Tom Parisian pulled up at Honey Bee Genetics in his Suburban wearing a bright yellow storm coat. As soon as he stepped out onto the road he was attracting bees: At first just a stray, then two, then half a dozen. They alighted on his shoulders, buzzed around his waist, and landed on his blue jeans. Was it the bright yellow coat that attracted them? Or was it something else? An aura of bee-ness? A pheromone of affection? He paid them no heed. Already he was eyeing the 4X4 fork lifts in the yard, unloading supplies, talking to Paulino, getting a status report from Rick, approving the paint color for the new shaker boxes for Gustavo and – at the same time – greeting me with a warm handshake.

Anyone who believes that bees do all the work around a bee yard needs to watch Tom and his team. It was a time in Mid-March of 2010 when all the hectic activities of the early spring season were bearing down on this working farm.

For instance, the almond bloom was nearly over, but the almond farmers were calling to ask for just a few more days to have the bees in the orchards. Meanwhile, the prune blossoms were opening, and different farmers in different orchards were calling to ask if the bees could be moved in a little early, before their scheduled day.

Simultaneously, there was a construction crew hauling in some final materials for the new bee barn that was being finished. But already the barn was in use. One corner had been made into a woodworking shop where new queen racks were being sawn and new shaker boxes were being painted. In another corner they were unloading and inspecting empty nucleus hives. In a third corner, a 4X4 forklift was moving an entire pallet of drive-t bakery sugar, which—in turn—was being distributed into the empty nucleus hives. From the size of this setup and the level of activity, it looked like they were planning to start an awful lot of nucs! I was about to ask...
how many when Tom’s cell phone rang.

It was Sharon, his wife, back at their house. She was busy scheduling the shipping orders for packages and queens. There she was, working out the shipping scheduling for Mid-April when, at that particular moment in the Mid-March, there were still no packages to ship and no queens to sell.

I felt as though I’d landed in the middle of a conjuring act and was about to witness a team of master magicians perform an amazing trick: Assembling new colonies out of thin air. How were they going to pull it off?

That was why I was here. I’d come to witness the great transformation of a working bee farm into the breeding bedroom for disease-resistant colonies of hybrid honey bees.

**Honey Bee Genetics**

Tom Parisian operates Honey Bee Genetics on about 40 acres of level Sacramento Valley farmland bordered by orchards and the distantly encroaching suburban tracks of Vacaville, California. He keeps about 3500 colonies of bees in continual rotation with the surrounding crops: Almonds and other fruit trees in the early spring and sunflowers in the summer. But pollination and the associated production of honey represent only two parts of his business. It’s the third part — genetically selected disease-resistant bees — that have made Honey Bee Genetics synonymous with healthy, productive beekeeping around the world. And the history of this small company runs like a beeline through the science and commerce of modern beekeeping practices.

**The Changing Fortunes of Bees**

I first became aware of Honey Bee Genetics in the late 1980s when a friend asked me to set her up with bees. I began a remedial investigation about the best bees for our local area: Remedial, because I’d not kept bees for 10 years. I was surprised and discouraged by how much beekeeping had changed in such a short time. Between 1974 and 1984 the whole etiology and treatment of bee diseases had become distorted.¹ What had caused such massive change? Of course, it was the mites: U.S. apiaries were being devastated first by infestations of tracheal (Acarapis woodi) and then varroa (Varroa destructor) mites. By 1989, varroa mites were wreaking havoc on colonies all across the country.

Most beekeepers were being instructed to use miticides and fumigants to manage the infestations and to save their colonies. But my friend was an organic gardener and the use of insecticides was not an option. Instead, we searched for alternative methods to keep the bees healthy. This quest led me to Taber’s Honey Bee Genetics in Vacaville, CA. They advertised a different approach that didn’t include chemical treatment: Bees bred, the ad said, for their resistance to tracheal and varroa mites. And Steve Taber was proving to be one of the most vocal champions of this new approach.

**Genesis of Honey Bee Genetics**

Steve Taber was already renowned as a USDA bee researcher, lecturer, and author when he retired to Vacaville, California in 1978 with the expressed purpose of raising new lines of hybrid queens that were more resistant to disease.

During that same period, Tom Parisian was working toward a PhD at nearby UC Davis on his own project related to queen rearing. And, in addition, he had his own burgeoning pollination business. “Back then, pollination was just extra cash — about $6 per colony,” Tom told me. “Not much by today’s standards. But for a poor grad student with a fair number of hives, it was good money.”

Tom’s business plan developed from some controversial economic research that questioned if pollination and honey production alone could financially sustain a business in bees. So, he determined to add queen rearing as a third element and discovered that it worked for his business model. From 1980 until 1988 he ran his bee business as Cal Queens Farm, based in Vacaville. But then in 1988 a fire destroyed both his home and his bee buildings.

In hindsight, it seems inevitable that Steve and Tom would team up, and the resulting partnership blossomed in 1988 under the business name of Taber’s Honey Bee Genetics.

“Both Steve and I maintained our breeding lines through instrumental insemination during that time,” Tom says. “We were identifying strains that were resistant to tracheal mites, and very few people were doing that. We’d dissect the bees, month after month, using microscopes to examine how they were withstanding the mites. And slowly — very slowly — we started to see signs of resistance in the surviving colonies. Then, we’d cross the queens that showed some resistance with drones from a different strain that also showed promise. And the cycle would repeat. We lost a lot of bees in the process: A very large percentage.”

To sustain an appropriately large pool of colonies for genetic selection, Tom’s acumen as a commercial beekeeper proved crucial. Tom ran the day-to-day operations of the apiary, while Steve attended primarily to the biology of resistance. Honey Bee Genetics expanded to thousands of working colonies actively pollinating the fields and crops near Vacaville. Using this resource of active colonies, Tom and Steve sustained their focus on selecting and breeding disease resistant lines.

“Steve had his own design for nucleus hives,” Tom remembers. “I still have some of them around here. They aren’t compatible with any other equipment, but that didn’t really matter at the time. Steve was happiest just working through his nucleus colonies, while I managed the day-to-day operations.”

Then, in 1991, after three years at Honey Bee Genetics, Steve suddenly decided to move to France. It created a quandary for the business, but Tom bought out Steve’s partnership, and the company was renamed simply “Honey Bee Genetics.”

Yet, in talking with Tom, it was very clear that Honey Bee Genetics had become more than a mere business venture. It had transformed into one of those rare and unique partnerships that — founded and nurtured on professional skills — flourished with a mutual, abiding respect and a deep underlying friendship. That friendship even survived this sudden dissolution of the partnership, and

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¹ “Inheritance of Resistance to Acarapis woodi (Acar: Tarsenemidae) in Crosses Between Selected Resistant Russian and Selected Susceptible U.S. Honey Bees (Hymenoptera: Apidae)”, Jose’ D. Villa and Thomas E. Rinderer, USDA-ARS Honey Bee Breeding, Genetics and Physiology Laboratory, 1157 Ben Hur Road, Baton Rouge, LA 70820.

**Honey Bee Genetics Today**

Fast forward 20 years, and Honey Bee Genetics today has become world-famous as a queen breeding organization. They have shipped packages as far west as Guam and as far east as the United Arab Emirates. They’ve sent hybrid queens to France, Italy, and Chile. The focus on disease-resistant colonies has intensified in recent years on survivor stock.

“After Steve left, I used instrumental insemination to maintain and produce breeder queens for the USDA ARS Y-C-1 project,” Tom says. “This was our Yugoslavian Carniolan line. But that is not all. “One of our current lines is the Russian Carniolan stock imported by the USDA,” Tom continued. “This line has been overwintered in a harsh climate with snow and low temperatures and has been maintained for six years without any chemical treatments for mites. We also offer an Italian line which is crossed to the Russian Carniolan drones.” And the results?

“Many of our customers have been repeat customers for many years. These customers — from states all over the country — give us feedback that our bees are surviving and thriving in their apiaries.”

**The Skilled Team**

Today Tom Parisian is running Honey Bee Genetics at a full-tilt pace with a team who has been with him for more than 15 years.

“I don’t think I’d still be doing this without the loyalty and the skill of my employees,” Tom said. “With Paulino Bustamante, Gustavo Gutierrez, Rick Frech and the rest of the crew doing the day-to-day, and I can actually focus on managing the business.”

Indeed, those I met at Honey Bee Genetics were as enthusiastic about their activities as Tom.

But the treat for me as an amateur beekeeper went beyond the opportunity to talk with one of the real pioneers in hybrid queen rearing. It was also the chance to watch his skilled team carefully and efficiently create hundreds of nucleus colonies in a real production setting.

How many nucleus colonies were they making? The goal this season was, according to Tom, 4,000.

**Counting, counting, counting**

As Tom and his team worked, the first thing I observed was their attention to the phases of the bee reproductive cycle, with an eye on the current weather forecasts and the pollen needs of clients. They clearly have the bee math down pat and are using it as the backbone of their schedule for creating the nucs.

Each nucleus colony needed a healthy queen and that meant **thousands** of newly hatched bee larva from the best colonies had to be grafted and floated in queen cups containing royal jelly. These queen cups were placed in **finishing hives** where a frame of nurse bees completed the queen cells as the larvae began pupation.

Later, four thousand of the best finished queen cells were chosen from the queen racks for implantation into the nucleus colonies. This reproductive schedule also dictated that Tom’s 1000 nucleus hives — each containing 4 sections — had to be physically ready within the twenty-eight-day window of pupation. This meant inspecting the 1000 hives, repairing frames, replacing foundations where necessary, and loading the 4000 sections with drivert sugar - no small minor undertaking on an operation of this scale. As a consequence, they stagger the overall hive maintenance work to coincide with multiple cycles of queen rearing and nucleus creation.

Meanwhile, the actual bees needed to fill the nucleus hives were gathered from the colonies that were pollinating in the orchards. Tom’s team uses specially constructed funnels, with integrated drone/queen excluders — called “shaker boxes”— that snap into the custom-built bulk bee cages. They **shake** the hives of orchard colonies into these funnels and the bees fall into the bulk cages. Then, the cages were driven back to the farm.

The bulk cages — each holding about 35 pounds of bees — were brought into a cool, darkened shed where the fully prepared nucleus hives have been staged in a single row. The bees were sprayed with sugar water to keep them calm, and the cool Sacramento Valley morning kept them from flying.

**Pouring the Nucs**

Then, began the process where the reproductive cycle of pupation connected with all the equipment preparation that Tom’s team had been working on.

A finished queen cell was pushed into a nuc frame with a single motion. Since there were four sections in each hive box, four queens cells were added to four frames per hive body.

At the same time a team member was grafting the queens onto the frames, another member was following close behind with a metal handleless ladle, carefully scooping bees from the bulk cages and literally “pouring” the bees directly into each section. A third member placed burlap inner covers over the top of the four sections, and then laid the exterior cover on the completed nucleus hive.

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As each layer of completed nucleus hives was closed up, a new layer of empty nucs was set directly on top, and the process was repeated. By the end of the morning, several hundred nucleus hives were assembled by this operation, each containing four colonies. The whole operation was a masterpiece of timing, coordination, and skill. Watching them handle these colonies with such grace and speed, I was awed by the care they demonstrated with each nuc. These were not some hired-hand day laborers, but each a truly skilled and dedicated beekeeper. They performed this operation in almost complete silence as a few wayward bees circled the stacks. It was like witnessing a team of midwives attending a birth: The creation of new life in the world.

They left the nucs in the dark for two days to allow the colonies to settle in and the queens to emerge. Then, they moved them out into an open bee yard. Within several days, the queen in each colony would fly out on her mating flight. When she returned, she would begin laying her first eggs, building up the nuc colonies.

**Catching the Queens in April**

On my fourth visit to Honey Bee Genetics, I rode out with Tom to visit the nucleus farm – the 1000 hives now nestled in an open agricultural field. Two team members were inspecting the colonies to make certain the emerged/mated queens were adequately laying a good pattern of eggs. Then, they harvested the queens and carefully slipped them into their queen cages. Watching them work in the field, as a couple of Thoroughbreds wandered in an adjoining paddock, there was almost a festive atmosphere: The sun was out, it was nearly 70, and it seemed a perfect California day for searching for queens. Meanwhile, back at the office, these queens were gingerly marked by Paulino — in preparation for individual shipping or as the queens to shipped with bee packages.

The packages, themselves, were also being assembled. Crew members drove out again with the bulk cages, shaking the active colonies to gather workers, and pouring them into shipping boxes where a queen awaited with a can of feeding syrup for their journey to their new homes.

**Shipping and Pickup**

On April 17th, almost precisely one month from my first visit in March, Tom asked me to drive over one more time to the apiary in Vacaville. His wife Sharon’s meticulous scheduling had already shipped thousands of bees as far north as Alaska, and as far east as Ohio, and their entire stock of packages—pre-ordered by individual telephone calls and emails—had been sold out for several weeks. Yet the telephone calls were still coming.

Some calls were from customers who had forgotten to order their bees, and now were disappointed. Some were about obtaining new queens. Most were from people needing some help with the installation. One call from an airport shipper in Washington reported that a forklift truck had pierced through a pallet of bees headed for Alaska. Fortunately, Tom found a local beekeeper to patch the shipment and it reached its destination. The frantic calls, Tom said, probably wouldn’t let up until June when the installation season ended.

The conjuring trick was now nearly complete: From out of thin air Honey Bee Genetics had sent another generation of disease...
resistant bees out into the world.

The Future at Honey Bee Genetics

Still, Tom had one more special thing he wanted to share. Each year, on three weekends, he invites the amateur beekeepers to drive out to the apiary and personally pick up their packages. Forty people had already come through that morning by the time I arrived at 9AM, and some had driven in from as far as Mill Valley, two hours away. Several had come with their children and their grandchildren. Others brought their spouse or neighbor to share this unique experience. I asked each how they had found Honey Bee Genetics, and each described a personal past connection to the company.

Then, Tom took each little group over to a table where he offered instructions on the best strategy for installing their packages. One young beekeeper stared wide-eyed, looking for assurances from his grandfather. Another stood by, silently tracking a few stray bees as his father asked detailed questions. Tom spoke softly, authoritatively, showing a knack for filling in when a questioner seemed hesitant or uncertain. Then, one by one, Tom led each family to its precious package, and soon the morning pickups were complete.

Finally, we pulled up a couple of empty supers and we sat outside in the beautiful California sunshine and talked about all I had seen. As we talked, bees from the finishing nucs strayed over and carelessly circled around his shoulders. Soon we were discussing a wide range of topics: About Colony Collapse Disorder; about the new pesticides in agribusiness; and about the amateur interest in bees. Finally, I asked how the Honey Bee Genetics of today had changed, and how the change related to the original goals that he and Steve Taber had set out more than 20 years before.

“Our vision has always been on customer service,” he said. “We do that by supplying the highest quality bees and bee products, and assisting the farmers in improving their crops by supplying them with strong, healthy bee hives.”

These were the precise elements of Tom’s business plan from more than 20 years earlier: Pollination, bee products, and genetics. It was a great response to hear from the owner of this small company: A true commitment to quality and customer satisfaction.

Beyond the Business Vision

But as an amateur beekeeper who had visited the apiary, and had witnessed how its bees performed over 20 years, I had my own personal vision of Honey Bee Genetics, and it seemed to stretch a bit further beyond the basic business model. And this same vision seemed to be reinforced by every beekeeper I met there that morning.

When colonies were being devastated by the new organic challenges of tracheal mites and varroa, Steve Taber and Tom Parisian charted a new direction for managing bees. They saw that chemical management of pests was as hard on bees as it was expensive for beekeepers. They seemed to understand that it was the adaptive biology of Apis mellifera that held the key to its own survival, and that treating the bees with chemicals actually retarded the long-term chances of the species’ survival.

It was this sort of vision that created the enterprise of Honey Bee Genetics. Steve Taber and Tom Parisian – along with a few others organizations had set up a chemical-free breeding refuge for the species to work out its own fate. This fate included hybridization, but it also relied upon reproductive adaptation—the propagation of survival strains—over years of careful and skilled professional management.

I wonder if this is the true legacy that Steve Taber and Tom Parisian will one day leave behind, and the reason Honey Bee Genetics will continue to thrive in the years to come.

Which is the true vision and future of this small and dedicated company? The business model or the scientific biological insight into this species called Apis mellifera?

As Tom took off on his next errand of the day, I watched as yet another handful of bees swirled around his shoulders. With a bit of imagination, one might believe they were whispering in his ear.