

# Reading the Frames

Bee-coming the Best Bee Detective You Can Bee!



Prepared by Landi Simone, Gooserock Farm  
EAS Certified Master Beekeeper

# The Best Beekeepers are Excellent Diagnosticians



Photo: [avivaromm.com](http://avivaromm.com)

- A good beekeeper can tell by EXAMINING a colony whether the bees are sick or well, and, if ill, what disease is present.



Photo: Carol Margulies

# So, are beekeepers like doctors?



Photo: medscape.com

- Doctors:
  - **Examine** their patients
  - Run **tests** on them
  - **Talk** to them to determine their symptoms and concerns, and
  - **Treat** them if they are ill.

- Beekeepers
  - **Examine** their bees
  - May run **tests** on them
  - **Treat** them for disease or parasites if found,
- BUT,
- WE CANNOT **TALK** TO THEM.



Photo: Carol Margulies

# Our Bees DO Talk to Us!



- Bees will tell us exactly what is going on with them, but since we do not speak their language, we must learn to understand their signals by ***observation*** and ***interpretation*** of their behavior.

- Detectives
  - Gather *clues* by *observation*, using the senses of sight, sound, smell, taste and touch. They interpret these clues and arrive at conclusions.



# A Good Beekeeper is a Good Detective



Photo: BBC Films, "Mr. Holmes"



- In the Sherlock Holmes books, authored by Sir Arthur Conan Doyle, Sir Arthur had Holmes retire to keep bees on the Sussex downs.
- He understood that keeping bees was a fitting occupation for his brilliant detective.
- The short story, “*The Adventure of the Lion’s Mane*” takes place in this setting.



Photo: Colonsay.org.uk

# Useful Sherlock Holmes Quotes for Beekeepers

- “Data! Data! Data!” he cried impatiently. “I can’t make bricks without clay.” *-The Adventure of the Copper Beeches*
- “You know my method. It is founded upon the observation of trifles.” *-The Bascombe Valley Mystery*
- “You see, but you do not observe. The distinction is clear.” *- A Scandal in Bohemia*
- “It is a capital mistake to theorize before one has data. Insensibly one begins to twist facts to suit theories, instead of theories to suit facts.” *-A Scandal in Bohemia*

# There is No Substitute for Experience, *but*

- You can learn a great deal about bee biology and behavior from reading, studying, and, if possible, working with an experienced mentor.
- You can train yourself to be a good observer and to interpret your observations in the context of your knowledge of bees.
- Doing this consistently will make your experience more valuable and will make you a better beekeeper.

# When we Examine our Bees, What are We Evaluating?

- Strength
- Health
- Queen-rightness
- Food stores



Photo: Parks Talley

# First Observation: Entrance Activity

- How much is there?
  - Lots of bees coming and going is usually a good sign but you can't stop there! Good entrance activity is NOT a guarantee your bees are fine.
  - Very few bees could indicate a problem. It could also just mean it's too cold or too wet for flight. It could even mean there's a high proportion of house bees to foragers, which can sometimes happen after swarming.
  - Are the bees on a nectar flow? If most foragers seem to have very direct, purposeful straight-line flight in and out, they're probably collecting a nice flow.
  - Is the colony being robbed? Is there a cloud of bees in front with lots of zig-zag flight and fighting at the entrance?
  - Are they bearding? It's hot or you just put something smelly inside the hive like a formic acid treatment.

*Most of these are clues to your colony's STRENGTH.*

# Next, Pop the Lid



Photo: Parks Talley

- Are there lots of bees on top of the inner cover?
  - Good sign. Probably strong bees making honey.
- Is there white wax visible in the hole in the inner cover?
  - They're on a nectar flow and running out of room. Add another honey super!
- Is there white wax between the inner cover and the top frames?
  - You definitely need to add a honey super!

*These are STRENGTH and FOOD clues.*

# Now Look at Your Honey Stores

- This one's obvious.
- LOTS of bees means LOTS of honey. STRENGTH and FOOD collection are intimately linked.
- This is true in fall as well as during the mid-season nectar flows. It's the strongest colonies that will make their winter quota of stored food the quickest, whether from natural nectar or from feeding syrup.



# Now for the Brood Nest...

- Accurately reading frames of brood is what separates the beekeepers from the wanna-beekeepers.
- The history and current condition of the colony is written in the brood frames.
- The brood frames will tell you a colony's queen status and its health. Being healthy and queenright makes a colony's population strong, which in turn determines their ability to gather food.

*The brood frames give you QUEEN and HEALTH clues.*



We may need to move some of these bees to get a good look at this frame, but first...



Photo: Carol Margulies

# Pay attention to some of the other clues the bees are giving you:

- Are they noisy?
- Are they lifting their abdomens and fanning their wings?
- When you pull a frame, are they running around nervously or are they calm and going about their business?
- Are they flying up and bumping you or stinging?

# Now for the Frames....





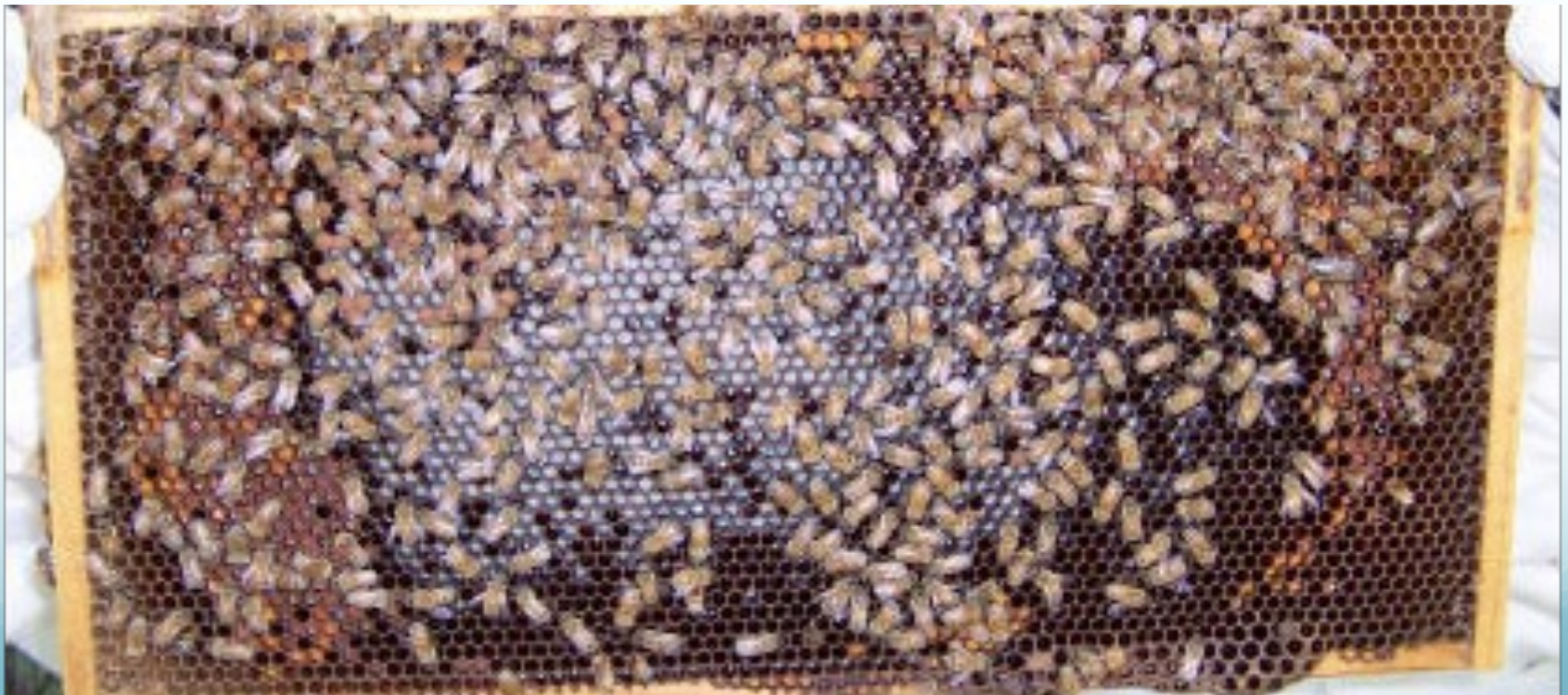
This is a beautiful frame of capped brood, solid and healthy. There's no capped honey but the lighter wax in the upper corners indicates there's nectar.

Note the solid drone brood near the bottom. Only queens lay drones in this kind of solid pattern. Watch this colony for swarming!

# How About This Frame?



- Many new beekeepers would think there is something wrong with this frame, but this is also a PERFECT frame of brood – it's just open brood rather than capped. Note the pearly white larvae in the center, the solid pattern, and the rim of pollen surrounding the brood.
- You must know what is NORMAL before you can spot what isn't.



# Another Brood Frame....



Photo: Sue Cobey



- Before you shout, “Drone layer!” take a closer look.
- This is a frame of solid drone brood deliberately introduced either as part of an IPM mite control regimen or a queen rearing operation.
- It is also a PERFECT frame of brood.



# What's Happening Here?





- There is absolutely nothing wrong with this frame of brood. It's a nice frame of EMERGING brood. The older bees around the outside are hatching out and the queen is relaying the center.
- This is the perfect frame to use if introducing a new queen in a cage as the newly emerged adults will instantly accept the new queen as "Mom."

And the next frame:



Photo: [krishisewa.com](http://krishisewa.com)



- SACBROOD, a virus
- Not uncommon, and we often see it together with EFB.
- Can clear up on its own with a good nectar flow. Re-queening may help, as can terramycin (even though it's a virus, not a bacteria.)

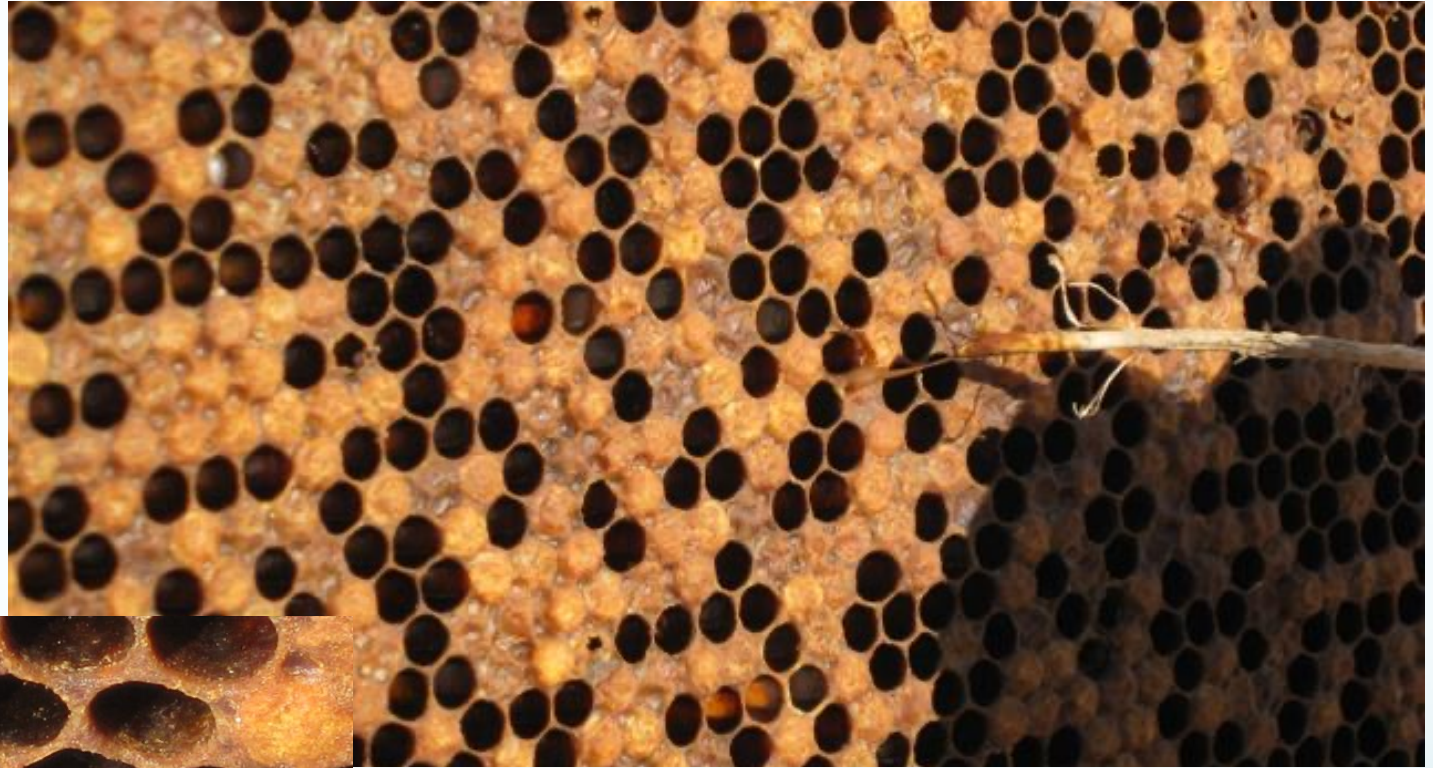
And the next....



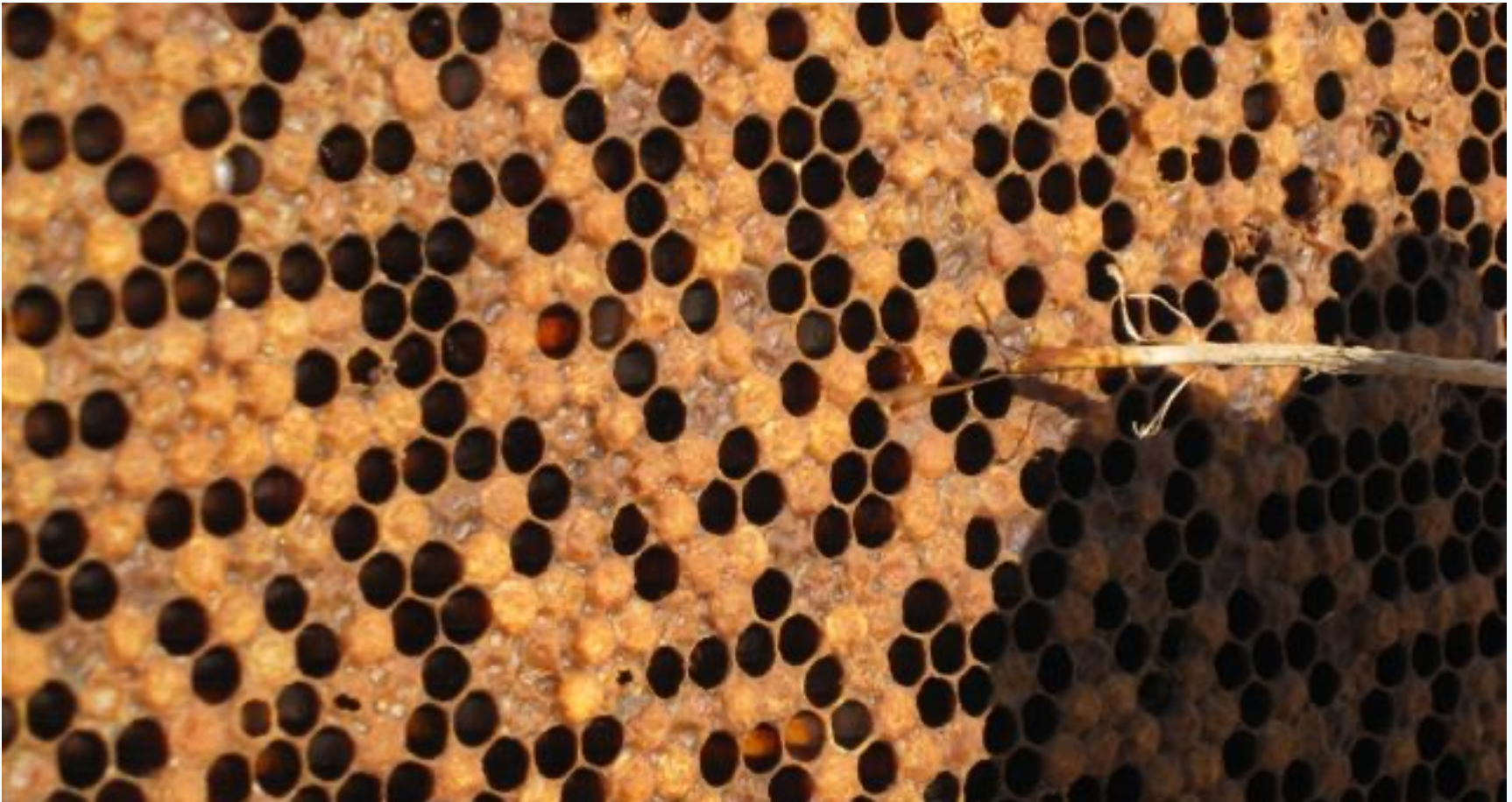
- EUROPEAN FOULBROOD (EFB).
- Several variants exist. They don't all look the same but you can distinguish them from AFB as EFB does not “rope” or form a scale that cannot be removed.
- Often seen together with sacbrood.
- Treat with terramycin.



# You should know this one:



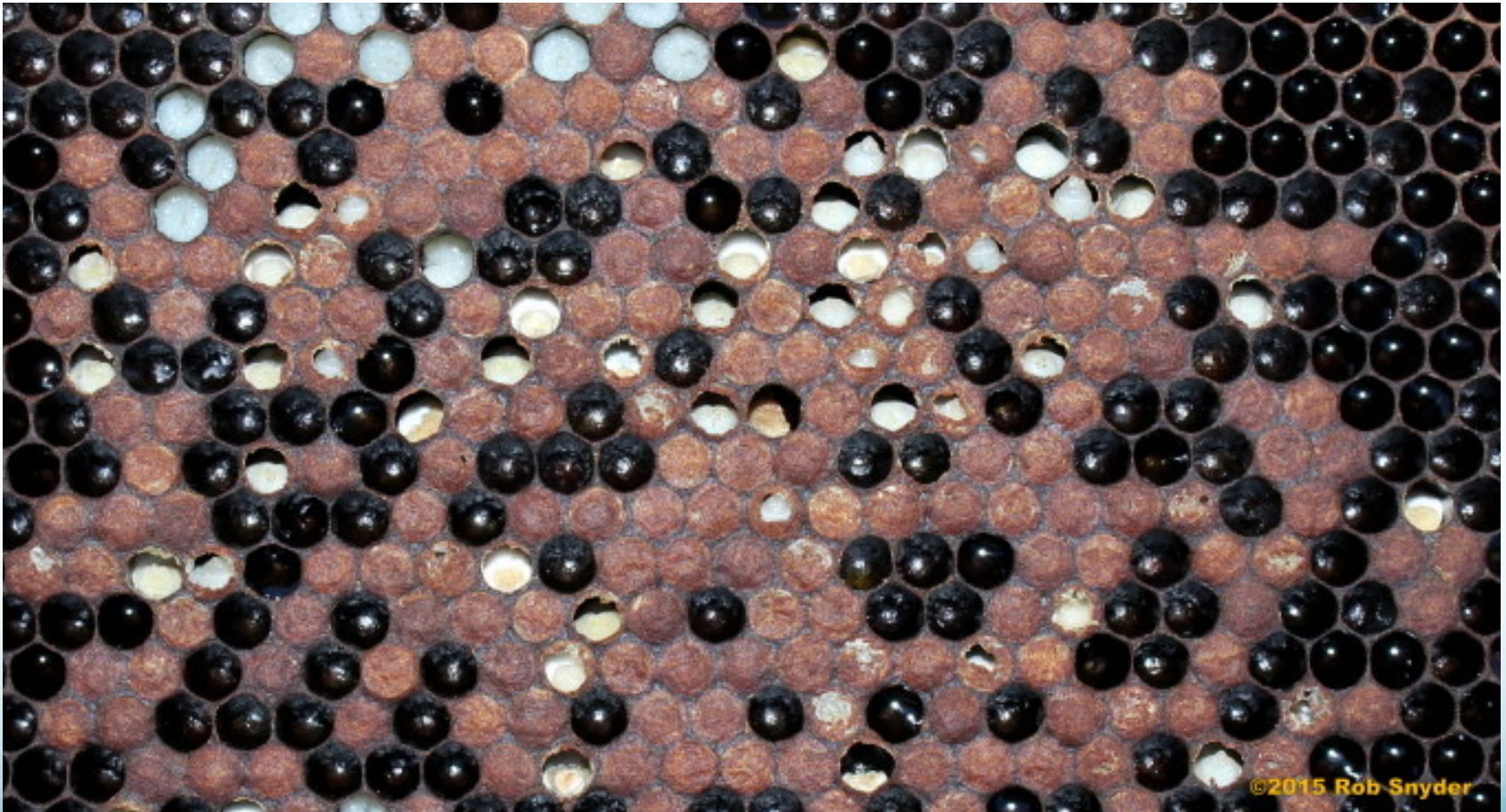
Photos: Adam Ebert



- AMERICAN FOULBROOD (AFB), the most deadly of the brood diseases.
- Distinguished by ropiness (shown), and a scale that adheres to the cell wall. Other symptoms include a distinct odor in advanced cases, sunken, greasy-looking cappings, perforated cappings, sometimes a projecting pupal tongue.



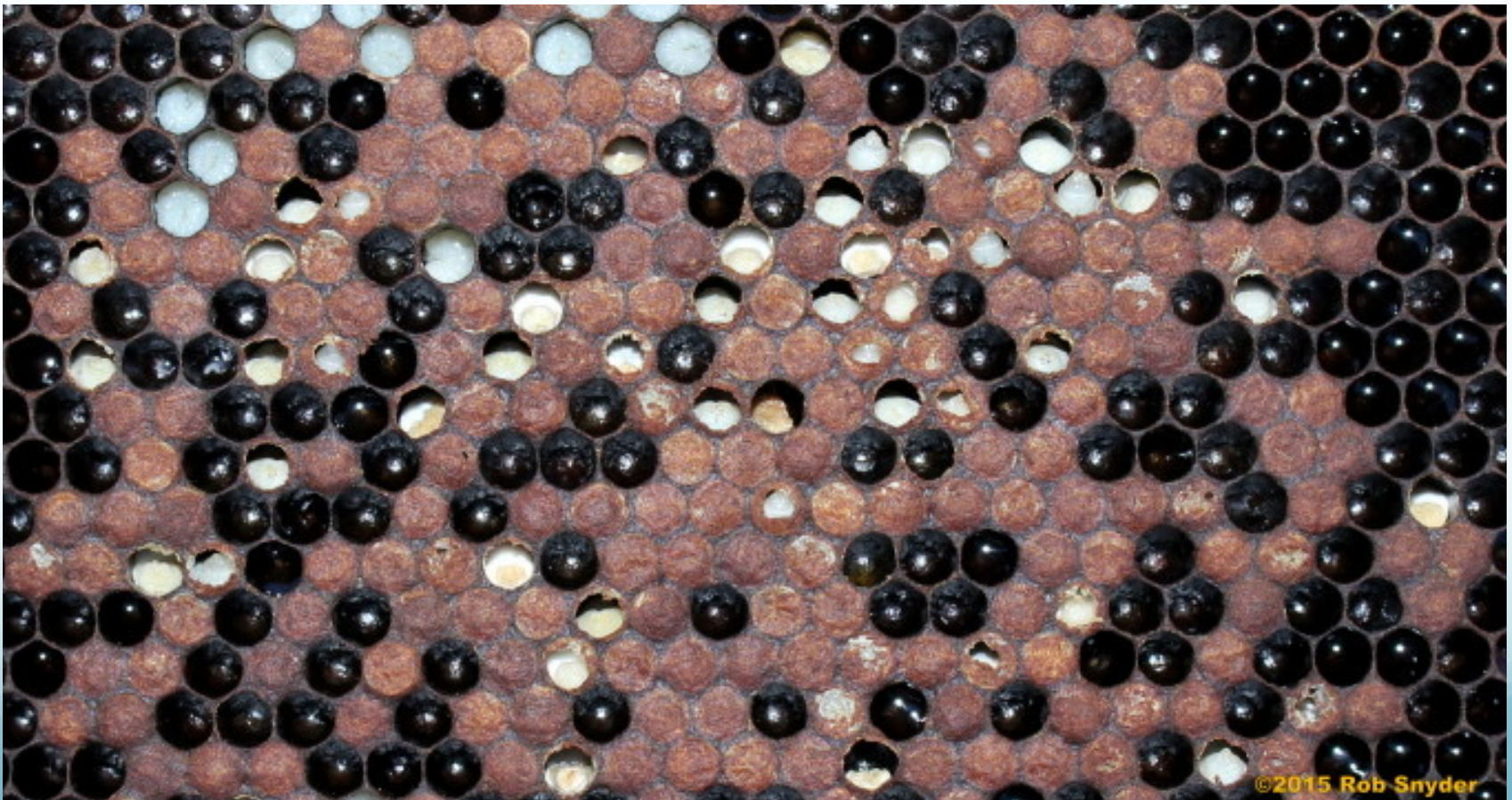
# This one's easy:



©2015 Rob Snyder

Photo: [Beeinformed.org](http://Beeinformed.org)

- CHALKBROOD, a fungal disease.
- Both chalkbrood and AFB have become less common since many beekeepers are selecting for hygienic behavior in their breeding stock. Hygienic bees are highly resistant to both diseases.



# What clues are on this frame?





- This queen is a drone layer. Colony must be re-queened.
- Note the presence of capped worker brood, which tells you there IS a queen.
- The capped drone brood in worker-size cells tells you the queen is either running out of sperm or mated poorly to begin with.



And this one?

Photo: Zachary Huang

# Laying Workers

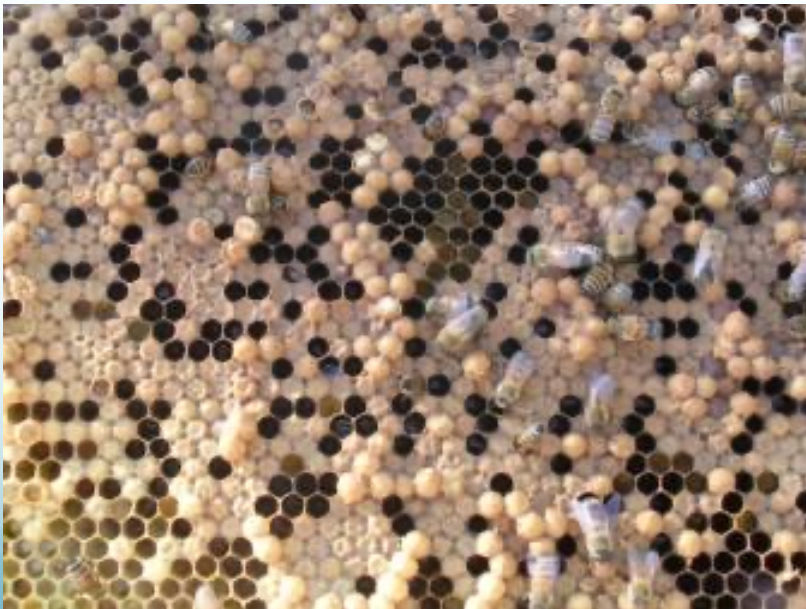


- The bees must be BROODLESS for at least two weeks before workers' ovaries will develop and the workers begin to lay unfertilized eggs.
- Since a brood cycle takes three weeks, getting laying workers means you have not checked the brood nest for FIVE weeks.
- You need to inspect your bees more often!

# Laying Workers vs. Drone Layer: telling the difference

Drone layer has solid pattern.  
Brood is grouped, with drone cells  
in the middle of worker brood.  
Even if there is NO worker brood,  
the drone brood is still in clumps.

Laying workers (not one but  
hundreds) do not lay a pattern.  
There will usually be NO worker  
brood, and the drone brood is  
very scattered. You may see  
multiple eggs in a cell or eggs on  
the sides of cells.



Note that very young queens sometimes lay multiple eggs in a cell,  
so that is NOT 100% indicative of laying workers.

# My Queen's a Bum. What now?

## I think I have Laying Workers. What now?

- These are problems that must be fixed NOW. New beekeepers often wait far too long, hoping the problem will go away, but it rarely does. Intervention is needed RIGHT AWAY.
- If you have a drone-laying queen, you must find her and kill her (or have the bees do it for you.)
- If you have laying workers, recognize that it's not just ONE laying worker, it's HUNDREDS. You need to enlist the bees from a queen-right colony to get rid of the laying workers before you can introduce a new queen.



Dumping out all the bees from a laying worker hive 50-100' away does not work.

- It's a waste of time and energy, and kills bees. The laying workers are perfectly capable of flying back to the hive.

# Fixing Laying Worker Colonies

1. Consolidate the problem hive to as few boxes as possible. They're usually weak so this is easy.
2. Remove the outer and inner covers from a strong, queenright colony. Place a queen excluder on top.
3. Put the laying worker hive above the queen excluder.
4. Leave for several days. You'll see the dead laying workers in front of the hive as the queenright bees kill and drag them out.
5. After a few days, you can remove the problem hive, add a few frames of brood and a mated queen, a nuc, or a cell. They'll accept the queen.

***You can use this same technique to get rid of a drone layer you're having trouble finding. The bees will find and kill her for you.***



Laying Worker or  
Drone Layer Colony

Queen Excluder

Strong queen-right  
colony

# Last one:



Photo: [honeybeesuite.com](http://honeybeesuite.com)

# Brood nest plugged with nectar

- NO open brood of any kind on any frame: no eggs, no larvae. There may or may not be capped brood present
- Cannot find queen
- House bees are jamming the brood nest with nectar, and sometimes pollen
- IS THIS COLONY QUEENLESS?

# Maybe. But maybe not.

- New beekeepers will often panic when they find a colony that has no open brood, and assume the queen died.
- If this happens in mid-spring, it's often the case that the bees have swarmed and there is a virgin queen present. In this case, open swarm cells offer a clue, as does a reduced population.
- At other times, the bees may have superseded their old queen and be waiting for the new one to mate and begin to lay. There may still be an open supersedure cell or the bees may have torn it down.
- How can you tell there's a virgin?

# Behavior Clues



- Truly queenless bees are often noisy – the “queenless roar”
- Queenless bees ACT nervous and unhappy. They may be more runny and sting more.
- Queenless bees often fan Nasanov pheromone .
- Bees with a virgin may be a bit more testy than a queenright colony but they are usually pretty calm and quiet.
- **BE PATIENT.** If you throw a new mated queen in there and they have a virgin, they will kill the mated queen.

# Virgin Queens

- Virgins may take a couple of weeks to mate after emerging.
- They are very difficult to spot, even by experienced beekeepers.
- One of the MOST COMMON mistakes new beekeepers make is to think a colony with a virgin is truly queenless.



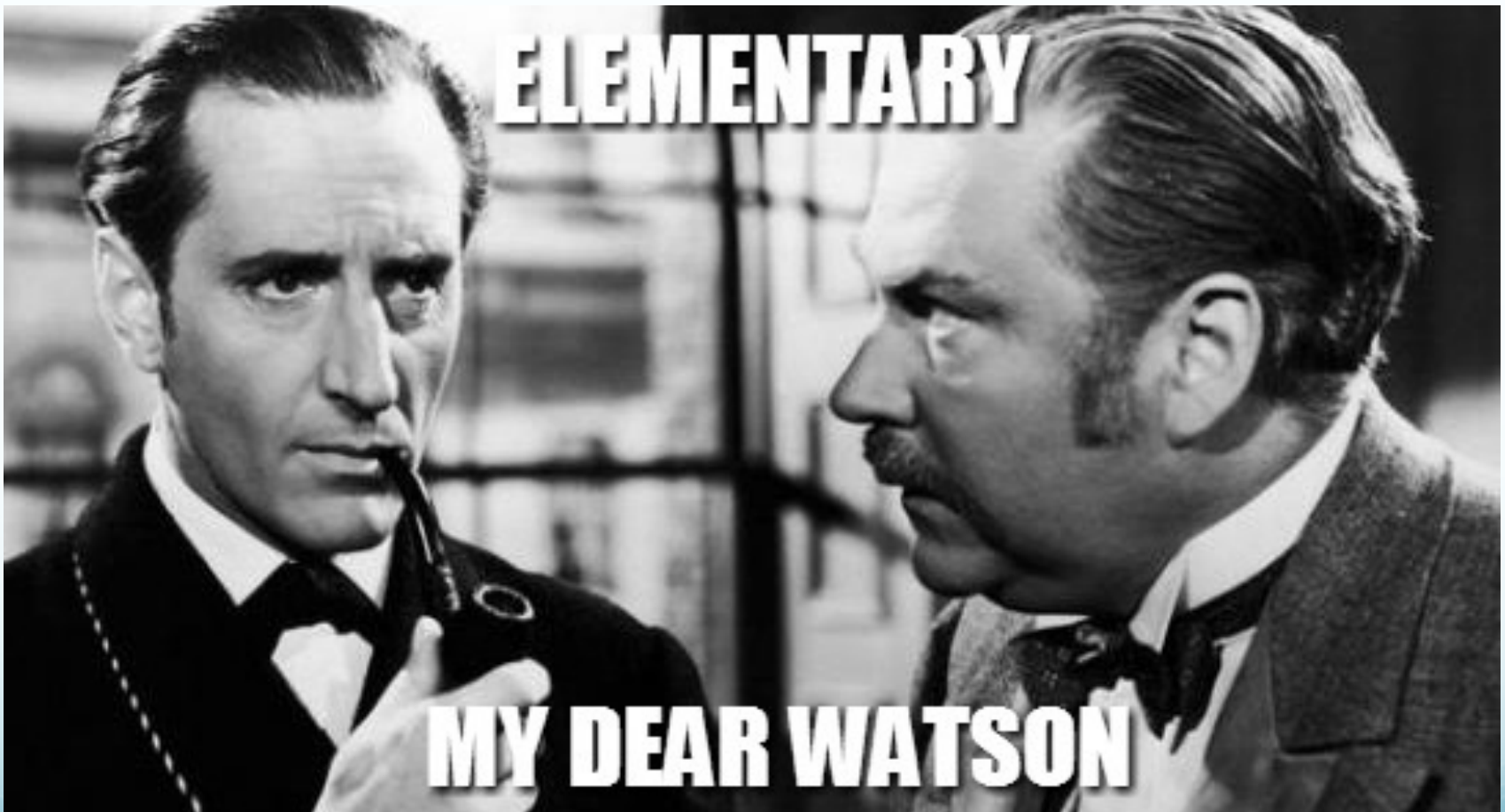
Photo: [brownsbees.com](http://brownsbees.com)



# Testing for Queenlessness

- If there are no eggs or young open brood and you think your bees might be queenless, take a frame of eggs and milk brood (with the young bees on it) from a queenright colony, and give it to the one in question. Mark the frame with a thumbtack or magic marker.
- After a few days, carefully remove the frame. If the bees have started a queen cell or two, there's a good chance they really are queenless.

And how will we recognize and remember all these clues?



We'll observe, record our observations, and check the results later!