HUNTERS AND GUIDES: MULTISPECIES ENCOUNTERS BETWEEN HUMANS, HONEYGUIDE BIRDS AND HONEYBEES

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ABSTRACT This paper discusses the relationship between humans and honeyguide birds (*Indicator indicator*) in the Adamaoua Region of Cameroon. Throughout Sub-Saharan Africa, the honeyguide is known to guide humans to nests of wild living honeybees that it cannot access independently. After the humans harvest the honey, the bird eats leftover larvae and comb. While the human honey hunters increase their yield of honey by collaborating with the honeyguide, the bird is able to expand on its usual diet of insects. This unique mutualistic relationship and the changes it is currently undergoing are discussed here. While honey hunting is still common in the Adamaoua, its importance has decreased in recent years as most honey is produced from bees kept in different types of beehives, mostly conical grass hives. A relatively recent phenomenon is the increasing diversification and professionalisation of the honey trade with high demand for high quality honey. As honey from wild living bee colonies is usually of a lower quality, salvaging honey from wild bee colonies is becoming less important and the interactions between humans and honeyguides less frequent. As the birds stop guiding humans if the latter do not collaborate, we must assume that the close interspecies collaboration might end in this area.

Key Words: Cameroon; Honey hunting; Beekeeping; Honeyguide; Human animal studies; Multispecies ethnography.

INTRODUCTION

The Greater Honeyguide (*Indicator indicator*; hereafter honeyguide) has attracted the attention of African honey consumers since the Pliocene era (Wood et al., 2014). It leads humans to honeybee (*Apis mellifera*) colonies living in hollow trees or holes in the ground, which it could not access without human help. After the harvesting, the bird eats leftover comb and larvae. In many places humans have developed strategies to facilitate the guiding process, for example by 'calling' the honeyguide or by 'rewarding' it. This unique interspecies relationship has fascinated missionaries and explorers, colonial birdwatchers and ornithologists (Friedmann, 1955) and a number of scholars more recently (see for example Isack & Reyer, 1989; Spottiswoode et al., 2016; Wood et al., 2014). While this relationship is usually highlighted as one of the few examples of collaboration between free-living animals and our own species (Spottiswoode et al., 2016), I perceive the reversal of roles as the most fascinating aspect of the phenomenon. It is rather common for humans to train or tame wild animals for different purposes but in the case of the honeyguide, the initiative usually starts with the bird and the bird

makes the humans perform a task for its benefit. From an animal perspective, the bird is able to successfully train humans. Only more recently in its evolution has the relationship become one of mutual manipulation—namely since humans have been trying to initiate the guiding or reward the bird after the harvest (Wood et al., 2014). During my research in central Cameroon, I found that the relationship between birds, bees and humans is currently undergoing deep changes. There is a possibility that honeyguides might stop guiding humans altogether in this part of Africa.

In this paper I will first give a general description of the relationship between humans and honeyguides through a literature review. Then, I will focus on my own research in the Adamaoua Region of Central Cameroon. I will discuss the importance of honey in Cameroon before describing the way honey has been produced and traded the Adamaoua region and my main research site Dang village. Thereafter, I will focus on the changes that honey production has undergone in recent years and how this has impacted on the relationship between humans and honeyguides. In the last section of the paper, I will raise the question if and how this multispecies collaboration might continue in the future, and discuss some broader questions emerging from my research.

COLLABORATIVE RELATIONSHIP BETWEEN HONEYGUIDES AND HUMANS

> The bird will come close to you and will start flying from branch to branch of trees and you follow its whistling. The bird can fly far from you but if it does not hear you, it will return back to you. As soon as the bird arrives on the tree with the bees' nest, it will not shout again. It will just stay on one branch, and you will know that it is the tree and start looking around the tree. But as it is bees, they fly all over, it will be easy to find the nest and start harvesting. … At the end you have to be grateful and leave some for the bird. (Interview with Bissi 23.8.2017)

The Portuguese missionary João dos Santos is believed to be the first Westerner to have written about the honeyguide, in 1569 in what is today Mozambique (Santos, 1609: 32). He noticed that certain birds entered his church building and fed on the wax of candles. Later, he realised that the same birds led humans to honeybee colonies in hollow trees and in the ground. Dos Santos' observations have since been confirmed by numerous explorers, colonial agents and ornithologists in different parts of Africa (Friedmann, 1955: 25).

Human-honeyguide Relationship

The Greater Honeyguide is native to most of Sub-Saharan Africa but lives in savannahs and bushlands rather than in tropical rain forests. The mid-sized bird is one of a few species that is able to digest wax and it is one of the few wild living animals that establishes a collaborative relationship with humans (Short &

Horne, 2001). The collaboration between humans and honeyguides is described almost identically by different sources (Friedmann, 1955; Isack & Reyer, 1989; Spottiswoode et al., 2016; Wood et al., 2014). It can be summarised as follows: the honeyguide attracts the attention of humans through a particular chattering sound, by flapping its wings or fanning its tail feathers. If the humans signal their participation in the search, the honeyguide flies to a nearby tree, where it perches, flapping and chattering. When the humans follow, the bird flies off to another tree, performing the same behaviour. The bird may disappear for a while but will return, for example if the humans are too slow. When the bird arrives close to a bee colony, it perches quietly close to the nest until the humans have spotted the colony and harvested the honey. Once the humans have left, the bird eats the leftover larvae and comb. It is widespread practice that humans try to attract the bird by whistling, shouting and/or knocking against trees with sticks or other hard objects. During the guiding, it is also common to signal one's following by making some of these sounds. Some honey hunters use special calls or whistles to either call the bird and/or signal their collaboration. Moreover, it is common to try to manipulate the bird into guiding again in the future. Interestingly, completely opposite strategies exist, namely rewarding the bird by leaving comb behind or (less frequently) by keeping it hungry by destroying or hiding the leftovers (Wood et al., 2014).

Is the Behavior of the Honey Guide Intentional?

While the human-bird interaction is undisputed, Friedmann claims that "guiding" is a misleading expression as there is no "pre-existing purpose or plan on the part of the bird" (1955: 54). At great length he argues that the bird does not actually know the location of the respective bee colony and that the nest is detected coincidentally during the guiding process. Friedmann conceives the bird's behaviour as instinctive, released by certain stimuli, namely by the sight of humans (as well as honey badgers and baboons, which he believes also cooperate with honeyguides) and halted by the sight of bees (1955: 59). Such a view is disputed by Isack and Reyer (1989) who conducted research on the honeyguide with members of the Boran ethnic group in Kenya. Their observations and experiments show that the birds usually take fairly direct routes between the points of contact and the bees' nests, indicating "that the directionality exhibited by the bird is a reflection of its prior knowledge of the nest locality" (Isack & Reyer, 1989: 1344). They observed honeyguides that repeatedly inspected bees' nests, suggesting that the "information gathered during such visits enables the bird to engage in its goal-oriented guiding behaviour" (Isack & Reyer, 1989: 1345). Importantly, they conclude that the local honey hunters are able to interpret the birds' behaviour and deduce information regarding the direction and distance to the nest correctly.

Such a view is supported by anthropologist Brian Wood and his team conducted research with members of the Hadza ethnic group in Tanzania (Wood et al., 2014). They accompanied a number of men who live predominantly from hunting and gathering with traditional techniques on their honey hunting trips. During these excursions, the honey hunters found an average of 0.5 bee colonies

per hour without the help of a bird and an average of 3.3 colonies per hour with the help of a honeyguide. The probability of finding a bees' nest in each tree they inspected thus increased from 19% to 58% with the support of a honeyguide. Moreover, the honeyguides only led humans to colonies of honeybees and not to those of stingless bees, which contain considerably less honey. Bee colonies that the Hadza found with the help of honeyguides thus contained an average of 7,480 kcal while nests found without the bird contained only 1,390 kcal. The research thus confirmed that collaboration with honeyguides significantly increases both the probability of finding bee colonies and the yield of honey. Moreover, Wood et al. make an important contribution towards understanding the evolution of this unique phenomenon. The authors reject earlier assumptions that the human-bird interactions have their origins in similar collaborations between honeyguides and baboons or honey badgers (Friedmann, 1955) on the grounds that these were not based on any credible evidence. Referring to Hoesch (1937) and Dean et al. (1990), Wood and his colleagues argue that the birds' guiding habit started directly between hominins and proto-honeyguides in the Pliocene era (some 2.6 million to 5 million years ago) (Wood et al., 2014: 544). They assume that the interaction developed in three stages:

> We propose that in a first, commensal phase, honeyguides preyed upon the bee nests and discarded honeycomb that hominins made available through their honey hunting. In a second, mutualistic phase, honeyguides evolved the habit of actively leading hominins to bee nests. Finally, in a third phase of manipulative mutualism, hominins began to actively change the payoffs received by honeyguides—either by actively "rewarding" them or by reducing their immediate payoff. (Wood et al., 2014: 544)

Interaction between Honey Hunters and Honeyguides

There are numerous reports of honey hunters trying to attract the attention of honeyguides and to initiate their guiding through singing, whistling, talking loudly or making noise when walking through the forest. This was confirmed by all of our 10 research participants.

Ornithologist Claire Spottiswoode and her team were recently able to verify the effectiveness of establishing contact with birds through specific calls (Spottiswoode et al., 2016). During her research in northern Mozambique, Spottiswoode was told by honey hunters of the Yao ethnic group that they attracted honeyguides using a special call. In order to assess the effectiveness of the sound, Spottiswoode and her colleagues made recordings of the particular call and of two different control sounds. Members of the research team then conducted simulated honey hunting forays during which they continuously played one of the three acoustic signals through a loudspeaker. While they were only guided by a honeyguide in 30 of the 72 simulations, the probability of contact was significantly higher when they played the specific call (66.7%) in comparison with a human control sound (25%) or an animal control sound (33%). Following

Spottiswoode et al., the call had "the potential to reliably signal to honeyguides that a prospective human partner is specifically seeking honey and has the tools, skills and time to open a bees' nest" (388). The researchers claim that "a wild animal correctly attaches meaning and responds appropriately to a human signal of recruitment toward cooperative foraging" (Spottiswoode et al., 2016: 389). The experiment thus confirms the practical knowledge of the honey hunters scientifically. Spottiswoode et al. highlight the difference between animals that humans individually train as foraging partners, such as dogs or falcons, and the honeyguide, which is free living and "whose interactions with humans have probably evolved through natural selection" (389). They point out that the honeyguide is brood parasitic, implying that its behaviour cannot be acquired from either its biological or its social parents—as these do not guide. From this they follow that "their propensity to locate bees' nests and guide humans to them is likely to be innate" (389). However, as the guiding call is locally specific, Spottiswoode at al. propose that:

> local refinements to guiding behaviour are probably learned … (and) … that learning might occur socially from conspecifics in the vicinity of bees' nests, resulting in a local cultural tradition among honeyguides that reflects the customs of their human collaborators. (Spottiswoode et al., 2016: 389)

Spottiswoode et al. thus assert that the propensity to guide is inherited, whereas the specific sound of the call is learned from other honeyguides. Unfortunately, the authors do not elaborate on the notion of honeyguide culture and how birds learn from each other. While I do not have any ornithological background, I imagine such learning as involving birds (possibly of different age groups or of different localities) and humans (making the sound and interacting with the learning birds) in a mutual process. The study suggests that the honeyguide is capable of highly intelligent behaviour and raises a number of broader questions about interspecies and intraspecies communication and processes of mutual learning.

RESEARCH ON BEES AND HONEY IN THE ADAMAOUA REGION

Together with Mazi Sanda, bee biologist at the University of Ngaoundéré, I have been conducting research on honey hunting and beekeeping in the Adamaoua Region since 2015. We applied different ethnographic research methods such as participant observation, guided forest walks and qualitative interviews. Following approaches of visual ethnography (Pink, 2007) and ethnographic film (Barbash & Taylor, 1997; Henley, 2000), we made intensive use of filming as a research method (Gruber, 2015; Gruber & Sanda, 2017a; 2017b).

As honey is produced, traded and consumed in a variety of places, we decided to follow the matter as well as the activities and the people surrounding it, by conducting multi-sited research (Marcus, 1995). This led us to do research in the capital city of Yaoundé; in Ngaoundéré, Cameroon's fourth largest city and the capital of the Adamaoua Region; in Dang, a village approximately 10 kilometres

north of Ngaoundéré; and in various small settlements situated around Dang. As we moved constantly between these different places (together with the honey), the roads and railways connecting them became an additional research site. Our enquiry alternated between periods of intensive ethnographic fieldwork, lasting between two and six weeks, and Mazi Sanda's regular short visits to the field during which he kept contact with research participants and enquired into specific questions.

Honey Production in Adamaoua

With an average annual production between 2003 and 2009 of 4,420 tonnes of honey (Ingram, 2014: 185).(1) Cameroon is a relatively small honey producing country compared to Africa's top honey producers Ethiopia (50,000 t), Tanzania (30,000 t), Angola (23,300 t) and Central African Republic (16,200 t) in 2013 (Châtel, 2017). At the same time, the production of honey is an important economic activity in some parts of the country, providing income to tens of thousands of rural families. The Adamaoua Region is located in central Cameroon between the 6th and 8th degrees of latitude north and between the 11th and 15th degrees of longitude east. It shares borders with Nigeria in the west and with the Central African Republic in the east. Most of the region's 62,000 km^2 consist of a high plateau with an average altitude of 1,100 metres above sea level. 1.2 million people populated the region in 2016 making it the least densely populated region of the country, with a population density of merely 18.9 people per km^2 (Institut National de la Statistique, 2016). The vast savannah landscape is characterised by grass and the trees *Daniellia oliveri* and *Lophira lanceolata* (Letouzey, 1968). This vegetation and the climatic conditions make the Adamaoua region an excellent territory for the production of honey. The Adamaoua is clearly Cameroon's most important beekeeping zone, producing 93% of the national production: 3.1 million litres of honey worth 1.7 billion CFA (approximately 2.6 million euros) have been produced in the Adamaoua Region annually between 2003 and 2009 (Ingram, 2014: 185). Of the country's more than 21,000 estimated beekeepers, 58% live there (Ingram, 2014: 173). The estimated 12,000 Adamaouan beekeepers own an average of 45 hives each and each hive yields an average of 10.5 litres of honey. In the town Ngaoundal, one of the area's beekeeping hotspots, the average annual income from beekeeping was 207,000 CFA (315 euros) for each beekeeper, representing 43% of the total household income in 2007 (Ingram & Njikeu, 2011). Interestingly, less than 2% of the honey produced in the Adamaoua is consumed by the beekeepers themselves. While approximately one quarter of the production is sold to local consumers, the biggest share is traded by wholesalers or transported by rail or road to the big cities outside Adamaoua (Ingram & Njikeu, 2011). Most beekeepers in the area thus do not produce honey for subsistence but in order to generate cash income.

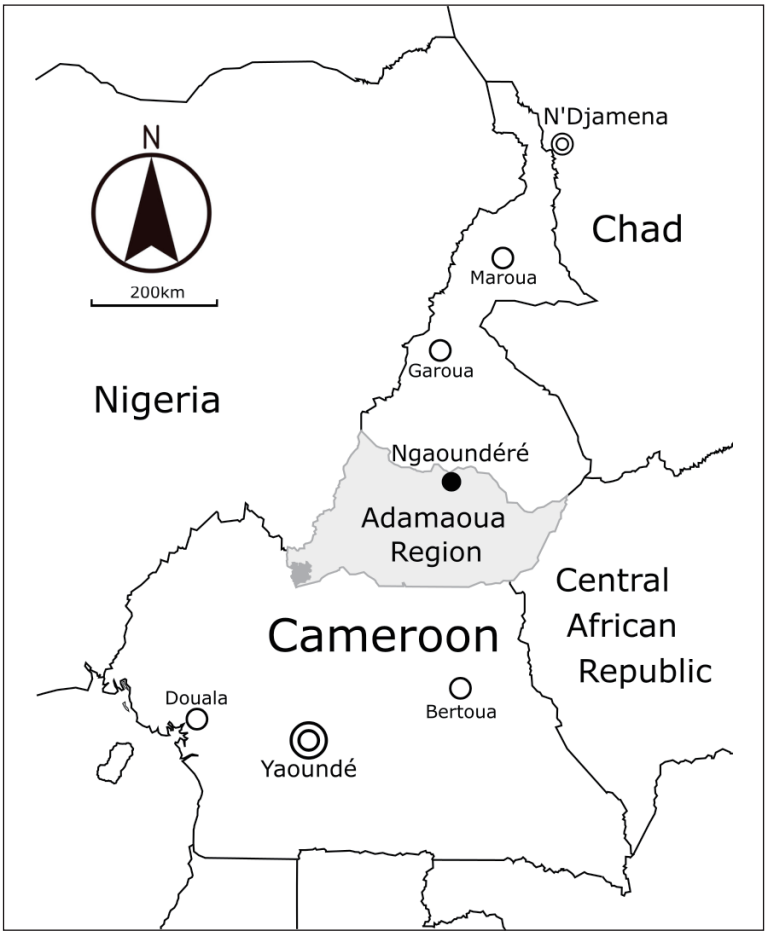

Fig. 1. Cameroon and Adamaoua Region

Procedure of Honey Production

Throughout the Adamaoua honey is produced either by salvaging the honey of bee colonies living in hollow trunks of trees or holes in the ground (honey hunting) or by keeping bees in cylindrical beehives manufactured from natural materials such as grass, palm fronds, liana and mud. The hives are placed horizontally in trees and swarms of honeybees (*Apis mellifera adansonii*) move in spontaneously. The beekeepers harvest the honey after a certain amount of time, usually a few months, but do not manipulate the bees in any other way. The materials used to make beehives are freely available throughout the rural Adamaoua and beekeeping can be undertaken conveniently between farming and other activities. This makes beekeeping potentially a good additional income for rural dwellers. Some beekeepers own over 100 hives, most of which are populated with bee colonies. Such beekeepers may produce up to 1,000 litres of honey per year,

making an additional income of up to one million CFA or 1,500 euros. Beekeeping and honey hunting are male domains in the Adamaoua Region. Women take part in the processing and trade of honey but manufacturing and placing hives as well as harvesting honey are tasks performed only by men.

Processing and distribution of honey

With a population of 230,000 in 2005, Ngaoundéré is the political and administrative centre of the Adamaoua Region. The city is an important trading and transportation hub, not only for honey. Situated on the main road between the south of Cameroon and the country's densely populated North and Extreme-North Regions, Ngaoundéré is also the northernmost end of the Trans-Cameroon Railway, connecting it with the capital Yaoundé and the port city of Douala. In addition to daily passenger trains, freight trains reach the town each day. At the freight terminal, goods and containers are transferred onto huge trucks bound for the northern cities of Maruoa and Garoua as well as to the Chadian capital N'Djamena.

A number of honey wholesalers are based in Ngaoundéré and the traditional market hosts a considerable honey section where honey of different qualities and quantities is traded. The business is organised as follows: Honey dealers buy the honey either directly from the beekeepers or through intermediary vendors. This can take place in the beekeepers' residential villages or in Ngaoundéré at the honey traders' shops.

Some of the honey is filtered by the beekeepers and sold as pure honey, but the majority is bought as a mixture of honey and wax. In the latter case, the purification of honey is accomplished by the traders, either by filtering the honey-wax mixture with different kinds of sieves, or by placing it in the sun and letting the honey settle. Some dealers use fire to separate honey from the wax but the quality of the resulting honey is comparatively low. The pure honey is packed in containers from 0.5 up to 25 litres. While most of the honey is filled in second-hand canisters or plastic bottles, an increasing number of traders are aiming at upscale markets by using professional packaging and labels.

In 2018, depending on the quality and the quantity being purchased, one litre of pure honey cost between 800 CFA (1.20 euros) and 1,200 CFA (1.60 euros) in a second hand container and 2,500 CFA (3.80 euros) in a new, labelled bottle in Ngaoundéré. In Yaoundé the market price for Adamaouan honey is approximately 3,500 CFA (5.20 euros) per litre. In supermarkets in the capital, the price for 500g of nicely packaged Cameroonian honey can reach up to 4,700 CFA (7.10 euros), which is approximately the price of good quality honey in Germany. It is interesting to note that honey in second hand containers is sold by the litre, while professionally packed honey is usually sold by the gram in containers of varying size. I assume that the shift of selling honey by the gram might have been initiated by European NGOs and later adopted by Cameroonian entrepreneurs. It would be easily possible to purchase new containers holding litres, but honey sold by the gram is clearly associated with professionalism. Another reason for the use of such containers could be by economic considerations—as one

kilogram is less honey than one litre. Further research on this issue is clearly necessary. There are different markets for honey (see also Ingram, 2014). While some of the honey is sold locally, most honey is sold to customers outside the Adamaoua Region. Only a small quantity of honey is exported to neighbouring countries like Nigeria and Chad.

ETHNOGRAPHIC RESEARCH ON HONEY HUNTING IN DANG VILLAGE

Dang Village

Honey is produced in the rural areas of the Adamaoua Region. We conducted most of our ethnographic research in the village of Dang and its surrounding settlements Borongo, Manwi, Darang, Do-Mbela and Massiwol. Dang proved to be an interesting research site for a number of reasons. The University of Ngaoundéré was founded there in 1993 and occupies a vast territory. The influx of students has led to the construction of new residential areas as well as to the establishing of trade and service providers. In addition to processes of urbanisation, much of the original savannah landscape has been converted into agricultural land. The highly cultivated surroundings are characterised by severe deforestation. In the vicinity of Dang, bee forage is not abundant any longer. Many beekeepers complain about small harvests and have moved their hives further away from the town. The environmental degradation is certainly one of the main challenges for beekeepers in Cameroon today and Dang can serve as a 'laboratory' to explore beekeeping in a changing environment.

At the same time, Dang's location between Ngaoundéré and the rural Adamaoua as well as its good infrastructure make it a unique, well connected place for producing and trading honey. The main road between the north and south of Cameroon serves as a marketplace for honey as many local beekeepers and small scale traders sell honey from roadside stalls. Their clients range from passengers of private cars and overland buses buying small quantities of honey for personal consumption or as gifts, to truck drivers loading several hundreds of litres onto their vehicles to sell at a profit at their next destination as an informal side business. The road, with its shared taxi service gives easy access to the honey markets and the honey traders in Ngaoundéré. Moreover, the weekly market held in Dang each Sunday is an important meeting point that connects Ngaoundéré to its hinterland. Agricultural products (including honey), second hand clothes, and goods for daily use are traded there. The market is extremely popular with people from the entire region. Its unique situation in a peri-urban space makes Dang an interesting field to conduct research on beekeeping and trade of honey in a situation characterised by urbanisation, diversification and professionalisation.

Fig. 2. Alim Garga and invisible honeyguide

Encounters with Honeyguides

Our research was intended as a multispecies ethnography about the interactions and relationships between humans, birds and bees (Kirksey & Helmreich, 2010). We wanted to be guided by Greater Honeyguides—called *Sabaru* in Fulfulde, *Mbaijourou* (*mbai* meaning chief and *jourou* bees) in Mboum and *Gbassara* in Gbaya—and experience this unique interaction first hand. This would allow us to understand the relationship between humans and birds as well as the role these collaborations play in their daily lives. In order to get in contact with honeyguides we accompanied beekeepers and cattle herders who often engage in honey hunting during their extended stays in the field. We went as a group of four or five people, walking slowly through the savannah. To attract the attention of honeyguides, we made the typical sounds of honey harvesting: talking loudly with each other, banging against trunks of trees with sticks or chopping wood with machetes. Some of the research participants performed special whistles and calls they had been taught by their fathers and grandfathers.

At the beginning of our enquiry, several research participants had assured us that they were frequently led by honeyguides and that it was only a matter of time until one of them would come and show us a nest. However, in four weeks of intensive fieldwork in March 2017, we had only two brief encounters with honeyguides.

On the first occasion, we were passing by a dense gallery forest, when a honeyguide suddenly started chattering inside the wood. We tried to locate the bird and climbed down a steep slope towards a small river bed, but the vegetation was too dense to even see it. After a few minutes, as we were unable to follow the bird, the chattering slowly moved further away and eventually vanished in the distance. When the bird was gone, our guide immediately pointed to a hole in the ground—a snake's hole he said—and explained that the honeyguide probably wanted to warn us of a snake (See Fig. 2). In that moment, it sounded to me like an excuse for the ethnographers' benefit. However, the bird is frequently

Fig. 3. Honeyguide in tree

and widely reported to indicate the presence of dangerous animals. Friedmann dismisses such reports as "native legends" or as coincidental (1955: 57). Our interlocutors told us that when this happens, the bird wants to warn them. For hunters of game this may have negative effects as the honeyguides' calls may also warn and chase away their prey. Unfortunately, the phenomenon has not been followed up and further research is necessary (Dean et al., 1990).

The second time we saw a honeyguide during one of our extended forest walks, the bird was perched high in a tree and singing, but not the distinct guiding call (Spottiswoode et al., 2016: 387). We tried to attract the bird's attention by shouting and whistling but it did not respond and flew away after some time. One of our research participants even raided a bee colony that he had spotted earlier in a nearby tree, in order to attract the bird with larvae and comb, but the honeyguide did not come (See Fig. 3).

We shifted our activities from the vicinity of Dang to the villages around it as our research participants told us that we needed to go to more remote areas in order to get in further contact with the birds. At the same time, we started questioning our interlocutors' stories of recent collaborations. Our research, therefore, is not based on the first-hand experience of being guided. Instead, we talked informally to our research participants during our extended forests walks and conducted interviews with them. Moreover, they showed us how to move in the forest, how to attract honeyguides and how to harvest honey from bee colonies in the ground and in tree trunks (Gruber & Sanda, 2017b). This kind of ethnographic enquiry revealed an entirely different situation than the initial stories of frequent human-honeyguide interaction.

Self-consumption or Commercialisation?

During our savannah walks, the research participants regularly spotted nests of honeybees, but they rarely harvested the honey. For example, during one six hour-long excursion, members of our party spotted seven bee colonies, but only har-

vested the honey from two. Despite the fact that many of those nests were easy to reach and the honey could have been harvested without great effort, they extracted such honey only if they were hungry and wanted something to eat right then and there. This suggests that wild bee colonies are abundant but that their honey is only harvested for immediate consumption. Diallo, a Fulfulde speaker in his mid 30s living in the village of Massiwol explained:

> Well, for honey hunting as I said I am not harvesting a huge quantity. It is just to feed myself when I am hungry while I am in the bush. … For the nest in the tree and underground, the honey is with dirt. That is the reason why I like to hang my hives on the trees because the honey is without dirt, it is clear. (Interview with Diallo 15.2.2017)

It seems significant that one thing in common between all the different places where we conducted our research was that people were keeping bees in hives and that they produced honey mostly for sale and not for subsistence. Honey from wild colonies was very rarely taken home for consumption or added to the honey that was used for sale. I assume that honey from wild living bee colonies is less important and less frequently salvaged in areas where hive beekeeping is practiced. This is certainly not restricted to the area around Ngaoundéré and Dang but characteristic for most parts of the Adamaoua Region (Ingram, 2014).

Such a setting is in stark contrast with two recent studies discussing thriving collaborations between honeyguides and humans. Significantly, both studies were conducted with people who do not keep bees in hives. One was carried out in Tanzania in an area where people do not keep bees in human made hives (Wood et al., 2014); the other one (Spottiswoode et al., 2016) was carried out in Mozambique in an area where hive beekeeping has only been introduced recently in the context of elephant fences and is very marginal (Spottiswoode; email communication on 6.10.2018).

Do Honeyguides Stop Guiding?

There have been numerous reports of places where Indicator indicator guides less frequently or stopped guiding entirely, in addition to those where the bird occurs but never guided humans (Friedmann, 1955: 50ff). Friedmann argues that the bird only guides humans if its efforts are reciprocated. He concludes that the honeyguide stops guiding if humans stop collaborating (see also Isack & Reyer, 1989; Dean et al., 1990). Such a view was confirmed by our research participants, as exemplified by Alim Garga, a 50 year old Fulfulde speaker from Dang:

> Last time we came across some people in the bush cutting trees. If the bird shouts they will not care about it. If today it shouts, no one cares, the day after it shouts no one cares, thereafter the bird will not shout any more if it sees humans passing. (Interview with Alim Garga 9.2.2017)

Friedmann explained the declining collaborations in the 1950s with processes

of urbanisation and modernisation. Referring to John Williams, curator at the Coryndon Museum in Nairobi between 1944 and 1966, he writes with a colonialist undertone typical at the time:

> Williams' own extensive field experience confirms this loss of the guiding habit in many places, especially in the vicinity of large towns or in areas where the natives have become more Europeanized in their way of life; good examples are Nairobi, in Kenya Colony, and Kampala, in Uganda. … Mr. John G. Williams informs me that it is extremely unlikely that any native around Nairobi would go to the trouble of opening up a wild bees' nest. He made extensive inquiries amongst the natives, who replied by asking why should they run the risk of getting badly stung when they can go to the local duka (shop) and buy sugar, or get honey from their own hives. (Friedmann, 1955: 51f)

While Friedmann briefly mentions the existence of hive beekeeping, his implicit argument is that honey as a sweetener will largely be replaced by sugar and that the people will stop hunting honey altogether. However, over 60 years after Friedmann's research, people all over Africa still keep bees and hunt for honey. In the Adamaoua (and possibly elsewhere), interest in honey production has been ever present. However, the honey traders in Ngaoundéré are increasingly seeking clean, high quality honey, which certainly does not correspond with the honey salvaged from wild bee colonies. Our study suggests that the changes in the human-honeyguide relationship cannot be explained by general societal developments like urbanisation or modernisation but are directly linked to the intensification of hive beekeeping coupled with the diversification and professionalisation of the honey trade.

Human-made Hives and Honeyguides

Interestingly, beekeeping with human-made hives seems a rather recent phenomenon at our research sites. While Ingram assumes that people in the Adamaoua Region have been using beehives for several generations (2014: 168), most of our interlocutors told us that the shift from honey hunting to this kind of more extensive beekeeping has occurred only within the last generation. Alim Garga, an experienced beekeeper, told us:

> (My grandfather) was doing honey hunting. He harvested all the bees nests in tree trunks and no matter how high a tree was, he cut it down and harvested. He harvested also the underground honey no matter how deep it was. That was his activity till he died. He has never constructed a single hive, be it traditional with grass or the wooden one. It was what he taught me. When I grew up, I found it difficult. I started working with constructed traditional hives. (Interview with Alim Garga 9.2.2017)

Unfortunately, we were unable to establish a precise timeframe for the intro-

Fig. 4. Djaouro Sardi with a traditional beehive

duction of hive beekeeping that could help us determine how the relationship between beekeeping and honey hunting in the Adamaoua has developed. Our research suggests, however, that honey hunting and collaborating with the honeyguide was still widespread and thriving less than 20 years ago. We found yet another aspect indicating that the honeyguide's behaviour towards humans is undergoing a transition.

Some of our interlocutors told us that honeyguides had started leading humans to their own or other people's beehives instead of wild bee colonies. This suggests that the honeyguide is not able to distinguish between natural and human-made bee domiciles and raises the question whether the honeyguide would be able to learn to distinguish between the two if the human-bird collaboration were to continue. This would constitute a whole new level of intelligent animal behaviour. However, somewhat tragically, the birds' 'confusion' actually seems to further impede human collaboration. Djaouro Sardi, a 60-year-old Gbaya speaker from Dang told us:

> I saw a honeyguide recently but I did not follow, because it will show me my own hives ... It flies from one hive to another, just around the same place, and it will not fly to another place. So there is no need for me to follow. (Interview with Diaouro Sardi 10.2.2017)

Our research participants discussed the birds' showing of human-made hives as a recent phenomenon even though, if the honeyguide is unable to differentiate between human-made and natural hives, it should have occurred regularly since the introduction of beehives. I interpret this as yet another indicator that the changes in the human honeyguide relationship are a recent phenomenon and are still ongoing.

Remaining Questions

In addition to the findings on developments of human-honeyguide interactions in the Adamaoua, our research sheds some light on a number of aspects that have been discussed controversially. Firstly, many of our research participants used specific calls or whistles to establish contact with the honeyguide. As we were working with honey hunters of different ethnic backgrounds who were speaking different native languages (Fulfulde, Mboum and Gbaya), we were not able to establish culturally specific guiding calls. Independent of this, their main common strategy to attract honeyguides was to imitate the soundscape of honey harvesting through talking loudly with each other and chopping wood with their machetes. Secondly, all of our 10 research participants observed that the honeyguides do not consume a lot of beeswax, but are mainly interested in bee larvae. Thirdly, our interlocutors agreed that it is necessary to reward the bird and leave some comb with larvae behind, not only to motivate it to guide again but also as a sign of gratitude. Not rewarding the bird or even removing the leftovers was regarded as immoral.

> … we always give the part of the bird after harvest, because when something helps you finding what is good for your health you must reward it. ... when we have not found something inside, we just take out empty combs and give it. (Interview with Alim Garga 9.2.2017)

DISCUSSION

The developments discussed in this paper raise a number of questions about the factors that have shaped the collaboration between honeyguides and humans in the Adamaoua Region as well as the future of this relationship.

Is Reciprocal Relationship Necessary?

At first thought, the assumption that honeyguides will stop their guiding habit if their efforts are not reciprocated is challenged by Wood et al., whose research participants never rewarded the birds that guided them to bees nests, but actively hid or destroyed leftover comb in order to increase the birds' hunger, which they believed further motivates guiding behaviour (2014: 543). However, Wood et al. argue that the relationship is nevertheless beneficial for the honeyguide:

> Even though Hadza honey-hunters only acted to limit rather than increase the birds' payoff, they could not possibly have prevented honeyguides from eating all the scraps of honey or brood or wax that remained inside the now-exposed nests or scattered upon the ground. (Wood et al., 2014: 544)

Wood and his colleagues interpret the fact that the birds guide humans despite their reduction of payoff, as a sign for the robustness of their mutualistic rela-

tionship. The situation in the Adamaoua differs insofar as honey hunting has decreased drastically in the last years, limiting the honeyguides' access to brood and wax from this activity almost entirely. Instead the honeyguides should be able to feed on leftovers after beekeepers harvest honey from their hives, as the empty beehives are often discarded after the harvesting. While empty combs are usually left behind, bee larvae are often consumed by the beekeepers on the spot or (less frequently) taken away. However, if they harvest from their own hives, the beekeepers do not feel morally obliged to leave anything behind for the honeyguides. The leftovers at honey harvesting sites can therefore be expected to be much smaller than the ones that honey hunters leave for the honeyguides as an active reward. While the unintended leftovers are an explanation for the birds' guiding of humans to human made beehives, one could argue that the relationship of manipulative mutualism is undergoing changes, implying a shift back to a commensal relationship (see Wood et al., 2014).

Honey as Commodity or Honey as Gift?

Interestingly, none of our interlocutors were particularly interested in honey, neither for food nor for medicinal or ritual purposes. To them, honey essentially constituted a source of income. In contrast, people living predominantly from hunting and gathering tend to value honey, particularly as food (Wood et al., 2014; see also Ichikawa, 1981). Moreover, beekeepers and honey hunters at our research sites conducted their honey related activities either alone or with immediate family members. They had little or no exchange with other beekeepers or with the consumers of their product. This differs from societies, in which honey hunting and beekeeping are collective activities that mediate social relationships within the producing community and in wider contexts (Ichikawa, 1981; Terashima, 1998).

Such mediating characteristics can be a factor for the continuation of traditional practices, even if they seem less economically viable, as exemplified by Ito's research in Ethiopia (2014). In the Gera district of southwestern Ethiopia, an area with a very long beekeeping tradition, beekeepers have rejected the introduction of 'modern' top bar hives, advocated by various researchers and NGOs (Ito, 2014: 78). Instead, most local beekeepers continue to use traditional beehives, as they perceive the related practices based on communal labour and labour exchange as important and meaningful. Significantly, these beekeepers do not sell their honey but consume it themselves or give it as a gift to relatives and friends. While top bar hives may yield higher quantities of honey, many beekeepers in Gera think that the honey produced in such hives is low quality or even tasteless. Following Ito, the difference in quality or taste may have functional reasons. In order to prevent them from being damaged or destroyed, modern hives are usually not placed in the forest where favourable honey plants grow, but in crop fields (93). However, as bees fly up to 3 kilometres to collect nectar, it would be necessary to analyse the honeys accordingly, in order to find out if the honey from modern hives actually differs from the one of traditional hives. I find it equally possible that differences in taste are based on subjective perception rather than on a

difference in contents.

Transferred to the sphere of honey hunting, this could mean that honey salvaged from wild bee colonies is tastier or better quality than the one from hives—and possibly that the honey found with the help of a honeyguide is the best. While such a correlation is completely hypothetical, it resonates with the role of honey hunting within the Mboum, an ethnic group in Adamaoua, with a long and intensive tradition of honey hunting. Bissi, one of our interlocutors originating from the Mboum community in the town of Belel some 100 km south-east of Ngaoundéré, told us that honey hunting with the honeyguide played an important role during his initiation into manhood, during which he and other members of his age group spent over a year in isolation and had to subsist largely by hunting and gathering. This important role of the honey guide as well as bees and beekeeping more generally is also reflected in Mboum oral tradition.

Future of Human-Honeyguide Relationship

Our research showed that the idea of collaborating with a honeyguide fascinates Adamaouan beekeepers and honey hunters as much as the researchers. I am therefore rather certain that many local beekeepers would appreciate the continuation of this practice if it would be viable. This raises questions about the possibility of strengthening or revitalising human honeyguide collaborations in areas where such activities have decreased or even stopped. In this context, to treat this practice and the associated knowledge (including the oral tradition) as a form of cultural heritage that should be valued, sounds like an interesting idea. While we were not entirely successful, our experience of honey hunting with the help of the honeyguide was very exciting. Maybe it would be worthwhile for beekeepers to continue the human-bird collaboration by generating additional income through guided tours or the marketing of their honey as a specific product.

From a multispecies perspective, one could interpret the changes in the human-honeyguide relationship as a struggle over agency and domination. In the beginning of my paper, I highlighted the fact that the birds usually initiate the collaborations with humans. I have argued that honeyguides successfully trained humans to open bees nests and thus to make wax and larvae available to them until very recently. This agency resided with the bird, even after humans started to claim authority by ‘calling’ the bird and by trying to manipulate it into further guiding, later in the evolution of their mutualistic relationship. When humans started keeping bees in hives, honeyguide birds became superfluous to them. This shifting can thus be viewed as a revolution against animal domination. While the birds’ subsequent showing of human made hives could be explained with its incapability to differentiate between natural and human made bee domiciles, it can also be interpreted as a somewhat stubborn challenging of human agency.

Interestingly, the third and central species of this triangular relationship, the honeybee, has not been the subject of much discussion in my paper. While this certainly has to do with the difficulty to interpret honeybee behaviour and perception, it also became clear that the bees and their honey were the constant factor within this triadic social arena:

> The introduction of modern hives did not change at all our work with *Gbassara* [the honeyguide]. It's rather us men who changed, by introducing hives to easily get honey. That said, *Gbassara* has no choice regarding the nature of the bees' habitat; whether in modern hives, whether in a tree trunk or in the ground, it suffices to see bees enter somewhere. His goal is to get some larvae and some honeycomb to consume. (Interview with Diaouro Sardi 17.2.2017)

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NOTE

(1) Ingram estimates an annual average honey production of 3,101,700 litres which is the equivalent of approximately 4,420 metric tons.

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