# Bottomless Beekeeping (Unpublished Version)

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Standing around one of my bee yards early one morning, I was considering why the Asian bee has been able to live so successfully with the varroa for a million years while the parasite spelled disaster for the European. After all, the Asian and the European aren't that different, or else those clever bee scientists wouldn't have been able to combine them to bring us the varroa problem in the first place.

What are the differences between the two bee sub-species that cause the differences in their handling of the parasite? I'm not buying that "housekeeping gene" business. I'm not saying it doesn't exist. I am saying the gene is not responsible for the grooming behavior. Rather, the grooming behavior is responsible for the gene. (More on this chicken-or-egg philosophical question later.) I also don't buy the "bee dance." Bees don't need to tell each other anything; they're born knowing. The dance is a sharing of excitement, not a treasure map. Those who continue to profess differently simply have not been paying attention. We avoid anthropomorphism around here, but what is this "bee dance," what is the concept of bee communication, of bee "language," of bee "housekeeping" if not anthropomorphism?

Von Frisch's study, according to Thomas D. Seeley, who wrote the Foreword to the great scientist's great tome, THE DANCE LANGUAGE AND ORIENTATION OF BEES, "…focuses on two principal questions: First, how does a bee direct her nest mates to desirable sources of food? Second, how does a bee find her way to and from sources of food? …multifaceted questions which have attracted a large corps of gifted investigators over the three decades since the publication of von Frisch's book."

"Gifted investigators" indeed! What a waste of talent, money, and time! Because the questions are not only meaningless but misdirecting, having set us off on the wrong path, but that's not unusual with a science that is more interested in funding than finding. Finding puts the kibosh on funding, so it must be scientifically avoided at all costs. Sure, it sounds cynical, but it's true. Our civilization is based on economy which is based on multifaceted illusions, if not out-and-out lies. The truth is a bee does not direct her nest mates to desirable sources of food; neither does she need to find her way to and from sources of food. These human concepts do not apply to bees. So we can dispense with the two principal von Frisch questions and also the lives and careers of many scientists. I know, the truth hurts, and I'm sorry.

Von Frisch did not intentionally set about to mislead us. He was simpler man in a simpler time, a good guy who believed in what he was doing and tried to do it right. Were he alive and reading this, he might even be able to get with what I'm saying, because, as Seeley says of him:

"…I think he would be little influenced by the abstract, mathematical approach so prominent now in neurobiology and behavior, and would rely instead upon personal observations of living animals for guidance into promising new scientific terrain."

From an observation of, of all things, a wood tic's behavior, combined with a later observation of that behavior replicated by bees and ants, I came into some promising new scientific terrain – about insect communication or, more properly, the lack of it, even more properly, the lack of the need of it.

My personal observations helped to convince me of what I had long suspected, that the dance is not a communication of data.

What happened was one day, while leaving a bee yard in my van, I observed a tic crawling up the engine compartment cover. It moved with purposefulness, like it knew exactly where it was going, making several seemingly meaningful twists and turns, before I picked it up and threw it out the window. Three weeks later, leaving another bee yard, I observed another tic crawling up the same engine compartment cover. This second tic followed the path of the first, exactly, every twist and turn (including getting picked up by me and thrown out the window). There were no terrain configurations or obstructions to account for the pattern. The second tic could only have been following the trail of the first, which, although invisible to me, was obviously clear enough to it. There is no other possibility. And when there is no other possibility, you find yourself approaching something like real evidence, moving past just a probable theory tenuously supported by possible evidence conditional on variable interpretations derived from often irrelevant influences such as the contents of the observer's stomach at the moment of observation.

And as for the ants: I keep nothing but bee pollen in my freezer. Three years in a row now, in winter, the ants have been marching into the freezer and not coming out. They die in there in great piles. I do nothing to stop them. After all, it's their natural choice and I support that. All three times, the process accelerated until there were no more ants coming

Using effectiveness in fulfilling earthly missions as the criterion for evaluating evolution, perceptive skills and intelligence, insects are way ahead us. They know their jobs without even having to know that they know, and they perform them perfectly without even trying. We, on the other hand, have job counselors, vocational aptitude tests, massive educational systems, job training, and we try and try and try again, and we still can't get it right. We would not even have a civilization if it were not for insects. For example, mankind learned paper and pottery making from wasps. Where would we be without paper and pottery?

They tell us bees have an extraordinary sense of smell. Whereas that is obviously true, they don't tell us that bees have a sense that goes beyond even the most extreme olfactory sensitivity. They have the ability to perceive memory that is neither intellectual nor located in their brains. It is external, located in the environment – which invalidates a whole lot of science that has been wasted searching for the answers in their brains, in their physical sensory apparati, looking for formulas to explain mathematically how you could get so much information into so small a space.

I postulate that the famous "housekeeping gene" is a memory unit, that it came into existence after the fact of the no-doubt random discovery of the grooming behavior and was thereafter concomitant with that behavior not the precursor of it.

In my day job as bee and wasp remover, I have for a client a hundred-and-fifty-year-old historical Victorian, three-story house which had a bee colony in an upper wall around a hundred years ago. The wall was opened and cleaned out more than 25 years ago, before the current owners took over, but to this day, every year, the bees try to get in where the old nest was located. The focus of their probing is under the shingles at the roof line where the wood is rotted in places. There is always the possibility they will be able to find a way in, as they have a few times, which keeps me setting up and taking down and running up and down and moving the 32′ ladder in an effort to keep ahead of them. Do they smell the old nest, or do they perceive the memory in the environment? Or could it be a mixture of both? Or could both be the same?

Because a lingering odor is a memory. But there is a memory so much more refined, so much more amorphous, so much more permanent that it may still be there even after it's been replaced, overwritten or displaced, and by that time has become so refined that no olfactory apparatus, in fact no apparatus at all could ever detect it, except perhaps that most sensitive and sophisticated of all scientific instruments, the human imagination. Yet this super-refined memory can be accessed and responded to by bugs!

I do my bee work with a van not an open truck. That means swarms and hives and loose bees are right in there with me. I always put them near the back doors, and any loose bees will invariably congregate in the corners of or fly against the back windows. Even if the front windows are wide open, they will remain stuck at the back windows.

But one time, as I was driving along, I noticed in the rear view mirror one bee leave the back window and fly an erratic course to the front and out the window. A few seconds later, I observed another bee follow the same exact course, and then another and another, until all the loose bees that had been on and around the back window, maybe fifteen in all, had flown out. What was notable was that each successive bee followed the course perfectly as defined by the first. Now that first bee's course, as had been that first tic's, was random I'm sure, but the others followed it as though it were etched in the air, and I'm sure it was. Also notable: neither the first tic nor any of those bees nor any of those ants ever went back, and so could not have physically communicated any information at all to the ones that followed, and I'm not getting into the possibilities of insect ESP in this article.

When trapping bees out of cavities, I often observe them refusing to enter the bait hive I have provided for them. They will keep trying to get into their old entrance, which is prevented by a one-way exit, completely ignoring my hive, which is properly baited, until one bee serendipitously finds her way in. But as soon as that first one does, it's a done deal. There will be a second and a third and so on, until all the bees are going directly for the bait hive, except possibly a few diehards that either never get the new idea or refuse to give up the old idea until they perish with it.

These behaviors reinforce the notion that every creature leaves a trail, that a trail is a memory, that every creature leaves a specific memory, and specific creatures read and respond to creature-specific memories.

Von Frisch: "The newcomers…fly rapidly and with certainty to the indicated flowers, even when these are kilometers away-an accomplishment on the part of the bees that is without parallel elsewhere in the entire animal kingdom (von Frisch 1967a, p. 57)." What about the migrations of birds? What about the migrations of butterflies – year after year, new generations returning to the same exact trees, with no survivors from previous generations to lead the way or communicate anything at all? What about dogs finding their way home across an entire continent, as well as countless other phenomenal findings of ways? When those bees leave the hive and fly directly to the honey source, they are not following Von Frisch's directions, they are following a trail left by other bees, the more bees having traversed it, the heavier the trail, the more nectar or pollen, the more exciting the odor recorded in that trail.

There are different groups of forager bees within a single hive, each group visiting certain flowers only. So the bees of one group will be following the memory trail of that particular group not the other groups, and none of them will be following information received from the dancers, such as orientation coordinates, distances and locations. They will only have received from the dancing bees excitement and odors.

Von Frisch himself proved this (THE DANCE LANGUAGE AND ORIENTATION OF BEES, p. 31), only he thought he was proving something else. In his experiment, he had set up two feeding stations, one visited by the bees of one group, the other visited by the bees of another group, both groups from the same hive. He withheld the feed from both stations for a few hours, then refilled one. A scout returning from that station did the dance and right away bees from both groups rushed out to the field. But the bees from the unfilled station did not go to the filled station. They went to the empty station and after examining it thoroughly, returned to the hive where they waited around, never going to the refilled station at all. Now this proves unequivocally that the dance does not communicate distance, orientation coordinates, or location. The dance is about sharing excitement not communication of data. The excitement stimulates the bees to venture forth, and, once they are aloft, to pursue the trail that relates to their memory-perceiving apparatus. In this case the memory would contain an odor which they picked up off the dancing bee, but since the odor of both feeding stations was the same, they would follow not that odor but that of the bees of their own group, which would also have been recorded in the trail.

Von Frisch believed he was really studying what he thought he was studying. He believed what he saw. He didn't know that nothing is what it appears to be. And that style of naive thinking, in the long chain of foolish science and heady pioneering, is exactly what has led us into our current dilemma. The scientists have not come up with real solutions. Is it that they don't want to, are they that intelligence-diminished or that sold-out to the flowers of lucre? For example, they've pretty much given up on the foulbrood problem, having decided that sickness and antibiotic economics should be accepted as the official way of life.

They tell us judicious use of the miticides, following the instructions exactly, will prevent resistance, but this is patently not true. They also say the miticide is harmless to bees and humans, and this is not true either. When I was using the stuff, handling it still sealed in its original foil wrapper, I could taste the toxicity in my gums. I also noted a negative effect in the bees. And, on top of that, the stuff didn't even work. And yes, I followed the instructions to the letter. My dear friend, third-generation grandmaster beekeeper Ormand Aebi (Holder of the official World's Record in the Guiness Book of World Records, for honey production from a single hive in a single season with a single queen, from 1957 to 1984, 404 lbs., which true, single-queen record, broken only with the use of multiple queens, will most likely never be legitimately broken or even seriously challenged.) followed the instructions to the letter also, and nobody follows instructions better than Ormand, and after two years of following instructions he was completely beeless for the first time in three generations.

Why is the varroa devastating to the European while lived with so nicely by the Asian?

For one thing, the Asian has a faster metabolism. The pre-imagoes spend a day or so less time in the cells, and since it's in the cells that the varroa does its dirty work, the time differential is sufficient to give the bees the edge.

For another thing, the Asian characteristically hangs its combs out in the open with minimum shelter, like under an overhanging ledge on the face of a cliff, whereas the European seeks a cavity. Obviously, with the Asian combs hanging in space, when a parasite falls it is gone forever. And the scientists have told us it is part of the parasite's process to drop from the combs at some point. In a cavity, there will usually be a surface close to the bottom of the combs, a joist in a wall, the bottom board of a beehive, the solid part of a tree, some place for the falling parasite to land and wait for a bee to which to attach itself.

Several years ago, I reasoned that screened bottom boards might be of use and went to work designing when all of a sudden they appeared on the market, and with sticky board inserts too, so you could even count the parasites. But the problem didn't go away.

So I decided to take it further: No bottoms at all.

My thinking was, obviously, that would allow the parasites to fall away and disappear like with the Asians. As for losing the ability to count them without the screened bottom boards and sticky inserts, who cares as long as they're gone?

First I planned on putting the bottom boards back when the weather got cold, but I caught myself thinking like a beekeeper instead of an apiculturist. I was thinking of the bees as static things, not living, adaptable beings. And I decided it would be better for them if the bottoms were in fact left off during cold, wet weather also. The bees would compensate for the increased exposure by tightening up the cluster, eating more honey to burn more calories to keep the temperature in the cluster up to where it needs to be, raising their metabolic rates. They would become more like Asian bees, not as the result of mixing the species with the disastrous consequences that engendered, but as the result of replicating the lifestyle, and thereby end up healthier – those with the will to survive anyway. Survival of the fittest is always the rule, so why try to get around it? When we artificially prop up the weak ones, we end up with perpetual sickness.

Besides, the Asian bee routinely overwinters in sub-zero weather without any but overhead shelter and possibly one wall, and that would be a cold, stone wall at that.

Here's a quote from Jamie Strange's article "The Bournacq Hive," in the October 2003 issue of *Bee Culture*:

"It was not until after beekeepers began working in moveable frame equipment that foulbrood became a problem…. Also, because generally only strong colonies were wintered, the beekeeper insured that he was keeping the best stock for the following year. These strong colonies did not have to be fed or treated for disease…the beekeepers were selecting for disease tolerant stock."

That is exactly what I am talking about, doing what it takes to make the colonies really strong and healthy. Except I don't think moveable frames are the culprit. Moveable frames are helpful and not harmful, when used correctly. The problem is reusing combs too many times, which is the inevitable result of the pernicious habits of using foundation and extracting.

I keep my hives on stands at least 16 inches above the ground to prevent skunk predation, of which we have quite a bit around here. I have, however, worked with many feral colonies close to the ground and going strong, in the bases of trees for example. So placing bottomless hives close to the ground will probably be fine as long as the colony is strong enough, and if it isn't strong enough, nothing matters anyway.

Now the approach for a skunk would be different with a bottomless hive close to the ground. Let's look at their modus operandi. They scratch the landing board which brings out a few curious bees which they eat. Scratch again, eat a few more. To feed on a bottomless hive that was raised up somewhat but not high enough to be out of skunk range entirely, the animal would have to stand up and expose its underbelly in order to scratch on the wall of the hive or literally get up underneath it, both of which approaches would subject it to serious attack, as scratching landing boards from a nose-first, horizontal position does not.

I have been slowly converting my hives to bottomless, leaving some bottomed for comparison. Every single converted hive, after an initial short period of confusion, while the bees were figuring out what was going on and what to do about it, showed an immediate increase in vitality.

It is now November, and several of my bottomed hives have already died from the parasite. Whereas the bottomless are going strong, much stronger than other hives in past seasons at this time of year, even those that went on to survive the winter.

**Advantages and Disadvantages of Going Bottomless**

Bottomless hives are difficult if not impossible to steal. The bee thief, looking for the easy way, will find exactly the opposite of what he or she is looking for. It goes against his or her nature to mess with a bottomless hive, especially a big, strong, competent colony housed in falling-apart equipment (my favorite kind).

The breathing capacity of the hive is immediately and dramatically increased. No more moisture build-up or moisture-related diseases. No more debris on the bottom boards. Bottom board rot is a thing of the past, along with the need to replace.

No more slanting hives forward. Vertically straight hives make straighter combs (not that that matters), support weight better, and ride earthquakes better (that does matter around here).

And no more mouse worries. Without a bottom board and sufficient space between the board and the bottom of the cluster, mice can't even get started. It also helps to use frames with no bottom bars in the bottom super of the brood area, so the combs hang naturally without artificial solid endings.

No more facing entrances to the sun. You might think this is not important but it can be. I moved some colonies onto a lovely piece of land overlooking a large slough designated as a wildlife preserve, faced to the sun as I had been taught. These hives steadily lost vitality and died. It was the wind. There is a fierce wind blowing straight up the slough and directly into the hive openings when the hives are facing south, which is the direction they need to face to get the most sun. Most sun means quickest warm-ups and most light for the longest duration, which means most work which means most production. Like lemmings, we gear everything to maximum production regardless of what untoward consequences might be engendered. It took two complete seasons with two complete bee losses on that location before I was able to unlearn enough of what I had been taught to turn the hives around. The third year I faced them north. I really had to force myself, and I worried about it afterwards. But they are thriving now. Nevertheless, I still catch myself feeling uncomfortable about it from time to time. Unlearning is much harder than learning.

With bottomless hives, smoking for manipulations is much more effective with much less smoke.

There are some disadvantages: Decreased honey production for one. Or, is that a good thing after all?

You might think bottomless hives could be invaded easier by yellow jackets and cleaned out by robber bees. But there is a difference between how the guard bees function with bottomless as opposed to conventionally bottomed. In the conventional setup, the robbers have only to get past the guards, which are positioned at the entrance looking out, and they're in and can have their way virtually without challenge. With bottomless, the guards cover the complete territory, scanning in every direction, and it is not possible to get past them. I have watched yellow jackets working the bottomed hives while avoiding the bottomless. I think with the guards out in the open, the yellows get attacked a lot quicker and heavier, and they learn fast. Of course, the strength of the colony is going to be the key, as it always is. I just can't see a good strong colony getting invaded by anything except maybe bears, but we don't have bears around here. And besides, a bottomless hive would be no more vulnerable to bears than a bottomed one. And if a weak colony gets wiped out, maybe that's a good thing too, saves the trouble of nursing it only to have it die off anyway, and it will; they always do.

The need to install bottom boards for moving. Each hive has to have a bottom board available. But there are probably better ways to close hives for moving than standard bottom boards with screened entrances. Come to think of it, I have many tops with feeder holes, left over from the bad old days when I used to feed. These would adapt excellently for moving bottoms by stapling eighth-inch mesh over the feeder hole, the end cleats forming convenient legs to keep the screened openings up and away from truck beds or floors or other hives when stacked, and allow the air to circulate. These could be stapled or duct taped on.

Loss of directionality. Bottomless beekeeping may not be for those who want to practice the safety procedure of staying behind the hives when manipulating, so as to keep out of the flight paths. Keeping out of flight paths is not what really reduces stinging incidents anyway. I'm sure it helps the keeper relax more to think he or she is doing it "the right way." But what really does the trick is when the handler maintains a cool and level, detached state of mind, when there is no fear, and, most importantly, when that state is not forced or faked but real and native – and, of course, slow, deliberate, smooth, assured movements and appropriate smoke.

Don't assume the bees will be flying every which way in a 360-degree chaos. They will establish flight paths and preferred ways in and out of the hives, but they won't be consistent among the hives, as when an entire traditionally bottomed apiary is pointing in the same direction, and the handler will be able to work with that if he or she deems it judicious to do so. Conversely, to not work with that means to ignore it, which is my preferred method. It makes no difference whether I am in a flight path or not, as long as my state of mind is correct, which it always is. But don't get me wrong, I'm not saying I never get stung. I do from time to time, and I usually like it. But just a few weeks ago, I was just standing there minding my own business, when a bee got right up in my face and stung me on the end of the nose. Ouch! That really hurt. Hurt my feelings too, that she would do such a thing to me without provocation.

On one of my removal jobs, I have a hive hanging 36 feet up, leaning against a two-inch pipe. Now, form-wise, a two-inch pipe against the side of a hive should be very much the opposite of a landing board in front, but those bees use that pipe like it was designed for just that purpose. Which leads me to think bottom boards and landing boards are functions of anthropomorphism not proper bee culture. We want the bees to have what we would want if we were them, a nice cozy tight room with a comfortable entrance, as though they were good little people that shared our sense of functionality as well as goals. As though they didn't have incredible abilities that we don't have, like the ability to fly, to take off from and land on virtually any surface in any position, to crawl vertically and upside down – which abilities they enjoy exercising. Everything that lives has the ability to enjoy, and when they enjoy rather than struggle against impossible odds or otherwise suffer, their health is automatically better. And to every loosening of the regimentation of Langstroth-driven modern beekeeping, the bees respond positively.

**A note on pollen trapping with bottomless hives**

Bottom-positioned, self-cleaning pollen traps on standard bottomed hives provide a little help against varroa. Parasites get knocked off when the bees squeeze through the screen and fall into the pollen drawer and die. But the board that covers the drawer on the top of the trap, which prevents debris from entering the drawer, forms another hive bottom where bees can walk around and fallen varroa can wait for a ride back to the brood area.

The solution is an eighth-inch mesh screen above the debris board, positioned on its own frame which is not attached to the pollen trap so that it can be easily removed for. With this screen in place and the trap used on a bottomless hive, it is more effective against varroa.

There is a wire-meshed space across the rear of the pollen trap and exit holes at the front, which would allow some mites to fall through. But when the trap is placed over a bottom board, any mites that might fall through will end up on the bottom board, and they might get rubbed off when the bee returns through the screen or they might not. But without the bottom board, any that fall through will be gone forever, and those that fall through the debris board screen onto the debris board will die there waiting for bees to attach to, if what the scientists say is true, that when a mite falls it remains stationary where it lands until a bee passes close enough or it dies. If it's not true, then a sticky board could be placed on the debris board, or it could be coated with an essential oil.

With my first converted pollen traps, I ran a half-inch strip around the outer top of the traps (see illustration) to provide space between the comb bottoms and the screen. Then I started using empty supers, without frames, between the pollen traps and the comb bottoms, which made the spacing strips unnecessary. Of course the colonies are managed so they build new combs above not below the bottom combs.

The space added by an empty super decreases the number of bees that would be walking around on top of the debris board or screen, since the bees mostly crawl up and down the inner sides of the super going to and from the combs, and might even make the screen unnecessary, especially when the pollen traps are removed in the fall and winter, which they should be. I realize some keepers simply open the flyway and leave the traps in place, but that's not a good idea because the exit cones, unused, get plugged with debris. So since you have to take them off to clean anyway, you might as well leave them off for late fall and winter.

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Our traditional modern ways mollycoddle the bees with one hand while abusing them with the other. Is it any wonder they can't get it together?

What I am proposing is not good for business. Instead of adding products, I'm taking products away. Instead of increasing honey production, I'm decreasing it. But a little honey is better than none, and dead bees make no honey.

Bottomless beekeeping, combined with foundationless (one of my favorite not-things), will result in a smaller, faster bee, both kinetically and metabolically, a stronger, healthier bee less susceptible to disease and predation.

My intention is not to return beekeeping to the dark ages, but to take stock of what works and what doesn't and to mix and match methods toward the goal of maximum health rather than maximum production. Bees are incredibly powerful creatures. Given half a chance, they are unstoppable.

Both philosophically and practically, the varroa has been a benefit to bee culture if not beekeeping. To use the words of my friend, the revolutionary British apiculturist Ian Rumsey: "We have overcome an enemy by making it our friend." Actually, we have overcome many enemies. What we must do is get out of the way to allow the bee to develop into the world-beater it can and should be, the very capable creature that can triumph over the harsh realities of life as it is, not as it used to be or we wish it was.