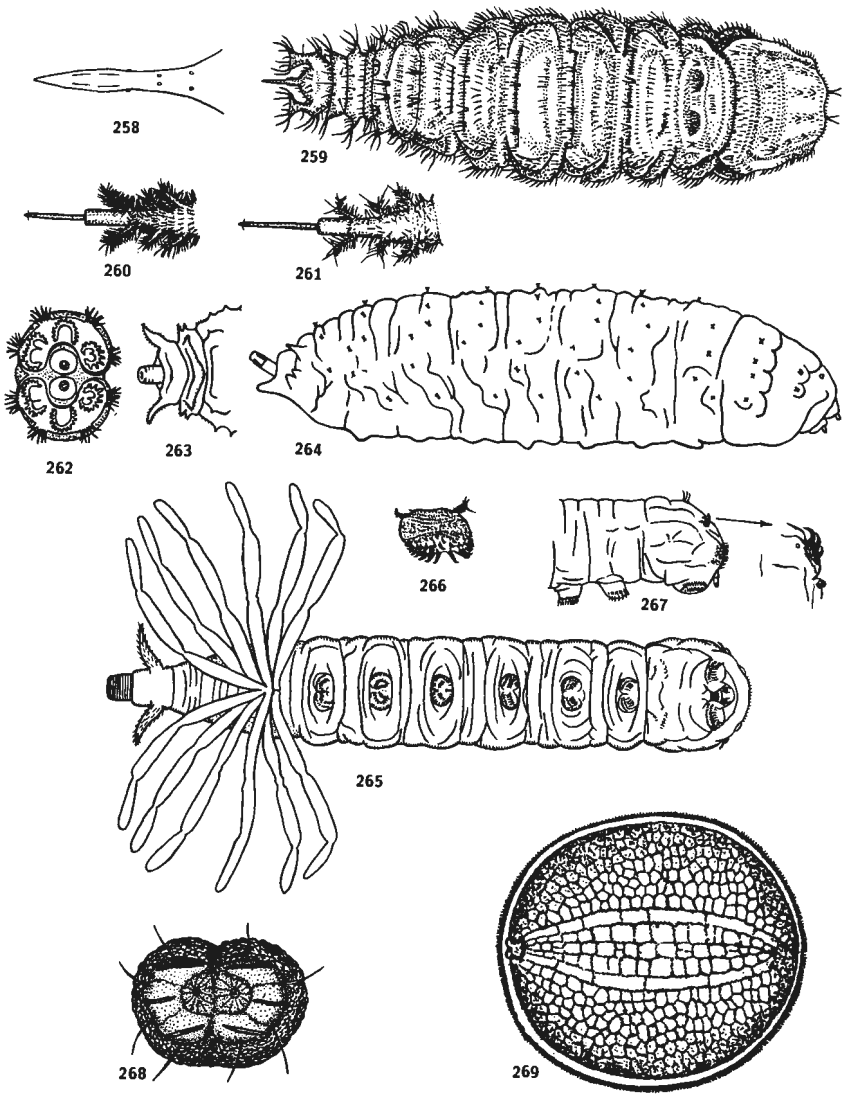
Figs 235–240. Phoridae larvae: 235, *Anevrina urbana*, lateral; 236, *Borophaga incrasssata*, dorsal; 237, *B. incrassata*, mouthparts, lateral; 238, *Conicera atra*, mouthparts, lateral; 239, *Dohrniphora cornuta*, dorsal; 240, *Spiniphora bergenstammi*, dorsal.



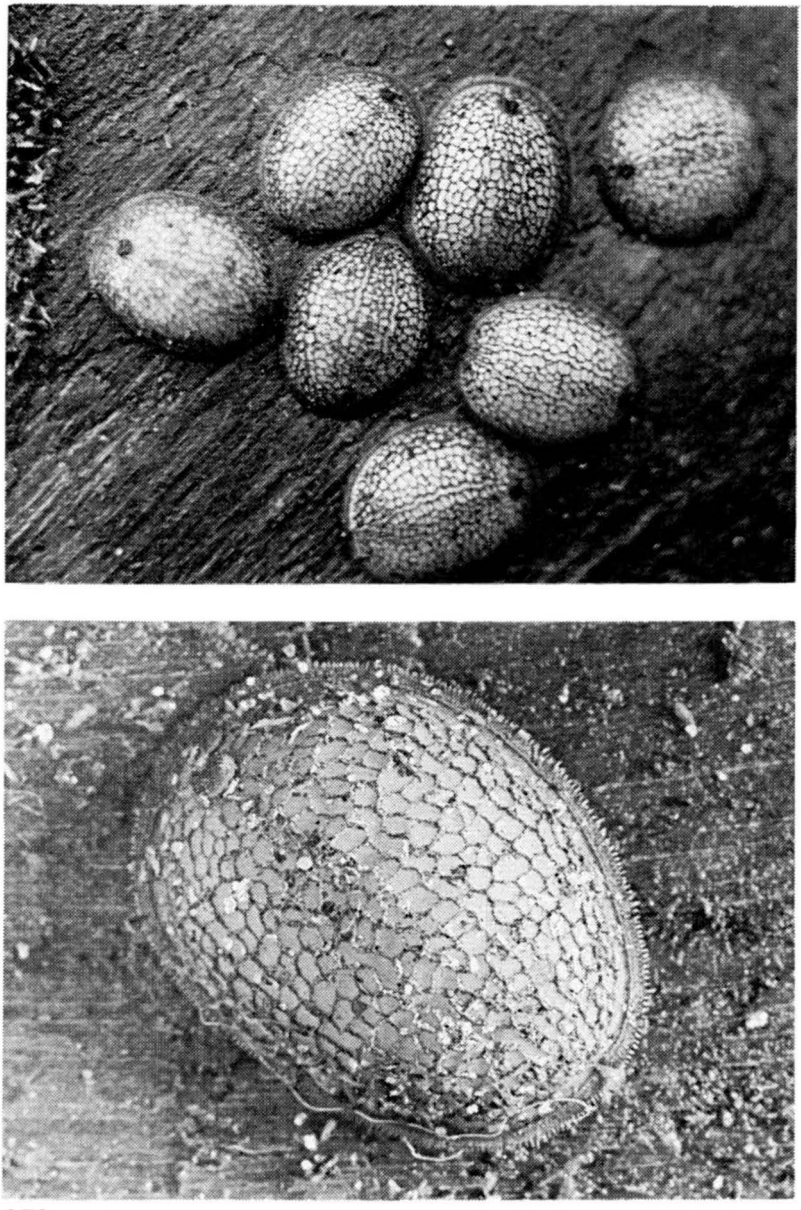
Figs 241–251. Larvae. 241–246, Platypezidae: 241, *Platypeza*, posterior spiracle; 242, *Platypeza*, dorsal; 243, *Platypeza*, head, lateral (a.sp. = anterior spiracle); 244, *P. fasciata*, mouthparts, lateral; 245, *Callomyia amoena*, dorsal; 246, *Agathomyia* sp., terminal segments. 247–251, Pipunculidae: 247, *Verrallia* sp., posterior spiracular plate; 248, *Cephalops semifumosus*, posterior spiracular plate; 249, *Eudorylas*, posterior spiracular plate; 250, *Cephalops*, first stage larva; 251, *Cephalops*, fully grown larva, dorsal.



Figs 252–257. Syrphidae larvae: 252, *Syrphus ribesii*, posterior spiracles, rear view (above); dorsal (below); 253, *Syrphus ribesii*, dorsal; 254, *Epistrophe eligans*, mouthparts, lateral; 255, *Dasysyrphus albostriatus*, dorsal; 256, *Paragus* sp., dorsal; 257, *Pipiza* sp., dorsal.

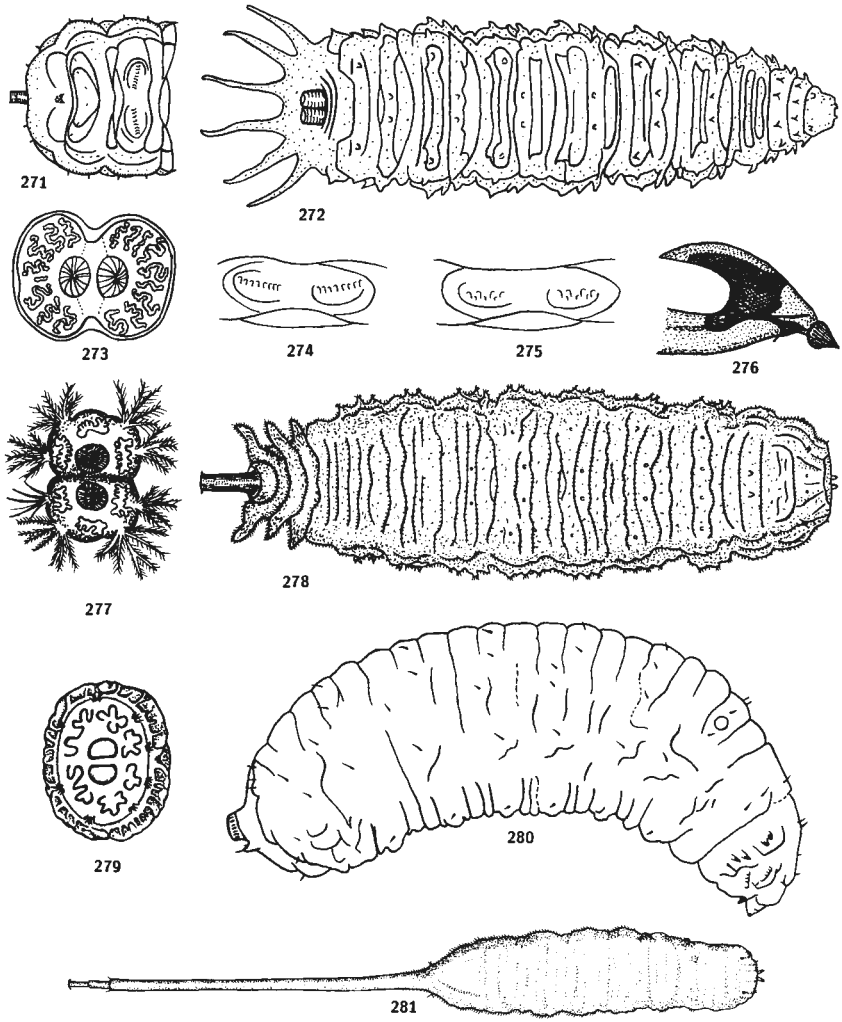


Figs 258–269. Syrphidae larvae: 258, *Chrysogaster hirtella*, tip of posterior spiracular 'lance', ventral; 259, *C. hirtella*, dorsal; 260, *C. solstitialis*, posterior end, dorsal; 261, *Orthonevra splendens*, ditto; 262, *Eumerus strigatus*, posterior spiracles in end view; 263, *E. strigatus*, posterior end, dorsal; 264, *E. strigatus*, lateral; 265, *Callicera rufa*, ventral; 266, *C. rufa*, proleg from 4th abdominal segment, lateral; 267, *C. rufa*, anterior end, lateral, and enlarged detail of anterodorsal trifurcate process; 268, *C. rufa*, posterior spiracles, end view; 269, *Microdon*, dorsal.

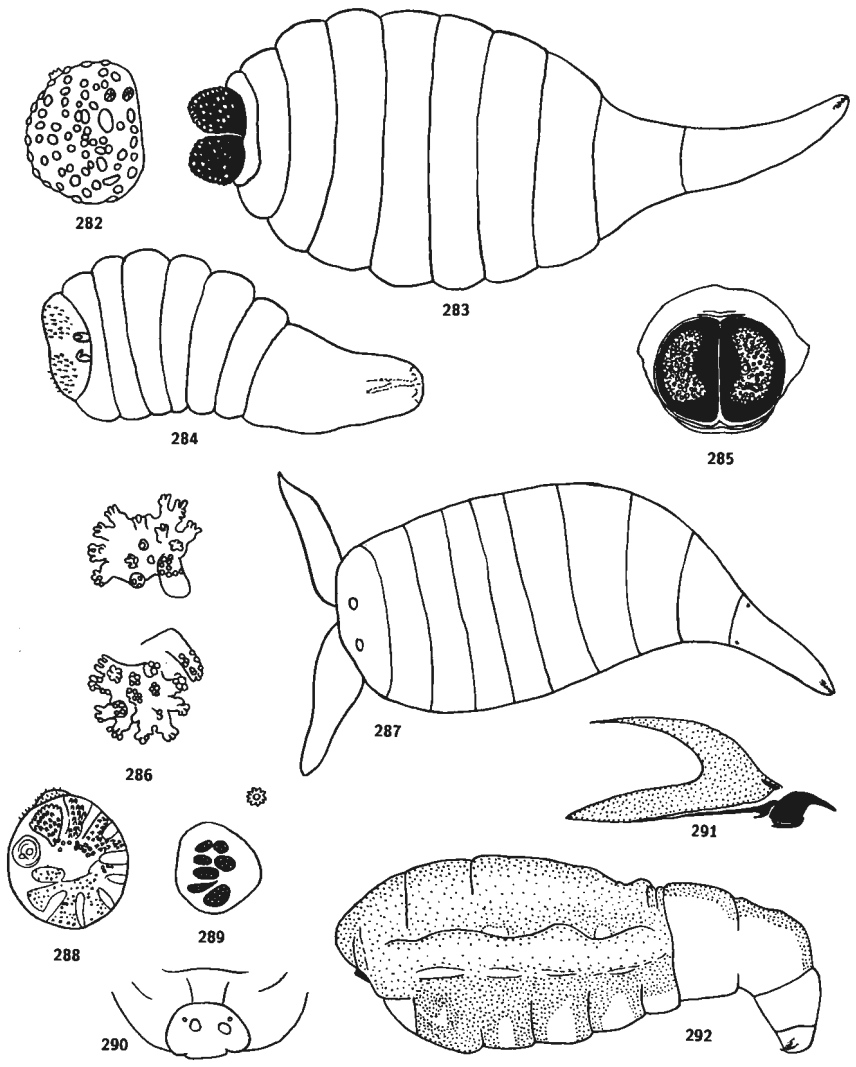


270

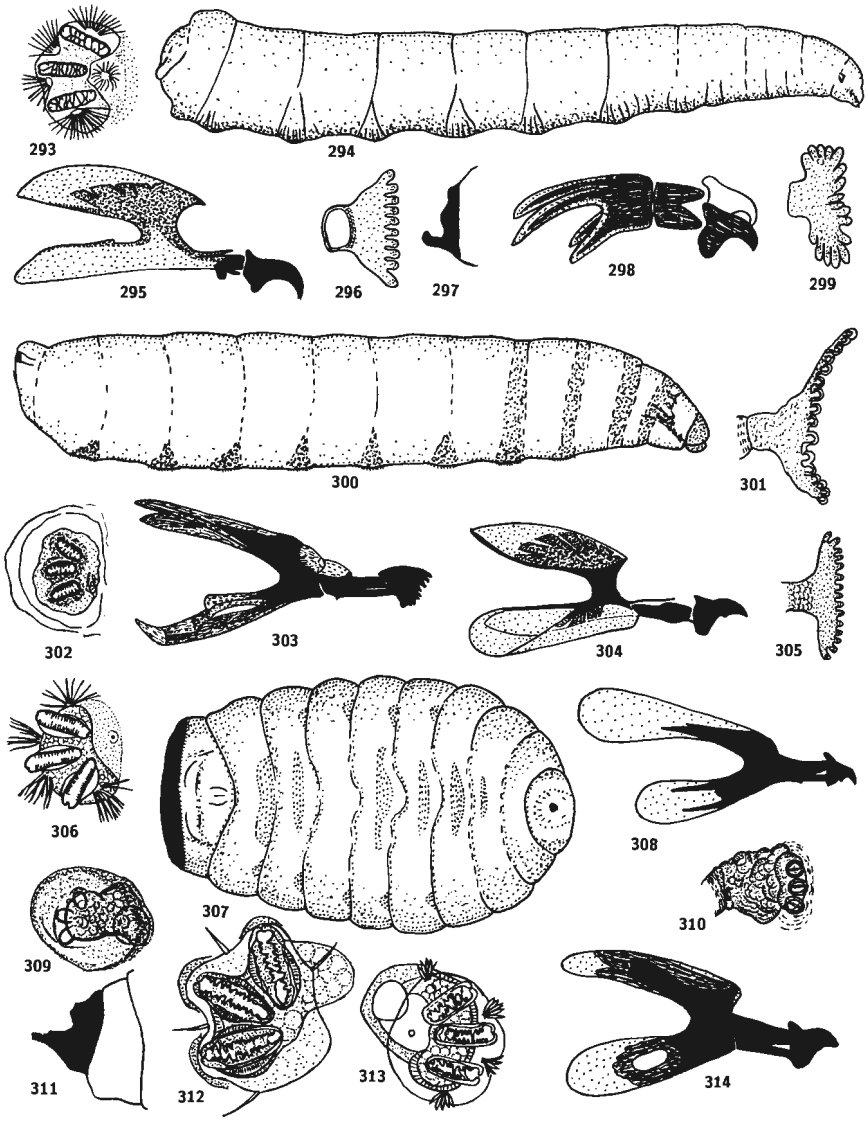
Fig. 270. Syrphidae: two photographs of the remarkable larva of *Microdon*, which was first described as a mollusc (courtesy of B. van Aartsen and G. Melmers, Jr.).



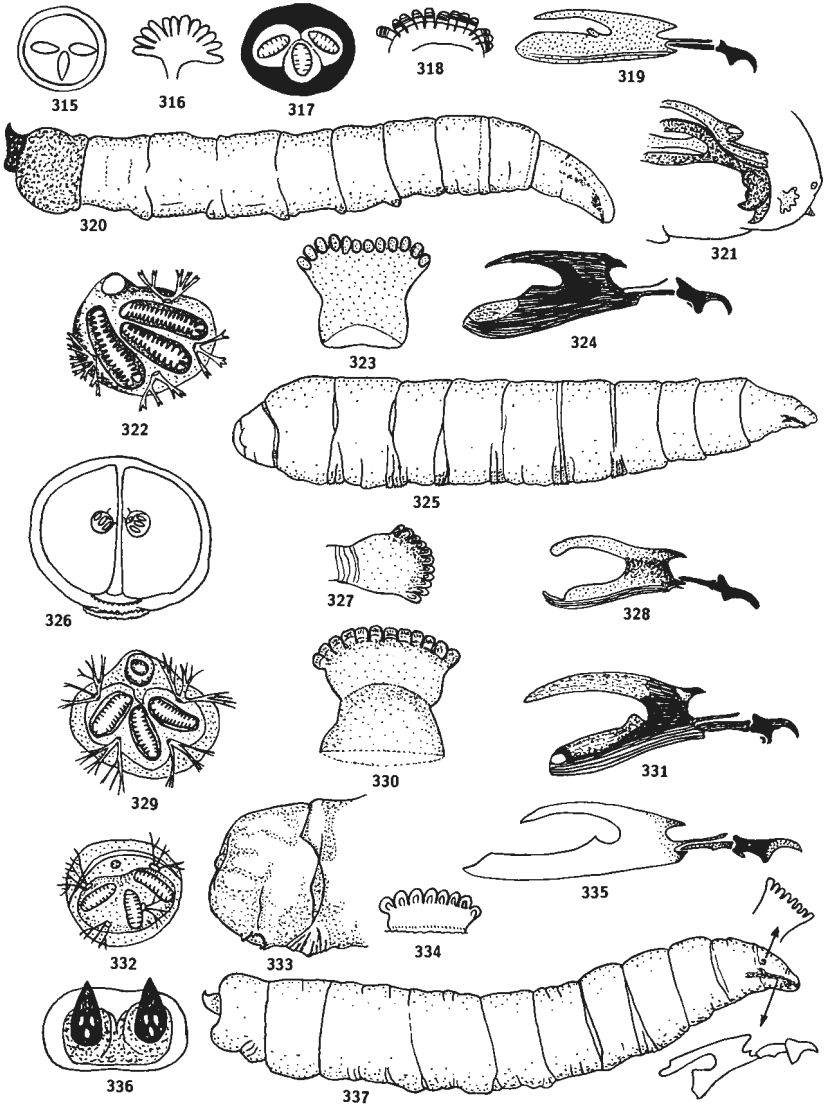
Figs 271–281. Syrphidae larvae: 271, *Volucella inanis*, posterior segments, dorsal; 272, *V. bombylans*, dorsal; 273, *V. inanis*, posterior spiracles, end view; 274, *V. inanis*, abdominal prolegs, ventral; 275, *V. bombylans*, the same; 276, *V. pellucens*, mouthparts, lateral; 277, *Syritta pipiens*, posterior spiracles, end view; 278, *S. pipiens*, dorsal; 279, *Merodon equestris*, posterior spiracles, end view; 280, *M. equestris*, lateral; 281, *Eristalis*, dorsal.



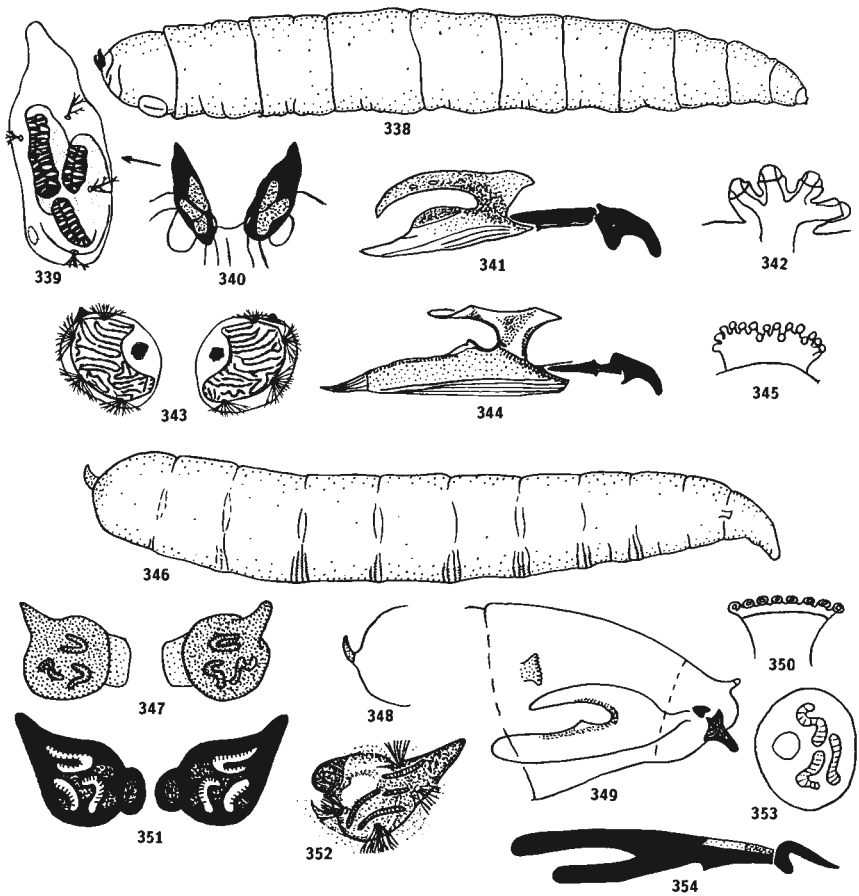
Figs 282–292. Conopidae larvae: 282, *Physocephala*, posterior spiracle, end view; 283, the same, fully grown larva; 284, the same, first instar larva; 285, *Conops vesicularis*, posterior spiracles, end view; 286, *Zodion*, posterior spiracles, end view; 287, *Zodion*, fully grown larva, dorsal; 288, *Sicus*, posterior spiracle, end view; 289, *Thecophora*, posterior spiracle, end view; 290, *Thecophora*, anal segment, end view; 291, *Thecophora*, mouthparts, lateral; 292, *Thecophora*, fully grown larva, lateral.



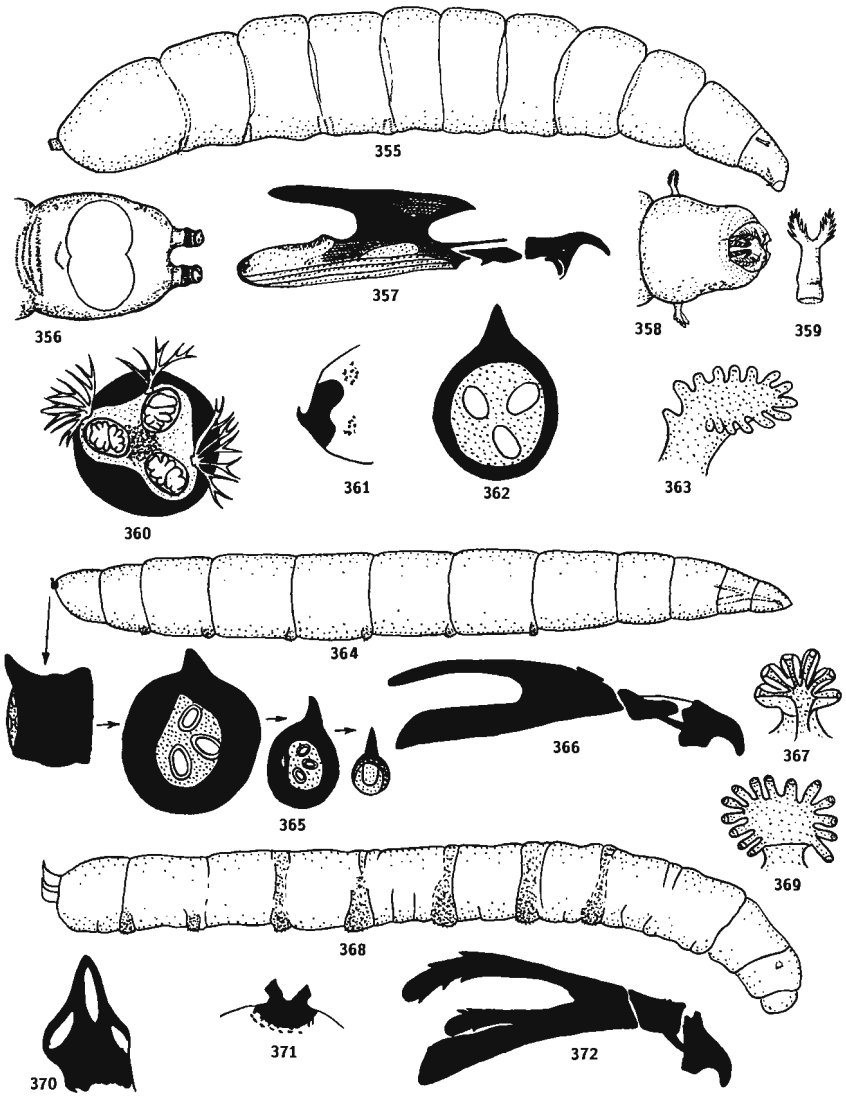
Figs 293–314. Tephritidae larva: 293, *Ceratitis capitata,* posterior spiracle; 294, the same, whole larva, lateral; 295, the same, mouthparts, lateral; 296, the same, anterior spiracle; 297, *Platyparea poeciloptera,* anal segment, lateral; 298, the same, mouthparts, lateral; 299, the same, anterior spiracle; 300, *Euleia heracleii,* lateral; 301, the same, anterior spiracle; 302, the same, posterior spiracle; 303, the same, mouthparts; 304, *Rhagoletis cerasi,* mouthparts; 305, the same, anterior spiracle; 306, the same, posterior spiracle; 307. *Urophora jaceana,* ventral; 308, the same, mouthparts; 309, the same, posterior spiracle; 310, the same, anterior spiracle; 311, *Cerajocera ceratocera,* anal segment, lateral; 312, the same, posterior spiracles; 313, *Tephritis hyoscyami,* posterior spiracle; 314, the same, mouthparts.



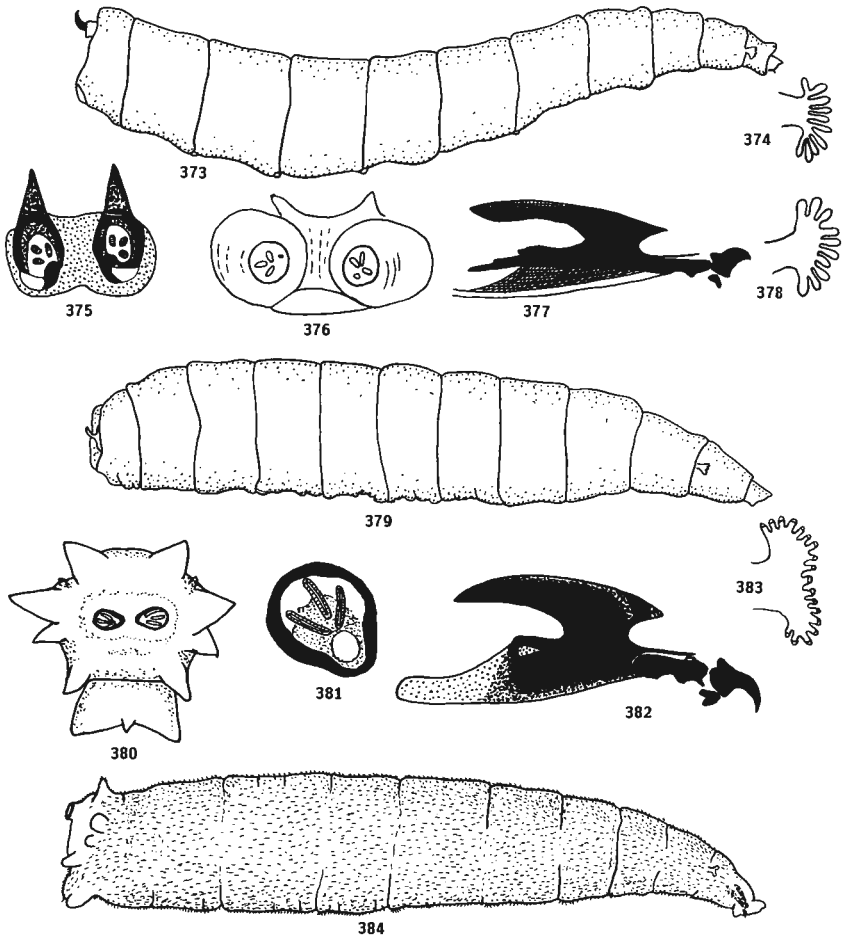
Figs 315–337. Larvae. 315–321, Platystomatidae: 315, *Platystoma lugubre* (European), posterior spiracle; 316, the same, anterior spiracle; 317, *P. euphorbiinum* (Canary Is.), posterior spiracle; 318, the same, anterior spiracle; 319, the same, mouthparts; 320, *Rivellia* sp. (from Zaire), third stage larva; 321, the same, mouthparts. 322–337, Otitidae: 322, *Physiphora demandata*, posterior spiracle; 323, the same, anterior spiracle; 324, the same, mouthparts; 325, *Myennis octopunctata*, third stage larva; 326, the same, anal segment, end view; 327, the same, anterior spiracle; 328, the same, mouthparts, 329, *Seioptera vibrans*, posterior spiracle; 330, the same, anterior spiracle; 331, the same, mouthparts; 332, *Ceroxys urticae*, posterior spiracle; 333, the same, anal segment, lateral; 334, the same, anterior spiracle; 335, the same, mouthparts; 336, *Tetanops myopaeformis* (Nearctic), posterior spiracles; 337, the same, third stage larva with simple outline of anterior spiracle and mouthparts indicated by arrows.



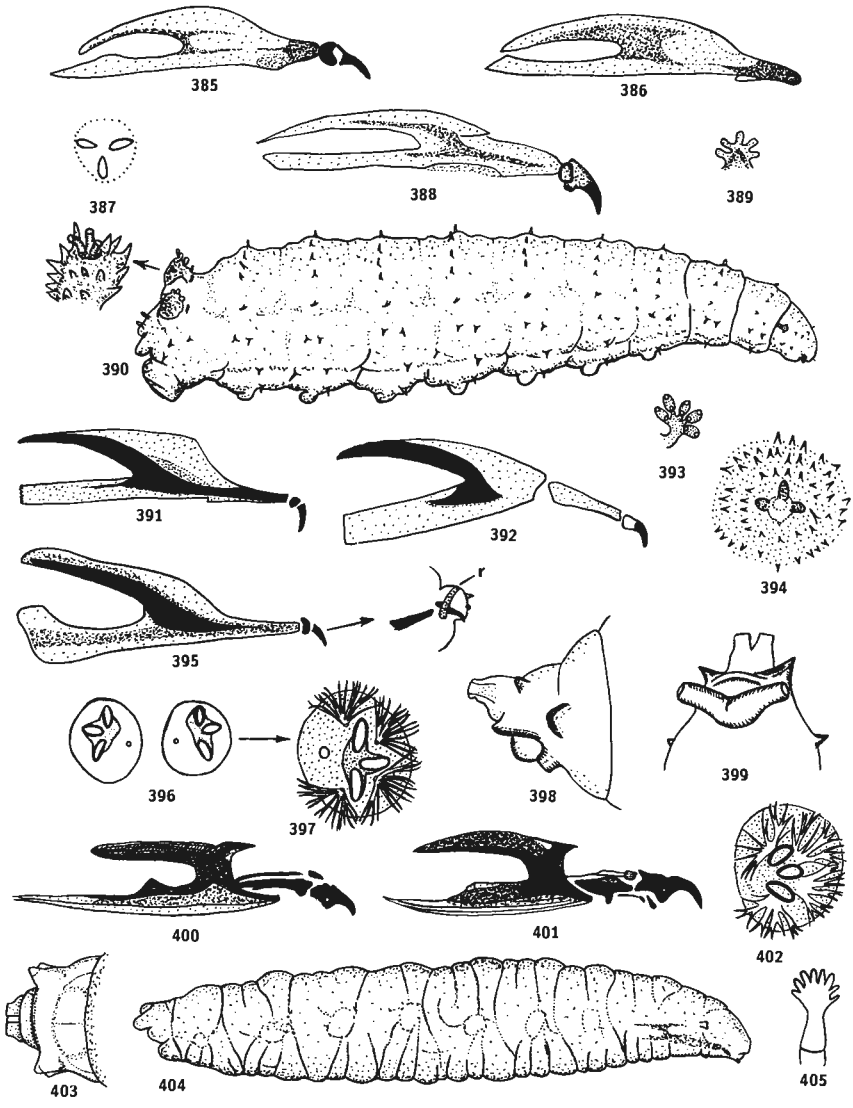
Figs 338–354. Larvae. 338–352, Micropezidae: 338, *Micropeza corrigiolata*, larva; 339, the same, a posterior spiracle enlarged; 340, the same, posterior spiracles; 341, the same, mouthparts; 342, the same, anterior spiracle; 343, *Rainieria antennaepes* (Nearctic), posterior spiracles; 344, the same, mouthparts; 345, the same, anterior spiracle; 346, *Calobata cibaria*, larva; 347, the same, posterior spiracles; 348, *C. petronella*, anal segment; 349, *C. cibaria*, mouthparts; 350, the same, anterior spiracle; 351, *C. petronella*, posterior spiracles; 352, *C. vittata*, the same. 353–354, Megamerinidae: 353, *Megamerina dolium*, posterior spiracle; 354, the same, mouthparts.



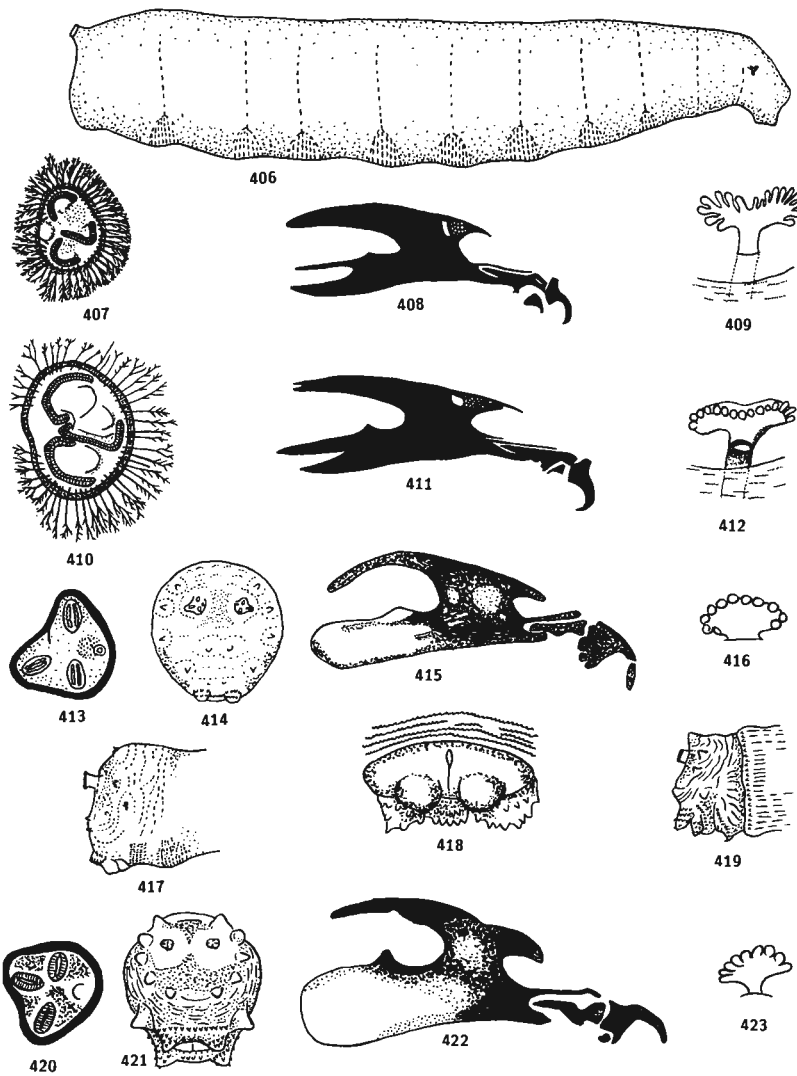
Figs 355–372. Larvae. 355–360, Tanypezidae: 355, *Tanypeza longimana;* 356, the same, anal segment, ventral; 357, the same, mouthparts; 358, the same, anterior end, ventral; 359, the same, anterior spiracle; 360, the same, posterior spiracle. 361–372, Psilidae: 361, *Loxocera albiseta,* posterior spiracle, lateral; 362, the same, posterior spiracle; 363, the same, anterior spiracle; 364, *Psila rosae,* larva; 365, the same, posterior spiracle, lateral and end views of third, second and first instars; 366, the same, mouthparts; 367, the same, anterior spiracle; 368, *Chyliza vittata;* 369, the same, anterior spiracle; 370, the same, posterior spiracle; 371, the same, posterior spiracular plate; 372, the same, mouthparts.



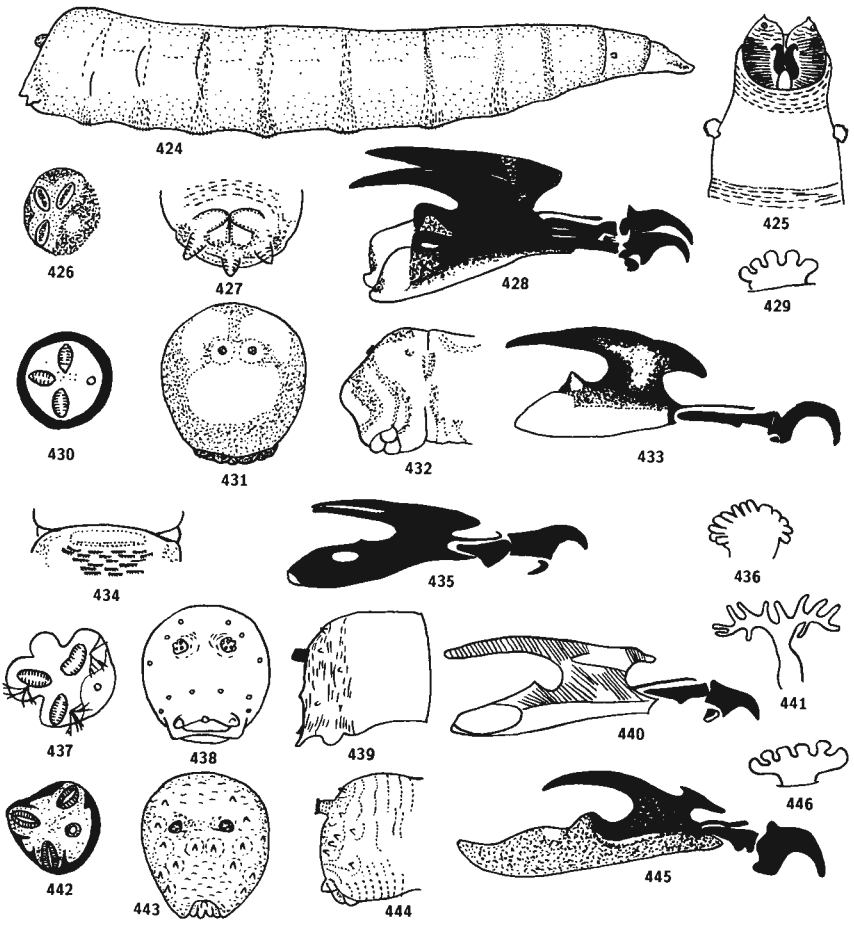
Figs 373–384. Larvae. 373–379, Helcomyzidae: 373, *Helcomyza ustulata*, larva; 374, the same, anterior spiracle; 375, the same, posterior spiracle; 376, *Heterocheila buccata*, anal segment; 377, the same, mouthparts; 378, the same, anterior spiracle; 379, the same, whole larva. 380–384, Dryomyzidae: 380, *Dryomyza analis*, anal segment; 381, the same, posterior spiracle; 382, the same, mouthparts; 383, the same, anterior spiracle; 384, the same, whole larva.



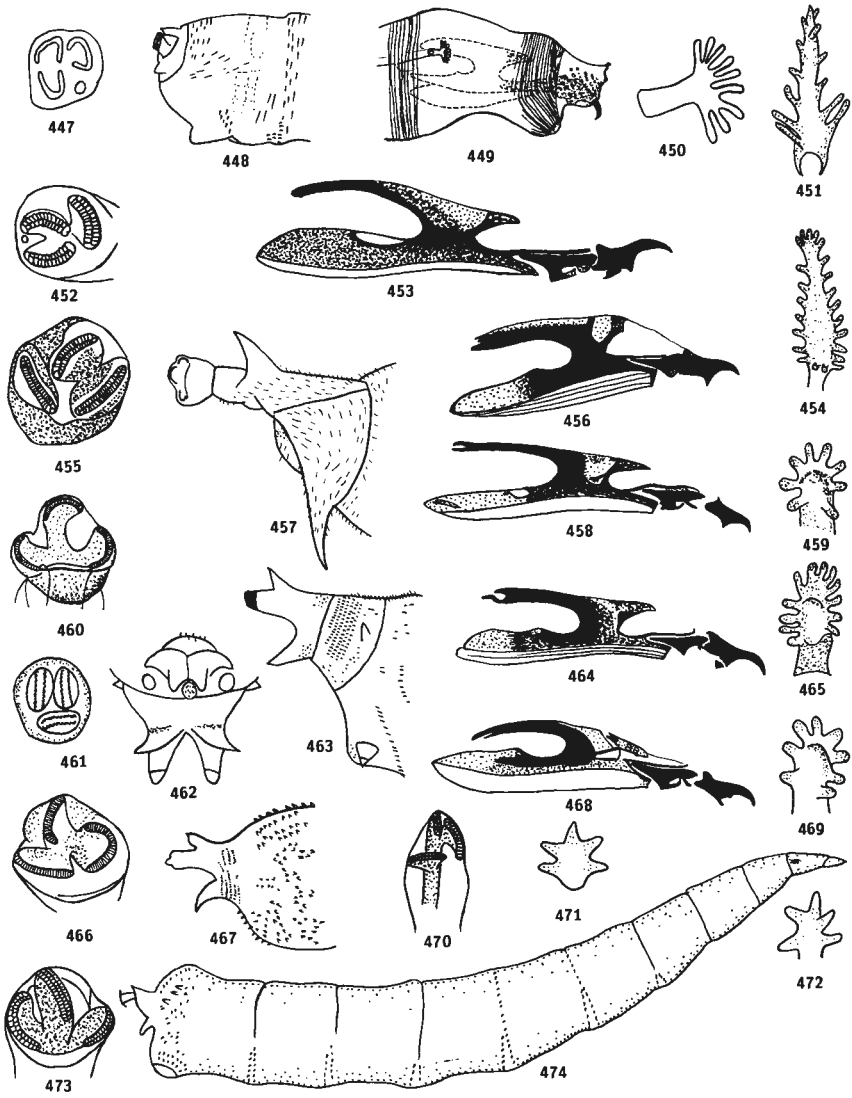
Figs 385–405. Larvae. 385–395, Chamaemyiidae: 385, *Chamaemyia geniculata*, mouthparts; 386, *C. juncorum*, the same; 387, *Parochthiphila coronata*, posterior spiracles; 388, the same, mouthparts; 389, the same, anterior spiracle; 390, *Leucopis* sp. with detail of posterior spiracle; 391, *L. melanopus*, mouthparts; 392, *L. griseola*, mouthparts; 393, *L. (Leucopomyia) silesiaca*, anterior spiracle; 394, the same, posterior spiracle; 395, the same, mouthparts (arrow shows ring on neck of *Leucopis*: see key). 396–405, Lauxaniidae: 396, *Lyciella rorida*, posterior spiracles; 397, the same, posterior spiracle, enlarged; 398, the same, anal segment, lateral; 399, the same, anal segment, ventral; 400, *Peplomyza litura*, mouthparts; 401, *Minettia lupulina*, mouthparts; 402, the same, posterior spiracle; 403, *Homoneura americana* (Nearctic), anal segment, ventral; 404, the same, whole larva; 405, *Minettia lupulina*, anterior spiracle.



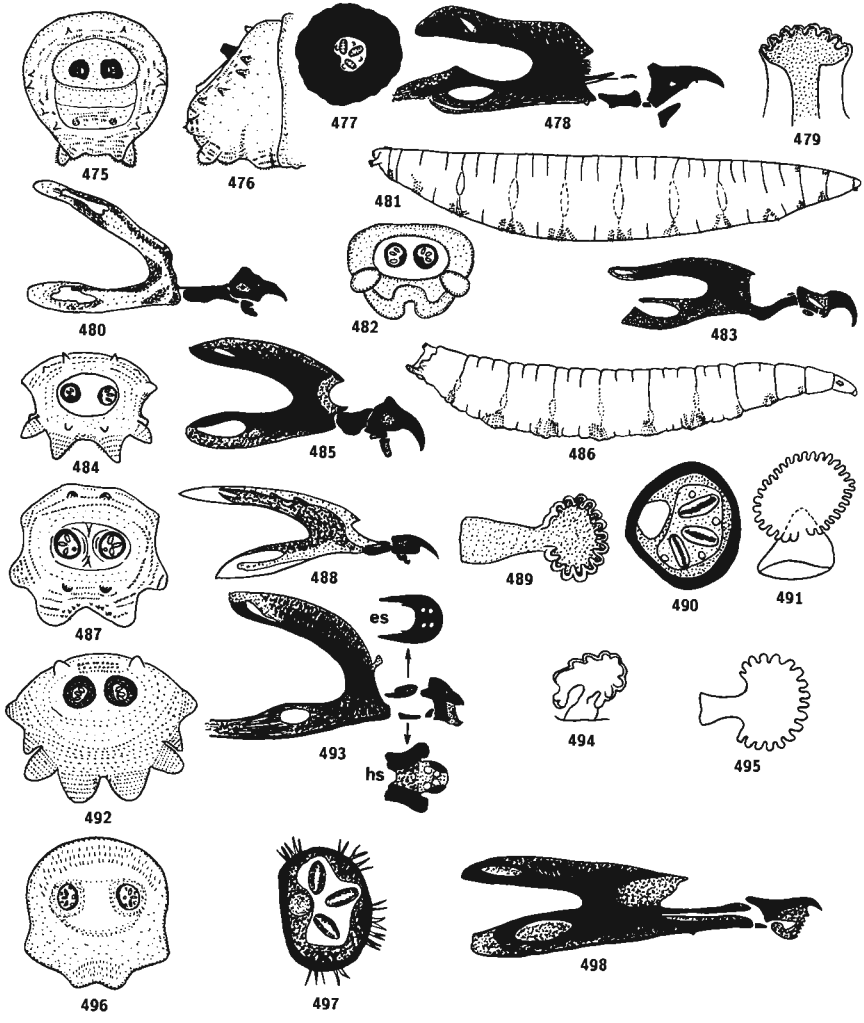
Figs 406–423. Larvae. 406–412, Coelopidae: 406, *Coelopa frigida;* 407, the same, posterior spiracle; 408, the same, mouthparts; 409, the same, anterior spiracle; 410, *C. pilipes,* posterior spiracle; 411, the same, mouthparts; 412, the same, anterior spiracle. 413–423, Heleomyzidae: 413, *Heleomyza serrata,* posterior spiracle; 414, the same, anal segment, end view; 415, the same, mouthparts; 416, the same, anterior spiracle; 417, the same, anal segment, lateral; 418, the same, anal segment, ventral; 419, *Neoleria inscripta,* anal segment, lateral; 420, the same, posterior spiracle; 421, the same, end view; 422, the same, mouthparts; 423, the same, anterior spiracle.



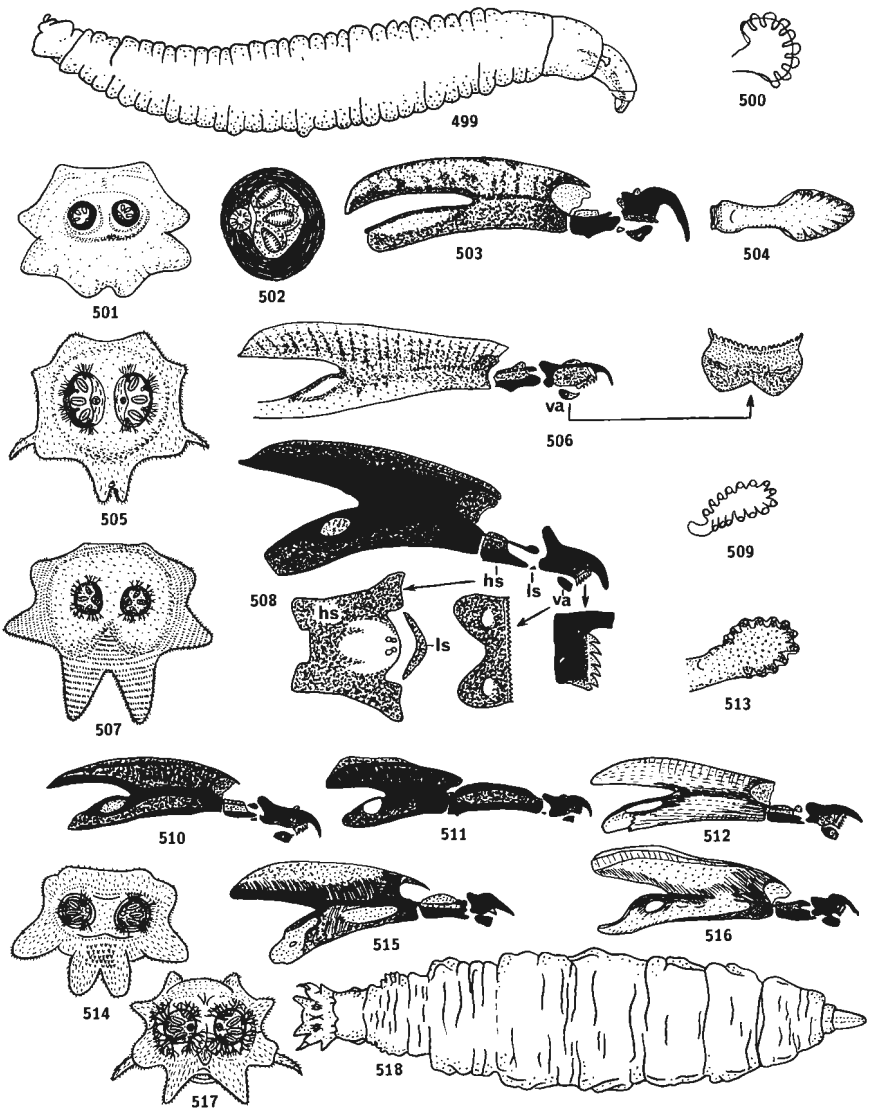
Figs 424–446. Heleomyzidae larvae: 424, *Scoliocentra villosa;* 425, the same, anterior segments ventral; 426, the same, posterior spiracle; 427, the same, anal segment, ventral; 428, the same, mouthparts; 429, *Oecothea fenestralis* anterior spiracle; 430, the same, posterior spiracle; 431, the same, anal segment, end view; 432, the same, lateral view; 433, the same, mouthparts; 434, the same, 'creeping welt', ventral; 435, *Suillia lurida* (not British), mouthparts; 436, the same, anterior spiracle; 437, *Tephrochlamys tarsalis,* posterior spiracle; 438, the same, anal segment, end view; 439, the same, lateral; 440, the same, mouthparts; 441, the same, anterior spiracle; 442, *T. rufiventris,* posterior spiracle; 443, the same, anal segment, end view; 444, the same, lateral; 445, the same, mouthparts; 446, the same, anterior spiracle.



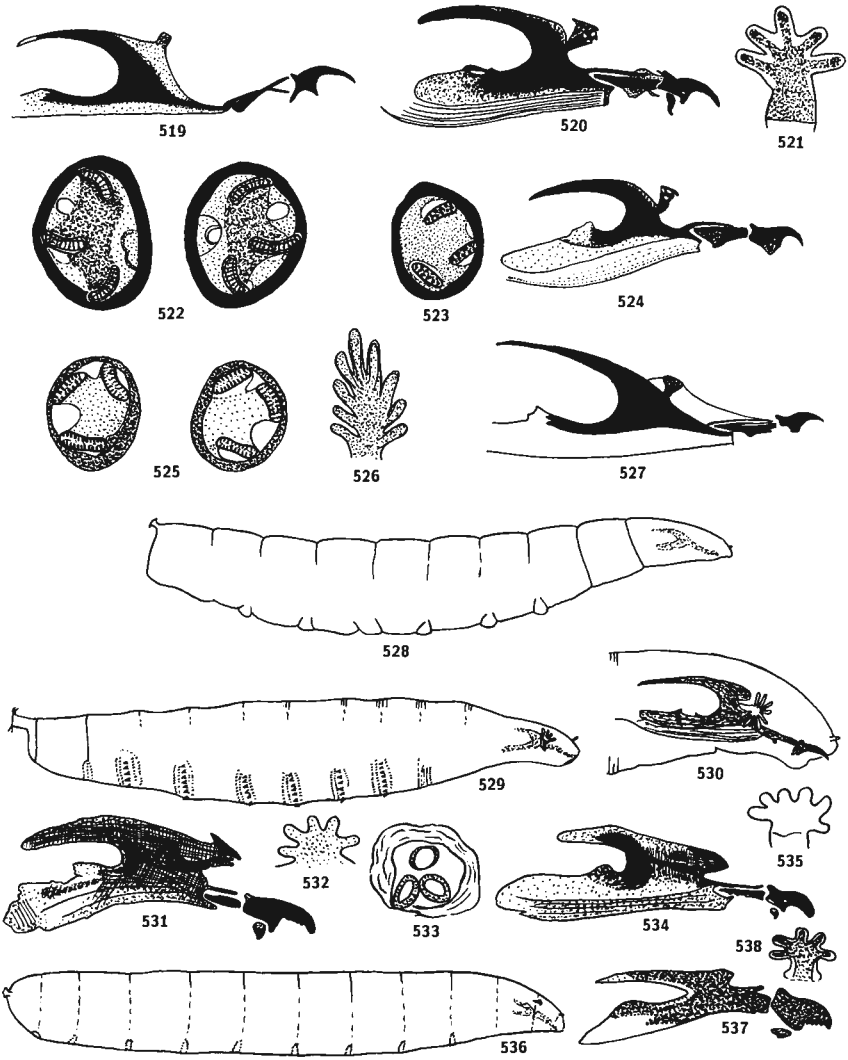
Figs 447–474. Sepsidae larvae: 447, *Orygma luctuosum*, posterior spiracle; 448, the same, anal segment; 449, the same, anterior segment showing outline of mouthparts; 450, the same, anterior spiracle; 451, *Saltella sphondylii*, anterior spiracle; 452, the same, posterior spiracle; 453, the same, mouthparts; 454, *Themira putris*, anterior spiracle; 455, the same, posterior spiracle; 456, the same, mouthparts; 457, *Meroplius minutus*, anal segment; 458, the same, mouthparts; 459, the same, anterior spiracle; 460, the same, posterior spiracle; 461, *Nemopoda nitidula*, posterior spiracle; 462, the same, anal segment, ventral; 463, the same, lateral; 464, the same, mouthparts; 465, the same, anterior spiracle; 466, *Sepsis cynipsea*, posterior spiracle; 467, the same, anal segment; 468, the same, mouthparts; 469, the same, anterior spiracle; 470, *S. biflexuosa*, posterior spiracle; 471, the same, anterior spiracle; 472, *S. thoracica*, anterior spiracle; 473, the same, posterior spiracle; 474, *Sepsis* sp., whole larva.



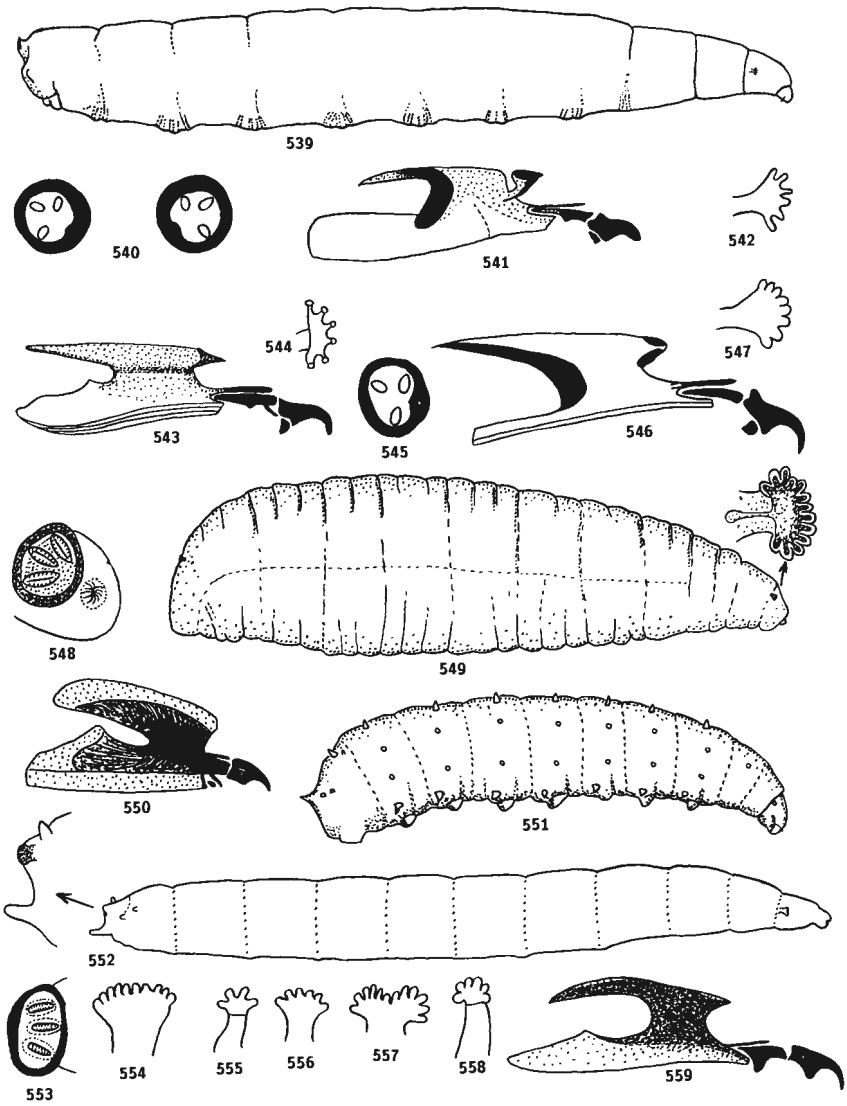
Figs 475–498. Sciomyzidae larvae: 475, *Salticella fasciata,* anal segment, end view; 476, the same, lateral; 477, the same, posterior spiracle; 478, the same, mouthparts; 479, the same, anterior spiracle; 480, *Colobaea distincta,* mouthparts; 481, *Pherbellia schoenherri;* 482, *Ph. dubia,* anal segment, end view; 483, the same, mouthparts; 484, *Ph. ventralis,* anal segment, end view; 485, the same, mouthparts; 486, *Pteromicra angustipennis;* 487, the same, anal segment, end view; 488, the same, mouthparts; 489, the same, anterior spiracle; 490, *Sciomyza simplex,* posterior spiracle; 491, the same, anterior spiracle; 492, the same, anal segment, end view; 493, *Tetanura pallidiventris,* mouthparts, lateral, with enlarged dorsal views of hypostomal sclerite (hs) and epistomal sclerite (es); 494, the same, anterior spiracle; 495, *Antichaeta brevipennis,* anterior spiracle; 496, the same, anal segment, end view; 497, the same, posterior spiracle; 498, the same, mouthparts.



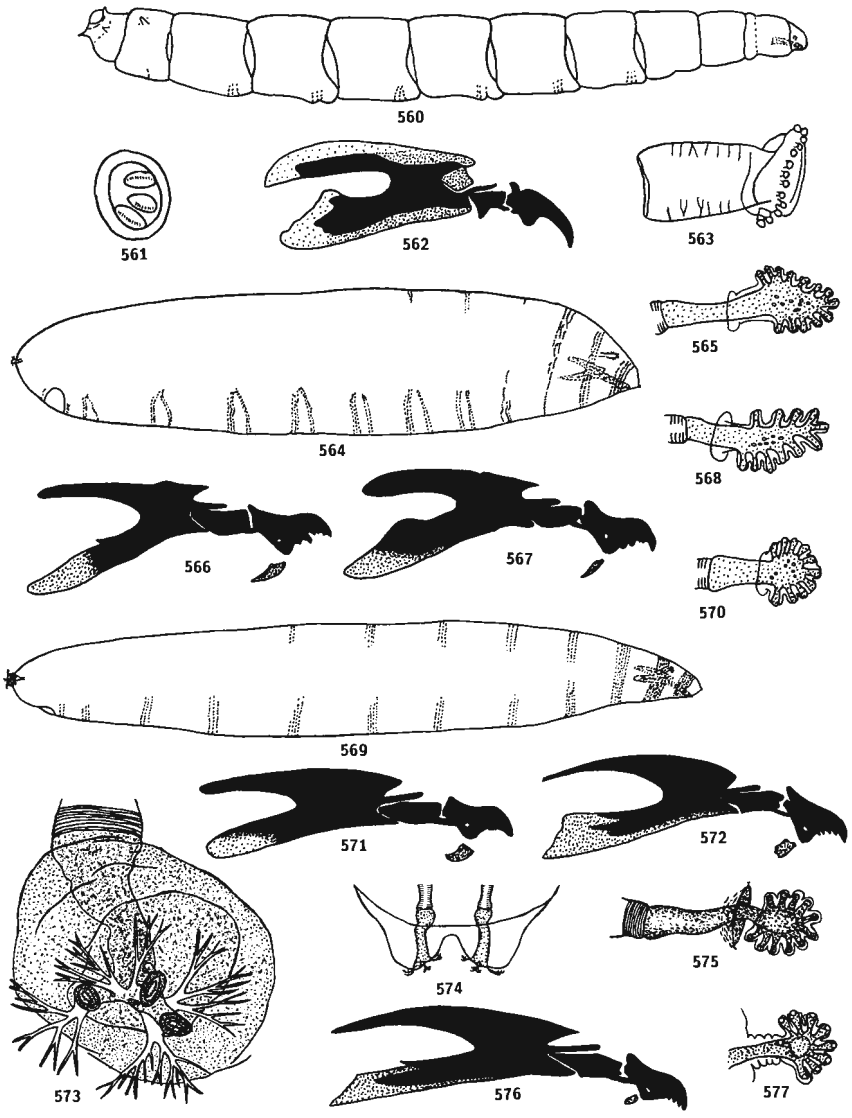
Figs 499–518. Sciomyzidae larvae: 499, *Coremacera tristis;* 500, the same, anterior spiracle; 501, the same, anal segment, end view; 502, the same, posterior spiracle; 503, the same, mouthparts; 504, *Elgiva sundewalli,* anterior spiracle; 505, the same, anal segment, end view; 506, the same, mouthparts showing ventral arch (va) enlarged, ventral view; 507, *Hydromya dorsalis,* anal segment, end view; 508, the same, mouthparts showing enlarged detail of ligulate (ls) and hypostomal (hs) sclerites, the ventral arch (va) and accessory teeth of mouthhook; 509, the same, anterior spiracle; 510, *Knutsonia albiseta,* mouthparts; 511, *K. lineata,* the same; 512, *Pherbina coryleti,* mouthparts; 513, the same, anterior spiracle; 514, the same, anal segment, end view; 515, *Tetanocera elata,* mouthparts; 516, *T. ferruginea,* the same; 517, the same, anal segment, end view; 518, the same, whole larva, dorsal.



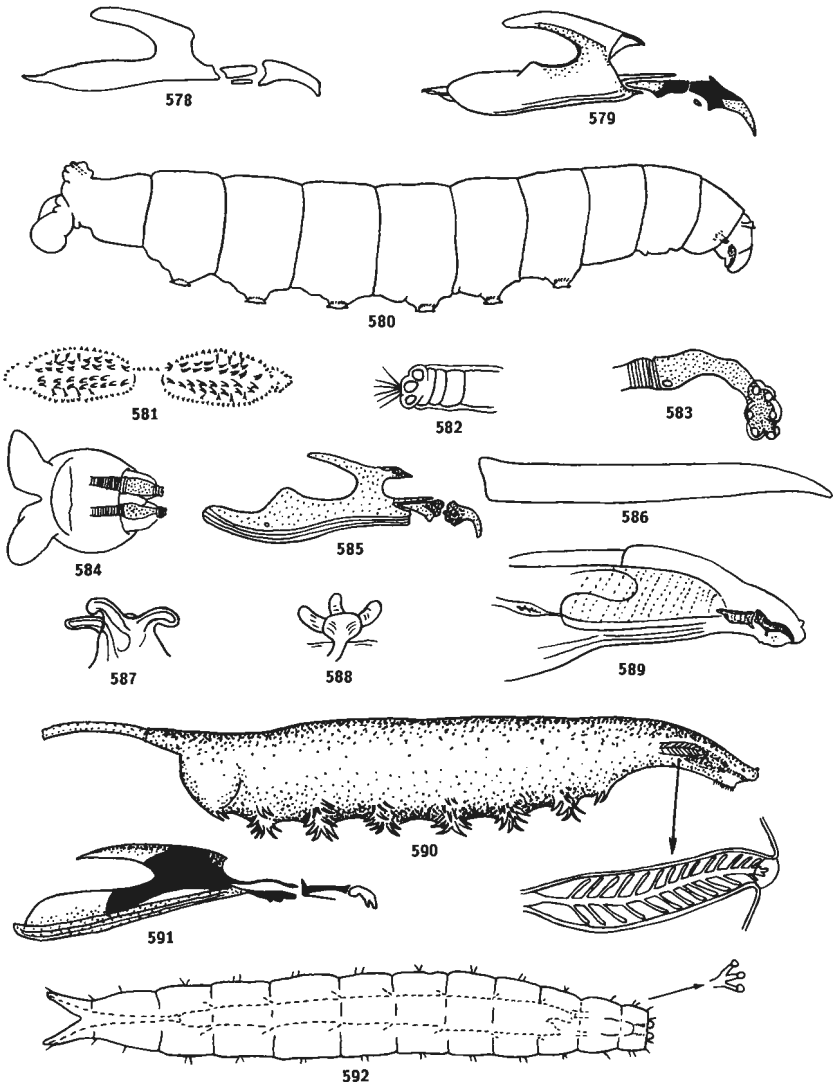
Figs 519–538. Larvae. 519–530, Sphaeroceridae: 519, *Sphaerocera curvipes,* mouthparts; 520; *Lotophila atra,* mouthparts; 521, the same, anterior spiracle; 522, the same, posterior spiracles; 523, *Coproica acutangula,* posterior spiracle; 524, the same, mouthparts; 525, *Chaetopodella scutellaris,* posterior spiracles; 526, the same, anterior spiracle; 527, *Limosina silvatica,* mouthparts; 528, *Spelobia parapusio,* larva; 529, *Thoracochaeta zosterae,* larva; 530, the same, anterior end enlarged. 531–538, Pallopteridae: 531, *Palloptera usta,* mouthparts; 532, the same, anterior spiracle; 533, *P. ustulata,* posterior spiracle; 534, the same, mouthparts; 535, the same, anterior spiracle; 536, *P. quinquemaculata,* larva; 537, the same, mouthparts; 538, the same, anterior spiracle.



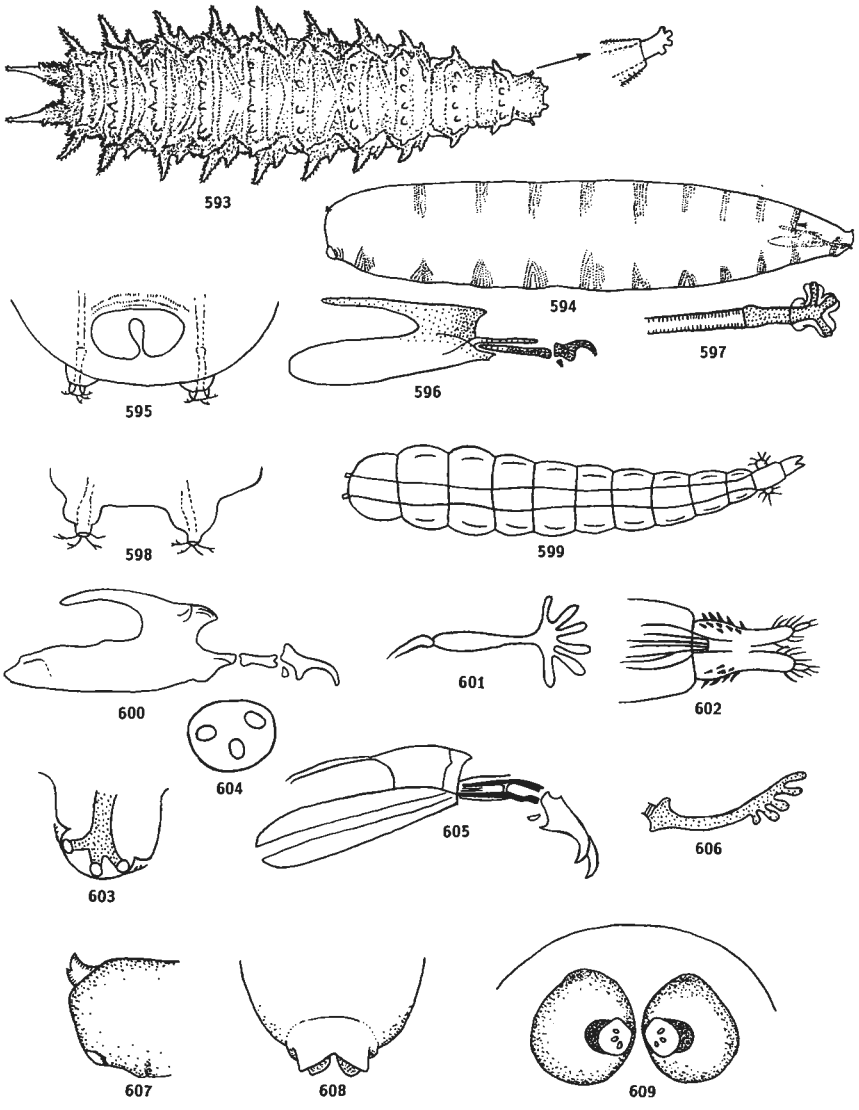
Figs 539–559. Larvae. 539–547, Lonchaeidae: 539, *Lonchaea* sp.; 540, *L. palposa,* posterior spiracles; 541, the same, mouthparts; 542, the same, anterior spiracle; 543, *L. collini,* mouthparts; 544, the same, anterior spiracle; 545, *L. fumosa,* posterior spiracle; 546, the same, mouthparts; 547, the same, anterior spiracle. 548–559, Piophilidae: 548, *Neottiophilum praeustum,* posterior spiracle; 549, the same, whole larva with enlarged detail of anterior spiracles; 550, the same, mouthparts; 551, the same, second instar larva; 552, *Piophila casei* whole larva with enlarged detail of posterior segment; 553, the same, posterior spiracle; 554, the same, anterior spiracle; 555, *P. bipunctatus,* anterior spiracle; 556, *P. varipes,* the same; 557, *P. foveolata,* the same; 558, *P. vulgaris,* the same; 559, *P. vulgaris,* mouthparts.



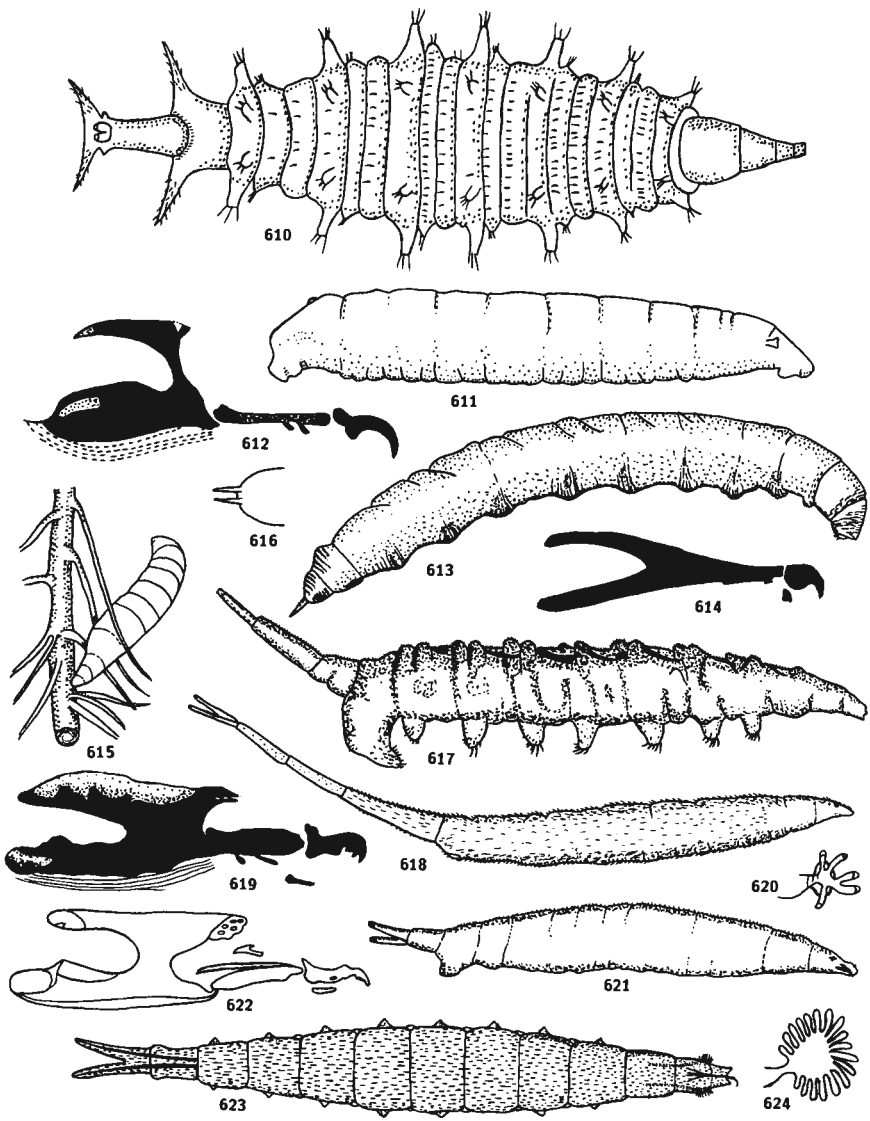
Figs 560–577. Larvae. 560–563, Piophilidae: 560, *Centrophlebomyia furcata;* 561, the same, posterior spiracle; 562, the same, mouthparts; 563, the same, anterior spiracle. 564–577, Opomyzidae: 564, *Geomyza tripunctata*; 565, the same, anterior spiracle; 566, the same, mouthparts; 567, *G. balachowskyi,* mouthparts; 568, the same, anterior spiracle; 569, *Opomyza petrei;* 570, the same, anterior spiracle; 571, the same, mouthparts; 572, *O. florum,* mouthparts; 573, the same, posterior spiracle; 574, the same, dorsal; 575, the same, anterior spiracle; 576, *O. germinationis,* mouthparts; 577, the same, anterior spiracle.



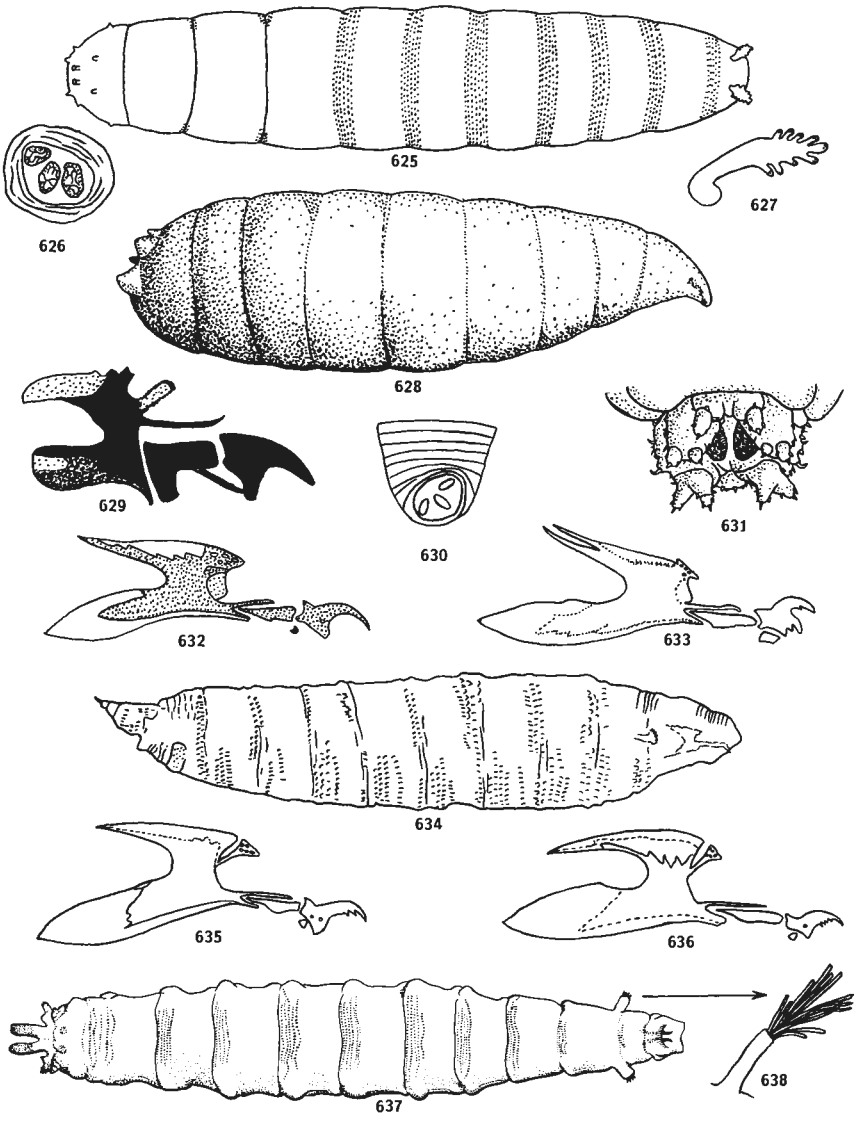
Figs 578–592. Larvae. 578, Clusiidae: *Clusiodes gentilis,* mouthparts in outline. 579–585, Odiniidae: 579, *Odinia meijerei,* mouthparts; 580, the same, whole larva; 581, the same, ventral 'creeping welt' of third abdominal segment; 582, *O. xanthocera,* posterior spiracle; 583, the same, anterior spiracle; 584, the same, anal segment, end view; 585, the same mouthparts. 586–589, Carnidae: 586, *Meoneura obscurella,* third stage larva (outline only from poor photograph in Engel, 1930); 587, the same, posterior spiracle; 588, the same, anterior spiracle; 589, the same, mouthparts. 590-591, Aulacigastridae: 590, *Aulacigaster leucopeza,* arrow shows enlarged detail of anterior spiracle; 591, the same, mouthparts. 592, Stenomicridae: *Stenomicra,* dorsal (from pineapple plant, Hawaii).



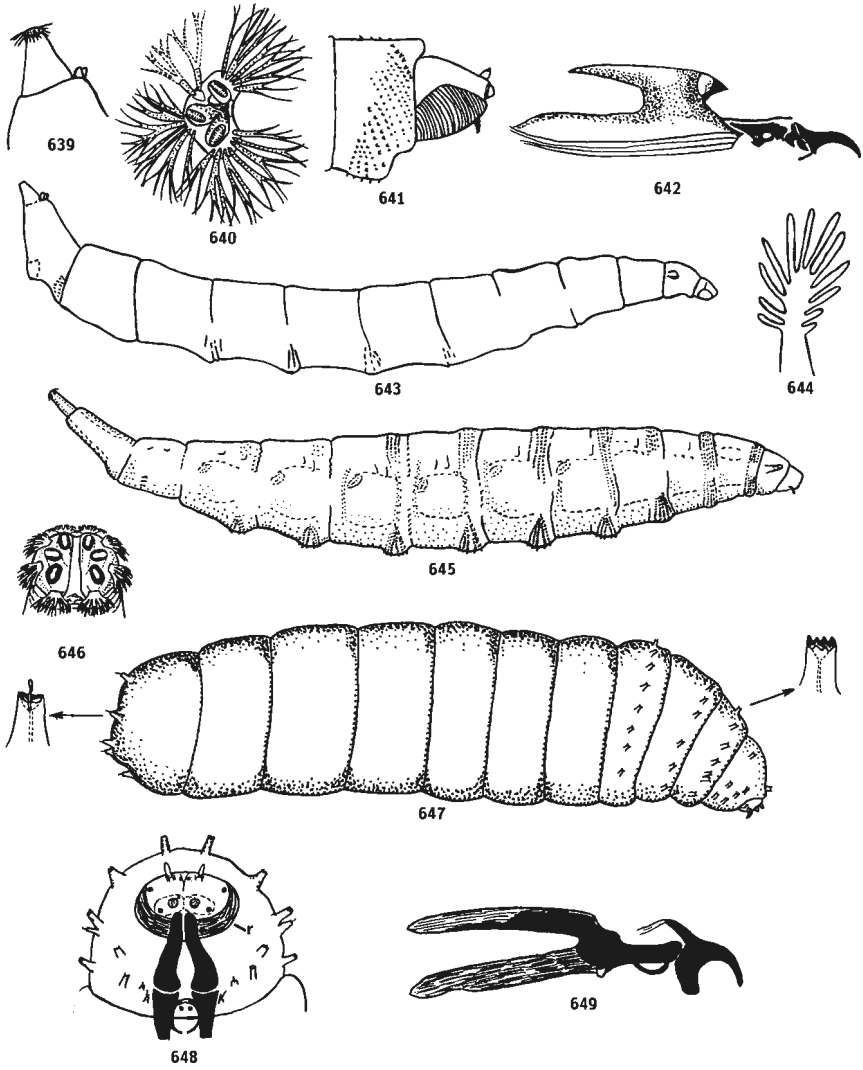
Figs 593–609. Larvae. 593, Periscelididae, *Periscelis annulata,* dorsal. 594–606, Anthomyzidae: 594, *Anthomyza sabulosa;* 595, the same, end segment, ventral; 596, the same, mouthparts; 597, the same, anterior spiracle; 598, *A. gracilis,* end segment; 599, the same, whole larva, dorsal; 600, the same, mouthparts; 601, the same, anterior spiracle; 602, the same, anterior end, ventral; 603, *Paranthomyza nitida,* posterior spiracle; lateral; 604, the same, end view; 605, the same, mouthparts; 606, the same, anterior spiracle. 607–609, Diastatidae: 607, *?Campichoeta punctum,* anal end, lateral; 608, the same, dorsal; 609, the same, end view.



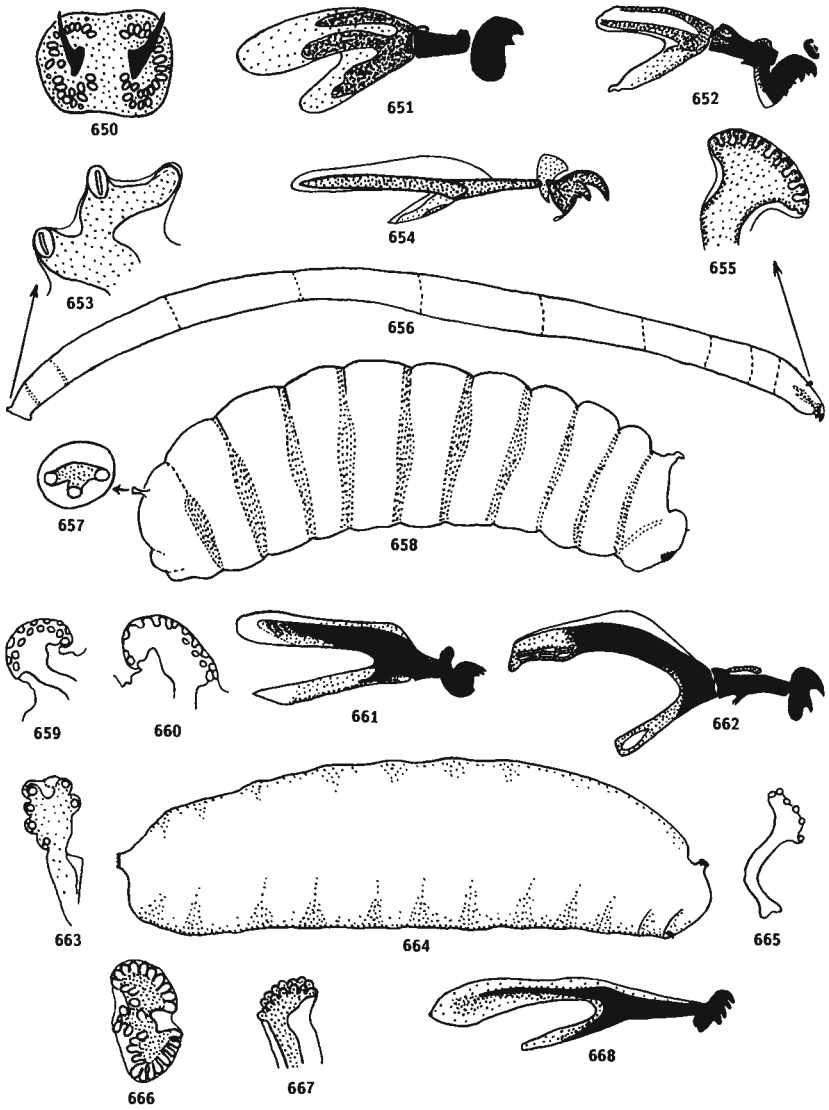
Figs 610–624. Ephydridae larvae: 610, *Discomyza incurva,* dorsal; 611, *Discocerina obscurella;* 612, the same, mouthparts; 613, *Hydrellia nasturtii;* 614, *H. modesta,* mouthparts; 615, *Notiphila riparia;* 616, the same, posterior spiracles everted; 617, *Setacera micans;* 618, *Ochthera mantis;* 619, *Scatella silacea,* mouthparts; 620, the same, anterior spiracle; 621, the same, whole larva; 622, *Teichomyza fusca,* mouthparts; 623, the same, whole larva, dorsal; 624, the same, anterior spiracle.



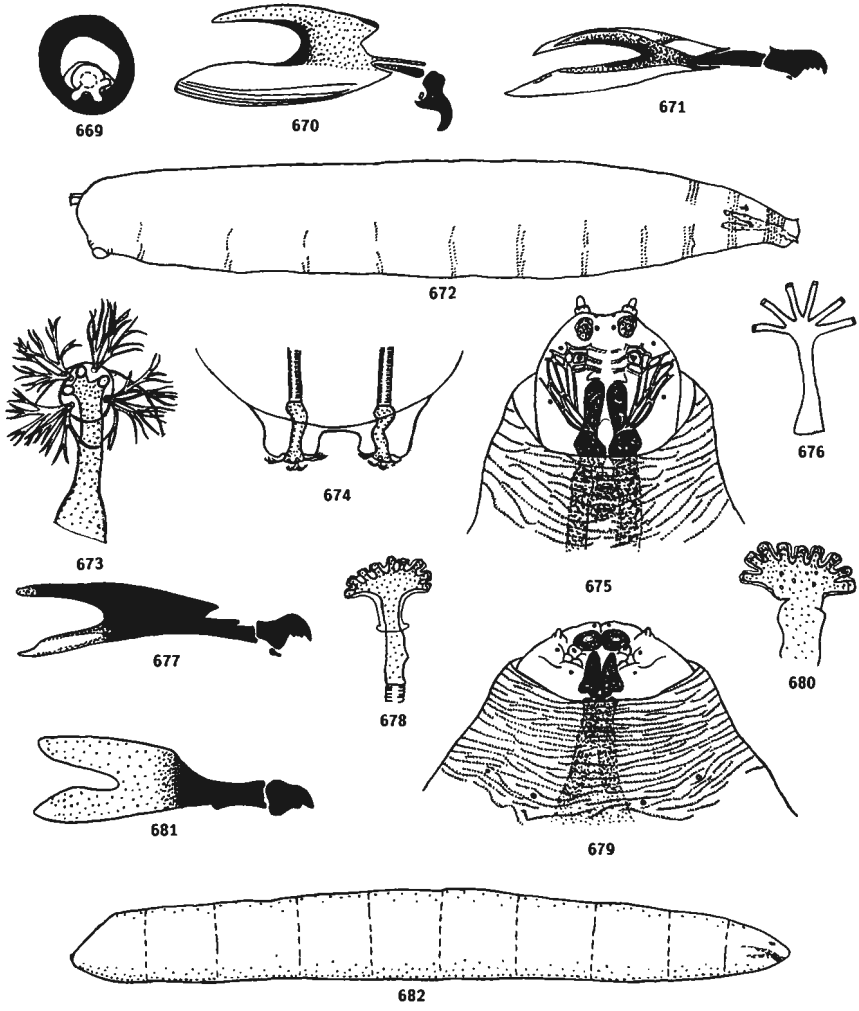
Figs 625–638. Drosophilidae larvae: 625, *Steganina coleoptrata,* dorsal; 626, the same, posterior spiracle; 627, the same, anterior spiracle; 628, *Cacoxenus indagator,* larva, lateral; 629, the same, mouthparts; 630, the same, posterior spiracle; 631, the same, anal end of larva, dorsal; 632, *Amiota variegata,* mouthparts; 633, *Scaptomyza graminum,* the same; 634, the same, whole larva; 635, *Drosophila funebris,* mouthparts; 636, *D. busckii,* the same; 637, *Drosophila* larva, ventral; 638, the same, anterior spiracle.



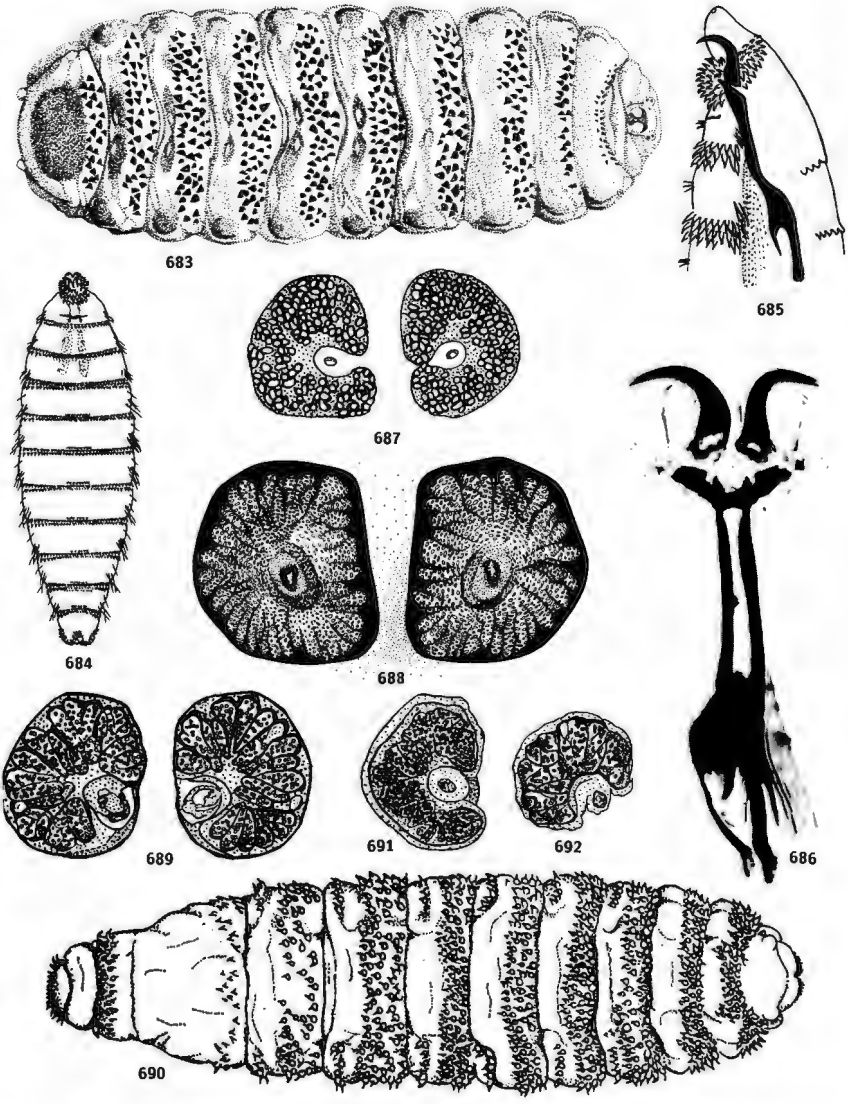
Figs 639–649. Larvae. 639–644, Milichiidae: 639, *Leptometopa latipes*, anal end, lateral; 640, the same, posterior spiracle; 641, the same, head; 642, the same, mouthparts; 643, the same, whole larva; 644, the same, anterior spiracle. 645–646, Canacidae: 645, *Canace macateei* (non British); 646, the same, posterior spiracle. 647–649, Braulidae: 647, *Braula coeca*, lateral, with detail of posterior and anterior sensoria; 648, the same, the same, head, ventral; 649, the same, mouthparts.



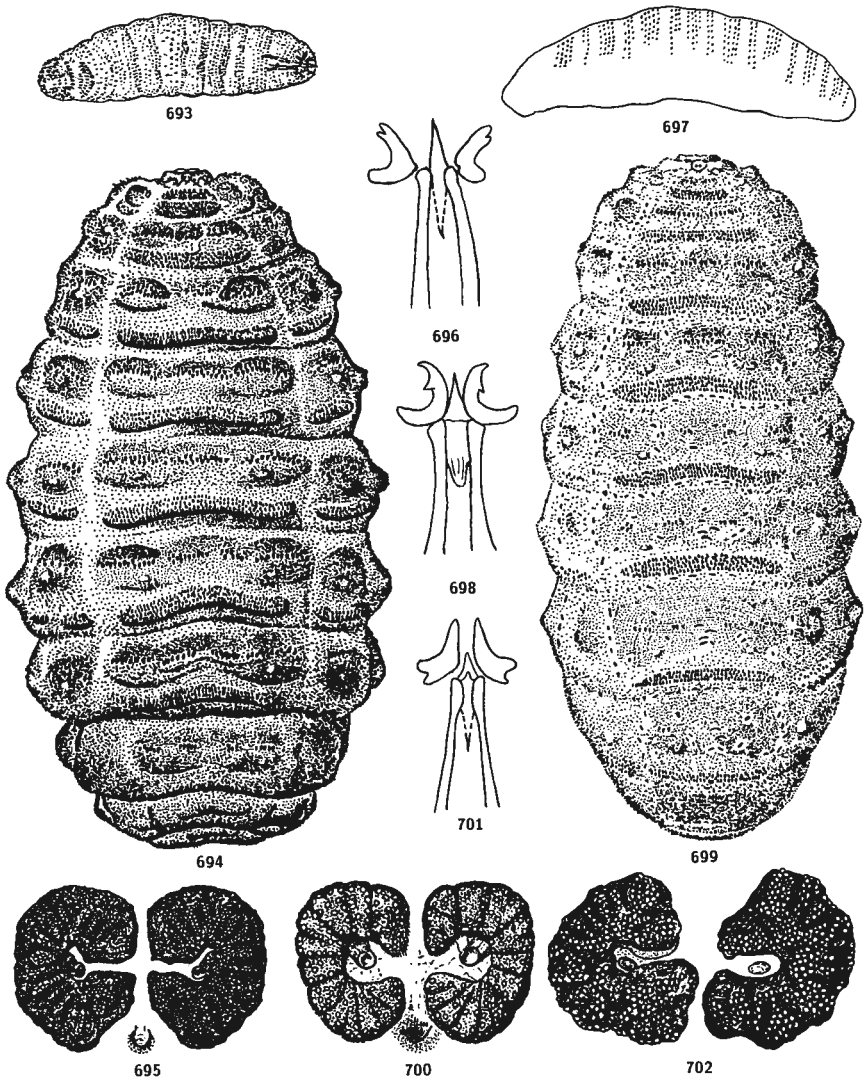
Figs 650–668. Agromyzidae larvae: 650, *Melanagromyza lappae,* posterior spiracles; 651, the same, mouthparts; 652, *Ophiomyia heracleivora,* mouthparts; 653, *Phytobia cambii,* posterior spiracle; 654, the same, mouthparts; 655, the same, anterior spiracle; 656, the same, whole larva; 657, *Liriomyza pusilla,* posterior spiracle; 658, the same, whole larva; 659, *Napomyza lateralis,* posterior spiracle; 660, the same, anterior spiracle; 661, the same, mouthparts; 662, *Phytomyza syngenesiae,* mouthparts; 663, the same, posterior spiracle; 664, *Phytomyza* sp., larva; 665, *P. syngenesiae,* anterior spiracle; 666, *P. rufipes,* posterior spiracle; 667, the same, anterior spiracle; 668, *Cerodontha (Dizygomyza) ireos,* mouthparts.



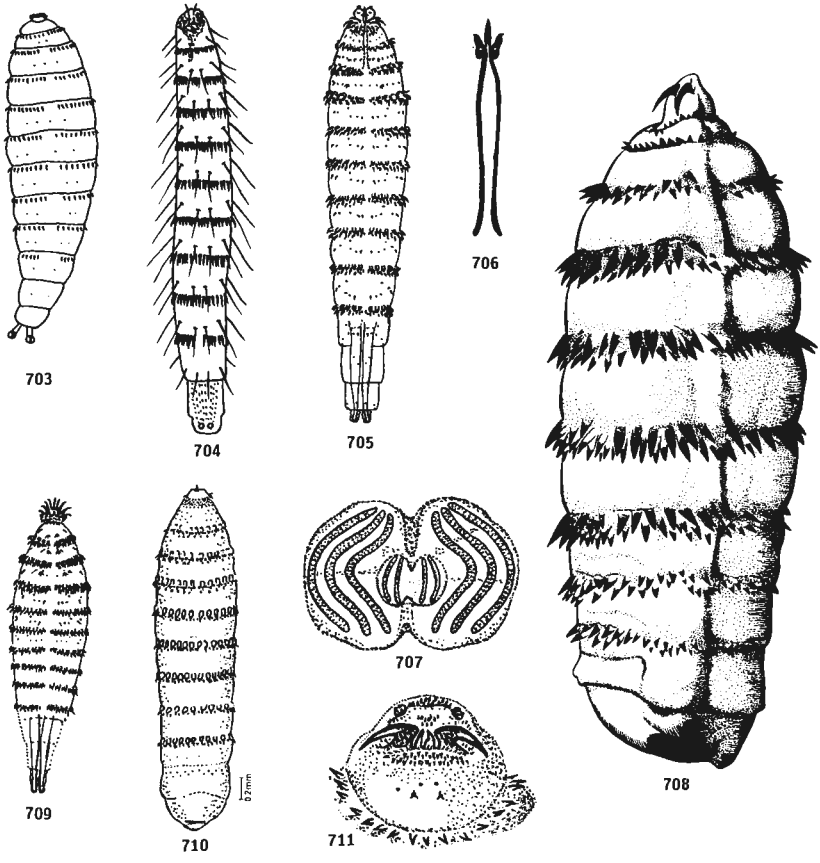
Figs 669–682. Chloropidae larvae: 669, *Gaurax dubius,* posterior spiracle; 670, the same, mouthparts; 671, *Oscinella frit,* mouthparts; 672, the same, whole larva; 673, the same, posterior spiracle; 674, the same, posterior spiracles, dorsal; 675, the same, facial mask; 676, the same, anterior spiracle; 677, *Meromyza variegata,* mouthparts; 678, the same, anterior spiracle; 679, *Chlorops pumilionis,* facial mask; 680, the same, anterior spiracle; 681, the same, mouthparts; 682, the same, whole larva.



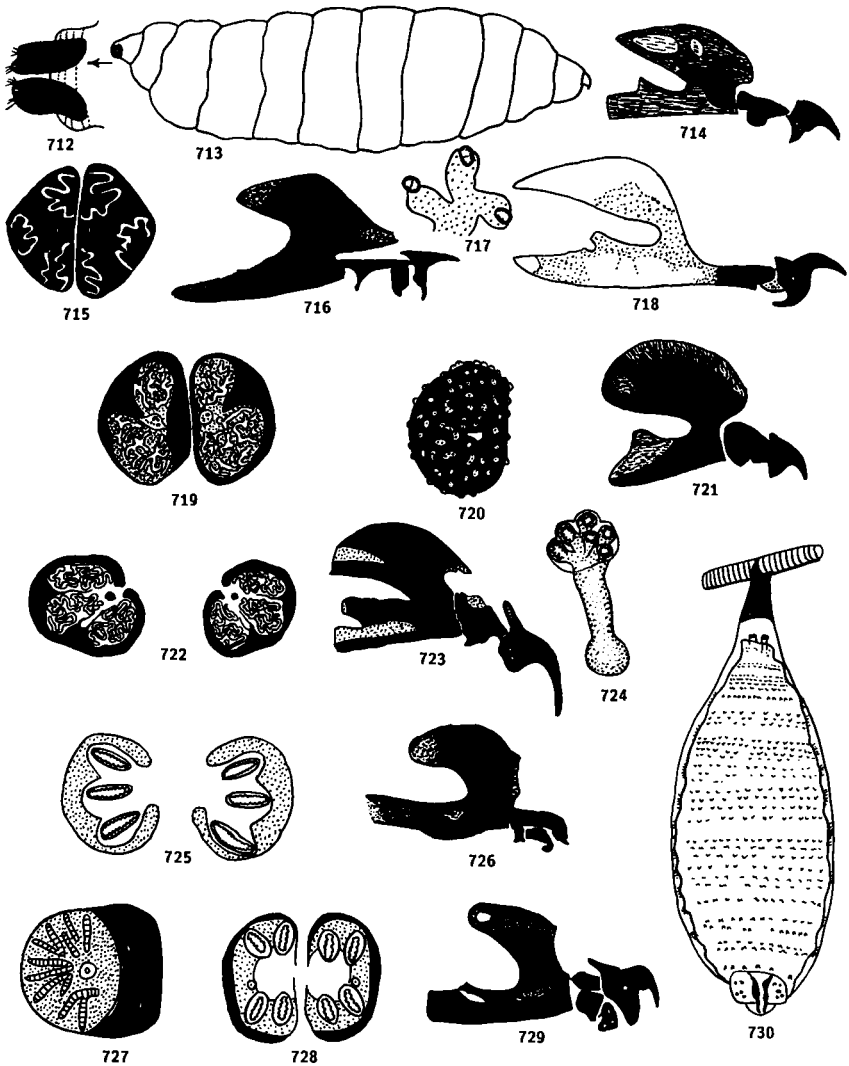
Figs 683–692. Oestridae larvae: 683, *Oestrus ovis*, third instar, ventral; 684, the same, first instar, ventral; 685, the same, head of first instar, lateral; 686, the same, mouthparts of first instar, ventral; 687, the same, posterior spiracles, second instar; 688, the same, third instar; 689, *Cephenemyia auribarbis*, third instar, posterior spiracles; 690, the same, whole larva, dorsal; 691, *C. trompe*, third instar, posterior spiracle; 692, *Pharyngomyia picta*, the same.



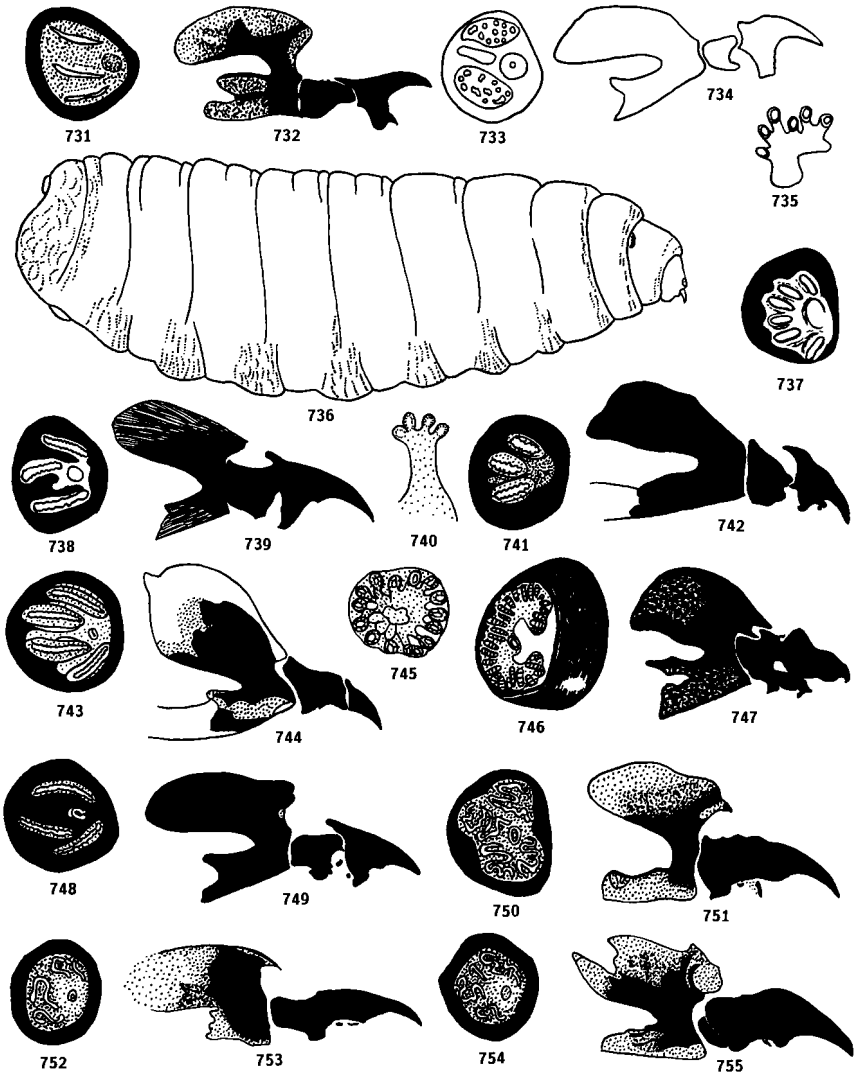
Figs 693–702. Hypodermatidae larvae: 693, *Hypoderma bovis,* first instar, ventral; 694, the same,third instar, dorsal; 695, the same, third instar, posterior spiracles; 696, the same, first instar, mouthparts, ventral; 697, *H. lineatum,* second instar, lateral; 698, the same, first instar, mouthparts, ventral; 699, the same, third instar, dorsal; 700, the same, third instar, posterior spiracles; 701, *H. diana,* first instar, mouthparts, ventral; 702, the same, third instar, posterior spiracles.



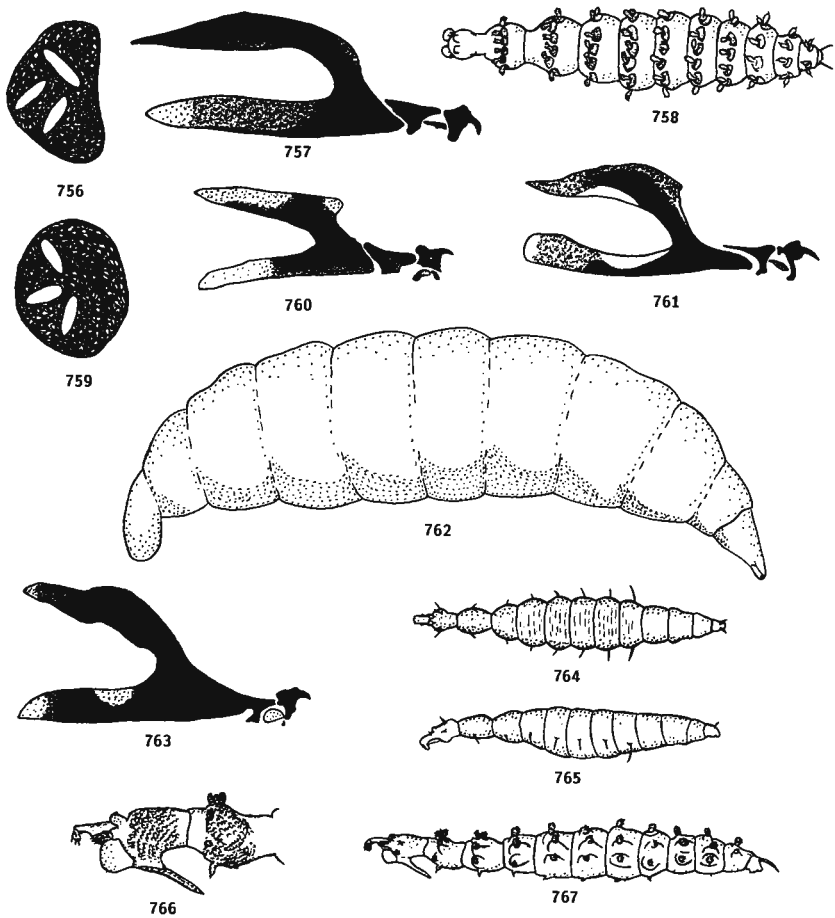
Figs 703–711. Gasterophilidae larvae: 703, *Gasterophilus haemorrhoidalis*, first instar; 704, *G. nasalis*, the same; 705, *G. intestinalis*, the same; 706, the same, mouthparts; 707, the same, third instar, posterior spiracles; 708, the same, third instar, whole larva, lateral; 709, *G. pecorum*, freshly hatched first instar; 710, the same, older first instar; 711, the same, third instar head, ventral.



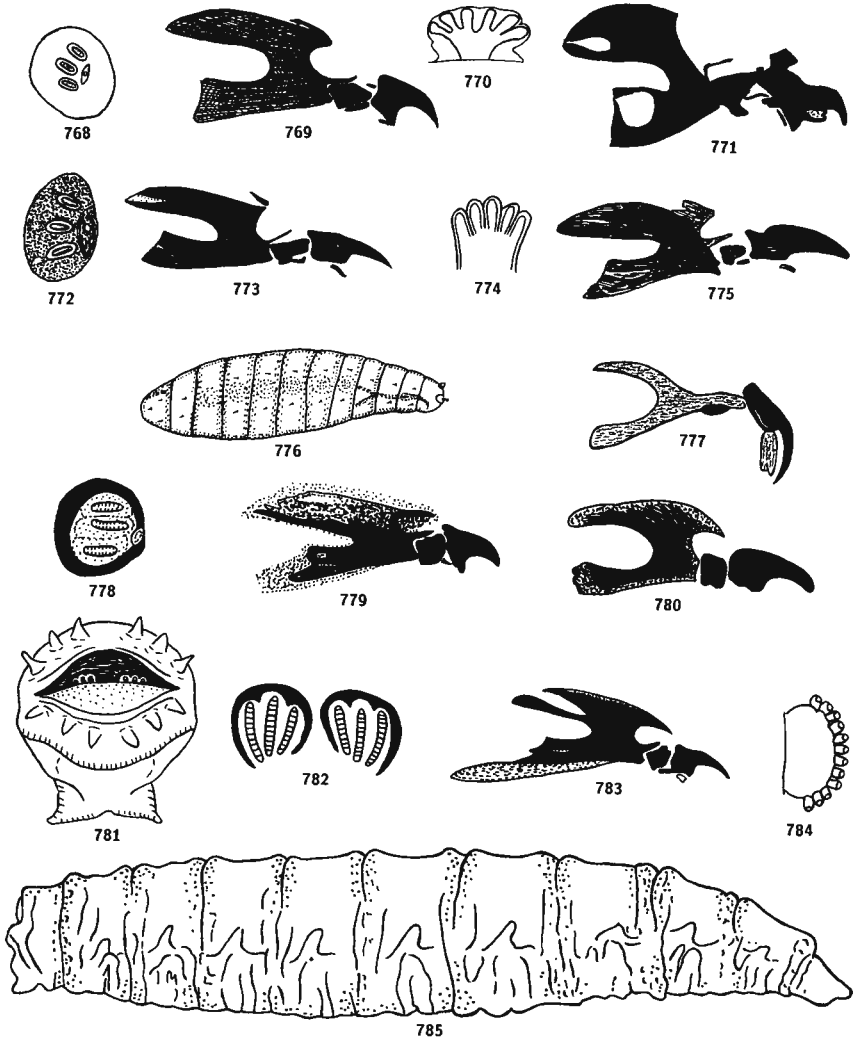
Figs 712–730. Tachinidae larvae: 712, *Cistogaster globosa*, posterior spiracles; 713, the same, whole larva; 714, the same, mouthparts; 715, *Cylindromyia brassicaria*, posterior spiracle; 716, the same, mouthparts; 717, *Microsoma exigua*, posterior spiracle; 718, the same, mouthparts; 719, *Dufouria chalybeata*, posterior spiracles; 720, *Pelatachina tibialis*, posterior spiracle; 721, the same, mouthparts; 722, *Ernestia rudis*, posterior spiracles; 723, *Lypha dubia*, mouthparts; 724, the same, anterior spiracle; 725, the same, posterior spiracle; 726, *Triarthria setipennis*, mouthparts; 727, the same, posterior spiracle; 728, *Siphona geniculata*, posterior spiracles; 729, the same, mouthparts; 730, the same, third stage larva attached to a tracheal trunk of the host by means of a chitinous sheath from which its anterior end is protruding.



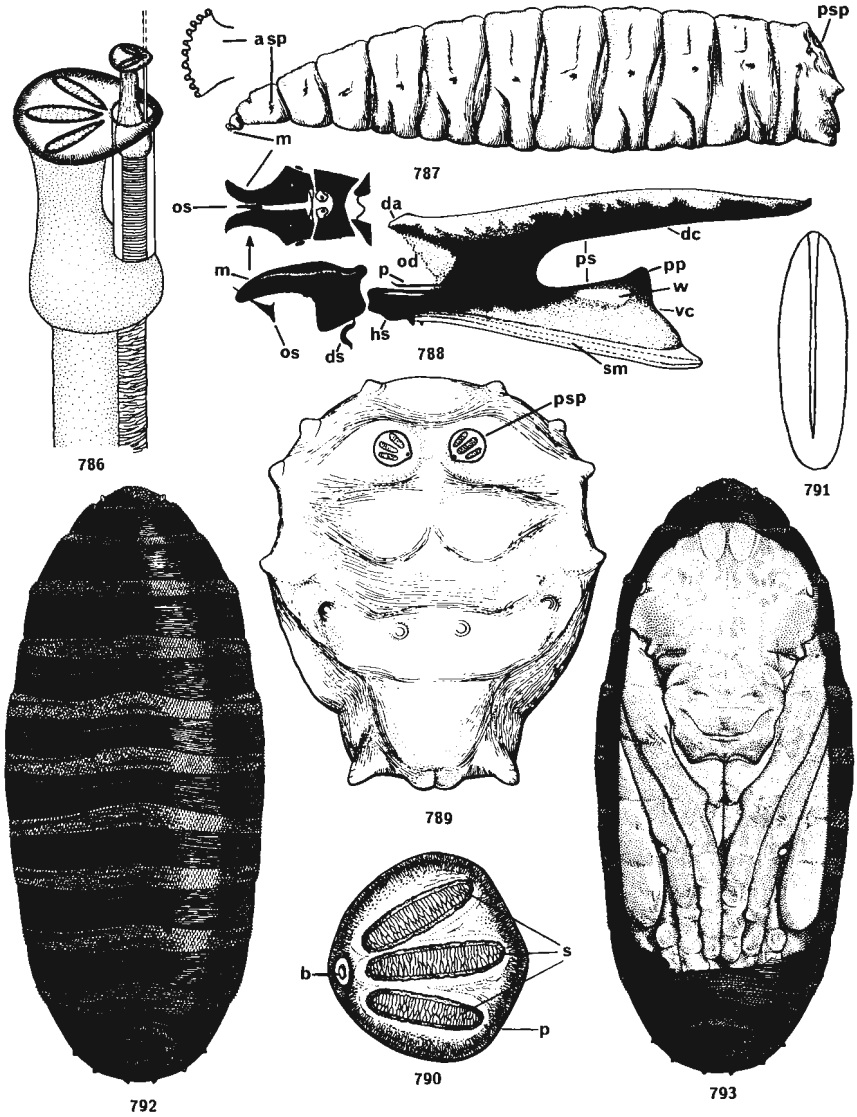
Figs 731–755. Tachinidae larvae: 731, *Compsilura concinnata*, posterior spiracle; 732, the same, mouthparts; 733, *Meigenia mutabilis*, posterior spiracle; 734, the same, mouthparts (outline only); 735, the same, anterior spiracle; 736, the same, whole larva; 737, *Zaira cinerea*, posterior spiracle; 738, *Exorista larvarum*, posterior spiracle; 739, the same, mouthparts; 740, the same, anterior spiracle; 741, *Nemorilla floralis*, posterior spiracle; 742, the same, mouthparts; 743, *Eurysthaea scutellaris*, posterior spiracle; 744, the same, mouthparts; 745, the same, posterior spiracle; 746, *Ocytata pallipes*, posterior spiracle; 747, the same, mouthparts; 748, *Senometopia excisa*, posterior spiracle; 749, the same, mouthparts; 750, *Epicampocera succincta*, posterior spiracle; 751, the same, mouthparts; 752, *Phryxe nemea*, posterior spiracle; 753, the same, mouthparts; 754, *P. vulgaris*, posterior spiracle; 755, the same, mouthparts.



Figs 756–767. Rhinophoridae larvae: 756, *Phyto melanocephala,* posterior spiracle; 757, the same, mouthparts; 758, *Tricogena rubricosa,* first instar, dorsal; 759, the same, third instar, posterior spiracle; 760, the same, mouthparts; 761, *Paykullia maculata,* mouthparts; 762, the same, whole larva; 763. *Melanophora roralis,* mouthparts; 764, the same, first instar, dorsal; 765, the same, lateral; 766, *Stevenia atramentaria,* seventh and eighth abdominal segments of first instar, lateral; 767, the same, first instar, lateral.



Figs 768–785. Sarcophagidae larvae: 768, *Amobia signatus*, posterior spiracles; 769, the same, mouthparts; 770, the same, anterior spiracle; 771, *Miltogramma punctatum*, mouthparts; 772, *Senotainia conica*, posterior spiracle; 773, the same, mouthparts; 774, the same, anterior spiracle; 775, *Metopia argyrocephala*, mouthparts; 776, *Ptychoneura*, first instar; 777, the same, mouthparts; 778, *Brachicoma devia*, posterior spiracle; 779, the same, mouthparts; 780, *Sarcophila latifrons*, mouthparts; 781, *Sarcophaga cruentata (=haemorrhoidalis)*, posterior view showing spiracles in sunken pit; 782, the same, posterior spiracles; 783, the same, mouthparts; 784, the same, anterior spiracle; 785, the same, whole larva.



Figs 786–793. Cyclorrhapha immature stages. 786, schematic figure of the moulting process of spiracles from second (2 slits) to third (3 slits) instar larva (see also Fig. 704); 787, *Calliphora vicina* (Calliphoridae), third instar larva in lateral view showing anterior spiracle (asp and enlarged inset), posterior spiracle (psp) and mandible (m); 788, the same, cephalopharyngeal skeleton, lateral and (inset above) ventral view, opened out, showing mandibles (m), oral sclerite (os), dental sclerite (ds), hypostomal sclerite (hs), parastomal bar (p), dorsal arch (da), ocular depression (od), pharyngeal sclerite (ps), dorsal cornu (dc), ventral cornu (vc), posterior projection (pp), sieving mechanism (sm), and 'window' (w); 789, the same, end view of larva showing posterior spiracles; 790, the same, posterior spiracle, 'button' (b), slits (s), peritreme (p); 791, the same, egg, showing longitudinal hatching pleat; 792, the same, puparium, ventral; 793, the same, puparium with part of ventral surface removed to show pupa inside.

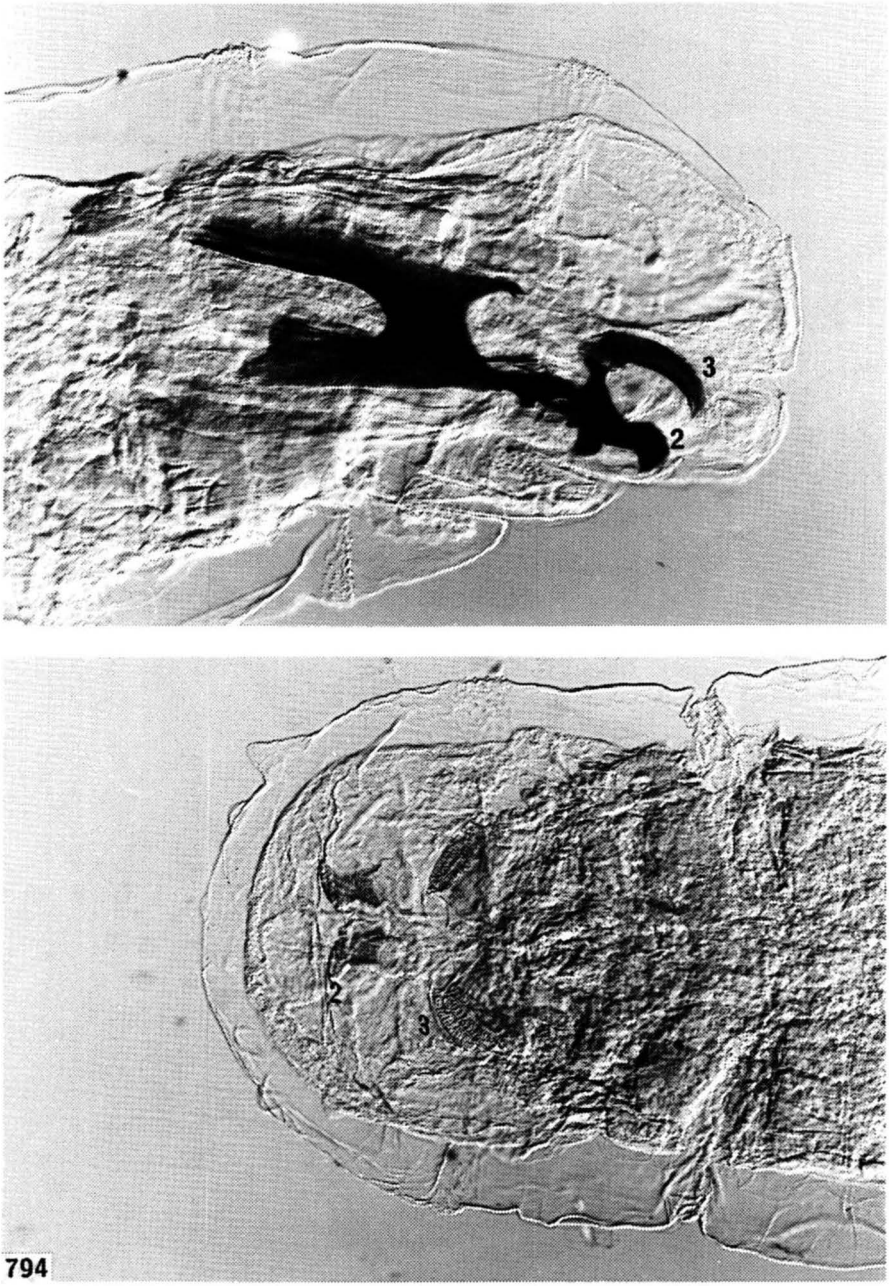
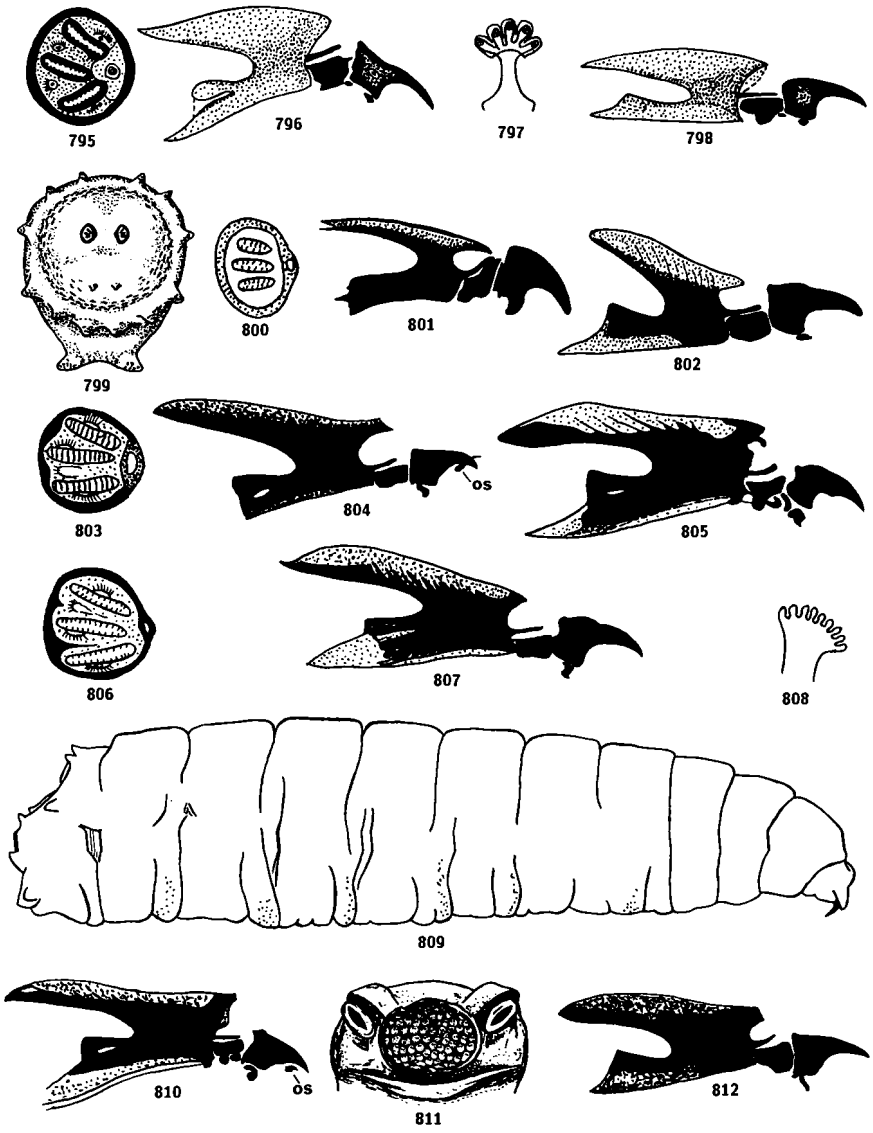
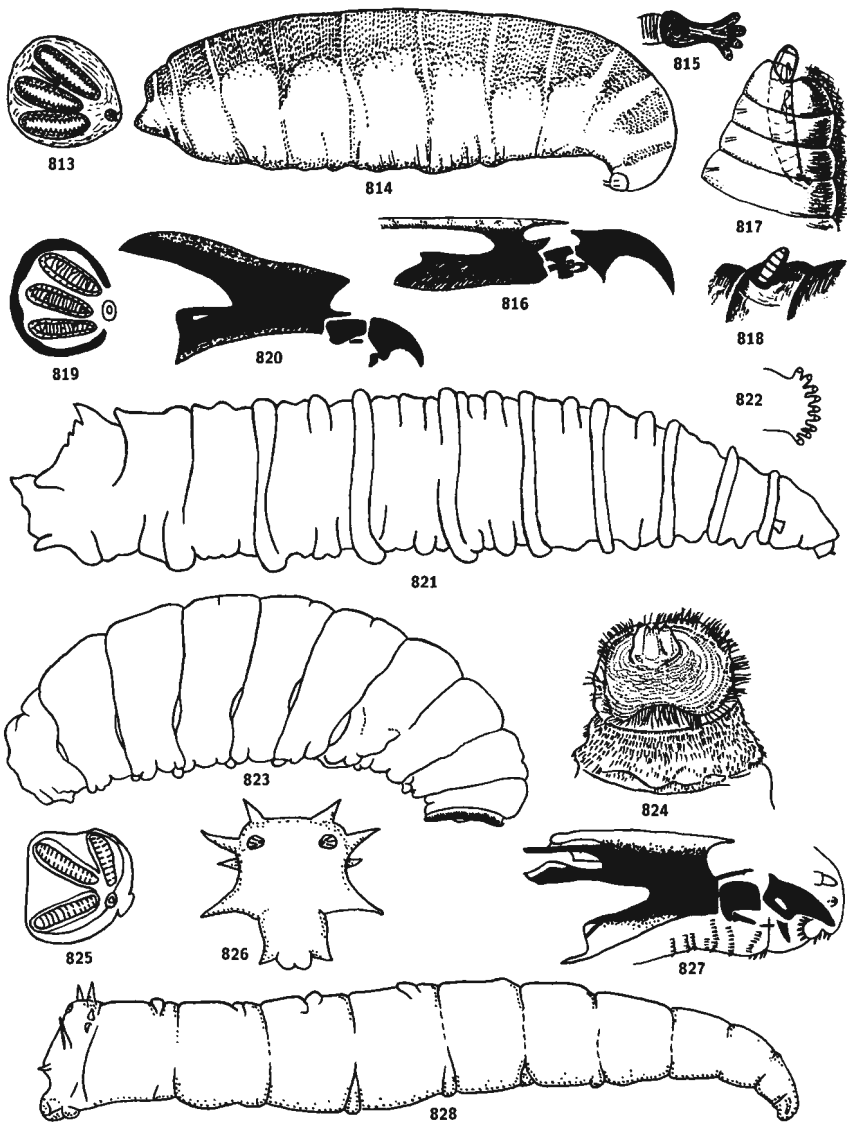


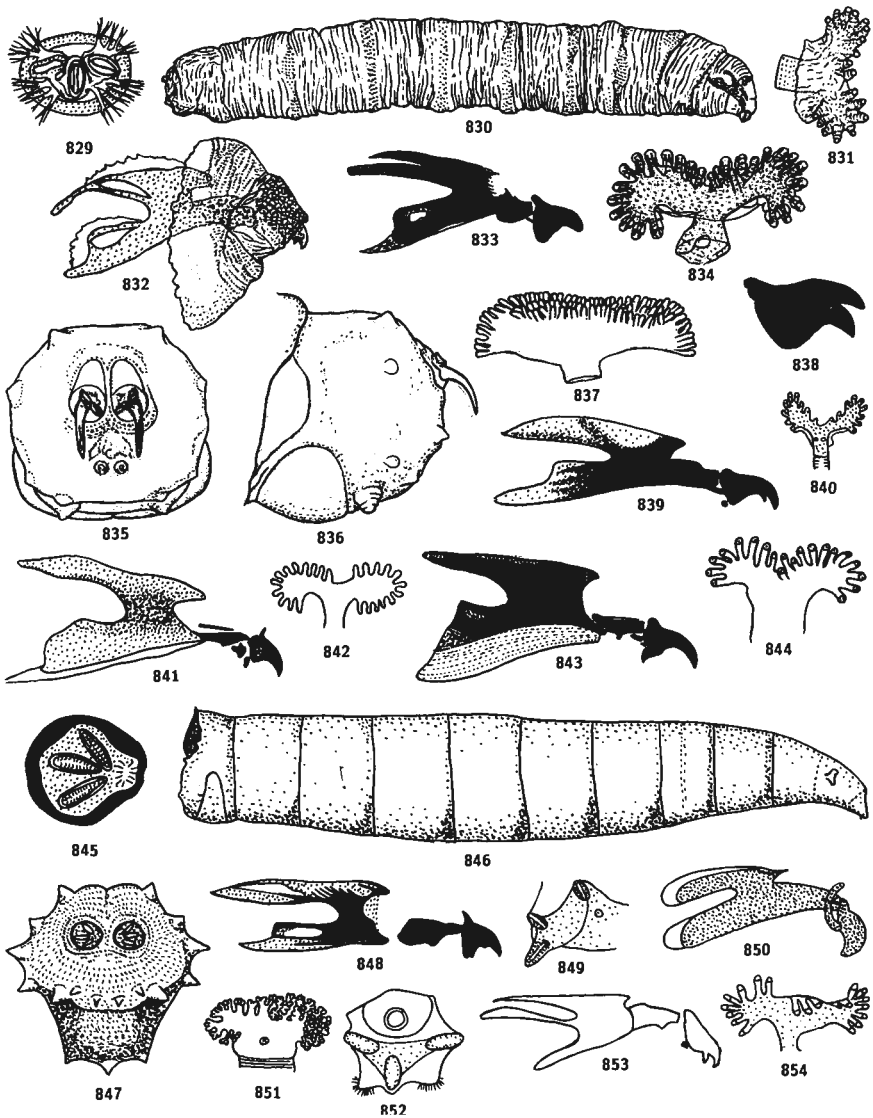
Fig. 794. Larva of *Calliphora vicina* at the stage of second (2) to third (3) instar moult, showing both sets of mouthparts (above, lateral view) and spiracles (below, dorsal view). Photo: Peter York. See also Fig. 786.



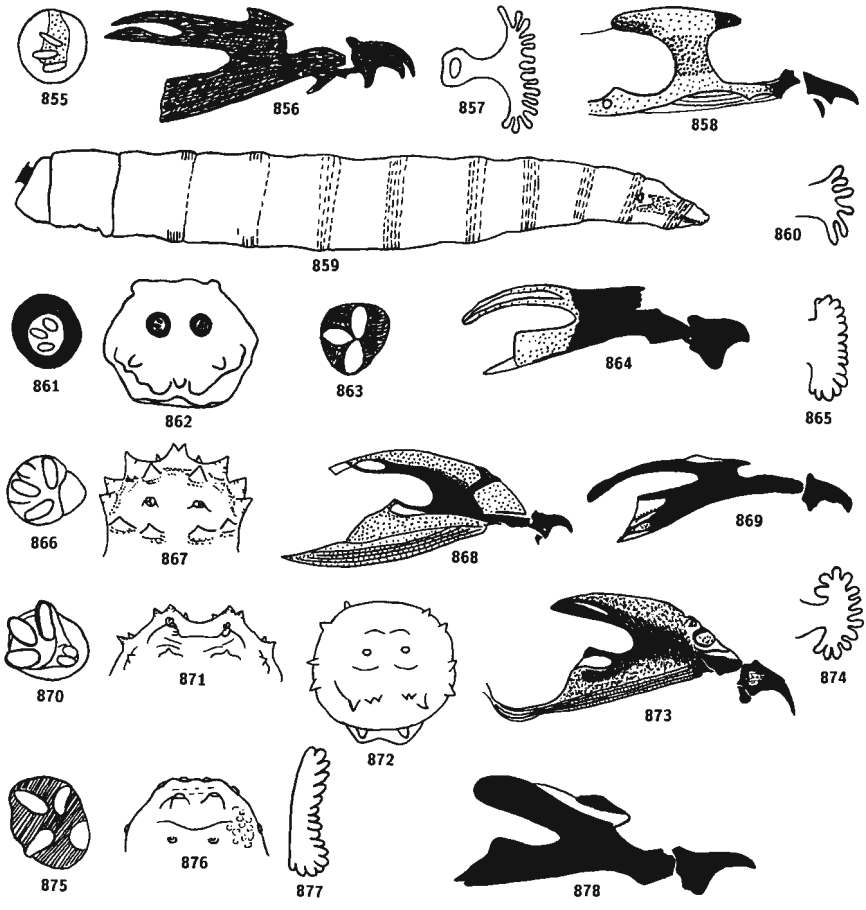
Figs 795–812. Calliphoridae larvae: 795, *Melinda cognata,* posterior spiracle; 796, the same, mouthparts; 797, the same, anterior spiracle; 798, *M. gentilis,* mouthparts; 799, *Bellardia agilis,* posterior view of larva; 800, the same, posterior spiracle; 801, the same, mouthparts; 802, *B. pusilla,* mouthparts; 803, *Cynomya mortuorum,* posterior spiracle; 804, the same, mouthparts (os = oral sclerite); 805, *Lucilia illustris,* mouthparts; 806, *L. sericata,* posterior spiracle; 807, the same, mouthparts; 808, the same, anterior spiracle; 809, the same, whole larva; 810, *L. ampullacea,* mouthparts (os = oral sclerite); 811, *L. bufonivora* larvae in toad; 812, the same, mouthparts.



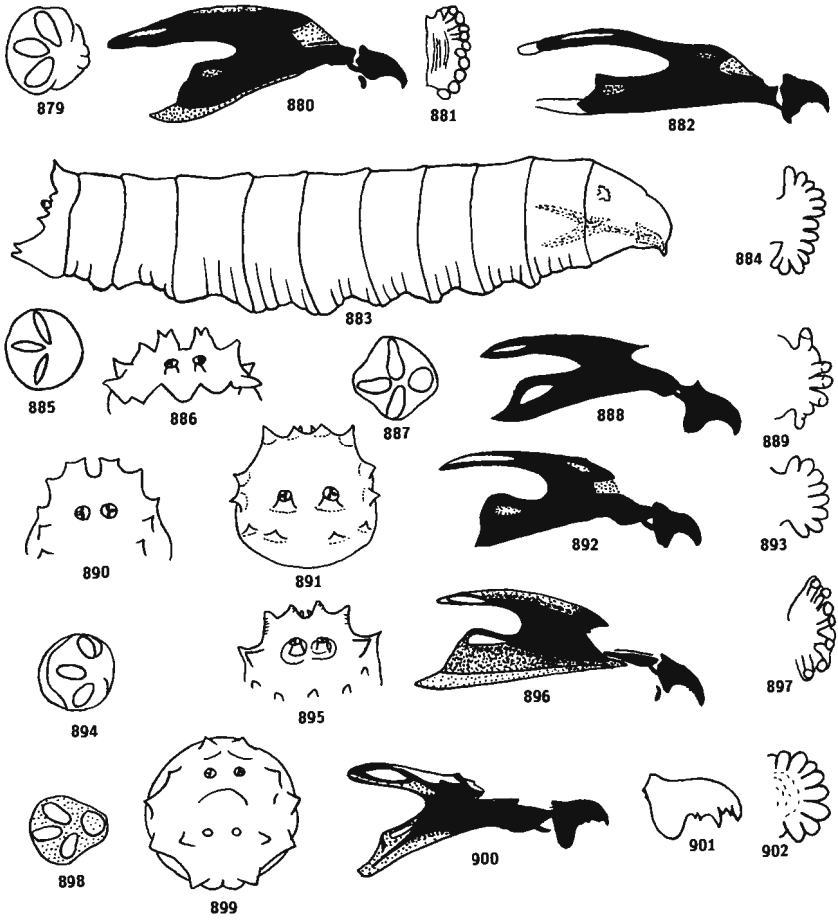
Figs 813–828. Calliphoridae larvae: 813, *Pollenia rudis*, posterior spiracle; 814, the same, whole larva; 815, the same, anterior spiracle; 816, the same, mouthparts; 817, the same, first instar exserting its posterior extremity from the mouth of an earthworm; 818, the same, first instar entering an earthworm via the genital orifice; 819, *Protophormia terranovae*, posterior spiracle; 820, the same, mouthparts; 821, the same, third instar; 822, the same, anterior spiracle; 823, *Protocalliphora*, third instar, uniform covering of denticles not shown; 824, *P. azurea*, anterior end of third instar; 825, *Stomorhina lunata*, posterior spiracle; 826, the same, larva in posterior view; 827, the same, mouthparts; 828, the same, whole larva.



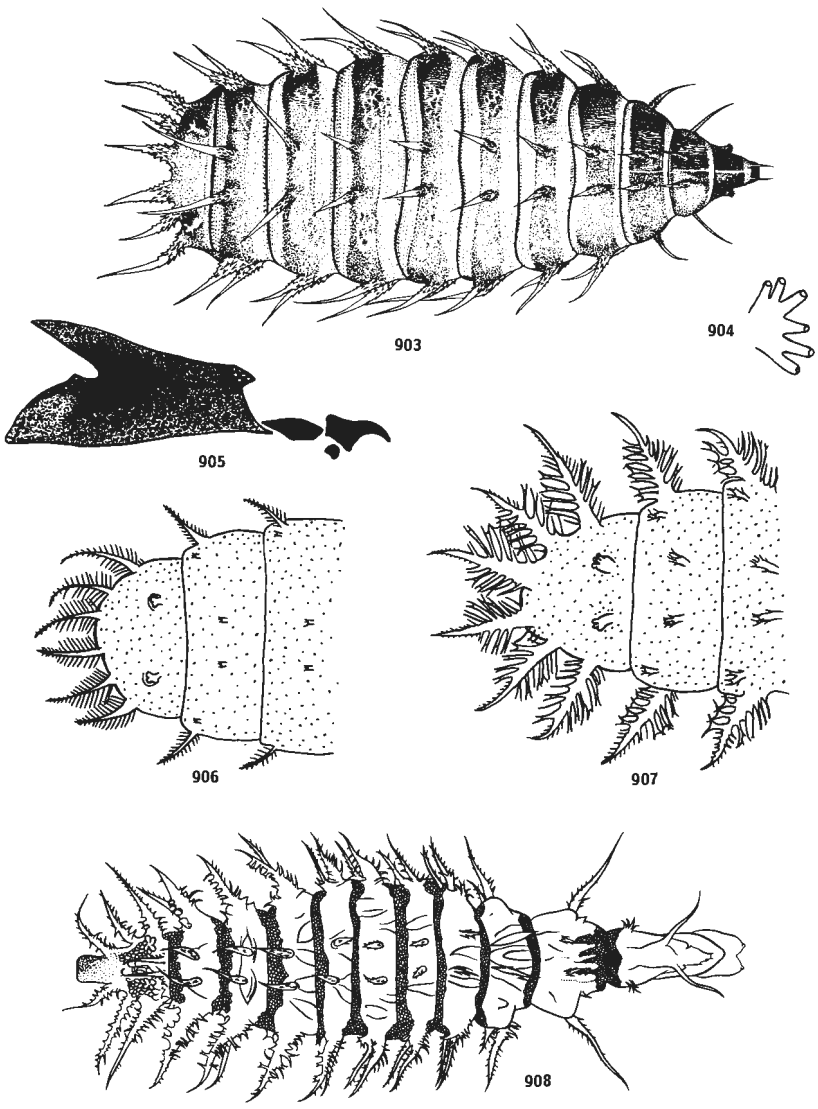
Figs 829–854. Scathophagidae larvae: 829, *Norellia spinipes,* posterior spiracle; 830, the same, whole larva; 831, the same, anterior spiracle; 832, the same, head and mouthparts; 833, *Norellisoma spinimanum,* mouthparts; 834, the same, anterior spiracle; 835, *Cordilura pudica,* last segment, end view; 836, the same, lateral; 837, the same, anterior spiracle; 838, *Cordilura,* bifid mouthhook; 839, *Nanna armillata,* mouthparts; 840, the same, anterior spiracle; 841, *Spaziphora hydromyzina,* mouthparts; 842, the same, anterior spiracle; 843, *Scathophaga stercoraria,* mouthparts; 844, the same, anterior spiracle; 845, the same, posterior spiracle; 846, the same, whole larva; 847, the same, end view; 848, *Gimnomera tarsea,* mouthparts; 849, *Hydromyza livens,* posterior spiracle; 850, the same, mouthparts; 851, the same, anterior spiracle; 852, *Delina nigrita,* posterior spiracle; 853, the same, mouthparts; 854, the same, anterior spiracle.



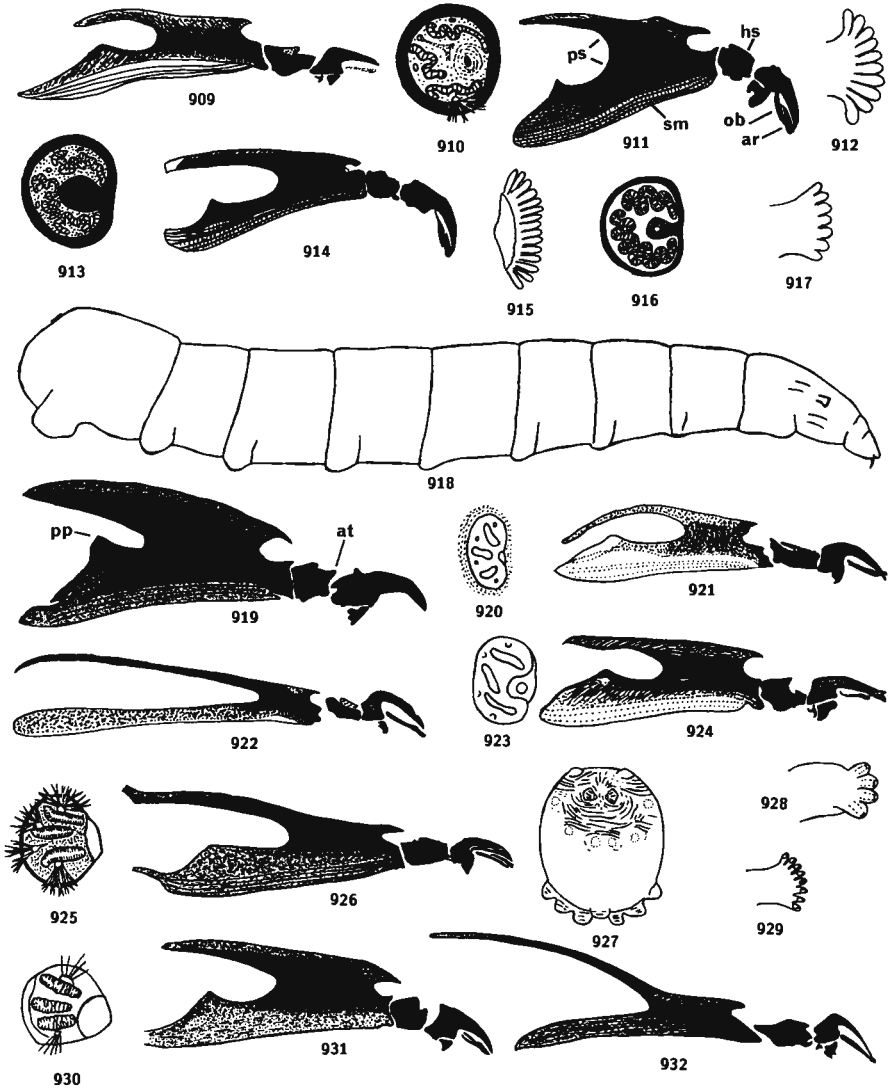
Figs 855–878. Anthomyiidae larvae: 855, *Chirosia parvicornis,* posterior spiracle; 856, the same, mouthparts; 857, the same, anterior spiracle; 858, *Fucellia maritima,* mouthparts; 859, the same, whole larva; 860, the same, anterior spiracle; 861, the same, posterior spiracle; 862, the same, last segment, end view; 863, *Chiastocheta trollii,* posterior spiracle; 864, the same, mouthparts; 865, the same, anterior spiracle; 866, *Pegohylemyia fugax,* posterior spiracle; 867, the same, last segment, dorsal, showing arrangement of tubercles; 868, the same, mouthparts; 869, *P. gnava,* mouthparts; 870, the same, posterior spiracle; 871, the same, last segment, dorsal; 872, *Anthomyia procellaris,* last segment, end view; 873, the same, mouthparts; 874, the same, anterior spiracle; 875, *Phorbia securis,* posterior spiracle; 876, the same, last segment, dorsal; 877, the same, anterior spiracle; 878, *Eustalomyia histrio,* mouthparts.



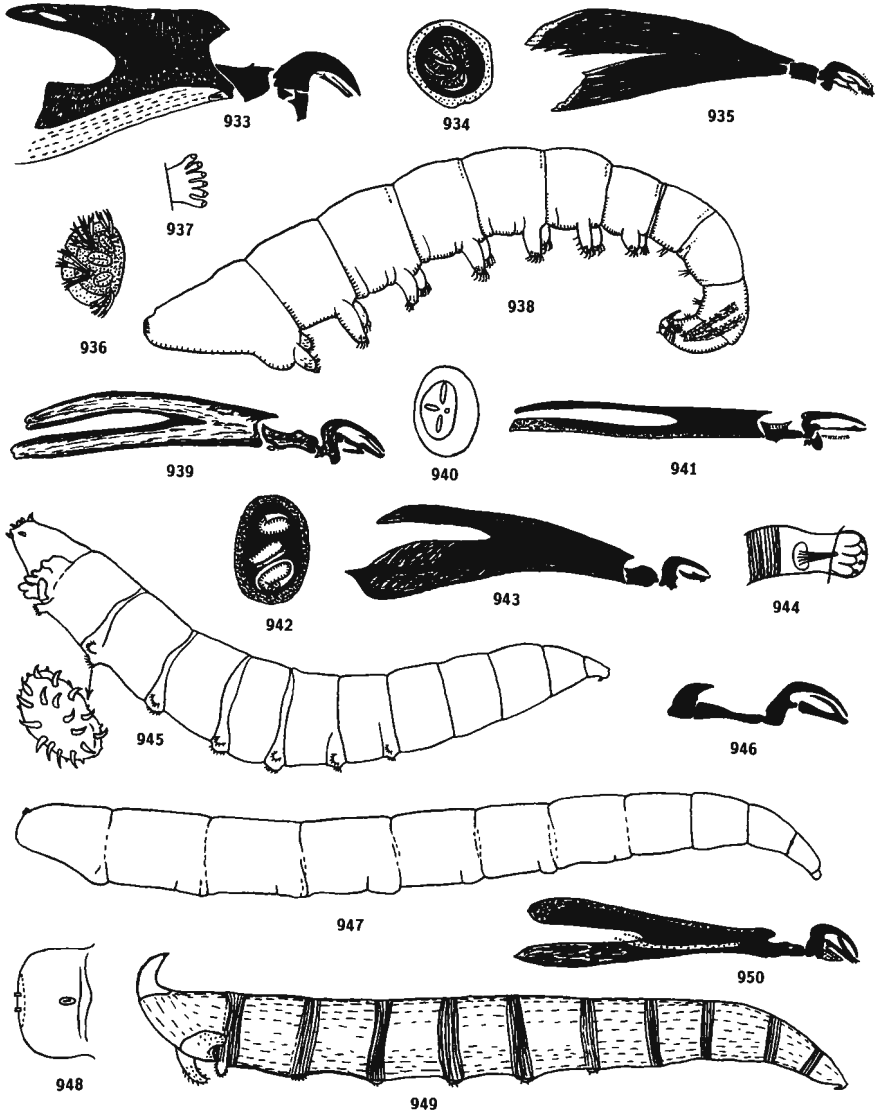
Figs 879–902. Anthomyiidae larvae: 879, *Delia antiqua,* posterior spiracle; 880, the same, mouthparts; 881, the same, anterior spiracle; 882, *D. brassicae,* mouthparts; 883, the same, whole larva; 884, the same, anterior spiracle; 885, the same, posterior spiracle; 886, the same, last segment, dorsal; 887, *D. coarctata,* posterior spiracle; 888, the same, mouthparts; 889, the same, anterior spiracle; 890, the same, last segment, dorsal; 891, *D. echinata,* last segment, dorsal; 892, the same, mouthparts; 893, the same, anterior spiracle; 894, *D. platura,* posterior spiracle; 895, the same, last segment, dorsal; 896, the same, mouthparts; 897, the same, anterior spiracle; 898, *Pegomya hyoscami,* posterior spiracle; 899, the same, last segment, end view; 900, the same, mouthparts; 901, the same, mandible enlarged; 902, the same, anterior spiracle.



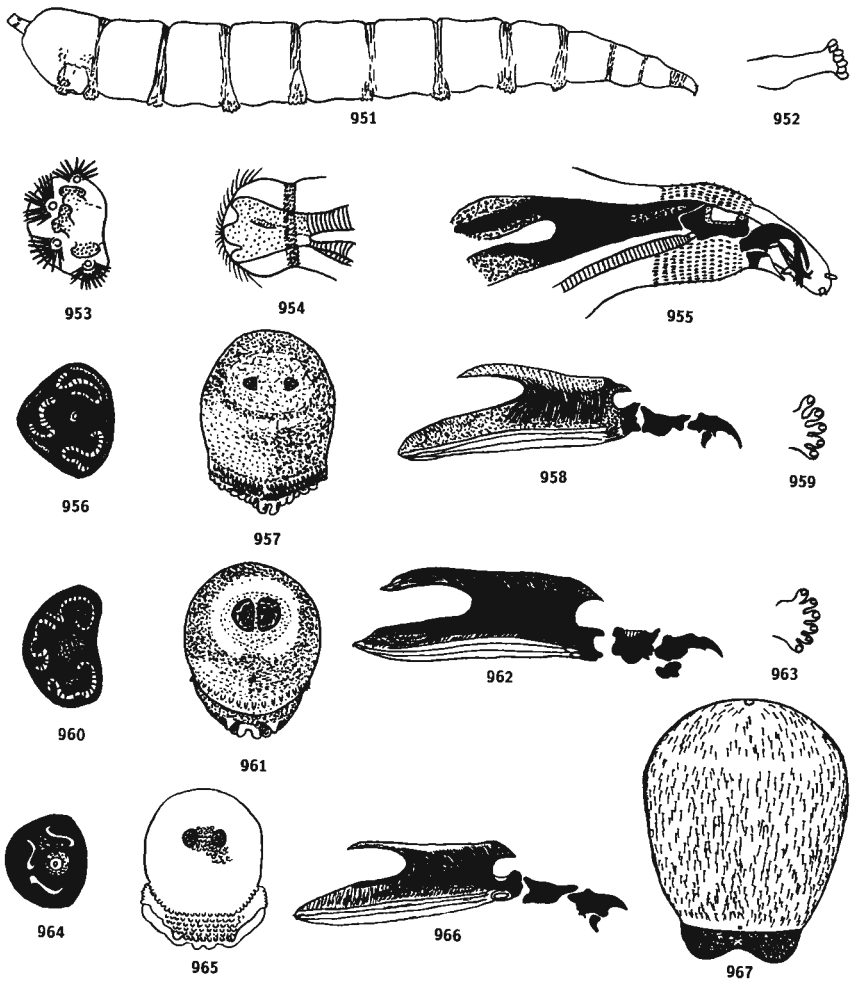
Figs 903–908. Fanniidae larvae: 903, *Fannia canicularis*, dorsal; 904, the same, anterior spiracle; 905, the same, mouthparts; 906, *F. manicata*, posterior end, dorsal; 907, *F. scalaris*, the same; 908, *F. fuscula*, dorsal.



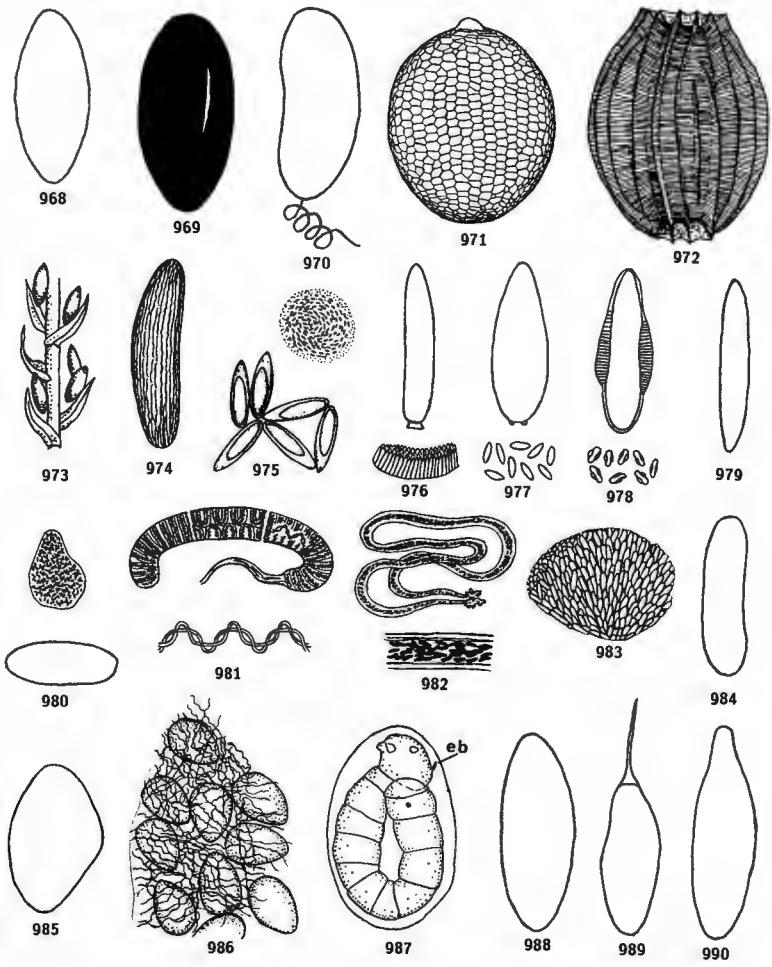
Figs 909–932. Muscidae larvae: 909, *Achanthiptera rohrelliformis,* mouthparts; 910, *Polietes lardaria,* posterior spiracle; 911, the same, mouthparts, ps = pharyngeal sclerite, hs = hypopharyngeal sclerite, sm = sieving mechanism, ob = oral bar, ar = axillary rod; 912, the same, anterior spiracle; 913, *Mesembrina meridiana,* posterior spiracle; 914, the same, mouthparts; 915, the same, anterior spiracle; 916, *Musca domestica,* posterior spiracle; 917, the same, anterior spiracle; 918, the same, whole larva; 919, the same, mouthparts, at = atrial angle, pp = posterior projection; 920, *Azelia cilipes,* posterior spiracle; 921, the same, mouthparts; 922, *Drymeia vicana,* mouthparts; 923, *Potamia littoralis,* posterior spiracle; 924, the same, mouthparts; 925, *Ophyra ignava,* posterior spiracle; 926, the same, mouthparts; 927, the same, end view of larva; 928, the same, anterior spiracle; 929, *Hydrotaea dentipes,* anterior spiracle; 930, the same, posterior spiracle; 931, the same, mouthparts; 932, *H. irritans,* mouthparts.



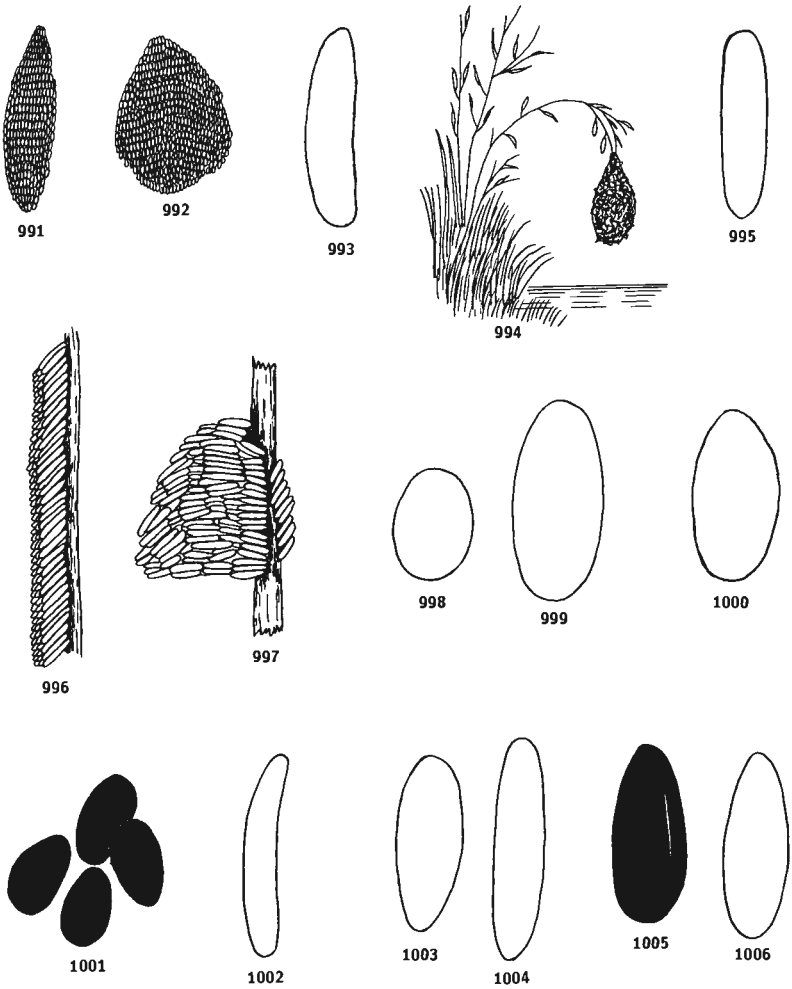
Figs 933–950. Muscidae larvae: 933, *Muscina stabulans,* mouthparts; 934, the same, posterior spiracle; 935, *Phaonia exoleta,* mouthparts; 936, the same, posterior spiracle; 937, the same, anterior spiracle; 938, the same, whole larva; 939, *P. trimaculata,* mouthparts; 940, *Helina pertusa,* posterior spiracle; 941, the same, mouthparts; 942, *Graphomya maculata,* posterior spiracle; 943, the same, mouthparts; 944, the same, anterior spiracle; 945, the same, whole larva; 946, *Villeneuvia aestuum,* mouthparts; 947, the same, whole larva; 948, the same, last segment, ventral; 949, *Limnophora riparia,* whole larva; 950, the same, mouthparts.



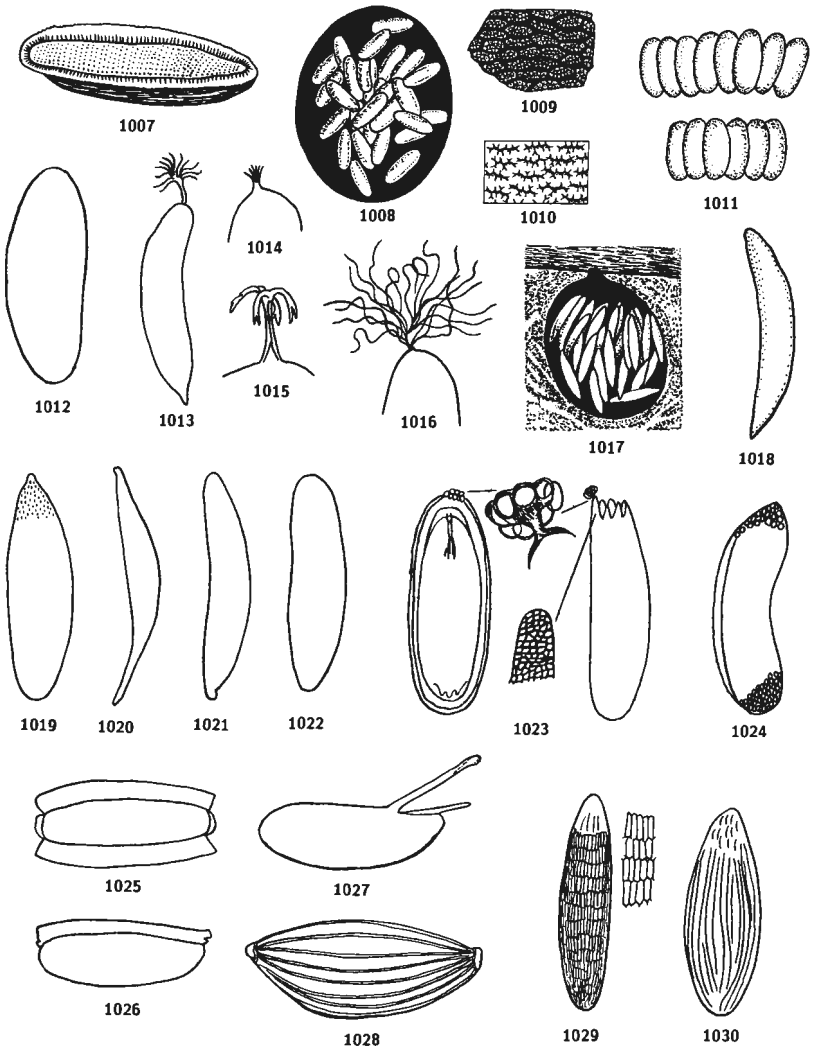
Figs 951–967. Larvae. 951–966, Muscidae: 951, *Lispe consanguinea;* 952, the same, anterior spiracle; 953, the same, posterior spiracle; 954, the same, profile; 955, the same, head and mouthparts; 956, *Stomoxys calcitrans,* posterior spiracle; 957, the same, end view of larva; 958, the same, mouthparts; 959, the same, anterior spiracle; 960, *Haematobia irritans,* posterior spiracle; 961, the same, end view of larva; 962, the same, mouthparts; 963, the same, anterior spiracle; 964, *Haematobosca stimulans,* posterior spiracle; 965, the same, end view of larva; 966, the same, mouthparts. 967, Hippoboscidae, *Olfersia fumipennis* larva, dorsal.



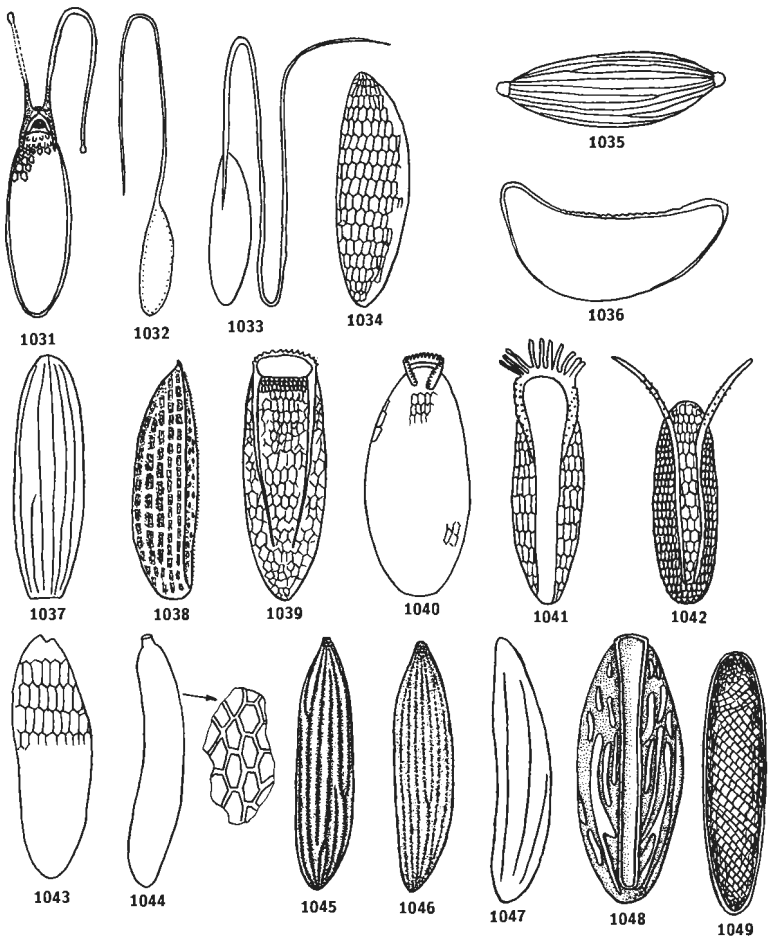
Figs 968–990. Nematocera eggs. 968, Trichoceridae, *Trichocera*. 969–973, Tipulidae: 969, *Tipula paludosa;* 970, *Dolichopeza;* 971, *Limonia nubeculosa;* 972, *L. stigma;* 973, *Phalacrocera replicata,* on moss. 974, Psychodidae, *Telmatoscopus*. 975, Chaoboridae, *Chaoborus,* egg mass above, enlarged detail below. 976–8, Culicidae: 976, *Culex,* single egg above, egg raft below; 977, *Aedes;* 978, *Anopheles*. 979, Ceratopogonidae, *Culicoides*. 980–982, Chironomidae: 980, pear-shaped egg mass (above) and individual egg of *Chironomus;* 981, *Chironomus dorsalis,* egg rope, with detail of twisted fibres which traverse the rope; 982, *Chironomus,* another type of egg mass with enlarged detail of eggs below. 983–984, Bibionidae: 983, *Bibio marci* egg mass; 984, *Dilophus*. 985, Simuliidae, the eccentric ovoid egg of *Simulium*. 986, Anisopodidae, *Sylvicola fenestralis,* part of egg mass. 987, Sciaridae, *Pnyxia scabiei,* egg with first stage larva inside showing egg-burster (eb). 988, Mycetophilidae, *Mycetophila cingulum*. 989–990, Cecidomyiidae: 989, *Contarinia pulchripes;* 990, *Aprostocetus* sp.



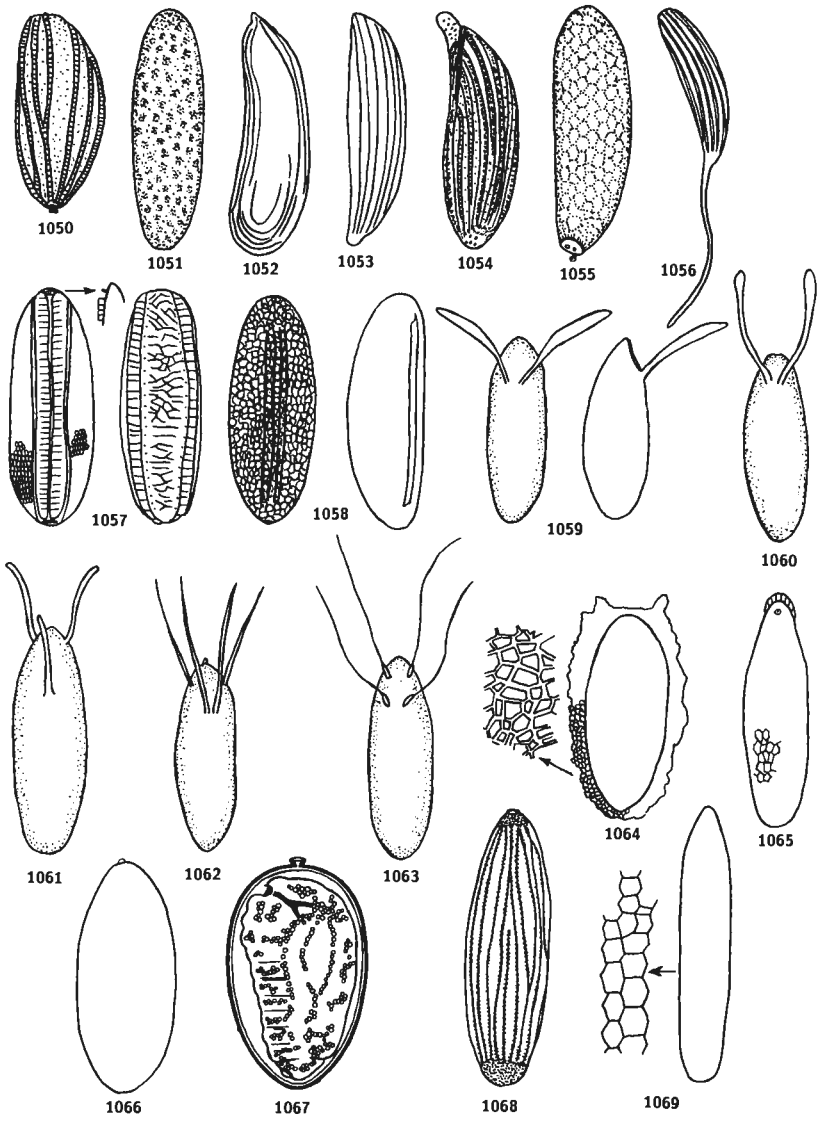
Figs 991–1006. Brachycera eggs. 991–992, Stratiomyidae: 991, egg batch of *Odontomyia;* 992, egg batch of *Stratiomys furcata.* 993, Rhagionidae, egg of *Symphoromyia.* 994–995, Athericidae: 994, *Atherix,* dead bodies of females with egg batches suspended over water; 995, *Atherix,* single egg. 996–997, Tabanidae: 996, egg batch of *Tabanus;* 997, egg batch of *Atylotus.* 998–999, Asilidae: 998, *Leptogaster cylindrica;* 999, *Pamponerus germanicus.* 1000, Scenopinidae, *Scenopinus fenestralis.* 1001, Acroceridae, *Ogcodes.* 1002, Bombyliidae, *Bombylius.* 1003–1004, Empididae: 1003, *Empis opaca;* 1004, *E. tessellata.* 1005–1006, Dolichopodidae: 1005, *Liancalus virens;* 1006, *Dolichopus griseipennis.*



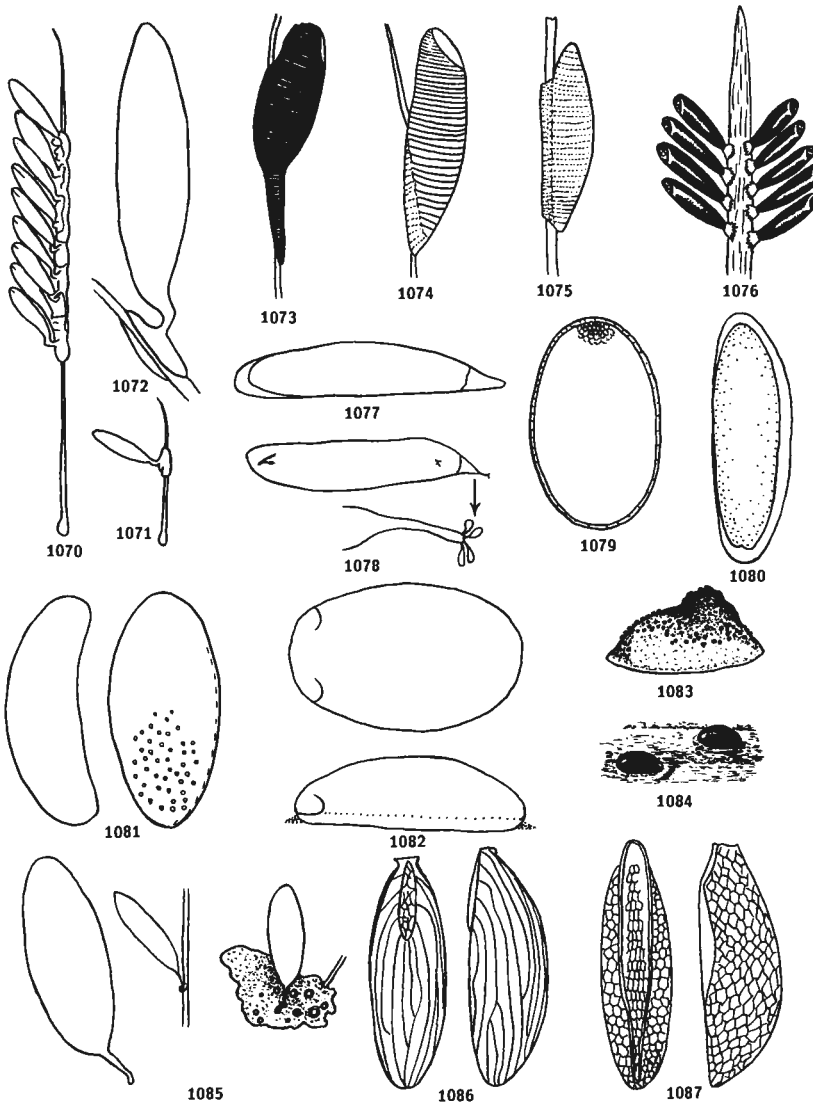
Figs 1007–1030. Cyclorrhapha eggs. 1007, Phoridae, *Megaselia rufipes*. 1008–1012, Syrphidae: 1008, *Syritta pipiens*, batch; 1009, the same, surface sculpture; 1010, *Melanostoma mellinum*, surface sculpture; 1011, the same, batch, 1012, *Merodon equestris*. 1013–1016, Conopidae: 1013, *Conops flavipes;* 1014, *Zodion*, micropyle; 1015, *Sicus ferrugineus*, micropyle; 1016, *Physocephala rufipes*, micropyle. 1017–1020, Tephritidae: 1017, *Ceratitis capitata*, egg chamber; 1018, the same, single egg; 1019, *Rhagoletis alternata;* 1020; *Urophora stylata*. 1021–1022, Otitidae: 1021, *Physiphora demandata;* 1022, *Seioptera vibrans*. 1023, Psilidae, *Psila rosae*, showing micropylar plug (after Ashby & Wright), one of the eight tongues freed from the plug after eclosion and sculpturing (see Introduction). 1024, Helcomyzidae, *Heterocheila buccata*. 1025–1027, Dryomyzidae: 1025, *Dryomyza anilis*, dorsal; 1026, the same, lateral; 1027, *D. flaveola*, lateral. 1028, Lauxaniidae, *Minettia lupulina*. 1029–1030, Chamaemyiidae: 1029, *Chamaemyia juncorum*, with detail of surface sculpture; 1030, *Leucopis melanopus*, the same.



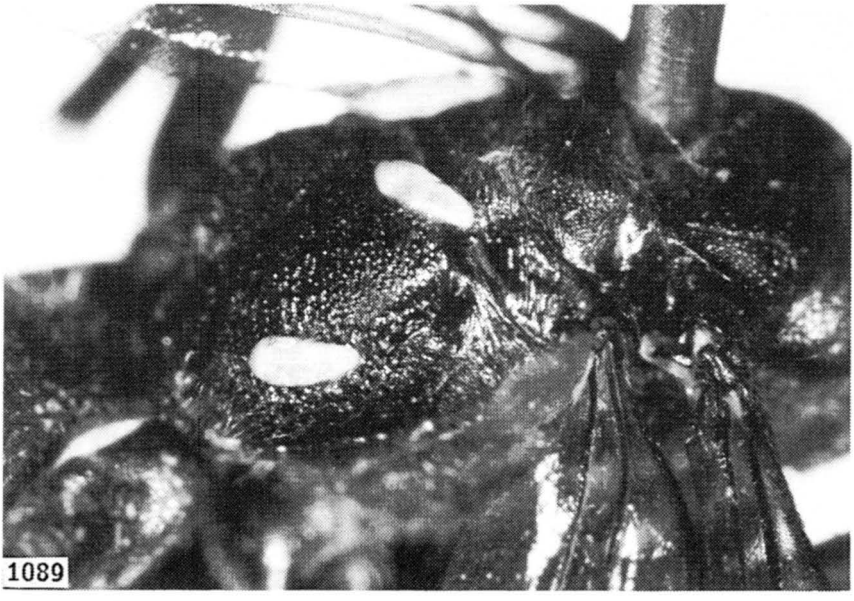
Figs 1031–1049. Cyclorrhapha, Acalyptratae, eggs. 1031–1033, Sepsidae: 1031, *Orygma luctuosum;* 1032, *Sepsis punctum;* 1033, *S. violacea.* 1034–1036, Sciomyzidae: 1034, *Pteromicra;* 1035, *Pherbina coryleti;* 1036, *Antichaeta analis.* 1037–1042, Sphaeroceridae: 1037, *Sphaerocera curvipes;* 1038, *Limosina silvatica;* 1039, *Thoracochaeta zosterae;* 1040, *Leptocera caenosa;* 1041, *Opalimosina* sp; 1042, *Coproica acutangula.* 1043, Lonchaeidae, *Lonchaea chorea.* 1044, Piophilidae, *Piophila casei,* and surface sculpture enlarged. 1045–1046, Opomyzidae: 1045, *Geomyza tripunctata;* 1046, *Opomyza florum.* 1047, Carnidae, *Carnus hemapterus.* 1048, Aulacigastridae, *Aulacigaster leucopeza.* 1049, Stenomicridae, *Stenomicra.*



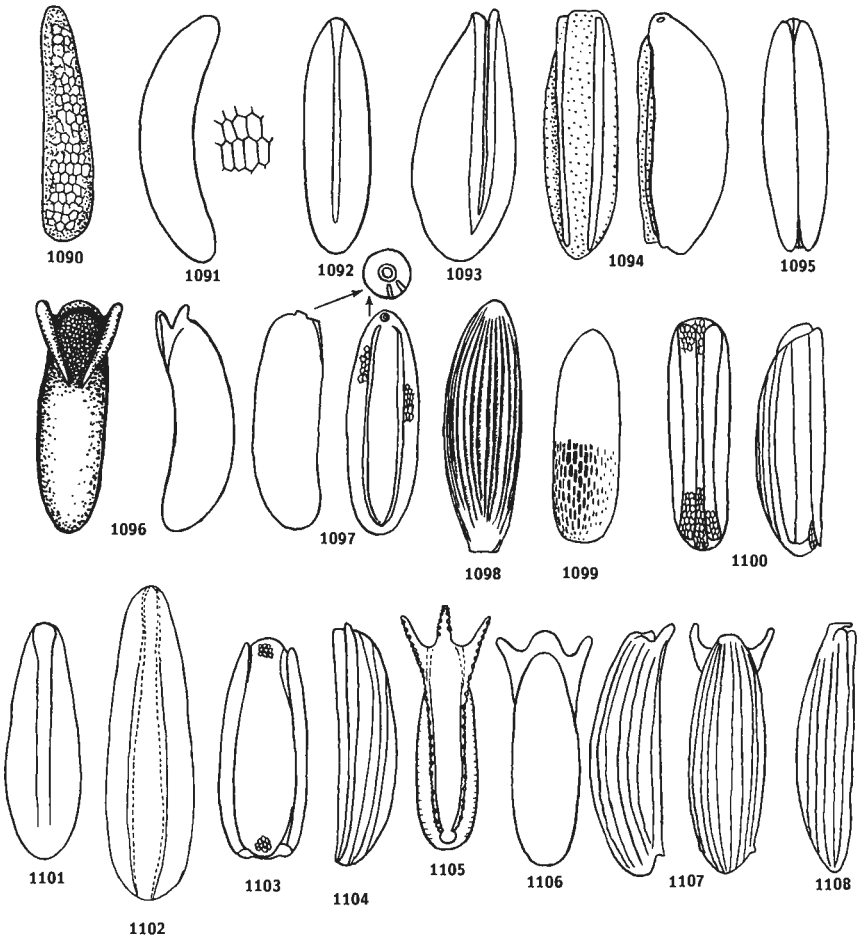
Figs 1050–1069. Cyclorrhapha, Acalyptratae, eggs. 1050–1056, Ephydridae: 1050, *Discocerina obscurella;* 1051, *Notiphila brunnipes;* 1052, *N. annulipes;* 1053, *Hydrellia griseola;* 1054, *Ochthera mantis;* 1055, *Ephydra riparia;* 1056, *Paracoenia fumosa.* 1057–1063, Drosophilidae: 1057, *Amiota variegata,* vela closed, with lateral detail and (right) the same, vela (hatching pleats) open; 1058, *Scaptomyza graminum,* dorsal, and (left) the same, lateral, without sculpture; 1059, *Drosophila melanogaster* (without sculpture), lateral view to right; 1060, *D. subobscura;* 1061, *D. phalerata;* 1062, *D. funebris;* 1063, *D. busckii.* 1064, Braulidae, *Braula coeca,* with detail of sculpture. 1065–1067, Agromyzidae: 1065, *Phytobia cambii;* 1066, *Phytomyza syngenesiae;* 1067, *P. ilicis,* showing larva inside. 1068–1069, Chloropidae: 1068, *Oscinella frit;* 1069, *Chlorops pumilionis,* with detail of surface sculpture.



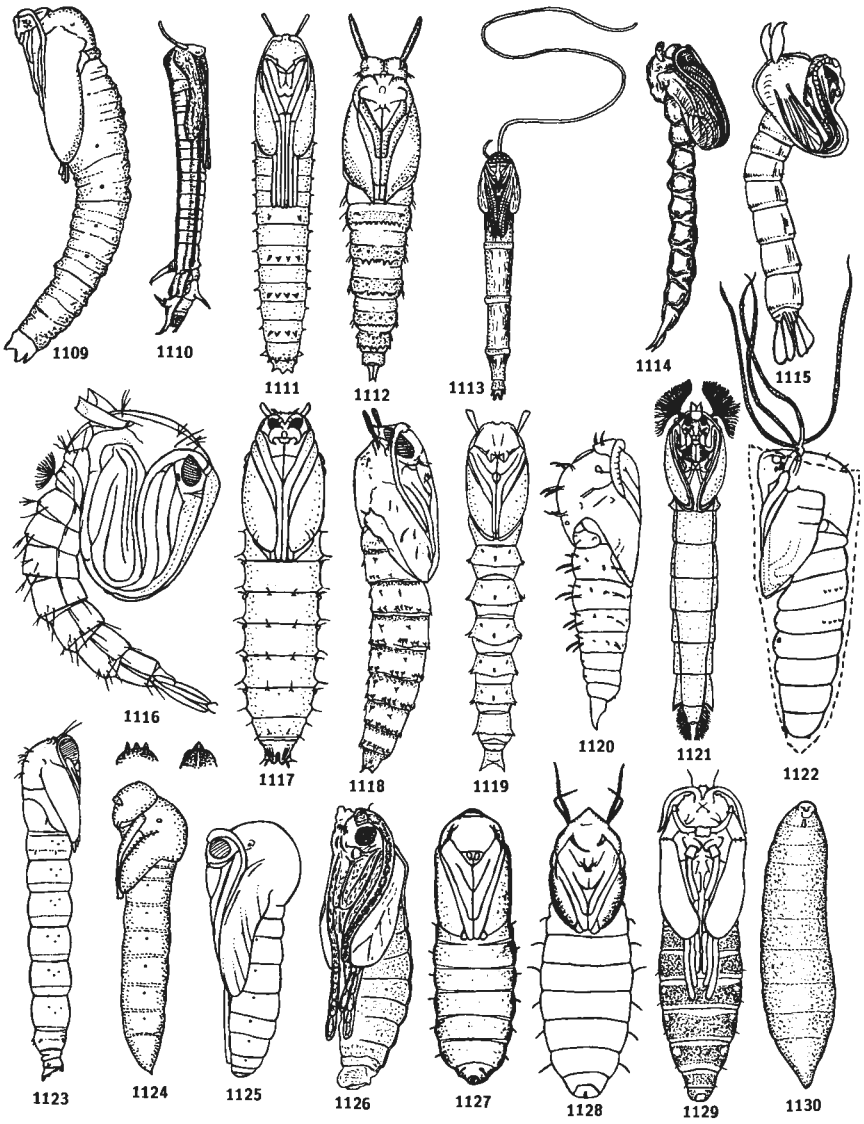
Figs 1070–1087. Cyclorrhapha, Calyptratae, eggs. 1070–1072, Hypodermatidae: 1070, *Hypoderma lineatum;* 1071, *H. bovis;* 1072, the same, enlarged. 1073–1076, Gasterophilidae: 1073, *Gasterophilus haemorrhoidalis;* 1074, *G. intestinalis;* 1075, *G. nasalis;* 1076, *G. pecorum.* 1077–1085, Tachinidae: 1077, *Phasia hemiptera,* membranous egg; 1078, *Cylindromyia brassicaria,* with enlarged detail below; 1079, *Cistogaster globosa;* 1080, *Lypha dubia;* 1081, *Meigenia mutabilis,* lateral (left) and dorsal (right); 1082, *Winthemia,* macrotype egg, dorsal (above), lateral below); 1083, *Ocytata pallipes,* microtype egg; 1084, *Gonia capitata,* microtype egg; 1085, *Carcelia lucorum,* pedicellate egg (left), attached to seta (centre), and attached to cuticle of caterpillar (right). 1086–1087, Rhinophoridae: 1086, *Phyto melanocephala,* dorsal (left), lateral (right); 1087, *Rhinophora lepida,* dorsal (left), lateral (right).



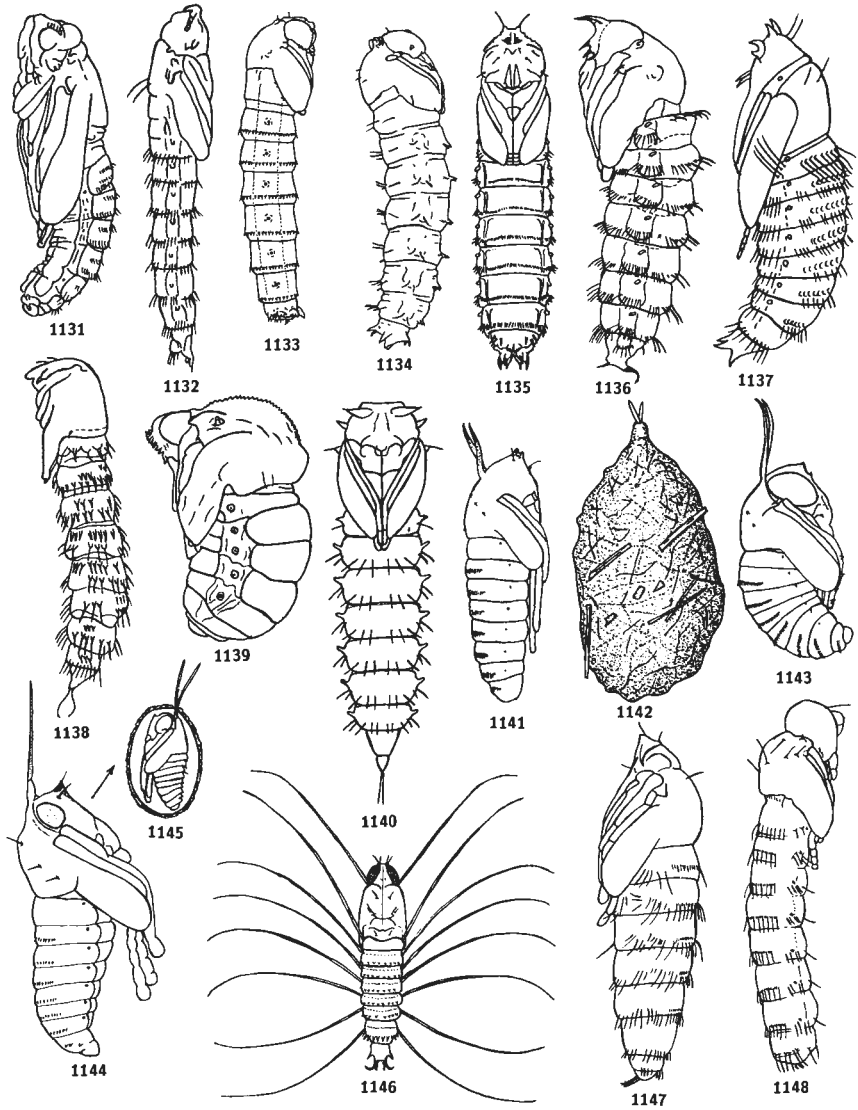
Figs 1088–1089. Calyptratae, Sarcophagidae, Miltogramminae, eggs: 1088, *Ptychoneura* eggs on propodaeum of *Rhopalum clavipes* (Hym., Sphecidae); 1089, two miltogrammine eggs on propodaeum of *Dipogon variegatus* (Hym., Pompilidae).



Figs 1090–1108. Calyptratae, eggs. 1090, Sarcophagidae, *Miltogramma punctum.* 1091–1093, Calliphoridae: 1091, *Melinda cognata,* with enlarged detail of surface sculpture (right); 1092, *Calliphora/Lucilia* type egg; 1093, *Pollenia rudis.* 1094–1096, Scathophagidae: 1094, *Spaziphora hydromyzina,* dorsal (left), lateral (right); 1095, *Hydromyza livens;* 1096, *Scathophaga stercoraria,* dorsal (left), lateral (right). 1097–1099, Anthomyiidae: 1097, *Fucellia maritima,* lateral (left), dorsal (right), anterior view (above); 1098, *Delia brassicae,* lateral; 1099, *Pegomya hyoscyami,* lateral; 1100, Fanniidae, *Fannia canicularis,* dorsal (left), lateral (right). 1101–1108, Muscidae: 1101, *Polietes lardaria,* dorsal; 1102, *Musca domestica;* 1103, *Phaonia exoleta,* dorsal; 1104, *Graphomya maculata,* lateral; 1105, *Mydaea urbana;* 1106, *Limnophora riparia,* dorsal; 1107, *Lispe consanguinea,* lateral (left), dorsal (right); 1108, *Coenosia tigrina,* lateral.

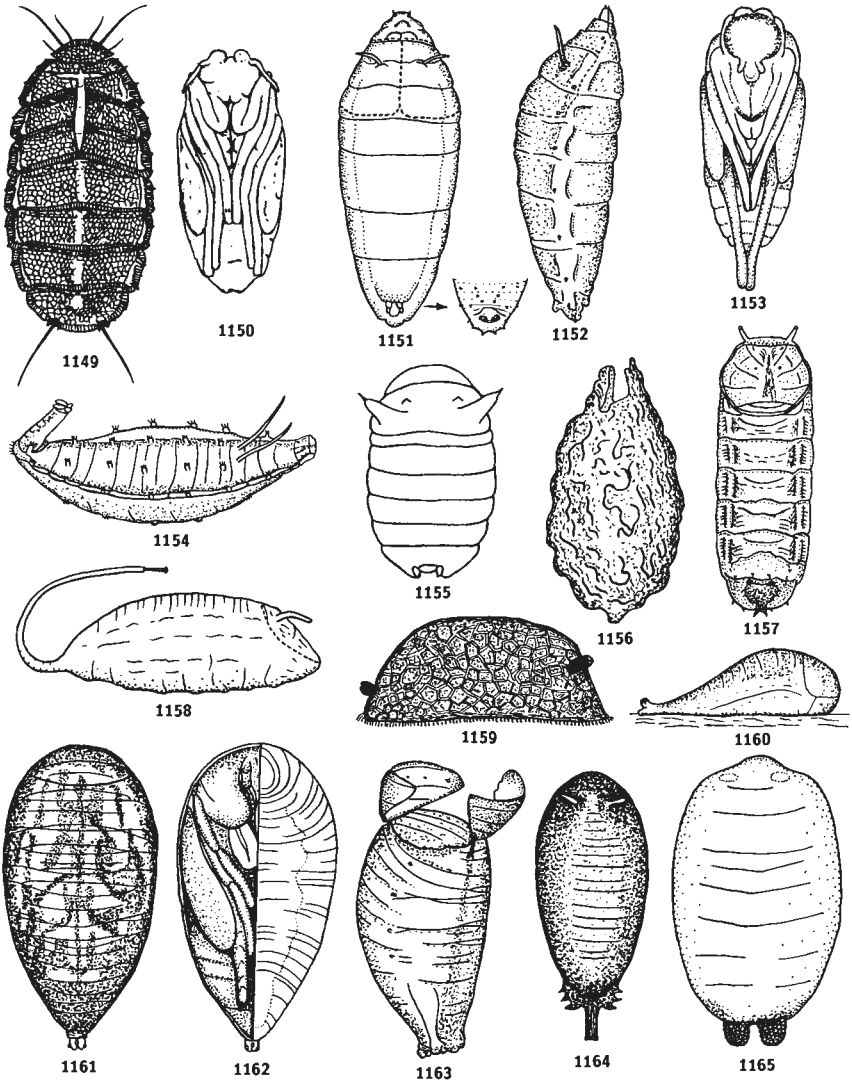


Figs 1109–1130. Nematocera pupae. 1109, Trichoceridae, *Trichocera,* lateral. 1110–1111, Tipulidae: 1110, *Phalacrocera replicata,* lateral; 1111, *Tipula* sp., ventral. 1112, Psychodidae, *Psychoda alternata,* ventral. 1113, Ptychopteridae, *Ptychoptera,* lateral. 1114, Dixidae, *Dixa,* lateral. 1115, Chaoboridae, *Chaoborus,* lateral. 1116, Culicidae, lateral. 1117, Thaumaleidae, *Thaumalea,* ventral. 1118–1120, Ceratopogonidae: 1118, *Culicoides,* lateral; 1119, *Sphaeromias,* ventral; 1120, *Forcipomyia,* lateral. 1121, Chironomidae, *Chironomus plumosus,* ventral. 1122, Simuliidae, *Simulium* sp, lateral (dotted line shows outline of cocoon). 1123, Anisopodidae, *Sylvicola fenestralis,* lateral. 1124, Bibionidae, *Bibio marci,* lateral, with above, head of *Dilophus febrilis,* male, ventral, and female, dorsal, to right. 1125, Mycetophilidae, *Mycomya,* lateral. 1126, Sciaridae, *Pnyxia scabiei.* 1127–1128, Scatopsidae: 1127, *Scatopse notata,* ventral; 1128, *Coboldia fuscipes,* ventral. 1129–1130, Cecidomyiidae: 1129, *Lestremia cinerea,* ventral; 1130, *Mayetiola destructor,* ventral.

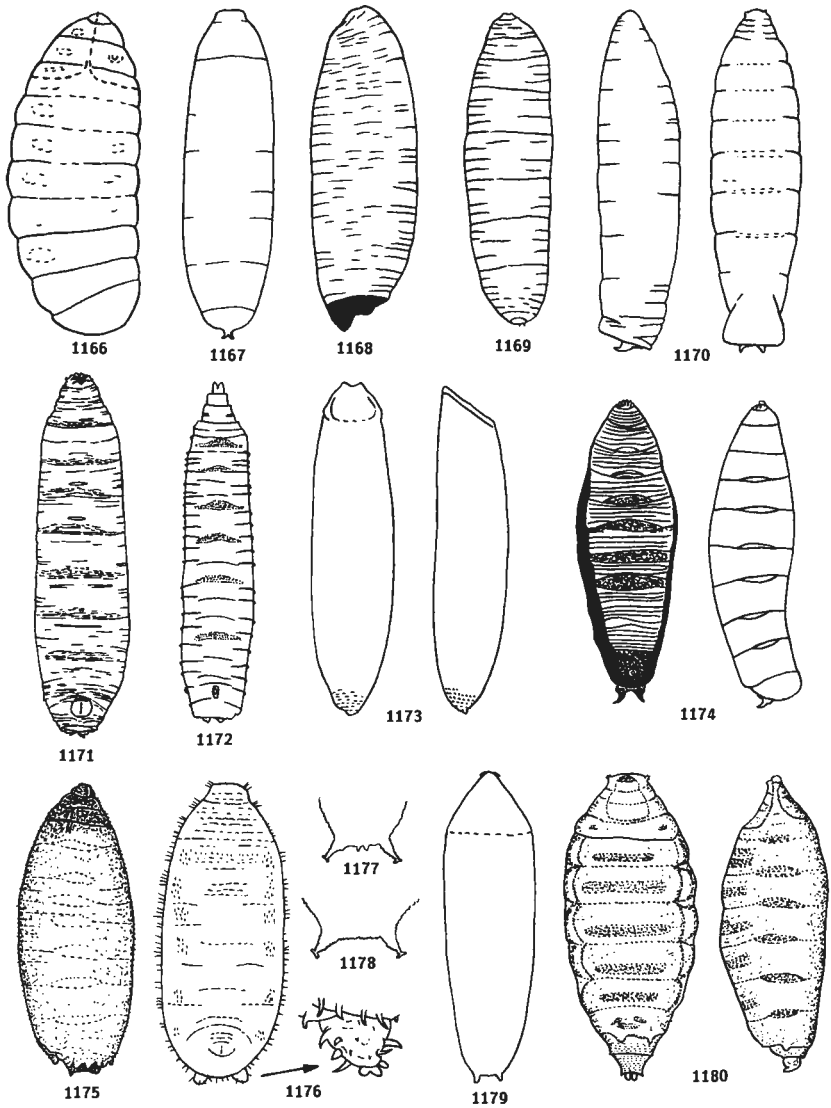


Figs 1131–1148. Brachycera pupae. 1131, Xylomyiidae, *Xylomyia,* oblique lateral. 1132, Xylophagidae, *Xylophagus,* lateral. 1133, Rhagionidae, *Chrysopilus,* lateral. 1134, Athericidae, *Atherix,* lateral. 1135, Tabanidae, *Haematopota,* ventral. 1136, Asilidae, *Philonicus albiceps,* lateral. 1137, Bombyliidae, *Bombylius,* lateral. 1138, Scenopinidae, *Scenopinus,* lateral. 1139, Acroceridae, *Ogcodes,* lateral. 1140, Therevidae, *Thereva,* ventral. 1141–1145, Dolichopodidae: 1141, *Dolichopus nubilus,* lateral; 1142, *Liancalus virens,* cocoon; 1143, *L. virens,* pupa, lateral; 1144, *Aphrosylus celtiber,* lateral; 1145, the same, in cocoon. 1146–1148, Empididae: 1146, *Hemerodromia unilineata,* dorsal; 1147, *Empis tessellata,* lateral; 1148, *Rhamphomyia anomalipennis,* lateral.

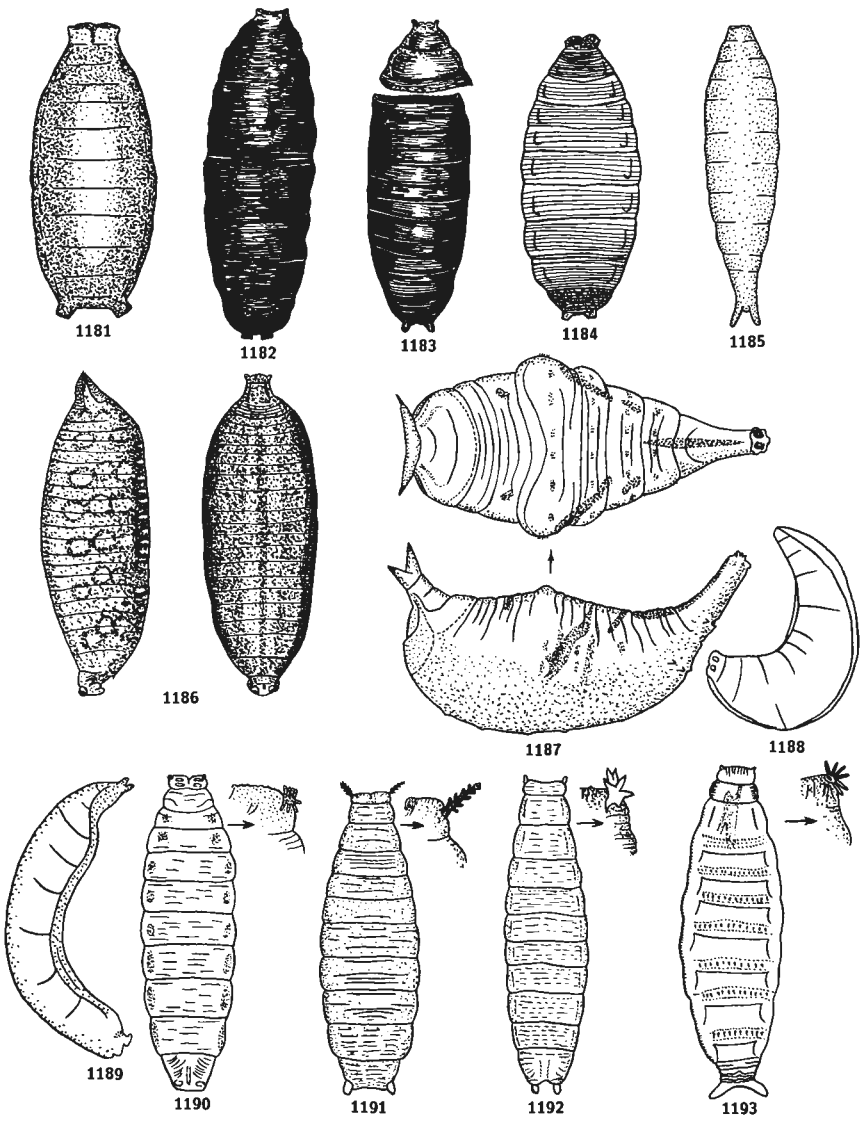
N.B. Pupation of Stratiomyidae and Xylomyiidae takes place *inside the last larval skin;* only the pupa of *Xylomyia* is shown.



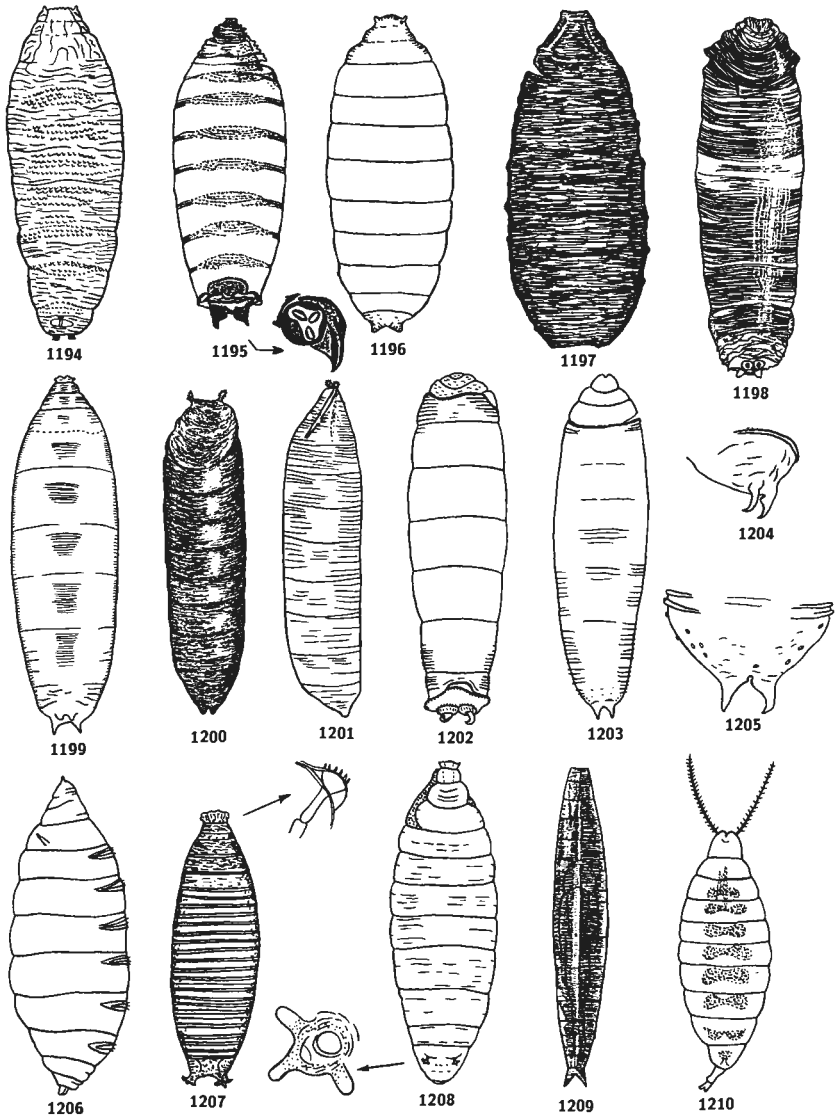
Figs 1149–1165. Cyclorrhapha, Aschiza, puparia and pupae. 1149–1150, Lonchopteridae: 1149, *Lonchoptera,* puparium after emergence of adult showing T-shaped split; 1150, the same, pupa. 1151–1154, Phoridae: 1151, *Megaselia nigra,* puparium, ventral, dotted line showing area ruptured during emergence of adult, end of *M. rufipes* puparium to right; 1152, *Megaselia,* the same, lateral; 1153, *Megaselia,* pupa; 1154, *Spiniphora,* puparium, oblique lateral. 1155, Pipunculidae, *Eudorylas,* puparium, ventral (spiracular horns shorter in most species). 1156–1157, Platypezidae: 1156, cocoon of *Polyporivora;* 1157, the same, puparium, ventral. 1158–1164, Syrphidae: 1158, *Eristalis,* puparium, lateral (dotted line shows line of rupture during emergence of adult); 1159, *Microdon,* puparium, lateral; 1160, *Episyrphus balteatus,* puparium, lateral; 1161, *Syrphus vitripennis,* puparium, ventral; 1162, the same, ventral, half cut away to reveal pupa inside; 1163, the same, oblique view showing ruptured cap after emergence of adult; 1164, *Syritta pipiens,* dorsal. 1165, Conopidae, *Physocephala,* puparium.



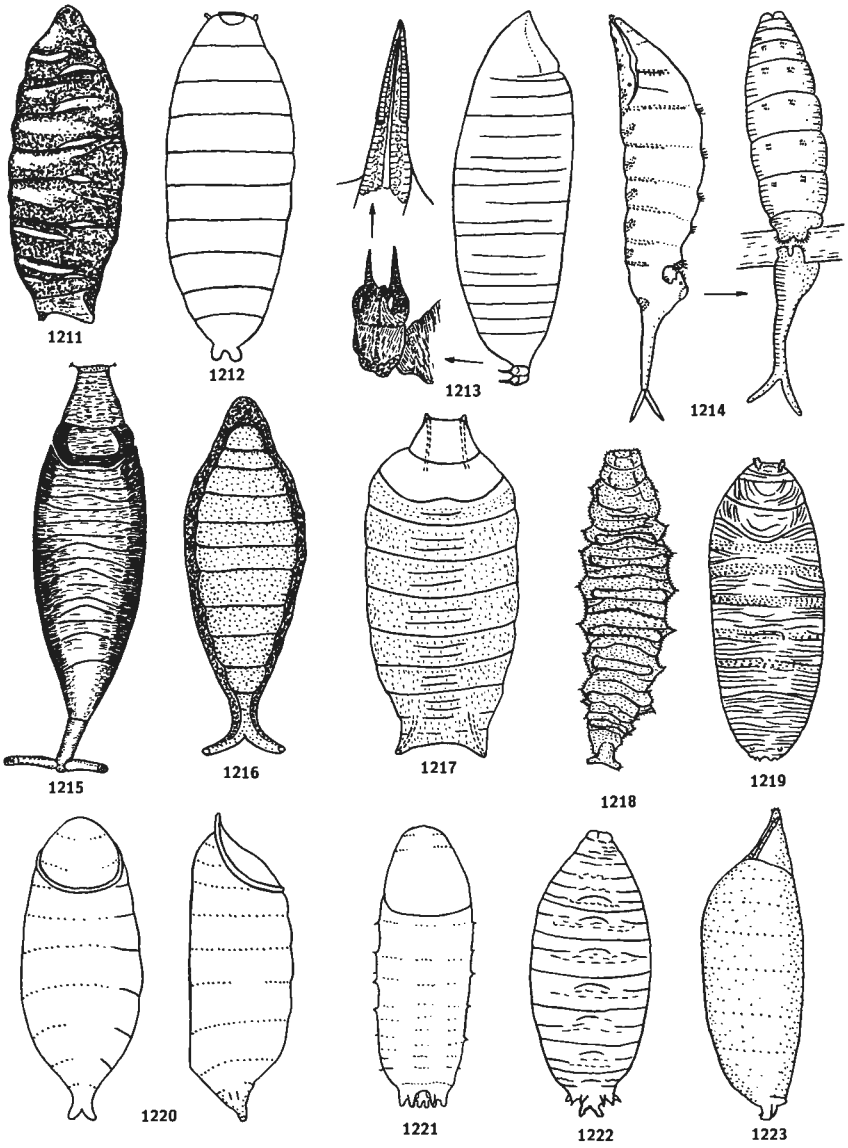
Figs 1166–1180. Puparia of Cyclorrhapha. 1166–1168, Tephritidae: 1166, *Ceratitis capitata;* 1167, *Platyparea poeciloptera;* 1168, *Cerajocera ceratocera.* 1169, Otitidae, *Tetanops myopaeformis.* 1170–1171, Micropezidae: 1170, *Calobata cibaria,* lateral and ventral; 1171, *Micropeza corrigiolata.* 1172, Megamerinidae, *Megamerina dolium.* 1173, Psilidae, *Psila rosae,* dorsal and lateral. 1174, Helcomyzidae, *Helcomyza ustulata,* ventral, and lateral outline. 1175, Dryomyzidae, *Dryomyza analis.* 1176–1179, Chamaemyiidae: 1176, *Leucopis griseola,* ventral, with enlarged detail of posterior spiracular process to right; 1177, *L. atritarsis,* detail of posterior spiracular processes, ventral; 1178, *L. melanopus,* the same; 1179, *Chamaemyia geniculata.* 1180, Lauxaniidae, *Minettia lupulina,* dorsal and lateral.



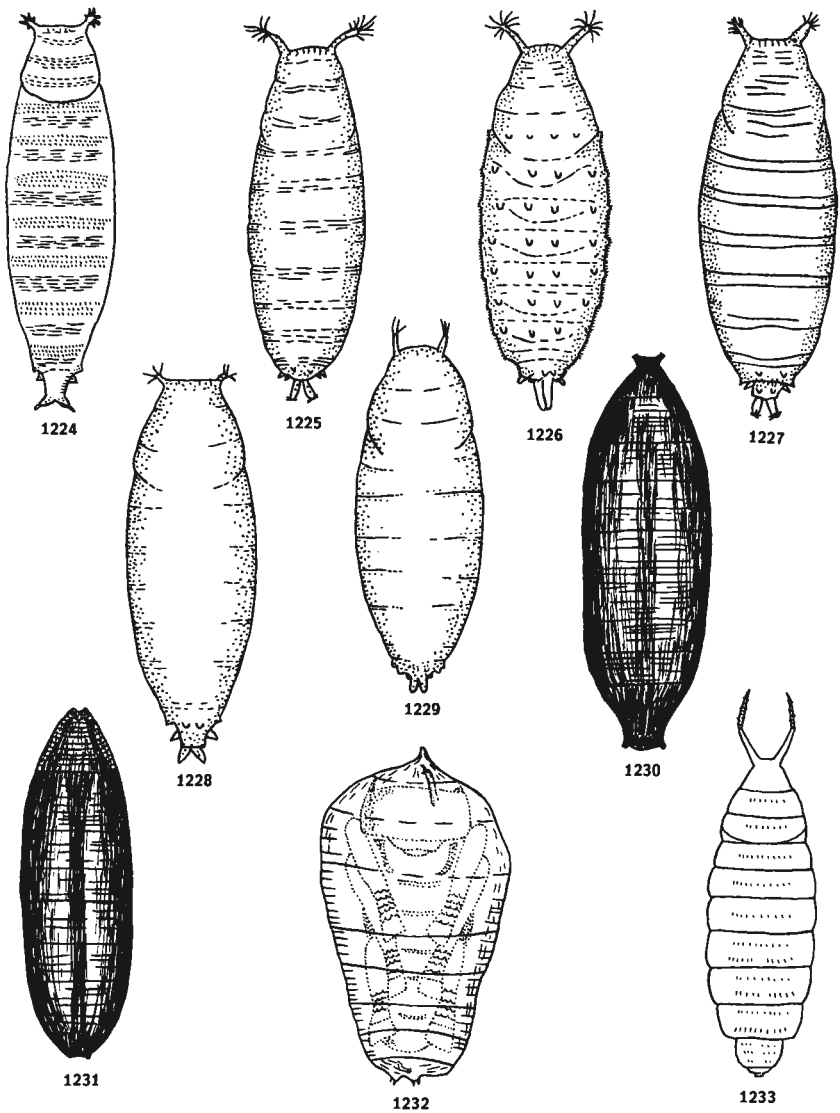
Figs 1181–1193. Cyclorrhapha, Acalyptratae, puparia. 1181, Coelopidae, *Coelopa frigida.* 1182–1183, Heleomyzidae: 1182, *Scoliocentra villosa;* 1183, *Heleomyza serrata.* 1184–1185, Sepsidae: 1184, *Orygma luctuosum;* 1185, *Sepsis punctum.* 1186–1189, Sciomyzidae: 1186, *Pherbina coryleti,* lateral and dorsal; 1187, *Elgiva sundewalli,* dorsal (above) and lateral; 1188, *Tetanura pallidiventris,* lateral; 1189, *Colobaea distincta.* 1190–1193, Sphaeroceridae: 1190, *Sphaerocera curvipes,* dorsal; 1191, *Coproica vagans,* dorsal; 1192, *Limosina silvatica,* dorsal; 1193, *Thoracochaeta zosterae,* ventral.



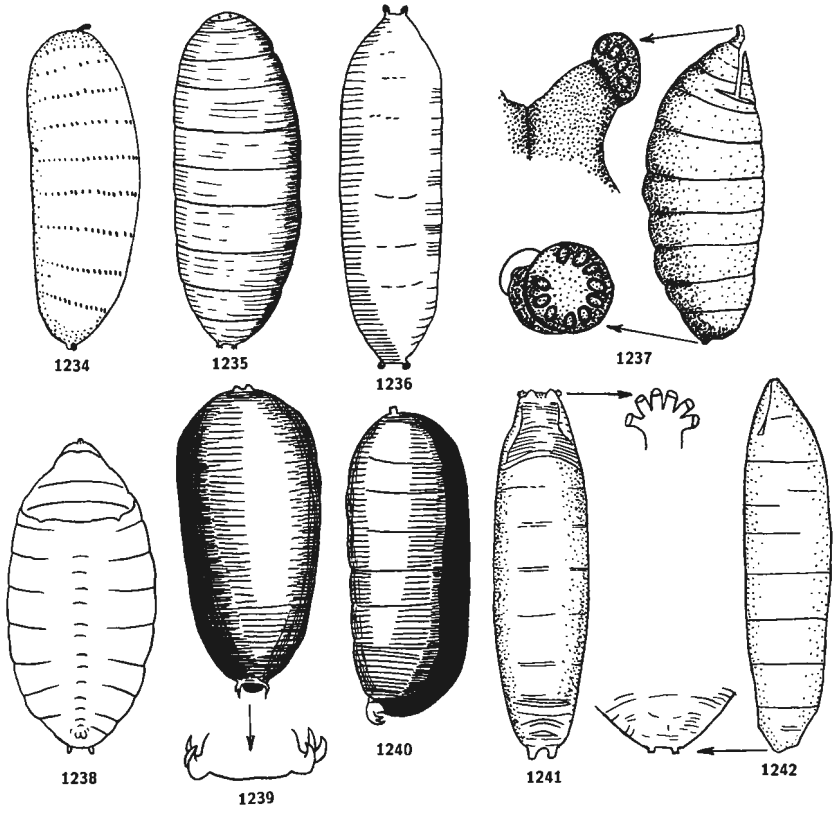
Figs 1194–1210. Cyclorrhapha, Acalyptratae, puparia. 1194. Pallopteridae, *Palloptera usta*, ventral. 1195–1196, Lonchaeidae: 1195, *Lonchaea peregrina* and enlarged spiracular detail; 1196, *L. fumosa*. 1197–1199, Piophilidae: 1197, *Neottiophilum praeustum*, after emergence of fly; 1198, *Centrophlebomyia furcata*, the same; 1199, *Piophila casei*. 1200–1201, Opomyzidae: 1200, *Geomyza tripunctata;* 1201, *Opomyza florum*. 1202–1205, Clusiidae: 1202, *Clusia flava;* 1203, *Clusiodes albimana;* 1204, *C. verticalis*, posterior end; 1205, *C. albimana*, the same. 1206, Odiniidae, *Odinia meijerei*. 1207–1208, Carnidae: 1207, *Carnus hemapterus*, with enlarged detail of anterior spiracle; 1208, *Meoneura obscurella*, with enlarged detail of posterior spiracle. 1209, Stenomicridae, *Stenomicra*. 1210, Aulacigastridae, *Aulacigaster leucopeza*.



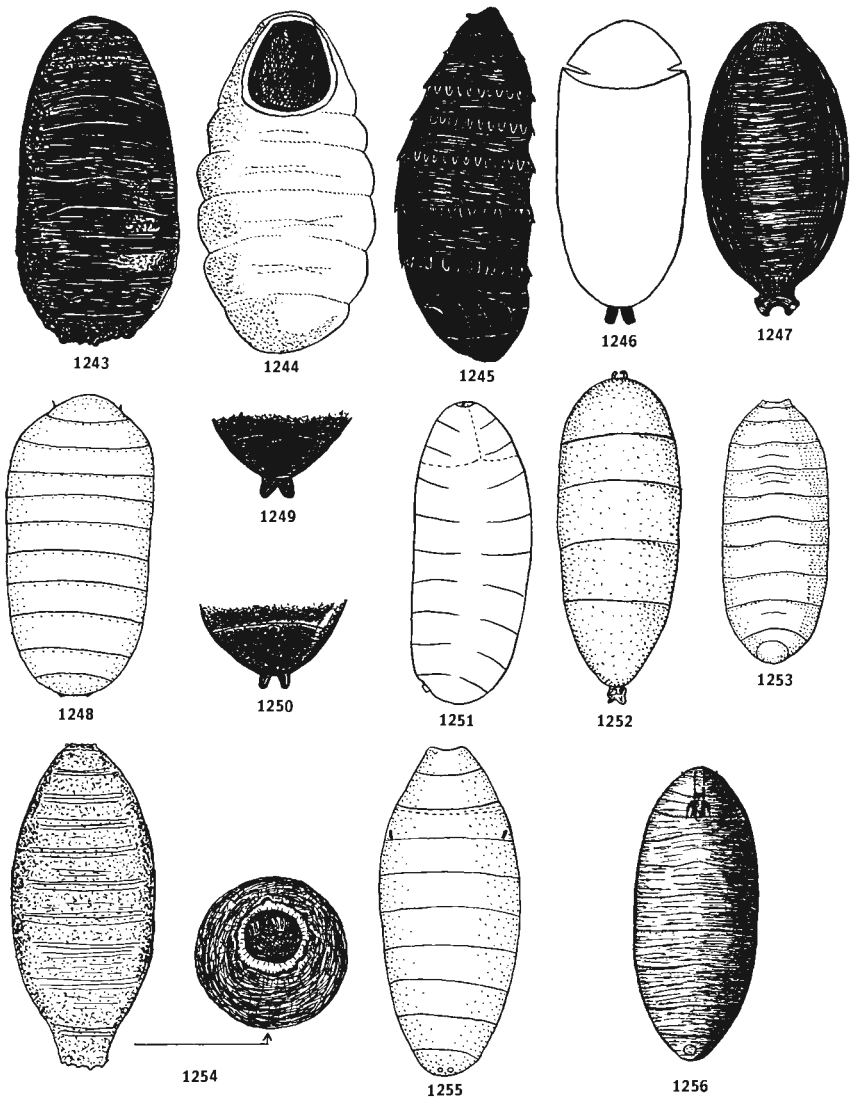
Figs 1211–1223. Cyclorrhapha, Acalyptratae, puparia. 1211–1218, Ephydridae: 1211, *Discocerina obscurella*, lateral; 1212, *Clanoneurum cimiciforme*, dorsal; 1213, *Notophila riparia*, with lateral and enlarged details of spiracular spines; 1214, *Ephydra subopaca*, lateral, and ventral, showing adaptation to holding onto plant stems; 1215, *Ochthera mantis*, ventral; 1216, *Scatella stagnalis*, ventral; 1217, *Scatella unicornis*, dorsal; 1218, *Teichomyza fusca*, ventral. 1219–1223, Drosophilidae: 1219, *Steganina coleoptrata*, ventral; 1220, *Acletoxenus*, ventral and lateral; 1221, *Cacoxenus indagator*, ventral; 1222, *Amiota variegata*, ventral; 1223, *Leucophenga maculata*, lateral.



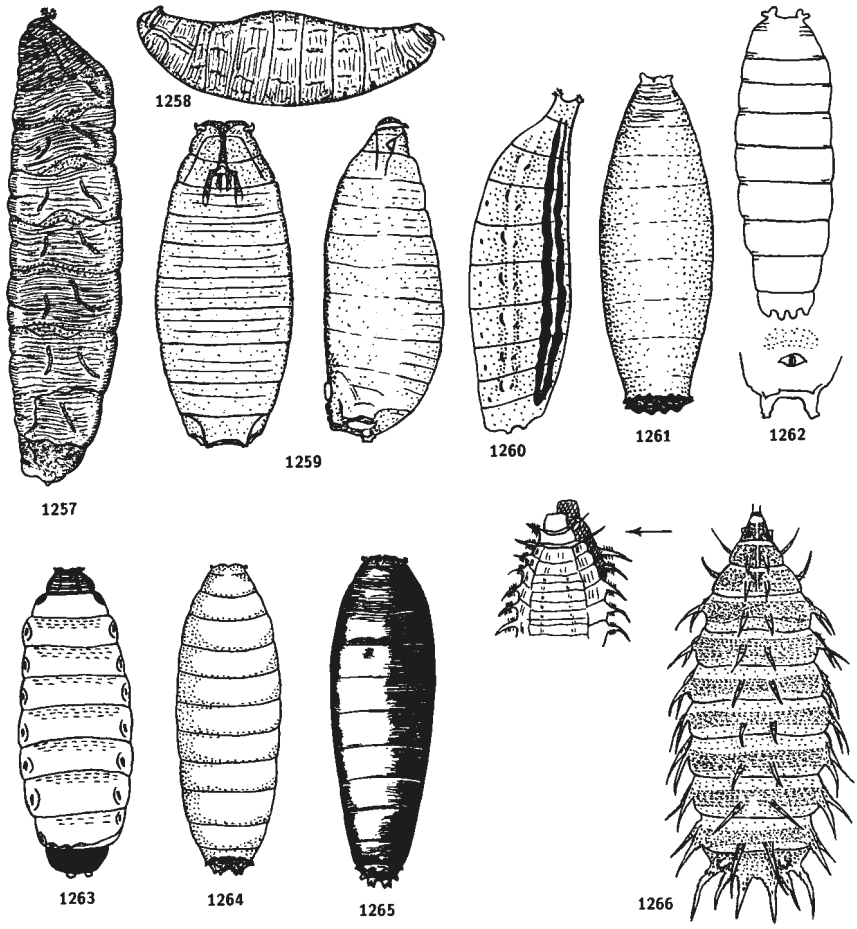
Figs 1224–1233. Cyclorrhapha, Acalyptratae, puparia. 1224–1229: Drosophilidae (dorsal); 1224, *Scaptomyza graminum;* 1225, *Drosophila funebris;* 1226, *D. busckii;* 1227, *D. melanogaster;* 1228, *D. subobscura;* 1229, *D. phalerata.* 1230–1231, Milichiidae: 1230, *Phyllomyza securicornis;* 1231, *P. formicae.* 1232, Braulidae, *Braula coeca.* 1233, Canacidae, *Canace nasica.*



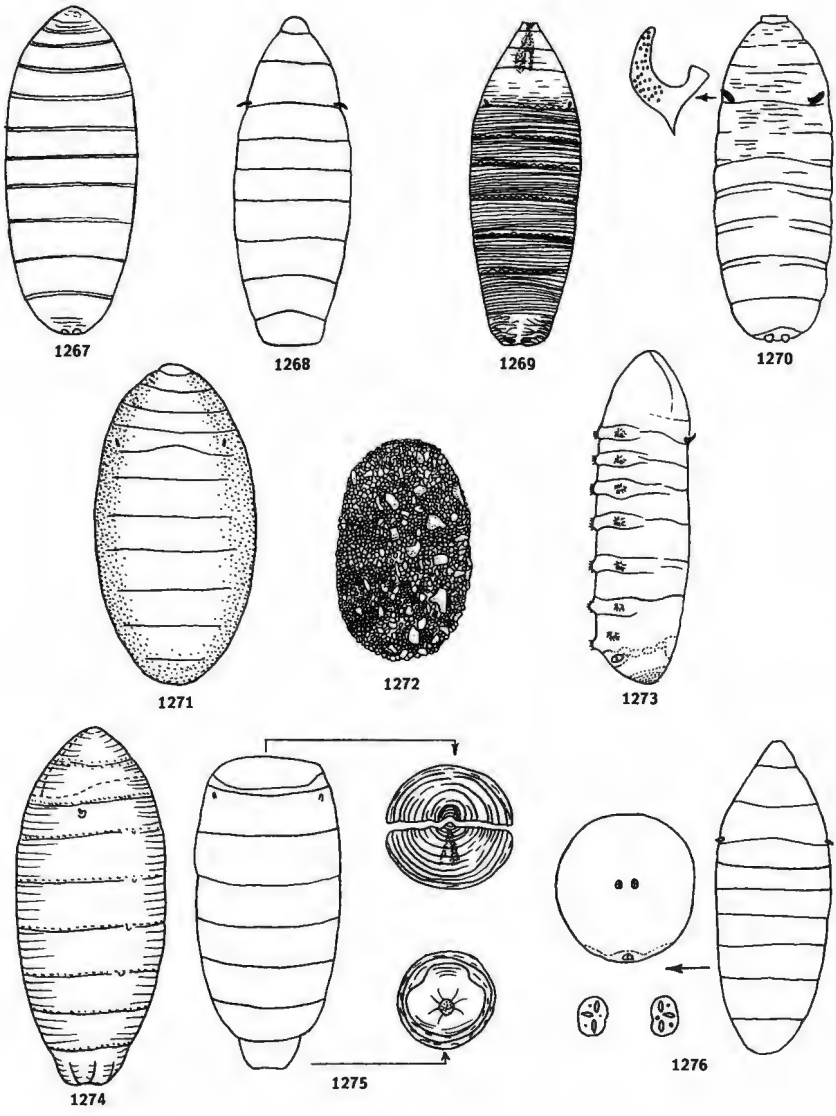
Figs 1234–1242. Cyclorrhapha, Acalyptratae, puparia. 1234–1240, Agromyzidae: 1234, *Hexomyza sarothamni;* 1235, *Phytobia cambii;* 1236, *Napomyza lateralis;* 1237, *Phytomyza syngenesiae* with enlarged details of anterior and posterior spiracles indicated by arrows; 1238, *Phytomyza ilicis;* 1239, *Cerodontha (Dizygomyza) ireos,* with enlarged detail of posterior spiracular processes; 1240, the same, lateral. 1241–1242, Chloropidae: 1241, *Oscinella frit,* with enlarged detail of anterior spiracle; 1242, *Chlorops pumilionis,* with enlarged detail (ventral) of posterior spiracles.



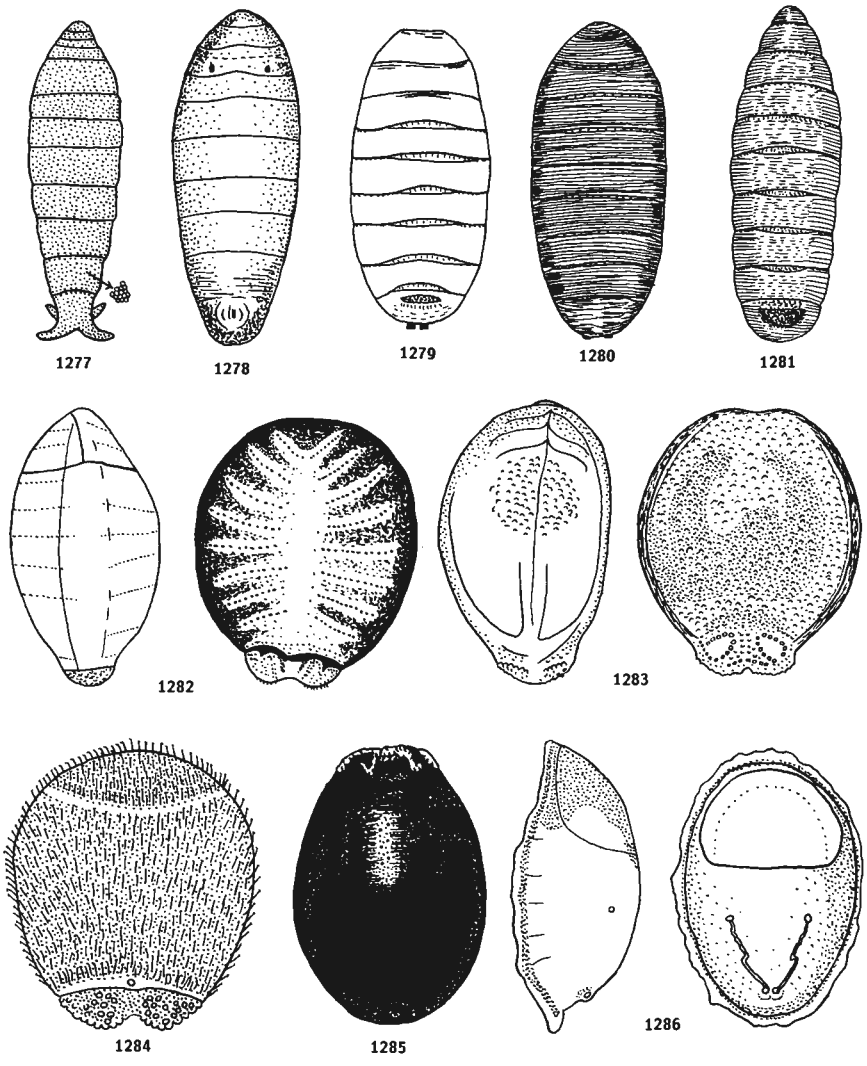
Figs 1243–1256. Cyclorrhapha puparia. 1243, Oestridae, *Oestrus ovis*. 1244, Hypodermatidae, *Hypoderma;* 1245, Gasterophilidae, *Gasterophilus*. 1246–1251, Tachinidae: 1246, *Cistogaster globosum;* 1247, *Pelatachina tibialis;* 1248, *Lypha dubia;* 1249, *Triarthria setipennis*, posterior spiracles, ventral; 1250, *Ocytata pallipes*, posterior spiracles, ventral; 1251, *Meigenia mutabiis*, lateral. 1252, Rhinophoridae, *Phyto discrepans*, dorsal. 1253–1254, Sarcophagidae: 1253, *Miltogramma punctatum;* 1254, *Sarcophaga*, end view to right showing sunken spiracles. 1255–1256, Calliphoridae: 1255, *Melinda cognata*, dorsal; 1256, *Pollenia rudis*, ventral.



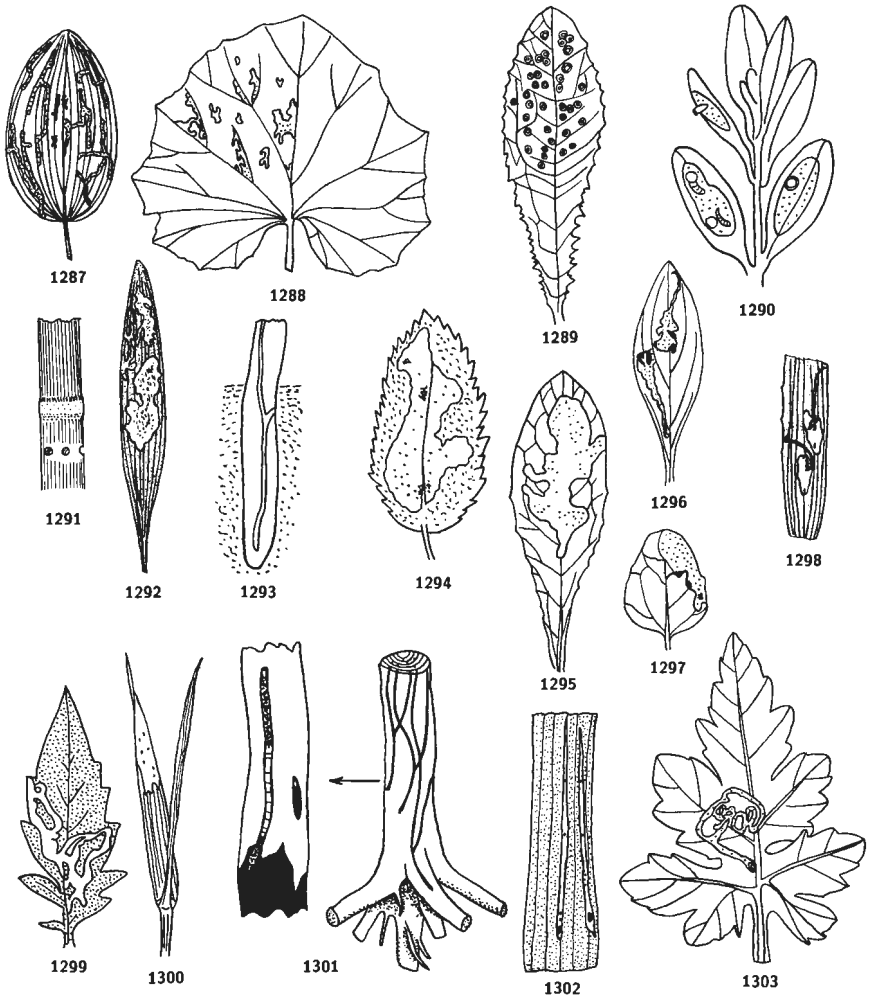
Figs 1257–1266. Calyptratae puparia. 1257–1262, Scathophagidae: 1257, *Norellia spinipes*, lateral; 1258, *Cordilura pudica*, lateral; 1259, *Gimnomera tarsea*, dorsal and lateral; 1260, *Spaziphora hydromyzina;* dorso-lateral; 1261, *Scathophaga stercoraria*, dorsal; 1262, *Parallelomma* sp., above, *P. vittatum* detail below. 1263–1265, Anthomyiidae: 1263, *Fucellia maritima*, dorsal; 1264, *Delia brassicae*, dorsal; 1265, *D. coarctata*, dorsal. 1266, Fanniidae; *Fannia canicularis*, dorsal with detail, to left, of split anterior end following emergence of adult.



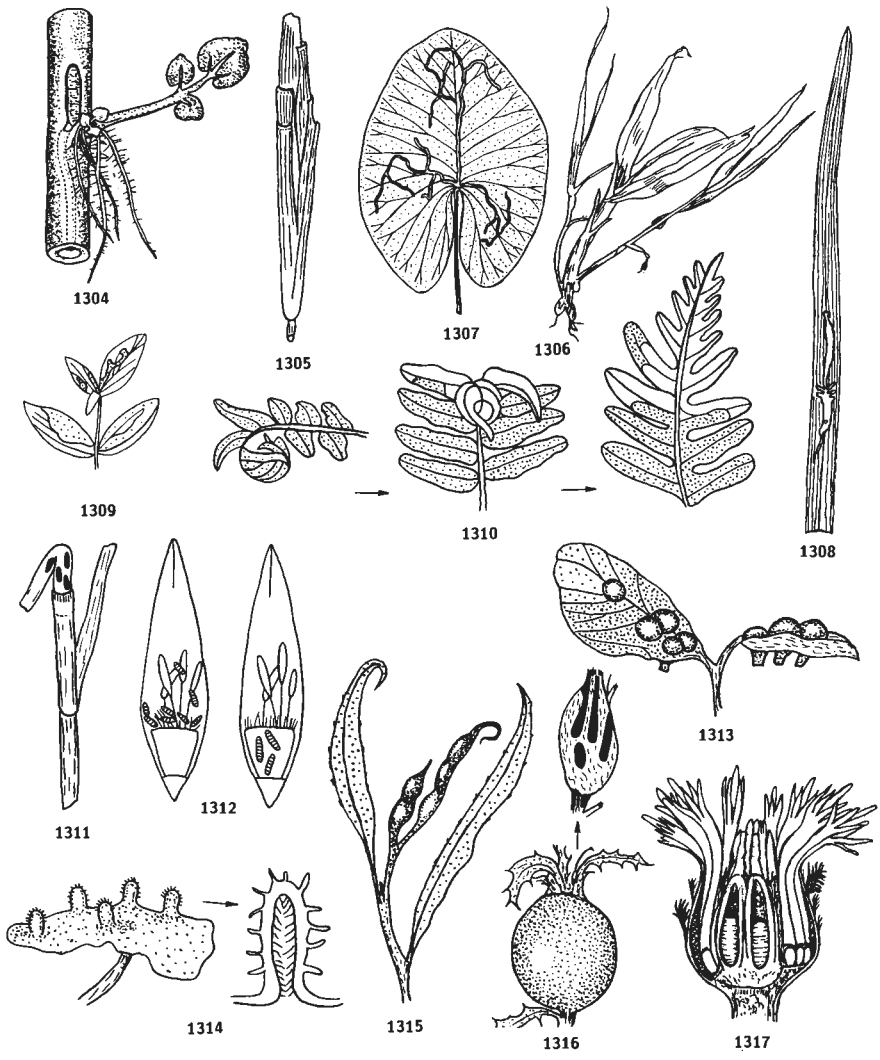
Figs 1267–1276. Muscidae, puparia: 1267, *Musca domestica*, dorsal; 1268, *Azelia cilipes*, dorsal; 1269, *Potamia littoralis*, dorsal; 1270, *Ophyra capensis*, dorsal, enlarged view of respiratory horn to left; 1271, *Muscina stabulans*, dorsal; 1272, the same, cocoon; 1273, *Phaonia exoleta*, latero-ventral; 1274, *P. erratica*, lateral; 1275, the same, ventral, with cap detached, posterior and anterior end views to right; 1276, *Helina reversio*, dorsal with end view and enlarged posterior spiracles to left.



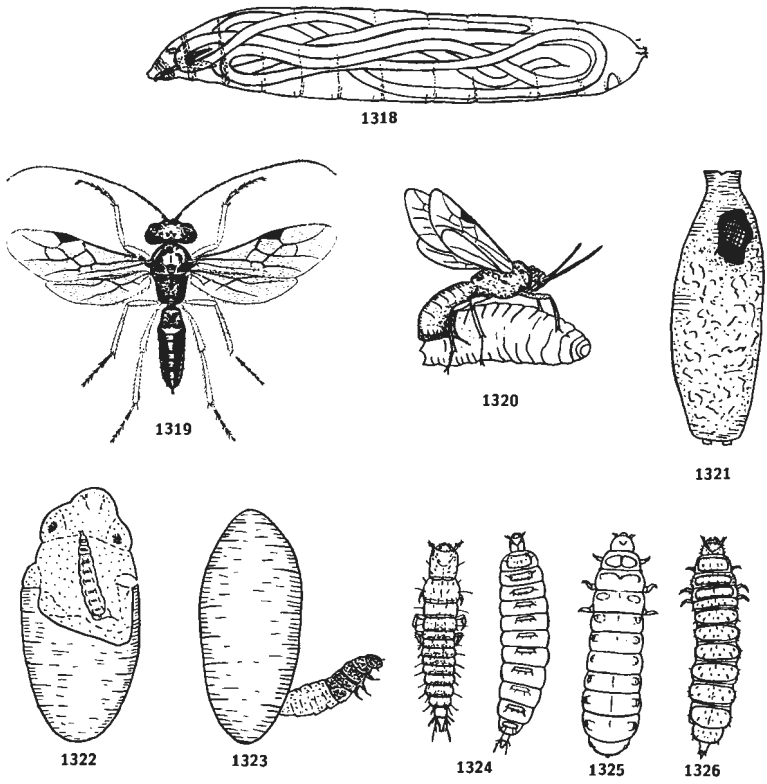
Figs 1277–1286. Calypterate puparia. 1277–1281, Muscidae: 1277, *Limnophora riparia,* dorsal; 1278, *Lispe consanguinea,* ventral; 1279, *Haematobia irritans,* dorsal; 1280, *Stomoxys calcitrans,* dorsal; 1281, *Haematobosca stimulans,* ventral. 1282–1285, Hippoboscidae: 1282, *Ornithomya avicularia,* lateral and dorsal; 1283, *O. chloropus,* lateral and dorsal; 1284, *Olfersia spinifera,* dorsal; 1285, *Lipoptena cervi,* dorsal. 1286, Nycteribiidae, *Nycteribia kolenatii,* lateral and dorsal.



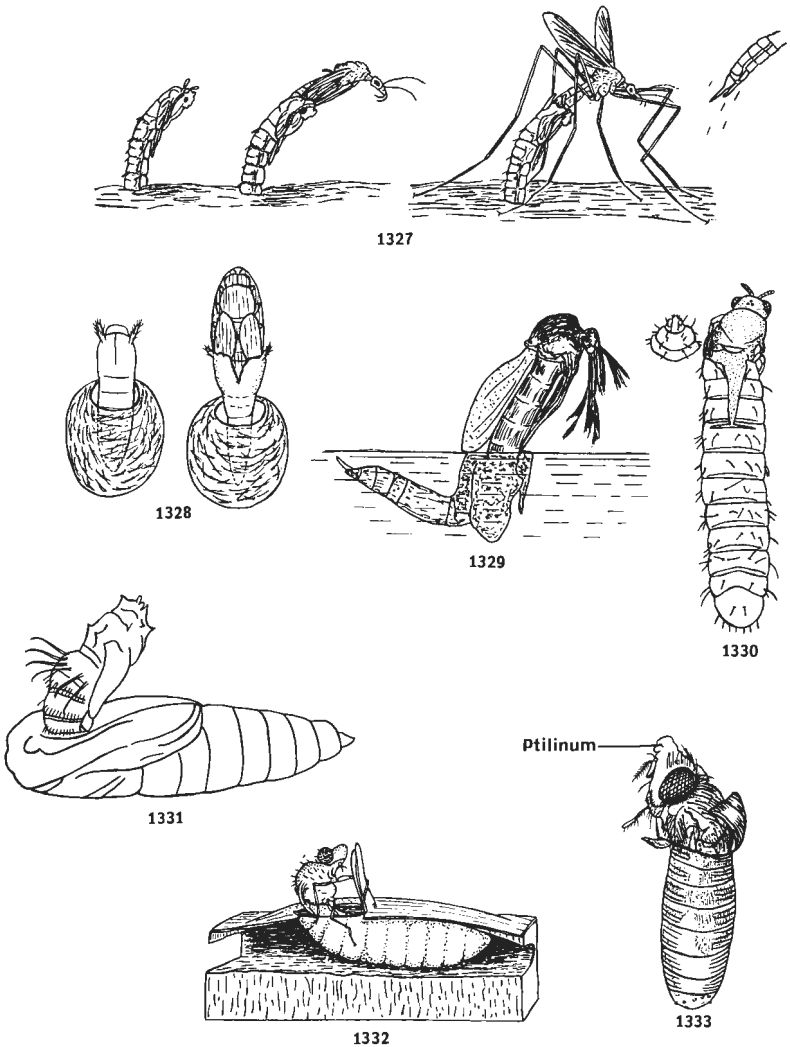
Figs 1287–1303. Leaf and stem mines caused by larvae of Diptera. 1287, Chironomidae, *Cricotopus brevipalpis* on *Potamogeton natans*. 1288, Sciaridae, *Phytosciara halterata,* on *Tussilago*. 1289–1290, Cecidomyiidae: 1289, *Cystiphora taraxaci* on *Taraxacum*; 1290, *Monarthropalpus buxi* on box. 1291, Dolichopodidae, *Thrypticus* stem mine. 1292, Syrphidae, *Cheilosia semifasciata* on *Allium*. 1293–1295, Tephritidae: 1293, *Platyparea poecilopterа* on asparagus; 1294, *Euleia heracleii* on *Pastinaca sativa* (parsnip); 1295, *Trypeta immaculata* on *Taraxacum*. 1296–1298, Drosophilidae: 1296, *Scaptomyza graminum* on *Melandrium;* 1297, the same, on *Atriplex;* 1298, *Parascaptomyza disticha* on *Allium*. 1299–1303, Agromyzidae: 1299, *Liriomyza bryoniae* on tomato; 1300, *Agromyza ambigua* (cereal leaf miner); 1301, *Phytobia cambii* on *Salix;* 1302, *Cerodontha (Dizygomyza) ireos* on *Iris pseudacorus;* 1303, *Phytomyza syngenesiae* on chrysanthemum.



Figs 1304–1317. Leaf mines and galls. 1304, Ephydridae, *Hydrellia nasturtii* on watercress. 1305–1306, Chloropidae: 1305, *Lipara lucens,* galled stem of *Phragmites;* 1306, *Chlorops pumilionis* (gout fly), 'gouty' stem (centre) of winter barley. 1307–1308, Scathophagidae: 1307, *Hydromyza livens* on *Nuphar;* 1308, *Norellia spinipes* on daffodil. 1309–1310, Anthomyiidae: 1309, *Delia echinata* on *Cerastium;* 1310, *Chirosia parvicornis* showing leaf of *Pteridium aquilinum* rolled and opened out to show mine. 1311–1315, Cecidomyiidae: 1311, *Mayetiola destructor* (hessian fly) wheat stem with sheath removed showing puparia above second joint; 1312, wheat midges in wheat flower, showing position of larvae of *Contarinia tritici* (left—colour yellow) and *Sitodiplosis mosellana* (right—colour orange/red); 1313, *Craneiobia corni* on dogwood; 1314, *Rondaniola bursaria* on ground ivy, enlarged detail to right; 1315, *Rhabdophaga terminalis,* bat willow gall midge. 1316–1317, Tephritidae: 1316, *Urophora cardui* on *Carduus arvensis,* showing section above; 1317, *U. jaceana* on knapweed.



Figs 1318–1326. Some important parasites of Diptera larvae and pupae. 1318, Nematoda: *Mermis* in larva of *Geomyza balachowskyi* (Opomyzidae). 1319–1321, Hymenoptera: 1319, *Alysia manducator* (Braconidae) from pupa of *Calliphora vicina* (Calliphoridae); 1320, the same ovipositing in larva of *Protophormia terranovae;* 1321, *Phygadeuon oppositus* (Ichneumonidae), exit hole in mud-caked puparium of *Scathophaga stercoraria* (Scathophagidae). 1322–1326, Coleoptera: *Aleochara curtula* (Staphylinidae); 1322, first instar larva on pupa (puparium cut away) of *Lucilia caesar* (Calliphoridae); 1323, the same, third instar larva leaving puparium of *Lucilia;* 1324, the same, newly hatched (left) and fully fed (right) first instar larvae; 1325, the same, second instar larva; 1326, the same, third instar larva.



Figs 1327–1333. Emergence of adults from pupae, a vulnerable stage of the life-history (especially for aquatic species). 1327, *Tipula* (Tipulidae); 1328, *Simulium* (Simuliidae); 1329, Culicidae; 1330, Stratiomyidae; 1331, *Anthrax* (Bombyliidae) pupa emerging from moth pupa; 1332, *Phytomyza ilicis* (Agromyzidae) in leaf-mine; 1333, *Calliphora* (Calliphoridae), showing ptilinum inflated.

Index

Principal references are numbered in bold type. Synonyms and page numbers of illustrations are in italic type. At least generic or family names are given for all Diptera, associated insects, other animals and plants. Popular or economic names are also given, especially in groups where scientific names may not be familiar to entomologists (e.g. birds, mammals) or where once familiar names have been complicated by synonymy; **both names should be checked**. Macro-, micro-, natural and artificial habitats (from dung to the kitchen sink) are also included so that wherever an immature dipteran is found the index may be used as an aid to identification.

ISBN 0 901546 75 5