

Some Unique Bee Behaviors

In The Private World of the Honey Bee

Dr. James E. Tew

Alabama Cooperative Extension System

<http://www.onetew.com>

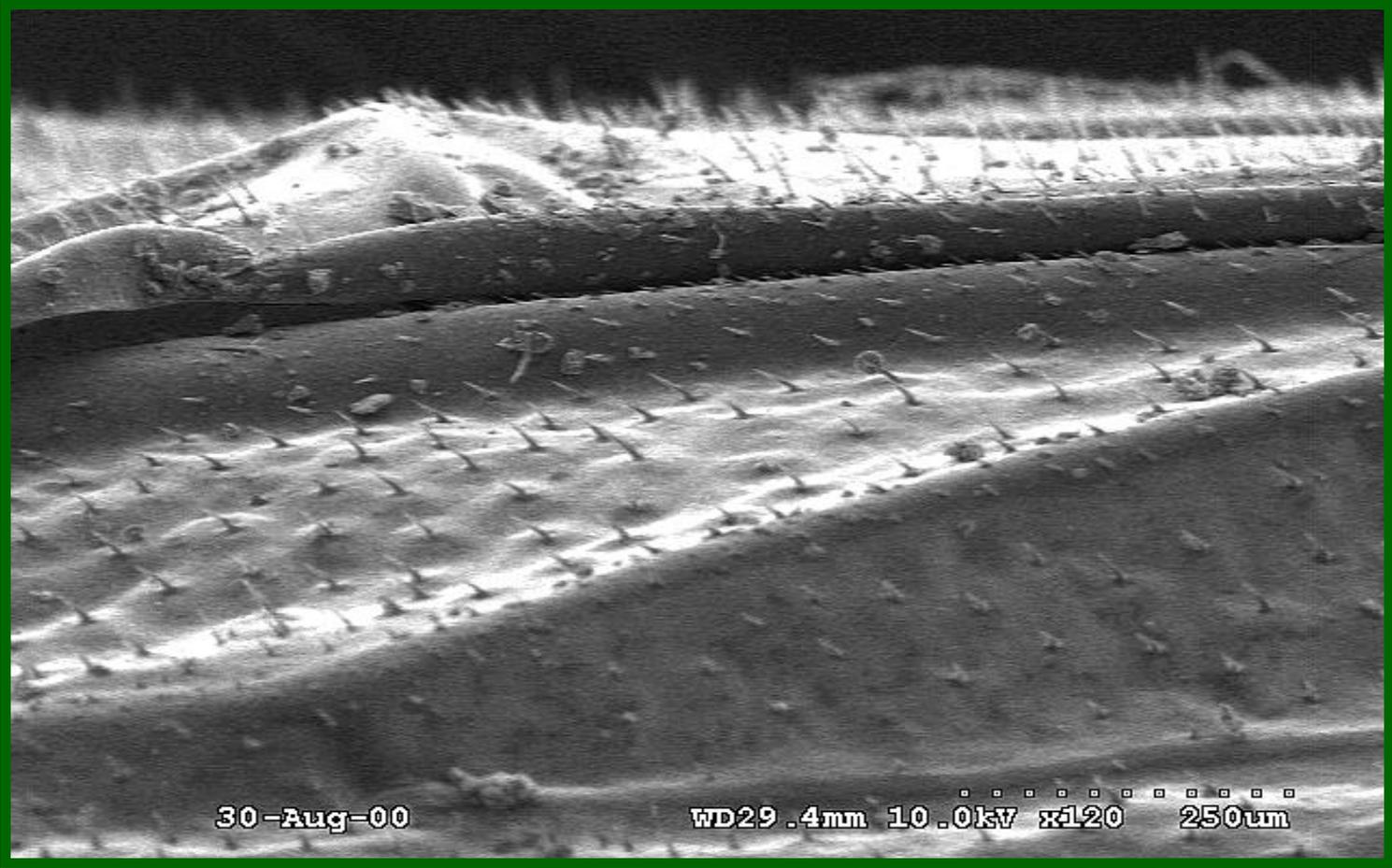
***Understanding honey bee biology
is necessary to more fully
understand bee management.***



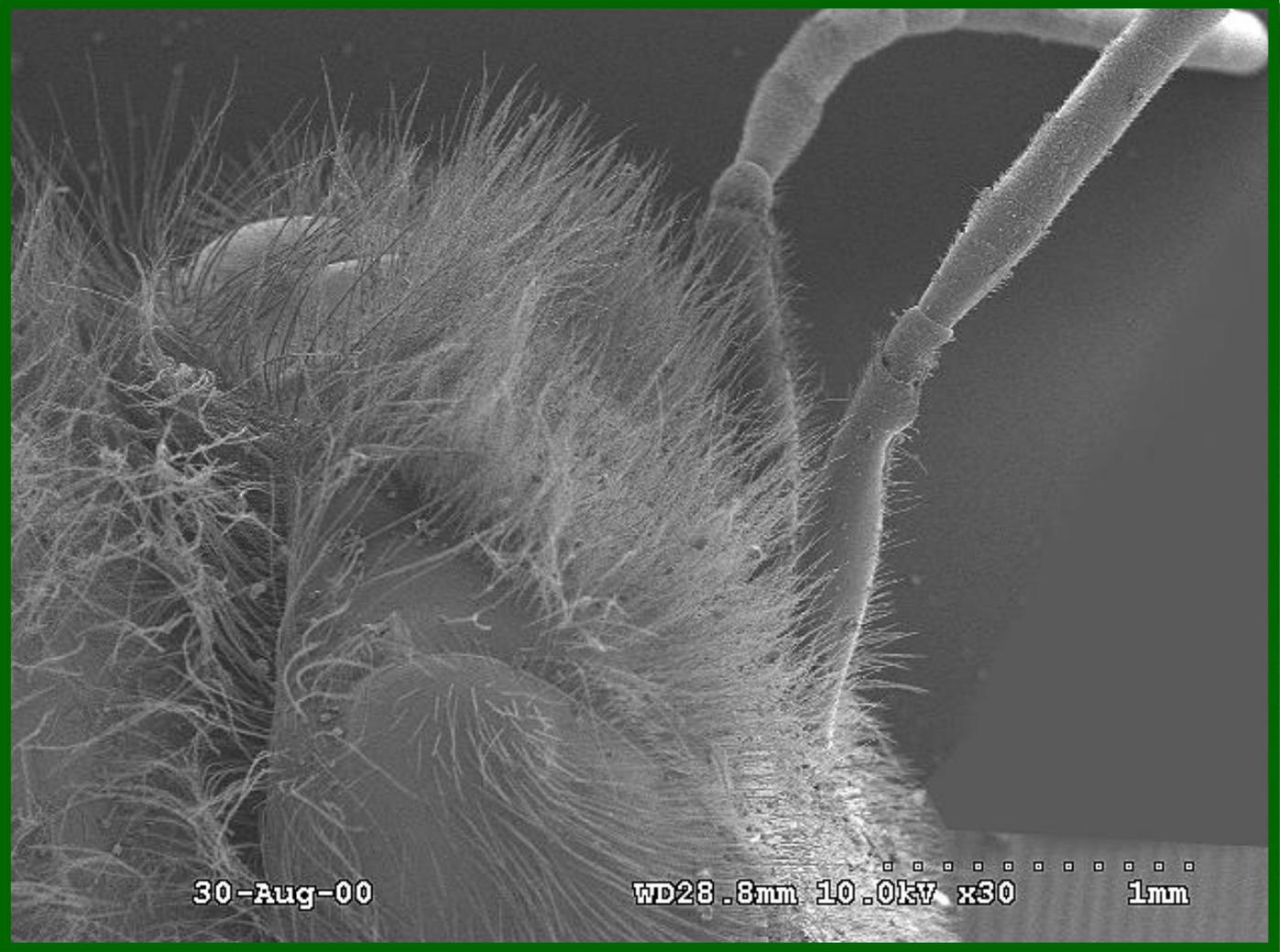
The Basic Honey Bee



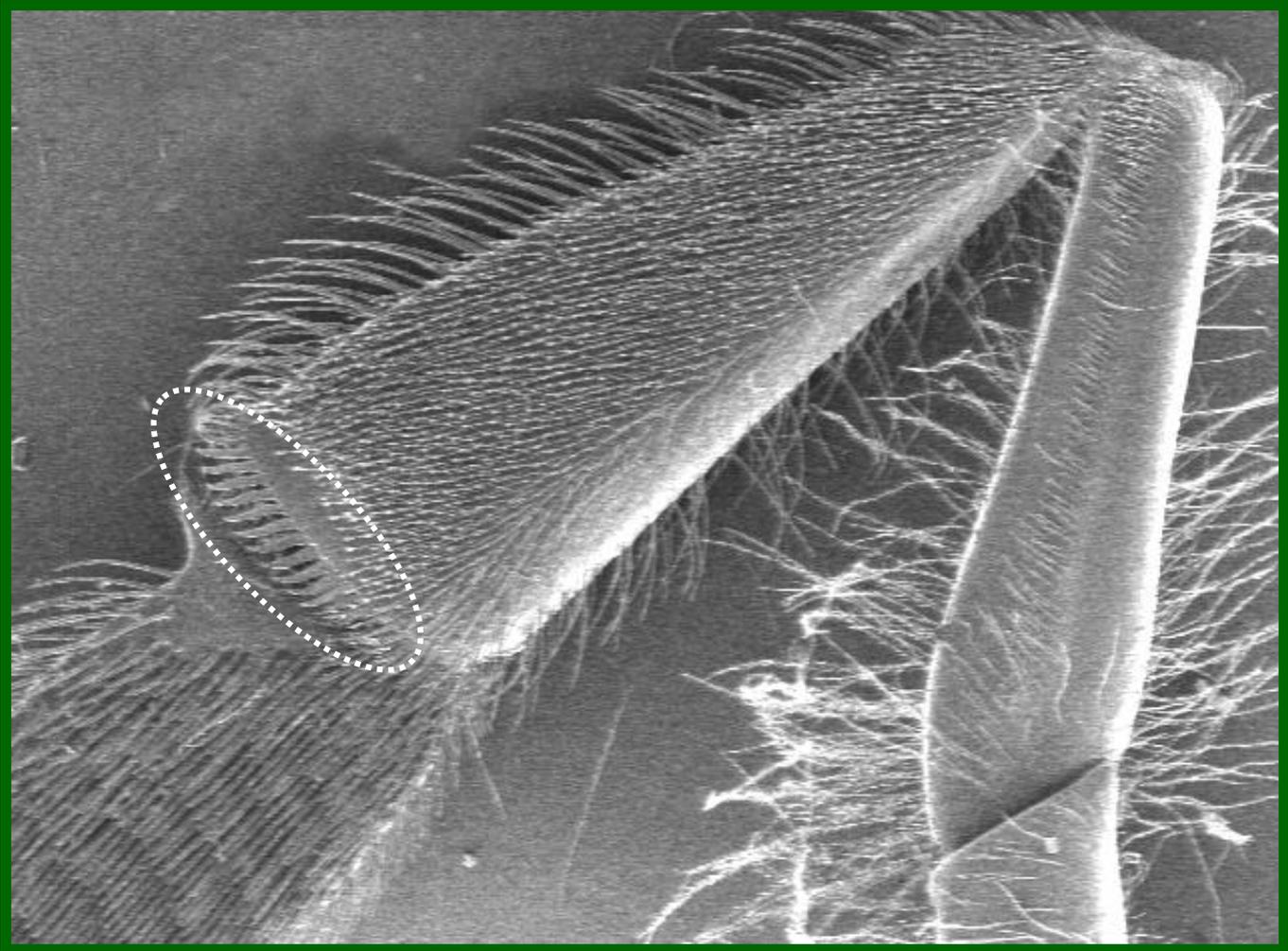
A Bee's View of a Bee's Wing



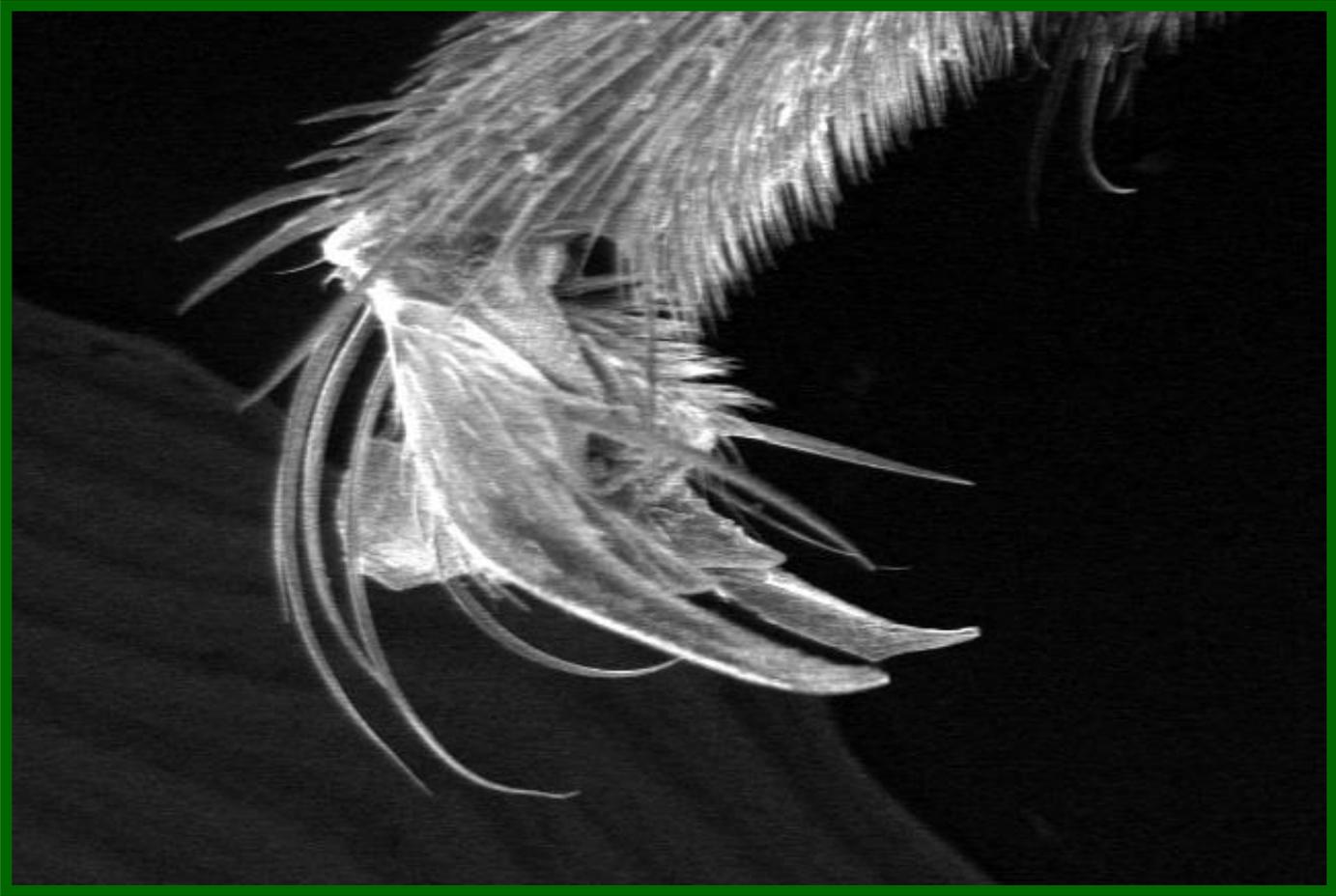
The Top of the Bee's Head



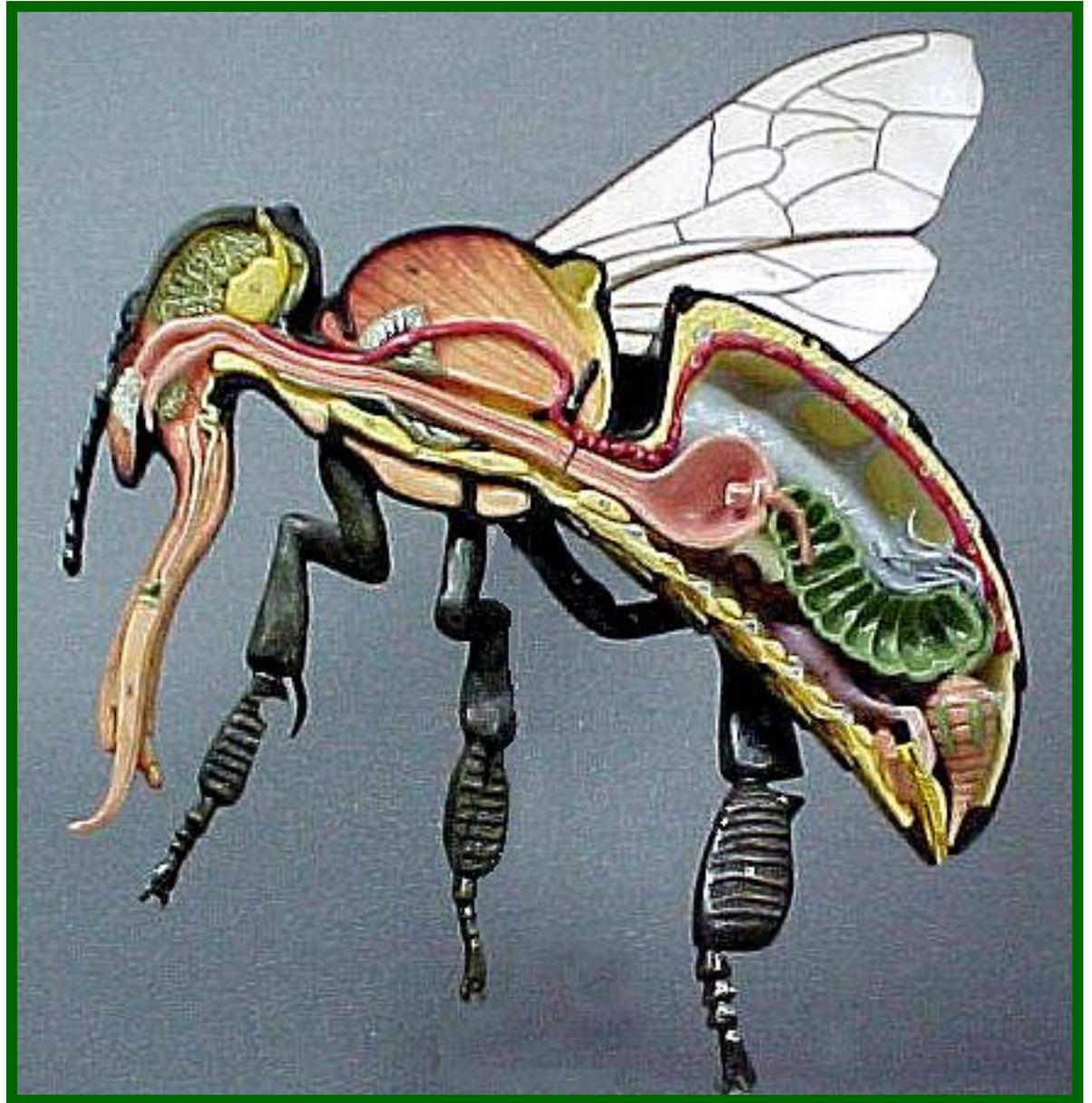
Inside the Rear Leg

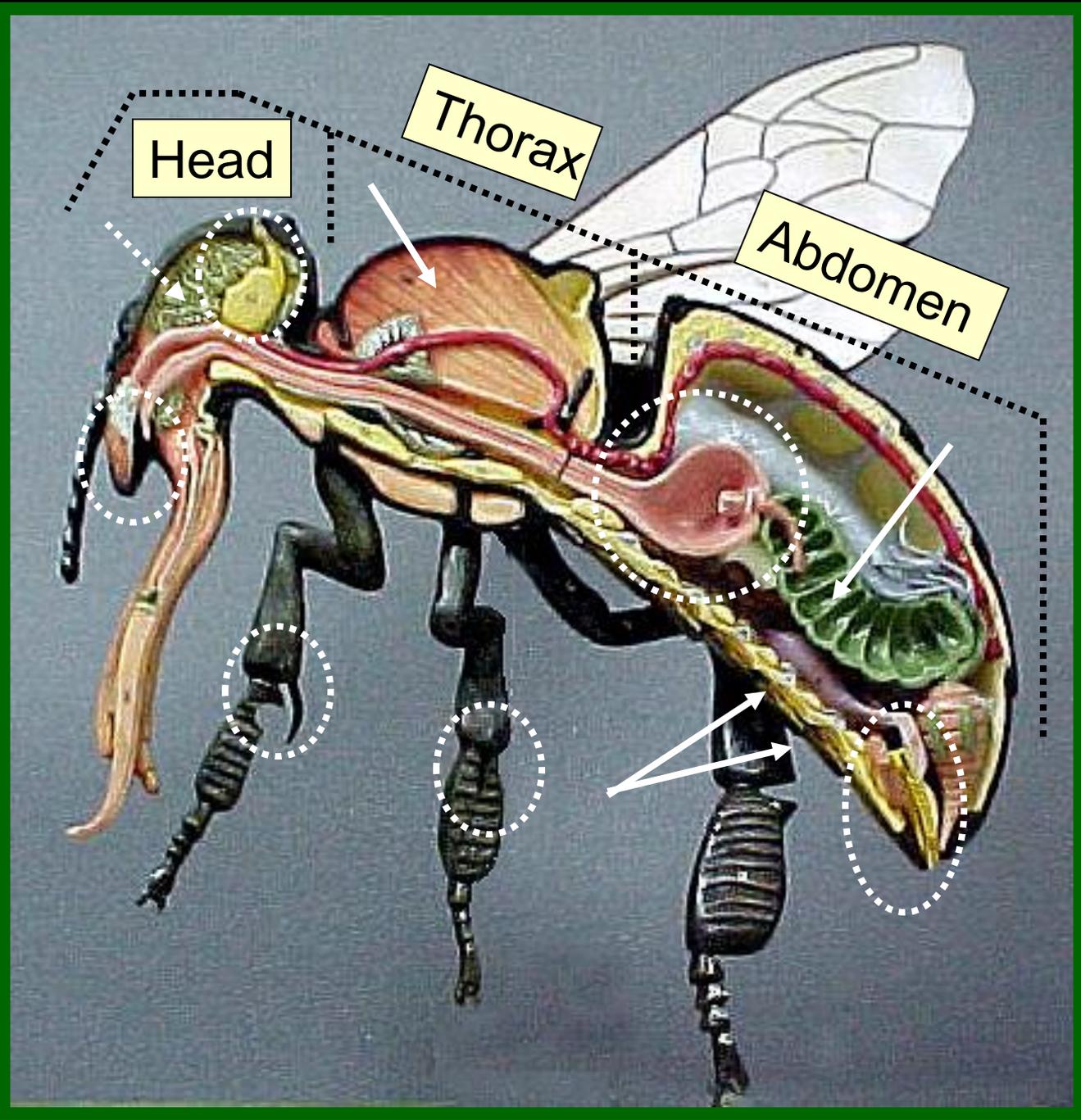


The Bee's Foot (Tarsal Claws)

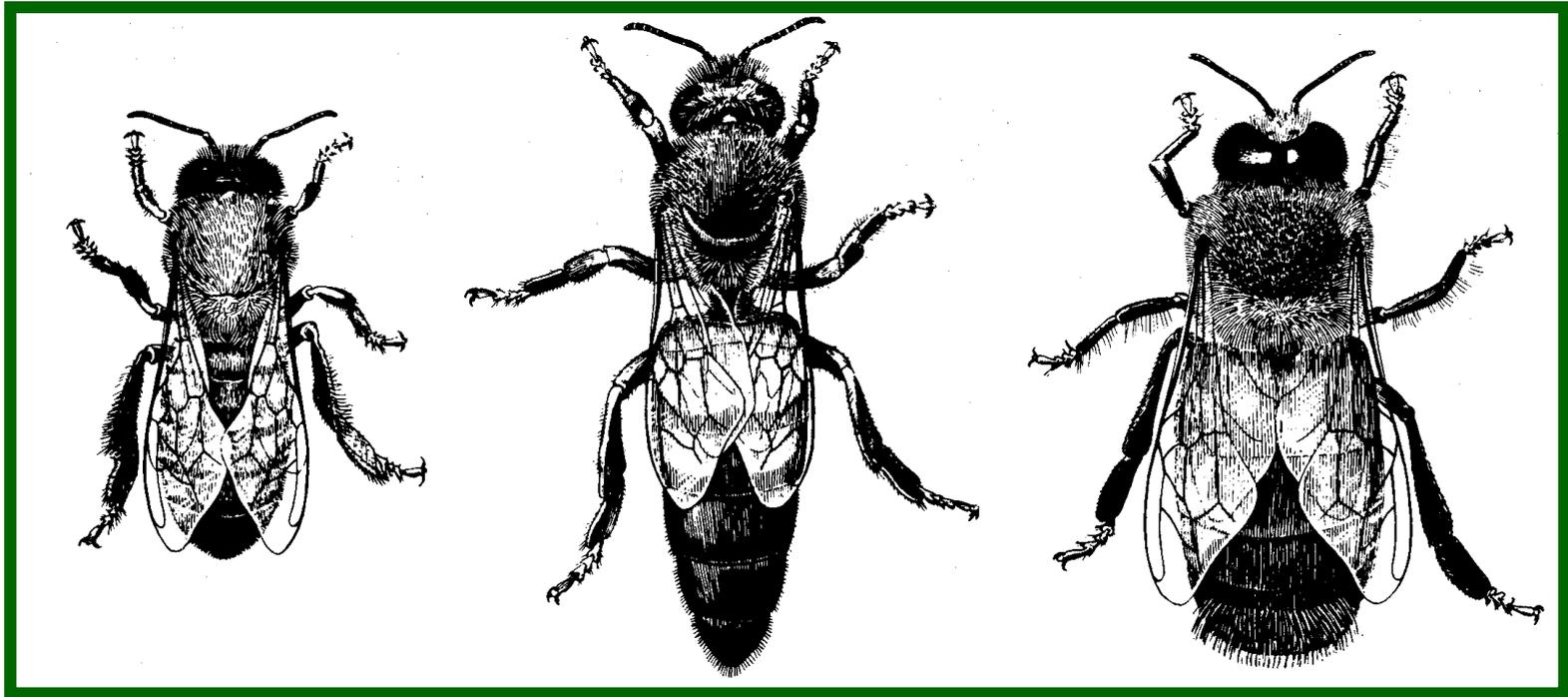


Inside the
Bee





The Honey Bee Caste System



Worker

Queen

Drone

The Worker

- 21 day development period
- Lifespan of 3-5 weeks
- Infertile female
- Tasks
 - Brood care
 - Nest construction and defense
 - Food and water collection
 - Queen maintenance



The Drone

- 23 day development period
- Lifespan of 2-3 months
- Tasks
 - Mate with queens
 - Heat production
 - Mating kills them



The Queen

- 16 day development period
- Lifespan of 3-5 years
 - Shorter now
- Fertile female
- Tasks
 - Produce eggs
 - Produce pheromones



Honey Bee Brood



New Comb

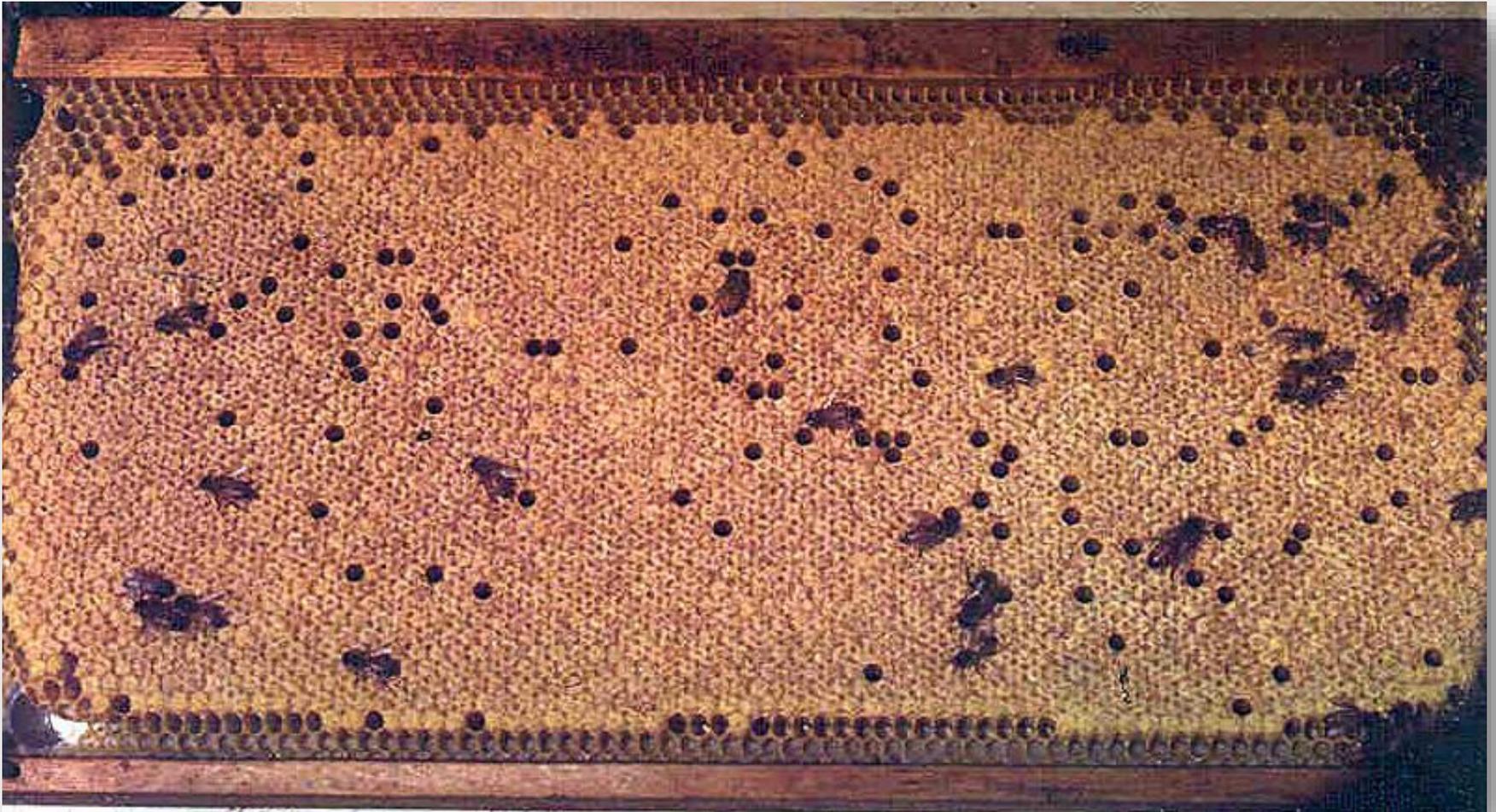


An Egg



Brood Stages

A Frame of Capped Brood (Pupae)



All Kinds of Behavior



Orientation Flights

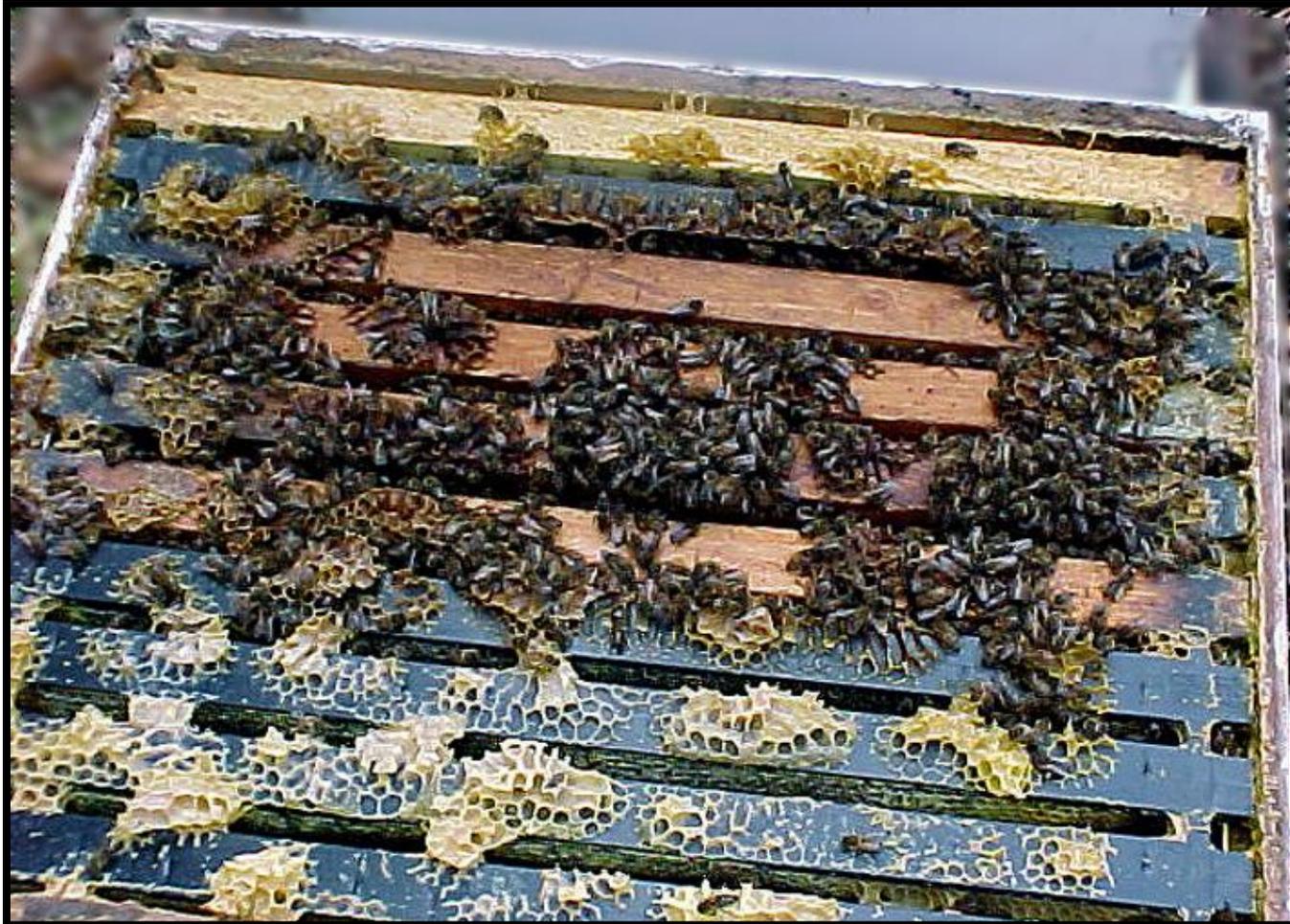


Scenting



Swarming

Surviving the Winter



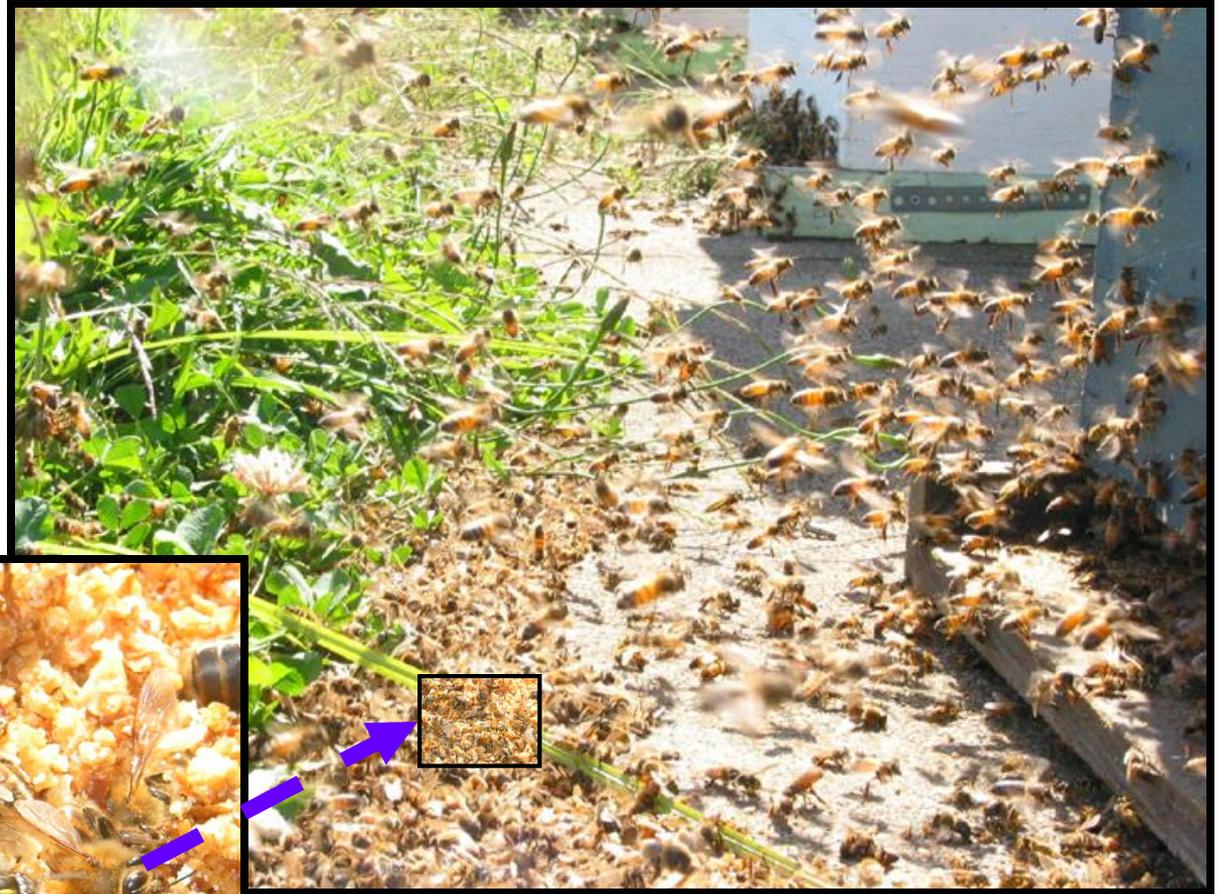
The Infamous *Stinger*





Things go
wrong

Robbing



Bees gone mad?



The Natural Bee Nest

Not as we would have designed

Nest Fundamentals

- Same cluster as in nest cavity
- Wax producers inside cluster
- *“Engineer bees”* layout comb midribs
- Gravity provides vertical orientation



There is no standardization in natural nest cavities

ALL NATURAL NESTS ARE NOT PERFECT



A Fatal Nest Site



Basic Requirements

- One cubic foot
- Dark
- Dry
- Defendable entrance
- Not already occupied
- Above ground





Beeswax

The bees' building material

Details not understood

- Why are wax producers within the cluster?
- Why is some comb wavy?
- Are wax scales passed upwardly?
- Why are dropped scales not retrieved?



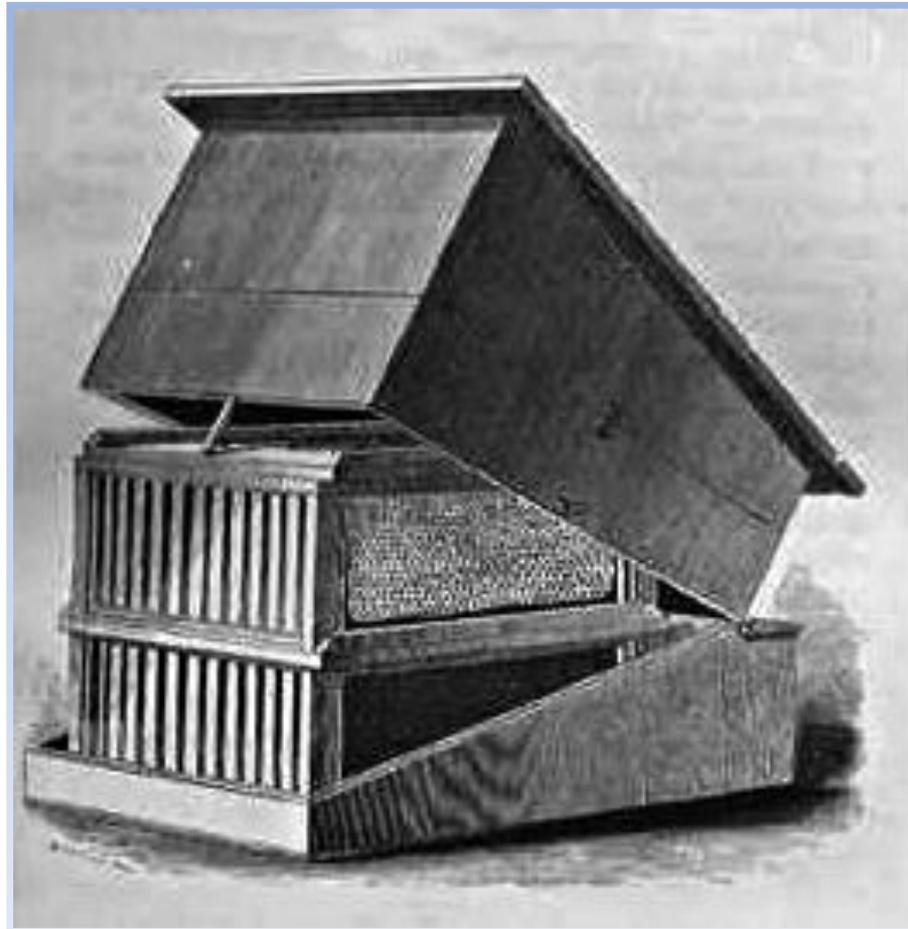
Honey Flow Farms Photo

Bee Space

- 1/4" – 3/8"
- Somewhat flexible
- Critical to hive design
- Bees \approx 1/8" tall
- Human space
- Honey cells/brood cells



L.L. Langstroth



The “Modern” Beehive



Standardized

- Interchangeable with various companies



Simple Design

- Easy to use



Accepted by bees

- In general, bees thrive in the hive



This is what it looks like inside the closed hive.....



- Hot
- Close & crowded
- Odiferous
- Electrically charged
- Gravitationally directed

Yet, outside the hive...



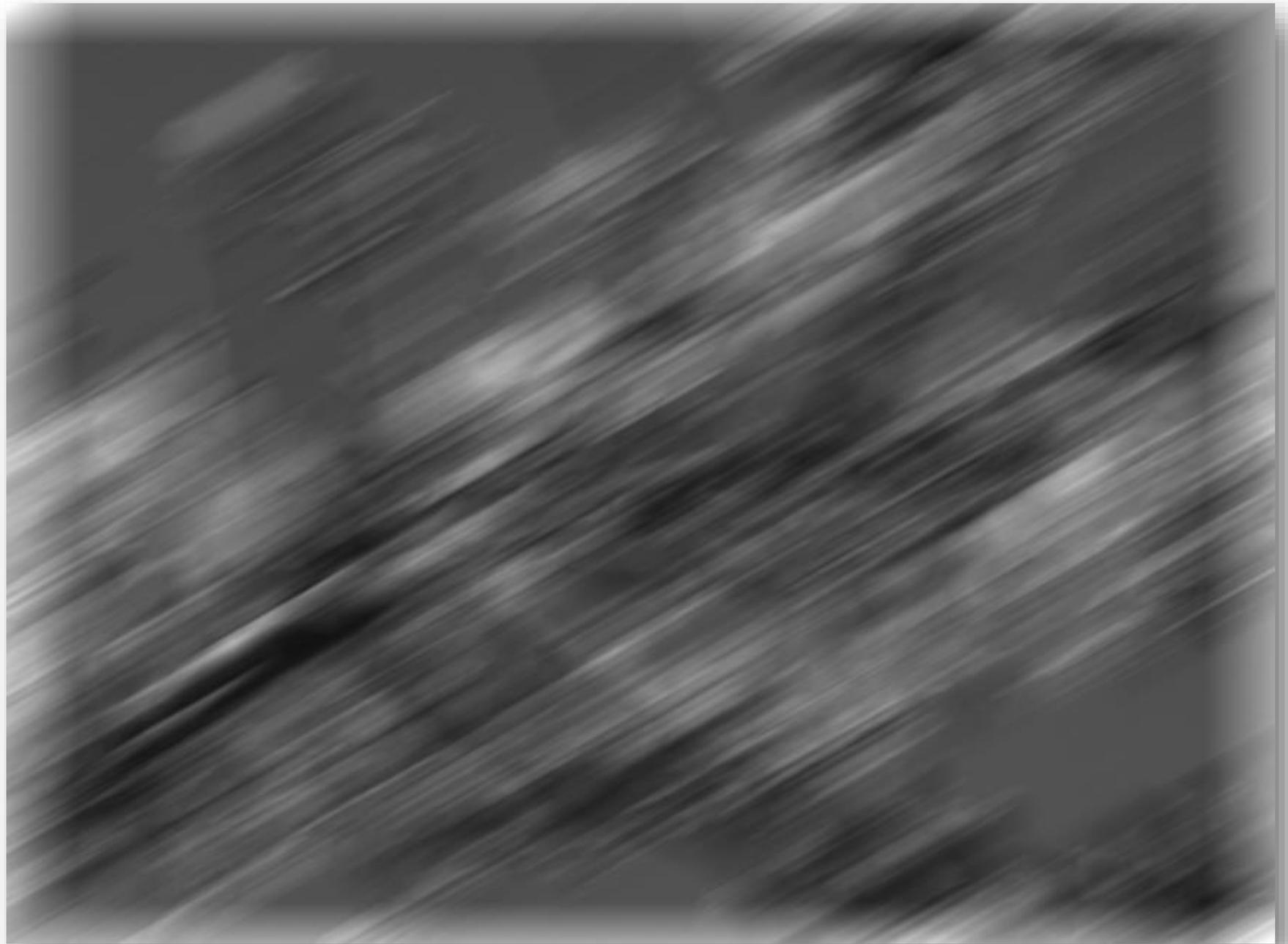
The Foraging Trip

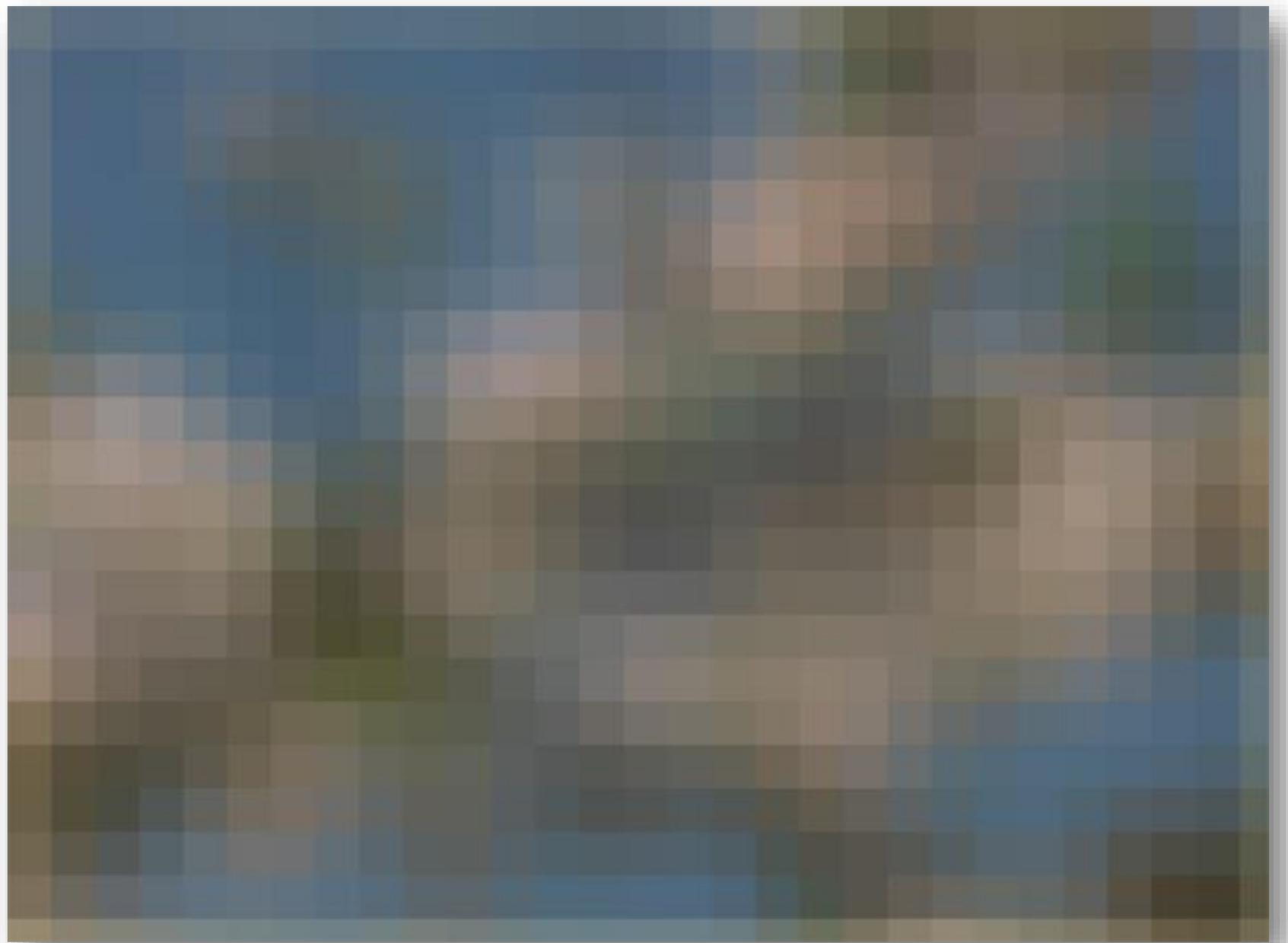
“Bees leave the colony and forage on blossoms.”

- Fixed focal length eyesight
 - Triangulation of the eyespots
- The perception of the environment
 - Flying at about 17 mph
 - Visual cues
 - Orientation to and from the colony
- The color, odor, and taste of the reward











The Passive Plant's Role

- Offers odors, taste, and visual cues
 - UV nectar guides
 - Visible color
- Flying bee acquires a positive charge
 - Pollen responds to static charge
 - Plant is grounded so bee discharges the charge as it alights
 - Charge is weather dependant





Propolis

The bees' finishing material

How do bees find propolis?

....the unloved hive product

Propolis does not exist anywhere other than inside the hive. Bees collect plant gums and mix beeswax with it to form propolis.



The Collectors



- Are specialized
- Are >15 days old
- Have atrophied wax glands
- Work warm months
- Add saliva & wax
- Need help unloading

The Load

- Each load =
3/10,000oz
- 1.8oz – 5.3oz per yr
- Caucasians 35 oz
- Stringy, sticky



The Collection Process

- Find plant resin and tear a stringy piece off
- Legs manipulate and move to basket
- Repeated several times to acquire load
- Short flight to manipulate load
- Return for more thread-like collections
- Laborious and time-consuming

The Unloading Process

- Must have help to unload
- Frequently at entrance
- Strenuous work for both bees
- Droplets (Stringlets?) fall
- Must be warm temperature
 - Otherwise bee will wait until warmed
- Moved by house bees to needed location



Propolis Uses within the Hive

- **Mechanical Uses**

- Thin layers on walls and surfaces
- Slippery varnish (pest removal)
- Fill cavities < 3/16"
- Repair combs
- Strengthen combs
- Enforce entrance
- Encapsulation

- **Biological Uses**

- Restricts putrefaction
- Brood protection
- Entrance repellent
- Entrance disguise
- Inhibits seed germination



Unappreciated water collectors

and their unappreciated temperature-sensing hive-mates

- Required for:
 - Larval food
 - Hive cooling
- The players
 - Nurse bees
 - House bees
 - Foragers



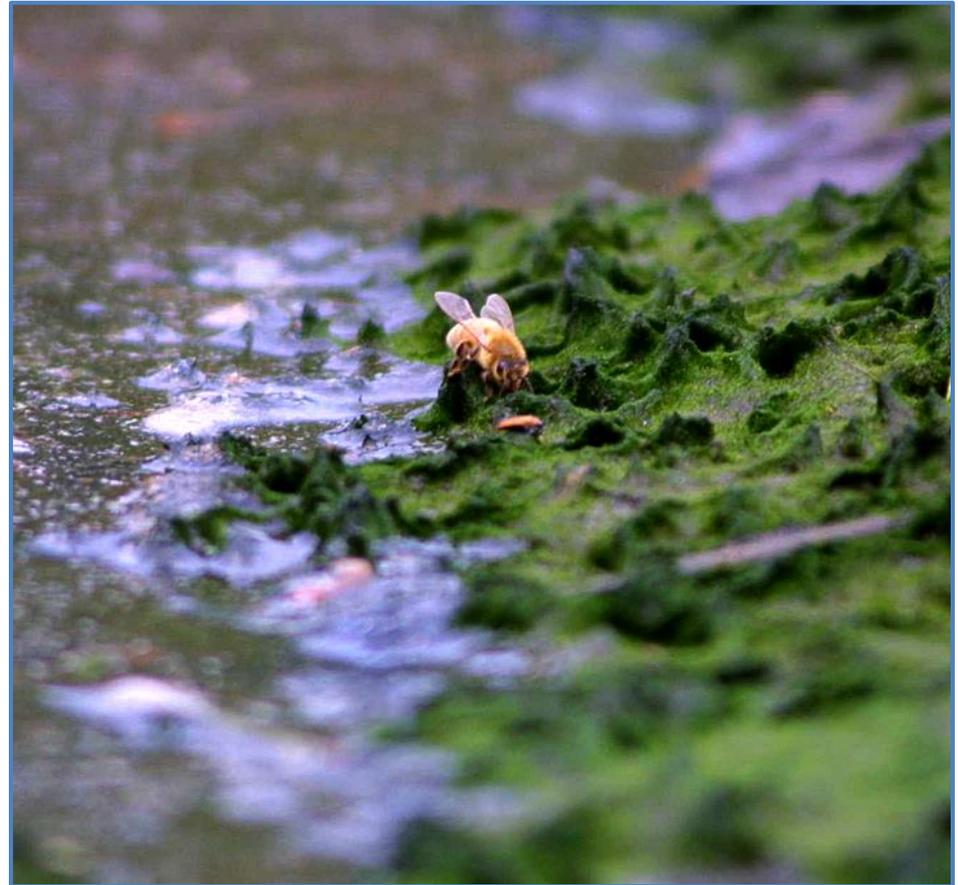
The procedure

- Honey sac contents become concentrated
- Nurse bees solicit water
- Water carriers are activated
 - Specifically water
 - Thin nectar
- Receptive eagerness important
- Dual uses
 - Food
 - Hive cooling
- Bee “buffaloes”



But how do they actually find the water source?

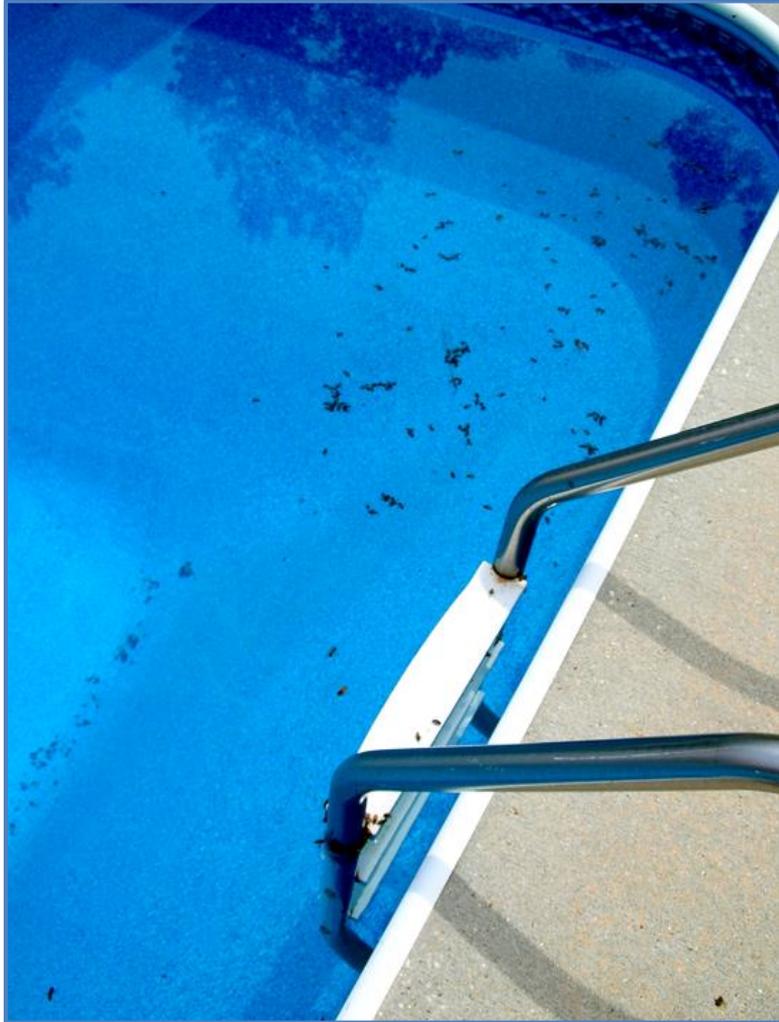
- Not really known
- Seemingly closest source
- Dependability helps
- About 50 trips per day – up to 100
- 800 collectors needed to provide 1 liter
 - Typical need per day



A dependable water source



But what's happening here?



“If any one of us could be a bee for just a few seconds, what in insight that would give us.”



LIFETIMES CAN BE SPENT ON THIS..

Thanks for Listening

