

## A Survey of Beekeeping in Uganda

Edward Roberts

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## A SURVEY OF BEEKEEPING IN UGANDA

by EDWARD ROBERTS\*

*Department of Crop Science and Production, Makerere University  
College, Kampala, Uganda*

*There are still many countries with a high beekeeping potential, as yet largely unexploited. A number of these are in Africa, and at the moment the focus of much attention; they have the added interest of a long beekeeping tradition. The author carried out the survey below, with the help of his students, while he was Lecturer in Agricultural Botany at Makerere.*

### Introduction

Uganda is a small country by African standards, being only a quarter the size of Tanzania, for instance. On the other hand, it is twice as heavily populated as Tanzania or Kenya (Rwanda, to the south, has four times the population density of Uganda, and above that of France). Nearly 20% of Uganda is swamp or open water, including parts of Lakes Victoria, Albert and Edward. Of the land surface, 84% lies between 900 m and 1500 m, yet the country possesses several mountainous regions of note, including the "Mountains of the Moon" associated with the Western Rift Valley. This impressive range, also referred to as the Ruwenzori Range, includes 21 named peaks over 4500 m, and has a permanent snowline just below this altitude. On the eastern border with Kenya, Mt. Elgon stands sentinel; this mountain is of volcanic origin and is possibly the biggest single mountain on earth. The Kigezi district in the south-western corner of the country is also volcanic in origin and has often been described as the Switzerland of East Africa. However, with these exceptions, most of the country is formed of rolling plains. Uganda is probably best known as the "Cradle of the Nile". This great river flows out of Lake Victoria and passes northwards through the country on its journey to the Mediterranean Sea.

The northern shore of Lake Victoria enjoys a fairly high rainfall (in the region of 50 inches [1300 mm] per annum), and the natural vegetation is of the tropical rain-forest type. Rainfall declines northwards, and the vegetation over most of the country is of the savannah type, becoming generally more open with decreasing precipitation. However, it is only in Karamoja in the northeast that rainfall is less than 30 inches [760 mm] and here excessive grazing by the herds of the local pastoralists has further reduced the vegetation.

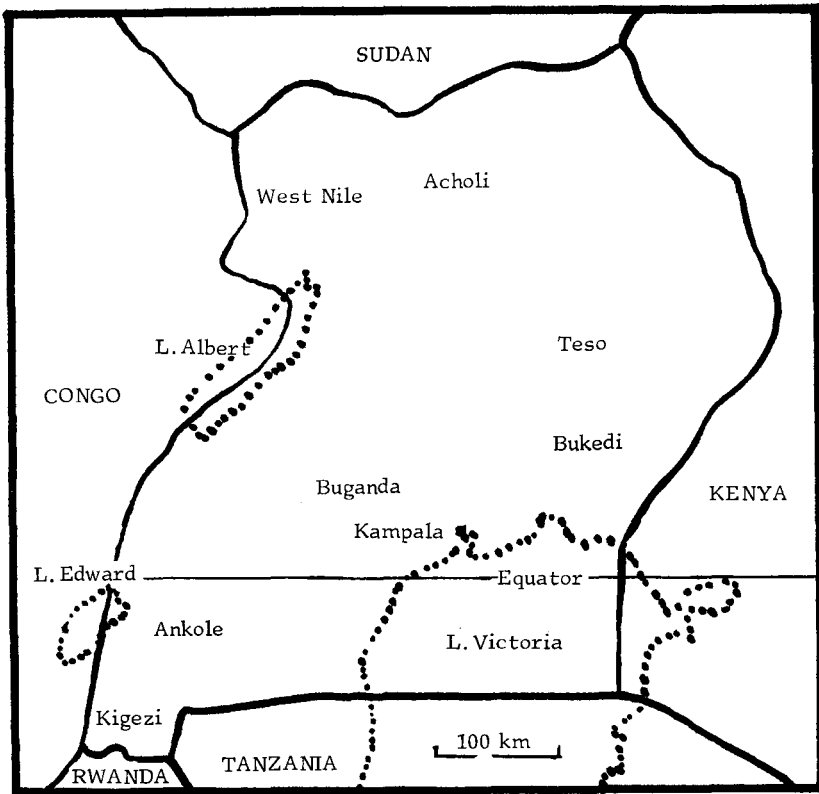
Despite the equatorial position of Uganda, temperatures are generally moderate because of the altitude. Most of the country enjoys temperatures between 15 and 30°C, mean annual maxima and minima rarely differing by more than 15°. The mountains of course have a climate and vegetation peculiarly their own, the most striking feature of the latter being the Afro-Alpine flora of the higher altitudes, with its giant groundsels and lobelias, and heather 6 metres high.

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\* Present address: Agronomy Department, Massey University, Palmerston North, New Zealand

Uganda, like many other countries in this part of Africa, has a population composed of very many tribes, reflecting several distinct ethnic movements across the country. The problem of welding these groups together into one nation is a major task confronting the Government. Four major groups can be identified within the nation. These are: the Bantu peoples of South, Central and Western Uganda; the Sudanic group in the Northwest; and the Nilotic and Nilo-Hamitic groups in the North Central and Northeastern areas respectively.

The majority of the population is rural in distribution, practising subsistence agriculture on small family-operated farms. Industrialization is increasing, but has so far exerted little effect on this pattern. Besides food crops, two cash crops are important: coffee at higher altitudes and in high rainfall areas, and cotton in the drier areas. These two crops provide the bulk of Uganda's exports and foreign exchange. In the dry savannah regions of Ankole and in the northeast of the country, the people mostly lead a semi-nomadic existence, moving with their cattle in search of pasture.



**Fig. 1.** Sketch map of Uganda showing main Districts and neighbouring countries.

Note: Buganda (Table 2) comprises Mengo, Mubende and Masaka.

## Beekkeeping

While *A. m. adansonii* honeybees exist in the wild over most of the country, and honey hunting is widespread, beekkeeping as an occupation is restricted essentially to three separate areas, Kigezi, West Nile and Teso. This distribution is extremely interesting, as there does not appear to be any attribute peculiar to these three areas. Ethnically, the Bakiga and Banyarwanda people of Kigezi are Bantu and related to the inhabitants of neighbouring Rwanda; the Itesot of Teso are of Nilo-Hamitic origin; and the several tribes found in West Nile are of Sudanic origin. Kigezi is a very mountainous region, largely at 1500–2400 m, with a natural vegetation of montaine forest—now mostly cleared, and the land cultivated, the area being densely populated. The West Nile district is also densely populated, little of the natural vegetation remaining, and although neither as high nor as rugged as Kigezi, it is certainly not as flat as Teso. Teso consists of a gently undulating plain with a savannah type of vegetation. Cultivation is greater in the southern part of the district where population density is fairly high. The northern part of the district, however,

TABLE 1. Estimates of numbers of hives and beekkeepers in Uganda, 1970.

<i>District</i>	<i>No. beekkeepers</i>	<i>No. hives with bees</i>
Kigezi	2913	30 400
Teso	?	22 500
Ankole	830 <sup>1</sup>	2 360
West Nile	300	1 000
Buganda	53 <sup>2</sup>	93
Bukedi	75	550
Bugishu		
Sebei		
Bunyoro	no information	no information
Acholi		
Karamoja <sup>3</sup>		
Total	4171	56 903

1. Largely Bakiga from Kigezi resettled in Ankole.
2. Largely immigrants from Kigezi and West Nile.
3. The District Veterinary Officer reported that a few hives could be seen in the mountainous areas, and that some honey hunting was carried out.

### Sources

Census of beekkeepers and beehives in Kigezi District, 1940. Report by Chorley in the files of the Government Entomologist.

National census of beekkeepers and beehives (1966) conducted by the Veterinary Department on behalf of the author.

Intensive studies of Kigezi, Teso and West Nile (1967–69) by three students of the Faculty of Agriculture, Makerere University College.

Personal observation by the author.

### Note

It is extremely difficult to obtain accurate information, owing to the strong local superstition that an accurate count of stock holdings will result in the death of at least one unit!

is largely devoted to cattle grazing, and it is in this lightly populated region that most of the beekeeping activity of the district is concentrated.

### Statistics: beekeepers and beehives

Beekeeping in Uganda is a traditional occupation, expertise being passed down from generation to generation within the family. Estimates of numbers of beekeepers and occupied hives, district by district, are given in Table 1. In addition to the occupied hives, each beekeeper is likely to have about the same number of empty hives out in the bush awaiting the arrival of swarms. The size of holdings visited by the author vary from 1 hive to 67; the majority of beekeepers have 3–20 hives. Not one beekeeper was encountered who depends solely on his bees for a living; bees are regarded as one of several enterprises included in the pattern of subsistence farming.

In Kyanamira sub-county in Kigezi, which was reported on by Chorley in 1940, and again by Ndwani (1968, see Table 2), it appears that the decline in the total number of hives is due to a reduction in the number of empty hives, the number of occupied hives having increased. In this area there appears to be a consolidation of apiaries into fewer and larger holdings, but whether this is a general trend or a local phenomenon is not known.

TABLE 2. Beekeepers and hives in Kyanamira Sub-County, Kigezi District.

<i>Year</i>	<i>No. beekeepers</i>	<i>No. occupied hives</i>	<i>No. empty hives</i>	<i>Average no. occupied hives per beekeeper</i>
1940 ... ..	312	1168	2024	3.7
1967 ... ..	175	1560	1111	8.9

### Forage

During surveys of beekeeping in the three main areas, beekeepers' opinions concerning nectar sources were collected. These are presented in Table 3. In Kigezi and in Teso more than 200 beekeepers were interviewed, and for these areas an "importance index" has been calculated. Not enough beekeepers were interviewed in West Nile for any useful index to be calculated.

In Teso it is the savannah trees which reputedly produce the surplus, the bees also gathering nectar from cultivated plants when available. This is borne out by the fact that harvesting in this district occurs towards the end of the long dry season (usually February/March) and follows closely the peak flowering of the savannah trees. In West Nile harvesting also coincides with the end of the dry season (March–May), and it must be assumed that it is trees which comprise the bulk of the surplus here also.

In Kigezi very little native vegetation remains, and here honey is reputedly produced largely from crops, pastures, weeds and exotic trees (especially species of *Eucalyptus*). This is borne out by the fact that the harvest is taken during July/August following the main rains (February–May) during which crops are grown, and it explains the greater variability of Kigezi honeys with regard to colour and flavour.

TABLE 3. Important bee forage plants for three districts of Uganda.

Kigezi District		Teso District—contd.	
Plant name	Importance	Plant name	Importance
<i>Bidens Grantii</i>	***	<i>Mangifera indica</i>	**
<i>Acanthus arboreus</i>	***	<i>Combretum Binderianum</i>	**
<i>Vernonia auriculifera</i>	***	<i>Citrus</i> spp.	**
<i>Datura suaveolens</i>	***	<i>Acacia Seyal</i>	*
<i>Hibiscus diversifolius</i>	***	<i>Ficus glumosa</i>	*
<i>Hibiscus</i> sp. (orwenzya)	***	<i>Euphorbia candelabrum</i>	*
<i>Hibiscus</i> sp. (omuziganimi)	***	<i>Harrisionia abyssinica</i>	*
<i>Eucalyptus</i> spp.	***	<i>Vitex Doniana</i>	*
<i>Crassocephalum</i> sp. (ekiinami)	***	<i>Gossypium hirsutum</i>	*
<i>Plantago palmata</i>	***	Various cultivated legumes	*
<i>Dyschoriste radicans</i>	***		
<i>Melanthera scandens</i>	**	<b>West Nile District</b>	
<i>Pentas</i> sp. (orukizi)	**		
<i>Lantana Camara</i>	**	<i>Plant name</i>	
<i>Bidens pilosa</i>	**	<i>Momordica Foetida</i>	
<i>Coleus Forskohlii</i>	**	<i>Eucalyptus</i> spp.	
<i>Pycnostachys Eminii</i>	**	<i>Cajanus cajan</i>	
<i>Mimosa</i> sp. (burikoti)	**	<i>Solanum incanum</i>	
<i>Vernonia lasiopos</i>	**	<i>Acacia Seyal</i>	
<i>Cyperus</i> sp. (ekembo)	**	<i>Tamarindus indica</i>	
<i>Crassocephallum vitellinum</i>	**	<i>Hibiscus Fuscus</i>	
<i>Guizotia scabra</i>	**	<i>H. cannabinus</i>	
<i>Erlangia</i> (? <i>cordifolia</i> )	**	<i>Butyrospermum Parkii</i>	
<i>Ageratum conyzoides</i>	**	<i>Phaseolus vulgaris</i>	
<i>Cucurbita</i> sp. (ebihaza)	**	<i>Crassocephallum mannii</i>	
<i>Leonotis nepetaefolia</i>	*	<i>Ipomoea Batatas</i>	
<i>Musa</i> spp. (ebitokye)	*	<i>Cucurbita</i> sp. (okondo)	
<i>Lobelia Gibberoa</i> (gives bitter honey)	*	<i>Sesamum orientale</i>	
		<i>Khaya grandifolia</i>	
		<i>Mangifera indica</i>	
		<i>Grewia mollis</i>	
		<i>Pterocarpus abyssinicus</i>	
		<i>Musa</i> spp.	
		<i>Ficus</i> spp.	
		<i>Piliostigma thonningii</i>	
		(ecere)	
		(lukulili)	
		(nyari)	
<b>Teso District</b>			
<i>Plant name</i>	<i>Importance</i>		
<i>Butyrospermum Parkii</i>	***		
<i>Terminalia torulosa</i>	***		
<i>Combretum Guienzii</i>	***		
<i>Terminalia</i> spp.	***		

*Note A.* Where identification has not been possible (or complete), the local name is given; those from Kigezi are Rukiga names and those from West Nile are Lugbara names.

*Note B.* The "Importance Index" is derived from lists of plants obtained from bee-keepers as being most important for bee forage. Plants marked \*\*\* appear on more than two-thirds of the lists; those marked \*\* on fewer, but more than one-third; those marked \* on less than one-third.

## Equipment

With the exception of a very small number of “African Dadant hives” introduced in Teso district under a subsidy scheme (now discontinued) by the Department of Agriculture, all hives are fixed-comb hives made from readily available materials. The basic form used throughout the country is that of a horizontal cylinder. In Teso district hollowed sections of tree trunks are favoured. In Kigezi the hive is constructed as a tube of grass, papyrus or cane-work, narrower towards the front and wider towards the back. The hive is then plastered with cow dung and thatched with banana fibre to give protection from the elements. In West Nile the predominant type in use is the hollow log, but there is a wide range of types, from disused cooking pots to baskets. It would seem that in areas with a low population density and abundant suitable trees, the more durable log hive is preferred, whereas in areas of high population density and a relative shortage of trees, almost any readily available material is used for hive making. Most hives are produced by the beekeeper himself.

In Teso district hives are placed on the branches of certain trees, including *Mangifera indica*, *Butyrospermum parkii*, *Terminalia indica* and *T. torulosa*. The choice of a tree is made with the following factors in mind: suitable branching system; shade; usefulness as nectar source, or proximity to a good source; not harbouring pests, especially ants. The hive, once placed, is left in position permanently, and is colonized sooner or later by a wild swarm; the honey is harvested in situ.

In Kigezi, the hive is usually suspended from a branch of a tree in the bush—either by rope made of bark, or by two crooked sticks—until occupied; it is then transferred to an apiary near the homestead, where it is supported on forked stakes driven into the ground. The tree most commonly used to provide these stakes is *Erythrina abyssinica*. This tree grows readily from these large “cuttings” and provides shade for the hive, also it is comparatively resistant to attack by termites.

In West Nile no general rule applies; some beekeepers leave their hives in trees in the bush, whereas others remove them to a site near the homestead once they are colonized.

Practices associated with the placing of new hives in the bush vary considerably. Almost all beekeepers burn pieces of wax in a new hive to make it attractive to bees. Some also rub the inside of the hive with herbal preparations. Several of the beekeepers encountered practised a ritual “calling of the bees” from the top of the nearest high ground. Songs used for this purpose vary in detail but all comprise three sections, the first part is a song of praise to the bee, the second extols the merits of the new hive, and the third tells of the reputation of the beekeeper for looking after his bees. The song is commonly repeated to the four points of the compass, and accompanied by loud noises usually provided by beating a stick against a petrol tin.

## Management

Management is inevitably severely limited with these fixed-comb hives, and mostly consists only of a periodic check to ensure that the colony is not attacked by pests, the hive being opened once (or in some places twice) a year for harvesting the honey. It is, however, surprising that a relatively high level of

management is practised by some beekeepers even with these primitive hives. Many beekeepers in the drier part of Teso provide water near their hives during the dry season, and recognize lack of water as an important factor in leading bees to abandon their hive. Other beekeepers use twigs to weave a crude, but apparently effective, queen excluder. Several beekeepers were found who removed all the comb outside the brood nest at the beginning of the honey flow, so that their harvest should consist of honey in new comb, and be relatively free from pollen. One beekeeper in Kigezi district had realized that his production was held down by the size of his hives, and had produced hives above the normal size which he reserved for very large swarms. These hives were producing 50–60 lb [25 kg] honey a year, compared with 30 lb [14 kg] from his normal hives.

Management practices generally are traditional. It is consequently difficult to obtain information concerning the origins of, or reasons for, many of them. The leading question usually produces a knowing smile, and persistent questioning can, not unnaturally, strain the host's hospitality.

Honey harvesting is always carried out at night, the reason being that no protective clothing is worn (in some cases no clothing at all) and the bees are much less prone to attack the intruder at night than during the day. The beekeeper and at least one assistant (usually a son) open the back of the hive and blow in smoke from a specially prepared torch of grass and herbs, which also provides light for the operation. The manufacture of these torches is a closely guarded family secret. The combs are cut out and placed in a container after any adhering bees have been brushed back into the hive. Most beekeepers stop with the removal of the first comb containing brood; however, during times of food shortage, the hive may be completely emptied and all the contents eaten.

One consequence of nocturnal harvesting is that the beekeeper cannot adequately see what he is doing. The result is usually a dirty product, comprising a mixture of ripe honey, unripe honey, pollen, brood, bees, charcoal, and burnt grass, in addition to any other extraneous matter which finds its way into the container in the dark. The insistence on nocturnal harvesting is undoubtedly responsible for the poor quality of most of the honey from these fixed-comb hives.

## **The crop**

The types of hive in use yield on average some 30 lb a year of honey in the comb. This includes say 1½ lb of clean wax and 25 lb of honey, the remaining 3½ lb being dross [1 lb = 0.45 kg]. These proportions vary considerably. Yields between 20 and 60 lb have been observed by the author. The size of the hive is probably the limiting factor in most cases. Assuming that there are 56 903 occupied hives in the country (Table 1), then some 600 tons of honey and 40 tons of wax are produced annually.

## **Products, markets and uses**

### *Beeswax*

Small amounts of wax are used for preparing new hives, mending gourds, and other household uses, but the greatest part is thrown away.



### *Honey*

In Kigezi district, trade in honey is very local. Barter is still an important feature of the economy, and the beekeeper often exchanges honey for goats or cattle, and it may form part of the "Bride-price". The demand is strong, as honey is a basic ingredient of the higher grades of the local beer. This is usually produced by fermenting millet or sorghum and adding honey to give that extra "kick" to the brew. This beer is an important dietary component of the Bakiga.

Beer making is the major outlet for honey also in West Nile. The "Duma" beer made here is based on sugar with honey added. Greater development of townships in this district has resulted in a change in the marketing system, with the introduction of a middleman who travels in the countryside buying honey for the townships. Prices fluctuate, widely depending on the supply, from £1.50 to £4.50 for a tin of about 50 lb of honeycomb.

In addition to satisfying the local beer market, beekeepers in Teso district supply honey to beer makers in Nairobi. Undoubtedly the good internal roads in the district and the rail link with Nairobi have assisted this commercial development of beekeeping. Honey is bought in by local traders, and passed through Soroti wholesalers and a Nairobi agent to the brewers. The beekeeper receives about 35 Uganda cents per lb for his honey, which ultimately costs the brewer about 120 cents [£1 = 2000 cents]. Gluts and shortages occur, with their associated price fluctuations. No grading of honey is carried out, and tins have exploded in transit as a result of premature fermentation. It has not been possible to obtain satisfactory figures for the volume of this trade, but it is likely to be in the region of 150–250 tons per annum.

Honey also has a variety of domestic uses. It is used as a sweetening agent in many foods, especially sorghum porridge, and is often eaten by itself. Its medicinal uses are legion. It is generally accepted as the correct treatment for burns, ulcers of the mouth, digestive upsets including dysentery, and many ailments of children. It is also given (especially in Kigezi) to mothers of new-born babies. In addition to these general uses, individual beekeepers have many and varied medicinal concoctions based on honey to treat a whole host of illnesses and diseases.

In parts of Kigezi, some of the crop is often presented to the local chief—either as payment for favours received or in anticipation of favours to come!

Imports of honey into Uganda amount to 10 tons per annum (5-year average 1964–68). This is largely honey in glass jars for the quality retail market. A small scheme initiated by the Christian Rural Mission in Kigezi in 1964 (which has since ceased to function) is the only attempt to date to supply from local sources the urban retail market of the country.

### **Superstitions and taboos**

Practices surrounding the placement of new hives have already been mentioned. After siting a hive, harvesting the honey crop from it, or other operation involving a major disturbance to it, many beekeepers refrain from sexual intercourse for four days. This is especially true of the Kigezi beekeepers, where almost total observance of this rule applies. It is claimed that the bees would disapprove of such activity and produce less honey next season, or shun the new hive altogether.

The following superstitions are believed by the people of Kigezi. Women are discouraged from approaching hives, beekeeping being a prerogative of the males. Particular exception is taken to a menstruating woman approaching a hive: the punishment for such a crime is stoning. Needless to say few women ever go near any hive! A woman is also barred from eating freshly harvested honey during menstruation. The consequences for the woman would be prolongation of the period, and for the beekeeper a depressed yield of honey.

Honey from a colony which began building combs from the rear of the hive is particularly taboo. It is stored separately, and can be eaten only by the immediate clan. A particular exclusion applies to the beekeeper's married daughters eating such honey, for it is believed that they would thereby be made barren, or at the very least experience difficulty in childbirth.

A very strong superstition concerning the ownership of hives is widely held in Kigezi. Should a hive containing bees be stolen, and the owner bewitch the thief, then the bees will attack and kill the thief. Moreover, they remain in possession of his house, rendering burial impossible—until the owner of the hive appears, when they return to their hive. This belief is extremely strong, and reports of such a death having occurred about ten years ago have undoubtedly served to strengthen it. The belief is in fact effective in preventing the theft of hives in Kigezi. In West Nile and Teso where no such taboo exists, theft of hives is a common occurrence.

These are the most common superstitions of the people of Kigezi. There are others of a minor nature, mostly associated with fertility.

## **Bee diseases**

No disease is known to have reached epidemic proportions; such an event would undoubtedly have become incorporated in beekeeping tradition. Individual colonies which have dwindled, and some that have died out, have been examined; but nothing has been found which could not be attributed to queen failure, or to attack by pests. It is impossible to inspect the brood nest of the type of hive in general use, but regular inspection of 6 Modified Dadant hives on the University Farm near Kampala for five years has produced no signs of brood disease, nor have any known adult diseases been recorded.

## **Legislation**

Uganda is party to the East African legislation controlling the importation of bees, appliances, etc., as a precaution against the introduction of disease. No other legislation affects bees or beekeeping in particular.

## **Poisoning**

Formerly, when nicotine tobacco (*Nicotiana rustici*) was grown in Kigezi, considerable concern was expressed by beekeepers that bees were being poisoned by the crop. Preliminary trials conducted by staff of the Department of Agriculture tended to support this view, caging bees among the leaves of the crop for half an hour being sufficient to cause 50% mortality. However, with the decline in the area under this crop the problem resolved itself, and further experimentation was not carried out.

Modern husbandry methods becoming widespread include insecticidal

spraying of cotton and coffee. It is to be expected that Teso—a cotton-growing area—will in the future find this an increasing problem, as spray treatment from first flower to harvest is advocated. In Kigezi, where much coffee is grown, beekeepers already complain of dwindling during the coffee-spraying season.

Death of adult bees due to insecticidal sprays is a more serious loss to colonies in Uganda than in north temperate latitudes, because of the large numbers of pests, which are constantly alert for an opportunity to strike, so a weakened colony rarely has a chance of recovering.

## Pests

Disease does not appear to constitute a major problem to beekeeping in Uganda, but the opposite is true of pests and predators. They are legion. The most serious pest is undoubtedly the greater wax moth (*Galleria mellonella*), but other insects—especially ants—are serious and widespread enemies. The small hive-beetle (*Aethina tumida*) is present, at least in the environs of Kampala; pests met with in hives in various parts of the country range through pseudo-scorpions, lizards, snakes, spiders and two species of small rodents. Among the predators, a small bee-eating bird (unidentified) is a serious pest in Kigezi, and two species of predatory wasps are locally common. A Conopid (*Physocephala pubescens*) and a Tachinid (*Rondanioestrus apivorosus*) were the reputed cause of the failure to establish Italian bees in the 1930s. The honey badger (*Mellivora capensis*) previously caused much damage to hives in Uganda, but is now only of importance in a few forested areas.

A serious study of the pests and predators of honeybees in this part of Africa is long overdue.

## Education, extension and advisory services

No formal training in beekeeping is yet available in Uganda. Beekeeping is included in the syllabuses of District Farm Institutes and the Veterinary Training Institute, but forms a minor part of these courses and is of an introductory nature. A report exists that several Ugandans were trained somewhere in Tanganyika before the first world war, and certainly several have been sent in recent years to the Beekeeping Section at Tabora, by the Department of Agriculture formerly—and more recently by the Veterinary Department of the Ministry of Animal Industry, Game and Fisheries, under whose aegis beekeeping now falls. Due to this recent change in responsibility both Departments have personnel involved in beekeeping in the field. However, there are not more than six of them in the whole country to the author's knowledge, and none has had any advanced training.

The 1930s and early 1940s saw an attempt to develop beekeeping in Western Uganda, especially in Kigezi District under the direction of the Government Entomologist (H. Hargreaves) and an assistant (T. W. Chorley). Considerable groundwork was done, including the survey of Kigezi alluded to earlier. The project was directed largely towards the cleaning, collection and marketing of beeswax. Demonstrators were trained, and lectures and demonstrations towards this end were held throughout the Western Region. An adequate marketing system never materialized, and with the departure of Hargreaves and Chorley the project collapsed.

During the 1950s and early 1960s the Department of Agriculture mounted another scheme, this time in the Eastern Region, aimed at improving husbandry and introducing a simple frame hive developed by Mr. Johnson of the Ongino Leprosy Centre, Kumi, Uganda, and the late Mr. Townley of Nakuru, Kenya, called the African Long Hive. This hive later achieved some success in Tanzania, but the Uganda scheme was discontinued.

Beekeeping features in the current five-year Development Plan. It is presently receiving the attention of the Ministry of Animal Industry, Game and Fisheries, and Mr. Patrick Fagg has been appointed with a view to its early development.

## Research

Very little research has been carried out on beekeeping in Uganda. Hargreaves and Chorley produced several reports of a preliminary nature on the industry during the 1930s and early 1940s, together with an account of the attempt to introduce Italian bees.

The author has carried out a general investigation of the industry in the country, also preliminary studies on the pollination of locally important crops, and the behaviour and productivity of the local bee under different management systems. Many interesting problems remain untouched, including the study of pests and diseases, and the compilation of a bee botany for the country.

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