ENTOMOLOGY NOTES

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Flight of the Bumblebee

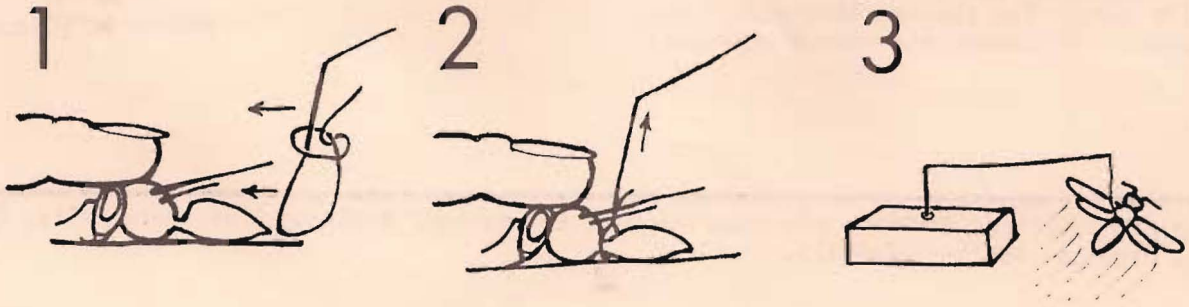
Everyone, except the bumblebee itself, knows that a bumblebee can't fly. Its body is too big for such small wings and furthermore it isn't particularly streamlined like the wasp. Don't take someone else's word for it, try flying bumblebees at home. Get a strand of porch screen or other fine wire for tying the bee. If you do this in late fall there is very little chance that you won't interfer with the bumblebee population. The new queens, which are the only ones which will survive the winter, are hibernating. The males and workers still alive will die by winter.

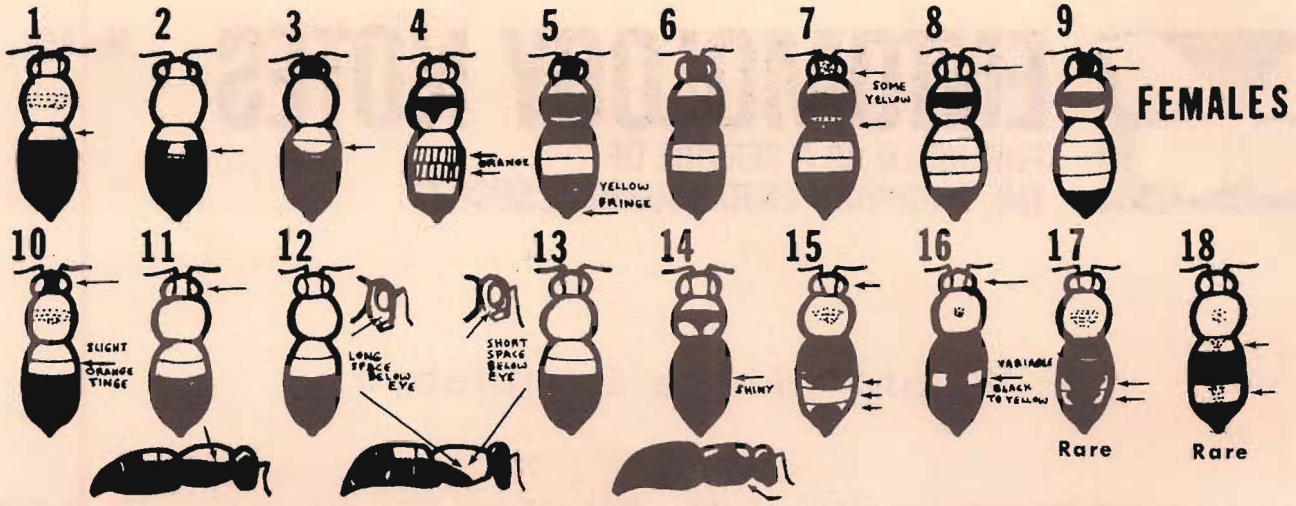
If you do not want to take a chance on getting stung, tie up a male instead of a worker or queen because males do not sting. If you are very good at identifying the common kinds of bees that occur, you can just grab a male off goldenrod and put it in your handkerchief until you get home. Put the handkerchief with the bee in an empty jelly jar and put the jar in the refrigerator for a half hour. While it's in there, take your single strand of wire and tie a slip knot in it. You might want to make 2-3 of these loops in case one slips off the bee and you can't get it opened up fast. After you take the bee out of the refrigerator, you have about 5 minutes to get it tied before the bee warms up enough to fly away. If it does get active, put it back in the refrigerator for another 10 minutes. Place your finger on the top of the bee. Slip the loop around the abdomen of the bee and pull it securely. Be careful to keep the wings out of your loop and keep the bee top-side up. Finally, secure the other end of your wire in a hole made by a needle in a piece of wood. You are now ready for experiments in the flight of the bumblebee. By the way, you can use other flying insects such as flies this same way.

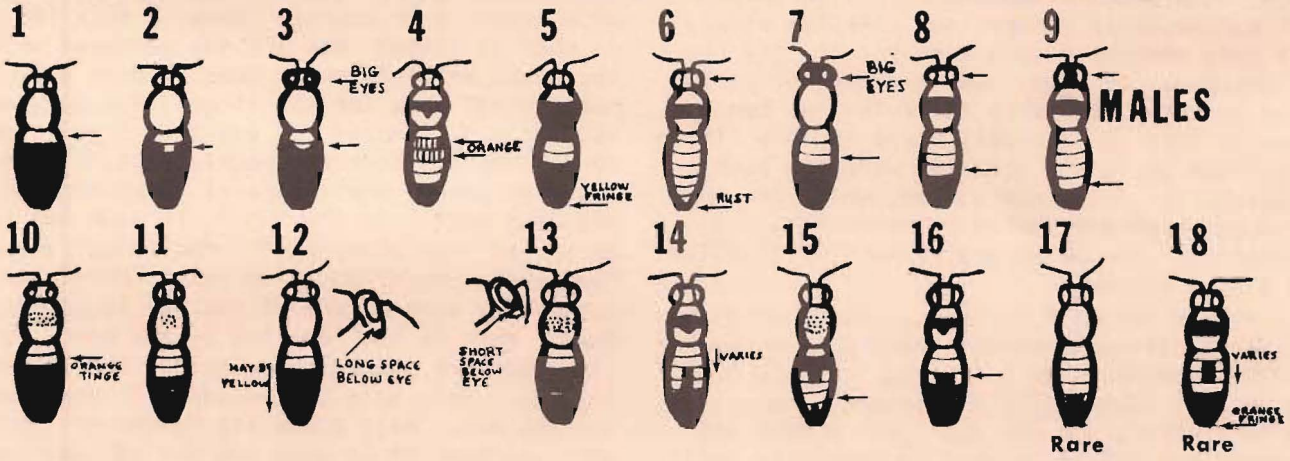
Here are some questions you might try to answer: How fast can your bee go? How many seconds does it take to make a circle? What is the distance once around your course? Does it tuck its legs in when it flies? How are the antennae held--up, down, straight out? Does it buzz when it is not flying? How far can it go? How many revolutions can it make? If you hold a paper or card under its feet (supporting it), then take away the paper, what happens? What happens if you blow gently in its face? Is your bee faster or slower than other bees? What would you guess the reasons might be for a faster or slower bee? Twist your wire around so the bee is upside down. What is the reaction by the bee? Can it fly? How are the antennae held? What do the legs do? Provide a bottle cap with sugar water for the bee. Will a bee fly longer or faster when you feed it or when you don't? Can you think of a way to estimate how fast the wings are beating? Others have used sound, wing marks on a rapidly rotating drum or a stroboscope. How would you use sound to guess wing speed? Do mosquitoes make a higher or lower sound than bumblebees? Would you guess that the wings beat faster if you were able to add weights to the bee? Would they beat slower or faster if you clipped off the wing tips? What species of bumblebee do you have?

Even experts have difficulty with the small fraction of bumblebees which have atypical color patterns. If you encounter one of the oddities, give it to your county extension agent to forward to a university. Fortunately, <u>most</u> local bees have more or less regular color patterns. Like people, each bee will be slightly different (see chart of bee species).

Male bumblebees and flies and moths which closely resemble bumblebees, do not sting. To







(1) *Bombus impatiens*; (2) *B. bimaculatus*; (3) *B. griseocollis*; (4) *B. ternarius*; (5) *B. terricola*; (6) *B. americanorum*; (7) *B. auricomus*; (8) *B. borealis*; (9) *B. fervidus*; (10) *B. affinis*; (11) *B. perplexus*; (12) *B. vagans*; (13) *B. rufocinctus*; (14) *Psithyrus variabilis*; (15) *P. ashtoni*; (16) *P. laboriosus*; (17) *P. insularis*; (18) *P. fernaldae*..

determine if you have a mimic, put your living insect, contained in a jelly jar, in the refrigerator for 10 minutes to stop its activity. If it has 2 wings instead of 4, it's a fly. If the antennae are clubbed and appear to come from the top of the head and it has small scales, it's a moth. Male bumblebees, in contrast to females, lack the cone at the back of the abdomen and lack the pollen basket on the third pair of legs.

Bumblebees have relatively long pile (hairs) of contrasting black and yellow patterns on a black shiny body. Two species have additional orange colors. Honeybees and most digger bees which are the size of small worker bumblebees lack the black and yellow color patterns. Black and yellow carpenter bees have shorter hair, rounded faces with the bottom of the eyes nearly touching the base of the mandibles and have stout legs covered with stiff hairs. In *Psithyrus* bumblebees, which are social parasites of *Bombus* bumblebees, the hair is less dense on the abdomen. So, the abdomen appears shiny like the abdomen of carpenter bees.

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