Diversity
Vigor in the Bee World

by M.E.A. McNEIL

"You are a beekeeper until you're done," said commercial beekeeper George Hansen. "It's not the kind of job where, they say, the average person has seven different jobs in a lifetime. That's not beekeeping. It takes longer for things to turn over and change. But because of the change in the landscape, because of the interactions we're having with our scientists, because of the less and less world that everything is, we are just faced with a new day."

Hansen has been president of the American Beekeeping Federation and a longtime producer-representative on the National Honey Board. He currently tackles beekeeping management issues on the Honey Bee Health Coalition and serves on the boards of the Bee Informed Partnership and Project *Apis m*. His observations come from years of service: "The industry is changing, and we are going to have to get used to a lot more diversity."

Although diversity in the natural world has long been understood by biologists to be a necessary condition for evolution and population fitness, it is more recently that social scientists have quantified its value in human interactions. For one example, a study of 1,700 companies of varied sizes showed that more diverse management teams produced 19% higher revenue. Another study analyzed thousands of scientific papers to explore the relationship between research significance and various classes of diversity: ethnicity, discipline, gender, institutional affiliation, and age. Ethnic diversity had the strongest correlation with scientific impact, resulting in significant gain for the scientists. The takeaway is that diversity in the workplace produces a variety of approaches that result in enhanced innovation in much the same way that diversity contributes in biology. Intellectual, educational, and cultural monocultures — like single-mated honey bee queens — can have fewer options to meet complex challenges.

That new day of diversity has been dawning differently across the bee world — academia and research; migratory beekeeping; breeding; small-scale operations; backyard enthusiasts. Within each can be found women; communities of Black, indigenous, people of color (BIPOC); LGBTQ.

The agents of change have been many. At the turn of the 19th century, 90% of the U.S. population lived on farms, and it was common for bees to be kept by women in dooryards. A confluence of circumstances — sentiment toward education as a democratic and moral right, respect for practical knowledge, grants of land — had made it possible for Lincoln to sign the Morrill Act in 1862, creating the land-grant colleges for the study of agriculture, which included beekeeping. Economic depression, depleted soil, drought, and pests plagued farmers; to help them, scientists at the colleges and newly formed federal labs and agencies produced information through agricultural courses and scholarly papers. As much as they welcomed help, farmers distrusted what they called "book farming." In an old joke, a young land-grant graduate took issue with the task of painting boxes for a beekeeper, explaining that he had a college education. The beekeeper replied, "I'm sorry for that; I'll show you how to hold the brush."

Nonetheless, various coalitions of interests — beekeepers, statewide organizations, governmental entities — made progress over the years. For example, pervasive honey adulteration brought about the Pure Food Act of 1906; the USDA Honey Bee Diagnostic Lab was established, where the causal organism of American foulbrood was discovered. Independence also played an important role, as the scientists were not ideologically aligned to a political party.

These were largely white men's pursuits. Progress was uneven at best for women scientists at the colleges, although it was said to be better early on than at the government labs. There were rare exceptions, such as Anna Comstock, who learned beekeeping at the land-grant college Cornell and became an extension professor in 1898 — until male colleagues had her demoted — and Margaret Washington who taught beekeeping to Black women at Tuskegee, one of the later-established land-grant colleges. Still, women wrote for the bee journals and typically kept their own bees.

Pause here to consider how the benefits were sliced. A second Morrill Act in 1890 was passed to include the South, where there was de jure segregation. It allowed the creation of separate land-grant colleges for Blacks — identified as "1890 schools." De facto segregation in the North was addressed with a separate college in Delaware. Funds, with few exceptions, bypassed the 1890 schools. (A century later, the USDA addressed the disparity.) As for extension support,

Top of Page: *John Harbo hired Mary Sutherland to work with him at the USDA lab at Baton Rouge in 1973. Pictured left to right: William Gordon, Eugene Jensen, Kenneth Tucker, Gary Reynolds, Jack Bishop, Mary Sutherland, Elizabeth Warrick and John Harbo.* From the December 1973 American Bee Journal

The University of Minnesota Beekeeping Class of 1924, left, was all women, whereas the class in 1944 was half men. Marla Spivak, who now teaches the classes, said that the 1990s classes were mostly men. She said, "Now it's shifting again, and there are more women. I think it has to do with this idea of wanting to be rural and in an urban setting."

in a typical example, Florida created a separate program for Blacks, and, when they comprised a third of the rural population there in 1920, 5% of extension funds were spent for work among that group.

A turning point in the structure of American farming came at the end of World War II. Some 5 million remaining farms had typically raised diverse crops, including livestock and bees for pollination and honey. High operating costs, low commodity prices and the use of synthetic insecticides brought about consolidation of farms into monocropping agribusinesses. In tandem, commercial beekeeping grew in size and cost. Migratory pollination had been developing since the 1880s along with transportation — horse and wagon, Ford model Ts, railroad cars and then trucks. At that scale, it became men's work. It was an expensive undertaking in land and equipment that tended to develop in white-owned family-run operations, as many still are today. It also faced new challenges that required scientific attention — for example, bee kills from pesticides. One researcher remarked, "Scientists have a good fraternity."

It was indeed a fraternity. The highly respected Roger Morse had 47 graduate students at Cornell from 1966 to 1996 — all men, with the exception of one woman near the end of his career. Those men, according to one estimate, eventually counted for a large portion of the apiary experts in the country — the same in ethnicity and gender for the most part as the rest of their colleagues.

But the times they were a-changing. When the first affirmative action law was expanded in 1965 to include gender, it changed the environment in which women could apply for state and federal positions. In addition, many women beekeepers had the option to do international beekeeping in the Peace Corps.

Among the agents of change were that generation of mostly male graduates. When a young John Harbo enquired to hire a lab technician when he arrived at the USDA in Baton Rouge, LA in 1971, he was told, "She's a little bit militant."

Migratory beekeeping grew with industrial farming. Dooryard hives had often been kept by women, but as the number of colonies grew in scale, it became men's work.

"Well, that's all right," he said. He smiled at the memory, 50 years later, his eyes sparkling. He'd purposefully gone to ask for a candidate from Southern University, a historically Black land-grant college. He interviewed Mary Sutherland and hired her. "Before she came it was only the scientists who did artificial insemination." He'd been told that the work was too important to leave to technicians. "But I figured we needed to train other people to do it beside me. I trained her and she turned out to be very good."

Mike Burgett, now Emeritus Professor of Entomology at Oregon State University, where he began teaching in 1974, was among those who came out of the Morse lab and made an effort to teach and promote women. To draw students into entomology, Burgett taught general beekeeping and courses for non-science majors such as "Creepy Crawlies" and "Plagues, Pests and Politics." That drew in Debbie Delaney, who is now Associate Professor of Entomology at the University of Delaware. Sue Cobey, now a researcher at Washington State University who has bred back the nearly lost Carniolan bee in the U.S., took her first beekeeping class from Burgett. She learned instrumental insemination from him, among others, and uses that skill working with a number of significant breeding projects. Lilia De Grosman, now at the USDA Baton Rouge lab, got her M.S. under Burgett.

When Marion Ellis, now an emeritus professor, arrived at the University of Nebraska at Lincoln in 1979, "It was a man's world," he says. UNL had no female faculty members in entomology. All of the students in entry-level classes were male. He recounted the change when the university hired

Tiffany Heng Moss to teach. "That was in the late 1990s. Now we have three introduction classes for entomology. The students are close to half female. We were nudged by the reality of the time and just conscientiously tried to be more diverse."

The mentors, the door-openers, the allies and advocates were but contributors to the change. "From my perspective," said Harbo, "the women who have succeeded in apiculture have done so because they were better than their male counterparts. I don't think they received any special privileges."

In the La Arana rock painting depicting honey hunting, from about 3000 BCE, two figures cling to ropes. [See "Revisiting Prehistoric Honey Hunting At Bicorp, Spain," November 2020 ABJ.] Steve Sheppard at Washington State University said, "It's usually titled 'The First Man Gathering Honey' but the person gathering honey has wide hips and the person down below has narrow. I think that the person gathering honey was a woman. A woman was the first." Whether that is true, the title makes an assumption that may not be supportable.

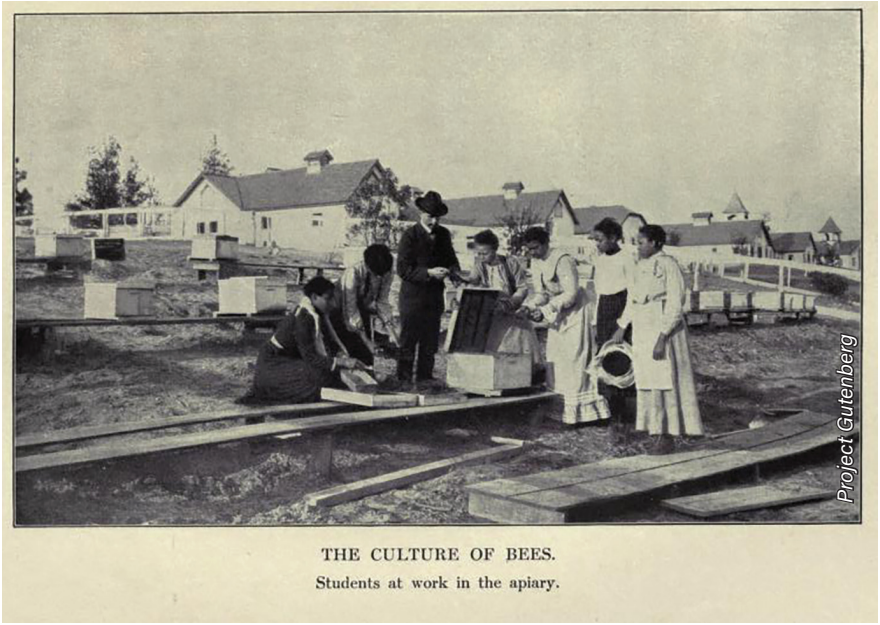
Before the women's movements of the 20th century, women naturalists, as they were first called, more often than not grew up in supportive family environments where learning was valued. The assumption was that, at most, a married woman could become involved in the work of her husband, although there were those that pushed the boundaries. Strictures on station and gender were still reflected when they were called "lady entomologists," and their interest was considered a hobby.

One of them, Edith Patch (1876-1954), was excluded from an after-dinner address at a meeting of the Entomological Society of America (ESA) because the men would be smoking and could not do so in the presence of a woman. Nonetheless, she found the meeting and took a seat. One account says that the room fell silent as the cigars and pipes were extinguished. Later, she was accepted enough to address the group. In her talk she advocated for the scientists to look closer at the adverse effects of chemical insecticides on non-targeted insect populations and their surrounding ecosystems. The speech, later published in 1938, began to sound an alarm with her statement, "The welfare of humankind depends on the protection of insects." She was later elected president of the ESA. Some other more cheeky writer might say they could put that in their pipes and smoke it, but that would not be fair.

The ESA has become an agent for change. Its annual meeting no longer has a "ladies' program" for the wives of members, leaving aside expectations about the gender of partners and spouses. The organization published a study of employment in entomology by Karen A. Walker in 2018 that showed a pattern. It found no shortage of entomology programs in the country, and a healthy number of women graduating from them — rising in 1989 from fewer than 20 percent to roughly half. But it also found that females are significantly underrepresented in entomology positions in academia and the federal government. The female share of those positions decreases with increasing rank, while the reverse is true for men. At the highest federal government grade level for entomologists, salary for females is significantly lower than for males. It's true that new graduates could be waiting to move into established careers that can be decades long, and the USDA gradually reduced the number of its bee labs to three over the last 25 years. Still, these results show that female entomologists, despite representing 40 to 50% of doctoral graduates in the last decade, are employed at levels far below that proportion.

It's called the leaky pipeline. Some posit the reasons as the challenge of balancing a career and raising a family. Other reasons put forth are a lack of women in positions to mentor young women, and bias in both hiring decisions and societal expectations of women. A review of the literature reveals various clues: In finding a faculty advisor, identical queries from hypothetical potential students with male names elicited significantly more responses from professors than female names; the male-is-scientist stereotype is more prevalent among scientists than among nonscientists; chances of promotion decline if women's applications are reviewed by an all-male board; if childbearing is delayed, only a third of women with faculty positions have children. One study found that some women in position of authority in a male-dominated company environment can treat female subordinates more critically, calling it the queen bee syndrome — although no such reports, even off the record, came out of interviews for this article. Since 2007 the ESA has established a Diversity and Inclusion Committee and increased female membership, but even so, their retention rate has been lower than among men.

A famous Harvard-Princeton study two decades ago sought to identify whether there was hidden gender bias in hiring for symphony orchestras. They found that "blind auditions increased the probability that a woman would advance from preliminary rounds by 50 percent."



Women in a beekeeping class at the Tuskegee Institute. The photo was published in 1906 by Booker T. Washington, who ran the agricultural and trade school at the time with the goal of producing instructors to spread learning. Project Gutenberg

In the 1970s, 80s and 90s, women were entering the field of bee research at a stumble. "What did they think," said Diana Sammataro, "we couldn't lift a bug?" Anita Collins had a professor refuse to serve on her doctoral committee because she was a woman, but her mentor, Walter Rothenbuhler, she said, "didn't have a discrimination gene whatsoever." She subsequently became one of two women scientists at Baton Rouge and contributed to work on affirmative action. She completed an exemplary career at two more USDA labs before "kind of" retiring. Martha Gilliam at the Tucson USDA bee lab was a microbiologist far ahead of current scientific interest in the microbiome of the honey bee gut. She was a mentor to Marla Spivak, who developed the Minnesota Hygienic Line and was awarded a MacArthur Fellowship. Several waves of female scientific talent have entered university and government labs. They included May Berenbaum, Jennifer Berry, Susan Cobey, Judy Chen, Michelle Frenniken, Diana Cox Foster, Gloria DeGrandi Hoffman, Lilia De Guzman, Maryann Frazier, Christina Grozinger, Nancy Moran, Elina Niño, Nancy Ostiguy, Juliana Rangel, Diana Sammataro, Judy Wu Smart, among others that will occur to the writer one midnight after press time; for them, an ex post facto apology. In addition, Dannielle Downey heads Project *Apis m*. Annette Meredith heads the Bee Informed Partnership, an organization that has had female Tech Team members, Katie Lee and Megan Mahoney.

Megan Mahoney has had to seek experience to learn beekeeping by working in queen breeding at Honey Bee Genetics in California, in Hawaii (pictured here), in an internship with Sue Cobey in Washington State and at last in her own breeding operation in partnership with Ross Klett.

No one says it has been easy. The how-to Beekeeper's Handbook by Sammataro, with Al Avitabile, was written from long and painstaking experiment. Lilia De Guzman rocked her toddler to sleep as she studied and wrote her dissertation while on bed rest pregnant with twins. Elina Nino's first son was nearly due when she interviewed and became the extension apiarist for UC Davis. Some merit can be claimed here for supportive partners.

Women are involved with commercial beekeeping, often with family — another story. Sometimes as queen producers, like Sue Cobey. Jackie Park-Burris and Valerie Strachan Severson have been long established, from Northern California family businesses. Others, like Caroline Yelle and Megan Mahoney, are getting started. Mahoney said, "I think it's a harder industry to be in as a woman." She spent several years as a sideliner looking for work with larger bee operations advertising in the back of the ABJ, but there was no housing infrastructure for women where seasonal help was typically housed together. Eventually Tom Parisian at Honey Bee Genetics hired her. "I don't think he took me seriously at first," but he put her in charge of a breeding operation that provided a steep learning curve. "Fortunately, I knew enough Spanish to make my way through with the guys working there helping me. I think they were intrigued by my determination to stay and really learn the ropes."

She lived in a tiny trailer in the middle of a large field. "I spent a lot of lonely nights. It was very rural, very isolated. Everything I've done I've wanted to become a better beekeeper, a more informed beekeeper. There are sacrifices involved with that. You might not get to live where you want to live. You have to learn how to fend for yourself. I don't have kids but if I did it would probably be not as possible. The physical labor is a whole other side. There are long hours. I think it's hard for a lot of people to realize how hard commercial beekeepers work, more than a lot of people would guess. And it gets very hot, very cold, rainy. It takes a lot of determination. For many, this is obviously a lot more than a job, this is like a life calling."

When she was the sole member of the Texas Tech Team for BIP, she said of her experience, "I think at first they were a little skeptical that some young woman was going to travel all around and teach beekeepers something they didn't already know. Once I started talking with these guys and got to know them, a lot of them became great friends of mine. And still are."

In her career, she's had what she calls edgy experiences as a woman, but "those are far fewer than my good experiences. Once I start talking to a beekeeper, the conversation always goes to the bees. And there's always a lot to talk about."

Now, after an internship with Sue Cobey, she is breeding Carniolan-Caucasian black bees in partnership with Ross Klett. She is migrating them between Texas and North Dakota as a satellite within the Klett family operation.

"I don't know if I have seen a change [in beekeeping]. Most of the beekeepers I know have always given me a chance. I'm not sure that the attitude was ever anti-female. I think it's like anything else, the more you get to know a person the more your relationship can build with them. I know that a lot of women have gotten into bee research, and that has impacted commercial beekeeping because there are women that are giving talks at the meetings, that's the interface. As beekeepers see more women and people of color talking to them with interest in their industry, I think there is only good that can come from that."

For Black, indigenous and people of color (BIPOC), beekeeping is not a diverse field. The National Science Foundation found that these demographics are substantially underrepresented in entomology as well. This mismatch has roots in what are often systemic interacting impediments. Nonetheless, some Hispanic apiary workers, who make up the majority, have begun to run bees of their own. And Arian Avalos, now a research geneticist at the USDA Baton Rouge lab, said his education and career have benefited from The Society for Advancement of Chicanos/Hispanics & Native Americans in Science (SACNAS).

Melanie Kirby has just returned from Spain where she was on a Fulbright-National Geographic fellowship. With Zia Queens, she breeds survivor stock in New Mexico. When she was asked about diversity in the bee world, she said, "I'm mixed race, Native American and Hispanic on my mother's side; we are part of the Tortugas Pueblo in Southern New Mexico.

My father is Caribbean, and his name, Kirby, is Scottish-Irish. So this is what I am, but because it is so fluid I never fixated on it too much until people would bring it up." As a Peace Corps volunteer in South America, she arrived at her rural community to teach beekeeping. "They couldn't believe that I was from the USA. So even for peasant beekeepers in South America, it was you don't look like what we know Americans to look like."

Working as a beekeeper when she returned, "I was more conscious of the fact that I was a woman rather than a woman of color in this industry, in the field. There are plenty in research, but not many doing it in the field as a profession, as a means of earning a living. I felt I had to prove myself more as a woman." She worked for a couple of Hawaiian queen breeders, once discovering that she had not received equal pay. She was the newsletter editor for several years for a company whose rep she met at a bee conference. He asked, "Do they know what you look like?"

In considering these experiences, she said, "One of my coping mechanisms is to ignore the micro-aggressions because when you think about it, they are present all the time. You're not prepared to take it head-on and make it your cause, because it's huge. But how can you navigate within that? I feel like my generation, Generation X, tried to get beyond labels. I know a trans beekeeper who said if we're going to be labeled, we would like to label ourselves."

In addition to working with Zia, Kirby will defend her master's degree thesis at Washington State this spring. She is also doing extension education at the Institute of American Indian Art. "I'm part of communities that have been disenfranchised, and when you have been disadvantaged, it behooves you to work with others — helping to advance human compassion and empathy and collective consciousness in a more equitable manner. You're trying to make the world more fair, not only for yourself but for your children and your children's children. I like to see that, despite our differences, we all love bees."

Such was the epitaph on the tombstone of Charles Henry Turner, wo lived from 1867 to 1923: "Scientist." He was a Black researcher, known for, among myriad studies, work on color perception in honey bees. It is not known why he turned to insects, but he was not accepted to a university position because of his race, so he had neither the laboratory facilities, specialized equipment or graduate students to help him with other work. Turner may hold the distinction of being the first African American to publish in the journal Science, yet J. McKeen Cattell, the editor at the time, stated at the 1913 annual meeting of the American Association for the Advancement of Science, "There is not a single mulatto who has done creditable scientific work." At that point, Turner had published 54 papers, with three of them in Science — the very journal Cattell edited.

Change has been slow. Studies, such as one that sent out 5,000 job applications and another that measured implicit bias, are among many that affirm that assumptions create significant lingering barriers to the BIPOC community. So it is that special mention is made of successful Black members in beekeeping and research. An example is Lonnie Standifer, who was an entomologist at the USDA Tucson bee lab and appointed director in 1970, a position he held until 1981.

Nelson Williams is a new member of the BIP Tech Team that monitors the health of commercial beekeeping operations in Minnesota, North Dakota and Wisconsin and then follows them to Texas and California. "I don't see too much diversity in beekeeping," he said. "Before I took this job that was something that greatly concerned me. I didn't know what the reception for me, being a Black beekeeper, would be in North Dakota. Nowadays things are so politically divided."

Although Williams had just moved to Minnesota to join the team, a North Dakota beekeeper suggested that he came from the street demonstrations in Minneapolis and should be social distanced. "I think they were trying to make a joke and just didn't really realize how it could be taken on my end. There have been a few instances of offhand comments such as that. I think that assumptions were made, and they made me at the time uncomfortable. There are a lot of little micro-aggressions that you have to deal with, really on a daily basis." For the reader, it may be informative that the only time Williams felt relieved of the stress of those micro-aggressions was the time he spent at Morehouse College, an all-Black institution.

He is neither cynical nor defensive. "A lot of it, I think, is just lack of exposure to people of color. And then you start to talk to these guys, you start to get to know them and you realize that they are great people, great folks. And they would do whatever they could to help me personally or to help the organization that I'm involved in. We have a lot in common in terms of our missions for the health of the honey bee in the beekeeping industry, and not only the honey bees but native pollinators.

Melanie Kirby breeds survivor stock with the Zia Queenbee Company in New Mexico. She has a diverse ethnic background and has returned from a Fulbright-National Geographic fellowship where she collected beekeeper stories in Spain.

"This is just my experience personally, but I think people don't take the time to know one another anymore. I think people are placed into a box whether it's their gender, race, their ethnicity. I'm not saying I'm the rep-

Nelson Williams does colony inspections and testing as a Bee Informed Partnership Tech Team member in support of beekeepers in California.

Charles Henry Turner (1867-1923), shown at the age of 35, was a researcher who did important work on, among other subjects, color perception in honey bees. Denied a university position because of his race, he became a high school teacher.

resentative of Black people or Black beekeepers, but I do think it's pretty powerful if there is someone who doesn't look like you, and you are still able to find a common passion.

"If I'm ever having a horrible day or my mind is racing, the best thing for me to do is to open up a colony. It really narrows your focus. Everything else just kind of fades away. The meditative hum and buzz, for me it's pretty magical.

"I think I'm really lucky for the opportunity to do something that I am passionate about. And it's really special to be in the same conversation with those other guys [on the Tech Team]. It's a great group of relatively young beekeepers that are trying to make a mark on the industry, trying to improve colony health. I'm glad that I'm here now."

Ang Roell's queen breeding business is called They Keep Bees. The name encompasses their preferred pronoun as well as the collaborative nature of their work. Within that context, they are a member and a supporter of the LGBTQ community. They have established a queen rearing circuit beginning the season in Florida, moving to North Carolina for early forage and then home to Western Massachusetts to select stock. They sell bees and queens and have LGBTQ field days at their farm.

They explain that they can make the self-introduction, "'My name is Ang, I'm a non-binary beekeeper, I use they and them pronouns.' But if I don't feel comfortable, I don't share my gender identity, accepting people using wrong pronouns, and eliminating the opportunity for education. It's not about shaming and blaming. It might be the first time to interact with a trans person. It is an opportunity for them to learn about a different paradigm of being. I do this work in other parts of my professional world."

"It takes creating space where we are comfortable with each other. How do people who are different from me feel more inclusive? How to shift, build coalition? We're out there — queer beekeeper groups, Black beekeeper groups, indigenous beekeeper groups." In a TED talk, Roell said, "There are three things that we can learn from the hive — cooperation, power-sharing and building." To achieve them, they promote the "culture of small" among beekeepers as a platform for building a diverse, inclusive community. But they look to inclusion in the established bee world as crucial: "There are folks in those meetings who hold the culture, most of the knowledge and resources."

George Hansen said, "The bee industry is going through big changes in demographics. I don't know if anyone has calculated the average age of a commercial beekeeper, but it's probably like farmers, and most of us are going to be replaced. If it's not someone in our family then look around, who is doing this? It's immigrants, and its people looking for new opportunities. In academia there are more and more women, young people, people of color and they are presenting to us, doing science for the bee industry. We are already seeing much more diversity at meetings and in organizations. We may as well take a good hard look at the reality. The industry is changing, and we are going to have to get used to a lot more diversity. It is happening, absolutely."

Ang Roell is a non-binary honey bee queen breeder whose company name, They Keep Bees, encompasses both their chosen pronoun and the coalition that they work with.

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