Bee World

ISSN: 0005-772X (Print) (Online) Journal homepage: http://www.tandfonline.com/loi/tbee20

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To cite this article: F. R. Irvine (1957) Indigenous African Methods of Beekeeping, Bee World, 38:5, 113-128, DOI: 10.1080/0005772X.1957.11094988

To link to this article: http://dx.doi.org/10.1080/0005772X.1957.11094988

BEE WORLD

Vol. 38 No. 5 MAY 1957

INDIGENOUS AFRICAN METHODS OF BEEKEEPING

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BEEKEEPING TRIBES

Many West African tribes practise beekeeping, especially those in the more open (savannah) areas, *e.g.* the Ewes of Togoland and parts of Sénégal. In East Africa, the Lango (Uganda), Warega (north west corner of Lake Nyasa), Warundi (of South Tanganyika) (van der Burgt, 1903), Watutai, Wahutu and Watwa keep bees, especially in Uyogama and Uzige, as this part of the country contains more trees. Monteiro (1875) (see p. 165 ff.) states that tribes near the River Quanza, Angola, are great beekeepers.

The Kenya hill tribes all keep bees (Dundas, 1910). In Kontagora Emirate (Northern Nigeria) the sparsely populated *Terminalia* bush is inhabited by the pagan beekeeping Kamberi tribe (Corby). Emin Pasha (1888) states that the Shuli (Acholi) country (Uganda) abounds in good white honey, owing to the practice of hanging the hives upon the trees.

According to Christy (1924) the Ituri Pygmies (Belgian Congo), when not tracking animals, seem to be always hunting for honey. The Akamba of Kenya are great beekeepers, and among the Masai of Kenya honey is eaten by everyone who can get it (Hobley, 1910). Denham, Clapperton and Oudney (1828) reported that the bees were so numerous in some places during their journey from Tripoli to Northern Nigeria as to obstruct the passage of travellers ; the honey was only partially collected.

Titherington (1939) reported that bees in East Sudan do not appear to ' hibernate ', and that there were always some nectar plants in bloom. Many wild swarms occurred in February and March.

TYPES OF BEES USED

The species and races of bees used by Africans have been described by Smith (1953); *Apis mellifera unicolor* is by far the most important. In Tanganyika the Chagga beekeepers are acquainted with various species of bees, and distinguish between their produce according to the season of swarming (Dundas, 1910). According to Nachtigal (1879) two kinds of honey are collected in Bornu (North East Nigeria) — that of the common bee and that of a bee covered with white down, which builds its cells underground. The Warega (north west corner of Lake Nyasa), who are very fond of honey, use that of the wild honeybee, and also of a small black bee which gives off a very pungent smell when crushed (Delhaise, 1909).

Corby reports the use of two kinds of bees. In East Sudan one produces much honey and wax, while a smaller and fiercer one, which is hairy, produces little honey or wax. Though they appeared to have no local names, they probably correspond to the *bi-kara* and *faifai* of the

Hausa beekeepers of Zaria (Northern Nigeria). The name *bi-kara* means ' follow the canes ' and the name *faifai* refers to a kind of basket-work plate. The first bee places its combs *along* the hive, following the *Sorghum* stalks of which Zaria beekeepers make their hives ; the latter places the combs across the hives and they are, therefore, round in shape.

BEE HUNTING

Honey hunting is common in many countries, *e.g.* in Britain where the earliest inhabitants must also have enjoyed honey from wild bees' nests in the forests which at that time covered much of the country. The collection of honey from wild bees' nests is an occupation which preceded beekeeping in many parts of the world, and it is carried out by many African tribes today, some of whom may also be beekeepers.

The nests occur in all types of locations, *e.g.* in holes in the ground, in rock crevices where they are safer from attack by man and the honey badger, in caves, and especially in hollow trees. Occasionally exposed nests occur, *e.g.* under the limb of a large and inaccessible tree. Tropical African bees are also expert at making their nests in roofs, above ceilings of rooms and verandahs, and even in household furniture in living- or bed-rooms. In occupied houses strong bee colonies become pests and, unless removed and specially hived, require to be gassed or fumigated, so destroying the whole colony.

It is the nests in hollow trees, especially in the Baobab (*Adansonia*) which are most generally robbed by African honey hunters, who are often guided there by bee guides (see page 121). The nests are generally robbed at night, and the honey removed, the hunter using a handful of smoking herbs, or a smoking bracket fungus or piece of rotten wood. Skilful smoking drives the bees away from the combs, which are then removed, though enough comb is usually left behind to encourage the bees to remain. Bees from such wild nests are generally treated more ruthlessly than those in primitive hives. According to Harris (1940) wild bees generally live in smaller communities than cultivated bees, and swarm more often during times of abundant food such as during the first flush of flowering before the rains come, and again as the rains decrease into light showers and bright weather.

TYPES OF AFRICAN HIVES

The following brief historical survey of types of hives used elsewhere in past ages (Root, 1947) is of interest in comparison with those now used in Africa.

' The earliest hives of which we have any knowledge are the cylinders of bark closed by a solid plug at one end and a perforated one at the other. Africans of Central Africa still anoint these with substances beloved by bees and hang them in trees to attract wild swarms. When one of these is full, the bees are ejected by building a fire beneath it, after which the hive is emptied, the brood eaten and the honey and wax stored for future use. These hives date from a very remote time, for they were found all over the Old World south of the mountains which stretch from Gibraltar to Kamchatka : in different countries they are made of different materials, but are always tubes or rectangular tunnels and are laid flat on the ground or on a support.

' In Egypt they have been made of Nile mud for thousands of years past, and are made into piles numbering hundreds, which are made into walls by pouring mortar in their interstices. The tomb of Pabu-sa (625

B.C.) now in the Metropolitan Museum of New York shows hives of this type. We find upright hives (introduced from the North) which are found in Northern Italy and the tunnel hives of the South. A similar mixture of northern and southern influence produced the Greek hive. In this, bars to which the bees attached their combs were placed across the hive, and in the spring the combs attached to their bars were cut out and divided between two hives. The Greeks knew that the bees in the queenless part could raise a queen from a young larva. There are reasons for believing that Aristotle (342 B.C.) used hives of this type.

' To the north of the great mountain range, the hives were nearly always upright and were placed on a stand as they had no bases of their own. The earliest of these hives were made of wicker work usually " cloomed ", and that is, covered with a mixture of loam and cowdung to make them air-tight, and topped with a straw cap, called a hackle, to keep out the rain. They are probably as ancient as the pipe hives of the Southern Lands, but are now found in out-of-the-way places only ; but until the eighteenth century was well advanced they out-numbered the straw skeps in England.'

The following types of hives are used in Africa:—

(*a*) *Bark hives*

Some hives are made of bark (Emin Pasha 1888), and Johnston (1902) describes how in Uganda bark cylinders are placed in trees to which wild bees come, so that they become semi-domesticated. The Acholi people of Uganda use the specially dried bark of the *opok** tree. A wheel is then put inside such pieces of bark and ' door shutters ' are fixed (to hold it ?) and a small hole is left at one end only. It is then tied with dry grasses and hung up in a tree half to three-quarters of a mile away from home. Bees then enter it, and in the following March the honey is ready.

Greene (1939) describes how *Brachystegia* bark is cut and bent into a cylinder, the edges being secured by 3–4 wooden pegs. The ends are fitted with circular pieces of bark held in position by diagonal strips of wood. Wider cylinders of the soft inner *Brachystegia* bark, which is pliable when moist, are also used and can be sewn with bark cord. The circular end pieces of bark are then covered with plaited straw to make a tight joint, the hives being thatched with grass against sun and rain.

In Nyasaland two to three lengths of bark are stripped off, and fixed together with wooden pegs so that they resemble hollow logs. Both ends are then closed, leaving a small hole to let the bees enter. The hives are then put in trees (Lipengo).

The Yalunkas of Sierra Leone use the bark of *Daniellia oliveri* for making hives, and the same practice occurs in French Guinea and other parts of French West Africa (Pobéguin, 1906).

The Dinka of East Sudan sometimes use hives made of bark (Emin Pasha). The bark of *Brachystegia* trees is removed in the Embangweni District of Nyasaland and is made into round hives (*mzinga*). A hole is left at each end for the bees to enter by. The hives are then hung in trees and the honey removed later. In the Cholo district of Nyasaland, the bark of large trees is removed with an axe (not an easy matter), and is then folded into the shape of a drum ; each end is fitted with a round disc made of grass, and beeswax is applied to seal it.

* The Lao name *Opok* refers to *Terminalia macroptera, T. torulosa* and *T. velutina.*

(*b*) *Thatched hives*

Scott (1952) describes conical thatch-covered hives which he saw singly in trees such as *Dracaenas* in Ethiopia. Once he saw a battery of thatched hives on a low wooden platform (his Plate 7), which he states is a method used in south-west Arabia. Harris (1940) states that in Tanganyika bark hives are generally made from *Brachystegia* and *Isoberlinia* trees and last for years. The Wanyamwezi hives have outer bark layers removed and are leathery and sewn to make a neater but less permanent hive. Bark hives are sometimes slit into two when they are being robbed, and are sometimes sewn up again later.

(*c*) *Hollow Logs*

The Hausa of Northern Nigeria use hives made of hollow logs, and place them in trees (Barth, 1857-59). Hollow cylinders of wood are used by the Akamba of Kenya (Hobley, 1910), the ends being roughly closed by a piece of plank. Thousands of these hives are to be seen throughout the country, their ends usually being marked with clan marks of the tribes. The Acholi of Uganda sometimes use pieces of bamboo smeared with mud.

According to Hollis (1909), the Nandi and Masai (Kenya) make honey barrels to entice wild bees to build in them. Scott considers the elongated barrel-like hives which he saw high up in tall forest trees (*e.g.*, *Acacia*) in Ethiopia to be the normal type.

(*d*) *Specially hollowed wood*

The stems of fan palms (*Borassus*) are specially hollowed out by the Hausa (Northern Nigeria) to make hives known as *kangi* (Dalziel, 1937). The Warundi of South Tanganyika also sometimes hollow out *Borassus* palms in the same way into wooden cylinders $1\frac{1}{2}$ yards [1·371 m.] long and $\frac{1}{2}$ yard [45·72 cm.] in diameter (van der Burgt, 1903). According to Monteiro (1875), one Angolan (?) tribe split logs, each half being then hollowed out in the middle and the halves joined together and three holes large enough to admit the little finger bored at each end. An aperture is cut in the middle of the hollow cylinder large enough to admit the hand; this aperture is closed with a piece of wood. In East Sudan, hollowed logs, with ends stopped up with mud, and a small entrance left for bees, are usual (Titherington, 1939). Greene (1939) describes log hives from Tanganyika hollowed out by fire at both ends and then closed by bark, clay, or a bung of dried grass.

The Asukwa people of Northern Nyasaland are great beekeepers and hollow out 2 halves of a log about 4 feet long, *Podocarpus milanfianus* being preferred, but *Entandrophagma stolzii* also being used, hundreds of such hives occurring along edges and in clearings of the Misuku forests. (Chapman).

According to G. P. Cooper (of Kew Herbarium) bees seem to favour *Octoknema borealis* for making their nests, and Africans in Liberia watch it constantly for signs of honey. Harris (1940) describes how hives in Tanganyika are generally hollowed out by axe or fire.

Driberg (1923) states that the Lango tribe of Uganda sometimes make their hives out of hollowed-out cylindrical trunks of trees ; these are stopped up at one end and are then placed in trees. They are cut from the '*Apok*' (probably *Opok* tree (*Terminalia* sp.) but see footnote on page 115). The Acholi of Uganda sometimes fell trees specially, using a portion of the trunk to hollow out and use as a hive. They also sometimes use the

tugu tree — fan palm, *Borassus aethiopum* ; this is first cut up into four parts, and these are then hollowed out, and joined together again. It has a very hard ' skin ' and will last as a hive for six to ten years.

Massam (1927) describes how in Kenya the Elgeyo hives are made from portions of tree trunks, first split in half, then hollowed out except at the ends, and strapped together again. Greene (1939) describes similar split log hives from Tanganyika, the two halves being secured by bark rope, the comb and honey being removed later by separating the two parts of the hive.

In North Nyasaland (Bulambya area) large trees are cut down ; these are cut into 4-foot [122 cm.] lengths which are then split and the central portion removed ; some burned beeswax is put in to attract the bees. The hives are then put up in trees in the Aram Nyondo district.

(*e*) *Specially prepared boxes*

According to Battell (1901), one tribe make a kind of chest for a hive, leaving a hole in it for an entrance for the bees. The pauper class (*ngobotok*) are the only ones of the Turkana tribe of Kenya who bother to make special hives (Emley, 1927), while Massam (1927) states that the Elgergo tribe of Kenya use honey boxes extensively. Junod (1927) describes how he once saw a Ronga man of the Nwambukota region of South East Africa who had made hives of his own invention, and had succeeded in securing plenty of honey. Titherington (1939) describes how in Eastern Sudan, two petrol boxes (used for holding two 4-gallon [18 litre-] tins) were made into a hive, with a queen-excluder and honey sections, and that excellent honey was obtained from it.

(*f*) *Pots*

Bees are also kept in special pots, for instance in North Nyasaland (Bulambya area — Aram Nyondo). In the Cleolo district of Nyasaland hives are sometimes made of special dry pitchers ; the pitcher is smeared inside with beeswax to attract bees (Woolton), and circular discs made of grass are placed to fit its mouth. The hives in Kontagora Emirate (Northern Nigeria) are shaped like a projectile (shell), with several small holes pierced low down on one side to give access for the bees. Higher up, on the opposite side, is a small door which can be opened for removing the honey. An open base and a hole at the top provide ventilation. The hives stand erect on a large flat stone lodged securely in the fork of a tree, and are covered with a conical grass thatch as a protection from rain and sun (Corby). A kind of pottery hive has also been used in the Mongalla area of East Sudan (Titherington, 1939).

(*g*) *Cowdung*

Seyffert (1930) describes hives made from cowdung and also basketry hives plastered with cowdung from Abyssinia and also amongst the Bongo (East Sudan).

(*h*) *Basketry*

Schweinfurth (1873) reported that the hives (and also the walls of huts) were specially made of basket-work by the Bongo of East Sudan. In Ruanda the hives are sometimes made of basket-work covered with clay. Greene (1939) describes light strong cylindrical hives made in Bukoba, Tanganyika, with a framework of light bamboo sticks covered with a thick layer of dried banana leaves, the two ends being made firm by circular pieces of wood. Emin Pasha mentions hives made of basket-work

which were hung in isolated trees. Schweinfurth (1873) describes how the Bongo of East Sudan make a long cylindrical hive of basketry with a hole 6 in. square half-way along it. According to Emin Pasha, the Dinka (East Sudan) sometimes use specially woven hives. Greene (1939) mentions the use by the Watsui, West Tanganyika, of cylindrical hives of woven grass.

Titherington described the use of basket hives coated with mud in East Sudan, though such hives tend to rot in the rain. Beeswax rubbed round the entrance, or left inside, was effective in attracting bees within a few days. According to Corby, this type of hive in Kontagora Emirate (Northern Nigeria) may be of the same shape as the pottery ones (para. (*f*)), or they may be nearly cylindrical. If cylindrical, they are usually woven like ordinary baskets, but if shell-shaped, the diagonal *zana* type of grass-mat weaving is used. Split bamboo and *iwa* grass (*Jardinea congoensis*) are generally used in weaving, and the finished hive is plastered inside and out with cowdung to seal the weave ; this is preferable to mud as it does not crack or break away from the basket-work. A basket-work disc, similarly plastered, is pegged and cemented into the open end of the basket.

In the cylindrical hives the flight entrances are generally made in the closed end, but in shell-shaped ones they are usually in the disc just mentioned. The finished hive of either type is wrapped round several times with thatching grass, and then placed on its side in a tree.

(*i*) *Grass*

The Warundi (van der Burgt, 1903) sometimes plait round hives from stems of papyrus (*Cyperus papyrus*). Discs are plaited of straw (or papyrus?) and are used to close the two ends, one having a hole to admit the bees. Driberg (1923) describes how the Lango of Uganda sometimes use cylinders of grass lined with clay as hives. *Sorghum* stems are sometimes used, coated with cowdung.

(*j*) *Calabashes*

Bees are sometimes kept in big calabashes in North Nyasaland (Bulambva area, Aram Nyondo). In the Embangweni part of Nyasaland, (Mzimba District) a big calabash is also used as a hive and hung in *Mzinga*, *i.e.*, ' hive' trees. The Ewes of Togoland use calabashes as hives, also placing them in trees.

(*k*) *Bee-rooms*

Monber has described in a letter to the writer the *Kaje* way of bee-keeping amongst the Hausa of Zaria, Northern Nigeria. A well established swarm is brought down in a clay pot from a tree and the pot is sealed on to a much larger pot, or even to a small room, at the back of the house. Some of such ' bee-rooms ' are quite spectacular, and Monber describes having seen 8 gallons [36 litres] of honey taken from a single colony in one season by this method. It is possible to enter such a ' hive ' through a hole in the bedroom wall, and to find oneself amongst comb and bees, the combs being enormous.

(*l*) *Masonry*

Seyffert (1930) describes masonry hives seen by the great German explorer Frobenius amongst the Malinke (French Guinea) and in other parts of West Africa.

Corby found that the beekeeping industry in Kontagora, Northern Nigeria, was on a surprisingly large scale when he was there in 1941–42. In five districts 1242 out of 8060 males kept bees, and admitted to having

9160 hives, a few having over 100 hives each. Excluding non-beekeeping villages, about 28% of the male population of these five districts were beekeepers.

LOCATION OF THE HIVES

In Ruanda the daubed basket-work hives are generally placed in high, dry trees (Czekanowski, 1927). According to Battell (1901) wooden hives are hung in trees, and taken down once a year. Monteiro (1875) reported that an African tribe near the River Quanza, Angola, place the hives securely in the branches of trees, and a quantity of dry grass is put over them as a roof or thatch. He also stated that hives were their principal wealth, some families possessing as many as 300 to 400.

Lindblom (1820) found that Akamba hives (in Kenya) are placed in forks of trees, or more usually hang down free from a branch ; there may be as many as 12 on a single tree. It is not unusual for one person to own 200–300 hives, which are generally located many hours' journey from the owner's village.

According to Corby new hives are put about in East Sudan in the dry weather (about Christmas), when harvesting is completed and there has been time to make the hives, and when bush fires have largely cleared the countryside and made walking easier. As bees also begin to swarm then, they are ready to enter the new hives. These are placed in all kinds of trees ; the shea nut (*Butyrospermum*), *Parkia*, tamarind (*Tamarindus*) and black plum (*Vitex doniana*) are special favourites. The hive is generally placed with the entrance facing west, away from the driving rains of the tornado season, preceding the main rains, and as high as possible to escape from bush fires and passing animals.

According to Routledge and Scoresby (1910), the Akikuyu of Kenya place their hives upon suitable forked branches in the isolated trees, to which they are secured by lashings of tough creepers. Bunches of sweet-smelling flowers are tied to one extremity of a new hive when it is first put in place, with the idea that these will attract the bees to it. These bee-keepers never suspend their boxes beneath the branches. Corby reported that the East Sudan Africans depend largely on fumigants to attract bees to new hives, much secrecy and superstition surrounding their use and composition. The general principle in preparing these fumigants is to mix some aromatic substance with a slow-burning material, and then ignite the mixture inside the hive, giving an attractive, incense-like odour. Dried and powdered flowers of *Pileostigma* (*Bauhinia*) *thonningii* (*kalgo*), and dried powdered cowdung are usual ingredients. Religious rites are practised to make sure the bees will then enter the hives and produce much honey, though the beekeepers consider themselves fortunate if half the new hives are occupied.

METHODS OF HANDLING BEES

Dalziel (1937) describes how Yoruba hunters of wild honey (Southern Nigeria) rub their bodies with a paste made from the red heart-wood of Cam-wood (*Baphia nitida*) to prevent bee stings.

In Uganda (Acholi District) wild honey is said to be found either in the ground or in the hearts of trees.

The honey sac used is made of the skin of the monitor lizard (*Varanus*). Fire and smoke (Persaye, 1907) are used by many tribes to drive off the bees, the honey being gathered in hollowed logs.

The whole colony of bees is generally destroyed in African methods of abstracting the honey.

The wild bees in Namaland (South West Africa) make their combs mostly in hollow rocks, or more rarely in hollow trees (Schultze, 1907). The Hottentot honey gatherer first takes soundings to ascertain whether honey is there ; if so he puts a torch down the entrance to drive the bees away, and then he goes into the crevice as far as possible, and removes the combs by means of a stick provided with a grapple hook.

For three months of the year, the Zande (of East Sudan) are engaged in hunting game, or in following the honey guide bird (*Indicator*) in search of wild bees' nests (Dalziel, 1937). The Masai of Kenya are also led to wild bees' nests by this bird. If the supply found is not sufficient for the hunter, he buries the empty combs instead of leaving them for the bird, and this will then lead them to another nest (Merker, 1910). The honey guide is discussed further on page 121.

According to Lindblom (1820) the Akamba tempt the wild bees to their new hives by smoking them first with an aromatic kind of wood, the smell of which appeals to the bees. In West Africa, it is considered best to allow the local honeybee to build plenty of comb, this being probably the most effective way of reducing its tendency to swarm.

When a Murundi sees a swarm of bees with a young queen, he tries to capture it (van der Burgt, 1903). The swarm is made to drop by means of throwing sand or water over it. A man, well covered all over the body, ' carries the hive near the swarm, makes a fire near the bees, and takes from a pot water by the mouthful to spit over the bees '. Swarms of African honeybees can be housed like those in Europe by thumping them off the tree into a box, and later on from the box on to a white cloth leading up to the entrance to the hive ; African bees are however very easily irritated during the process.

According to van der Burgt (1903) when the queen is caught, she is put into the middle of the hive, and when the bees have joined her, the hive is taken to the desired place.

Titherington (1939) describes how he hived a swarm of wild bees in East Sudan with his pipe and a soup spoon ! Proper veil, gloves and smoker are, of course, useful.

The Thonga of South East Africa—mouth of Zambesi region of Mozambique (Junod, 1927) — attract bees by placing a broken pot upside down in the bush ; a swarm will occasionally make its home in the pot.

Titherington (1939), writing of beekeeping in East Sudan, states that strong colonies are aggressive and that smoke is the only protection, though at the end of dry weather in waterless areas, bees become ' mad from thirst '. A man attacked by surprise was covered with bees and lay unconscious for 24 hours as a result, being only saved by other men armed with grass brands. When lightning strikes a tree occupied by bees, the whole area becomes depopulated, and any domestic animals in the area not set free in time would be killed by the infuriated bees. On the other hand, Bowers (1939) describes an incident where a Nuba from Sudan robbed a strong bees' nest and was completely covered with stings and did not appear to suffer from them, even though Bowers and others who received a few stings from them suffered pain and even swellings. Ammonia is accepted as an antidote to bee stings ; some tribes use urine for this

purpose. The Pangwe (Gaboon area) treat stings of bees and wasps with *Heckeria subpeltata* (Tessmann, 1913).

The leaves of the African oak (*Oldfieldia africana*), which are said to be bitter, are crushed and applied to the incisions on wine palms (*Raphia* sp.) in Sierra Leone to drive off bees which are after the palm wine.

HONEY GUIDES AND OTHER BEE ENEMIES

Indicatoridae are small robust birds, very fond of bees and honey. The skin is very thick and tough, so that bee stings do not penetrate it. Some of them seem to feed on bees and comb by themselves, but the black-throated species tries to attract the attention of a man or a honey badger (ratel) when he finds a wild bees' nest. Then the bird flies in front, singing its special honey-guiding call — *churr-churr-churr*. When the nests have been opened and most of the honey and bees removed, the honey guide finishes up all that is left (Fremont, 1946).

The honey guides (Indicatoridae) form a small family, related to the barbets. There are 12 species (with subspecies) in Africa and two species in South East Asia.

The black-throated honey guide (*Indicator indicator*) occurs in the African thorn bush country from tropical Africa to Cape Province, but not in really dense forest. The birds occur singly and not in flocks, though yearlings go in small groups, and the sexes go about together to some extent in the breeding season, though they feed separately. The birds are nowhere very common, and each has its own territory and even definite trees to which it returns quite regularly.

When leading persons to a nest, it makes a loud chattering noise which, though probably heard by other birds, does not lead to their joining in the final feast. In calling it sits upright, chats loudly and then flies off in a leisurely way, showing the white on its tail feathers clearly. It flies short distances from tree to tree, chattering as it flies. After 10 minutes, it stops at a large tree and chatters in a subdued manner. It finally goes to the branch where the nest is, and sits quietly and erect.

The stomach contents of these birds have been found to consist of bee larvae, adult bees and wax. Most African tribes are superstitious about their birds, and always leave some honey and wax for them when they have been led to wild bees' nests. They believe that the tribe will have bad luck if they fail to leave something for the birds ; however the birds often lead them to the hives they have made themselves.

Theresa's honey guide (*Indicator theresae*) has a yellow, parchment-like skin which is a protection against bees. Honey, wax and insects (probably bees) have been found in its stomach. The thick-billed honey guide (*Indicator conirostris conirostris*) has also been found to feed on honey and wax, and on insects (probably bees). The least honey guide (*Indicator exilis exilis*) also feeds on honey, and probably on bees. Zenker's honey guide (*Melignomon zenkeri*) feeds on wax and insects (including Hymenoptera).

Another species, *Prodotiscus regulus camerunensis*, has been found to include beeswax, honey, larvae and small insects in its diet (Bannerman, 1933).

Lizards such as the *Agama* lizard were also a pest ; I have seen them sitting at the hive entrance, eating bees as they entered and left the hive. Skinks (*Mabuya perrottetii*) were found inside the hive. Where a hive was located under a tree, the green bee-eaters — *Melittophagus pusillus* —

took up their abode there during the day, swooping down and catching the bees in flight. They consumed great numbers of them.

A general description of other enemies of bees in the Tropics is given by Smith (1953). My own experience in Ghana was that the greater wax moth — *Galleria mellonella* — was one of the most serious.

Ants were one of the worst pests, and it was necessary to place each leg of the hive in a tin filled with kerosene to prevent ants climbing into the hive from the ground and stealing the honey in it.

METHODS OF COLLECTING HONEY

Battell (1901) reports that the bees are chased with fire and smoke which kills some of the bees, after which a large quantity of honey is obtained. An Angolan tribe (Monteiro, 1875, p. 165 ff.) take the honey once a year from their hives which are located in trees, leaving some to induce the bees to return to work. However, near the River Quanza in Angola, they are careful not to kill any of the bees, and are said to extract the comb as often as three times a year (Monteiro, 1875). Emin Pasha stated that if the baskets (placed in trees) were found to be full of bees, the bees were expelled with smoke, and the honey then taken out. According to Titherington the constant removal of honey in East Sudan tends to keep the bees busy and they become less aggressive. If a whole hive is cleared of bees the queen is killed, which is wasteful, as a fresh swarm is needed before a new colony can be founded. However in East Sudan hives are generally opened once a year, in the hot, close season, just before the rains begin. In the Auna District, they are opened in August, during the early millet harvest, when more honey is obtained (Corby). The hive is opened just after sunset by removing the end disc or mud door, and smoke from a torch of grass is blown gently into the hive to drive out the bees, the comb being removed on to a calabash. The disturbed bees merely crawl on to a nearby branch and, in the hands of an expert, few are killed ; he leaves some comb in the hive, and the bees usually return to it next morning. The beekeepers are usually naked, except for a tight loin cloth, and are seldom stung ; they flick off the few odd bees alighting on their bodies. The presence of clothes is said to annoy them.

Honey is much sought after by the Lango of Uganda, who place their hives in trees during April (Driberg, 1923). The honey is taken out a little at a time, for fear that the bees may desert the hive.

According to Emin Pasha (1888), the Bari country of Southern Sudan produces no honey at all, and the Madi country but little.

The Akamba of Kenya usually gather their honey after dark. This is done usually two or three times a year.

A METHOD USED FOR PROCESSING HONEY

Corby describes the method he adopted for processing honey in Kontagora, Northern Nigeria, in 1941. He has tried extracting honey from the comb by means of a centrifuge suitable for handling the somewhat loose and broken comb. However, he soon found that hand squeezing was both more acceptable to local labour, and also safer and quicker. The comb was best squeezed over some stout wire mosquito-gauze so as to exclude the larger particles of wax. It was found that although a petrol tin could hold 60 pounds [27 kg.] of honey, 50 pounds [22·6 kg.] was enough to prevent the seams from opening and to make porterage easier. Crude extracted honey was placed in settling tanks, 44 gallon-[200 litre-]

oil drums at Kontagora, and left standing for a week, during which time the denser impurities were able to fall to the bottom and the less dense to rise to the top, where they were skimmed off daily.

The resulting honey was then clarified by the simple means of placing it in bags 26 inches [66 cm.] deep and 8 inches [20 cm.] wide, with rounded bottoms which were made from white satin (80 meshes to the inch), the seams being triple sewn with fine stitching. About 15 pounds [6·8 kg.] of honey was put in each bag, taking care not to disturb the bottom sediment. The bag was then closed with jute string (as less likely to cut the bag) and suspended over a bowl and the honey ' milked ' out of it with the thumb and middle fingers of both hands. The bags were not squeezed, nor was the residue milked out ; it was put to one side afterwards. The bags were rinsed in cold water to remove the honey, and boiled with soap and water to remove wax, and then rinsed again with cold water to remove the soap. It was found that 5 girls with 40 clean bags could clarify a drum of 44 gallons [200 litres] in a day. Warming the honey to a temperature bearable to the hands simplified such clarification. Residues from this and the tanks process were sold as second-grade honey.

Nearly 71% of clarified honey and 3% wax was obtained from the comb honey by the above methods. Windows were kept screened, and the workers sometimes worked at night so as to avoid the attention of bees which came after the honey. Allowing 2d. a pound for comb honey, the value of the refined honey and wax was about 6d. a pound exclusive of profit.

According to Dalziel (1937) the viscid juice of the creeper *Cissus populnea* is sometimes used to adulterate honey in West Africa.

USE OF HONEY AS A FOOD

According to Johnston (1902) honey is the most important article of diet of all the Nandi-speaking people of Kenya ; on the other hand, amongst the Nilo-Hamitic Elgeyo peoples of Kenya, honey is a special luxury (Massam, 1927) and also among the Turkana of North Kenya (Emley, 1927).

Honey is distinguished by the Lango of Uganda (Driberg, 1923) as *ageger* (old, hard honey) and *atonggwen* (egg-shell coloured, *i.e.*, fresh honey). Of recent years a ready sale has been found for surplus honey amongst Indian traders, especially in the region round Atura, Uganda.

Dalziel (1937) describes how honey is sometimes used by the Hausa for mixing with the very sweet and edible pulp of *Cordia abyssinica*, and also *Vitex cuneata* to make a plastic sweetmeat known as *alewa* by the Hausa of Northern Nigeria.

A favourite dish of the Akamba (Kenya) is honey mixed with *usuru* or gruel (Hobley, 1910).

The Akikuyu of Kenya are said to eat honey in the state in which it is obtained naturally, often black with age and smoke, and mixed with broken comb. No attempt is made at separation or purification (Routledge and Scoresby, 1910).

Among the Masai (also of Kenya) it is only the children who like wild honey ; old men eat the comb full of brood (Hollis, 1905). Tithering-ton (1939) describes how in East Sudan the mixture of grubs, ashes, dead bees, *etc.*, is strained through dirty *tob* and is adulterated with (impure) local water.

The Kenya Masai like to eat some wax in their honey with the result

that the bee industry of Mounts Kilimanjaro and Meru is devoted almost entirely to producing such honey for the Masai (Harris, 1940).

USE OF HONEY FOR BEVERAGES

Mixed with honey, the mealy pulp of the fruits of *Parkia biglobosa* are used in parts of the savannah area of West Africa as a soothing drink for children (Dalziel, 1937).

The married Masai of Kenya drink a wine prepared from honey (Hollis, 1909). The young unmarried Nandi, men and women, never used to drink fermented liquors, though the older people know how to prepare an intoxicating mead from honey (Johnston, 1902). Mungo Park describes how in parts of West Africa they drink beer and mead.

The Akikuyu of Kenya make mead from one part of honey and two parts of water. The strained fluid is ready for drinking in less than 24 hours. Neither of these beverages remains potable for more than a day. As might be anticipated, that made from honey is much the more intoxicating (Routledge and Scoresby, 1910). Scott (1952) describes how *tej* (mead) varies locally in flavour and potency in different parts of Ethiopia.

Schultze (1907) describes how, after the honey harvest, the bushman of the Kalahari Desert brewed his primitive mead ; this was mixed with a certain root which rendered the beverage more intoxicating.

Stow (1905) writing of the Korana of South Africa says : ' they made a very intoxicating mead or hydromel, by fermenting it with the juice of a certain plant, the secret of which was always retained amongst them with great strictness.'

Theal (1919), writing of another South African tribe says " They know how to make an intoxicating drink of honey ". The Akamba of Kenya too (Hobley, 1910) make intoxicating beverages of the juice of the sugar cane, and of honey, and the Thonga of South Africa consider honey as a drink, as well as a food (Junod, 1927). Meek (1925), writing of Northern Nigeria, says : ' beverages are also made of a mixture of rice and honey or of tamarind '. Czekanowski (1927) describes how six local types of beverages are prepared in Ruanda, one of which is made from fermented honey and water. In 1828 the beverage of the wealthy, on an expedition in Bornu (North East Nigeria) was rice-water and honey (Denham, Clapperton & Oudney, 1828). Another local (Bornu) beverage consisted of rice-water, honey, tamarinds and red pepper.

TRADE IN HONEY

In olden days in South Africa, honey and wax were exchanged with the Bantu for foodstuffs and implements (Schapera, 1930).

One writer reported that beautifully granulated honey was brought for sale in the Karagwe district in Uganda, although no hives could be seen.

Denham, Clapperton & Oudney (1828) noted the sale of a little honey in local markets at Woodie (north west end of Lake Chad) in 1828, and also honey on sale at markets in Bornu (North East Nigeria). They also reported the sale of honey in Kano market, in Northern Nigeria.

BEES AS FOOD

Both honey and young bees are eaten by the Khoisan people of South Africa (Schapera, 1930).

Bee brood is commonly eaten in the comb in Malaya, India, by the

Australian aborigines and the Chaco Indians of South America. This practice is widespread in West Africa, where honey is commonly collected from wild bees' nests and sold (sometimes unstrained) in the local market.

The larvae, pupae and eggs of the honeybee (presumably *Apis mellifera*) boiled in the honey comb are made into a relished soup in India where the larvae and pupae of the giant bee *Apis dorsata* are also eaten. In Tanganyika bee grubs are commonly eaten in the process of chewing beeswax to remove the honey.

BEESWAX

According to Smith (1953) the main bee export of Africa is not honey but beeswax, as honey is almost all consumed locally. Beeswax is produced by worker bees which digest 7–15 lb. [3–6·8 kg.] of honey to produce 1 lb. [0·4 kg.] of wax (Harris, 1940). White at first, it darkens to yellow brown and even blackish. Pollen, bee brood, and portions of bees become impurities in the subsequent wax. Deep red pollen especially stains the wax and if the comb is melted with little or no water, dust and pollen becomes mixed with the wax. If more water is used, the muddy effect of impurities is avoided and the colour of the wax is correspondingly lighter and more desirable commercially (Harris, 1940).

As the sugar cane replaced honey in Europe as a sweetening agent, beekeeping declined there and with increasing demands for wax, *e.g.* for candles from both Europe and the American colonies, Asia and Africa became the great producing areas of beeswax, which played an important part in the opening up of Africa. In olden times beeswax was used in trade by the people of Rabbah (Fulani) (Macgregor Laird and Oldfield, 1837). Smith (1953) states that much beeswax is lost because the beeswax trade is not properly organized, *e.g.* in Tanganyika which since 1952 has had an average export of 650 tons of beeswax compared with an estimated yearly yield of 10 000 tons of honey, all of which is consumed locally.

Tanganyika is the main beeswax producing country in Africa. Angola, Mozambique and to a lesser extent British and French West Africa (especially Gambia and Sénégal), Sudan and Abyssinia all export beeswax also, though the best quality comes from Tanganyika, *e.g.* Tabora wax. All the beeswax is produced by honey hunters and by primitive methods of beekeeping. East African beeswax is usually* a by-product of honey-beer (mead) production. This happens in the more densely populated areas, though in less densely populated areas it is sometimes an industry in itself. In most of these areas over 60% of the wax comes from primitive hives, the average wax yield per hive or nest being 2 lb. [0·9 kg.]. In 1937 800 000 colonies were involved, 75% of which were in Central or Northern Tanganyika. There were probably 360 000 beehives there, the owners of which were not solely interested in honey. According to Hobley (1910) beeswax used to be collected by the Akamba of Kenya from wild bees, the wax being then sold to itinerant traders who exported it. Attempts to interest the Lango (Uganda) in the beeswax industry have been unsuccessful (Driberg, 1923). Though bees are common in Central and South Sudan, little beeswax is exported, and efforts to stimulate the trade in it are advocated.

There is often a distinct relationship between rainfall and wax yields. In dry thorn country, extreme dryness is the only factor reducing the bee

* Beeswax *Port of London Authority (1939)*

population. In *Acacia* and *Combretum* woodlands a reddish wax is produced ; upland areas produce dark wax, becoming darker with increasing altitude. The best wax, pale yellow in colour, is produced in *Brachystegia—Isoberlinia* woodlands, though such areas are not of good agricultural value otherwise. Collecting often begins a month or so after the rains have ceased, increasing as the country is burned over and woodlands become more accessible and danger from wild animals is reduced. The honey, being of much less value, is often removed on the spot and is not carried away. During 1941, 90% of the beeswax bought by the United Africa Company at Zungeru, Northern Nigeria, was purchased between April 1st and August 31st of that year, and 45% was purchased during June alone.

According to Harris (1940), when the wax is collected on a small scale, the honey comb is chewed by the family to complete the removal of the honey. The full combs are generally heated to make the honey more fluid and are generally squeezed by hand, *e.g.* in long woven grass bags, which are also used for straining beer, so as to separate wax and honey. The crude wax is melted in clean hot water and then strained through a locally made bag, *e.g.* a stocking-shaped grass bag, two sticks being twisted on the bag to force out the wax. The resulting wax is often moulded into balls of various sizes. Sometimes the melted wax is poured into holes in the ground, though this is not to be recommended. Sometimes it is put into 4-gallon [18-litre] petrol tins which should not be rusty, as rust stains the wax and the stains are difficult to eradicate, thus spoiling its quality. Where wax cools slowly in pots, most of the deposited rubbish can be scraped off the underside of the solidified wax. Enamel basins are sometimes used as moulds : Dar-es-Salaam wax is moulded in small bowls before chopping up and shipping, the wax being yellow with coloured veins, a darker wax coming from Sudan.

Harris (1940) gives six rules in producing good commercial wax in Tanganyika :

1. melting the comb, after removing the honey, in a pot with plenty of clean water ;
2. straining the mixture through woven palm-leaf bags or bark cloth, and twisting the bag between two sticks ;
3. collecting the resulting wax and water in a clean vessel and allowing it to cool slowly ;
4. scraping dirt from the underside of the wax obtained on cooling ;
5. re-melting the wax in a clean pot, avoiding burning ;
6. straining the wax through a coarse cotton cloth into a clean basin, and allowing it to cool away from draughts, covered to prevent the entry of dust.

CUSTOMS AND SUPERSTITIONS

A custom resembling that of ' telling the bees ' when a person dies is also found amongst the Akamba (Lindblom, 1820). ' When an owner of beehives dies, his nearest relations proceed to his beehives, and throw small stones or clods of earth against them to attract the bees' attention, saying " Wake up, you bees ! Your owner is dead, but because of that you must not cease to work and gather honey !" The Akamba also appeal to bees to come to any new hives they put up, and the Wachagga (Tanganyika) invite their bees to a newly suspended hive by singing ' (Gutmann, 1926).

According to Dundas (1910) Chagga beekeepers have to observe many ceremonies in connection with their beehives. The implement for making their boxes must be specially fashioned, the tree in which the hive is hung is exhorted and threatened to secure its co-operation, and finally the collection of the honey is the occasion for ceremony, prayer and thanks.

Among the Suk tribe of Kenya honey and honey-wine may not be partaken of by pregnant women (Beech, 1911).

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NOTICES AND NEWS

Superseded Queens : The Bee Department, Rothamsted Experimental Station, Harpenden, Herts., would be grateful to receive between now and end May SUPERSEDED QUEENS (for experimental purposes) from colonies where the old Queen and her daughter are living peaceably together. Old Queen only required. Mailing cages sent on request ; postage will be refunded.

Foul Brood Disease of Bees Order, 1957 : The Minister of Agriculture, Fisheries and Food specifies the FIRST DAY OF APRIL TO THE THIRTIETH DAY OF SEPTEMBER (both inclusive) as the period in any year during which, in the case of hives and combs inhabited by bees, any examination pursuant to Article 4 of the Order shall be made.

Bees to eat : In an article ' My adventures in eating ' J. Allsop describes, among other unusual dishes, fried bees served in a restaurant in Tokyo : 'I really rather enjoyed the bees, which are a pleasant dish. The country children make a game of finding the wild hives, imitating the bee birds; their families pick the young bees from the combs, fry them and put them down in crocks ; and this strange preserve helps to satisfy the fat and protein hunger that is so common among the poorer Japanese.'— *Saturday Evening Post* 10th March 1956

Sac brood in Australia : The *Australasian Beekeeper* for December [58(6) : 96 (1956)] reports an outbreak of sac brood in the north-west of New South Wales—in Tamworth and Inverell, which are two of the most important beekeeping districts of Australia. The Department of Agriculture is actively investigating the outbreak of this disease, which could have serious effects on the honey export trade.