"It's not that they sting you. It's that they *don't* sting you." Beekeepers and the narrative construction of human-honeybee relationships

By Kate Marx

ABSTRACT

There are seemingly endless accounts available of the bond that is often formed between humans and other mammals. Far less, however, has been written on interactions between humans and animals of more pronounced physiological difference to us, for example, insects. The purpose of this study was to investigate how far it is possible for a human to experience meaningful interactions with, or even to form an attachment bond to, an animal of extreme phylogenetic difference to us, namely, the honeybee (*Apis mellifera*).

Preliminary research was conducted through an online survey posted on the UK's most popular beekeeping forum. Three quarters of survey respondents indicated that they viewed their interactions with bees as a 'relationship' with the bees. The survey was followed up by in-depth interviews with four beekeepers, chosen to represent as varied a cross-section of beekeeper society as possible, in terms of attitude, method and experience. Through a narrative research approach three common themes were explored. These were the notion of communicating with bees, elements of risk and reward in beekeeping, and the human-bee co-creation of the hive space. Duranti's description of culture as knowledge (1997), both propositional ('know that' information) and procedural ('know-how' information) was useful in exploring these themes. It was found that beekeepers experience their interactions with bees in intense, embodied ways that encourage them to form strong attachment bonds to their bee colonies.

There are seemingly endless accounts of the bond that is often formed between humans and other mammals (Gunter, 1999; Haraway, 2008; Hurn, 2012; Knight, 2005; Lorenz, 1994; Podberscek et al., 2000; Serpell, 1996). Far less, however, has been written on interactions between humans and animals of more pronounced physiological difference to us, for example, insects (although see Laurent 2000, 2001 on insects as pets in Japan, Kosut & Moore 2013 on beekeeping in the U.S.) The purpose of this study was to investigate how far it is possible for a human to experience meaningful interactions with, or even to form an

attachment bond to, an animal of extreme phylogenetic difference to us, namely, the honeybee (*Apis mellifera*).

Records of humans harvesting the honey of *Apis mellifera* date back to 6000 BC (International Bee Research Association, 2017), and we have spent the subsequent 8000 years creating a rich tapestry of mythology and folklore casting the honey bee in the role of altruist, prophet, taskmaster (or mistress), warrior, royalist, manufacturer, and servant of God (Maeterlinck, 1901; Nixon, 1954; Preston, 2006), and more recently as bitch, loose woman, feminist sister, or in the case of drone bees, lazy and incompetent (Kosut & Moore, 2016). Indeed, the honeybee is typically described in gendered terms by the beekeeper, or apiarist, and her movements are often colloquially attributed to human-like motives and reasoning capabilities. Yet in parallel to these narratives, beekeepers can be ruthlessly controlling of their colonies, as evidenced by the clipping of the queen's wings to prevent her from swarming, the insertion of "queen excluders" in hives, which stop her from accessing the majority of the hive, culling of "excess" drone brood, and the culling of entire bee colonies considered to be too "angry" or "stingy" by the beekeeper. These practices are all very common, and are included in the advice of the main beekeeping organisation in Britain, the British Beekeepers Association (British Beekeepers Association, 2017), referred to by one of my informants as "The British Beekillers Association".

My objective, therefore, was to identify the extent to which beekeepers anthropomorphise bees, versus the expression of a genuine affection and appreciation of the honeybee as a distinct and intriguing species. Further, to explore how this affection can be reconciled with the often hyper-invasive and destructive practices associated with modern apiculture.

Literature Review

Over the last century, and roughly coinciding with the invention of the modern removable frame hive by Reverend Lorenzo Lorraine Langstroth in 1852 (which finally rendered beekeeping as a potentially profitable commercial operation), there has been much research into honeybee behaviour, including the lay-texts of bee admirers, such as Maurice Maeterlinck's *The Life of the Bee* (1901), as well as progressively more scientifically rigorous investigations, notably Karl Von Frisch's ground-breaking text *The Dancing Bees* (1955). Von Frisch was the first to discover the now famous waggle-dance of the honeybees, which communicates detailed information with other bees about direction and distance to flower patches, water sources and potential new nest sites. His discovery initiated a debate that continues to this day regarding the cognitive and communicative abilities of *Apis mellifera*, as explored in Crist's "Can an Insect Speak? The Case of the Honeybee Dance Language" (2004). In *Biophilia* (1984) Wilson uses the honeybee waggle dance as one of his first examples of the mysteries and revelations of nature. Menzel's "The honeybee as a model for understanding the basis of cognition" (2012) and Wray *et al.*'s "Collective personalities in honeybee colonies are linked to colony fitness" (2011), which argues that each honeybee colony has a distinct "personality" (called "collective personality") which influences the success of the colony, can perhaps be seen as examples of contemporary science embracing the complex cognitive capabilities of the honeybee. Papers such as "Bees Raise Questions" (Conard, 1940) and "Planet Beehive" (Mathews, 2011) explore what it might be like to be a bee.

There are also many and varied guides to becoming a beekeeper, as well as essays on the other potential uses of honey bees, for example, in 1943 Bertholf was writing about the best uses for honeybees during periods of war and rationing, and more recently Kosek's "Ecologies of Empire: On the New Uses of the Honeybee" (2010) looks at the current research into the deployment of honey bees in warfare situations. In popular literature,

Wilson's *The Hive* (2004) explores human attitudes to the honeybee over the last few centuries.

Unsurprisingly, the vast majority of publications about the honeybee in recent years have focused on the worldwide collapse of honeybee colonies, known as Colony Collapse Disorder (CCD), and what is being done to prevent and reverse this trend, both from a hard-sciences and anthropological perspective. The new fashion for beekeeping that has arisen in part as a response to anxieties over CCD, as well as a renewed interest in self-sufficiency in general, is starting to attract the interest of the social sciences, with Moore and Kosut conducting a three-year multispecies ethnography of urban beekeeping in New York City, explored in their book *Buzz* (2013) as well as in a chapter in *Mattering: Feminism, Science and Materialism* (Kosut & Moore, 2016), in which they write that, "bees have always been present in cities, but only recently have been cast as trendy urban pets to be fostered and saved" (2016, p. 246). They describe bees as their "nonhuman informants" (p. 246) and "active and lively subjects rather than passive objects, or othered species" (p. 247).

Methodology

Preliminary research was conducted through a brief survey posted on *Beekeeping Forum* (beekeepingforum.co.uk), the most popular online forum for beekeepers in Britain, with almost 15,000 members. The survey first asked respondents to identify whether or not they considered their interactions with their bees as constituting a "relationship", seeking a simple "yes" or "no" answer. It was deliberately left to respondents to identify the parameters of the word "relationship". The second part sought more qualitative data, with an open-ended question asking respondents to qualify their response to the first question in as much detail as possible. This was done in order to be able to begin to construct a picture of what beekeepers found most relevant about beekeeper-bee interactions.

Conducting a survey in this manner enabled the collection of data from a relatively large pool of respondents – 121 people completed the survey – and the targeting of people registered to a popular beekeeping forum, as well as the brevity of the survey itself, ensured that the resulting data was relevant to the questions posed by the study. There were, however, some limitations associated with the use of an online survey in this way. Nothing was known about the respondents other than that they were registered as users on a popular beekeeping forum (it does not necessarily follow that they were all active apiarists). Only those beekeepers with access to the internet were able to find or take part in the survey, potentially precluding certain beekeepers or beekeeper demographics from taking part. Also, due to the "mainstream" popularity of *Beekeeping Forum* it could be assumed that respondents might tend towards those with more "mainstream" views on beekeeper-bee interactions (as opposed to "alternative" views, for example, those associated with "natural beekeeping", which will be discussed later on).

Three interviewees were chosen from the initial pool of respondents, with one further interviewee being recommended to me, in a mini-snowball effect. These four beekeepers were selected to represent as varied a cross-section of beekeeper society as possible. Informants comprised a retired Naval Officer with thirty years of experience as a beekeeping hobbyist, the Chief Executive of a telecoms company who had recently taken up beekeeping with his wife, a retired free-range chicken farmer and a blogger and professional tutor of "natural beekeeping". The first three individuals had all responded at length to the survey, and had all indicated that they would be willing to take part in an interview. From their answers on the survey, they appeared to represent (to a greater or lesser degree) different perspectives on the beekeeper-bee relationship (although all had answered that they did consider their interactions with bees to constitute a "relationship"). Some examples of how "difference" was judged included the length of time that they had been practicing beekeeping

for and the extent of control or invasiveness with the bees that they alluded to as required in their survey answers. It was not deemed necessary that all participants be "experts" in beekeeping, only that they had practical experience interacting with bees on a regular basis. The fourth participant, a blogger and tutor of "natural beekeeping" was included in the interview process because it was considered that he represented a perspective and approach that might otherwise not have been recognised from the results of the survey carried out on the more mainstream beekeeping forum.

No more than four people were interviewed due to time constraints and the nature of the interview, which was an in-depth semi-structured interview, lasting around two hours, and based around the notion of narrative research, as described by Mishler, who writes that, "a general assumption of narrative analysis is that telling stories is one of the significant ways individuals construct and express meaning" (1986, p. 67). It was considered that, in the absence of a hypothesis regarding the extent to which people experienced meaningful interactions with their bees, the stories that came out of open-ended questions and conversation could provide a sound basis for some initial conclusions. Indeed, interviewees did not have to be explicitly encouraged to formulate stories regarding their history and interactions with bees; they did so naturally and frequently during the course of the interviews.

Included in the analysis of naturally occurring narratives, I will be looking at the themes chosen by beekeepers in light of Duranti's description of culture as knowledge.

> In the cognitive view of culture, the body of knowledge necessary for competent participation in the community includes both **propositional** knowledge and **procedural** knowledge. Propositional knowledge refers to beliefs that can be represented by propositions such as *cats an dogs are pets, smoking is bad for your health* and *new born babies cannot crawl*. These are the 'know-that' types of statements…Procedural knowledge is the 'know-how' type of information that must often be inferred from observing how people carry on their daily tasks. (Duranti, 1997, p. 28)

The heavy emphasis placed on correct and incorrect ways of keeping bees, coupled with an apparent lack of consensus over best practices (over the course of the research I heard the adage "ask three beekeepers a question and you'll get four differing opinions" several times) would seem to render notions of propositional and procedural knowledge particularly pertinent.

Bee-attitudes: Analysis of Results

It is important here to note that *Beekeeping Forum* is geared primarily towards people who keep bees either as a hobby or as a side-line to their main source of income. In other words, they are not commercial bee farmers. While a bee farmer aims "to run profitable business enterprises based on the management of stocks of honey bees" (Bee Farmers Association 2017), when referring to "beekeepers" this paper refers to individuals who keep bees for reasons other than, or in addition to, financial gain. Where a commercial bee farmer may oversee hundreds or even thousands of colonies of bees, the beekeeper will tend to one or a few hives, enabling them to develop a far more intimate acquaintance with specific colonies than a bee farmer is able to have. In addition to this, the beekeeper is not wholly reliant on their bees for a living, and the relationship is therefore unavoidably different to a bee farmer, who depends upon their bees to produce certain commodities for them; honey, pollen, beeswax, propolis, royal jelly, queens (some farmers specialise in queen breeding) or even pollination services (some rent out colonies to agriculturalists for pollination).

One hundred and twenty-one people responded to the preliminary survey, with a surprising proportion of them – 73.6% - answering that yes, they would characterise their beekeeper-bee interactions as a relationship. People who answered yes described their interactions as complicated, responsive, symbiotic and mutually respectful. Emphasis was placed on the role of experience in understanding what the bees like and dislike, and in being able to "read the mood" of the colony, through understanding their movements and the pitch

of their buzzing sounds. Beekeepers learned to get the best responses from their bees with calm, measured movements, and by talking soothingly to them. The bees, in turn, are described as responding to the beekeeper's mood and demeanour. One respondent described herself as the bees' "guardian, protector and pupil", and others reported feeling guilty if they accidentally crushed a bee, and for "stealing" their honey. Respondents who answered "no" cited the fact that although the beekeeper may feel an affection for the bees, they considered this to be a one-sided sentiment. They argued that bees do not recognise individual humans, that they react to pheromones and quick movements through instinct, and that beekeepers develop skills with the bees that only lull them into feeling that a bond has developed. People on both sides of the argument mentioned that they viewed a colony of bees as a "super-organism", or a "collective personality" as Wray *et al.* would put it (2011), rather than a collection of individuals.

Three main themes having to do with aspects of the beekeeper-bee relationship emerged in the survey, and these were further explored in narrative form by the four interviewees. These can briefly be described as the concept of bee communication, beekeeper-bee interactions based on risk and reward, and the human-bee co-creation of a hive space.

Bee Communication

The reconciliation of the folk tradition of talking to and about bees as honorary humans, with the plethora of scientific knowledge that modern apiarists are expected to have regarding inbuilt instincts and pheromone responses, surfaced as problematic for the beekeepers themselves. It can be surmised that the difficulty arises because of an abundance of conflicting propositional knowledge regarding how bees are to be treated – as humans in miniature, as is folkloric? As honey manufacturers, as is "modern"? Or as something else

entirely, perhaps an independent agent capable of acts of cognition and expression that leave themselves open to the interpretation of the humans around them?

Three out of the four interviewees, without any prompting, were careful to mention the dangers of anthropomorphising bees, due mainly to the impossibility of knowing the depth or extent of their consciousness. Yet, with that caveat out of the way, each one of them created narratives which interpreted bee behaviour in terms of what the bee was most likely to be experiencing, as if it were a human. The scientist beekeeper Henry S. Conard wrote that, "in many ways, the behaviour of bees suggests our own ways. Old beekeepers always attribute to their pets the will, the motives, the emotions that they recognise in themselves. Bee-keepers speak of bees in the language of human conduct" (1940, p. 57). Nigel (all interviewees gave permission to use their real names but I have elected to use pseudonyms), a retired naval officer and now education officer for his local beekeeping society, described helping a new beekeeper with her first swarm.

> Nigel: There are, there are quite, she, she'd got a nucleus, and within two months it had swarmed, I mean, we just don't think like that. And what's more, it was a thumping big swarm and it was up this tree at the end of the garden.
> Kate: It must have been an amazing thing to watch.
> Nigel: 'Can't, can't possibly be mine'…it is an amazing thing to watch. And, um, so I went on there and we put the ladder up the tree and she had a second hive, and she'd set it up for this event, and we moved the swarm into the hive. One of the lovely things to see is a swarm of bees entering a hive, because the scout bees go in and sort of look at the hive and say "mmm, a comfy place this", and then "wow, there's a bit of honey inside as well", and "just the job", and they pass the message around and within ten minutes the whole regiment of bees is, can't they can't get in there fast enough.

The pleasure that Nigel describes is derived in part from his appreciation of the way that the bees are able to communicate with each other, and from the ease he feels in interpreting what they are saying. Importantly, it is taken as self-evident that bees do not actually communicate in this exaggeratedly human way, but that their actions are available to interpretation by somebody intimately familiar with bee behaviour. In this manner, beekeepers are often able

to position themselves as more practically acquainted with the capabilities of the honeybee, than scientists who make declarations about what bees are and are not capable of (Crist, 2004). Earlier in the interview Nigel told a story about the loss of his beekeeping partner, Anthony.

> Nigel: Then I came home, Anthony had been keeping the bees while I was away. I can't say that they were, that they'd exactly flourished, but they were ok. And then the next milestone really was, um, in the spring of ninety-four, um, his wife came over one night and broke down in floods of tears and said that her husband was diagnosed with bowel cancer. And at the end of the year he died [coughs] and um, people came to me and said, um, "you must go and tell the bees that he's died, otherwise the bees themselves will die". It's a myth. Of bees
> Kate: Yeah, I've heard it mentioned.
> Nigel: And um, so anyhow, he, he died. That meant I was a singleton looking after the bees. Again. I didn't really mind, but doing it with someone is a really nice thing.
> Kate: Yeah, I can imagine.
> Nigel: And two pairs of hands and two pairs of eyes is really… so it was, um, it was a, a basis of a really strong friendship.
> Kate: So did you go tell the bees?
> Nigel: I did. And the bees didn't die [coughs] and um, I soldiered on.

The tradition of telling the bees is mentioned time and again in bee histories (Hallman, 1951; Nixon, 1954), as well as being used as a narrative device in fiction, for example in Atwood's *The Year of the Flood* (2010), in which Toby, the main protagonist, must tell a colony of rooftop bees that their previous keeper has died. It is interesting that this particular piece of procedural knowledge, that the bees must be told when someone dies, has survived in spite of the abundance of conflicting, more "modern" counter-knowledge.

Risk and Reward

The elements of risk associated with beekeeping gave rise to some of the longest and most detailed stories offered by interviewees, and an example of the conflicting procedural knowledge among apiarists. The most obvious risk, of course, is that of getting stung. Nigel described a severe reaction that he once had after being stung "ten, or a dozen" times. The stings resulted in anaphylactic shock and having to call an ambulance, and the story was

couched in a larger description of his clumsiness when he first started beekeeping. Peter, the natural beekeeper, explained that he rarely wears gloves when working with his bees, because over time he has become immune to their stings, and his extensive experience also means that he is rarely stung anymore. Former chicken farmer Andrew described his defensive technique around guard bees, who typically "go for the eyes". His defence includes the use of a smoker, utilised by beekeepers for calming bees during hive inspections.

> Andrew: If I've got a couple of stroppy bees going wiz wiz wiz around my head and bouncing off me veil, I'll do my patented smoking twirl. They cough like billion, and you pirhouette around, and you end up reeking of smoke, but they end up coughing and spluttering and heading back to the hive.

Conversely, the main narratives that fit the first category of "reward" were not about honey, propolis, royal jelly or any of the other bee "products", although these were mentioned in passing. The reward of *not being stung* was positioned in direct opposition to the risk of being stung, and was connected to the wisdom and competent husbandry that comes with experience. Hamish, the newest beekeeper interviewed, whose wife had to have her wedding ring cut off after being stung on the knuckle, and who himself had been stung, described the root of his affection for bees.

> Hamish: And you end up with, there are small interactions, when you're just dealing with the hive, you end up with this thing that can sting ya, just lands on you, and does nothing. Right? And it's that, you end up with the interaction of it doing nothing, right? It's, it's, because the darn things *armed*. Right? And it doesn't! It refrains…I look at them, it lands on ya, and you've been stung before, but it goes. Wanders around. Wanders up here. And it's just, *curious* […] So, it's not that it stings you. It's that it *doesn't* sting you.

Part of the satisfaction of perceived "good husbandry" derives from the fact that the honeybee is acknowledged not to be tame. He does not fall easily into the category of wild animal or domestic animal, but hovers in a middle ground of his own making. When Hamish talks about the pleasure of not being stung, that satisfaction derives partly from the

knowledge that bees, although having been "kept" by bee keepers for hundred of years, have not changed their behaviour in any kind of adaptation to their human keepers. Their behaviours are the same as their wild cousins, and they persist in following the wisdom of their own natures. As noted in a 1934 radio address by James I Hambleton, and quoted in "The Science News-Letter", "There are no domesticated bees…The bees that inhabit picturesque country-side apiaries are as wild as the bees found in a bee tree in the densest part of an isolated forest" (1934, p. 350). Therefore, for a beekeeper to put his hand into a hive of bees and not get stung is something akin to putting his head in the mouth of a lion and not having it unceremoniously bitten off. After all, beekeepers are not referred to as "bee farmers" the way that pig farmers or sheep farmers are. They are "keepers", in the same way that big game keepers are! The skill of the beekeeper is reflected in their ability to manoeuvre around the hive without getting stung, which leads to proclamations, such as that of Erik Osterland, speaking at the 2011 National Honey Show in the UK, that "I looked for the worst kind of bees, the bees that had the worst kind of reputation!"

Co-creation of the Hive Space

> The city is a place, a center of meaning, par excellence. It has many highly visual symbols. More important, the city itself is a symbol. The traditional city symbolized, first, transcendental and man-made order as against the chaotic forces of terrestrial and infernal nature. Second, it stood for an ideal human community: "What is the Citie, but the People? True, the People are the Citie" (Shakespeare, Coriolanus, act 3, scene 1). It was as transcendental order that ancient cities acquired their monumental aspect. Massive walls and portals demarcated sacred space. (Tuan, 1977, p. 173)

The extent of control that the beekeeper should exert over his hive, and the accompanying procedural knowledge of how best to control the hive, is a contentious issue amongst apiarists, who make frequent subtle references to the way in which a colony of bees resembles a civilization of its own, but who do not follow this assertion to its logical conclusion; that the beekeeper is its omniscient deity. Until the eighteenth century the most

common man-made housing for bees was the straw skep, which had to be burned, along with the entire colony of bees inside of it, in order for the honey to be extracted. When compared to the skep, almost any modern style of hive can be considered benevolent, yet the style chosen depends largely on what the beekeeper is trying to achieve, and whether maximum honey yield is the priority. Indeed, honeybee expert Thomas Seeley gave a talk at the 2011 National Honey Show, entitled, "The Bee Hive as a Honey Factory".

Nigel was the most conventional of the interviewees, using the Langstroth style hive, which has a box at the base for the queen to lay her brood, and a certain amount of honey "supers" fixed above the brood box. The mesh queen excluder prevents the queen from accessing the honey supers, so that she cannot lay her brood in a comb reserved specifically for honey storage. To ensure that the worker bees do not waste honey-making energy on constructing wax honey comb, frames pre-fitted with comb shaped plastic are suspended into the honey supers, for the bees to use immediately. In contrast to this style, both Peter and Andrew are part of a growing number of natural beekeepers who believe that the conventional style of hive is too restrictive. I asked Peter how he came to replace his traditional Langstroth hives.

> Peter: I discovered, gosh, there are lots and lots of ways of keeping bees that don't require all this, all this stuff. And, um, something that appealed to me most of all, was something called the top bar hive, which is something that reduces beekeeping to its most basic elements, so it gives bees somewhere to live that's warm and dry, and some, a space that's largely under the control of the bees, and um, aside from that it doesn't create any obstacles for the bees to, um, negotiate. So, it's just a space that the bees can use as they feel fit, um, as they see fit.

The natural beekeeper was portrayed as trying to avoid interfering with the hive as much as possible. In contrast, the practices of drone culling and queen clipping are associated with the Langstroth hive, as is the convention of inspecting the contents of the hive every seven or eight days.

> Andrew: Why? Um, well, the reason they do it is, is again, it's this control thing, they're bloody control freaks. Um, they spend their entire time ripping the hive apart about every eight days, puffing it full of smoke, which is basically saying "Your home is on fire". Shock, Panic, Horror, Probe, Whatever! And the poor little bees fill themselves full of honey in preparation for flight, even conventional beekeepers admit, that sets the hive back two days.

Unlike other interviewees, new beekeeper Hamish was still in what he called the "experimental phase" of his beekeeping career, yet although the practices described were fairly conventional, he had built a new type of hive, based on the Langstroth design, but made of polyurethane instead of wood.

> Kate: So how come you wouldn't go back to a wooden frame?
> Hamish: Um, when I had a look at the actual, the physics of…been doing a lot of research about it, finding out what they do, have in their natural habitat. And what they have in their wooden boxes that we give them, the wooden boxes smack too much of cruelty, 'cause they're an order of magnitude less retentive of the heat than a tree would be…And now, so it ends up with, and that's what I found out, our treatment, beekeeping, is really a bit on the cruel side. And that includes all these eco people. As well, because they're still keeping them in rather cold climates.

The compulsion to "improve" upon the honey bees' natural hive choice and construction, the desire to technologize their already highly sophisticated building technologies, is viewed as arrogant by the natural beekeepers, who cite the 30-million-year evolution of *Apis mellifera* versus the comparatively short history of the human species. Yet from all the interviewees there emerged a genuine sense of wonder at the fact that the bees (who are not captives, despite preventative measures put in place to stop them from leaving) accept the shell, or foundation of a home that they are offered (the plastic comb sheets in the Langstroth hive are actually called 'foundation') and choose to build upon it, to fill it up with honey and cap the wells, to soften hard edges, to plug any draughty cracks or gaps, to make it a true working city, co-created by human hands and honey bee limbs.

Conclusion

Schiffrin writes that, "telling a story allows us to create a 'story world' in which we can represent ourselves against a background of cultural expectations about a typical course of action" (1996, p. 170). This paper has used snippets of narrative extracted from longer stories, in order to sketch out what beekeepers found relevant in their interactions with honeybees, indeed, *if* they found their interactions relevant at all. It appears that they did, in spite of any predominant cultural expectations to the contrary. It was always possible that beekeepers would report that they did not experience their interactions with bees to be particularly meaningful, or if they did, that they were not keen to acknowledge it. Yet nearly three quarters of all survey respondents identified their interactions with bees as constituting a "relationship", with many stipulating that the relationship was with a colony of bees, as a kind of "super organism", than with individual bees. More in-depth interviews explored themes that had originally surfaced at the survey stage; of communication between beekeepers and bees, the risk and reward of not being stung, and human-bee cooperation in building bee homes. It became clear that beekeepers experienced their interactions with bees intensely, perhaps due in part to the unavoidably embodied nature of their encounters, with bee and human bodies intermingling, yet always vulnerable to harm from the other. When they felt it was required, beekeepers fiercely defended their own propositional and procedural knowledge about bees.

The current surge in beekeeper numbers has been largely attributed to the popular awareness of CCD, and a desire to increase pollinators and counteract the widely publicised depletion of honeybees in the United Kingdom and across the globe (Bees for Development, 2017). In the future, these priorities may well shape a very different hive to the one set up primarily as honey factory. This may in turn change the dynamic of the beekeeper-honey bee

relationship altogether, not least of all due to an acknowledgement of how deeply dependant we as a species are on the fascinating honeybee.

References

Anon. (1934). No Living Honeybee Has Ever Stung a Human Being. *Science News Letter, June*, 350.

Atwood, M. (2010). *The Year of the Flood.* London: Virago Press.

Bees for Development. (2017). Livelihoods and biodiversity. Retrieved from http://www.beesfordevelopment.org/our-work/livelihoods-and-biodiversity/

Bee Farmers Association. (2017). What is Bee Farming? Accessible from http://beefarmers.co.uk/what-is-bee-farming/ [Retrieved 14th March 2017]

Bertholf, L. M. (1943). The Honey Bee in Total War. *Bios, 14*(3), 120-123.

Bradley, G. (2014, April 3). How do I become…a beekeeper. *The Guardian*. Retrieved from https://www.theguardian.com/money/2014/apr/03/how-become-beekeeper

The British Beekeepers Association. (www.bbka.org.uk)

Conard, H. S. (1940). Bees Raise Questions. *The Scientific Monthly, 51*(1), 57-64.

Crist, E. (2004). Can an Insect Speak? The Case of the Honeybee Dance Language. *Social Studies of Science, 34*(1), 7-43.

Duranti, A. (1997). *Linguistic Anthropology.* Cambridge: Cambridge University Press.

Von Frisch, K. (1955). *The Dancing Bees.* New York, NY: Harcourt, Brace.

Gunter, B. (1999). *Pets and People: The Psychology of Pet Ownership.* London: Whurr Publishers.

Hallman, M. S. (1951). The Story of Honey Bees. *Bios, 22*(3), 198-208.

Haraway, D. J. (2008). *When Species Meet.* Minneapolis: University of Minnesota Press.

Hurn, S. (2012). *Humans and other Animals*. London: Pluto Press.

International Bee Research Association. (www.ibrabee.org.uk)

Knight, J. (Ed). (2005). *Animals in Person.* Oxford: Berg.

Kosek, J. (2010). Ecologies of Empire: On the New Uses of the Honeybee. *Cultural Anthropology, 25*(4), 650-678.

Kosut, M., & Moore, L. J. (2016). Urban Api-Ethnography: The Matter of Relations between Humans and Honeybees. In V. Pitts-Taylor (Ed.), *Mattering: Feminism, Science and Materialism* (p. 245-257). New York: NYU Press.

Laurent, E.L. (2000). Children, 'insects' and play in Japan. In A. L. Podberscek, E. S. Paul and J. A. Serpell (eDS.) *Companion Animals and Us*. Cambridge: Cambridge University Press.

Laurent, E. L. 2001. Mushi: For Youngsters in Japan, the Study of Insects Has Been Both a Fad and a Tradition. *Natural History* 110 (2), p.70-75

Lorenz, K. (1994). *Man Meets Dog.* New York, NY: Kodansha America.

Materlinck, M. (2006). *The Life of the Bee.* New York, NY: Dover Publications.

Mathews, F. (2011). Planet Beehive. *Australian Humanities Review, 50,* 159-178.

Menzel, R. (2012). The honeybee as a model for understanding the basis of cognition. *Nature Reviews Neuroscience, 13,* 758-768.

Mishler, E. G. (1986). *Research Interviewing: Context and Narrative.* Cambridge, MA: Harvard University Press.

Moore, L. J., & Kosut, M. (2013). *Buzz: Urban Beekeeping and the Power of the Bee*. New York: New York University.

Nixon, G. (1954). *The World of Bees.* London: Hutchinson.

Osterland, E. (2011, October). *Swedish Beekeeping and the Constant Fight Against Varroa*. Presentation at the 80th National Honey Show, Weybridge, UK.

Paget, M. A. (1982). "Your Son is Cured Now; You May Take Him Home". *Culture, Medicine and Psychiatry, 6,* 237-259.

Podberscek, A. L., Paul, E. S., & Serpell, J. A. (Eds.). (2000). *Companion Animals and Us: Exploring the Relationships Between People and Pets.* Cambridge: Cambridge University Press.

Preston, C. (2006). *Bee.* London: Reaktion Books.

Schiffrin, D. (1996). Narrative as Self-Portrait: Sociolinguistic Constructions of Identity. *Language in Society, 25*(2), 167-203.

Seeley, T. (2011, October). *The Beehive as Honey Factory*. Presentation at the 80th National Honey Show, Weybridge, UK.

Serpell, J. (1996). *In the Company of Animals: A Study of Human-Animal Relationships.* Cambridge: Cambridge University Press.

Tuan, Y. (1977). *Space and Place.* Minneapolis: University of Minnesota Press.

Wilson, B. (2004). *The Hive*. London: John Murray.

Wilson, E. O. (1984). *Biophilia*. London: Harvard University Press.

Wray, M. K., Mattila, H. R., & Seeley, T. D. (2011). Collective personalities in honeybee colonies are linked to colony fitness. *Animal behaviour, 81*(3), 559-568.