

From the solitary bee to the social bee. The inventiveness of children in the acquisition of beekeeping skills (southwestern Morocco)

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Résumé :

De l'abeille solitaire à l'abeille sociale. Inventivité des enfants et apprentissage de l'apiculture (sud-ouest du Maroc). À partir de plusieurs exemples ethnographiques du sud-ouest marocain, le propos de cet article est de restituer la part de l'enfant dans son apprentissage de l'apiculture, notamment lors de l'étape de l'essaimage et dans la relation aux abeilles solitaires. Ceci permet de mieux comprendre comment la vocation d'apiculteur émerge d'une transmission culturelle qui s'appuie en grande partie sur l'expérience autonome et ingénieuse des enfants avec la biodiversité qui les entoure. Pour suivre le processus de transmission et d'apprentissage des savoirs apicoles, cet article propose d'analyser le contexte culturel de sensibilisation de l'enfant à l'abeille dès le plus jeune âge et d'identifier les lieux de l'apprentissage en fonction des différentes expériences avec l'abeille et des tâches apicoles. Enfin et surtout, nous chercherons à confronter cette sensibilisation par le monde des adultes aux apprentissages, liés à la pratique de jeux éducatifs propres à l'univers des enfants avec des abeilles solitaires, préparant à la compréhension du monde des abeilles et des techniques apicoles.

Mots-clés : Apprentissage, apiculture, enfants, imagination, biodiversité, savoirs

Abstract :

Based on several ethnographic examples from southwestern Morocco, this paper aims at restoring the role of children as significant contributors in the acquisition and learning of their bee-keeping skills, particularly during the swarming season and during their relationship with solitary bees. We also aim at generating a better understanding of learning processes, which enable apiculture or bee-keeping vocations. Processes draw upon cultural transmissions, which are largely based on the autonomous and ingenious experiences of children with the biodiversity that surrounds them. In order to follow the transmission and acquisition of beekeeping skills, this paper proposes to identify the cultural context in which children become aware of bees from an early age as well as places in which learning occurs during their different experiences with

bees and beekeeping tasks. Finally, and most importantly, we seek to confront the awareness gained from adults' world to that acquired during practices of self-educational games by children with solitary bees leading to facilitate the understanding of the world of bees and beekeeping techniques.

Keywords : Learning, beekeeping, children, imagination, biodiversity, knowledge

Abstracto :

De la abeja solitaria a la abeja social. Inventiva de los niños y aprendizaje de la apicultura (suroeste de Marruecos). A partir de varios ejemplos etnográficos del suroeste marroquí, el propósito de este artículo es el de restituir el rol del niño en su aprendizaje de la apicultura, en particular a partir de la etapa de la enjambrazón y en la relación con las abejas solitarias. Esto permite comprender mejor cómo la vocación de apicultor emerge de una transmisión cultural que se apoya en gran medida sobre la experiencia autónoma e ingeniosa de los niños con la biodiversidad que los rodea. Para seguir el proceso de transmisión y de aprendizaje de los saberes apícolas, este artículo propone analizar el contexto cultural de sensibilización del niño con la abeja desde la edad más temprana, e identificar los lugares de aprendizaje en función de las diferentes experiencias con la abeja y las tareas apícolas. Por último, y sobre todo, intentaremos confrontar esta sensibilización a través del mundo de los adultos, con los aprendizajes ligados a la práctica de juegos educativos con las abejas solitarias, propios del universo de los niños, que preparan para la comprensión del mundo de las abejas y de las tareas apícolas.

Palabras clave : Aprendizaje, apicultura, niños, imaginación, biodiversidad, saberes

Introduction

THE LEARNING OF the skills and knowledge required for an independent and fulfilled childhood is an essential aspect of human experience and prepares for and increases competence as an adult, thereby generally benefitting humankind (Dira & Hewlett 2016; MacDonald 2007; Zarger 2010). Until very recently, this process was dealt with primarily in terms of socialization, with only very little credit going to the ingenuity and inventiveness of children (Hirschfeld 2002). This is particularly well illustrated in the case of children's relationships to insects. When entering the keywords "children" and "insects" into traditional bibliographical search engines, one will find an abundance of literature references, including ethnological and ethnolinguistical domains. This literature provides a broad range of approaches for early childhood education, particularly in Europe but also in other parts of the world. Some specifically refer to the world of insects as a means to transmit moral values, such as one might find in fairy tales for example¹. But what about how children themselves view insects and how it contributes to their cultural learning? Playing with insects is probably a constant and almost universal element in the history of human childhoods. The universal character of the recreational appeal of insects for children lies in two of their characteristics: firstly, the diversity of their forms and behaviors, however bizarre they may at first appear to young humans, never fail to stimulate their imaginations, and secondly, their small size on the basis of which many cultures draw analogies with the small size of children. Ouedraogo (2003: 92), referring to crickets and the Mossi people, says that in addition to eating them, the herdsmen children remove the rear legs from some of them and attach them to a thread in order to "herd" them in the same way they might herd the cattle that they already own in their imaginations. Costa Neto (2003: 101) notes in his work in Brazil that most children in rural areas play with insects. Similarly, whilst it is adults who indulge in cricket fighting activities in Indonesia, it is highly likely that children are involved in finding and collecting the said crickets (Geertz 1995, quoted by Pemberton 2003: 153). These few observations raise important questions regarding the autonomous learning processes resulting from encounters between children and insects and the way in which these processes are incorporated into the acquisition of skills linked to adult activities.

Research on knowledge transmission relating to bees between children is still relatively rare, and this includes knowledge transmission that occurs through play. Nonetheless, it is already possible to make a logical distinction between two types of learning linked to the two different ways in which honey is ultimately harvested, i.e. honey hunting and beekeeping. In the case of honey hunting, the transmission of knowledge and practices often involve participation in the ritual activities that precede the harvest, as illustrated by the Nawene-Nawe in Brazil, (Dos Santos & Antonini 2008), the Kattunayakan tribes in Kerala, India (Kumar & Reddy 2014) and in many other places. Only a particular age group may be allowed to participate in these ritual activities and the ensuing honey hunt. Very often it may be restricted to young men, or sometimes to men of various ages and, more rarely, the whole community, men, women and children, may be involved. For beekeeping, it is learning over an extended period that counts. The commonly-held view of the long-term learning involved in beekeeping is based on vertical knowledge transmission from father to son that is dependent on participatory observation, where there is no role for initiative in the child's learning process. Based on several ethnographic examples from southwestern Morocco, this paper will aim to represent children as significant contributors in the acquisition and learning of their beekeeping skills, particularly during the swarming season and in terms of their relationship with solitary bees, in order to generate a better understanding of how the vocation for beekeeping emerges from a

cultural transmission that largely draws on the autonomous and ingenious experiences of children with the biodiversity that surrounds them.

Our observations show that 15% of men in a rural environment in southwestern Morocco, are involved in beekeeping. Nearly all of these beekeepers are men who tend to their bees alone, even if some of them may belong to beekeeping organizations. Hives are kept near houses or on neighboring plots of land, but can be moved if necessary. For the majority, they are traditional hives made with reeds, but increasingly there are also “modern” hives, which are mostly Dadant style. The beekeepers’ know-how in these regions is primarily based on “the management of different types of agricultural spaces, as beekeeping is an integral part of the global agroecosystem” (Simenel *et al.* 2015; Simenel & Aumeeruddy-Thomas 2016). This distinction between different agricultural spaces particularly affects varying degrees of bee domestication, which may range from manipulating wild swarms in the forests to controlling swarms in an apiary.

In order to follow the transfer and acquisition of beekeeping skills, it is essential to consider initially the cultural context in which the child becomes aware of bees from a very early age and to identify the places in which learning occurs, depending on their different experiences with bees and beekeeping tasks. This context is largely formed by means of the image of bees as conveyed in any discussions, proverbs and anecdotes that the child hears. In addition to this cultural absorption or impregnation that is implicit in their relationship to bees, there is also the active observation that occurs in the apiary when the child accompanies his father. But that is not all. When unobserved by adults and left to their own devices, children develop between themselves self-educational games with solitary bees, which lead to an understanding of the world of bees and beekeeping techniques. A solitary bee, referred to as *Braziz*², and whose behavior portrays the opposite traits to that of social bees, proves to be both a guide in children’s discovery of biodiversity and the main medium for the learning of beekeeping skills in southern Morocco. One of the aims in this paper is to cover fully the propaedeutic role of these three stages (cultural impregnation through oral traditions, observation in the apiary, relationship with solitary bees) in the emergence of the beekeeping vocation by explaining how the child and the solitary bee represent a stand-alone, autonomous world whose main purpose lies in direct experimentation of the environment.

Methodology

Material presented in this paper was collected over the course of many fieldtrips to the Essaouira, Agadir, Sidi Ifni and Guelmim regions between 2008 and 2013. This subject was also covered by Morgane Salzard, a student in L3 at Montpellier SupAgro, during a two month study placement co-supervised by Romain Simenel and Lahoucine Amzil in 2013. The three tribal groups studied are the Haha, the Ida Outanan and the Aït Ba’amran. The majority of discussions with beekeepers, non-beekeepers and children took place in Tachelhit, the local Berber dialect, or in dialectal Arabic. A lot of data was gathered by means of observation and by monitoring both beekeeping activities and the children’s activities. Another type of material was collected during the school sessions, which took place in five primary schools spread across the Ida Outanan region and the Imgrad region. These sessions consisted in inviting children between 7 to 11 years to draw what they knew about beekeeping, bees and solitary bees in an open-ended approach without any specification³. Children were also asked to imagine discussions between bees and solitary bees. A dialogue between the bee and *Braziz*, poems and a song were also produced on the children’s initiative and collected during these sessions.

All information and productions of children have been collected with the consent of their parents or teachers. The drawings of schoolchildren are published with the agreement of the directors of the three corresponding schools.

Bees, divine intelligence and the hand of man

For the populations of southwestern Morocco and in Morocco in general, bees, *tizoi* in Tachelhit, occupy the most sacred position of all in the animal kingdom. The sacredness of bees is explained by the fact that they are referred to in the Koran and in the hadiths. Even if the majority of men and women in these regions may not know these surahs, they know of their existence and that is sufficient to legitimize the special character of bees and its religious interpretation. They incarnate ideal values of sociability, honesty and righteousness and are often likened to angels. The social organization of bees is compared with that of the Kingdom of Morocco, with a *Sultan n Tzoi*, Sultan of the bees, and not a queen bee, and a *makhzen*, an administrative infrastructure with its police, supervisors and workers... The paradox of the Sultan of the bees being responsible for the laying of larvae is only apparent to the researcher and systematically causes beekeepers to burst out laughing when questioned on this aspect. The parallel established between the Moroccan royalty and the royalty of bees more widely reflects the propensity of human collectives to project their social and political behaviors onto social insects, as so brilliantly illustrated in the example of the Mofu people and the *jaglavak* ant (Seignobos *et al.* 1996: 127). However, the analogy between human society and that of bees stops there, because unlike the first, the second is not corrupt. Their honey is a gift from god that is consumed only at certain moments, such as during illness or to welcome a guest. Even their sting conveys benefits that help counteract diabetes, rheumatism, or the after-effects of a scorpion sting. Their ingenuity never fails to amaze those who are interested in them, and is often considered to be a miracle. According to the Aït Ba'amran, under Allah's command, bees are only supposed to produce honey for the prophet Muhammad. It is said that because mankind has hidden the death of the prophet from them, the bees continue to produce honey *tammant*. This interpretation infers that the common mortal doesn't deserve this divine product. What is more, the bees are referred to as the "workers of the lazy" *akhedane 'omekhine* beings that we are; it is by means of their cunning that humans harvest the precious substance. So, the dominant perception of bees requires that they are already programmed to produce honey, which appears to be a *baraka* from which mankind benefits.

Despite the influence of this religious discourse that uniformly portrays bees as a species that has been "domesticated" by the means of its sacred status, beekeepers in southern Morocco make a clear distinction between bees that are not subject to human interventional practices and those that are subject to traditional beekeeping practices. As with the majority of domestic animals in the Berber world, bees kept in apiaries have their wild counterparts (Simenel 2010: 171). Bees living in wild, woodland areas, referred to as "those on the left" are systematically contrasted with "those on the right", which are kept in hives. By means of this dynamic representation, beekeeping territory is divided based on a left (forest or woodland)/right (cultivated areas and house) orientation, which is typical of a more general distinction in the culture of these regions between the world of the *jnoun* situated on the left, the forbidden side of the world *haram*, and the world of humans situated on the right, the permitted side of the world *halal*. In addition, beekeeping is considered to be a pastoral or agricultural activity. Hives are often grouped together in an enclosure that is referred to as a *tagrouit*, quite literally "little sheep fold", and is referred to as the apiary in this paper. When bees are out of the hive and gathering pollen, they are said to graze *kss*, just like sheep.

From the solitary bee to the social bee. The inventiveness of children in the acquisiti...

These “sheep folds of bees” can be found in gardens, fields, in prickly pear plantations and even in the house. Each one is marked with the owner’s surname, thereby sealing their appropriation into a domestic environment. Thus, the naturally domestic character of bees as evoked in religious texts is relativized both by the contrast established between bees on the right and those on the left, and by the inclusion of apiculture in agricultural practices.

In reality, of course, these two extreme views of the world of bees are in fact totally interlinked, because a beekeeper creates his apiary on the basis of swarms that come from the forest and swarms that have just come out of the hives, which very often return to the forest. Bees on the left move to the right and vice versa. Nevertheless, this practical reality is absent from oral traditions, and it is of course on the basis of the distinction between the world of wild bees, namely that of the forest, and the world of domestic bees, specifically cultivated spaces or the house, that the popular representations, which influence the child’s mind are constructed.

Learning in the apiary

From the age of five, the male child is invited to join his father in the apiary. Note that in the regions studied for the purpose of this paper, beekeeping is systematically learnt using traditional hives even in cases where the beekeeper also owns commercially produced hives. At this stage, the small boy simply accompanies his father and observes his actions. “I learnt when I was a boy by watching what my father was doing” is a phrase that comes up again and again when talking to beekeepers about the origins of their beekeeping skills. “Sit down and watch” is how they summarize their initial learning experiences. Learning starts gently, through observation rather than action. Slowly, the child begins to help his father when asked to. He might, for example, carefully pass him the required tool or instrument when asked — knives, smoker, newspaper, buckets... However, during this stage of the learning process, the child says almost nothing and his father explains nothing. Everything is learnt through observation. As Philippe Descola reminds us, in any field that requires a practical skill,

“...A task can only be performed quickly and effectively once the necessary knowledge that has been transferred through the intermediary of language, oral or written, has become instinctive, and does not require reflection, so that it is a sequence of automatic gestures and not a list of operations that need to be carried out. Whatever the role of language in this process, this kind of skill requires that the language is deleted in order to become effective...” (Descola 2005: 146).

Learning to watch in silence, to develop a personal understanding of the relationship that the beekeeper has with the world of bees and the gestures and actions involved is the first stage in this learning process (*cf.* Photo 1 and Figure 7 below).

Photo 1: A beekeeper busy with his hive, © Yildiz Aumeeruddy-Thomas 2009



The very first task that the child must perform alone occurs during swarming. Swarming, which involves the old queen's departure from the hive with part of the swarm in order to make space for a new swarm resulting from egg laying, is a crucial and delicate stage in the beekeeping process. During swarming, bees leaving the hives may get lost and attach themselves on branches of trees in fields or in forests. Children are therefore asked to go and watch out for departing swarms and to follow them in order to identify where they settle, with a view to then being able to retrieve them and reintroduce them into a new hive (*cf.* Photo 2 below). It is therefore logical that children, who, on a daily basis and during their free-time, are entrusted with tasks such as taking donkeys, cows, sheep and goats away from the house and to more distant pastures such as recently harvested fields or woodland pastures, should be asked to track swarms of bees. In this way, the adults ensure that one of the key stages in beekeeping benefits children's intimate knowledge as shepherds, of their environment and their excellent powers of observation and experience (Simenel 2017). The first time that children participate in this swarming stage, they stand guard over the hives and must inform their parents if a swarm leaves a hive. For now, no close contact is allowed. Nevertheless, their observation allows them to become used to being surrounded by bees and to distinguish between the different types of sound that they make, particularly the sound that is characteristic of a swarm that is ready to leave the hive. A year or two later, they will be allowed to track the swarms, and this is why at the end of April it is possible to see dozens of boys between the ages of 7 and 10 running as fast as they can across the fields and forests after the swarms. The children share practical tips to make their task easier, such as throwing a stone up vertically into the air to encourage a dispersed swarm to regroup. Children often describe swarming as a recreational phenomenon with a certain competitive element to it. When the child eventually confirms the

From the solitary bee to the social bee. The inventiveness of children in the acquisiti...

final position of the swarm, he accompanies his father to collect the swarm by smoking the bees to encourage them to enter a new hive. It is only after having assisted in this stage of swarm collection two or three times that the child, by now adolescent, is able to do it independently. The first autonomous relationship between the child and the bees occurs therefore during swarming in the form of tracking or hunting not honey, but the swarm.

Photo 2: A child sets off at a run to retrieve a swarm of bees with his hive under his arm,

© Yildiz Aumeeruddy-Thomas 2010



Figure 1: © Fatima, Iguer Bouhemd School, 2011



Figure 2: © Lahoucine, Aguersouak School, 2011

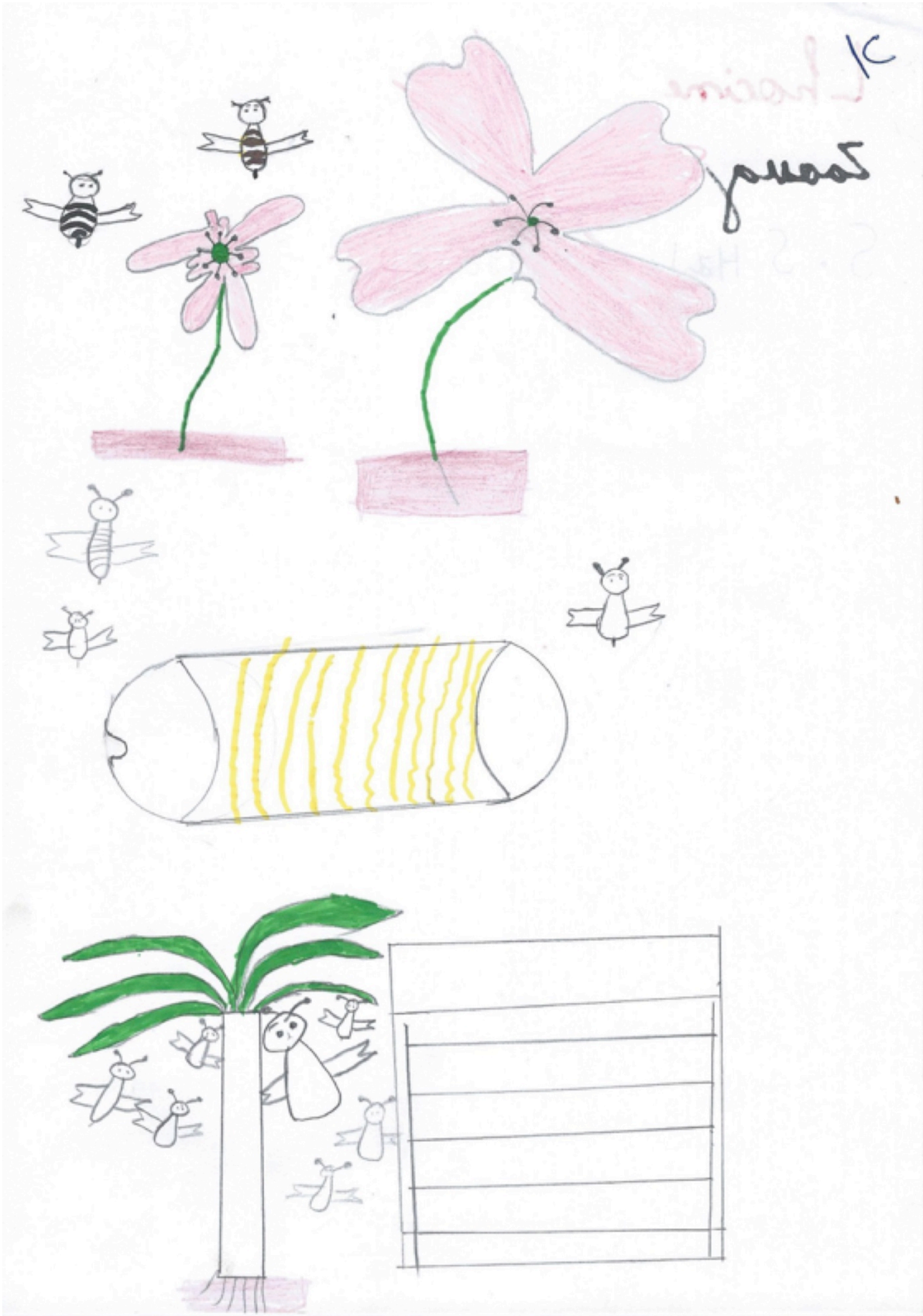


Figure 3: © Mohamed, Iguer Bouhemd School, 2011



Figure 4: © Fatim, Tadrart School, 2011



If children are allowed to participate in this swarming stage, it is because it is the least dangerous stage and the one that is the most similar to shepherd's activity during which they have already developed an intimate knowledge of their environment. During swarming, bees are not aggressive as they are too busy looking for shelter. Activities that take place in the apiary are an adult affair and children only approach the hives little by little. Another important stage in learning beekeeping is the harvesting of honey when the child, who is closer to his father and the hives than ever before, plays the role of assistant by holding knives and bucket at the ready. It is at this precise moment that the child discovers for the first time the inside of the hive and its frames. The impact of this discovery on a child's imagination and on his vocation in becoming a beekeeper is fundamental. At least, this is what we witnessed in the drawings done by children in primary school classes. Children who had not yet participated in harvesting the honey primarily focus on bees gathering pollen from flowers, some draw a swarm scene, or perhaps a hive (*cf.* drawings of Figures 1, 2, 3 and 4 above). For those who had already assisted in harvesting the honey, it was very clear from their systematic representations of the inside of a hive and the way which the bee world is

organized that this was a source of fascination (*cf.* drawing of Figure 5 below). The first honey harvest is therefore a turning point for the child in terms of his knowledge regarding bees. Even if he may know the stages involved in harvesting and is able to mime his father's actions, even if he knows how bees feed themselves and the different types of hive, he has no idea about the world inside the hive other than bits of information he has been able to glean from discussions on the ideal organization of a hive.

There is not one identical bee in all these drawings. Each child has his/her own way of drawing a bee. The colors, shapes, number of legs (ranging from 0 to 8), the number of wings (ranging from 0 to 4) vary from one drawing to another. With or without antennae or sting, some with a smile, others wearing shoes, the bees are presented in a variety of ways, but remain faithful to behavioral patterns and the insect's environment. And so we find that in all of these drawings, there is never a bee without a flower! Many children also include the water that is essential to the bee, in the form of a small body of water or the rain. Most of the drawings feature not just one, but several bees. The image of the bees gathering pollen on flowers is the most common. Honey harvesting only featured four times in 113 drawings. Some children go into a detailed representation of the pollen. The proportion of traditional hives *ssild* and modern hives *soundouk* is variable. These drawings are an incontestable evidence of a transition from one style of beekeeping to another (*cf.* Figure 6 below). For example, the children at the school in Tadrart only drew traditional hives. Three kilometers away, at the school in Aguersouak, most of the drawings featured both traditional and modern hives. A further five kilometers on, at Iraln school, the vast majority depicted only modern hives. The traditional hives are generally more detailed than the modern hives. In some drawings, the children had drawn the dividing segments typical of traditional hives inside modern hives, through lack of knowledge in this respect, which supports our claim that traditional hives are used in beekeeping initiation even in a context where modern hives are commonly used.

Given that beekeepers represent only 15% of the male population, how does the emergence of this vocation occur? Not all children learn about beekeeping, and only a few of them participate in all stages of learning. The father never forces his child to follow him into the apiary, or to participate in retrieving a swarm or harvesting honey. He simply leaves the door of the apiary open until his son or one of his sons joins him of his own free will. Some children become involved and are then discouraged by a sting or a lack of patience or genuine interest. Under no circumstances does the father force the child into beekeeping, although he may encourage him by promising him the honey from a hive for which he is responsible. Many beekeepers claim that their vocation is not just the result of their willingness, but also willingness on the part of the bees. As they love saying "It is the bee that chooses you", or "It works for him, but not for his neighbor". In a general way, the beekeeper is supposed to have a certain *baraka*, or divine benediction, that allows him to develop a unique relationship with the bees. However, this *baraka* is not a foregone conclusion and depends on the behavior of the beekeeper towards the bees and all living beings. It is not uncommon to hear of a beekeeper who had to stop because the link with the bees had been broken through a behavioral error. This *baraka* develops from a very early age and explains why one child more than others will be privileged enough to develop an intimate relationship with the bees.

Figure 5: © Abdouhahim, Tadrart School, 2011

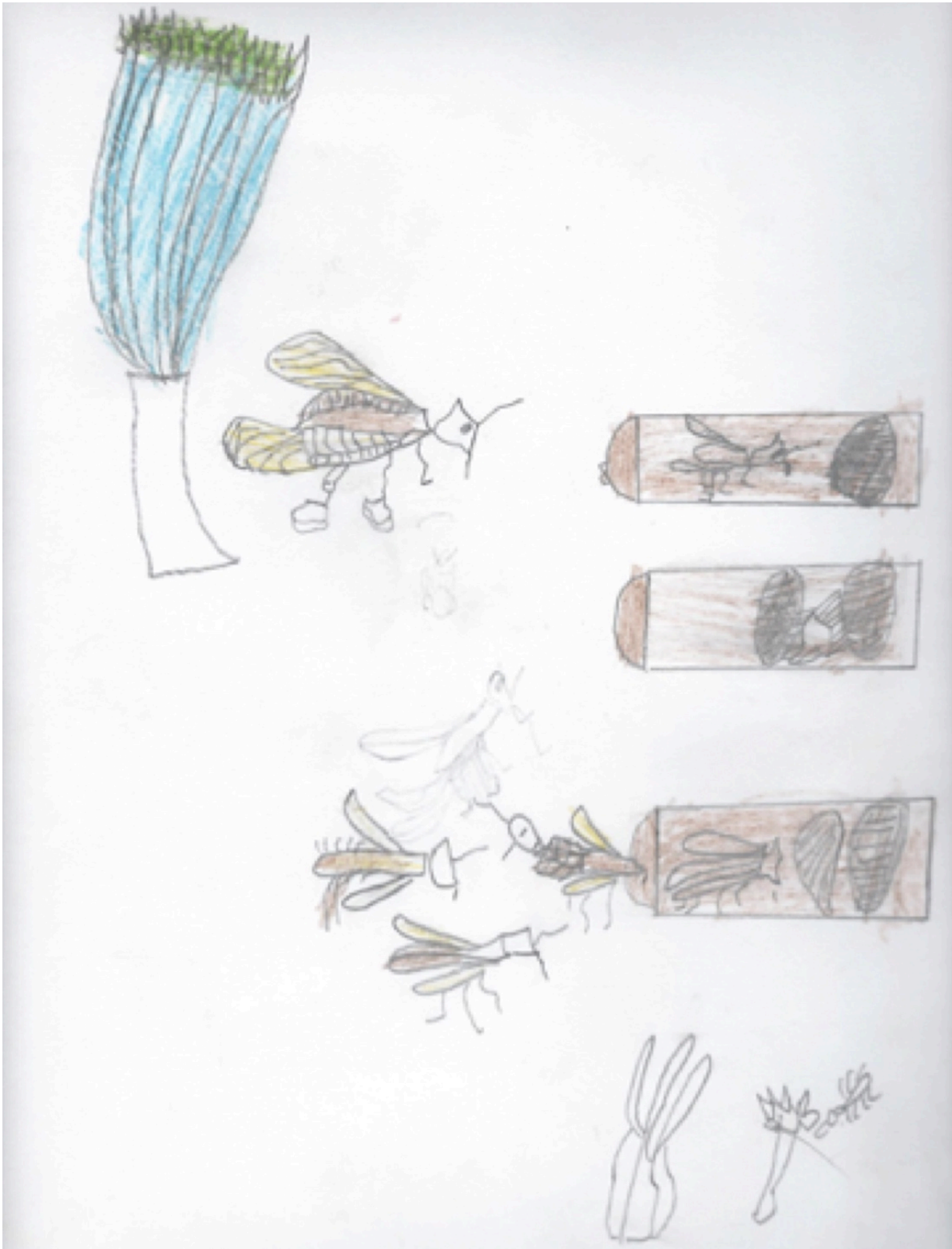


Figure 6: © Karima, Iguer Bouhemd School, 2011



Children's recreational learning with the solitary bee

The solitary bee character

Away from the hives and under instruction not to go near them without an adult, children from the age of 6 or 7 experiment between themselves relationship with an insect that is in every way similar to a bee, but solitary: the solitary bee. Whether it is called *Braziz* in the Sidi Ifni and Tiznit regions, or *Bakenziz* around Essaouira and Agadir; they represent a variety of species of the Megachilidae family (cf. Photos 3 and 4 below). The majority of children describe *Braziz* as a male insect that is small and more or less black, a large definition, which leaves much freedom and ample choice for selecting the preferred species. The solitary bees are so very varied, whether it be in size, color, shape, or markings that are sometimes almost imperceptible, that depending on the region, it may be a particular or various species that incarnate the character of *Braziz*. Certain shared physical traits are retained by the children as being characteristic of the personality *Braziz*, such as antennae that are longer and more hairy than those of honey bees. In addition, the first thing that the children say about it is "it stings but doesn't die afterwards like a bee". Apart from its solitary nature, *Braziz* is described by children as being particularly lazy, spending its time sleeping in the flowers. It is not very brave and it is very possessive. It likes to reserve the flowers from which it gathers pollen for its own personal use, transforming them into *melk*, private property. But this doesn't make it any less playful. The playful aspect to its character is supported by its behavior: according to the children, it is the one that seeks them out to play with and it is the one that "goes out early in the morning to look for friends" (*Ifough zik lahal itli s imdoukkaln*). They interpret *Braziz's* tendency to occupy a number of different habitats as its desire to play hide-and-seek with them. In fact, they describe it as a perfect playmate, a "friend", as expressed in the term *amdukkel*,

From the solitary bee to the social bee. The inventiveness of children in the acquisiti...

which they use to describe it.

Photo 3: Braziz in a flower, © Yildiz Aumeeruddy-Thomas 2009



Solitary bees only live during the spring and disappear as soon as the temperature rises. During drought years, they don't exist. These bees construct galleries where they lay one or several larvae, for which they create a pollen reserve. These galleries can be found in several types of isolated nooks and crannies: crevices in house walls or trees, cracks in wooden front doors, reeds used for ceilings, on rocks and sometimes even in empty snail shells (*cf.* Photo 5 below). In this particular case, the bee has laid its larvae in a snail shell, more specifically a terrestrial Helicidae or terrestrial snail, the opening of which *Braziz* blocks with a mixture of grass or soil. The humidity of the grass makes it possible to determine how much time has passed since the opening was blocked. Children have a preference for solitary bees (most frequently *Osmia* mason types) living in snail shells: they are easily accessible and they constitute a kind of trophy for children. However, the diversity of the solitary bee habitats is interpreted by the children as being hiding places that are waiting to be discovered. The main attraction of the solitary bee for the children is its "honey". When the children talk about the "honey" of solitary bees, they are referring to the type of pollen that the bees stock in the tightest turns of the shell to feed their larvae. This hard and yellow color substance has nothing in common with true honey and is only considered to be a treat by children, as adults cannot see any reason to consume it. For the children, retrieving this delicacy is above all the pretext for a whole series of games, the main subject of which is, of course, the solitary bee.

Photo 4: Another species of Braziz, © Yildiz Aumeeruddy-Thomas 2009



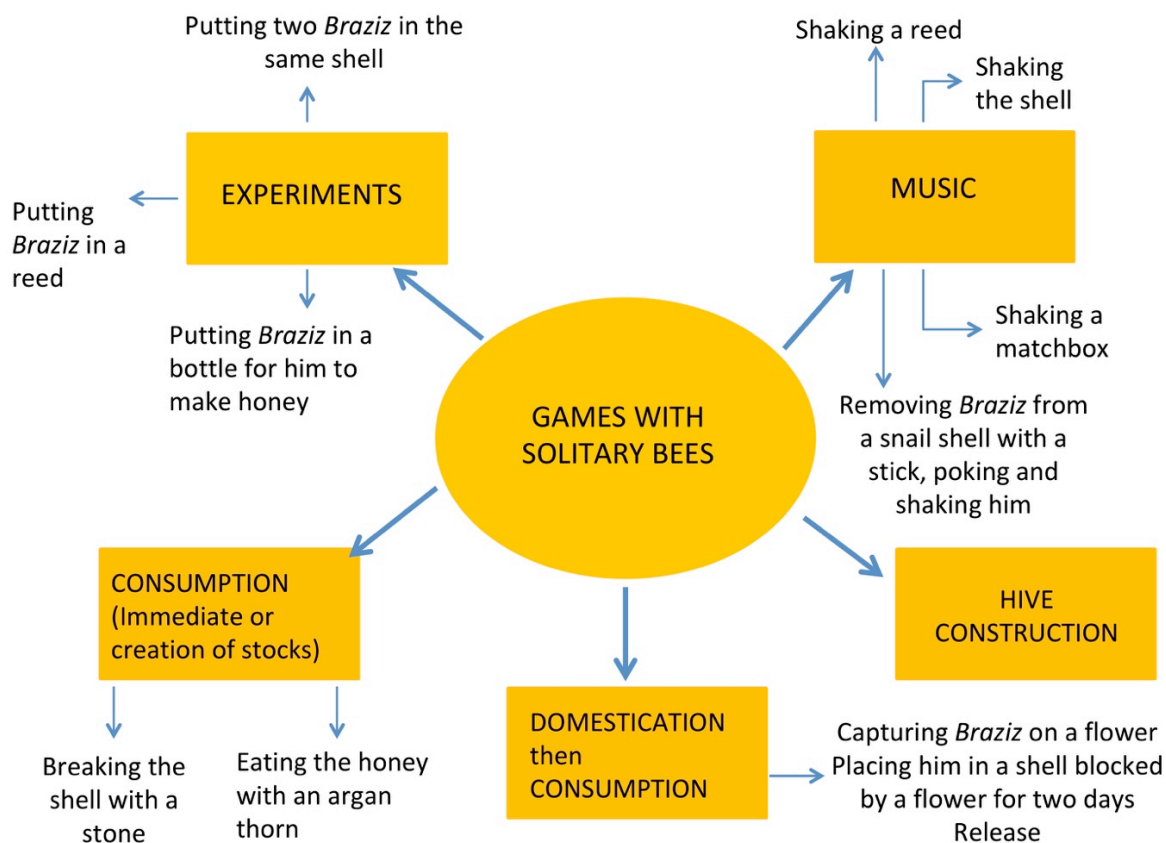
Photo 5: A child showing his harvest of solitary bee shells, © Anouk Garcia 2011



Playful relationships towards the solitary bee

Most of the time a child will learn about the existence of solitary bees from other children and his/her curiosity is piqued by the childish discourse s/he has heard snatches about an insect that is similar to a bee and able to make honey. As the adults remind us, the solitary bee is for children! Games with *Braziz* are generally played between the ages of 6 and 12, which is the period of the children's lives in which they are shepherds. From the age of 12, those who wish to continue in the acquisition of their beekeeping skills move onto a different phase. From this point on, they will be close to bees and will no longer be interested in *Braziz*. Beekeeping is a predominantly male and solitary activity, whereas the games with solitary bees are played by boys and girls. Children play in the fields, around school and close to their homes, but above all in the forests during their shepherding activities. In contrast to the social bee, the solitary bee is not dangerous: as the children remind us, it isn't necessary to take any precautions with *Braziz* as his sting is tolerable and any fear of the pain involved is quickly overcome. With solitary bees, children behave like budding beekeepers in a playful kind of way: they track them and then capture them, they install them in little nooks and crannies, harvest their pollen, attempt to rear them collectively... Each of these stages is the subject of games or other amusements that generate competition between the children. Figure 7 provides more complete details on the variants of these games (*cf.* Figure 7 below).

Figure 7: Variations of children's games with solitary bees



At the beginning of spring, the children track *Braziz* by following its trail in the hope of finding it. The children learn to identify its favorite flowers to increase their chances of locating it. These favorite flowers include poppy *filou*, mustard *lkerkaz*, the flower of the prickly pear *taknarit* and different varieties of bindweed *tansfelt*. They use a plastic bag, a piece of cloth or simply their hands to catch it on a flower. They then hold the insect by its wings and enclose it in a snail shell, the opening of which is obstructed with a flower, very often bindweed, for two days. After two days shut inside the snail shell, the children consider that *Braziz* has acclimatized and has chosen to lay its larvae there. Now the children simply need to wait for the solitary bee to fill in the shell with pollen that they will harvest and eat for themselves. In the children's minds, the bindweed flower is both an obstacle and a bait because if *Braziz* didn't like this flower, it wouldn't choose to live in the shell through constraint (cf. Photo 6 below). Other children use empty matchboxes to carry *Braziz* to their preferred site, where they release it in the hopes that it will settle there. Trapped by a bindweed flower in an empty snail shell or bundled about in a matchbox, the solitary insect becomes the subject of a utopic rearing program by the children. Some older people remind the fun they had in their childhood building little hives for *Braziz* from stones, soil and bits of wood. They made sure to leave an opening so that several solitary bees could come in and the first one to have collected a certain number would cry out "I've got my hive!" *dari taddartinu*. Others remember shutting a couple of solitary bees in a matchbox or a blocked reed to make a musical instrument, a kind of local maracas for children! One child confessed to having put two solitary bees in a snail shell and noted that they fought to death. Other children told us about failed attempts in getting solitary bees

From the solitary bee to the social bee. The inventiveness of children in the acquisiti...

to adapt to different types of habitat, such as plastic bottles. The children are constantly moving the solitary bees about and bringing them together in one way or another with a view to getting them to cohabit. Children's imagination for experimenting with *Braziz* has no limits.

Photo 6: Braziz trap, a bindweed flower in a snail shell, © Morgane Salzard 2011



At the end of spring, the snail shells are full and it is time to harvest. The children break the shell with a stone or use an argan thorn to extract the yellow powder (*cf.* Photo 7 below). The solitary bee's "honey" is a treat that is not to be shared, but which can be exchanged or sold. At school, everyone makes the most of recess to run into the neighboring fields and collect as many shells as possible, the fruits of which are either enjoyed in-situ, or sometimes discretely in class. Some children manage to amass enough shells to provide themselves with enough of this treat to last until the following summer. A "solitary bee champion" *champion n Braziz* is proclaimed by the children at the beginning of each summer in the douars of the Sidi Ifni region. The champion, who is selected based on his ability to harvest the most "honey" and rear solitary bees, receives a pollen mark on his forehead as his medal.

Photo 7: A child who has opened a piece of reed that is full of solitary bee pollen, © Anouk Garcia 2011



Cases of children harvesting of pollen or honey produced by other members of the Apoidea family apart from the social bee are of course referenced in many other geocultural areas, such as the Mofu people in Cameroon where the wild honey produced by Trigonid bees is referred to as “children’s honey” (Seignobos *et al.* 1996: 153). In a more general manner, ethnographical literature deals with the subject of children’s relationships to insects from two major points of view: the first one, the more common, is very pragmatic and asks the question of the ecological knowledge through the prism of nutrition, and the second one, more marginal, adopted by authors such as D.A. Posey or D.F. Lancy, is focused on knowledge construction without any functionalist perspective. In the first approach, the children’s interest in the insect is determined by its nutritional value and any knowledge (nomination, classification...) is just a consequence of this⁴. In our example, it would seem that the opposite is the case. The nutritional benefit of the solitary bee’s “honey” is derisory in comparison to its value as a trophy in the children’s republic. The pollen mark made on the forehead on the *chambion n Braziz* is the celebration of the child successfully overcoming a series of different stages in his relationship with the solitary bee: capturing the insect, transporting it in a matchbox, introducing it into its new habitat, harvesting its pollen. So, formed on the basis of the autonomous inventiveness of the children in their playful relationships with *Braziz*, all of these stages prefigure beekeeping practices that only some boys follow in parallel: tracking the swarm, transporting the swarm, introducing it into the hive, harvesting honey. Therefore, these games provide children with a framework for mimicking beekeeping from an experience forged on their own inspiration.

The solitary bee in the oral tradition of children

Relationships with the solitary bee and all the knowledge and practices inherent therein are supported by a collection of children's discussions and oral traditions regarding the solitary bee and the social bee. *Braziz* is systematically described in comparison with the social bee, and the two types of insect are intrinsically linked in parables, proverbs, songs and stories. First of all, in contrast with the bee, there is no reference to a solitary bee in religious texts, which means that there are no particular restrictions regarding behavior towards it. The sacred character of the bee is therefore contrasted with the playful and profane character of the solitary bee. The oral tradition relates the meeting of two opposed worlds, two societies with different morals and values, which counterbalance and complement each other: that of the solitary bee, *Braziz*, and that of the social bee *Tizoi*. The majority of material in children's oral traditions seeks to solve the enigma of the existence of bees that don't live in colonies. In this way, this oral tradition reflects the children's attempts to try and rear several solitary bees in a single habitat. According to them, *Braziz* is inferior to the bee and jealous of the number of friends the bee has. It cries all the time about having to be alone and having such a difficult character that living socially is impossible. Its solitary lifestyle means that it is surrounded by enemies, whereas the bee has only friends. The chorus of a song expresses it thus: "Poor thing, what are you looking for? Haven't you found a friend yet... to help you in your life? It lowered its head and it cried. Poor thing, it stayed all alone and it said: I am all alone!" *Ayanbguitt nass massa tlit? Asmoun izd ourta toufit? Ak iaaoun gh dounit? Youdr ougayou ariala. Iguilin ighama ouahdout inas: Nki guigh ouahdou!* As the mood of this song testifies, the vast majority of children feel affectionately towards *Braziz*, and feel sorry for it, particularly when they have to kill its larvae to collect the pollen stores.

We asked children in the primary school to create conversations between the bee *Tizoi* and the solitary bee, referred to as *Braziz* in this region. These dialogues are the fruit of their collective imagination. We reproduce an excerpt translated from Tachelhit to French and then into English:

(*Tizoi*) "Hello bee!"

(*Braziz*) "Hello Sir. Do you know me?"

(*Tizoi*) "Yes, you are *Braziz*."

(*Braziz*) "Do you have any friends?"

(*Tizoi*) "Yes, I have lots of friends: male bees *Agaimrou*, butterflies *Awan*, flies *Izan*..."

(*Braziz*) "Wow, you've got lots of friends!"

(*Tizoi*) "Where do you live?"

(*Braziz*) "I live in snail shells, on the walls of houses and mosques and in the soil."

(*Tizoi*) "What are you doing in a snail shell?"

(*Braziz*) "I'm hiding from my enemies and I'm producing honey."

(*Tizoi*) "Ah! You make honey like me! But who can enjoy your honey?"

(*Braziz*) "Me! I eat part of it, but often my children steal it."

(Tizoi) "Ah Ah Ah! Do they prefer eating your honey to mine?"

(Brazil) "And who enjoys your honey?"

(Tizoi) "People eat it because it is full of good things and can be used as medicine."

(Brazil) "What is your honey like?"

(Tizoi) "My honey is delicious and nutritional... whereas yours seems to serve no purpose and is not nice."

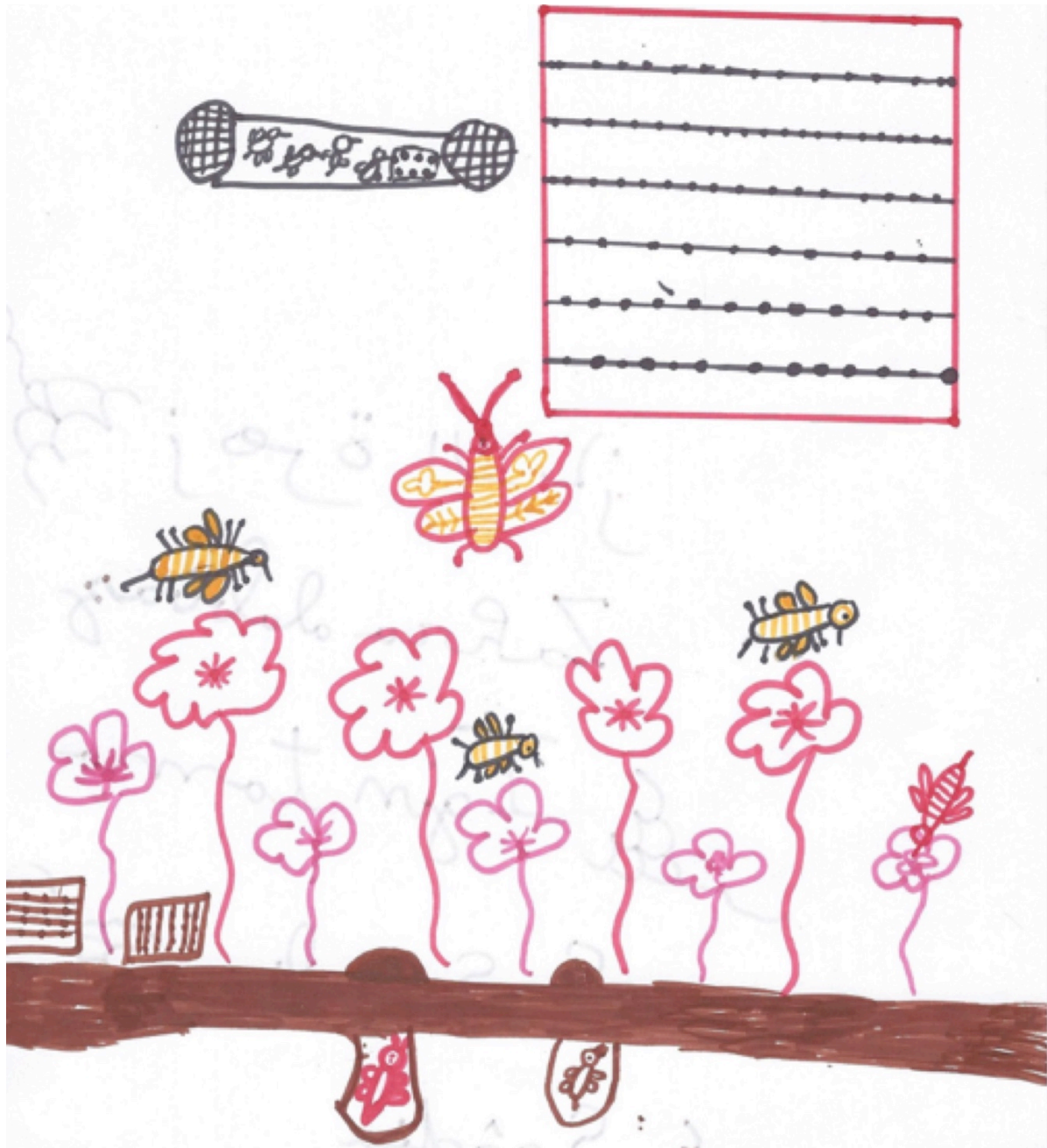
(Brazil) "You make a lot of honey because you have a lot of friends, whereas I am all alone."

(Tizoi) "Oh poor thing! Come on, I'll be your friend, but only if your promise not to touch my honey."

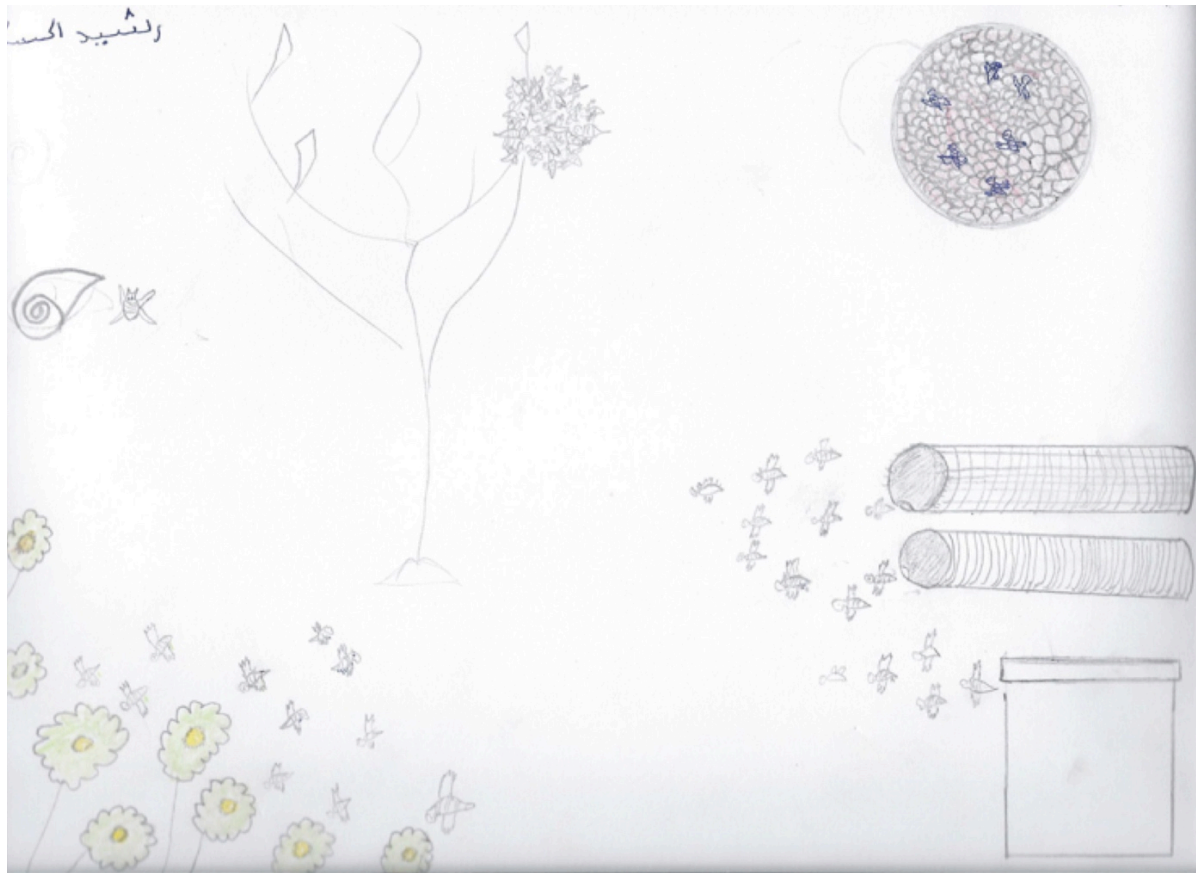
(Brazil) "Thank you, beautiful bee."

In most of the conversations created by the groups of children, *Brazil* seemed to know the bee, but the bee didn't know *Brazil*. The bee is therefore clearly marked out as being better known than the solitary bee. It is for this reason, that it is also described as being a lot more self-satisfied than the solitary bee. It boasts of the number of friends it has, the quality of its honey and even its beauty in some dialogues. Nonetheless, the children try to enhance and promote the solitary bee's habitat, explaining that "*Brazil* lives in a shell because it's comfortable". When asked about how *Brazil* might react if it found itself at the entrance of a hive, most of the children say that it will enjoy being in the hive, but that it would also feel a bit lost, jealous and angry. Others would say that it is going to be happy to witness the solidarity between bees and to meet all of its bee friends. These reactions are of course the reflection of the children's own reactions, as they are unable to imagine a happy life without friends with whom to play. In the end it is the bee that agrees to be friends with *Brazil* and not the other way around. The question of the friendship between *Brazil* and the bee was the idea of a teacher, who hoped to help the children to deal with the question in a more subjective manner. Most of the children wanted *Brazil* and the bee to be friends, even if one child specified that normally they are enemies. The reasons used for legitimizing this friendship were firstly the obligation for cooperation as required by God, the bee feeling sorry for *Brazil*, and according to one pupil who made the whole class laugh with his idea: *Brazil* promised to bring the bee a *derbouka*, a famous Moroccan percussion, from its next trip.

Figure 8: © Zahra, Aguersouak School, 2011



The dialogue between the two insects created by the pupils in this school is accompanied by a few drawings (cf. Figure 8 above and Figure 9 below). *Braziz* doesn't feature in all the drawings by any means, but where it does feature, it is depicted hiding under some soil or in a snail shell. The contrast is not really apparent on a physical level, but definitely is so on a spatial and behavioral level. *Braziz* is always by itself in its corner, whereas there are many bees in the sky. The children who drew *Braziz* drew traditional hives with or without the presence of modern hives, but there are no drawings of *Braziz* and only modern hives. Thus it would seem that the children who still have access to traditional hives are still in an educational environment where games with solitary bees play an important role.

Figure 9: © Rachid, Tadrart School, 2011

The instructive nature of relationships to solitary bees

From the children's point of view, everything, apart from the fact that they consider *Braziz* to be a bee that makes honey, differentiates the solitary bee from the social bee. *Braziz's* character is conveyed indirectly through portrayal of the social bee and the mirror reflection of its personality makes it possible for the children to familiarize themselves very quickly with the world of bees, even if they are kept at a distance because of the danger that they represent. The children in no way consider *Braziz* to be brave, hard working or an example of solidarity, unlike the social bee. In contrast to the beauty and strength of the bee, *Braziz* is an insect that is a source of amusement, known for decorating its snail shells with mosaic patterns, appreciating the walls of mosques for their tranquility and for giving the bee a *derbouka* as a sign of friendship. This is perhaps why the children feel free to indulge in games with it that they would never dare even to imagine with the sacred bee. The children are fond of *Braziz*, but don't respect it in the same way that they respect the bee. They feel much closer to it because they have a real contact with it and its character lends itself to playing, for at this age, interacting with bees is still forbidden. The child cannot approach them without his/er father, but all the children want to produce honey like the adults.

These games result in part from the fact of not being allowed to play with "real" bees, and serve to create the relationship with *Braziz* based on the analogy of why it is not a social bee. The relationship that the children have with *Braziz* is outside parental control and authority and the children are not therefore influenced by instructions or advice about how best to handle the bee or warnings. There is direct contact between the child and the solitary bee, whereas with the

other bees, the relationship is a distant one, controlled by the father. The child therefore creates a situation that allows him/her to come into close physical contact with a bee, and this first contact is decisive in terms of the possible future proximity to social bees and the control that the child will have over his/her fear of being stung. *Braziz* is also a vehicle for the re-creation of the acts involved in beekeeping. These acts, which are inspired by apiculture amongst other things, such as the selection of a snail shell as a hive, are primarily characteristic of *Braziz* and the children's interest in his ecology. The playful and educational relationships that the children of southern Morocco have with the solitary bee are an opportunity generated through the combination of their own ingenious imaginations and its solitary, non-aggressive character to learn about the different stages of beekeeping in an age-appropriate, completely free and safe manner. They represent beekeeping "in the making", in an autonomous way that is adapted to the time and spirit of childhood, whilst creating the basic framework of the learning process involved in beekeeping as practiced by adults, based on the inversed analogy established between the solitary bee and the social bee.

In this way, children learn to read their environment through the prism of an increasing awareness of beekeeping that isn't reserved only for future beekeepers, but which is open to everybody, including girls and those who will not make a career of it, but will nonetheless be aware of the processes involved. Pretending to be a beekeeper with a solitary bee allows the children to understand the diversity of the insect world and the world of bees in particular, and to apply their experience and knowledge to biodiversity in general. These are the foundations on which the few boys who choose to become beekeepers will build their skills and know-how in the apiary. This explains why most of the beekeepers we encountered had been *chambion n Braziz*. Even if probably not all *chambion n Braziz* become beekeepers, this title is nonetheless symbolic of a selection process or indicative of someone who is predisposed to become a beekeeper. There are two concurrent scenarios that can be used to analyze the emergence of a *chambion n Braziz*: it is either a child who is already attracted to beekeeping and uses his observational experiences in the apiary to benefit from his/her relationship with *Braziz*, or the dexterity manifested by the child in tracking and rearing *Braziz* causes him/her to become increasingly interested in bees and to start visiting the hives. The solitary bee therefore represents an opportunity for the transfer of skills acquired in the apiary to the children's unrestricted free spaces, and vice versa. Play-based experiences with solitary bees conceal an introduction to apiculture that can have variable outcomes. If the child is not destined for beekeeping, his relationship with solitary bees is no less complementary to an environmental experience that occurs in parallel to his activities as a shepherd and which gives him an intelligible and imaginative way into the world of insects, their habitats and their floral foods. However, solitary bees can also be a springboard into beekeeping and the relationships that the child develops with solitary bees are a solid foundation for his training as a beekeeper.

At the age of 12-13 years old, an adolescent who wishes to can try his hand at beekeeping. He still accompanies his father to the apiary, but assumes an increasingly autonomous role. The beekeeping link between father and son will be broken before or at the latest when the young man gets married and acquires his own hives. It is an important moment in personal, individual learning, when the observations and experience acquired in childhood, including the ingenious imagination that has developed thanks to the solitary bee, are applied to the situation.

Conclusion

In southwestern Morocco, beekeeping is an activity that children have some contact with from

an early age, but that is reserved as a vocation for a small section of the male population. As far as we have been able to describe it in this paper, children in southwestern Morocco acquire beekeeping knowledge and skills through two specific pedagogical processes. The spatial context of the learning process is characterized by a defined area of competence, the apiary, a place of observation and silence, which one enters only by choice, and a performance area, the forest, the land surrounding fields and houses, all of which is an area of freedom for the children, a space for action and play, whether it be the swarming of bee colonies or activities with the solitary bees. As such, the child whose experiences lead to the possibility of beekeeping as a vocation and whose curiosity encourages him to enter the apiary, is able to access two distinct worlds of learning: the one where he absorbs beekeeping skills from and with his father, and the other which is characterized by the ingenious and playful approach of children during swarming or whilst playing with solitary bees⁵. This experience with the solitary bee not only generates a play-based prism through which all children expand their field of discovery of their own environment in relation to the world of insects, but also, thanks to the mirror effect produced by the oral tradition of children, provides a reference to understand better the world of bees and their behaviors, as well as a test ground for apicultural ingenuity. The introduction to beekeeping, which these games with solitary bees provide with variable outcomes, shape the beekeeper's being and approach by associating experiments with a body of knowledge and images or representations of the bee. We can well imagine that the inventiveness of the children in creating hives for solitary bees is on the same level as that of modern beekeepers working to innovate their hives and create new hybrid models (Adam *et al.* 2016). To these two learning spaces there are two corresponding, different atmospheres. The particularly verbal experience with the solitary bee allows for vast experimental freedom in comparison to the silence of the apiary and the sacred nature of the social bee as conveyed in the oral traditions of adults. The dissociation of the world of competence (apiary) and the world of performance (forest and any other space for playing) is an active element in the southern Moroccan children's experience of beekeeping and as such is the pedagogical trick that stems from their own experiences prompting some of them to develop an ingenious sense of imagination centered on analogy and metaphor, and is therefore one of the keys to the stabilization of the analogical modes of perception of the world and apicultural knowledge adopted by beekeepers in southwestern Morocco.

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Notes

1 Fairhead & Leach (2003: 198), De Colombel (2003: 59) and Aldasoro Maya (2003: 69) give some information on this subject.

2 Depending on the region, this solitary bee can be named *Braziz* in the Sidi Ifni and Tiznit regions, or *Bakenziz* around Essaouira and Agadir.

3 All drawings were collected by Morgane Salzard.

4 For a recent example of this kind of approach, refer to Setalaphruk & Price 2007.

5 A similar process was observed regarding the learning of language in southwestern Morocco (Simenel 2017).