

Legends for TextFigures 1 - 29

TextFig. 1A: "Intellective cell" of the mushroom body of *Apis mellifica*. **B:** Mushroom body (P.K) of the right side from above. The outer P.K is shown in cross-section, the inner one is cut off. After Kenyon, 1896. d Dendrite, n Neurite, r.a anterior root, r.i inner root, P.K mushroom body, St stalk

TextFig. 2. Horizontal section through the left half of the brain of *Allanthus scrophulariae*. Gl.i Internal globulus, Gl.e External globulus, M.m.m: medulla of the lobus opticus, Sp Indication of the furrow. Scale: 1:80.

TextFig. 3. Section through the brain of *Tenthredo flava* ♀. Plane between the horizontal and frontal planes. Semi-schematic (the indicated internal globulus is not captured in the preparation). R Retina, M.m.e lamina, M.m.m medulla, M.m.i lobula, Ch.e, Ch.m, Ch.i external, middle, and inner chiasma, St Stalk, Kr bifurcation of stalks, R.i Inner root, L.pr Lobus protocerebralis, Gl.i Internal globulus, Gl.e External globulus, CK Central body, L.olf Lobus olfactorius. Scale: 1:64

TextFig. 4A. Oblique section from back-top to front-bottom through the brain of *Bombus agrorum* ♀. Oc.med medial ocellus, Oc.lat lateral ocelli, Tr Trachea, Ca.i inner calyx, Ca.e outer calyx, L.pr Protocerebral lobes, Po.int Pons intercerebralis, P.i Pars intercerebralis, C.c cordon commissural (Viallanes, 1887a). Scale: 1:75 **B.** Section through the brain of *Camponotus herculeanus* ♀. Scale: 1:145.

TextFig. 5A horizontal section (**A**) and sagittal cross-section (**B**) through the brain of *Rhodites rosae* ♀. Gl.e Outer globulus, Gl.i Inner globulus, P.i Pars intercerebralis, N.oc Ocellar nerves, L.pr Protocerebral lobes, L.olf Olfactory lobes. Scale: 1:270

TextFig. 6. A horizontal section (**A**) and a sagittal section (**B**) of the brain of *Sirex gigas* ♀. Only the right half of the brain is depicted in **A**. L.opt Optic lobe, St Stem, R.a anterior root. See TextFig. 5 for other labels. Scale 1:80.

TextFig. 7. Two horizontal sections (A and B) and one sagittal section (C) of the brain of *Ichneumon obsessor* ♀. Ca.i Inner calyx, Ca.e Outer calyx, P.K Mushroom body, N.oc Ocellar nerves, L.opt Optic lobe, L.olf Olfactory lobe, L.pr Protocerebral lobes, R.a Anterior root, St Stem. Scale 1:75.

TextFig. 8. Two frontal sections of the brain of *Exetastes fornicator* ♀ (**A**) and *Aphidius rosarum* ♀ (**B**). P.i Pars intercerebralis, C.K Central body, R.i Inner root, Kr bifurcation of the stalks, Oc Ocellum, C.oe Subesophageal commissure, Ph Pharynx, Ch.e Outer, Ch.m Middle commissure, M.m.e lamina, M.m.m medulla, M.m.i lobula of the optic lobe. Other labels are as in the previous figures. **A:** Scale 1:52; **B:** Scale 1:140.

TextFig. 9. Three horizontal sections of the brain of *Crabro cribrarius* ♀ (**A**), *Xylocopa violacea* ♀ (**B**), and *Anthophora vulpina* ♀ (**C**). Ca.e outer calyx, Ca.i inner calyx, Sp furrow. Scale A 1:60; B and C 1:40

TextFig. 10. Diagram for the various measurements: a -- a = a: greatest width of the mushroom bodies, b -- b = b: greatest width of the protocerebral lobes, c -- c = c: greatest distance between the medullae of the lobus opticus, h: greatest height of the mushroom bodies.

TextFig. 11. Three frontal sections through the brain of *Crabro cribrarius* (A), *Prosopis variegata* ♀ (B), and *Sphecodes gibbus* ♀ (C). Ca.e: outer calyx, Ca.i: inner calyx, M.m.i: lobula, M.m.m: medulla, L.pr: protocerebral lobes, L.olf: olfactory lobes, C.K: central body, P: pars intercerebralis. Magnification: A and C: 1:60; B: 1:75.

TextFig. 12. Two frontal sections through the brain of *Colletes cunicularius* ♀ (A) and ♂ (B). Ca.e outer calyx, Ca.i inner calyx, M.m.m medulla, M.m.i lobula, C.K central body, L.olf olfactory lobe, L.pr protocerebral lobe. Scale: 1:52.

TextFig. 13. Three frontal sections through the brain of *Ceratina cucurbitina* ♀ (A) *Eriades crenulatus* ♀ (B) and ♂ (C). Labels as in TextFig. 12. C = slightly schematic. A = 1:80. B and C = 1:60.

TextFig. 14. Two frontal sections through the brain of *Xylocopa violacea* ♀ (A) and ♂ (B). Tr Trachea, Ch.e outer cross, Ch.m middle cross. The other labels as in TextFig. 12. Scale: 1:32.

TextFig. 15. Two frontal sections through the brain of *Osmia cornuta* ♀ (A) and ♂ (B). Labels as in TextFig. 12. Scale: 1:40.

TextFig. 16. Two frontal sections through the brain of *Megachile lagopoda* ♀ (A) and ♂ (B). Labels as in TextFig. 12. Scale: 1:40.

TextFig. 17. Two frontal sections through the brain of *Anthidium septemdentatum* ♀ (A) and ♂ (B). Labels as in TextFig. 12. Scale: 1:40.

TextFig. 18. Two horizontal sections through the brain of *Anthidium oblongatum* ♀ (A) and ♂ (B). Sp furrow. Scale: 1:45.

TextFig. 19. Two frontal sections through the brain of *Nomia diversipes* ♀ (A) and *Systropha curvicornis* ♀ (B). The labels are the same as in TextFig. 12. Scale: 1:75.

TextFig. 20. Two frontal sections through the brain of *Andrena albicans* ♀ (A) and ♂ (B). The labels are as usual. Scale: 1:60.

TextFig. 21. Two frontal sections through the brain of *Eucera longicornis* ♀ (A) and ♂ (B). The labels are as shown in TextFig. 12. Scale: 1:52.

TextFig. 22. Two horizontal sections through the brain of *Andrena apicata* ♀ (A) and ♂ (B). Sp furrow. Scale: 1:60.

TextFig. 23. Three horizontal sections through the brain of *Bombus agrorum* ♀, queen (A), ♀, worker (B), ♂, male drone (C). Sp furrow. Scale: 1:40

TextFig. 24 A-C. Three frontal sections through the brain of *Bombus agrorum* ♀, queen (A), ♀, worker (B), ♂, drone male (C). Labels as in **TextFig. 12**. Scale: 1:40

TextFig. 25. Horizontal sections through the brain of *Bombus agrorum*. A = Female type ♀ (queen) and ♀ (worker), B = ♂ male type. Ret Retina, M.m.e, M.m.m, M.m.i lamina,

medulla, and lobula, Ch.c, Ch.m outer, middle chiasma, L.olf Olfactory lobe, L.pr Protocerebral lobe, T.opt optic tubercle, F.i.a Inferior anterior fascicle. 1:52

TextFig. 26. Two frontal sections through the brain of *Nomada succincta*. A = female (♀), B = male (♂). Labels as in TextFig. 12. Scale: 1:40.

TextFig. 27. Three horizontal sections through the brain of *Vespa vulgaris*. A = female type, ♀, queen, B = ♂, worker, C = ♂, male. Labels as usual. 1:40.

TextFig. 28. Three frontal sections through the brain of *Vespa vulgaris*. A = ♀ queen, B = ♂ worker C = ♂ male. Tr Trachea, C.K. Central body, Pi Pars intercerebralis, F.s.a Superior anterior fascicle. Other labels see TextFig. 12. 1: 40.

TextFig. 29. A hypothetical phylogenetic tree based on neural characters of mushroom body features in diverse hymenopteran groups.