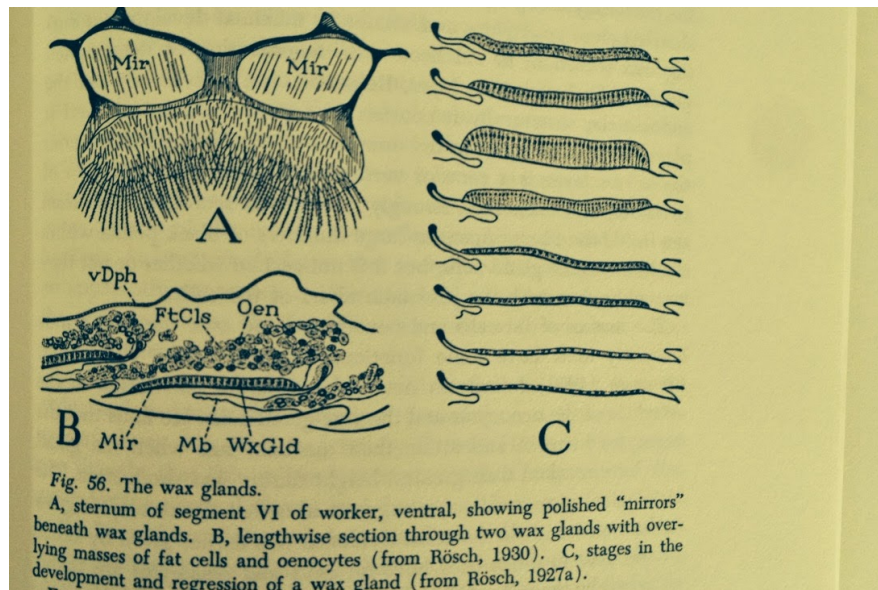
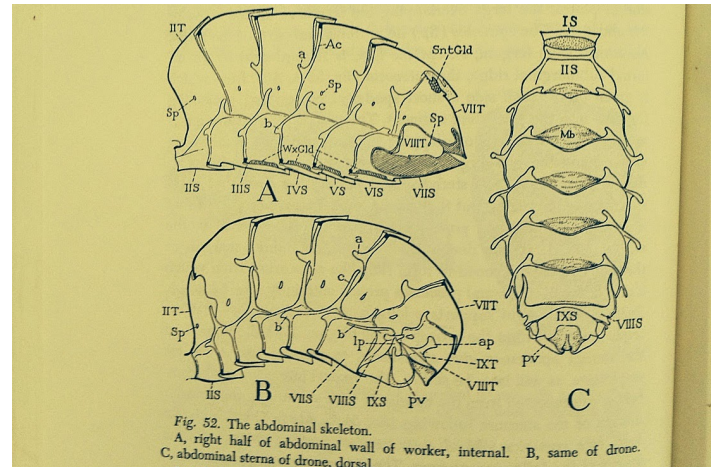
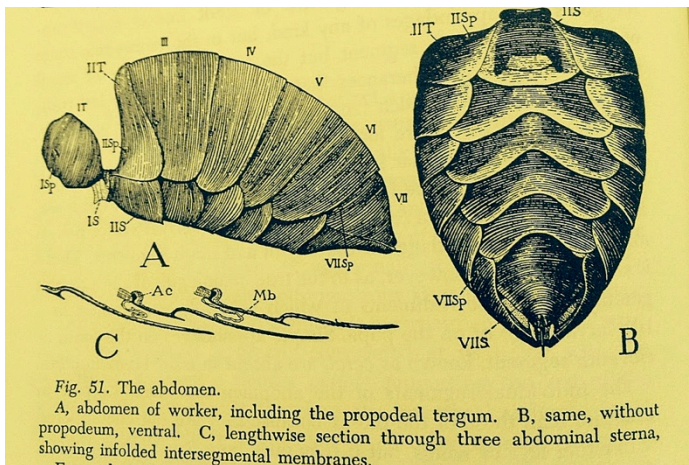


Beeswax

When a colony of bees enters a new home (in nature, this is usually an empty cavity in a tree or rock), it has committed itself to the task of creating a proper hive in which to lay eggs and raise brood, to store pollen, to process nectar into honey. In addition, the colony needs an expansive surface on which to congregate by the tens of thousands, close enough to communicate among themselves in the near-total darkness of the hive, yet with enough room to move about and work and ventilate. Its design must allow the colony to cluster together during the long months of winter, with constant access to stored honey to warm themselves and thus to survive.

Beeswax is the building material for a hive, and they do not gather it - *they secrete it*. Upon entering the hollow place chosen (*by them or for them*) to live, they start work at once ... and the work is most remarkable. Four glands on the underside of the abdomen secrete long-chain lipids which, as they are extruded onto the flat abdominal plates, cool into flakes of wax.

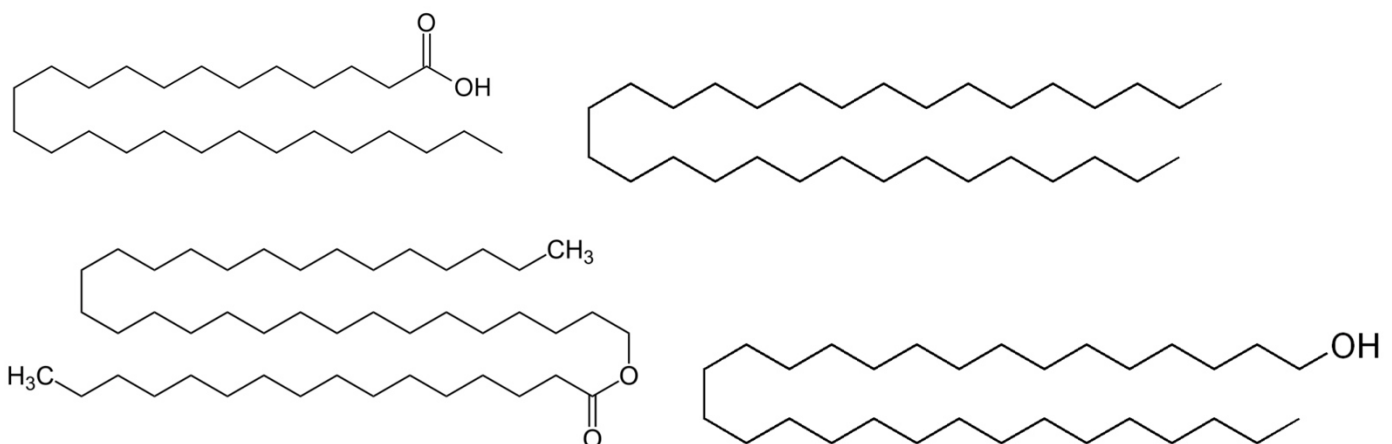




Bees collect these freshly minted flakes in their mandibles and begin to assemble their new home from scratch. In the sense that individual honey bees are short-lived (4 weeks in spring and summer), while the *hive* might stay alive with bees and intact for many years, the composite group, *the colony in its hive*, is considered the relevant being, the *superorganism*. In this sense, the extensive waxworks - brood comb and honey comb - might be considered a living *tissue*. Wax comb of a typical hive contains more than 150,000 cells.



Composition of wax is complex, being comprised of several major constituents and nearly 300 minor components. Four long chain fatty acids: **cerotic acid, hentriacontane, myricin, and triacontanol** are dominant:





The unique physical properties of beeswax allow it to be crafted (*by insects!*) into the remarkable architectural masterpiece of the comb. Beeswax is considered a liquid, with two transition points: one at 77 deg. F, where it becomes pseudo-crystalline, and another at 104 deg. F, at which temperature it becomes amorphous and more free-flowing. Bees working wax and building comb can *and do* heat themselves up to 109 deg. F, selectively making use of the precise geometries that result *when semi-liquid cylinders stacked together are heated then allowed to cool in place*: thus are formed the perfect 120 degree angles and 0.07 mm walls of the hexagonal cells of the honeycomb. Gravitational sensors - hairs surrounding leg joints - allow orientation of the vertical comb on a plumb line; individual cells are set with a slightly upward tilt.



For additional info and references, go to imagesays.com -> beeswax