

A Golden Presentation



Adventures in Reading

**Prepared for LCBA by
Morris & Rita Ostrofsky
6/21/11**

This program can be found on the club's website. www.lcbaor.org

The Stories your Frames Tell



The bees are telling us the story about what is happening inside the hive. It is our job to read and comprehend what is being said. Reading frames means you have opened and entered the hive. You have heard me propose, “Minimally invasive beekeeping.” With that given, the purpose of this program is to maximize the information you glean when you do get into your hive.

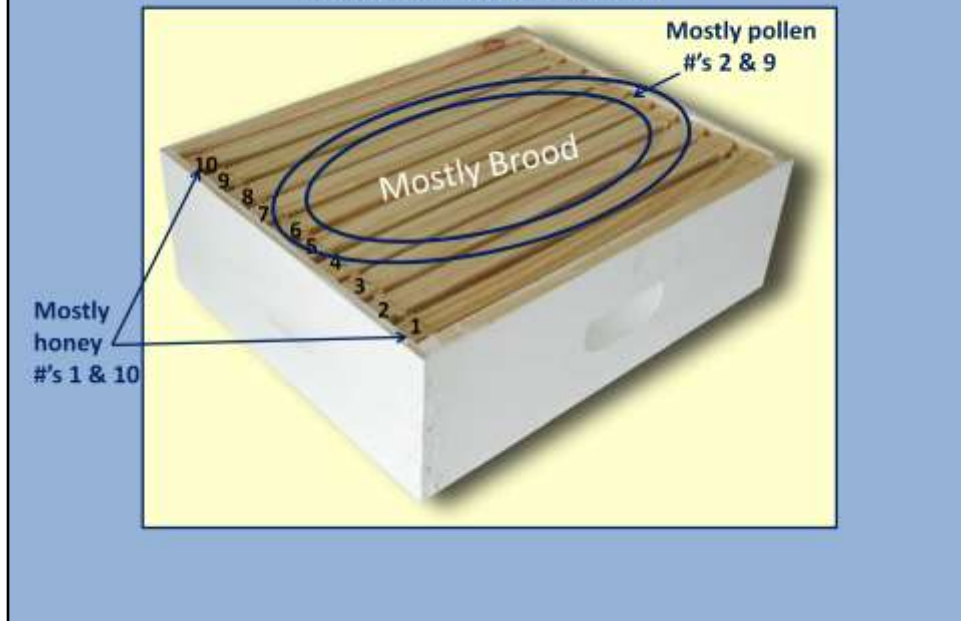
What your Frames can Tell You



By learning to read frames you can understand what is going on, or going to go on, in a hive.

You can learn a great deal by paying attention to what is going on with frames.

Just like chapters in a book frames are numbered and include a table of contents



Frames have their place in the hive. Starting from one side going to the other they are numbered one to 10. It doesn't matter whether you start numbering from one side or the other because the right side of the box should be a mirror image of the left side. For example the #1 and #10 should be very similar in an established hive.



Number 1 Frame

Let's take a look at the #1 frame. Q. What is the number of this frame's mirror image? #10

Number 1 Frame

#1 frame New Hive



#1 frame Established Hive



The number 1 frame and its mirror image the number 10 frame are used for storing honey. In an established hive, that is what you should see. Obviously on a new hive it takes some time to build the comb and store honey. This will usually take place some time during the honey flow.

Reading the frame top to bottom



Because the bees start working the frames from the top and work their way down to the bottom you will find cells on the top capped over while those near the bottom of the frame are less complete. You can see this in the upper left corner of this frame. Note: this is why starter strips work. Why isn't the older honey on the top of the frame capped? A: They cap the cells as they become full.



Number 2 Frame

Number 2 Frame

Q. Why do we see different colored stored pollen?



What is its mirror image? # 9. These frames will usually contain pollen in an established hive. A. Flower constancy.



Number 3 Frame

The number 3 frame (mirror image 8) is the beginning of the brood. Note: These frames containing brood, pollen and honey, are ideal for establishing a nuc.

Number 3 Frame

Established Hive



In an established hive brood is located in frames 3 through 8 with the greatest proportion in frames 5 and 6



Number 5 Frame

The center of the brood chamber.

Number 5 Frame: Center



Whether this is a first year hive or a well established hive, your number 5 frame should look very much like this. Notice: we have brood dominating most of the frame. The brood in the center bottom of the frame is uncapped. Just beyond that is a rainbow shaped dome of capped brood. The band beyond that is stored pollen and finally beyond that at the outer corners is capped honey. If we were to continue to move from frame 5 to frame 10 we would see a mirror image of what we have already looked at.

It is not necessary to go any further because everything else will be a mirror image of what we have already seen.

What happens in early spring if you accidentally place the #1 frame in the #5 position?



Plot Twist: Number 1 Frame in Number 5 Position

So we have returned the number 5 frame to the hive being careful to replace the frames in exactly the same order/place where you found them.

Here is a plot twist: Question: What would happen if you returned the #1 frame in the number 5 position. Answer: by dividing the brood you run the risk of the brood not being entirely covered by bees on an abnormally cold night. What disease could happen as a result? Think back to last month's program. Chalkbrood.



June 21, 2011

Two story hive

We're going to first look at a hive started from a package on Glory's Bee's Bee day in April.

By now you have a two box hive. Both boxes are brood boxes. We are going to look at the top or second brood box.

70% of Frames are being used

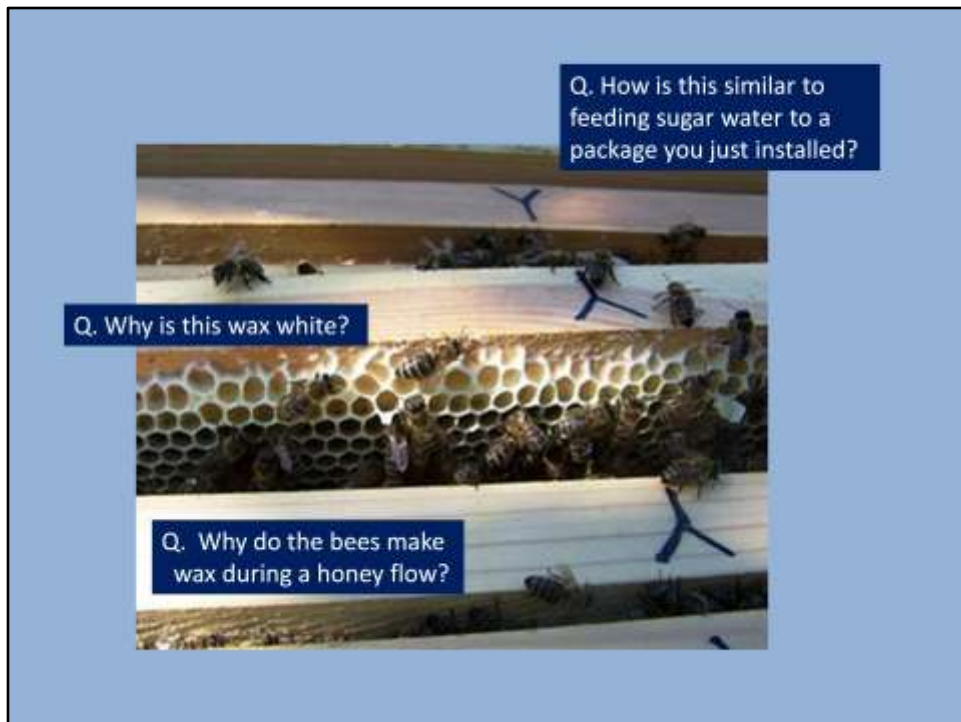


What do the frames tell us? What do I see? The bees are using 70% of the frames. This a good sign. A second brood box has already been placed on the hive and is about 70% full which means it's just about time for the next box; most likely a honey super. This applies to a new or established hive. When you see 70% of the frames being used, it should be a knee jerk reaction: new box.



White Wax on Top of the Frames

The next thing I see is white wax. Let's take a closer look and see what the story is.



Bees are making new white wax and when you see the wax on the top of the frames, you know that there is a honey flow on. Why are they making the wax? Because the nectar stimulates wax production. This is the same reason you fed you package sugar water after installing it. You wanted to stimulate wax production so the bees would draw out the frames. Why is the wax white? Answer: hasn't had a chance to get travel stained.

Time to add a honey super



How do I know the difference between a brood box and a super? The queen excluder is the barrier that keeps the queen in the brood area of the hive. If you use one, and not all beekeepers do, then the box above it is called a honey super. Over the summer you will continue to add honey supers as needed again using the 70% rule.



A new super on the hive. You placed the honey super 3 weeks ago and the bees more than ready ready for a new box. In fact they were crowded. This what the hive looks like now and it seems like there is less activity on the landing board than before. Let's take a look.

This is what you see in
the new honey super



You take the cover off and look at the super. You expect that the bees would have drawn the comb and be making honey by now. But all you see is an empty super. This isn't right. We need to look at the frames in the brood box.

2nd Brood Box
on June 1st



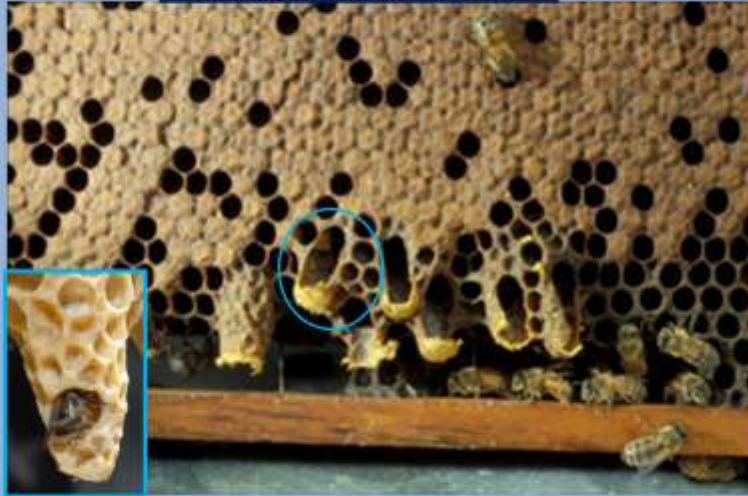
2nd Brood Box
on June 21st



There is a big difference in density since the beginning of June. There should be more bees not less. We need to look further.

Homicide: Plot takes a twist

When did these bees swarm?



You notice queen cells located on the bottom of the frame. If I see queen cells located on the bottom or side of the frame, this tells me that the bees have swarmed and probably after swarmed. At some point one of the virgin queens went around and killed her remaining sisters still in their queen cells.

What else does this frame tell you? Since we still have capped brood on the frame, we know that the queen was there at least within the last 24 days. Q. How do we know it has been less than 24 days? A. It takes brood 24 days to develop. Q. When did the bees swarm? A. About 9 days ago. Q. How do we know this? A. The bees swarm after the first queen cell is capped over. Six days later the new queens start emerging. This is when you have after swarms. When the population is depleted to the point of no longer being able to issue viable swarms, then one of the virgins starts going around and killing the other unmerged queens. After the queen kills her sister, the workers begin to tear down the cells. This is about 3 days worth of tearing down the cells. See inset for start. This is how we arrive at the 9 day figure. You can pretty much pin point the day by reading the frame.

So where does this leave you? You now have a virgin queen running around this hive. If she is indeed a virgin, she will be nervous and will easily fly away if the hive is left open too long. At this point all you can do is go to the calendar and circle the date three weeks into the future to check to see if you have brood.



Location, location, location

Q. Why is this queen cell on the face of the comb and not along the bottom?



Q. What's different about the position of the queen cell on this frame compared to the previous frame? A. Location of the cell. The queen cell is on the face of the frame. Q. What does story does this tell? A. Supersedure Why on the face and not at the bottom edge of the comb? With supersedure the bees are desperate for a new queen. They will build the cell where ever they can find a proper aged larva. With swarming not the same sense of urgency and they have more time to build queen cells where they prefer.

What story does this frame tell?



You check on the bees and this is what you find. What is this frame telling you?
Spotty brood pattern and too many empty cells. So what is going on?

What is going on?

- Failing Queen
 - Poorly mated Queen
 - Hygienic Queen
- Aging queen?
 - Time of year?
 - Hygienic behavior

Could be any of these things. There is not a clear cut answer but there are a couple considerations to help you distinguish among them. One consideration is the age of the queen. Is she marked? If she is a 3 year old queen, you can expect that she is running out of steam and may be failing. Another consideration is the time of year and weather conditions; like it was in May. If it is spring and cold and damp, the virgins may not have had a chance to fully mate resulting in a spotty brood pattern. If it is a hygienic queen recently introduced into a hive with a high varroa mite count, you could see a “spotty” brood pattern because the workers would be plucking out inflected pupa. Sometimes the answer isn’t clear and you have to consider other things to read the story line.

Some Hygienic Queens

- Russians*
- New World Carniolan
- VSH
- Minnesota Hygienic

*Russians build up quickly in the spring; use a 60% rule with them and give them extra room

What are some hygienic queens: seems like almost everyone is selling hygienic queens: if breeder says he/she is selling hygienic queens, then you probably have one.

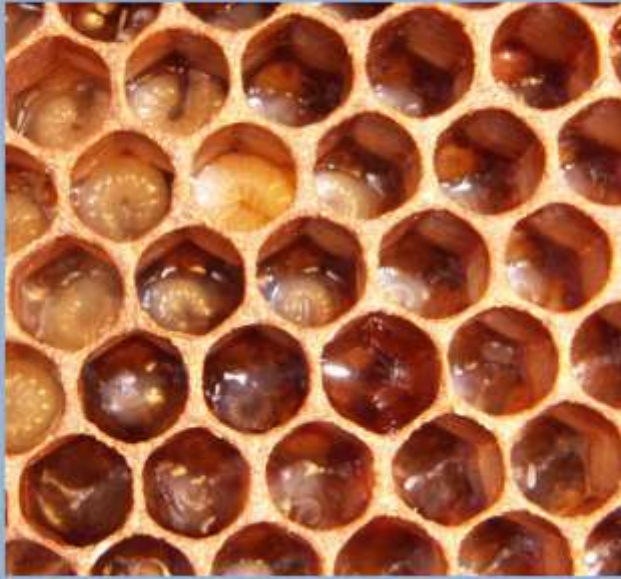
There are suppliers who raise their own hygienic bees; if you are a new beekeeper, I do not recommend using Russians unless you are prepared to stay on top a fast growing hive. This is true of NWC.

What more can you
read into this frame?



There is more that this frame can tell you. There should be a gradual transition in the development of the bees; i.e., you should have young larva near other young larva. You do not see this even transition on this frame. Instead you have empty cells near capped cells. Let's look at what it should look like.

This is what the development
should look like



You can see the gradual development of the larva. Going from the lower right hand corner are un-hatched eggs, moving to the left you can see the gradual development until you get to the top left where you see larva. Compare this to the frame we just looked at.

A second read

Where do you typically see drone brood?



There is even more that this frame can tell you. Notice the circled brood. It appears to be drone brood. I can tell this because the caps on these cells are much higher than those on the surrounding worker cells. This is another indication of poor mating. Drone brood is not typically mixed with worker brood. This drone brood can be a sign of either a failing queen or one that was poorly mated.

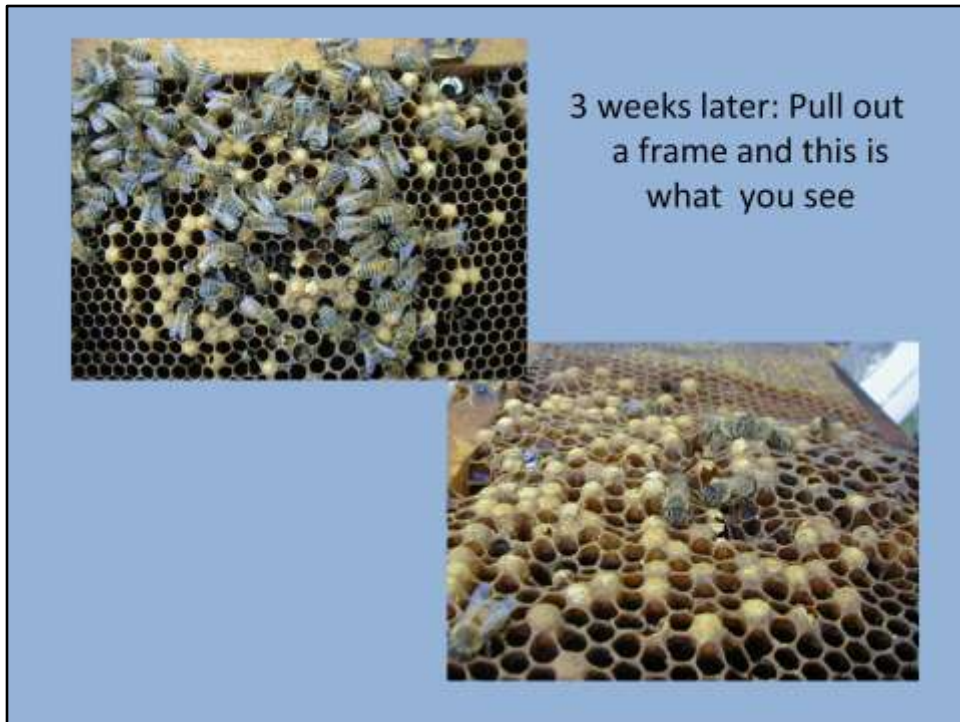
Q. Where do you typically see drone brood? A. On the edge of the brood area; not intermixed with workers.



Enter the Villain!



Another dark chapter in the bees' life. You've had a swarm. You have eliminated all but one of the queen cells. The queen emerges, five days later we have a rare nice day. The queen makes her mating flight and is one her way home full of ambition and anxious to start her new family. Enter the villain and exit the queen. Unbeknownst to you have lost your queen.



Three weeks later you open your hive anticipating that you will see new brood. What you see on the frame is a pattern that at first looks similar to the spotty brood pattern of a poorly mated queen. But there is a big difference. Let's take a closer look at the inside of the cells and see what it is.

What is different here?

What do multiple eggs in a cell mean?



The difference between the frame of the poorly mated or failing queen and this one is multiple eggs in the cells. A laying worker colony. When a colony becomes 'hopelessly queenless', workers lay eggs. The eggs are all unfertilized so all develop into drones. Such colonies are usually doomed. What to do? Add the bees to another hive. It is very difficult to requeen a hive with laying workers.



Someone offered to give you free bees. You take one look at the free hive and decide "I had better check out the frames." You pull out the #1 frame and this is what it looks like.

#1 Frame



Way too dark. But your curiosity is piqued. So you head for the #5 frame.

Close up of #5 frame

Why wouldn't you take these free bees?



AFB. Would you take these free bees? No, better sterilize your hive tool.

How do I confirm AFB?

Field Test using a twig AKA "ropiness" test



Rope or string of
mucus-like material

- Rope is rubber glue-like, half an inch to an inch long
- To test, insert a twig or match stick into suspect cells, stir dead larval material, then slowly withdraw the testing stick.
- If it comes out as illustrated, you have AFB

What if no Foulbrood; just old frames

How would you change out all the frames rather
than 1/5th of the frames per year?

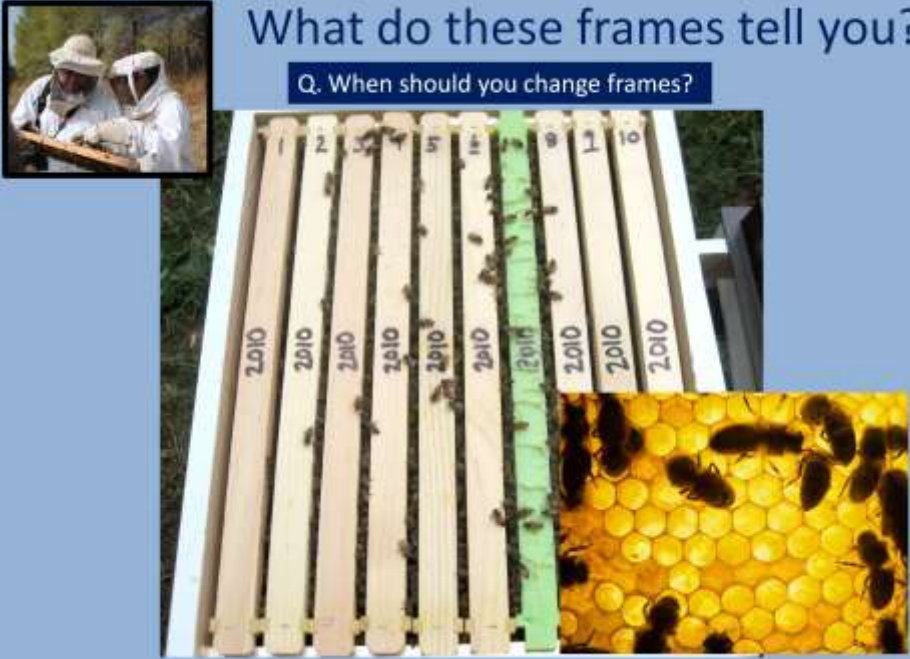


What if the hive did not have AFB; just old frames. How can you do this with all the frames rather than the usual 1/5th per year?

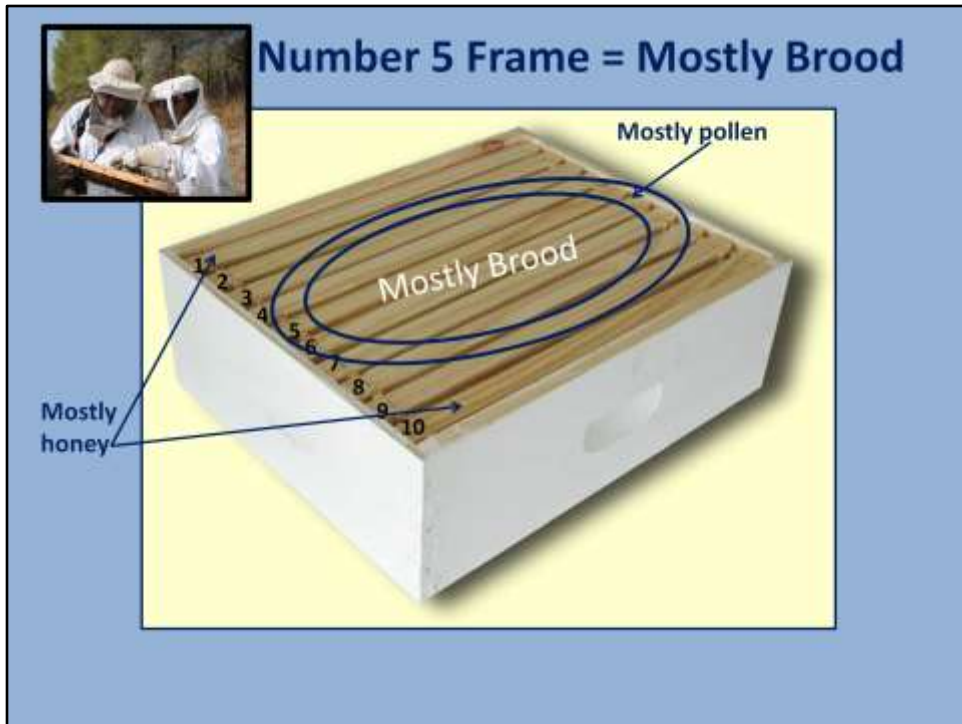
You can do this by putting a new box on top of the old one. By the end of winter the bees should have all moved up into your new equipment. Then you can retire the old box.

What do these frames tell you?

Q. When should you change frames?



Excellent example of dating frames. There is no question as to the age of these frames. This hive was started last year and apparently belongs to a conscientious beekeeper. The rule of thumb is to start changing out frames when they become opaque when you hold the frame up to the sun and can't see light coming through it.



When we look at our diagram we see that the number 5 frame should be mostly brood.

1st brood box: #5 frame

Why is #5 frame a problem in the 1st brood box?



This is not what you expected to find. The proportion of honey to brood is way too high. It is certainly desirable to have a lot of honey in the hive. Q. Why is this Why would this be a problem in the 1st brood box? A. Even after the population of this first box would warrant putting a second brood box on, the queen is going to be reluctant to cross the boundary of honey. Therefore she is going to get frustrated and you know what they say about when the queen is not happy, nobody is happy. If you put a second brood box on top of this first brood box, the queen still could not expand her brood area. These bees are honey bound.



What to do when honey bound?

- Give the bees another brood box; place this frame in the #3 position
- Give this frame to a weaker hive
- Use this frame in a nuc

What to do? Option #1: give the bees another brood box if they do not already have one and take this frame and place it in the number 3 position in the second brood box.

Option# 2: take this frame and give it to a weaker hive

3: use this frame to start a nuc



Sad story: Broodless without hope

Why isn't there any hope for a new queen?



This frame came from the center of the brood area. As you can see, there isn't any brood. And the bees are now filling the brood cells with nectar and honey. This is a situation when there isn't a queen and there is no hope for one. Q. Why not. A. There is no queen or young brood with which to make another. You will need to add the frames to a queenright hive or get another queen.



What's the story here?



Western size frame in a full depth box. Probably in the number 3 or number 8 position. How do I know the location? Typically build drone brood on the edge of the brood nest and these tend to be the number 3 and 8 frames.

When would you intentionally put
a western in a full depth box?



A. If you are raising queens, you could use this as a method of building a drone population. Here is a situation where we have provided the bees with extra space in the brood chamber to build as they see fit. So let's use this idea as a tool to determine the needs of the hive.



Recommended reading: Free Building Frames

Strips of wax



Paint stir stick dipped in wax



With free building frames you are expanding on this technique of placing a western frame into a full depth box. Reading a freely built frame makes it possible to read the intention of the bees. Generally speaking only fools and weather men make predictions. However, this is an exception to that rule. Before we get into what the frames will tell you, let's talk about what free building frames are. A free building frame uses an empty standard full depth or western in which the foundation has been replaced. It can be replaced with 1) a strip of wax (not the same as foundation) as in the photo on the right or a even better a paint stick that has been cut, beveled and dipped in bees wax. In both cases they are placed into the groove of the top bar.

The frame is placed in the #3 position.

Necessary Conditions

- Hive should have at least 9 frames worth of bees
- Stores of honey, sugar syrup or nectar flow in progress
- Queen must be present
- Hive **MUST** be level

Why are these conditions necessary? #1 the frames must be covered with bees in order for the bees to draw out the comb. #2 It takes the bees a lot of energy to make the comb, they need a source of energy coming into the hive in order to make the comb. #3 Self evident #4 Since the bees build down with gravity, if the hive is not level, the combs won't be aligned properly within the frame. This condition does not effect reading the frame but it does affect your ability the frame without damaging the comb.



Place Free Building Frame in either position



Example of how this works. Because the bees start working the frames from the top and work their way down to the bottom you will find cells on the top capped over while those near the bottom of the frame are less complete. You can see this in the upper left corner of this frame. Note: this is why starter strips work



Speed Reading your hive

What is happening

- Worker cells
- Drone cells
- Drone cells started first and then followed by worker cells
- Drone cells used for storage after drones emerge
- Building stops

What the bees are saying

- All is well
- Swarming is on their mind
- Changed their mind about swarming
- Swarming tendency has diminished
- Lack of food, illness, the queen injured or killed or nectar flow stopped

This one frame is a microcosm of the entire hive. It saves time and avoids a more invasive look at the hive and therefore less stress on the bees. Kind of like speed reading.

Happy Ending: Free Building Frame

“For the beekeeper who takes the trouble to learn the language of the bees, he is able in the space of one minute to ascertain exactly what is going on, or going to go on, in a hive.”

Peter Borst

This quote comes from Peter Borst a former hive inspector and a frequent contributor to Bee-L list serve. “...enables the mood and intentions of the bees in the hive to be read in advance and the necessary controls....to be exercised in order to retain the productivity of the colony.” This is relatively new for me; I start using free building frames last year but did not realize all the benefits. According to Peter Borst this diagnostic tool has been used in Europe for years as a predictive and diagnostic tool. I will be using this frame and maybe some of you will as well and we can compare notes. Hopefully next year we can share the results at a future meeting. Hopefully this will be on the best seller list.



Pondering as he walked the application of bee space became clear to Langstroth . Single most important discovery in beekeeping was the application of bee space to moveable frames. He was the first person to put bee space to use with moveable frames: a great mixture of art and science.

Special Thanks for Making This Program Possible

