"A severe stinging and much fatigue" –Frank Benton and his 1881 search for *Apis dorsata*

James P. Strange

Early in 1881, a young American bee keeper and entrepreneur named Frank Benton (Fig. 1) traveled to Ceylon (Sri Lanka), Singapore, and Java (Indonesia) in search of *Apis dorsata* F., the giant honey bee[1] (Fig. 2). The journey to the Orient, which lasted nearly 6 months, was chronicled in the *American Bee Journal* in letters from Benton to his partner D. A. Jones. The curiosity of the beekeeping community about Benton's trip and *A. dorsata* was reflected in numerous letters and articles, also appearing in the *American Bee Journal*.

Benton's journey, recounted below, provides ample entertainment, mostly due to mishaps by Benton, himself, of which he was not amused. Large hornets, mosquitoes vectoring malaria, and poor interpersonal skills were among the obstacles Benton encountered in his search for *A. dorsata*. Beyond simple entertainment though, Benton's letters and those of other beekeepers provide a retrospective into late 19th century views of science, exploration, the colonial world, and the state of American beekeeping. To understand what led Benton to search for *A. dorsata*, it first is necessary to look at the history of American beekeeping up to 1880.

Historically, the importation of honey bees was not restricted legally but, instead, was regulated by the cost of transporting hives of bees across the Atlantic. The historical importance to the industry is evidenced by the interest surrounding the importations of the late 1800s. A few such ventures (e.g., the importation of *Apis mellifera ligustica* Spinola from Italy by various individuals in 1859 and 1860) sparked particular interest and were covered extensively in the trade journals of the time.

Imported Honey Bees

The date of first introduction into North America is unknown, but it is documented that *Apis mellifera mellifera* L., a subspecies of honey bee from northern Europe, was present by 1620, having been imported into Virginia from England some time previously (Pellett 1938). Importation probably stopped temporarily soon after the bees were established in the New World because travel across the Atlantic was done on sailing ships with limited space and at great expense. *A. mellifera* was highly successful in the temperate areas of the Americas, spreading widely through reproductive swarming from the limited stock established from early European importations.

In the mid-1800s, a few key events had an enormous effect on the further introduction of bees into the United States. In 1840, the first regular steamship service across the Atlantic began. By 1847, several vessels were making regular trips from Europe to America in only 15 days, a minor advance over the wind-driven clippers (Bauer 1988). However, this slight increase in speed, coupled with increases in payload and reliability, reduced the cost and risk of transporting bees across the Atlantic.

Fig. 1. Frank Benton. Reprinted with permission from the *American Bee Journal*.

Italian Honey Bees

The first importation of the Italian honey bee[2] was greatly heralded in the monthly *American Agriculturist*. In 1858 and 1859, letters from beekeepers, eagerly awaiting the importation, extolled the gentle nature and high productivity of these bees. The attention to this subspecies led to a race for importation and fueled considerable controversy regarding who was responsible for the first successful importation, a distinction that was claimed by two rival beekeepers (Pellett 1938; Watkins 1968a,

[1]The common name for *Apis dorsata,* the giant honey bee, is not currently among the common names of insects and related organisms approved for use by the ESA Committee on Common Names of Insects. However Benton used "the giant honey bee" frequently as a common name and it remains in use among bee researchers as evidenced by Friedrich Ruttner in his 1988 *Biogeography and Taxonomy of Honeybees*.

[2]Common name not currently among common names of insects and related organisms approved for use by the ESA Committee on Common Names of Insects.

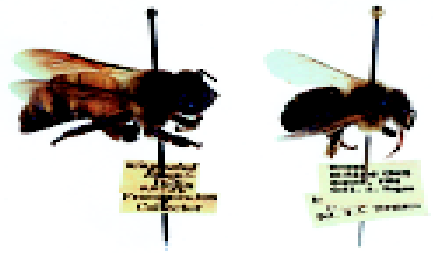

Fig. 2. *Apis dorsata* (left) and *Apis mellifera mellifera* (right). Frank Benton collected this specimen of *A. dorsata* in India during his 1905-1906 voyage to Asia.

1968b; Sheppard 1989a). Once it arrived, the Italian honey bee was propagated extensively and it quickly became very popular among American beekeepers. Importation continued until passage of the 1922 Honeybee Act. To this day, most bees sold in the United States are marketed as Italian bees.

Old World Honey Bees

The success of the importation of the Italian honey bee led to an interest in the other subspecies and species of Old World honey bees. Some beekeepers wrote of developing a hybrid of *A. dorsata* and *A. mellifera*, which they proposed to name *Apis americana* (Langstroth 1878, Newman 1880), a bee that would outperform bees around the world in honey production. After the Civil War, a few people began to import additional subspecies from Europe and Africa. (For a detailed treatment of this subject, see Sheppard 1989a, 1989b).

The importation of honey bees into North America intensified greatly in the 1880s as various entrepreneurs began shipping queen bees across the Atlantic. Frank Benton of Detroit, MI, and D. A. Jones of Beeton, Canada, boarded a steamer for Europe early in 1880 with the intent of importing bees from Cyprus (Fig. 3). The subspecies *A. mellifera cypria* Pollmann had been highly touted in several popular articles of the *American Bee Journal* and in European bee journals. Jones and Benton traveled throughout Europe learning more about beekeeping. They finally ended up in Cyprus where they established a breeding apiary with the purpose of exporting bees to North America. It appears that Mr. Jones financed most of the trip and that Frank Benton was endorsed, if not partially financed, by the Michigan State Beekeepers Association (Anonymous 1879).

Born on 5 July 1852, Frank Benton grew up in Coldwater, MI, and was educated at the Michigan Agricultural College where he studied agriculture and foreign languages. At the age of 22, he left his boyhood home in Detroit to spend 2 years as a teacher in rural schools in the southern states. He also traveled and observed beekeeping in Tennessee, Alabama, Georgia, South Carolina, North Carolina, and West Virginia but returned to Detroit in 1876, concluding that "It is only in wintering that I perceive the South can claim any advantage over the North." (Benton 1877a).

Hopes For Importation

Benton then wrote for and edited the *American Bee Journal*, covering the *Foreign Notes* feature until he resigned to go to Cyprus at the end of 1879. Benton's fluency in German, French, and Dutch enabled him to translate articles from European journals for the *American Bee Journal*. Notably, he translated articles and letters from Edward Cori of Bruex, Bohemia, including a publication titled "The Large Bee, *Apis dorsata,* of Java" (Cori 1877, 1878). At approximately the same time, Benton wrote that "Giuseppe Fiorini of Monselice, Italy...has undertaken the importation [into Italy] of the large bee known as *[A]pis dorsata*..." (Benton 1877b). Later, Benton received a letter at the *American Bee Journal* from Fiorini dated 28 November 1877 in which Fiorini wrote, "I await from day to day the bees of the island of Java...." Fiorini also provided his rationale for this undertaking when he wrote, "consider its size, which enables it to collect much honey, or whether its large proboscis, enabling it to obtain honey from flowers that our bee cannot collect from." The lack of any subsequent reference to the Fiorini attempt to import *A. dorsata* indicates that it most likely ended in failure. Nonetheless, additional articles in the *American Bee Journal* reflect the interest of both American and European beekeepers in the importation of *A. dorsata* (Cori 1878, Fiorini 1878, Parmly 1878, Thomas 1881).

In various articles and letters, speculation about the biology and potential for domestication of *A. dorsata* often was declared as fact. Cori (1877, 1878) noted that he had been told by people who "heard from the natives that this bee lives in hollow trees, and is not a wanderer." Known for his incorporation of "bee space" into the moveable frame hive, L. L. Langstroth (1878) wrote to the *American Bee Journal* in November 1878 concerning his "deep interest in the introduction of [*Apis dorsata*] into America." He cited his personal correspondence with beekeepers in the United States and abroad regarding *A. dorsata* and was convinced the bee would take to domestication because he had heard reports of it living in cavities of trees and in structures. It also was in this letter that Langstroth proposed that American beekeepers collect a fund to pay for a beekeeper to travel to Java and procure some

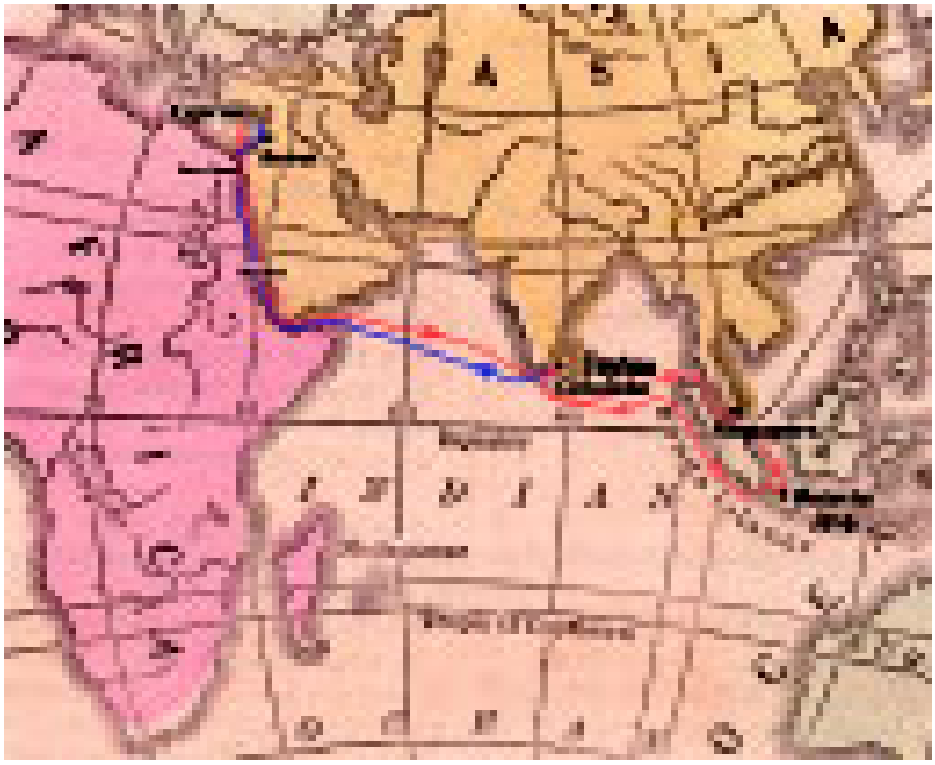

Fig. 3. An 1864 map from *Mitchell's Primary Geography* modified to detail Benton's 1881 trip in search of *A. dorsata*. The red line indicates his journey in search of this bee. The blue line shows his return trip from Ceylon after collecting two colonies. In addition to collecting *A. dorsata* in Ceylon, Benton transported *A. mellifera* to Ceylon, Singapore, and Java in exchange for money and assistance in locating *A. dorsata*

of these bees. An article published in the *American Bee Journal* in January 1878 by E. Parmly contained what likely was at the time the most accurate account of the biology of *A. dorsata*. Parmly quoted Alfred Russel Wallace who observed the bee while in Indonesia in 1854.

Cyprian and Syrian Bees

In 1880, Frank Benton; his wife, Hattie; and D. A. Jones traveled to Cyprus where they purchased 100 colonies of *A. m. cypria* from island residents for breeding and exportation to the United States and Canada (Benton 1880). It was to the breeding apiary in Cyprus that Benton planned to bring *A. dorsata* for propagation and eventual export to America (Jones 1880a). Jones proved to be the consummate businessman, writing many letters to the *American Bee Journal* that underscored the superiority of the bees he was importing and the expense to himself on behalf of the beekeeping community. He opined "that the Cyprian bees are superior to any other in the hands of some of the most experienced European bee-keepers" (Jones 1880b). In May, Jones traveled to Syria and Palestine where he "bought a large quantity" of what he called "holy bees" or "holy land bees"[3] (i.e., *Apis mellifera syriaca* Buttel-Reepen) to use for breeding in the apiary in Cyprus. Despite the difficulty and expense of moving whole colonies of bees from the interior of Syria and Palestine across rough terrain to the Mediterranean coast and then shipping them to Cyprus, Jones returned to Canada in June 1880 "with 150 pure Cyprian queens, as well as some from Palestine." He promptly sold the queens for $10-15 each (Jones 1880b) (currently, queens in the United States sell for $5-15). In October 1880, Jones wrote an article in the *American Bee Journal* detailing a speech he had given to a national convention of beekeepers during the previous month. In his speech, Jones declared, "I feel satisfied that the years 1880-1881 will be marked in the bee history of America as making greater outward strides in beekeeping than any previous years" (Jones 1880c, 1880d). Despite his public relations blitz, history did not prove him correct. However, his letters bolstered his business and allowed him and Benton to continue the importation of the Cyprian bees and the "holy bees" and to finance the trip to search for *A. dorsata* in Java.

While Jones was creating a market in America for the new races of bees from the Middle East, the Bentons remained overseas, propagating queens in the breeding apiary in Cyprus and shipping them to Jones in Canada. By December 1880, Frank Benton also was preparing for the journey to Ceylon and Java to locate and bring back *A. dorsata* (Fig. 3 illustrates the route taken by Benton). A letter from Hattie Benton to the *American Bee Journal* detailed the proposed route of her husband's trip and related his plans to "take with him thirty to thirty-five colonies of Cyprian and Syrian bees," which were to be carried to Ceylon and Java to trade when needed. He departed on 21 December 1880 (H. Benton 1881).

Searching For *A. dorsata*

By 24 January 1881, Benton reached Point de Galle, Ceylon, where he disembarked and set up his Cyprian and Syrian bees on shore (Benton 1881a). From there he traveled overland to Colombo, Ceylon, searching for *A. dorsata*. He found a small bee he called "*Apis zonata,*"[4] and another colony referred to as *Apis indica* L., and collected samples and provided brief descriptions in a letter to D. A. Jones. The letter also provides the first indication of the hardships Benton endured, as he reported, "I have had a horrible time getting stung with large hornets in the jungles. It laid me up for one whole day" (Benton 1881b). A week later, Jones received another letter from Point de Galle in which Benton mentioned three native bees he had seen there, including *A. indica*; the other two species, trigonids, he felt would be of questionable worth to beekeepers. Also while in Ceylon, Benton wrote an article that appeared in the *Ceylon Observer*, a British newspaper from the island, in which he documented the start of western beekeeping on Ceylon using some of the *A. mellifera* colonies he had transported from his Cyprus apiary (Benton 1881a, 1881b).

Having failed to locate *A. dorsata* in Ceylon, Benton, with his remaining Cyprian and Syrian bees, boarded the French steamer "Yangste" for Singapore en route to Java on 31 January 1881. His next communication to Jones appeared 2 weeks later from Singapore. He described, using the Ceylonese names, the bees he had collected in Ceylon: *Kana Mee Meso,* a trigonid; and *Mee Meso*, a "small honey bee." Benton also wrote about two bees he had not seen but about which he had been told by the Ceylonese natives: *Duadual-Meso* and *Bambera*, the latter which proved to be *A. dorsata*. Benton was sanguine regarding the Cyprian and Syrian bees he had carried as far as Singapore and believed they would survive to Java. He noted they were faring well and that some had been left in Ceylon "to introduce the species *Apis melifica* [*sic*]" and to "establish...an industry that I am sure will thrive...." He also related a long list of seeds, gems, and sundries he was collecting to bring back to Cyprus (Benton 1881c).

Two weeks later, Benton sent two letters to Jones from Batavia, Java, in which he reported that the *A. mellifera* colonies that he had taken with him were proving useful tender with the Dutch administrators of the island. Either in exchange for or as a result of Benton's successful importation of the Syrian and Cyprian bees, the Dutch agreed to buy his colonies for 5 pounds each and, as Benton wrote, "the head of the Government Department of Agriculture has instructed one of his officers of the Government Agricultural School to furnish me aid in securing some of the wild bees-*Apis dorsata*" (Benton 1881d, 1881e).

From February to early March, 1881, there is no published record of correspondence between Benton and Jones, but two letters dated 7 March foretold the eventual results (Benton 1881f, 1881g). The first letter was written while Benton was in Java and detailed his travels through the interior of Java where he had crossed the mountainous terrain in search of *A. dorsata*. He described the rain forest, concluding that, "It rains so much, and the moisture which gathers each night is so great....There is absolutely no place for the bees. Few of the trees are hollow; there are not many flowers that would attract the bees." The second letter was written while he was aboard a steamer back to Ceylon and had an air of hope about finding *A. dorsata* upon his return to Ceylon.

A month passed without a word from Benton until a letter, dated 3 May 1881, was sent from the Red Sea aboard the steamer *Djemnah* (Benton 1881h). Benton wrote:

> Friend Jones: No doubt you look for a long account telling you that I have with me scores of colonies of bees of various kinds and races, some of them far more valuable than those we now cultivate, and I should be very glad indeed to be able to give such a report, but instead, I must say I have with me but two races of bees and but two colonies of *Apis dorsata*, the Great East India bee and one of *Apis florea*, a

[3]Jones referred *A. m. syriaca* as "holy bees" in his initial letters to the *American Bee Journal*. However, in advertisements that appeared later, he sold the queens as "holy land bees." In his letters to Jones, Benton used the terms "Syrian bees" and "Palestinian bees" interchangeably with "holy bees." From the context of the advertisements and the letters it is clear that they are both referring to bees from a single breeding line.

[4]*Apis zonata* Smith is an invalid synonym for *A. dorsata* because it is a homonym for *Apis zonata* L. *A. zonata L.* was used for a solitary, but sometimes aggregating, anthophorine bee now placed in the genus *Amegilla*. Because it seems unlikely that Benton would misidentify the bee he was searching for, it may be that he was referring to this solitary bee in this letter. (C. D. Michener, personal communication)

> race of very small bee, curious, but not valuable, and furthermore, I cannot say the colony of large bees is in any condition as to be likely to reach its destination alive.

Benton then described his search for *A. dorsata* in Ceylon and the fateful misfortune that he suffered, the details of which are recounted below (Benton 1881h).

After arriving in Ceylon, Benton traveled to the island's interior where he met a native chief, "a man more interested in bees than any other native-perhaps I might say *person*, in Ceylon." The chief, with whom he stayed for this visit to Ceylon, provided Benton with information on the locations of *A. dorsata* colonies, which led him to the first colony he had ever seen (only 2 miles from where he was staying). Benton immediately climbed the tree in which these bees nested 50 feet up, getting close enough to touch the comb. He observed them for a few minutes, until he was stung, and when other bees began to attack him he was forced to climb down. Describing the event, Benton

Journeys into the jungle were arduous and exhausting, often taking hours to advance a few miles. Most of the distance was covered with an oxcart to haul the beekeeping equipment over rutted and muddy roads.

wrote "but my new found friends accompanied me, as I went into the jungle." He "received many stings" and captured or killed those that plagued him. Later that night, he and some natives climbed the tree to hive the colony, but part of the nest was inadvertently burned with a torch; once in the box, the queen could not be located and the colony soon died. A few days later, Benton tried to secure another colony in a high tree but returned to the ground with only "a severe stinging and much fatigue." He ventured many times into the night, only to find that the colony of which he had been told either had been destroyed by natives harvesting honey or were swarms that had left before he arrived (Benton 1881h).

Journeys into the jungle were arduous and exhausting, often taking hours to advance a few miles. Most of the distance was covered with an oxcart to haul the beekeeping equipment over rutted and muddy roads. When the roads ended, Benton and his assistants would travel on foot through the rocky jungle, which also was "slow and laborious." The most productive part of Benton's stay in Ceylon was "a trip to *Bamberagalla*...22 miles with ox-cart and 7 miles on foot." *Bamberagalla* (literally, "*Apis dorsata* rock") was a large cliff rising out of the jungle floor where Benton found 14 colonies of *Apis dorsata* nesting on the rock face. He and his native assistants climbed the wet, slippery rock at night in "a fearful blinding thunderstorm" to hive two colonies that they could reach from a ledge. Benton later would carry those two hives onto the steamer returning to Cyprus (Benton 1881h).

Benton Contracts Malaria

In Ceylon, he managed to hive another colony he found in a tree before further work was prevented by a malarial fever. It is not clear what happened to this colony because it is not mentioned again in his letters. When the fever began, Benton still was residing with the chief in the interior of Ceylon, without access to western medical care, and his condition worsened until, as he wrote, "at last, in desperation, I walked several miles through the jungle and went 9 or 10 in an ox-cart to where I could get some medicine." He then traveled by coach and boat to Colombo, where he convalesced at the residence of the editor of the *Ceylon Observer*. During those 10 days, he "suffered immensely" and as he boarded the steamer was, in his words, "so weak I could hardly stand" (Benton 1881h).

Benton continued to recover during his return trip to Cyprus but was dismayed that the colonies he had collected were dwindling (Benton 1881h). It was while on the steamer that he began to feel that *A. dorsata* might not be suitable for importation into Europe and America because he felt the bees would be poor honey-producers. Interestingly, he still believed they could be hived and perform well in their native range. He wrote Jones that he felt confident that he could still reach Cyprus with some bees (Benton 1881i).

The final blow for Benton's bees came in the form of a bubonic plague outbreak in Mesopotamia (Iraq) and parts of Syria. Benton wanted to circumvent quarantine at Syrian ports by taking a train from Suez to Alexandria, Egypt, and then sailing directly to Cyprus. Before reaching Suez, he experienced another bout of malaria and was unable to disembark at Suez; so he continued to sail to Beirut. The bees were alive when he landed in Beirut, but he was placed in quarantine. This diversion resulted in Benton starting his next letter, "They have me behind bars and locks, with plenty of guards about!" He spent a few days in quarantine and when released, found his *A. dorsata* dead and the *Apis florea* L. alive but weak (Benton 1881i).

Interest in *A. dorsata* Wanes

Upon his return to Cyprus, Benton sent specimens of *A. dorsata* preserved in alcohol to Jones (Benton 1893). These specimens made the rounds in Canada and the United States, enabling beekeepers and scientists to examine them. The bees inspired at least one beekeeper to write to the *American Bee Journal* voicing concerns that the bees were too large and the stings too long for him to want to keep these bees (Clarke 1882).

During the time Benton was traveling, letters regarding *A. dorsata* were appearing in bee journals in the United States and in Europe. *Bienen-Zeitung*, a German bee periodical of the time, reported that soon more information would appear to explain how to overwinter *A. dorsata* in colder climates. The article was translated and reprinted by the *American Bee Journal* (Gravenhorst 1881). Nonetheless, for all of the excitement these bees had generated in the beekeeping community, critics of the idea gave voice to their opinions and many predicted failure. A regular contributor to the *American Bee Journal*, Mrs. Harrison, wrote to denounce the idea, arguing "it is doubtful whether it could be taught to dwell in a hive, or endure the winter's cold" (Harrison 1881). After publication of Benton's final letter of 1881, letters to the editor about *A. dorsata* decreased in frequency.

The Bentons spent the summer in Cyprus and their first daughter was born on 5 September 1881 (Benton 1882). During the next few years, Benton would be plagued with recurrent illness that left him incapable of performing the rigors of queen-rearing, and this resulted in 1882 being a poor year for queen production in the Cyprian apiary (Newman 1882). In spring 1882, he moved his queen-rearing operation to Beirut, where he fell sick three times and his daughter died from an illness. Benton blamed his daughter's death on an episode of cholera he contracted during his travels (Benton 1884). In the winter of 1882-1883, Benton studied at the University of Athens, then returned to Beirut in the spring (Anonymous 1919). Spring 1884 found Benton residing in Berlin, where he was working toward a Ph.D. at the University of Munich. He primarily resided in Munich until 1890, where he continued to write letters to the *American Bee Journal* detailing his trip and observations on *A. dorsata* and various *A. mellifera* subspecies (Benton 1884, 1885a, 1885b).

Benton Returns Home

After Benton failed to bring *A. dorsata* back from Java, the fervor for *A. dorsata* abated slightly, and the issue was not visited seriously again until June 1905. Up to that time, letters continued to appear in the *American Bee Journal* regarding importation of *A. dorsata*, and Benton continued to correspond with the magazine, mostly about the bees he was exporting to the United States and Canada. In 1890, the Bentons returned to the United States and Benton took a position as the Department of Agriculture's first apiculture specialist. While with the Department, Benton was involved in another round of interest in *A. dorsata*, which culminated in June 1905 (Anonymous 1919) when Benton again set out for the Far East as a representative of the Department of Agriculture. The desire to bring *A. dorsata* to the United States had faded, but there was some interest in *A. dorsata* to supplement pollination of fruit crops in the South (Anonymous 1919). This trip did not bring bees to the United States because the trip was to study Asian bees and horticultural crops, not to attempt importation (Benton 1892, Anonymous 1919).

Reading his letters a century after they were written, it is easy to view Frank Benton as a reckless entrepreneur, roaming through the jungles of Java, buying up local bees by the droves, and writing letters to bee journals about what he perceived to be the savagery of the natives; however, Benton was a product of his time. His contributions to the beekeeping industry in America are many, if relatively unknown. He exported thousands of queens from numerous subspecies, adding to the genetic diversity of *A. mellifera* in the New World. Ironically, many of the bees he imported were not popular with beekeepers, who stopped managing them in favor of gentler races. In 1899, while with the Department of Agriculture, Benton wrote *The Honey Bee: A Manual For Apicultural Instruction*, a 118-page guide for new beekeepers (Benton 1899). He invented the Benton cage for shipping queen bees (Pellett 1938). The cage is used almost exclusively in the modern queen shipping industry, allowing for convenient transport of bees over long distances. After his return to the United States, Benton continued queen-breeding and lobbied for the introduction and breeding of new subspecies.

Benton remains one of the lesser known figures in beekeeping, largely because he lived during a time when critical labor-saving and profit-making devices, such as the moveable frame hive and the centrifugal honey extractor, were invented, and the Italian honey bee rose to prominence in American beekeeping; by comparison, his contributions seem modest. Upon his death in February 1919, the *American Bee Journal* published an obituary and a short travelogue about Benton (Anonymous 1919); but, apart from a mention of his importations in Pellett's *History of American Beekeeping*, little else was written on his work.

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James P. Strange recently completed his M. Sc. degree in entomology at Washington State University, where he worked on the control of mites in honey bee colonies. He will remain at WSU to work on the evolution and ecology of honey bee ecotypes for his Ph.D.

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