'Bout a 100 – Sideline Beekeeping

FACING THE CHALLENGES OF SIDELINE BEEKEEPING

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A Short List of Big Challenges; Learning from G.M. Doolittle

What challenges face larger hobby and sideline beekeeper these days? It's not hard to develop a list, and here are the key issues I see – my list – based on visits I have had with beekeepers around the country. You might want to jot down your own challenges and see how much we agree or disagree.

1. Queens: Failure to Introduce, Failure to stay in the hive, and Failure to live more than a few months. And problems with abrupt termination of egg laying right in the middle of the flow, with no effort to supercede! How can I use virgin queens shipped to me from a distance?

2. Bee forage: What and where is it being produced? Is there enough to support my colonies? Or should I plan to feed colonies. And if so, when should I feed my bees? Should I be feeding in the summer when everything is in bloom? And if so, what with – pollen, sugar syrup or both? And is that high-fructose corn syrup really bad for my bees?

3. Honey: It seems I either have too much or not enough. What do you do about both situations? Should I develop a backup source for honey to meet my market needs?

4. Winter losses: How to eliminate them, or at least get them to an acceptable level, such as under ten percent, rather than the whopping 90% loss I had this past Winter/Spring.

5. Fear of contamination of the hive and bee products with chemicals used in apiary work and from the environment. Do the so-called naturally occurring miticide treatments leave residues too? And do they interact with other pesticides in the environment, from herbicides to orchard fungicides to impact on foraging, stored pollen and nectar reserves and bee behavior?

6. Laws, rules and regulations restricting free trade of honey.

7. Neighbors: The Good, The Bad and The Ignorant.

8. Time: How can I manage it better? Is there a way I can work a 40-hour week (that is often over 50 hours) and still run 25 or 250 colonies? What do I give up to do it?

9. Beekeeping is getting so expensive. And the fuel prices are killing me!

10. Allergies to bee venom in the family – what do I do when my kid is allergic to bee venom?

We will take the time to discuss each of these issues, and others, as they develop. I think it is very important that we spend as much time as necessary to discuss each point. This month we will look at the first issue, of queens and their challenges, through the eyes of an observer who first reported on his beekeeping activities in this publication in 1870, G.M. Doolittle.

Queens & Their Many Challenges

I have re-read Doolittle's *Scientific Queen Rearing* cover-to-cover in preparation for a reprint I have been threatening for nearly 20 years. G. M. Doolittle was a commercial beekeeper producing comb honey in Borodino, New York, outside of Syracuse, and this book was first published in 1889. While called the Father of Modern Queen Rearing, he freely admitted he was not the first beekeeper to develop ideas for the production of queens, nor the last. Yet the ideas and practices he developed over a century ago still form the essential base of the commercial queen rearing industry worldwide, and I teach the essentials of his process when I offer courses on queen rearing, and others do too. Doolittle's method of raising queens is often called the *grafting method*, yet Doolittle did not use that term to describe the transference of larvae from worker cells to those of delicate queen cups he hand dipped and affixed to grafting bars. In his book he used the word grafting only to describe the process used to fasten different genetic material to fruit tree rootstock.

My self-imposed and somewhat critical re-reading of this book re-

Normally emerged queen cell showing flap from the cocoon. Use of newly emerged virgin queens to requeen colonies was routine in Doolittle's era.

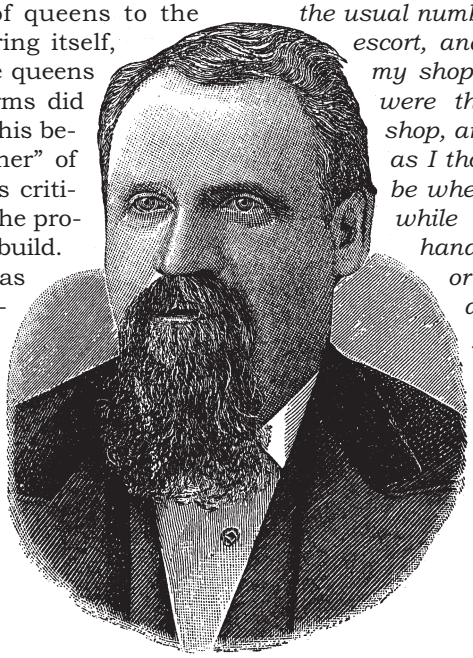
Doolittle argued that the sudden termination of a vigorous queen's egg laying was the cause of injury or imbalance that caused her to perform poorly when reintroduced into a colony.

minded me how amazingly unstructured – even disorganized – Doolittle was, and at the same time an absolutely brilliant observer of bee behavior and queen development. Some of the points he makes are spread out through a minefield of instructions for cage making and dimensions. Doolittle admitted to his own disorganization when he wrote:

It [the book] is not a manual, giving in terse, sharp periods, and the greatest amount of accurate information in the briefest space. My style, I fear, is often like my bee-yard, which in looks is irregular, while it attempts something useful. I never could be pinned down to systematic work. I always did like to work at the bees near a gooseberry-bush, full of ripe, luscious fruit, or under a harvest apple-tree, where an occasional rest could be enjoyed, eating the apples which lay so temptingly about. Do we not all need an occasional relaxation from the severer duties of life? [Preface].

One might argue that Doolittle was not really scientific about his work, but very systematic in his observations and trials. He took time to study an issue, and had the writings and correspondence of many other beekeepers to compare experiences and develop new observations. He tried things, sometimes for a number of years, before he rejected, modified or accepted them. His observational skills of the activities of bees are noteworthy – a skill I promote in all beekeepers. More beekeepers need to spend time looking at bee activity inside the hive, in mating nuclei, and at observation hives. This goes directly to the time issue – few of us have time (or invest it) to spend an afternoon in the mating yard watching the queens and drones flying in and out, and watching for returning queens with the last drone's endophallus – the mating sign – protruding from the tip of her abdomen! There are too many things most beekeepers miss about bees and beekeeping that Doolitttle noticed and examined.

For that reason we might think that Doolittle's world was much less complicated than our own, but he details the challenges he faced; of his evaluation of the different races of bees and how they performed. This is something we are again doing after a century of near-exclusive use of Italian bloodlines. Just a few years after the Civil War ended he reported a large loss of queens in the spring in prime conditions, without explanation or supercedure, these queens stopped laying! Now we would link an event like this to the presence of pesticides in the hive (I have certainly suggested this in my classes). After analysis, he linked this disappearance or failure of queens to the act of queen rearing itself, recording that the queens produced in swarms did not demonstrate this behavior. This "Father" of queen rearing was critical of the process he promoted and helped build. He was a success as a queen producer, 120 or more years ago, before automobiles, airplanes, high fuel costs, planetary warming and other challenges. Doolittle's idea of a good day in the apiary was to rest with an apple from a nearby tree and doze in the shade after working his colonies.



G.M. Doolittle

I certainly identify with Doolittle's style of colony management and his way of thinking. Rather than being absolutely linear in my thinking I often have several mental pots simmering that eventually lead to a workable scheme at the right time and place. The idea of sitting under an apple tree and munching on a ripe apple on a bright fall day does not seem so bad to me either.

Doolittle had answers about queen problems that are amazingly similar to what I teach. I suspect that this may be due to my integration of Doolittle's ideas over the years, from my initial reading the book back in the 1970s while working with Bud Cale in Hamilton Illinois for Dadants, or from working with those who have been exposed, directly or indirectly, to his concepts. So at the risk of admitting that I forgot where I first read about some of these ideas, and of again repeating myself, here are some of Doolittle's choice observations that I have somehow merged into my teaching! All these ideas are of immediate benefit to hobby and sideline beekeepers everywhere.

Doolittle examined the role of caging and handling queens and the interruption of egg-laying, and how these may or may not cause queen introduction and performance issues after they have been shipped:

I caught some of my most prolific queens and caged them, the same as I would for shipment, giving them the usual number of bees for an escort, and placed them in my shop. A part of these were thrown about the shop, and handled about as I thought they would be when shipped away, while others were handled very carefully or let alone entirely; all being kept from the hive from one to two weeks. Upon returning them as the heads of colonies again, some of them proved of little value, and, strange to say, a part of those that were of the least value, were among those treated the most carefully. I was now satisfied that

the cause very largely lay where I mistrusted that it did – in the sudden stopping of a queen from prolific egg-laying; for whenever a queen expects to leave a hive with a swarm, she almost, or altogether, stops egg-laying preparatory to leaving, but doing the same gradually [Chapter XXI].

In the prior Chapter he had suggested a method to circumvent one hazard of abrupt shipping:

If the bees are put up twelve hours before they are mailed, and left with the face side of the cage downward, but raised a little off the table, the queen will rid herself of eggs, and thus better endure the sudden jars which she will be liable to get [Chapter XX].

As far as the issue of shipping cage and introduction cage design, Doolittle was adamant that one cage could not perform these two duties. The next paragraph shows his reliance on the use of a wire cage, now called a push-in cage, as a means of introducing a queen.

No shipping-cage which meets the requirements as I have set forth, can be a successful introducing-cage; for to meet with the greatest success in introducing, the cage should cover at least one-sixth of one side of a comb, so that hatching brood and some honey can be enclosed. In the hatching of this brood, to form an escort of bees for the queen, and in her laying eggs in the cells enclosed by the cage, carries an assurance of safety, not found in any other item regarding cage-introduction of queens. When these young bees, which hatch out with the queen, become so attached to her that they accept her as their mother, it is not long before the bees outside of the cage fall into line. They now begin to feed her such food as is given for egg-production which means safety to any queen [Chapter XX].

DRONES! Compared with other writers from his era, Doolittle best recognized the importance of drones and the need to select colonies for drone production. He did not, as is often the case today, rely on all colonies in an apiary or area to produce drones. Instead he selected only certain colonies, showing desirable traits, for that task:

I find that the next best thing that I can do, is to set apart two or three of my very best queens for drone-rearing, causing them, as far as may be, to rear all of the drones in the apiary. I do this by giving these colonies a large amount of drone-comb, and keeping up their strength, if need be, by giving them worker-brood from other colonies. [Chapter XV].

Since all colonies instinctively produce drones, Doolittle *suppressed* their need for drones by introducing developing drone comb from the colonies he selected for drone production. His process is in complete agreement with what we know about drone production and colony social physiology:

The other colonies are largely kept from rearing drones, by allowing only worker-combs in their hives, and by giving them a comb of drone-brood occasionally from one of the colonies rearing drones, just when they want drones the most; for if this is not done, they will have drones anyway, even if they have to tear down worker-comb to build such as is needed to rear them in. As soon as the major part of the drones from this comb have hatched, it is taken away, before the inferior drone-brood (if any is placed in the comb) has time to mature. In this way I get all the drones reared from my best queens . . . [Chapter XV].

Not only was Doolittle a northern beekeeper producing queens for sale from late May on, he had a strong market for his queens in the Fall. To insure mating into October in the central-New York area, he used a manipulation where a few colonies would house drones, similar to the Drone Holding Colony system I wrote about in *Bee Sex Essentials.* I suspect that Doolittle was the source of the DHC idea taught to me by Dr. Bud Cale Jr while producing Starline and Midnite stocks:

To keep drones late in the fall, I make a strong colony queenless, at the close of the honey-harvest, and in this colony I put all of the drone-brood that I can find in my drone-rearing colonies at this time. As much of this brood is in the egg and larval form, when given to the queenless colony, I have them hatching after all the other drones are killed off, for queenless colonies which are strong, are very choice of drone-brood. In this way I generally have a hive full of nice drones, as late as I desire to rear queens, keeping them frequently into October [Chapter IV].

VIRGINS! Doolittle routinely used virgin queens to requeen colonies and mating nucs. He believed that most beekeepers knew . . .

. . . That just-hatched virgin queens, which are so young as to be white, weak and fuzzy, can be introduced to any colony that will accept a sealed queen-cell, is a fact generally known to all [Chapter XVII].

Doolittle wrote that . . .

. . . it is very desirable to have some plan whereby we can introduce a virgin queen from 5 to 8 days old to a nucleus as soon as a laying queen is taken away from it; as well as to introduce one into any other colony where we wish to place a virgin queen coming to us from a distance, which we have ordered to improve our stock, by a direct cross between her and one of our drones. [The discovery of the queen's multiple mating had not yet been made when Doolittle wrote this]. *From the fact that not one colony in 500 will take such a virgin queen, when giving her at the time of taking away the laying one…*

On no one thing in bee-keeping have I spent so much thought, as on how to successfully introduce virgin queens, from 4 to 10 days old; and I am happy to say that I am master of the situation; not that I have dug it out all alone, for I have not. I have picked up little things here and there for several years, and by saving every little item that proved to be in advance of what I already had, and applying them, together with what I could study out myself, eventually gave me success…

I believe that the day is not far distant, when the traffic in virgin queens will assume greater proportions than at the present. A virgin queen is not fit to start on a journey until she is at least 24 hours old; and as from 2 to 4 days must be required in her transit…

Doolittle described three methods using older virgin queens, going into considerable detail. I have included the first and perhaps the easiest to

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understand. In this, he adds a virgin queen to a colony that already has queen cells in production, arguing that these colonies are willing to accept a virgin:

I found that whenever I came across a nucleus or colony having queen-cells sealed, all that I had to do to introduce a queen was to go to my queen-nursery and pick out a nice virgin queen, and drop her in some honey; when, after pouring some of the honey out of a tea-spoon on her back, and rolling her about in it until she was thoroughly daubed, the quilt was raised from over the frames, and after scooping her up together with some of the honey, I turned the whole down among the bees between the combs. The hive was then closed, and I would usually have a laying queen in three or four days. To prevent the queen from flying, when introducing her in this way, I held the mouth of the cage close down to the honey (which I generally take in a tea-cup), when, by a sudden jar, caused by striking the cage, she was thrown down into the honey, thus daubing her wings, after which there was no further danger.

This plan I also use when receiving a virgin queen from abroad [Doolittle was a major importer of genetic stock from overseas, something we cannot do today because of the risk of adding even more diseases, parasites and viruses], *if I have a colony that has been queenless long enough to have cells sealed.*

We must dig deep to find some answers to our frequent questions as hobby and sideline beekeepers. The above examples from Doolittle's observations made years ago should remind us that we do not always know our beekeeping history, or if we do, we must carefully review the work of our predecessors in beekeeping. The average bee school is taught by instructors who are either relatively new to the craft and/or do not have a great depth of knowledge that comes from reading old works and developing a depth of knowledge on the subject. I get very nervous when I hear bee school instructors passing out misinformation about bees and beekeeping, or advice that is one-sided and an incomplete version of the subject. There is no easy answer for this except we need to reflect on the work of the past, read everything we can find, and discuss these matters with an open mind for new, or very old, ideas. It may be daunting to "newbees" that I have been a student of the honey bee for 40 years now, and I'm learning, or relearning, something every day about these insects, their care and manipulation. What we do not know may just turn around and hurt us!

So, on with the list in future articles! BC

Dr. Connor will be in Connecticut for the Southern New England Beekeepers Assembly in mid November; check out www.sneba.com for further information. Many readers have found the www.wicwas.com website very useful for purchasing books, including Connor's two books, Bee Sex Essentials *and* Increase Essentials *and* Doolittle's A Year in the Out-Apiary. *Watch for notice of the reprint of Doolittle's* Scientific Queen Rearing.
