

## THE UGANDA SOCIETY

**SUBSCRIPTIONS.**—The annual subscription (expiring 30th June) for ordinary members and institutional members is Shs. 10. A double subscription of Shs. 15 entitles two members of a family to all the rights and privileges of full members, except that they receive one copy only of each issue of the Society's periodical. Any member who has reached the age of 55 can become a life member by paying a lump sum equal to the amount of ten annual subscriptions. A member who has not yet reached the age of 55 can join for life by paying the same sum plus the number of subscriptions by which the age falls short of 55.

The annual subscription for associate members is Shs. 2/50. Associates are admitted to lecture meetings and may use the library; but are not entitled to receive the periodical, to vote, or to borrow from the library.

Bankers' Order forms may be obtained from the Secretaries. Completed Bankers' Orders should be sent to the Society in the first place, not direct to a Bank.

Members are requested to keep the Secretaries fully informed of changes of address.

**PUBLICATIONS.**—The *Uganda Journal*, the organ of the Society, is published half-yearly, in March and September. Back numbers of most issues of the *Journal*, and of certain other publications of the Society, can be supplied as advertised on the back cover of the current issue.

The chief aim of the *Journal* is to provide a medium for the publication of historical, literary and scientific matter relating to Uganda and its peoples. Material offered for publication should be sent to the Honorary Editor at the Society's address. Contributions in the form of short notes or records, as well as longer articles, are invited. Authors will receive twenty separate copies of their contributions free of charge: additional separates may be obtained at a cost of ten cents a page if ordered at the time when the manuscript is submitted. The Editor can arrange for manuscripts to be typed.

The Society is ready to consider entering into arrangements with other institutions for exchange of publications.

**MEETINGS.**—Meetings, at which papers are read by members or visitors, are held periodically in Kampala. Notices of meetings are sent to those members living in or near Kampala and Entebbe; and to other members by request. A member wishing to read a paper should communicate with the Secretaries. The Society reserves the right to publish, in whole or in part, any paper read at a meeting.

**LIBRARY.**—The library contains over 1,600 books and periodicals, chiefly on African subjects, with a number of English newspapers and reviews. It is open to members: Monday to Friday—12.30 p.m. to 2 p.m. and 5 p.m. to 7.30 p.m.; Sunday—10 a.m. to 12.30 p.m. Books may be borrowed against a deposit of Shs. 20, not more than two volumes being taken at one time. Members resident away from Kampala can borrow by post, on application to the Honorary Librarian.

**ADDRESS.**—The Society's Rooms, which include reading and lecture rooms and the library, are situated in the old Sikh Barracks, at the corner of Nakasero and Kyagwe roads, Kampala. The postal address, to which all communications should be addressed, is:

THE UGANDA SOCIETY,  
PRIVATE BAG,  
KAMPALA.

# LIBRARY RULES

Rules for the use of the library are as follows:

## I. READING

1. The library is open to ordinary members and associate members for reading at the hours announced in the *Journal* and on the Notice Board.
2. Books should not be returned to the shelves after use. They should be left on the table by the door.

## II. BORROWING

Ordinary members are entitled to take books on loan under the following conditions :

3. A member wishing to borrow books from time to time is required to pay a library deposit of Shs. 20, to be retained by the Society until the member signifies his wish to discontinue borrowing. The money will then be refunded.
4. Deposits should be paid to the clerk in the office (or posted to the Hon. Librarian); a receipt will be given.
5. The Librarian is authorized to prohibit altogether, at his discretion, the removal of certain valuable books, or books in constant use. Such books will be clearly labelled. Current unbound periodicals are on no account to be taken away.
6. Books taken on loan by Kampala members may be retained for not longer than two weeks in the first instance (three weeks will be allowed for members who live more than twenty-five miles from Kampala). An extension of this period may be granted by the Librarian at his discretion.
7. Not more than two volumes may be taken or retained by a member at a time.
8. The catalogue number of the book, the name of the author, and the name and address of the borrower must be entered in the loan book by, or in the presence of, the clerk.
9. Within reasonable limits, the cost of outward postage to up-country members will be defrayed by the Society.

## III. LOSS OR DAMAGE

10. A member who loses or damages a book will be expected to defray the cost.
11. A member who fails to make good the loss or damage of a library book, or to return a borrowed book after a second reminder, will forfeit the whole or part of his deposit, and also his right to borrow further books from the library until his full deposit is renewed.

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The library is open to members at the following hours:

|                  |       |                        |
|------------------|-------|------------------------|
| Monday to Friday | ..    | 12.30 p.m. to 2 p.m. ; |
|                  |       | 5 p.m. to 7.30 p.m.    |
| Sunday           | .. .. | 10 a.m. to 12.30 p.m.  |

## LIBRARY NOTES

Nearly 500 books have been added to the library since the library list was published in 1945, so that the Society's collection now totals about 1,600 volumes. It is hoped to bring out a new library list shortly.

It is encouraging to find that so many of the Society's reciprocating members are now able to supply the back numbers of Journals printed during the German occupation of their countries. To the list printed in Volume 10, No. 2, of the *Uganda Journal* should be added the following names of Journals available for members' reference in the library:

*Arquivos de Angola.*

"*Brousse*," *Les Amis de l'Art Indigène du Congo Belge.*

*Bulletin Agricole du Congo Belge.*

*Bulletin du Centre d'étude des Problèmes Sociaux Indigènes.*

*Bulletin de l'Institut Française d'Afrique Noire.*

*Journal de la Société des Africanistes.*

*Kongo-Overzee.*

*Le Monde Orientale.*

*Nada.*

*Nigeria.*

Owing to the kind assistance of Mr. S. J. K. Baker of Makerere College, the Society's map collection has now been indexed. It is available in the library.

So far, the member responsible has not yet returned the book by Fairfax Downey, *Burton: Arabian Nights' Adventurer*, New York (Society No. 841). It is urged that members should check through their bookshelves for this volume, since it is extremely difficult to obtain another copy of this work to-day.

The Honorary Librarian would welcome suggestions from members of library additions; and those who have collections for disposal are asked to give the Society first refusal.

The Society is much indebted to Sir John Gray for his gift of the Rev. H. W. Duta's book, *Engero Za Baganda*; also to Messrs. Maneckji N. Dhalla, G. H. E. Hopkins, A. S. Thomas and the Trustees of the King George V Memorial Fund, for further gifts.

The Honorary Librarian has received from the Empire Information Bureau of the Royal Empire Society a copy of its cyclostyled Information Paper No. 8—*Notes on Conditions in Uganda, Autumn 1946.*

The paper, which is dated February 1947, covers five foolscap pages and contains useful information for intending visitors or newcomers to Uganda. Conditions in the Protectorate are dealt with under such heads as "Restrictions on Entry," "Health," "Transport and Communications," "Hotels and Boarding Houses," "Housing," "Supply (and Cost) of Goods," "Domestic Servants," "Cost of Living," "Educational Facilities," "Climate," "Medical Services," "Amusements," "Taxes," "Currency," and "General Comments."

Members of the Uganda Society may be interested to know that files giving similar information on living conditions and cost of living in nearly every part of the British Empire are held in the Bureau, which is situated at The Royal Empire Society, Northumberland Avenue, London, W.C.2. These information files, which are kept as up to date as possible, are available for consultation by all inquirers between 9.30 a.m. and 5.30 p.m., Mondays to Fridays, and 9.30 a.m. and 12.30 p.m. on Saturdays.

# ACCESSIONS TO THE UGANDA SOCIETY'S LIBRARY

1ST JULY 1946 TO 31ST MARCH 1947

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## THE CROCODILES OF NABUGABO

By E. A. TEMPLE PERKINS

IT so happens that this story about loathsome reptiles opens in a picturesque setting—a sylvan scene by a moonlit lake. In a clearing in the forest, short-grassed, slightly above water level, and edged with a small clean beach, is a thatched hut owned by a sports club. Inside the building a party of Europeans, just in from a bathe, are enjoying supper. Three African servants are in attendance, and there are six dogs. Hung from the front rafter of the hut are two hurricane lamps, for the moonlight does not penetrate far under the low thatch. The three servants are sitting round the fire, not twenty yards from the building and only a few feet from the lake. The dogs have been dashing in and out of the water, but five of them are now lying on the grass; the sixth has almost reached the beach in front of the hut, after a short swim from a raft moored out in the lake.

Casually, a servant says, "There are still two dogs in the water"; another corrects him, "No, only one, five are ashore."

At this moment there is a slight splash, a piteous yelp and then silence. "*Mamba!*" (crocodile) shouts one of the Africans, and the party rushes from the hut—to see only a few bubbles on the water and a semicircle of ripples. Hastily a boat is launched and a search is made, but with no results. The serenity of Nabugabo has been rudely shattered.

Next morning the incident was common knowledge in Kampala. Everyone was keenly interested because, till now, Nabugabo had been considered free from crocodiles, if we except a few short-lived and unprovèn rumours some years ago. When I was asked by an old friend if I would investigate I very gladly consented. This article tells what I found.

Nabugabo is an oval lake, slightly less than five miles in length and about three miles in width. It lies about two miles from the western shore of Lake Victoria, from which it is separated by forbidding, rough and undulating country, thickly forested on the part nearest Lake Victoria, swampy on the other. Nabugabo is said to be sixteen feet higher than Victoria, but this I find hard to believe. It is fed by one small stream but has an extensive catchment area to the west. Nabugabo has for many years been one of the few popular holiday resorts in Uganda, in fact, the only one of its kind in the country. Its great attraction was its safe bathing.

Except for two unconfirmed statements by visitors, the only record known to me of a crocodile being seen in Nabugabo was when one of the four Foster brothers sighted and fired at a crocodile in 1932. The creature was not seen again, the suggestion was made that perhaps it had not been a crocodile after all, and the popularity of the lake in no way diminished.

Before this, in 1916, according to a European resident, a canoe containing an African was capsized, its occupant vanishing. A crocodile was suspected as the possible cause, but was never traced. These observations may be of

interest to certain Baganda who have asserted to me that crocodiles only entered Nabugabo after a "new kind of fish" (blue-gill) had been introduced by the Fish Warden in February 1944.

And now for my story, told in the form of extracts from my diary, starting with an entry made five days after the dog was taken :

*17th February 1946.* This morning I canoed right round the lake, taking nearly five hours to do it. No sign of a crocodile, though I didn't land anywhere. Little of the shore is typical crocodile habitat. Except for a few small beaches on the mainland side, there seems no place suitable for them—no sand spits on which to bask or lay eggs. A strong wind blows almost daily off Lake Victoria, rising in mid-morning and making Nabugabo much cooler than it would otherwise be only twenty-two miles from the equator. The beaches, which alternate with patches of forest, are all on the exposed side and are in constant use by fishermen or visitors. The rest of the lake is fringed with coarse grass, reeds and peat bog. On the north-east shore there are a few short stretches of peaty shelf, with isolated unsubstantial lumps of peat lying out in the water like small islands. When the water is glassy calm in the early morning the entire surface is visible to the twenty or so fishermen canoeing on all sides ; yet none of them has ever reported a crocodile. I am struck by the fact that the fishermen wade fearlessly in the shallows, when attending to their reed and basket traps near to the huts on the east and north-east shores. They say that their gill nets, set farther out, are never disturbed materially. I cannot believe that the dog-snatcher was a crocodile ; if there is one here—a creature so shy that the fishermen have never seen it—would it have ventured so close to the fire and lights on the bathing beach ? The twelve-foot cliff near the hut, thickly bushed and creviced, with tall trees on top, suggests to me a python. It might lie out on a branch and drop silently into the water if any prey appeared.

That was my belief until this evening, when I discovered leopard spoor not only on the cliff but also on the beach. This fills in all the blanks. A sudden leap into shallow water is probably nothing new to a leopard. It must have pounced when the bathers were talking in the hut and the servants had left the fire. One of them said he saw two dogs in the water, when there was only one. In the moonlight, a leopard's head could excusably be mistaken for a dog's. A leopard must be the answer.

*19th February.* Yesterday's entry can be scrapped. This has been an unfortunate day for Nabugabo enthusiasts : we have seen a crocodile ! The lake this morning was in a dead calm ; it was in one of its good moods. Water birds were everywhere, monkeys were playing near the beach, and the one dog on the scene was enjoying the water. When I first went out, the usual flight of white egrets had just left its roost and was moving over to the east shore where the cattle often graze, a few ibis had flapped off noisily from their haunt above the cliff, and a white heron was wading in the shallows enjoying its breakfast of young blue-gills. It was incongruous to be thinking of repulsive reptiles in such a setting but as I looked across the lake my eyes at once picked up a black, queerly-shaped object shining wet in the sun about half a mile from where I stood. By no stretch of the imagination could this

be one of the many net floats : it was, unmistakably, the head of a crocodile, clearly visible to the naked eye.

"Confound it, George, there *is* a crocodile here, after all," I said to Marriott, who was standing beside me. We watched it for some time, and as it did not move we climbed the cliff to get a better view. We had only just done this when the crocodile turned to face the shore ; then, as we were deciding that it must be interested in Marriott's dog, it vanished.

Two hours later we saw the crocodile again, in about the same place, and soon, to our astonishment it began to swim towards us, making for a cove on our right. I dashed along behind the bungalows, keeping well out of sight, until I was more or less in its line of approach, near a small beach on the edge of thick forest. On this beach was a tame white muscovy duck with three ducklings, all four preening themselves in the sun. The crocodile, clearly visible from where I stood in the undergrowth, was coming closer and closer. Before very long it had almost reached a small patch of reeds only twenty yards from the ducks, which seemed quite unaware of its presence. I was hoping that it would come right up to the beach and give me an easy shot, but it kept its distance, although it was obviously intent on the ducks and appeared to be trying to mesmerize them. It presented a very poor target and I was about to risk moving to a flank to get a better shot when some monkeys jumped out of the trees on my right almost on to the beach. Remembering that I had some bananas in my bungalow, I lost no time in getting them and threw them carefully on to the right hand end of the beach. I knew that the bananas would attract the monkeys, and hoped that the monkeys would attract the crocodile, inducing it to turn its head.

The monkeys responded most creditably, some going right down to the water's edge, but the crocodile failed to move an inch. Then the worst happened—the morning breeze sprang up and the lake began to ripple. Any more movement on the water and I would lose sight of my target : I must fire at once. I heard the bullet strike, but it was not the sound of a direct hit on bone : I had gone an inch or so below the water line. The head was no longer visible to me, but Marriott, on the next beach, had a wider view than I. He saw the crocodile plunge and show its yellow underparts, about a hundred yards away : next its head appeared for a moment, and then it submerged. He did not see it again.

After tea, Marriott and I walked along the shore as far as we could. As we reached the end of the last clearing, just before the main mass of forest begins, an animal crashed out of the undergrowth into the lake, only a few yards in front of us. "A hippo!" Marriott exclaimed. "No," I replied, peering into the water, black beneath the sprawling branches of overhanging trees, "the crocodile, and there it is." I could just see the top of its head in the water, facing us, in the shadow of a bush. There was not a chance of a shot, the head disappeared as I raised my rifle, but the mere presence of the brute was significant. It must have been hit, and hit to some effect, or it would not have lain up for seven hours only two hundred yards from where it so nearly met its end this morning.

"Well, that's that," I said, "we know there's a crocodile in this lake, and we know that it's wounded. Perhaps to-morrow we shall find it dead."

*20th February.* To-day was spent in a fruitless search for the wounded crocodile. The fishermen were questioned but were utterly apathetic, entirely unconcerned with any affairs but their own. Not one of them offered to help.

*21st February.* This morning at 11.45 a.m., having scanned the surface of the lake at intervals since dawn, I was just becoming hopeful that the reptile must have succumbed when I sighted a crocodile in mid-lake. As it is still alive the time has come for more positive action.

The next few days were spent in endeavours to attract the crocodile to the near shore. My first idea was to shoot a hippopotamus for bait and to anchor it where I wanted it: this seemed an easy and inexpensive method of securing suitable meat. The bait, however, wouldn't play, and as I write, three months later, I have still to shoot a hippo in Nabugabo. There are three of them in the lake, and they are the most elusive animals I have ever come across! Not being able to get one in Nabugabo, I brought once across in pieces from Lake Victoria by road.

I believe hippo may have been the cause of the crocodile's arrival in Lake Nabugabo from Victoria. Hippo wander far at night and a crocodile may have followed the spoor of a young one into Nabugabo, in the hope of a delicacy.

To make doubly sure of having plenty of suitable baits I solicited the help of the local people. I asked them to tether a goat here and there near the beach for an hour or so in the early mornings. Dogs could also, I thought, play a part in avenging the death of one of their kind, by lying in perfect safety near my bungalow. Anything to make that crocodile look my way again!

All my plans proved abortive; the local people were completely unco-operative and although the ducks were again obliging the crocodile was "once bitten", and would not approach. I was driven, therefore, to laying traps in the form of large baited hooks, using all manner of bait. Believing that the crocodile would be more securely hooked if it had to grab at the meat, I hung my baited double hooks about eighteen inches above the water. They were attached to a strong seven-strand steel trace, passed through the fork of a large branch hanging out over the water and fastened to a second branch behind. A float was so arranged that, if the crocodile broke away, it would mark his position.

This was all very well in theory, but that crocodile had no intention of being caught, and removed the meat from the hooks as cleanly as we would pick a chicken bone. He was hooked three times, I feel sure, and once at least he had to fight to escape, bending one of my double hooks to an incredible extent. Another time he snapped a seven-strand steel trace a couple of feet above the water line, and for eleven nights in succession took all the baits I could devise. The last time he did this I had left two baited hooks dangling side by side. Surely, I argued to myself, he can't juggle with two at once, but he did, and both hooks were devoid of meat at dawn.

I was then told by a friend that the best way to catch a crocodile is to use a stick, pointed at both ends, instead of a hook. The stick, about a foot long, should be of *nzo* wood, and is embedded in a lump of meat. The crocodile gulps the meat, the stick catches in his throat, and a float tells you where he is in the morning. All very well elsewhere, perhaps, but not at Nabugabo! The pointed sticks were treated with the same disdain as the hooks. One night the stick and meat were taken but in the morning there was no sign of the float!

I was told of other kinds of snares later, but was by then tired of traps. I had decided to revert to using hippopotamus meat as bait, intending to shoot the crocodile from the cliff as he came in towards it.

While all this abortive trapping was in progress other activities had not been neglected. The surface of the lake was systematically searched with glasses not only at dawn and during the day, but at night also whenever there was a moon—which was not often.

The crocodile was seen several times, always in the south-west corner of the lake at a place which I christened "hippo bay". It was seen only twice after 11 a.m.; once at 12.15 p.m., once at 2 p.m. Observation was made difficult by the scores of floats attached to the gill nets all over the lake, many of which looked at first sight remarkably like crocodiles.

And now, after this digression, let us return to the diary:

*2nd March.* Sighted the crocodile in the usual place, first at 8.15 a.m., and again, exposed almost full length, at 9.45 a.m. Very soon afterwards, at 10.10 a.m., spotted a crocodile away over to the east. It is a thousand to one that there are *two* crocodiles! Are they a pair and, if so, how many offspring are at large?

*3rd March.* Harry Boazman and I, from our canoes in hippo bay, saw, distinctly, two crocodiles close together at 7.30 a.m.

*4th March.* Saw a crocodile in hippo bay at 7.30 a.m. At 8.30 a.m. a crocodile plunged like a hippo. Was it the wounded one being attacked by the other or being worried by fish?

*17th March.* Sat up most of last night in the forest near the estuary, but the moon was completely hidden by clouds from 2.30 a.m. onwards. I was fairly comfortable in a deck-chair behind a small beach, and for the first time appreciated fruit bats—they helped to keep me awake and entertained. There was plenty of time for reflection; I remembered Shakespeare's "O, aching time; O, moments long as years"; but it was all for nothing!

*18th March.* A perfect dawn. At 6.45 a.m. saw a big crocodile near the raft at the sports club beach and at 7.30 a.m. a crocodile (a different one, I think) in front of the camp. At 8 a.m. I went over to inspect the bait under the cliff and was amazed to find a crocodile there. Gave it a .404 bullet in the head: it thrashed about, plunged and dived, lashing out with its tail as it went under.

*19th March.* Found yesterday's crocodile floating near where it was shot—a male 11 ft. long. *The first crocodile shot at Nabugabo?* Its stomach contained hippo meat taken from my traps, and a few small stones. Two of its teeth had been broken recently, perhaps on my double hook.

*23rd March.* The anchored hippo bait had been moved at dawn, most

of it was in the water, only one piece remaining on the rock. At 7.20 a.m. sighted a crocodile half a mile from the bait. It stayed motionless for half an hour, then suddenly made swiftly for the cliffs not far from where I stood, turning in under the overhanging trees towards the bait. I shot it on arrival and it sank, but its body was not recovered. An old Muganda, the first Nabugabo inhabitant to give me any information, told me to-day that "three crocodiles entered the lake from the east, many months ago".

*29th March.* At 6.15 a.m. a crocodile was plainly visible out in the lake in glistening water under a bright quarter moon. In a dead calm at 11 a.m. saw a crocodile fairly close in to the shore to the right of the bungalows, perhaps after the ducks. Cannot understand why these birds were not taken long ago: they spend most of the day on the lake and often sleep either on branches only a foot or so above the water or even on the shore.

*18th April* (the first entry after a period of two weeks of dull inactivity on the part of the crocodiles). A superb dawn, gold to the east, mauve to the west, with the lake like a sheet of ice. Wind got up later. Paddled over to the east shore near the fishermen's huts thinking that I would have another look at this most unlikely spot, among the fish traps, while no canoes about. *Saw five crocodiles in less than a mile of the coast!* They ranged in size from about five to ten feet: all were lying up singly on blackish peat.

To-day, for the first time, I have discovered the true facts! So much for the local chief, the local fishermen and my paddlers, all of whom know perfectly well that I am looking for crocodiles. Not one of them ever told Boazman or me where the creatures were to be found—among the fish traps between two huts about a mile apart. Now that I know, the fishermen condescend to speak. They say there are six crocodiles altogether. It is now quite clear to me how they must be dealt with: they must be stalked and shot, one by one, until the lake is free.

*24th April.* Went out far east after breakfast. Shot a female crocodile, 8 ft. long, on the way home.

*25th April.* A perfect morning. As I passed the sports club beach at 7 a.m. a reedbuck, rushing to escape from something, took a flying leap off the cliff into the lake. Felt sorry to add to its troubles, but as good meat is scarce felt obliged to kill it. Saw two crocodiles and shot the larger. Failed to retrieve it.

*26th April.* Shot the smaller of the two crocodiles seen yesterday—a male, 5½ ft. long. No sign of the other.

*30th April.* Out from dawn till 1 p.m. Shot a young female crocodile, 7½ ft. in length, then went ashore and sent the canoe ahead. A second crocodile came back towards me; it rose about ten yards from where I sat, but submerged as I raised my rifle and I did not see it again.

*1st May.* Spent the day exploring. A very big crocodile was in clear view off the point to the west, at 7 a.m., moving slowly east. It stopped as usual in mid-lake, and then submerged. I found its lair later in a most unlikely place—no sand, no peat, just grass. It was on the north-east side of the lake in a quiet inlet about four hundred yards long. This is possibly the point at which the crocodiles first entered Nabugabo and is certainly the point at which

most of the dirty weather comes across. The inlet has tall grass trailing in the water for about a quarter of its length on the left going in, followed by reeds and occasional patches of mud, but for the most part is edged with shortish grass. I found the remains of a few crocodile eggs near the water; they were in short grass on one of the few pieces of firm ground. It seemed to me most unlikely that crocodiles could breed in such environment. The old crocodile has probably been in the lake for a very long time—but what of the others? Why have they suddenly made their appearance? The solution may be that the local Baganda are doing more hunting of *sitatunga* (a marsh antelope) between the two lakes. Any meat left lying about would, I think, attract the reptiles from a considerable distance.

The possibility of preventing further influx should certainly be explored in more favourable weather conditions—the country is flooded at present and difficult to traverse on foot. It is obvious that the more unfavourable conditions are to man the more favourable they are to the easy passage of crocodiles.

The crocodiles seem to lie up in several places, more often than not, apparently, in the long grass sprawling over the water, where they are practically invisible to passing canoes. When I first went round the lake on 17th February I mistook some of the worn places where they lie for fishermen's landing places. They are slightly barer than their surroundings, and the grass is flattened—the sort of place where a canoe might have grounded. As it happened, my canoe this morning went almost on to one of the brutes, as it lay hidden. There was the usual scrambling noise in the grass and then a splashing plunge as it dived in under us. I never got a glimpse of it.

*2nd May.* Something new to report. At 12.30 p.m. the big crocodile was plainly visible in the far distance, some way out from the lair. At 1 p.m. it met another, and a short tussle ensued. It looked as if one was being attacked because several times a head with jaws wide open came out of the water. After a few minutes one of the two went slowly off.<sup>1</sup>

*3rd May.* Killed a female crocodile of 7 ft. After I had disturbed it without getting in a shot, and when waiting for it to lie up again, a *sitatunga* doe appeared only fifty yards from me, wading gracefully in the shallow water quite unaware of my presence. It made off suddenly when two dogs came on the scene. Through my glasses I could see their owner making his way along the treacherous coast I knew so well. When the party had gone off I saw the doe's head in the lake: she had taken to the water to evade the dogs. She swam a long way out, but came to no harm in that dangerous spot, and landed safely well away from her pursuers.

*7th May.* Bagged an 8 ft. crocodile to-day with a diagonal shot which passed through the brain, thorax and heart. These small crocodiles are unafraid of canoes. They often appear only a few yards away but give one a poor target.

*8th May.* Shot another small female crocodile, 5½ ft. long. It leapt up at the strike of the bullet and came down on its back, lying belly up for

<sup>1</sup> It is possible that the crocodiles were mating. See Captain C. R. S. Pitman's "About Crocodiles" in the *Uganda Journal*, Vol. 9, p. 94.—[ED.]

several minutes. As I approached it slipped into the water but later I got another shot and finished it off.

*11th May.* Had an interesting but, on the whole, a disappointing day in the big crocodile's lair, grounding the canoe a quarter of a mile away and walking across unpleasant boggy country to the inlet. I thought the noise I was making in the long grass strewn with dead leaves and thick crackling yams (*mayuni*) must disturb anything that might be there, but it didn't, and I almost walked on to the crocodile. He was lying on some mud close to where I had put him up before but, most unfortunately, was hidden from me by a clump of reeds. I saw his head as he went under water with a splash and swirl, only twenty-five feet from where I stood. I hadn't time to raise my rifle. I then settled down as best I could in some long thickly clumped reeds, dry on top but with deep water only a foot underneath, where I could get occasional glimpses of the lake without exposing myself.

The scene before me was attractive, and typically African. The inlet was glistening in the sun, with hardly a ripple on its surface; not far off a beautiful white heron stood motionless awaiting a fish; near it a rufous heron was preening itself on the bank; a brace of yellow-bill ducks swam unsuspectingly past and landed on a minute island; a brilliant pigmy kingfisher perched on a twig near my side; several pied kingfishers were diving assiduously for their prey; and from time to time other birds, including weavers and bee-eaters, came into view. Tranquil as it usually seems, the inlet is full of surprises: it is not a place to be trifled with. After waiting nearly an hour in its peaceful stillness, I was rudely startled by a loud and wholly unsuspected grunt close by. Surely, I thought, that must be the crocodile (though the noise had sounded more like a buffalo or hippopotamus), and I suspected that it must either have scented me or must have a companion with it. I raised myself to peer through the reeds, and there, sure enough, in the water only twenty yards away, was a sinister head looking in my direction. My rifle was ready, cocked, by my side but in the moment it took to raise it the coveted trophy had disappeared.

After another long wait there came a slight sound from the water a few yards to my right. Again I looked through the reeds but this time saw only a swirl and a circle of ripples. A crocodile had been lying hidden in the mud and long grass almost at my feet! Surely the big one hadn't had the foolhardiness to pass me and lie there calmly after spotting me aiming at him? It must have been another.

Not long afterwards the very big one cruised round the inlet, showing only the top of his head. He was within easy range but was not showing enough of himself for me to risk a shot. And then I saw a second. It was lying at the far end of the inlet and stayed there motionless for an hour or more, only once showing any sign of life when it blew through its nostrils, making the water ripple on either side—a thing I have never before seen a crocodile do. At 4 p.m. the wind rose and I left for home.

*15th May.* A red-letter day! Once again I walked across that foul piece of country to the lair and almost immediately put up two crocodiles in quick succession, but did not see either. While looking for the big fellow,

from a new hide, I was surprised to see the other swim strongly into the bay, head well up out of the water and back showing too, giving the impression of a battleship going into action. I took the hint, turned my artillery on to him as he passed my hide, and gave him a bullet in the forward turret. There was no commotion but I saw black mud churned up from the bed of the lake. Later, after vainly watching the big one in the hope that it would present a better target, I made my way along the shore to another hide, where to my great joy I found that I had at last caught a crocodile unawares. There, only twenty feet in front of me, was a great green body lying flat on the floating sudd, the head pointing away from me. I put a bullet into it and the creature hardly moved. It was the one I had shot earlier, a female 11 ft. long, containing one hundred and six eggs.<sup>1</sup> Fifty-two of them were nearly the size of a ping-pong ball, the rest ranged down to a quarter of that size. My first shot, although missing the eyes and the brain, had gone through the top of her head, no doubt the reason why she had lain up again so soon and so near.

On the way home, in dull weather, a fish eagle flew in front of the canoe and, suddenly, before I knew what it was after, swooped down to the rough water and grabbed a very large fish from the surface—a *semutundu* of about five pounds. It was an impressive sight.

*23rd May.* The reverse of a red-letter day! Went to the second hide and after a careful search of the near shore looked across the inlet and saw a big crocodile on the grass close to the water: it was fully exposed except for the head, which was hidden by a tuft of grass. What was to be done? It was a long shot in a bright glare and there seemed little chance of getting over the inlet unobserved. As it was no good just standing and looking, I decided to risk a shot. When I fired, the brute sprang instantaneously into action and hurled itself into the water. When it reappeared it seemed to be in trouble, raising itself partly out of the water and laying its head on the bank. I fired again, and it moved not an inch. After a quarter of an hour I assumed it was dead but it slipped back into the water just as my paddler brought up the canoe. Ten minutes later I saw the head of a crocodile swimming out of the inlet. Had I been in the outer hide I could have had a shot at it.

*24th May.* Although yesterday's journey back was very tiring in a choppy sea I decided this morning, weary though I was, to try again. A storm was approaching but I got to the first fishing hut before the rain began. Within a quarter of an hour of starting off again I spotted the head of a large crocodile propped up against a clump of peat in a place I had not seen one before. Luckily I was on the alert and had not relaxed even in this unlikely spot, fully two miles short of the lair. My paddler and I managed to hide the canoe without the crocodile seeing us and then I had a difficult and hazardous stalk along the boggy coast. When I reached some good cover a hundred yards from the crocodile, I rested to regain my breath, took aim at the vital spot, and fired. The crocodile didn't move, so we went

<sup>1</sup> According to Pitman (loc. cit., p. 98), sixty eggs is an average clutch. The most he has found in a nest is eighty-five.—[ED.]

across ; and then a curious thing happened. My canoeman hit the creature with his paddle, to make sure it was dead, and its upper jaw moved. I was taking no chances : I put another bullet into its brain. A second later the jaws opened slowly to their full extent, closed, and opened again—yet the animal was dead ! On the upper jaw just in front of the left eye was a large wound where a bullet had gouged out a piece of bone across more than half the skull. *It was the wound I had inflicted on my very first victim at Nabugabo—on the 19th February.* Is this the big fellow dead at last ? I hardly think so. To-day's victim, a female, is only 11 ft. long. I feel sure that the one I hit yesterday was larger, and that there may well be a bigger one still. The hunt must continue.

*26th May.* A beautiful morning. Had a surprise at the lair when I came across a crocodile in almost the same place that I got the big female on the 15th. It was impossible to get a good view because it was well hidden by reeds. I risked a shot but the only result was the familiar rush and splash. My feelings and language are better imagined than committed to paper ! I went on to explore the far end of the lair, and the inlets beyond, and was amazed to come on the crocodile a second time. It had apparently gone to this remote corner to lie up ; all I saw of him as my canoe glided silently by was a cluster of bubbles and some churned-up mud.

*27th May.* A boisterous day, but I'm glad I went out, for I killed a young female crocodile of 6 ft. This is the last of the small fry, I feel sure—the only one left now is the one that really counts.

*30th May.* After two days of rough weather, very little sun, and exasperating delay, to-day dawned clear though dull. I arrived at the lair at 10.30 a.m., explored it first on foot and then by canoe, went on as far as the fishing village to get shelter from rain and then came back again at 3 p.m. After the storm, the place was unpleasantly wet, cold and eerie, and I very nearly gave up the search, thinking no crocodile would lie up in such bleak weather. There was nothing to be seen from the first two hides, but from the third, when I searched the far shore near the top of the inlet with my glasses, I got the sight for which I had been longing—the big crocodile in full view on a bank of short grass. If I could struggle through the marsh between the hide and the head of the inlet I would be within eighty or ninety yards of my quarry. The colossal brute was facing and almost in the water, its head propped up on a clump of grass and its jaws wide open, presenting a rare target. I reached my objective without much trouble but had to try several firing points before I was satisfied. The wind had meantime dropped completely and I feared the crocodile might hear me. At one time I found myself on top of a nest of small biting ants, which did not add to my composure : it was just as well that I didn't have the experience of a day or two back when a snake slithered across my bare leg. However, when at last I settled down and peered through the reeds to make sure that my target had not moved I was thankful to see that huge yellow mouth still gaping across the water. I wished I had brought the .450 double barrel, but my trusty old .404 magazine would no doubt meet the case. I took careful aim at the monster's upper palate and fired for the brain. At the shot, the immense jaw

snapped shut and the head collapsed almost into the water. I was not satisfied, however, and sent across a second bullet to the back of the head. It was a clean shot and, as I was certain that the crocodile was dead, I was in no way alarmed when it toppled over into the water. After that came two and a half hours of hard work trying to get the body to the surface. It was lying in about ten feet of water and the fishermen's spears were quite unequal to the job of lifting it: nothing we had with us could puncture that armour-plated hide. We gave up at 6 p.m. and returned to camp for my harpoon.

*31st May.* To-day at noon the trophy was brought in. Compared with the ten other crocodiles which have been landed, it is gigantic. It is an old male, 15 ft. long, and huge in girth, measuring 5½ ft. round the body, 4 ft. 7 in. round the neck, and 4 ft. 1 in. round the base of the tail. These measurements dwarf those of the biggest of the seven thousand crocodiles trapped during the last two years in Lake Kioga—a specimen of 13 ft.—but crocodiles from that locality do not attain the dimensions of those in Lake Victoria.<sup>1</sup>

To the casual glance, there was no sign of a wound. The first bullet had entered right at the back of the throat, and had not emerged; the second had made an almost invisible puncture in the dark green plating behind the head.

When I pondered over the immense body lying on the beach I hoped that all Nabugabo bathing enthusiasts would be duly relieved and thankful that the monster's obituary notice could now be written. The lake itself was exceptionally calm when the carcass was brought ashore—as if celebrating the fact that it was at last cleansed of the awful stigma which for a brief time had besmirched its honourable name.<sup>2</sup>

<sup>1</sup> Most of the adult male crocodiles measured in Lake Victoria by Pitman have been 12-14 ft. long (loc. cit., p. 109). Specimens just over 14 ft. are not uncommon, but he has seen only one of 15 ft. Of the hundreds of females shot on the breeding grounds the majority have been 10-11 ft. long. Breeding females 9-10 ft. long are not uncommon, but anything smaller is rare. Pitman had measured one breeding female of 12 ft. and another of 13 ft. His largest female was a monster of 14 ft., but this was no longer breeding.

Newly-hatched crocodiles are 11-13 in. long and, in favourable conditions, will grow for several years at the rate of about 9 in. a year. On this basis, the eleven Nabugabo crocodiles measured by Mr. Temple Perkins may be classified as:

- 2 adult males and 2 adult females of uncertain age;
- 4 immature females, 8-10 years old;
- 2 immature females and 1 immature male, about 6 years old.

Captain Pitman considers that the two 11 ft. females and the 15 ft. male must have been at least 30 years old.—[ED.]

<sup>2</sup> Since this story was written, in June 1946, more crocodiles have appeared in Nabugabo. The exceptional rains at the end of that year no doubt flooded the country between the two lakes, which may account for this fresh colonization.—[ED.]

## AHMED BIN IBRAHIM—THE FIRST ARAB TO REACH BUGANDA

By SIR JOHN MILNER GRAY

WE are told by Sir Apolo Kagwa in *Basekabaka be Buganda* (p. 88) that blue cotton cloth, copper wires, and cowry shells first reached Buganda during the reign of Semakokiro. He tells us that Semakokiro used to send ivory to Karagwe to exchange for these commodities. On one occasion the chief in charge of this trading mission was waylaid, robbed of his ivory and killed. Semakokiro thereupon led a punitive expedition into Karagwe and returned with a large number of cattle. Shortly after his return Semakokiro died. The date of his death can be fixed with an approximate degree of certainty as having taken place round about 1815.

In 1856 the C.M.S. Missionary, James Erhardt, published the famous "Slug Map", which contained all of what was then the most recent and most reliable information regarding the interior of Africa. On that map he delineated the "chief route of the Suahelis, Arabs, and Waniamesi to and from Uniamesi". The route extended from Bagamoyo, on the east coast opposite to Zanzibar, to Ujiji, on the shores of what Erhardt called the "Ukerewe Sea"<sup>1</sup> but which is now known as Lake Tanganyika. With some deviations the modern railway from the coast to Lake Tanganyika follows much the same line as Erhardt's "chief route of the Suahelis". When it reached the place which Erhardt called "Unianembe" and which we know as Tabora, the route would appear to have forked, as the railway does at the present time. One track continued westwards to Ujiji and the other (which is not shown on Erhardt's map) led north to Lake Victoria.

It must have been along this route from Bagamoyo that the first cloth was carried, about a century and a half ago, to Buganda. It must have been the same sort of highway as Burton, Speke and Livingstone describe—a narrow, fairly well-trodden track, winding through forest, jungle and elephant grass, along which men could only walk in single file. There is no record or tradition that in those very early days any Arabs ventured so far into the interior as Karagwe. Probably, therefore, the people who brought this cloth to Karagwe were either Wa-Swahili or Wa-Nyamwezi, who were the early "merchant adventurers" of Central Africa. Their trading ventures were doubtless more or less casual and were probably not conducted upon any very large scale. None the less, the fact that Semakokiro considered it to be worth his while to send parties to Karagwe to exchange ivory for cloth shows that the ventures were something rather more than mere petty trading. Even so, the impression one gains is that, at that date, the trade was very spasmodic.

Arab trading ventures into Central Africa began to assume importance soon after Seyyid Said bin Sultan, Sultan of Oman and Zanzibar, finally

<sup>1</sup> "Ukerewe Sea. So the sea is called about Ujiji" (Erhardt).

disposed of the Mazrui at Mombasa in 1837 and thereby made himself the undisputed master of the east coast of Africa. It is impossible to say how far this commercial expansion was systematically promoted and encouraged by Seyyid Said himself, but what is certain is that during the next twenty years the whole system of trade between the coast and the interior expanded far beyond the more or less casual operations of previous days and came to be conducted on quite an elaborate scale. The caravans grew in size and would indeed sometimes appear to have mustered more than a thousand strong. Trade routes hitherto unknown to the Arabs were explored, and Arab settlements came into being at the more important commercial centres on these routes. One such settlement was already established at Ujiji when Erhardt compiled his map. Another, which was established in the outskirts of the large and straggling African town of Unyanyembe, came to be called Tabora. As we shall see, a third was established in Karagwe near the banks of the Kagera at Kafuro.

Burton and Speke visited the Arab settlement at Tabora in 1857-58. Speke was back there again, with Grant as his companion, in 1861. During their stay at Tabora, these three learnt a good deal about the trade which the Arabs had opened up with Buganda.

In about 1848 an Arab half-breed named Saim visited Buganda and according to himself travelled, thence, eastwards as far as the Masai country.<sup>1</sup> About the same date the Baluchi, Isa bin Hussein, who is said to have been once a soldier in the Sultan of Zanzibar's army, arrived in Buganda and apparently installed himself with his matchlock as Suna's personal bodyguard.<sup>2</sup> Isa was standing guard over Suna when Snay bin Amir El Haris visited Buganda in 1852. Six years later Snay gave a long and interesting account of that visit to Burton, who gives the substance thereof in his *Lake Regions of Central Africa* (II, p. 183, et. seq.).

Sir Apolo Kagwa gives us no dates, but supplies some further interesting particulars regarding these Arab visitors. It would appear from him that about the time of Saim's visit in 1848 certain Arabs or Swahilis assisted the Baganda in a raid into Busoga and rendered invaluable aid by using "secret weapons" in the shape of firearms. But a much more interesting person still was Ahmed bin Ibrahim El Ameri, part of whose story is told by Sir Apolo Kagwa in *Ebika bye Buganda* (p. 104).

Like a great many of his contemporaries, the father of Ahmed bin Ibrahim El Ameri migrated with his family from Oman to Zanzibar during the reign of Seyyid Said bin Sultan. In 1876 Ahmed himself was old enough to be called Sheikh Ahmed, a title of respect which is generally accorded to Arabs of good social standing round about their fiftieth year. It would therefore seem probable that he was born between 1820 and 1825. As was the case with a number of his contemporaries, the spirit of adventure attracted

<sup>1</sup> Speke (*Journal of the Discovery of the Sources of the Nile*, p. 148).

<sup>2</sup> Burton's and Speke's accounts of Isa bin Hussein differ in many details (cf. Burton—*Lake Regions of Central Africa*, I, p. 193, and Speke—*Journal*, pp. 276, 349). The latter's statement that Isa was given land in Buddu is confirmed from native sources and his descendants are said to have been living in the country until very recently. Burton, on the other hand, alleges that "after his patron's death he fled to independent Unyoro".

Ahmed to the mainland at a very early age. Some years later Ahmed bin Ibrahim told Emin Effendi<sup>1</sup> that he had paid three visits to Buganda during the reign of Suna. According to himself he was the very first Arab to visit Suna and first arrived at his Court in A.H. 1260 or about A.D. 1844. His third visit was some time before Suna's death which, according to him, occurred in the month of Safar 1273, otherwise October 1856. Stanley, who met him some twenty years later, says, "the quick nervous gestures and the bold voice of Sheikh Hamed, seemingly entirely out of place, jarred on me".<sup>2</sup> But Sir Apolo Kagwa tells us in his *Ebika* (p. 104) of one occasion when the bold voice of Ahmed bin Ibrahim was raised to good effect. Like his predecessors and like his son and successor, Suna not infrequently ordered large scale executions of his subjects in propitiation of the deities of Buganda. Once, such orders were given by Suna in Ahmed's presence. Ahmed at once rose to his feet and told Suna that both he and his people had been created alike by Allah, that to Allah alone he owed his kingdom, and that it was a grievous sin in the eyes of Allah to destroy those whom Allah had created. Probably no previous ruler of Buganda had ever been addressed in such language. Many of those who heard this rebuke must have been aghast and almost expected the heavens to fall, or at least to see the Arab share the fate of the victims, whose cause he had thus pleaded. But Suna had some true elements of magnanimity in him. He was much struck by the boldness of the rebuke and asked to be told something of this religion which was no respecter of persons. Thereafter there were several meetings between him and Ahmed, at which Ahmed bin Ibrahim expounded some of the elementary principles of Islam.<sup>3</sup> For a time Suna proved a ready listener. After his death a report was spread that he had died a Mohammedan, but Mohammedans have never claimed him as a convert and there is no doubt at all that Suna died almost, if not quite, as thorough-going a pagan as he was on the day when he first "ate Buganda". When Ahmed bin Ibrahim left Buganda, Suna's interest in Islam appears to have waned very rapidly. Perhaps the only relic which survived in after years of those fleeting studies of Islam was an old and tattered religious treatise in Arabic script, which passed from Suna to his son and successor, Mutesa, and was shown by the latter to Chaillé Long in 1874.<sup>4</sup>

From a purely commercial point of view Ahmed bin Ibrahim, like others of his compatriots, had nothing but praise for Suna. He later told Emin that he had found him "most obliging". In addition to ivory, he appears to have obtained from him a number of slaves who had been captured in wars with the Banyoro. The report which was given by other Arabs to Burton at Tabora in 1858 was that "Suna greatly encouraged, by gifts and attention, the Arab merchants to trade at his capital; the distance has

<sup>1</sup> The autobiographical information communicated by Sheikh Ahmed to Emin is set out in full in Appendix A.

<sup>2</sup> *Through the Dark Continent*, I, p. 457.

<sup>3</sup> See "Extracts from 'Mengo Notes'" in this present issue, where Ahmed bin Ibrahim is referred to by Sir A. Kagwa as Medi Abraham.—[ED.]

<sup>4</sup> Chaillé Long (*Central Africa*, p. 120).

hitherto prevented more than half a dozen caravans travelling to Kibuga ; all, however, came away loudly praising his courtesy and his hospitality".<sup>1</sup> But at a later date differences appear to have arisen between the Arabs and the Baganda : at the time of Suna's death there were apparently no Arabs in Buganda and a ban was imposed upon their entry until such time as Suna's successor should have securely established himself by going through the ceremony of "eating Buganda".<sup>2</sup>

Ahmed bin Ibrahim would appear to have left Buganda some time before Suna's death, which as already mentioned, took place according to him in October 1856. We next hear of Ahmed at Kirira, a place slightly off the direct route from Tabora to Ujiji. He was then apparently in partnership with an older man named Masud bin Musellem El Wardi.

In December 1857, Burton set out from what is now Tabora on his journey to Lake Tanganyika. He met Ahmed bin Ibrahim at Kirira and gave the following account of the meeting in the *Lake Regions of Central Africa* (I, pp. 392-393) :

"After a short and eventless march, on the 26th December, to Masenga, I reached the following day the little clearing of Kirira. I was unexpectedly welcomed by two Arabs, Masud bin Musellem El Wardi, and Hamid bin Ibrahim El Amuri. The former, an old man of the Beni Bu Ali clan, and personally familiar with Sir Lionel Smith's exploits, led me into the settlement. . . There was much bustling and not a little importance about Hamid, the younger host, a bilious subject of twenty-four or twenty-five years old, who for reasons best known to himself assumed the style and title of Sarkal—Government servant."

As a footnote to this passage, it may be mentioned that, as he himself states, Burton was at this date a very sick man and his impressions of strangers, whom he encountered on his travels, may therefore have been somewhat jaundiced. It is also possible that his estimate as to the age of his younger host is not altogether reliable. Information from other sources suggests that Ahmed bin Ibrahim may have been at least five years older than the age attributed to him by Burton. Ahmed and his partner had with them what Burton describes as "a large gang" of slaves who had originally come from Bunyoro.<sup>3</sup>

Ahmed was to refer to this meeting in a conversation with Emin Effendi over eighteen years later. On 14th August 1876 Emin mentions in his diary "Sheikh Ahmed or, as he was called by Burton, Hamed bin Ibrahim". On 11th August—three days earlier—Emin mentions that "he inquired with great cordiality after Haji Abdulla (Burton), whom he admired very much. He will write to him and I shall procure that the letter be sent to Burton." In due course the letter was written and despatched by Emin to Burton in Trieste.<sup>4</sup>

<sup>1</sup> *Lake Regions of Central Africa*, II, p. 193.

<sup>2</sup> Speke (*Journal of the Discovery of the Sources of the Nile*, pp. 187, 265).

<sup>3</sup> *Lake Regions*, II, p. 198.

<sup>4</sup> Wilkins (*The Romance of Isobel, Lady Burton*, pp. 651-652).

It would appear that in about 1861 Ahmed bin Ibrahim paid one of his rare visits to Zanzibar. At a later date he told Emin that he was acquainted with Captain (afterwards General) Rigby, the British Consul at Zanzibar, and the Hanoverian explorer, Baron von der Decken. He can only have met the former at Zanzibar. In all probability he also met the latter at Zanzibar in one of the intervals between two of his journeys of exploration on the mainland. As Rigby left Zanzibar in 1861, it was probably in the early months of that year that Sheikh Ahmed met these two Europeans, that is to say, after von der Decken's return from the Kilwa hinterland at the beginning of that year and before his departure for Mombasa and Kilimanjaro in June 1861.

One gathers from subsequent information that Ahmed bin Ibrahim returned very soon to the interior of Africa. He would appear to have been back in Karagwe, on the southern bank of the River Kagera (Alexandra Nile), in about 1864. It was at Kafuro in Karagwe that Stanley met him on 15th February 1876. In his *Through the Dark Continent* (I, p. 453), Stanley gives the following account of him:

“Hamed bin Ibrahim is rich in cattle, slaves and ivory. Assuming his own figures to be correct, he possesses 150 cattle, bullocks, and milch cows, 40 goats, 100 slaves, and 450 tusks of ivory, the greater part of which latter is reported to be safely housed in the safe keeping of his friend, the chief of Urangwa, in Unyamwezi. Hamed has a spacious and comfortable gable-roofed house. He has a number of concubines, and several children. He is a fine, gentlemanly-looking Arab, of light complexion, generous and hospitable to friends, liberal to his slaves, and kind to his women. He has lived eighteen years in Africa, twelve of which have been spent in Karagwe. He knew Suna, the warlike Emperor of Uganda and father of Mutesa. He has travelled to Uganda frequently, and several times made the journey between Unyanyembe and Kafuro. Having lived so long in Karagwe, he is friendly with Rumanika who, like Mutesa, loves to attract strangers to his court.”

“Hamed has endeavoured several times to open trade with the powerful Empress of Ruanda, but has each time failed. Though some of his slaves reached the imperial court, only one or two managed to effect their escape from the treachery and extraordinary guile practiced there.”

It was apparently round about 1868 that Ahmed made his first unsuccessful attempt to enter Ruanda.

“The Wanya Ruanda”, he told Stanley, “are a great people, but they are covetous, malignant, treacherous and utterly untrustworthy. They have never yet allowed an Arab to trade in their country, which proves them to be a bad lot. There is plenty of ivory there, and during the last eight years Khamis bin Abdulla, Tippu Tib, Sayid bin Habib and I myself have attempted frequently to enter there, but none of us has ever succeeded.”<sup>1</sup>

<sup>1</sup> *Dark Continent*, I, p. 455.

“ You cannot ”, he said a few days later, “ proceed through Mpororo, as the people are Shaitans<sup>1</sup>—devils—and the Wanya Ruanda are wicked ; and, because something happened when the Wangwana<sup>2</sup> first tried to go there, they never tolerate strangers. A strange people and full of guile verily ! ”<sup>3</sup>

Stanley stayed just over a month in Karagwe. On 21st March 1876—five days before he left—Sheikh Ahmed showed Stanley, at Rumanika’s request, “ the treasures, trophies, and curiosities in the King’s museum or armoury, which Hamed was most anxious to do, as he had frequently extolled the rare things there ”.<sup>4</sup> Fifteen years before, Rumanika had shown the “ museum ” to Speke.<sup>5</sup> It exists to this day at Bweranyage, though many of the exhibits which were there in Stanley’s day have since disappeared.<sup>6</sup> Not a few of these were “ gifts from Arab friends ” amongst whom must in all probability be reckoned Sheikh Ahmed bin Ibrahim. Though Stanley himself does not mention the fact, before setting out for Lake Tanganyika he borrowed a thousand dollars from Sheikh Ahmed.

Stanley left Karagwe on 26th March 1876. Some time within the next three months Sheikh Ahmed bin Ibrahim returned to Buganda after an absence of twenty years or more. During those years a good deal had happened in the country and a short account of some of those events is desirable.

When Speke and Grant visited Mutesa in 1862, the ban on the entry of Arabs into Buganda appears not yet to have been lifted, or only to have been lifted very partially.<sup>7</sup> But in or before 1867 there would appear to have been a fairly considerable influx of Arabs into Buganda. On Christmas Day, 1868, David Livingstone, who was then to the west of Lake Tanganyika, received an erroneous report that a steamer was working on a certain lake called “ Chowambe ”. His informants were Arabs from Ujiji, who told him that “ a letter came from Abdulla bin Salem, Moslem missionary at Mutesa’s, Ujiji, three months ago with this news ”.<sup>8</sup> Amongst other early arrivals Sir Apolo Kagwa mentions a certain Ali “ Nakatula ”.<sup>9</sup> In his celebrated letter to the *Daily Telegraph* Stanley mentions the “ poor Muslim ”,

<sup>1</sup> The particular Shaitan of Mpororo would appear to have been female—in other words, a reincarnation of the Nyabingi spirit, cf. Bessel—“ Nyabingi ” (*Uganda Journal*, Vol. 6, p. 73).

<sup>2</sup> i.e., the Coastal People.

<sup>3</sup> *Dark Continent*, I, p. 469.

<sup>4</sup> *Dark Continent*, I, p. 473.

<sup>5</sup> Speke (*Journal of the Discovery of the Sources of the Nile*, p. 206).

<sup>6</sup> Hall, “ A Tribal Museum at Bweranyage ” (*Tanganyika Notes and Records*, Vol. V, p. 1).

<sup>7</sup> In “ Some Notes on the Reign of Mutesa ” (*Uganda Journal*, Vol. 1, p. 129), Omwami Hamu Mukasa says two Arabs (Abdulla bin Hassan and Muhoya bin Saleh) arrived in Buganda in 1859 and began to instruct Mutesa in the Koran. Of these two persons Muhoya bin Saleh may be Stanley’s Muley bin Salim. But neither Speke nor Grant makes any mention of Arabs in Buganda at the time of their visit in 1862, or of any Arab having recently visited the country. On 7th January 1862, Speke met “ a semi Hindu—Suahili, named Juma, who had just returned from a visit to the King of Uganda ” (*Journal*, p. 243). This Juma may well have been mistaken by the Baganda for an Arab.

<sup>8</sup> Waller (*The Last Journals of David Livingstone*, I, p. 359).

<sup>9</sup> *Basekabaka*, p. 139.

Muley bin Salem, and the "noble youth of Muscat", Khamis bin Abdulla.<sup>1</sup>

It would appear that these new arrivals found few, if any, traces of the work done by Ahmed bin Ibrahim some twenty or more years previously. At this date the attitude of the inhabitants of Buganda to religious matters appears to have been distinctly Erastian. In their eyes Suna was Buganda personified. To follow what he declared to be the true religion seemed to his subjects not only to be expedient, but also positively right. Therefore when Suna relinquished his ephemeral interest in Islam, his subjects at once followed his example.

Consequently at the time of Mutesa's accession there would not appear to have been even a small remnant of converts observing the rites of Islam, either openly or in secret. The religion had gone out of fashion and out of mind. But the newcomers to Mutesa's court were, many of them, missionaries as well as traders. Some of them began to expound once more the doctrines of Islam. Stanley names as the principal of these missionaries Muley bin Salim, who may be the same person as Livingstone's Abdulla bin Salim. He found in Mutesa an apt and ready listener.

There is evidence that not a few of Mutesa's subjects were far from satisfied with the grosser forms of superstition which surrounded many of the pagan cults which then prevailed in Buganda and that they were anxiously seeking for some better form of worship. To them the religion of the Arabs made a real appeal and they embraced that faith from a true sense of religious conviction. "Their creed", said one of their number, who later became a Christian, "seemed to be superior to our superstitions. I received instruction and, together with a number of Baganda, embraced their religion."<sup>2</sup> But Mutesa's profession of zeal for Islam does not appear to have arisen from the same sense of conviction. The informant just mentioned believed that Mutesa's motive was anxiety to please the Sultan of Zanzibar. It is certainly interesting to note that, in 1870, Mutesa sent a special caravan to Zanzibar with presents for the Sultan, which included ivory and a young elephant.<sup>3</sup> The motive for this expedition was avowedly the acquisition, by the Baganda, of arms and ammunition. One is also disposed to think that the same motive lay behind Mutesa's contemporary profession of a desire to become a Mohammedan. If the Sultan of Zanzibar could be persuaded that he was dealing with a co-religionist, he might be induced to be more liberal in the supply of arms and ammunition.

Having announced that he wanted to become a Mohammedan, Mutesa went to considerable lengths to spread the impression that he really meant what he had announced. We are told that "orders were given to build mosques in all the counties. For a short while it looked as if the whole

<sup>1</sup> Hutchinson (*The Victoria Nyanza*, pp. 15-18). Stanley describes Khamis bin Abdulla's exploits in *How I found Livingstone*, pp. 267, 293.

<sup>2</sup> Nicq (*Vie du Réverend Père Simeon Lourdel*, p. 224; Hallfell (*Die Neger-Martyrer von Uganda*, p. 45); Thoonen (*Black Martyrs*, p. 50).

<sup>3</sup> For an account of this caravan, see Appendix B.

country was going to embrace the religion."<sup>1</sup> Sir Apolo Kagwa says Mutesa introduced the Mohammedan calendar.<sup>2</sup> According to the same authority he also on one occasion announced that it was a criminal offence for his subjects not to greet him or each other in Arabic fashion and with the appropriate Arabic words. Twelve of his luckless subjects, who failed to comply with this edict, were put to death.<sup>3</sup> Zanzibar influence appeared to be greatly on the increase and several Wa-Swahili were appointed to Chieftainships. Omwami Hamu Mukasa tells us that Mutesa's profession of enthusiasm for the new religion carried him so far that he sent messengers to Bunyoro to convert Kabarega, who became ruler of that country in 1869. The messengers were sent back with a polite intimation that Kabarega had his own gods whom he worshipped and with whom he was quite satisfied.<sup>4</sup>

But, as Cameron was told by some Baganda who visited him at Tabora in 1873, the great "obstacle in converting Mutesa to the Mohammedan religion was the difficulty experienced in finding any one sufficiently bold to perform the rite of circumcision, for it was feared that death would be meted out to any one who caused him pain."<sup>5</sup> If, however, Mutesa was not prepared to go thus far, certain of his subjects were quite ready to do so. Either in the latter half of 1874 or else in the opening days of 1875 they were to learn that they had incurred the royal displeasure by thus wholeheartedly embracing an alien faith.<sup>6</sup> The trouble arose when certain of the converts refused to eat meat, which had been killed by the Kabaka's butcher, who was a pagan.<sup>7</sup> Orders went out that all the converts were to be put to death. There was a general round up and a large number were actually burnt alive.<sup>8</sup> Some two or three hundred more managed to escape and to join Arab caravans, and thus to make their way out of the country to Zanzibar. A few more were able to conceal their conversion and to pass themselves off as pagans,<sup>9</sup> and others hid until the war of persecution spent itself.<sup>10</sup> But for the time being Islam had received a very severe set-back in Buganda.

<sup>1</sup> Nicq, Hallfell and Thoonen, loc. cit.

<sup>2</sup> *Basekabaka be Buganda*, p. 139.

<sup>3</sup> *Ebika bye Buganda*, p. 106. Probably the edict was issued for no other purpose than to collect victims for a propitiatory sacrifice to some deity. In order not to be accused of shedding innocent blood, Mutesa had simply declared that non-compliance with this edict was a capital offence. Father Thoonen (op. cit., p. 53) gives another example of this method of collecting victims for a human sacrifice. When, in 1874, Chaillé Long was about to proceed to the Ripon Falls, seven men were decapitated to propitiate the river god and Mutesa told Long in broken Arabic: "It is necessary that I kill these men because you wish to go to the river (they would prevent me); they have done me much injury, but it pains my belly to kill them" (Hutchinson, op. cit., pp. 29-30).

<sup>4</sup> Omwami Hamu Mukasa, "Some Notes on the Reign of Mutesa" (*Uganda Journal*, Vol. 1, p. 130).

<sup>5</sup> *Across Africa*, I, p. 154.

<sup>6</sup> *Mackay of Uganda*, p. 183, says this incident took place "before Stanley's arrival". As Chaillé Long does not mention it, it would appear that it took place after his departure in July 1874 and before Stanley's arrival in April 1875.

<sup>7</sup> Ashe (*Two Kings of Uganda*, pp. 129-130).

<sup>8</sup> *Mackay*, p. 183, gives the figure as 200; and Wilson (*Uganda and the Egyptian Soudan*, I, p. 209) as 100. Very possibly the figures were exaggerated by the informants.

<sup>9</sup> Nicq, p. 224; Hallfell, p. 74; Thoonen, p. 50.

<sup>10</sup> Ashe (*Two Kings of Uganda*, p. 130).

Shortly after this massacre, Stanley reached Mutesa's capital and sent, thence, his celebrated appeal to the *Daily Telegraph*, for Christian missionaries to come to Buganda. Stanley arrived at Rubaga in April 1875, and finally left Buganda in the early days of 1876. At Mutesa's request he left behind him a certain Dallington Scopion Muftaa "that he might assist to confirm him in his new faith, that he might read the Bible for him, and perform the service of a Bible reader until the good people of Europe should send a priest to baptize him and teach him the duties of the Christian religion".<sup>1</sup>

It was soon after all these events that Sheikh Ahmed bin Ibrahim returned to Buganda. He found Mutesa posing for the time being as "the most Christian king" of Buganda. Dallington was in high favour. He was not only being constantly called in to impart religious instruction to the Kabaka, but he had supplanted Mutesa's former Arab scribe as his private secretary and all Mutesa's official correspondence was being conducted by him. Dallington Scopion Muftaa was an ex-slave from Nyasaland and was a youth of only seventeen. Sheikh Ahmed bin Ibrahim was middle-aged, a free-born Omani Arab, and a strict Mohammedan. For him it must have been particularly galling to find thus installed in favour a person so diametrically opposite to himself as Dallington. Moreover, Mutesa was not ready to spare from further humiliation the Arab who had once been his father's friend. He took a special delight in promoting disputations on religious topics in front of himself. Religious controversy tends only too often to become extremely embittered. When the protagonists were a free-born Omani Arab of middle age and an African ex-slave, who was a mere youth, that bitterness was likely to be increased tenfold and the consequences might have been disastrous. Very fortunately the disputes never appear to have reached alarming proportions.

This was probably due in no small degree to subconscious recognition of the fact that, whatever his religion might be, Ahmed bin Ibrahim was a person entitled to considerable respect. He had reached an age and a position in life which had earned for him the title of Sheikh. As the doyen of the Arab community and the known friend of Mutesa's father, he could not be treated as a person of no consequence. Despite all Mutesa's temporary ultra-Christian propensities, Ahmed seems very quickly to have made his way more or less back to the position which he had occupied during Suna's reign. As will be seen, he was even at times co-opted as a supernumerary member of Mutesa's state council. His advice was especially sought when questions arose out of contacts between the Baganda and the great non-African world beyond Buganda.

That advice was very quickly needed. For some time past the Khedive of Egypt, Ismail Pasha, and his principal advisers had been planning the extension of Egyptian rule to the head-waters of the Nile and the Lake regions of Central Africa. In April 1876 some 160 Egyptian troops reached Mutesa's capital, Rubaga. The clear and avowed intention of this force was the annexation of Buganda to Egypt. The Egyptian officers in command did not

<sup>1</sup> Stanley (*Through the Dark Continent*, I, p. 325).

disguise the fact that they considered that annexation to have already taken place and that they regarded themselves as the real rulers of the country. Naturally, both Mutesa and his subjects strongly resented this attitude and the tension soon became extremely acute. According to information given to a C.M.S. missionary a few years later, there were even plans afoot to surprise and overpower the Egyptian commander and his men.<sup>1</sup> If this information was true, more moderate counsels prevailed and bloodshed was averted.

It must have been perfectly obvious to Sheikh Ahmed bin Ibrahim that, amongst other things, the Egyptians were intent upon depriving the Zanzibar merchants of their monopoly of the ivory trade. Chaillé Long, an American in the Egyptian service, in fact actually asserts that Mutesa had promised to give this monopoly to the Egyptian Government.<sup>2</sup> Naturally, Sheikh Ahmed, along with the other Zanzibar traders, was strenuously opposed to such a change. Though the Egyptians were co-religionists, his sympathies and those of other Zanzibar traders were definitely on the side of Mutesa and the Baganda, but Sheikh Ahmed knew enough of the outside world to realize that an attack on the Egyptian troops, though it might achieve a momentary success, would almost inevitably lead to serious reprisals. Therefore, anxious as he was to see the Egyptians out of Buganda, his counsels were all on the side of non-aggressiveness and moderation. It could not have been an easy task with persons roused to such a pitch of excitement as were Mutesa and his leading chiefs, but somehow or other moderate counsels eventually carried the day. Very fortunately there were no regrettable incidents.

At the end of July 1876, Emin Effendi arrived at Mutesa's capital at Rubaga as an emissary of the Egyptian Government. Sheikh Ahmed was present, acted as interpreter at Emin's first audience with Mutesa on 28th July, and afterwards accompanied him to his residence.<sup>3</sup> Thereafter the two met and discussed matters almost daily. In fact, Sheikh Ahmed proved useful in smoothing over a number of difficulties, which, if left to themselves, might have developed to very serious proportions. Thus, Emin, who was a recent convert to Islam, was greeted on his arrival with a letter, which was written by Dallington on behalf of Mutesa, and which told him "I was the Mohamedeans and find it is all lie" and enjoined Emin to "be thou Christian first". Naturally this effusion gave great offence to Emin. It might easily have led to an early rupture between him and Mutesa, but Sheikh Ahmed managed to pacify Emin "by saying everybody had thought I was a Christian and wished to pay me a compliment".<sup>4</sup> On another occasion, the Egyptian garrison ran short of provisions, and Mutesa and his people refused to supply them with any more food. Such a refusal would inevitably have led to the men of the garrison taking matters into their own hands and helping themselves from the adjacent shambas. If they had done so, the shamba owners would undoubtedly have defended their crops by force, and bloodshed would

<sup>1</sup> Ashe (*Two Kings of Uganda*, pp. 114-115).

<sup>2</sup> Hutchinson (op. cit., p. 31).

<sup>3</sup> Emin's *Diary*, 28th July 1876.

<sup>4</sup> Emin's *Diary*, 29th July 1876.

have been inevitable. Sheikh Ahmed intervened and obtained a promise from Mutesa that "he would pay attention to their food". At the same time Mutesa also promised Sheikh Ahmed to surrender four members of the Egyptian garrison who had deserted. Strange to relate, both these promises were solemnly made by "the most Christian king" of Buganda swearing upon the Koran.<sup>1</sup> Perhaps it is not quite so strange to have to relate that the first of these two promises appears to have been only very partially kept.

Greatly to Emin's disgust, at all these interviews with Mutesa the conversation was constantly diverted into a discussion of the rival merits of Christianity and Islam. On one occasion, for instance, Emin was confronted with a wooden board on which were written in bad English a number of questions and answers, such as, "What is the meaning of the word Christmas?" and "What is the meaning of the word Good Friday?" "I was asked", says Emin, "to translate these word for word into Arabic, presumably to see whether I understood English. It would appear that I passed my examination." Then Sheikh Ahmed arrived on the scene and was promptly dragged into the discussion. He "developed a long-winded explanation, but for a Wahabite (this I learnt to-day) a remarkably tolerant one."<sup>2</sup>

But affairs of state needed urgent attention from time to time. Thus, on 13th August, Emin recorded in his diary that

"To-day is the great council of the Sultan, to which the soothsayers, women, Sheikh Ahmed and three newly-arrived Matongali<sup>3</sup> of Kabarega have been summoned. My belief is that the question to be discussed is the fear of the occupation of Lake Albert, where the steamer is now working."

Naturally, Emin was all agog to know what had happened at this meeting and next day questioned Sheikh Ahmed, but he had to record in his diary that "Sheikh Ahmed or, as he was called by Burton, Hamed bin Ibrahim—he met him in Kirira—had nothing new to say".

On 29th August letters reached Emin instructing him and the Egyptian troops to leave Buganda and return to Mruli. On 30th August, Emin left and the troops followed a day or so later. Thereafter there was never any further question of the annexation of Buganda by Egypt. Not only Mutesa and the Baganda, but also Sheikh Ahmed and the other Zanzibar traders, must have watched the departure of the Egyptian troops with profound relief.

Emin returned to Buganda in December 1877, to discover that "most of my old Zanzibar acquaintances have gone". Amongst those who had departed was Sheikh Ahmed bin Ibrahim. In their place Emin found the Rev. C. T. Wilson, of the Church Missionary Society. Wilson and Shergold Smith had reached Rubaga on 30th June 1877. Some years later Alexander Mackay appears to have been told that, "when Lieutenant Smith came here,

<sup>1</sup> Emin's *Diary*, 2nd August 1876.

<sup>2</sup> Emin's *Diary*, 6th August 1876. Sheikh Ahmed was in fact a member of the Ibathi sect, which is not infrequently confused by European writers with the Wahabi sect.

<sup>3</sup> i.e., Batongole (chiefs).

Hamadi bin Ibrahim advised Mutesa to kill him and Wilson".<sup>1</sup> I have no doubt at all Mackay received this information and genuinely believed that it was true, but that does not mean that it was in fact true. It is remarkable that Wilson, who was alleged to have been one of the intended victims, appears never to have received such a report. When, in 1882, Wilson referred to the Arabs in his *Uganda and the Egyptian Soudan*, he mentioned that "the principal of these Arabs is Mohamed [sic] bin Ibrahim, who has been some twenty years in Uganda", but he never alleged that Ahmed bin Ibrahim or any other Arab had ever incited any person to procure the assassination of either himself or of Shergold Smith. The accusation was one which it was obviously very easy to make, but at the same time it was one calling for proof by strong and convincing evidence before it ought readily to have been believed. Here, there is no such evidence, and the allegation is altogether out of keeping with what else we know of the character of Sheikh Ahmed bin Ibrahim El Ameri.

Undoubtedly as a devout Mohammedan, Sheikh Ahmed disliked the arrival of European missionaries. Their advent may well have been one of the reasons which prompted him to leave Buganda. In his eyes the times could not have been what they had once been. Things were very different from those days when he had found Suna a ready listener to what he had to say about Islam. Suna's son now reigned in his stead and that son was certainly not like his father. Moreover, Sheikh Ahmed was twenty or more years older than on the day when he last bade farewell to Suna. The enthusiasms of twenty years ago had waned. It was now the time for middle aged folk to shake their heads, shrug their shoulders and exclaim against the degenerate times. If Islam was to recover lost ground in Buganda, it were better that the task should be undertaken by a younger man.

Thereafter Sheikh Ahmed bin Ibrahim would appear to have resided at his former residence at Kafuro. He had always kept on the best of terms with Rumanika, Mukama of Karagwe, that very attractive personality for whom Speke, Grant and Stanley all had nothing but praise. That friendship continued until Rumanika's death in about 1881.

As a devout Mohammedan, Sheikh Ahmed still endeavoured to proselytise, but Islam appears to have made little headway in Karagwe despite the presence of a permanent Arab colony at Kafuro.<sup>2</sup> Rumanika himself appears to have clung steadfastly to the belief of his ancestors, as did his sons who followed after him. But one of those sons had a wife named Kirungu and her brother became a convert to Islam. This brother took the name of Amani and became a close friend of Sheikh Ahmed. As will be seen, this friendship was to prove the Sheikh's undoing.

Sheikh Ahmed bin Ibrahim appears to have died in the latter part of 1885. At the beginning of 1886, Vita Hassan, an Egyptian government official, was at the court of Kabarega in Bunyoro, whither he had been sent

<sup>1</sup> Letter of Mackay to C.M.S., 29th September 1885. The story is repeated by Ashe in *Two Kings of Uganda*, p. 167.

<sup>2</sup> Korit-Schoner, "Tribal Structure in Uhaya" (*Tanganyika Notes and Records*, Vol. XIV, p. 18).

by Emin Bey as a liaison officer. On 1st February 1886, he made the following entry in his diary :

"Babedongo<sup>1</sup> came with Abdulrehman<sup>2</sup> who says . . . Hamadi bin Ibrahim has been killed at Mankereve [*sic*] at night. He was in his hut (*tokul*) and had a fire kindled and the blacks came in the direction of the fire and shot him with arrows."<sup>3</sup>

The full story has been told partly by Stanley and partly by Salha binti Ahmed El-Amouria, a daughter of Sheikh Ahmed bin Ibrahim, who until very recently was still living in Zanzibar, in sadly reduced circumstances.

Stanley heard part of the story when he reached Kafuro with the Emin Pasha Relief Expedition on 3rd August 1889. He has told a portion of the story in *Darkest Africa* (II, p. 377) in the following words :

"Rumanyika the gentle pagan, a characteristic Mhuma, has gone too, to sleep only a little more peacefully than he had lived. And after him came Kyensi, who reigned only nine months. Then followed Kakoko,<sup>4</sup> another son, who usurped the throne and reigned for three years, and during that time slew seventeen brothers, and put out the eyes of Luajumba, his youngest brother. Then Ka-chikonju went in unto Kakoko as he lay on his bed sodden with *malwa*, and drove his sharp spear twice through his breast, and relieved the land of a tyrant. The same month Hamed bin Ibrahim, who had lived in Karagwe many years trading in ivory, was murdered. . . .<sup>5</sup> The successor to the rights and prerogatives of King of Karagwe is Ndagara, or Unyagumbwa, for he has two names, who was now in his sixteenth year, and as the son of Kyensi was the rightful heir."<sup>6</sup>

Here, Sheikh Ahmed's daughter, Salha, must be allowed to tell the rest of the story in her own words.

"Ahmed bin Ibrahim went to Uganda and became a close friend of the King and acquired great wealth. He lived chiefly at Kafuro, and was finally killed by the Wanyambo<sup>7</sup> at his house. He was sitting on his baraza [*verandah*], just after having finished saying his evening prayers, at about 8 p.m. conversing with a few Arabs and some of his slaves. The baraza was lit with a number of lanterns and the Wanyambo came quietly

<sup>1</sup> Rwabidongo, Katikiro (first Minister) of Kabarega.

<sup>2</sup> A Zanzibar trader who had arrived at Kabarega's court a day or two previously.

<sup>3</sup> Vita Hassan sent his Journal to Emin. The relevant extract in Italian is reproduced in Stuhlmann (*Die Tagebuecher von Dr. Emin Pascha*, III, p. 159).

<sup>4</sup> Ashe (*Two Kings of Uganda*, pp. 122, 125), gives the name of the usurper as Ntare.

<sup>5</sup> Stanley adds, "by his son, Seyed bin Hamed", but Vita Hassan and Salha binti Ahmed show that this information is wrong.

<sup>6</sup> Ndagara was described by Mounteney Jephson as "looking more like a 'sweep' than a representative of royalty" (Parke, *Experiences in Equatorial Africa*, p. 465). His reign was a short one. In 1890 he was succeeded by Ntare, who was then a child two years of age (Hall, "A Tribal Museum at Bweranyange" (*Tanganyika Notes and Records*, Vol V, p. 2)).

<sup>7</sup> The Banyambo are the aboriginal race of Karagwe (Kollmann, *Victoria Nyanza*, p. 46). It is also the usual generic name given to the inhabitants of Karagwe generally (Korit-Schoner, *op. cit.*, p. 6).

quite near to the house and, hiding amongst the pomegranate trees which were planted just near the house, shot him with arrows. The arrows struck him, one in the ribs and the other just above the right thigh. He was then taken into the house. He called us all, spoke to us a little and died. On the third day the Wanyambo raided the house of his eldest son, Abdulla bin Ahmed; they broke into the yard but Abdulla managed to escape—a few Arabs helped him. The cause of the trouble between Ahmed and the Wanyambo was as follows:

“When the King of Karagwe died, he left a wife who had two sons. His wife was called Kirungu and the names of his two sons were Mrombe and Magasa or Ngasa.<sup>1</sup> Kirungu had a brother by name Amani. He was a Mohammedan and an intimate friend of Ahmed bin Ibrahim. But the King had brothers who wanted the throne and in order to succeed they conspired against Amani and wanted to kill him because they knew that Amani would try to get his nephews to the throne and that, if they killed him, they would succeed easily. After the death of the King of Karagwe, Kirungu his wife was killed as it was the custom in those days to kill the Sultana when the Sultan died. Ahmed was a close friend of Amani and helped him to escape from the conspirators. He gave him some money and told him to run away. This came to the knowledge of the conspirators who took revenge on Ahmed and came at night to the house and shot him with arrows. He died the same night. Ahmed had many European friends but I remember only the names of Burton and Stanley. My father used to be called El Dola, that is, ‘Thou art a Government.’ This is a sort of praise. I was very young when my father was killed but I remember everything that happened on that night. I saw my father dying. Our father was very liberal and kind to us all.”<sup>2</sup>

It would appear that the Arabs completely abandoned Kafuro shortly after the murder of Sheikh Ahmed. In 1889, the Emin Pasha Relief Expedition reached Kafuro. This is the description given of the place at that date by Surgeon Major Park in *My Personal Experiences in Equatorial Africa* (p. 465):

“August 3rd.—We reached Kafuro shortly after 11 a.m. today, and camped on a site which had formerly been occupied by trading Arabs, but is now the wretched looking wreck of a deserted settlement. All the mud-walled houses, which had been built by the Arabs in their prosperous days of trading here, are now thrown down. The place was, it appears, formerly occupied by five or six well-to-do Arabs, with their respective households. All but two of them are now dead, and those survivors have gone to Unyanyembe and Msalala respectively. The several graves of the deceased Arabs are still to be seen; and the only living relics of their residence are one lemon tree, and some tomatoes they had planted.”  
Emin’s companion, Major Gaetano Casati, who was with the Relief

<sup>1</sup> Mugasha.

<sup>2</sup> I am indebted to Mr. A. L. Jiddawi of the High Court, Zanzibar, for this statement.—J.M.G.

Expedition at the time, says, with reference to Karagwe, in his *Ten Years in Equatoria* (II, p. 282):

“The Arabs, who once used to have stations here, after the opening of the road to Uganda through Usukuma and the Lake, now only make raids on the State at certain times in order to obtain the supply of ivory, compelled to do this by the continual hostility of the natives. Their permanent station, established at Kafuro, was abandoned after the murder of the Arab Bin Salem [*sic*], treacherously shot with arrows by the natives.”<sup>1</sup>

I fear that Sheikh Ahmed bin Ibrahim's grave can no longer be traced, but one would fain believe that possibly some relic of him remains amongst those copper drums and models in iron of horned cattle, which are still to be seen in the tribal “Museum” at Bweranyange and which Sheikh Ahmed himself showed with such pride to Stanley seventy years ago. The man, who, risking his own life to save the lives of others, once stood up to administer a bold rebuke to Suna, deserved a kindlier fate than that which befell him. One feels that he should not be allowed to be numbered amongst those “who have perished as though they had never been born”, but should rather be remembered amongst those “merciful men whose righteousness hath not been forgotten.”

<sup>1</sup> Stanley, in *Darkest Africa*, II, p. 378, records that “two years before our arrival” (i.e., circa 1887) the Baganda pillaged the store of “Bakari, a coast trader, occupying the place of Hamed Ibrahim” at Kafuro, killing him and his principal men.

#### APPENDIX A

##### **Biographical details supplied to Emin by Sheikh Ahmed in 1876**

(Below are given translations of those portions of Emin's diary for 1876, which record biographical information relating to Sheikh Ahmed bin Ibrahim. The diary was published in 1917 in German by Dr. Franz Stuhlmann in the first volume of *Die Tagebucher von Dr. Emin Pascha*. The figures in brackets at the end of each entry are references to the pages of that volume. Footnotes to the entries are given at the end):

*30th July.* Sheikh Ahmed is the first Arab to arrive here. He was present here to see the birth of the present Sultan (35 years<sup>1</sup>), who holds him in high respect (p. 139).

*6th August.* Sheikh Ahmed, who in Zanzibar had much to do with the “Dutch” (Hamburg Merchants<sup>2</sup>) and the English, as well as being personally known to Hammerton,<sup>3</sup> Rigby,<sup>4</sup> etc., as well as being on good terms with all travellers (Burton,<sup>5</sup> Von der Decken,<sup>6</sup> Speke,<sup>7</sup> Stanley<sup>8</sup>), developed a long winded explanation, but for a Wahabite (I learnt this to-day) a remarkably tolerant one . . . (p. 149) . . . I went part of the way with Sheikh Ahmed who explained to me that Stanley had received here 1000 reals<sup>9</sup>—presumably from him—and on 21 Moharram 1293 (16th February 1876<sup>10</sup>) had left here for (Lake) Tanganyika to make his way into the interior.<sup>11</sup> If hostilities prevented him from continuing his journey, he would come back. He himself, Ahmed, had come here

three times during the time of Suna, Mutesa's father, the first time being in 1270 (?). Suna had been most obliging. Ahmed speaks the language of the Waganda, but he is a bit of a liar,<sup>12</sup> though he is a Wahabite (p. 149).

*11th August.* At 12.30 Sheikh Ahmed came to correct his information, and stated that he first came to Suna in 1260,<sup>13</sup> and that Suna and Seyyid Said of Zanzibar both died in Safar, 1273,<sup>14</sup> that Speke's route followed the merchant's route up to to-day etc. By the way he inquired with great cordiality after Haji Abdullah (Burton), whom he admired very much. He will write to him and I shall procure the letter [*sic*] (? to be sent to Burton) (p. 154).

*14th August.* Sheikh Ahmed or, as he was called by Burton, Hamed bin Ibrahim—he met him in Kirira—had nothing new to say (p. 157).

## NOTES

<sup>1</sup> i.e., Mutesa. When Speke saw Mutesa in 1862, he believed him to be about 25 (*Journal*, p. 290). Long, who saw him in 1874, estimated his age at 35 and Stanley, who saw him in 1875, at 34 (Hutchinson, *op. cit.*, pp. 12, 29). Wilson, who left Uganda in 1879, considered Mutesa to be 45 (Wilson, *op. cit.*, I, p. 197).

Suna had some one hundred and fifty officially recognized wives and over two hundred children. At the time of his death sixty-one of his sons were possible candidates for his throne (Kagwa, *Empisa za Baganda*, pp. 65-71). There does not appear to have been any reason why Mutesa's birth should have attracted more attention than the birth of any other of those sons.

<sup>2</sup> Hamburg merchants first reached Zanzibar about 1841 (Coupland, *East Africa and its Invaders*, pp. 381, et. seq.).

<sup>3</sup> Atkins Hamerton was British Consul at Zanzibar, 1841-1857.

<sup>4</sup> Captain (afterwards General) Christopher Palmer Rigby was British Consul at Zanzibar, 1858-1861.

<sup>5</sup> Burton and Sheikh Ahmed met on 26th December 1857 at Kirira.

<sup>6</sup> Baron von der Decken made a short expedition inland from Kilwa in 1860, another to Kilimanjaro in 1861, and a third to the Rivers Tana, Ozi and Tula in 1864. He was murdered whilst exploring the River Juba in 1865.

<sup>7</sup> Speke does not mention Ahmed in his books, but that does not mean they never met.

<sup>8</sup> Stanley met Sheikh Ahmed at Kafuro in Karagwe on 26th February 1875. Sheikh Ahmed was an Ibathi, and not a Wahabi. In common with many other European writers, Emin confuses the Ibathis with the Wahabis. Both sects are strong in Eastern Arabia and they have a number of points of doctrine in common. But, they also have a number of marked doctrinal differences. Politically the Wahabis were strongly opposed to Seyyid Said, ruler of Oman and Zanzibar. Right up to 1853 they were constantly invading Oman (Coupland, *East Africa and its Invaders*, *passim*). Therefore Wahabis were not likely to be found in Seyyid Said's East African dominions in the first half of the nineteenth century.

<sup>9</sup> i.e., dollars. Probably Maria Theresa dollars.

<sup>10</sup> 21 Moharram 1293 was 18th February 1876.

<sup>11</sup> Emin has clearly misunderstood the information given to him by Sheikh Ahmed. Stanley left Mutesa in December 1875, and reached Kafuro in Karagwe on 26th February 1876, where he met Sheikh Ahmed for the first time. There is no reason for believing that Sheikh Ahmed did not tell Emin that he met Stanley at Kafuro. He had no motive for making a false statement in regard to this matter.

<sup>12</sup> The grounds on which Emin makes this allegation do not appear. As the preceding note shows, certain misstatements of fact in Emin's diary are clearly due to his own misunderstanding of the information given to him by Sheikh Ahmed.

<sup>13</sup> 1260 A.H. extended from 20th January 1844 to 9th January 1845.

<sup>14</sup> Safar, 1273, extended from 1st October to 30th October 1856. Seyyid Said of Zanzibar died at sea on his way to Zanzibar on 19th October 1856 (Coupland, *op. cit.*, p. 553). Writing on information received from Arabs in 1858 at Tabora, Burton (*Lake Regions of Central Africa*, II, p. 188), says Suna "reigned till 1857". Very probably the information was that Suna died "about a year ago".

## APPENDIX B

**Mutesa's Caravan to Zanzibar, 1870-1872**

On 30th January 1868, Livingstone made the following entry in his journal on the information of an Arab trader named Mohammed Bogherib :

“ Seyd Seyd<sup>1</sup> is said to have been the first Arab Sultan who traded, and Seyd Majed<sup>2</sup> follows the example of his father and has many Arab traders in his employment. He lately sent eight buffaloes to Mutesa, King of Uganda, son of Suna, by way of increasing his trade, and it is not likely that he will give up the lucrative trade.”<sup>3</sup>

The part which the Sultan of Zanzibar took in trading ventures into the interior of Africa would appear to have been much the same as that taken in their days by Elizabeth and the Stuart kings in overseas trading ventures from England. They subscribed for shares in those ventures and sent special presents to the rulers of the countries, to which the ventures were proceeding, so as to make the path of the actual traders run smoothly.

Though at first sight Seyyid Majid's present of buffaloes to Mutesa might look rather like sending coals to Newcastle, it would appear very probable that the animals were domesticated transport animals from India. History is silent as to whether these particular buffaloes reached their destination,<sup>4</sup> but we do know that the caravan reached Buganda and that Mutesa was much impressed by the presents which actually did arrive from Seyyid Majid. In 1870 a return caravan was organized. The famous Tippoo Tib met a number of Baganda at Tabora in the latter part of the year. He learnt that “they had been sent by Sultan Mutesa to bring presents to Seyyid Majid in return for the ample presents which he himself had sent from Zanzibar”.<sup>5</sup> It was some 150 strong and was in charge of a chief named Sengiri Omutebi.<sup>6</sup> The caravan reached Tabora just at a time when the Zulu tribe, the Angoni, had invaded Unyamwezi and had reached Njambo, a district only some three hours to the south of Tabora. The Arabs at Tabora called on the Baganda to assist in driving away the invaders. A mixed force of Arabs, Baganda, and Waswahili went out to give battle to the Angoni. The result of the battle was disastrous. At least twenty-two of the Baganda were killed as well as a number of Waswahili.<sup>7</sup>

The Angoni were only out to raid cattle and they retreated before their opponents could be reinforced. The Baganda were therefore able to continue their journey with their depleted numbers down to the coast. They reached

<sup>1</sup> Seyyid Said bin Sultan, Sultan of Oman and Zanzibar, 1806-1856.

<sup>2</sup> Seyyid Majid bin Said, Sultan of Zanzibar, 1856-1870.

<sup>3</sup> Waller, *op. cit.*, I, p. 273.

<sup>4</sup> Some buffaloes, which were sent from Zanzibar to meet Livingstone at Ujiji, all died on the way from the coast (Waller, *op. cit.*, II, p. 7).

<sup>5</sup> Brode (*Tippoo Tib*, p. 56).

<sup>6</sup> Munno (1915), pp. 115-116, 160.

<sup>7</sup> Waller (*op. cit.*, II, p. 96); Brode (*op. cit.*, p. 56). Tippoo Tib put the number of Baganda killed at “more than 100”, but Livingstone's Arab informants gave the number as 22. This last information was given to Livingstone on 28th January 1871, very shortly after the disaster.

Zanzibar either shortly before or shortly after the death of Seyyid Majid on 7th October 1870, but his successor, Seyyid Barghash, gave them a most friendly reception. They brought with them a quantity of ivory and also a live African elephant. This latter gift was handed over by Seyyid Barghash to Dr. (afterwards Sir John) Kirk, the British Consul General. Thereafter, "he was marched through the island completely tame and docile, helping himself to sweet meats from the shops and otherwise making himself obnoxious in a most civilized way". It was very possibly after receiving protests from the sweet meat vendors of Zanzibar that Kirk shipped the young elephant to Sir Philip Wodehouse, Governor of Bombay, who presented it to Sir Solar Jung. Livingstone informs us that Seyyid Barghash "spent all the ivory in buying return presents of gunpowder, guns, soap, brandy, gin, etc."<sup>1</sup>

On its return journey, the caravan reached Tabora some time after Stanley left that place in September 1871 to proceed to Ujiji and some time before Livingstone and Stanley returned together from Ujiji to Tabora on 18th February 1872. On 12th March 1872, two days before Stanley left Tabora to return to the coast, the porters of the caravan gave a farewell dance in Stanley's honour. The refrain of the song, which accompanied the dance, was a complaint that "Bana Singiri" had kept the porters from their homes on short commons for a very long time.<sup>2</sup> As Livingstone's *Last Journals* show, close on six months more were to elapse before they finally left Tabora. The country between Tabora and Lake Victoria was in a very disturbed state owing to the constant warfare between the Arabs and the local chief, Mirambo. For a long time the Arabs refused to let the Baganda leave, partly because they were afraid their arms and ammunition might fall into Mirambo's hands and partly because they wanted to avail themselves of their services in the war. They were, in fact, delayed so long that a large party was sent from Buganda "to see what is stopping the way to Mutesa's". During these delays one of the leading Baganda died of dysentery and another became blind from ophthalmia. In addition, they had to sell their cattle and much of their property in order to provide for their maintenance at Tabora. A small advance party got away at the end of July 1872 with a few goods, but it was attacked by Mirambo's people shortly after leaving Tabora. The main body got away in August, but they too were waylaid by Mirambo and their leader, Sengiri Omutebi, was killed.<sup>3</sup>

It is not out of place to note that in 1877 and 1879 Mutesa sent other caravans to Zanzibar, which got in touch with Kirk. Mutesa also kept up a somewhat desultory correspondence with Kirk from 1877 to 1882. He seems to have appreciated Kirk's efforts to keep the road open between Zanzibar and the coast.

<sup>1</sup> Waller (op. cit., IV, pp. 176, 202); Lugard (*The Rise of Our East African Empire*, Chap. XIX).

<sup>2</sup> Stanley (*How I found Livingstone*, pp. 620-622).

<sup>3</sup> Waller (op. cit., II, pp. 176, 181, 186, 188, 199, 222-226, 232); Munno (1915), pp. 115-116, 160; Stanley (*Through the Dark Continent*, I, p. 396).

## "MOLES" IN UGANDA

By G. H. E. HOPKINS

THERE are no moles in East Africa. This statement will probably surprise many people, for "mole-hills" are a familiar sight in many areas. The explanation is that we have mammals that look like moles, behave like moles, but which are neither closely related to the true moles, nor even to one another.

All our "moles", together with the true moles, have certain structural characters in common. Their bodies are almost cylindrical, their legs extremely short and the fore feet modified to form powerful spades, the eyes and external ears are extremely small and the fur (except in one species) is very soft, dense and inclined to be velvety. All these points give the animals a very characteristic appearance which makes them very similar to one another but quite unlike any other mammals.

The group of these creatures that comes nearest to the true moles is the genus *Chlorotalpa* or Golden Moles, of which one form (*C. stuhlmanni*) occurs on Ruwenzori and in the higher parts of Kigezi, and another (*C. fosteri*) high up on Mount Elgon. These are handsome little animals, about  $4\frac{1}{2}$  inches long, with shiny, dark brown, fur which is very dense, long and soft, and which shows green and violet iridescence in oblique light. Their teeth are sharp and pointed (not unlike those of a dog) and are adapted for eating food, such as insects or worms, which requires cutting up and tearing rather than chewing. Even the Golden Moles are not very closely related to the true moles, but they do belong, like the latter, to the order Insectivora. Our two Golden Moles illustrate one of the interesting peculiarities about the East African fauna and flora—the occurrence of closely related species or subspecies isolated on the mountains, for the Golden Mole found on Ruwenzori is very closely related to that found on Elgon and the latter should perhaps be regarded as a subspecies of the former. There are many instances of this phenomenon, among the best known being the giant groundsels and lobelias, and the fritillary butterflies (genus *Argynnis*), all of which occur on most, if not all, of the East African mountains but not in the lower country. Many of the plants and animals which have this peculiar distribution are related to forms found in temperate regions; thus the explanation of the phenomenon is probably that the climate of East Africa was formerly much cooler so that these plants and animals then occurred all over the country, but that increasing heat drove them up into the mountains and killed off those that remained in the lower country.

Very little is known about the biology of the Golden Moles. Mr. George Foster, who collected the types of *Chlorotalpa fosteri*, noted that it made a noise like a puff-adder, and (because of the form of their teeth) it is a safe assumption that the food of these animals includes insects and worms; they burrow a few inches under the ground and their "mole-hills" are extremely like those made by true moles, but rather smaller. Captain Pitman found that the Bakiga in Kigezi use skins of *C. stuhlmanni* as charms.

Our other "moles", the Mole-Rats, all belong to a totally different group of mammals, the order Rodentia. Rodents are at once distinguished from nearly all other mammals by the arrangement of their teeth: the incisors, or cutting teeth, in each jaw, are very large (especially those of the upper jaw), chisel-shaped, and continue growing throughout the life of the animal. There is a wide toothless space between the incisors and the molars or gnawing teeth, and the chisel-edges of the incisors wear in such a way that they always remain sharp. Such teeth are beautifully adapted for gnawing, cutting through tough roots or stems, and grinding up hard vegetable matter, and the food of rodents consists mainly of various parts of plants, especially roots and seeds, though many species have become almost omnivorous.

Two genera of Mole-Rats occur in Uganda, and a third genus which may be found to occur in Karamoja is sufficiently unusual to be worth mentioning. The commonest of these groups is the genus *Tachyoryctes* or Orange-toothed Mole-Rats, locally common in the southern part of Uganda. Members of this genus are the largest of our "moles", adults measuring from 7 to 10 inches excluding the short tail. The colour alters greatly during the life of the individual, young specimens being dark slate-grey or black, while adults vary from reddish brown to very dark brown; at all ages they often have irregular blotches of white. They are very easily distinguished from our other Mole-Rats by their deep orange incisor teeth. Orange-toothed Mole-Rats live in colonies, often isolated by many miles of country from any other colony. As in the case of other mammals, isolation leads to inbreeding and this, in turn, tends to cause the members of each colony to have characteristics which make them a little different from their relatives belonging to other colonies. Because of this, many "species" of *Tachyoryctes* have been named, but in a recent review of the rodents it is considered probable that all the East African forms of *Tachyoryctes* are merely geographical races of *Tachyoryctes ibeanus*. Rather more is known of the biology of *Tachyoryctes* than of any of our other "moles". They usually occur on open ground, but not generally on extensive plains; some occur at high elevations on mountains. Loring records, of the Naivasha form, that when dug out of their burrows and released they could only crawl very slowly, but that after a few seconds "they would begin to dig. In any slight depression they began work; and when small roots or a tussock of grass intervened, they used their teeth until the obstruction was removed, and then, with the nails of their front feet only, continued digging. As the hole deepened they threw the dirt out between their hind legs, and with them still farther beyond. After the earth had accumulated so that it drifted back, they faced about, and, using their chest as a scoop, pushed it entirely out of the way. They were most active in the evening, at night, and in early morning. Several were found dead near their holes, having evidently been killed by owls or small carnivorous mammals." They do not burrow very deep, the normal depth of the burrow being some six inches or less. The large nests, made of grass, are placed in side chambers just off the main burrow. As Loring notes, they are often filled with droppings and are apparently used as latrines. The animals sometimes occur in sufficient numbers to be a serious nuisance; one colony caused much trouble

by burrowing on Jinja aerodrome and hindering the landing of planes. The females usually give birth to only one young at a time.

North of a line which apparently corresponds for most of its length with the course of the Victoria Nile (in West Nile, Acholi, Lango and Teso) Orange-toothed Mole-Rats are replaced by White-toothed Mole-Rats, of which only one species, *Cryptomys lechei*, occurs in Uganda. This is a rather smaller animal than *Tachyoryctes* (it is about  $7\frac{1}{2}$  inches long) and has short velvety fur. It is immediately separated from *Tachyoryctes* by its pure white incisor teeth. The fur is mole-grey in colour and many specimens have a patch of pure white (very variable in size) on the crown of the head and sometimes a narrow white line on the underside between the fore legs. *Cryptomys* is not at all closely related to *Tachyoryctes*; the latter belongs to the family Muridae, which also includes ordinary rats and mice, but the former to the family Bathyergidae, belonging to a quite different section of the rodents. Practically nothing has been recorded as to the biology of these animals in East Africa, but their habits are probably very similar to those of *Tachyoryctes*, and the hills the two animals make are indistinguishable.

The only other Mole-Rat likely to occur in Uganda is *Heterocephalus glaber*, the Naked Mole-Rat, which occurs in the semi-desert areas of northern Kenya and may prove to occur in Karamoja. Like *Cryptomys*, it belongs to the family Bathyergidae, but it can at once be distinguished from any other small mammal in East Africa by the fact that it is entirely naked except for a few bristles.

Our "moles", taken as a whole, illustrate very well one of the biggest difficulties in systematic work, for we have seen that although they all share many important characters, they belong to two different orders of mammals; even the Mole-Rats belong to two very different families of rodents, so that these peculiar characters must have arisen independently at least three times. The reason is, of course, that all the characters are adaptations to life in underground burrows and all animals which have taken to this mode of life are likely to become modified in the same way, regardless of their real relationships. Powerful spade-like fore feet are very important for burrowing, a cylindrical body with short legs fits better into a narrow tunnel than would one of the normal shape, large eyes, a long tail, and external ears would be a nuisance underground so they become greatly reduced. The problem of earth caking among loose fur is solved for most of our "moles" by the fur having become very dense and velvety so that soil particles do not easily penetrate it (such fur is also easily reversible, so that the animal can move either backward or forwards in its burrow without discomfort), but *Heterocephalus*—perhaps because it lives in much drier country—has solved the problem by discarding fur almost completely. Such modifications in connection with a special way of life are known as adaptive characters; they are often very striking and animals possessing them seem to the non-specialist to be closely akin, but they give no indication whatever of true relationships.

## NOTES ON THE KUMAM

By THE REVEREND FATHER C. I. WALSHE,  
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**K**ITCHING—quoted by Driberg (*The Lango*, p. 36)—believed the Kumam to be a small section of the Lango tribe which had moved southwards and so become affiliated with the Iteso. Driberg, however, thought they were Iteso who had adopted a Nilotic language from the Lango, and that this had occurred quite recently. He states that the name Akum is more correct and that they themselves say that it is not a nickname, but the name of an actual division or tribe. On the other hand, he says that they claim the name Lango-Ikokolemu as their true one.

I have been told, nevertheless, by many an old Kumam that, in fact, the name Akum or Akuma (Kumam) is a nickname given to them by the Miro (Lango). The County Chief Yakobo Engwau told me that they were so called because they used to grieve over their cattle stolen by the Miro: *Kumo* in Kumam and Lango means "to mourn or grieve".

I think, however, that Driberg is correct in saying that Lango or Lango-Ikokolemu is their real name. Even nowadays they say, in ordinary conversation, "We Lango do such and such a thing," and refer to bush-paths as *yo Lango*, to native medicine as *yat Lango*. They speak of *leb Lango* (Lango language), *paco Lango* (Lango home), *pone Lango* (Lango customs). The other day I asked a Kumam boy whether he had been "reading" at his village church near the lake. When he said he had, I suggested that only Bakenyi were attending. "Oh, no," he said, "*Lango da*" (Lango also—meaning his own people).

All that can be said of the name Kumam is that it is a nickname which has more or less stuck and has been adopted officially. Driberg used to say that the Kumam and Lango fought over the name Lango, and old men have told me the same. So it seems, as has been suggested by others, that Lango was the name of one big tribe or family, living in the east, which later split up into Lango dyang (Karamojong), Lango olok (Jiwe), Lango miro (called so by the Kumam and Acholi) and, I would like to add, Lango Ikokolemu (the Kumam). I have been told that the Luo of Kavirondo called the Suk and Masai by the name Lango, also, but am unable to verify this.

To turn from the name "Lango", it is interesting to note that the word for "clan" among the Lango, Kumam and Iteso, is *Ateker*, *Atekere*, and that many clans have the same names, not only among these three people, but also among the Karamojong and Turkana: examples are the clan names Ikarwok, Atek, Irarak, Itengor. This would seem to be another indication of a common origin. No one seems to know the meaning or source of these clan names, but I have read that the Suk call their chief elder *Kirwokin* (adviser), from a Turkana word *woko*. I wonder if this has any bearing on the origin of clan Ikarwok?

If the Kumam originally spoke a Hamitic language, how did they get their present Nilotic one? Many Kumam tell me that they learnt it from the Jo Wer, i.e., the "Chopi" or "Jo pa Wir" (Jo pa Luo?), living at Bululu. There are not very many there now, but they may have been more numerous when the Kumam first came to their present country from Soroti.

Mulwano—an old Chopi at Bululu—gave me the names of his great grandparents (Mulwano s/o Choga, Jampura, Obe and Oceng), and said they all died at Bululu or on the island of Kaweri. He said, moreover, that they first came into contact with the Kumam (whom they called Lango), while fishing in Lake Kioga, and that they had not understood each other. These Kumam fishermen, he said, came from Kamoda and Lale (Soroti) and, when they had made friends with the Chopi, many of them began to settle down at Bululu amongst them and to pick up the Nilotic language of their hosts. Incidentally, Mulwano said that the Chopi had always called the present Lango "Miro".

On the other hand, there are very many Kumam at Soroti who never reached the Kaberamaido country and who speak the present Nilotic language. One would have expected them to have retained their original Hamitic language. Could the few who moved westward and who learned the Chopi tongue have taken the new language back to Soroti?

Eibu s/o Ajao—an old Kumam living at Agora, Soroti—states that his grandfather, Ochaga (who died at Agora), told him that their ancestors came from Angodingodi, Kapujan and Kokorio, near Toroma. Some of those ancestors spoke "Lale" (the present Kumam language), others spoke "Dum" (a foreign language, a dialect of Teso). The first Lale or Kumam speakers were from a clan of two famous elders, Angati and Wonayera. This group was called Ilalei. The Dum-speaking people moved towards Amuria and Orungo, while the Ilale moved towards Gweri, Soroti, the present Lale and Kamoda, and later across to Obur (Alomet).

Another old man, Katidi of Dokolo, says his ancestors came from Angodingod, and moved to Awoja and then to Soroti, Lale and Kamoda. The "Jo Dum" were Ngora and Katakwi Iteso. He said that the Kumam were then known as the Ilale and Kokolemu.

The Rev. L. Ekadu, of the Native Anglican Church, Kalaki, gave me the interesting information that there is a Kumam clan called "Jo Agwaya" who were formerly Miro (Lango). I later heard the full story from Epuru, an old man of the Jo Agwaya, living near Kabalang, Alwa. Many years ago a certain Miro killed another man of his own tribe while hunting and with his wife and children fled to Soroti to settle down amongst the Kokolemu. His children married with Kokolemu, particularly with the family of Wonagwai, whence came the name Jo Agwaya. A Lango named Juk, at present living at Bata, considers those Jo Agwaya as his own people, because it was his ancestor who fled to Soroti. Some of Epuru's sons are now living with Juk.

It is interesting to compare the more common Kumam surnames with those of the Lango (Miro), Iteso, Acholi and Karamojong. The Kumam names are distinctive and quite unlike those of the other tribes, although there

are exceptions such as the names Otim and Okello, and the twin names Opio and Apio. Kumam names follow a regular pattern :

Ewii, Engulu, Econyu, Eyamu, Etwomu ;  
Asao, Awico, Ameco, Agwayo, Alayo.

Compared with true Itesot names or with Lango names, they are very different.

As it is the custom to give children the names of their grandparents, one would expect to see, in their names, traces of the tribe's origin. Lango names, other than those adopted from the Acholi, Luo, etc., are similar to Itesot names, e.g., Amuge, Okol, Onyanga. The Kumam, with very few exceptions, seem neither to have adopted Chopi names nor any from Teso. On the other hand, there are quite a number of Kumam whose great grandparents had names beginning with *Won*—the Acholi word for "father or owner of". Thus there are well-known Kumam ancestors called Wonayera, Woneswap, Wonagwai, Wonomai, etc.

Kumam household words, expressions, idioms, voice tones for verb tenses, are all very akin to Acholi. Among the non-household words (e.g., names of grasses and of some trees) there are many words which are Hamitic or of Hamitic roots. I know from my own experience that a knowledge of Kumam makes it easy to converse with the Lango, Acholi and Alur on ordinary household topics.

For a long time I thought that if a tribe learned a new language, the tendency would be to retain the household words of the original language. But it was pointed out to me by Fr. Tarantino of Lira that it would be precisely these household words and expressions which would be learnt first in the new language. So if the Kumam did settle down among the Chopi they would naturally very soon learn from their hosts the words for hut, fire, water, food, chickens, goats, etc. Uncommon words, such as the names of grasses, insects, or of interior parts of the body, would hardly enter into ordinary conversation and so would remain in the original tongue.

Around Atuboi and Anyata there are many of those people, referred to above, who speak a dialect of Teso and are called Jodum by the Kumam proper—meaning those who speak a foreign language. These Jodum do not regard themselves as Lale or Kokolemu. They know the Lale language and the tendency is for them to pick up this rather than for their Kokolemu neighbours to learn Teso. This is, perhaps, not unexpected: the Nilotic tongue seems to attract people because it is easy to learn. Once, at Achwa (Amuria), I overheard two pure-blooded Teso talking Kumam. When I taxed them, they at first denied it, but when I insisted they grinned and admitted, saying, "Oh, we are simply learning it" (*Opwonyo apwonya*).

It is fair to say that, whatever the origin of the language, the Kumam to-day consider "*Leb i Kokolemu*" their own language and take pride in it.

Many of the Kumam ceremonies connected with birth, marriage, death, hunting, etc., are similar to those described by Driberg for the Lango. In particular, one notes the ceremonial naming of the child, the period of purification for the mother, the ceremonial washing of mother and child, and (for the first-born child) the taking of the child "to see the rafters of the

grandmother's house".<sup>1</sup> For twins, the customs are much as described by Driberg; for death, there is the *Kongo me Apunya* at the end of the mourning period, and the special way of burying twins should they die; for hunting, there is the *Won Ariga* (the hunt owner) with his drum and charm plant (*Bomo*).

This plant *Bomo* and the branch *Isas*, carried in the ceremonies of a first-born child, play an important part in the various ceremonies. The rites connected with life's major events do not change much down the years: as one Kumam teacher said to me, "These customs, and the importance of the *Bomo* and *Isas*, will not be lost in a hurry."

Mention should also be made of the Kumam custom of calling out one's sweetheart's name when spearing an animal (*Nying Apa*). The Lango do the same.

#### SUMMARY

1. Akum or Kumam is a nickname, now more or less adopted officially.
2. The real name should be Lango-Ikokolemu (or Lango-Ilale).
3. The Kumam belong to the Karamoja group; the clans show a common origin and, perhaps, similar birth ceremonies, etc.
4. They learned their present language partly from the Chopi and partly from the Lango "Leb Lale" represents a fusion of the two.
5. They retain many of the non-household words in their original Hamitic tongue.
6. Their names are distinctive.
7. It is by no means certain that they are actually Iteso: they may be a branch of the original Lango (Hamitic) family, who, although speaking a language similar to Teso, kept more or less to themselves and were known to the Iteso as "Kokolemu".

*Postscript.* I had always thought that the expressions "Leb Lale" (Lale language) and "Jo Lale" (Lale people) referred to the Kumam as a whole, being alternative names for the language and the people. The expressions are used in this way now. But it appears that formerly, Ilale was the name of an *Etem* (division) in the *Iworon* initiation ceremonies. As far as I can gather, there were four or five such divisions, all the boys of the "Ilale" division assembling at one particular elder's home, all of those of the "Imorotok" division at another's, and those of the "Abokota" division somewhere else. These names had no relationship with clans, and many clans would be represented in each division. "Ilale" seems to have been rather a large division but how the word got its present application to all the Kumam, I cannot say.

I have recently discovered an alternative meaning for the name "Ikokolemu", which Driberg suggested meant "children of Olemo", without explaining who Olemo might be. The story told to me to explain the name

<sup>1</sup> I do not think Driberg describes this, but I believe the Lango have the same ceremony.

is that many years ago, far away in Karamoja or beyond, a certain member of the Lango family stole a head-dress of honour—*Alem*—and with some other relations fled towards Lake Kioga where they settled down among the Jo Wer (Chopi) and learned their Nilotic language. They were called "Ikokolemu" by the rest of the family, *Akoko* in Teso meaning "to steal".

The Lango have the same word *Alemo* to denote a horned head-dress, so the Kumam were the "head-dress thieves". This is an interesting explanation and, I think, supports my theory that the Ikokolemu are not Iteso (as Driberg thinks), but are a branch of their own, originating, it is true, from the same Hamitic family, but keeping to themselves and always known to the Teso branch as Ikokolemu.

The story may explain why they abandoned the language of their ancestors and adopted new names for their children. To steal a head-dress was doubtless a very grave offence, so the thief had every reason to make a complete break with the past and settle down among other folk.

## THE GIANT FRESHWATER PERCH OF AFRICA

By E. W. GUDGER<sup>1</sup>

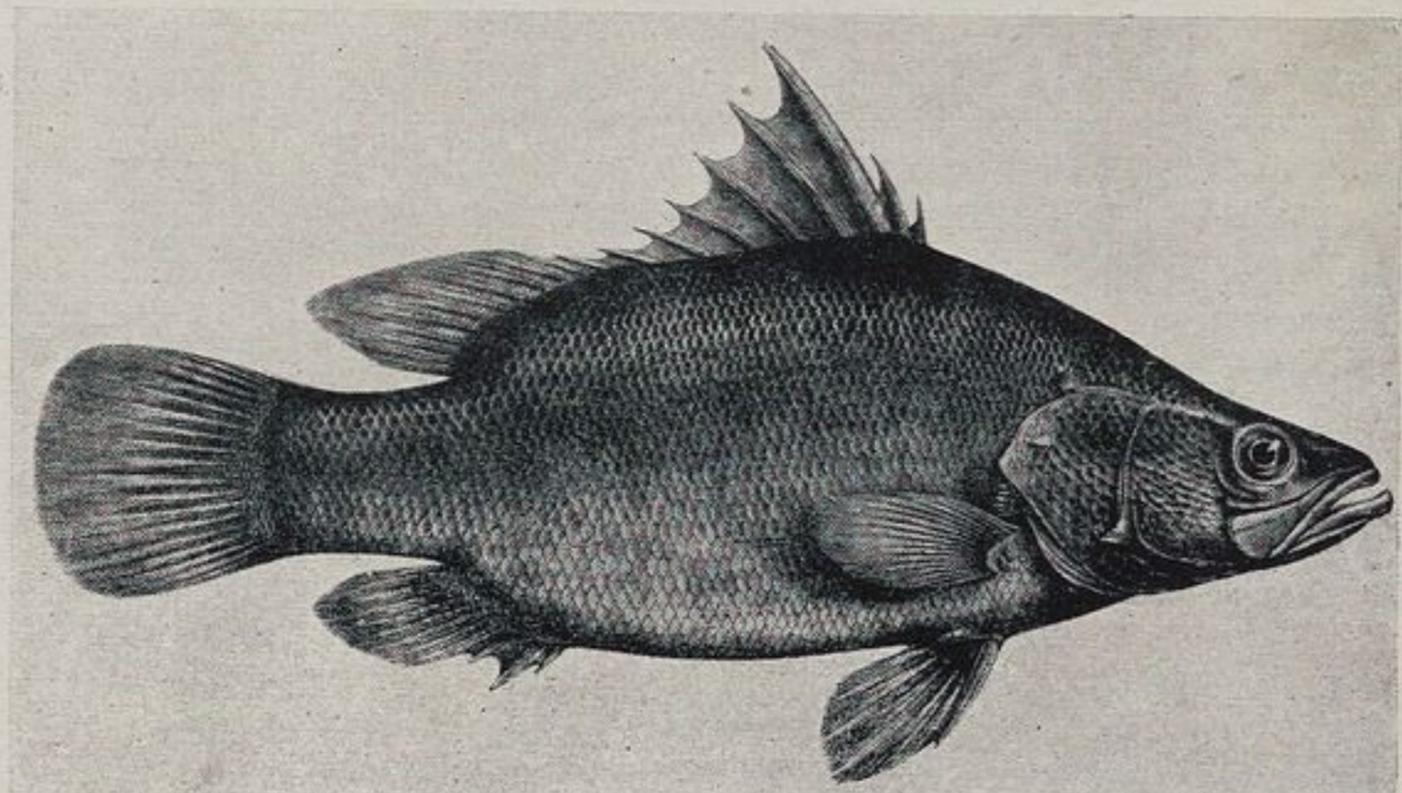
AFRICA, that dark continent of great lakes and mighty rivers, lying under the tropic sun, has many ichthyological rarities. Like its neighbour across the Atlantic, it is a continent of catfishes. Boulenger, the great authority on African fishes, states that there are about two hundred species of Siluroid fishes in its waters. So far as I know, no one has estimated the number of species of these fishes in South American rivers. But as I have shown elsewhere, there are surely three and possibly thirteen kinds of giant catfishes in these rivers. On the other hand, Africa, with physical conditions very much the same, might be expected to produce a whole flock of great Siluroids; but for some unknown reason, it has not produced even one catfish worthy of mention because of its size.

Indeed, Africa's only giant freshwater fish is a percoid, *Lates niloticus*, the Nile perch. However, it is literally a giant perch, reaching a length of six feet. Its distribution is a curious one. Although found throughout the Nile from Lake Albert to its mouths, the Nile perch is not peculiar to the Nile, but is found also in the large western-flowing rivers—the Senegal, Niger and Congo. For some unknown reason, it is absent from the Zambesi and other South African rivers. As we shall see, it has long been known in the Egyptian Nile and its portrait was painted in remote antiquity.

The Nile perch is not only the largest freshwater fish in Africa, but also the largest freshwater percoid in the world. Large specimens run ordinarily to 4 or 4½ ft. in length. At the Sports Club in London there was recently a preserved (mounted?) specimen of a *Lates* whose weight was given as 253 pounds. It was said to have been caught in Lake No, at the junction of the Bahr el Ghazal with the Bahr el Jebel or Nile proper. Another from Lake No is said to have weighed 280 pounds. Lortet and Gaillard (*Archives Muséum d'Histoire Naturelle de Lyon*, 1903, Vol. 8, pp. 185-190) measured one 71 in. long, and state that they had seen caught at Assuan several individuals over two metres long—probably more than 80 in. overall; but they do not say that they actually measured these specimens. At the time of the publication of his book, *The Fishes of the Nile* (1907), Boulenger gives as the attested record *Lates* known to him, one taken a few miles up the Sobat River, the most southern Nile tributary from Abyssinia, in about 9° N. Lat. This great perch was 73 in. in length, 55 in. in girth, and weighed 266½ pounds.

Little is known about the natural history of this splendid fish, which is beautifully portrayed in Boulenger's drawing (Fig. 1). Efforts made at Cairo to keep large specimens in the Aquarium were not successful; they fed ordinarily on live fish but lived only a few days or at most a few weeks.

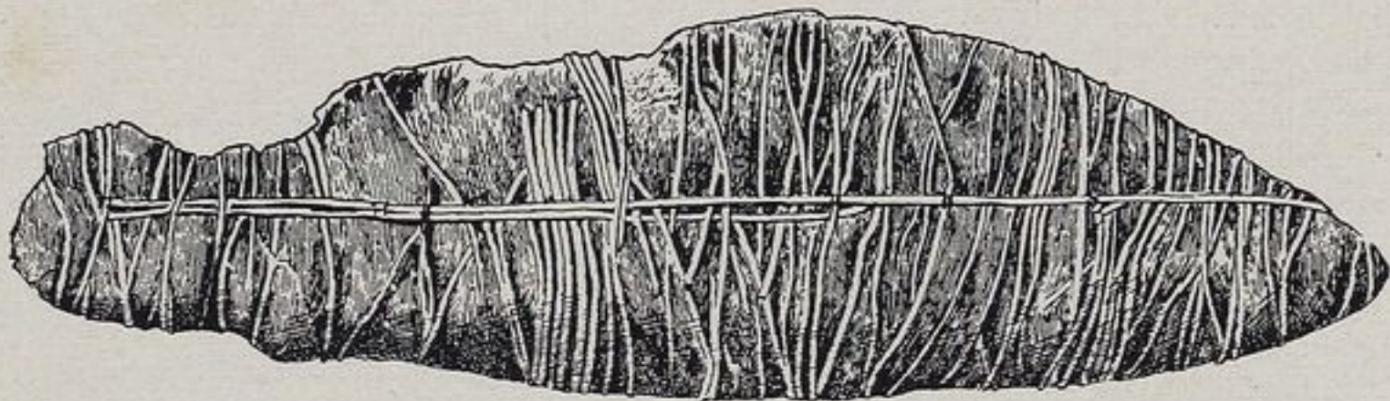
<sup>1</sup> Reprinted, with kind permission, from *The Scientific Monthly*, April 1944, Vol. LVIII, pp. 269-272. A contribution from Dr. E. W. Gudger, Honorary Associate in Ichthyology, The American Museum of Natural History, New York City.



After Boulenger, 1907

FIG. 1

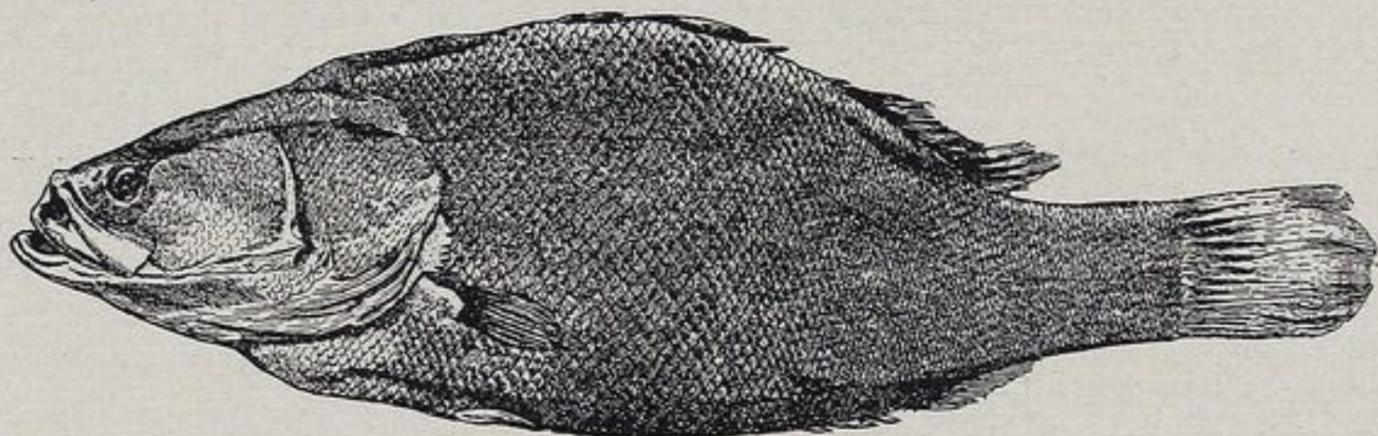
The Nile Perch (*Lates niloticus*). The largest freshwater fish of Africa and largest freshwater percoid in the entire world.



*After Lortet and Gaillard, 1903*

FIG. 2

Mummified Sacred Fish, Lates, external view. From Esneh, Upper Egypt. Showing linen swathings and lashing cords that form the mummy case.



*After Lortet and Gaillard, 1903*

FIG. 3

Mummified Lates unwrapped and cleaned of dried salty slime. This fish has been perfectly preserved, even with scales, fins and eyeball, for twenty-five centuries.

However, some young specimens thrived and grew rapidly, often at the expense of their smaller and weaker brethren who mysteriously disappeared—evidently down the gullets of their stronger cannibalistic fellows. The word Lates is derived from the Greek word *latos*, the name for a perch-like fish of the Nile, and is now restricted to this particular form.

The ancient Egyptians were animal worshippers and it is interesting to note that they did not overlook the superb fish which we know as *Lates niloticus*. It was much venerated by them and its mummified remains, scattered throughout the valley of the Nile, are very numerous. There was a special cult of Lates at Esneh on the Nile in Upper Egypt (Lat. 25.4° N.), where it was worshipped as a divinity of the first rank, and for this reason, in Graeco-Roman times the town was called Latopolis—the city of the Lates fish.

At Esneh, Lates mummies have been found in great numbers buried at shallow depths in a sandy plain near the town. Examination of these mummies showed that the large specimens had each had an abdominal incision made to permit easy entrance of the mummifying solution. Then each fish had evidently been subjected to prolonged immersion in a strong brine from one of the Egyptian natron lakes, but there was no evidence of the use of asphalt or bitumen. (This was ascertained by making a chemical analysis of the flesh of the fish and of the wrappings.) Next the fish was swathed in linen cloths, and these were secured by many circumferential windings of cord. These in turn were held in place by a longitudinal cord (Fig. 2). The curing in pickle may have been done after the fish had been wrapped. Finally, the mummified fish were buried in the dry sand.

Thus prepared and buried, these mummies in the dry air and dry sand of Upper Egypt have “kept” perfectly and when exhumed after twenty-five centuries are found, according to Lortet and Gaillard, to possess almost as much animal matter as dried codfish in our markets. Fig. 3 shows what was found when the wrappings (seen in Fig. 2) were removed, and when the dried salty slime in which the fish had been pickled had been wiped off with a damp cloth. This fish has been marvellously preserved. Note not only the splendid form of the body, but the wonderfully preserved scales and lateral line, the fin-rays, and membranes. Most notable of all is the fact that even the very eyeball is intact. Many such finely preserved specimens were about five feet long.

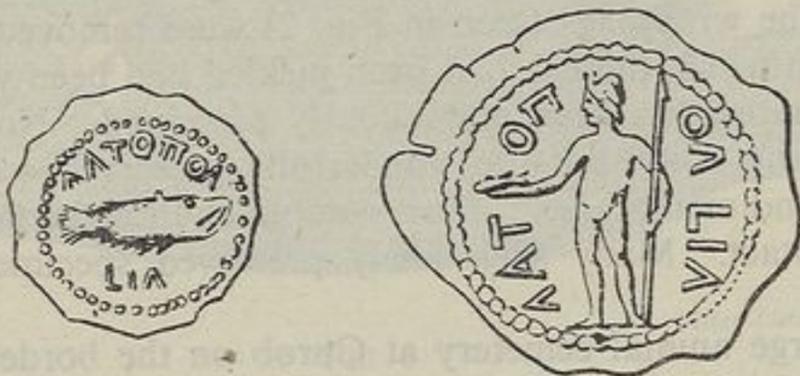
There is a large animal cemetery at Gurob on the border of the district of the Fayum on the west bank of the Nile about sixty miles south of Cairo. Fifty burial pits here were exhumed by L. Loat and reported on in 1904 (*Egyptian Research Accounts*, X, p. 3). From these pits, Loat obtained remains of scores of Lates. Unlike the Lates at Esneh, these were not mummified, but were sometimes wrapped in bundles of grass, or covered with ashes obtained by burning the grass. Various animals were buried here but the Lates' remains predominate. Over and over Loat notes “no preservative”. The fish were wrapped in grass, partially covered with ashes, or laid down as caught. Not being mummified, the flesh has gone, leaving only the loose bones, or sometimes rather complete skeletons, as Loat's photographs show. In the photographs, sometimes the outline of the fish's

body shows quite plainly. Study of these remains of large fish showed that the abdomen of one had been opened (the vital organs probably removed) and the cavity filled with ashes, while the mouth and gill openings of another large specimen had been filled with ashes. This looks as if some attempt had been made to use ashes as a help in preservation, but Loat repeatedly notes "no preservatives"—such as was used on the Esneh fish. Desiccation and slow oxidation have left nothing but the hard parts. The rough outline of the body in some cases (as shown in Loat's photographs) is probably due to the scales on the under side of the body remaining somewhat intact. Thus one fish, it is said, measured "5 ft. 6 in. long, and nearly 2 ft. in depth".

These remains of Lates ranged from small to large. Loat repeatedly speaks of large specimens, and for the better preserved fish gives measurements: 5 ft.; 5 ft. 2 in.; 5 ft. 6 in. (two specimens, one "nearly 2 ft. deep"); and last of all, "one large fish, nearly 6 ft. long". From this one must not conclude that Lates grew larger in olden days, but that the fishery then was probably less efficient than to-day and the fish had a better chance to attain full growth.

It is interesting to note that in contrast to burial pits for oxen and goats at Gurob, the pits for fishes were more carefully dug, and in many cases only a single fish was found in each pit. If two or more fish were buried together, a certain order was observed; either they were laid side by side, or head to tail, or placed in layers, and in no case was any other fish or animal species found with Lates. These things indicate the great reverence in which the fish was held.

Paintings of Lates are found on the walls of various tombs in Egypt, particularly on those of Medum, which is on the left bank of the Nile between the river and the Fayum, about fifteen miles north of Gurob. On the south

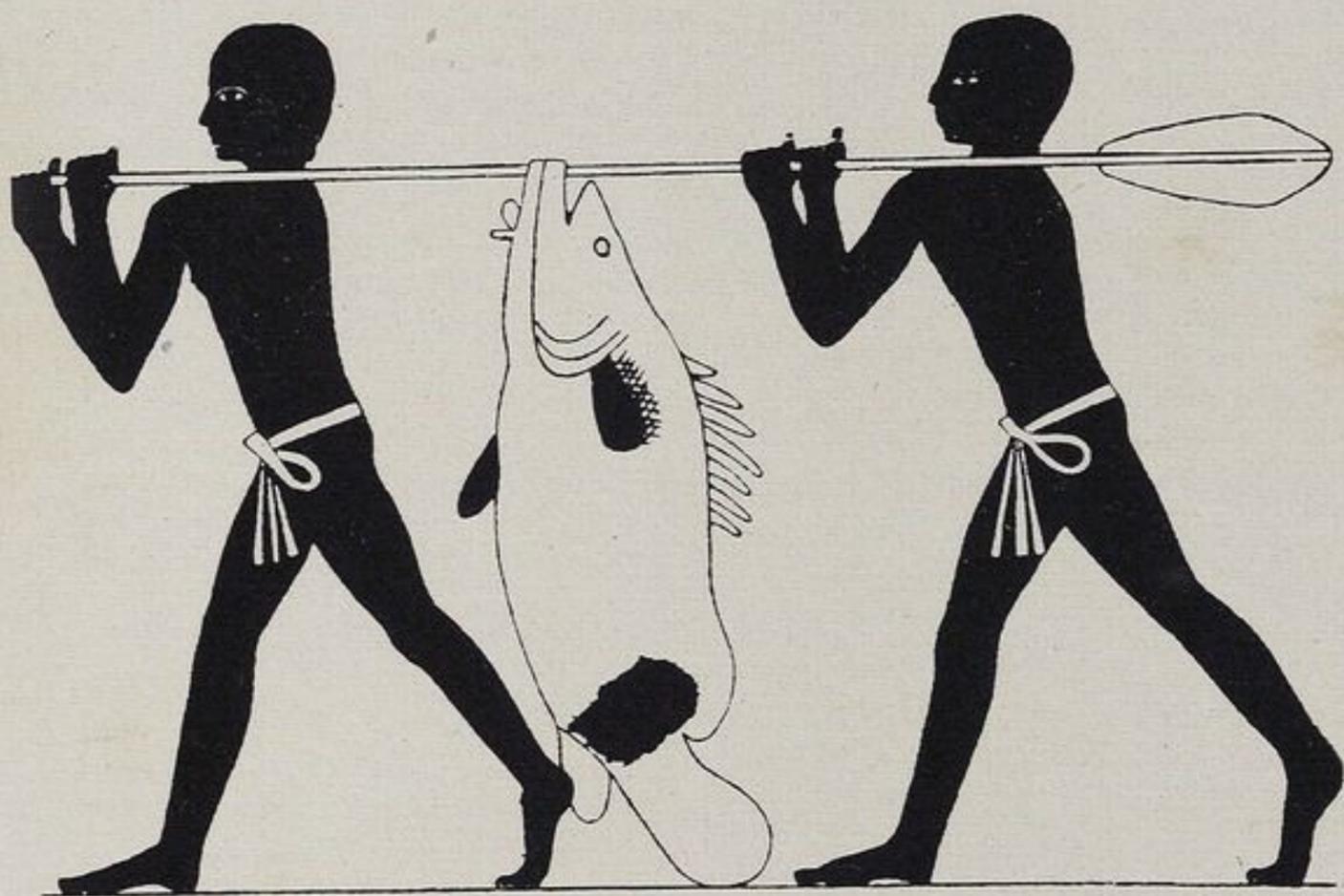


*Figs.  $\times 2$  from Russenger's Reisen, 1846*

FIG. 5

Greek coins of Latopolis. Ancient coins said to portray the Nile Perch.

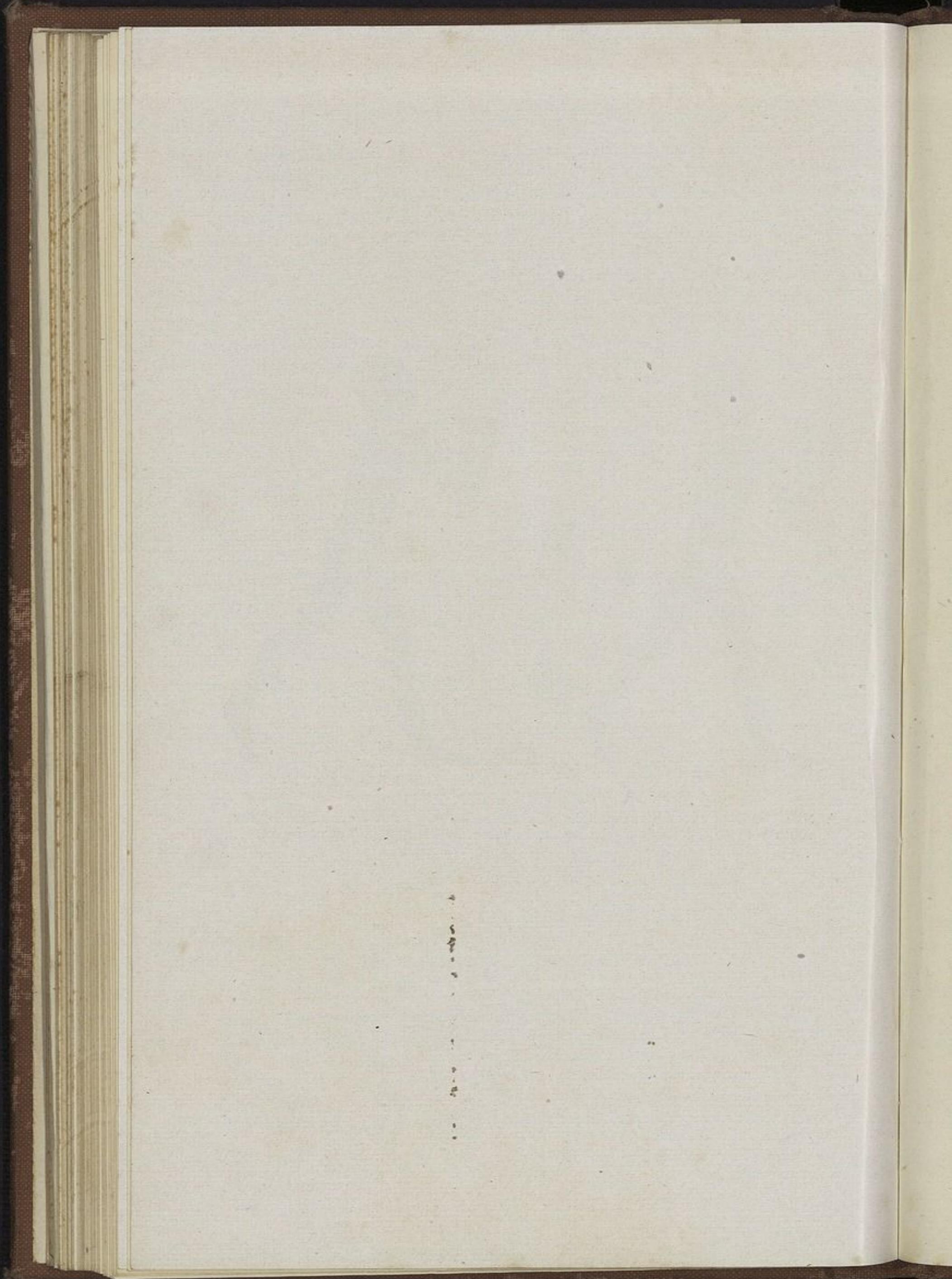
wall of the mastaba (or tomb) of Rahotep, high priest of Heliopolis (the city of the Sun), is an easily recognizable representation of the Nile Perch (Fig. 4). Here a large specimen of Lates (apparently about five feet long) is carried on the long handle of a paddle supported on the shoulders of two men. This figure closely resembles the one drawn for Boulenger. Even seven of the nine dorsal spines are shown, the eighth and ninth being so incorporated in



*From Flinders Petrie, pl. XII, 1892*

FIG. 4

A Nile Perch carried on the handle of a boat paddle. From a painting on the south wall of the tomb of the priest, Rahotep, at Medum in Lower Egypt.



the soft dorsal fin as to be easily passed over. According to an Egyptologist, the Medum Lates was painted about 2780 B.C.; thus it is probably the oldest figure of a fish of historic times.

But the Egyptians were not content with portraying the fish in a painting. Boulenger writes that in 1899 he was shown "... a bronze model, 115 millimetres long, which at once suggested to me a young *Lates niloticus*. This model contained a mummy of a small fish, the loose bones of which I have been able to examine and to identify as those of a young Lates."

Boulenger states that, on certain ancient Greek coins of Latopolis, there are representations of a fish which he and Russeger recognize as Lates (Fig. 5). It is noted by Russeger, from whom the figures of the coins are copied, that on the reverse side of each coin is found an effigy of Hadrian, the Roman emperor whose reign covered the years A.D. 117-138. This establishes the fact that these coins were minted more than 1,800 years ago. However, a mere glance shows that the artist, who cut the figure of the fish on the dies from which the coins were struck, was not in the same class with the painter who depicted Lates on the wall of the tomb of Rahotep at Medum thousands of years earlier.

## EXTRACTS FROM "MENGO NOTES"—IV

(26)

### HOW RELIGION CAME TO UGANDA

By APOLO KATI KIRO and THE REVEREND HENRY WRIGHT DUTA,

translated by C. W. HATTERSLEY

#### 1. Mohammedanism

**D**URING the reign of Suna (the king who preceded Mutesa) he was visited by some Arabs: Medi Abraham, and Kyera, and Amulain, and Mina, and Katukula Mungazija, and Zigeya Mubulusi.

Of these he liked Medi Abraham best, and gave him a great many presents, ivory, women and slaves.

Later on Medi Abraham told Suna, when he saw him killing people, that, although he killed them with so little thought, yet there was a God who created them, and from Him he had obtained his kingdom, and the people he governed, and that he himself was created by Him.

This Suna did not believe, for he said he knew his Lubare gods and they had given him his kingdom, but Medi Abraham repeated his words every time he was called to see him.

Some time afterwards Suna asked Medi, 'Where is there a God greater than I?' And Medi told him that there is a God who will raise up all who believe in Him, and they will go to Paradise.

When Suna understood this, he agreed that Medi should read to him, but only now and then, and he got through the first four chapters of the Koran.

When he had got hold of these, more or less by word of mouth, Medi returned to the coast and did not come again to Uganda, and soon after this Suna died and Mutesa succeeded him, and made his capital at Banda, half way between Mengo and Ngogwe. He also encouraged Arabs to visit him, Katukula Hali and his friends, and Hamuli Musirimu, and Makwega, a Swahili. Mutesa made friends of these and gave them many things just as his father Suna did before him.

King Mutesa asked Katukula what it was his 'father used to talk to them about, when they visited him', and he told him, 'we used to tell him about God, the King of Kings, and that He will raise people from the dead'.

King Mutesa asked him, 'Are you not lying? Is there a resurrection from the dead?' They told him that indeed there was, and that those who learnt the words of God, when they died would rise again.

So King Mutesa said to Katukula, 'Well then, come and teach me to read,' and he brought a Swahili called Makwega, who taught the king every day, and he learned Mohammedanism very quickly. Some others learned with him whose names are Musisi Sabakaki and Basude Sabawali of Kigalagala, who is now Mutola, and Kyakonyi Omumyuka of Myukanya, and

later Kauta Mukasa, who was Katikiro, and Mujabi Omutabuza, and Tebukoya, and Sembuzi and Wakibi.

These were first taught, but afterwards the converts were slow in coming forward.

When the king went from his capital, Banda, and went to Nakawa he persevered with his reading and fasted during the first fast, and he then ordered all his subjects to read Mohammedanism. He also learned to write in Arabic: the Arab Wamisi brought the Mohammedan Kibali who taught the king.

Then Mutesa came from Nakawa to Nabulagala, and thence to Rubaga, where he stayed some time. He again ordered his people to read, but he saw they were not giving their minds to it. So he said to his head district chiefs, 'I want to know if people are learning to believe in Islam well.' His chiefs told him they were. 'Well,' he said, 'if they are, how do they salute each other as Mohammedans?' They replied, 'Some salute thus—*Salamaleku dekimu musalamu*—others, *Sibwakede bwatulise*.'

He saw they had not learned to salute, and found that those who had begun to really learn were very few indeed, and he gave orders that every man who had not learnt was to learn the salutation, *Salamu alekumu alekumu salaamu* or *Shabuluheri*. And in anger the king gave orders that every one refusing to learn was to be seized.

Many who would not learn were then seized, called infidels and killed. Then every married man fixed up a stone in his yard to pray at, and every chief built a mosque, and a great many people became readers, but were not circumcised, and all the chiefs learned that faith.

## 2. Christianity

The religion of our Lord Jesus Christ took root in Uganda in this way.

When King Mutesa was at his capital—then Rubaga—he went to a place called Kazi on the lake to hunt. When he had been there three days he heard that an Englishman had arrived across the lake.

He therefore sent men to fetch him, who found him at Namukuma, Kikwata's place, and brought him on to King Mutesa at Kazi. They then returned together to Rubaga and became friends. The king asked Stanley, 'Do you know about religion?' and was told that in England we believe in the religion of Jesus Christ, the Son of the Living God, Who will raise all men from the dead.

King Mutesa at once said, 'I want you to teach me,' and Stanley replied that he was quite willing, and that as soon as he had fetched his things he would do so. Stanley went to Usukuma at the south of the lake, and when he returned he found the king had gone to fight the Bavuma, and he met him at the Ripon Falls in Busoga, and from there they went to Luba's. And Stanley said to Mutesa, 'You said you wanted to learn our religion?' and the king said, 'Quite right, teach me,' which he did day by day out of the book of Genesis, and afterwards left him a man called Dilington Muftaa to teach him in Kiswahili. They returned from Luba's to Rubaga, and there

Muftaa remained and became Mutesa's servant, and taught him daily in Genesis and another book, until he quite understood them. Then he wrote them in the Arabic characters, which he could read well. There were some youths in the king's service who were Mohammedans, who when they saw him studying hard at these books despised him, and said he was becoming an infidel because he was reading the Christian religion, and these refused to eat any meat killed in the king's enclosure, saying it was not killed as it should be for Mohammedans.

Some of these got disobedient, and two of them, Mponyebuwonye and Kaganyulo, and some of their friends, used to visit some of the big chiefs at night, in the king's name. The king heard of this, and was very angry and had them put to death at Namugongo.

Not very long after this, an Englishman named Smith came to Uganda on 30th June 1877, and with him Mr. Wilson.

When Mutesa saw Mr. Smith he said he had a great desire to read in English characters, and Mr. Smith quickly wrote out the alphabet on some pieces of cloth (*ensuga*), which he gave to the king, and came every day to teach him. The king also told all the chiefs to bring their children to be taught the religion of Jesus Christ our Lord, the Son of the Living God.

Those who commenced to read first, chiefs and children, were Tebukoza Kyambalango, now Andereya Kadu Namungi, Zephaniya Bugeza, now Mukubankwata, Isaya Mayanja Munakulya, Kabunga Mukwenda, Edwadi Omuzigiti, Luta Bugobera, Sembera Mackay who was a Musoga, Henry Buza, son of Isaya Mayanja, Firipo Mukasa and Daudi Nyenje, Henry Wright Duta, Kalemba Omulumba and Gabunga Kaya.

Then Smith left Wilson to teach these to read and he went to the south of the lake to fetch his belongings, and he was killed at Walukonge (Ukerewe). When he heard this, Wilson went south to see where they had killed his friend Smith, and there he met Mackay and came back with him to Uganda.

On his arrival Mackay met Dilington Muftaa whom Stanley left to teach Mutesa. Mackay quickly began to teach in earnest, and went regularly to the king's place to teach the head chiefs in their mosque, and taught them the Gospel according to St. Luke and Genesis.

Thus the religion of our Lord Jesus Christ took root here; but not all those whose names are mentioned above believed, some did, but others did not.

Those who believed were Andereya, Zephaniya, Isaya, Edwadi, Luta, H. W. Duta and Sembera Mackay, who was most earnest in persevering in reading and teaching others, and was a very clever teacher. He was afterwards killed in the wars between the Roman Catholics and the Protestants, and his loss caused very great grief. Henry Buzabalyawo also believed, but he was driven away later to Bunyoro in the persecution by Mwanga, and was killed by Kabarega, King of Bunyoro. Firipo Mukasa and Daudi also believed.

The religion of Jesus Christ was taught during the reign of Mutesa without any persecution. Mwanga, whilst still a prince, was taught by Mr. Mackay, and got to the end of the first reading book (*mateka*).

Mwanga, on the death of Mutesa, became king on 25th October 1884,

and all the young men readers were delighted that he had succeeded to the throne, thinking that they would be helped with their religion. But in January 1885 he began to persecute the Christians and sent one of his head soldiers Kapologa to Mr. Mackay's house, to apprehend three boys, Yusufu Lugalama, Maliko Serwanga and Yusufu Kakumba. These three were taken to the place of execution, Mpima Erekeru, near the river Mayanja, and burnt there. At this, those who were readers were much distressed, and those who were determined to persevere read in the seclusion of their own homes.

All the same, after a very short time, the number of readers increased greatly, for the report got about that even if they suffered death they would rise again if they believed in Christ. It was then that I, Apolo Katikiro, began to read in earnest. I was then about thirteen years of age, and I left my father and went to become one of the king's boys. Now I met there a boy whose name was Mukasa and who knew how to read, and I asked him to teach me, which he did. But when I began to read I found that I was unable to succeed owing to the Swahili alphabet being used. After this I went to the house of Mr. Mackay together with Samwiri Mukasa, and we read the alphabet daily, which was familiar to Mukasa because he was a Mohammedan reader, and he quickly picked it up, but I was a long time over it.

After Mutesa's death we came here to Mengo: and then I diligently studied and was baptized. Nuwa Nalukaga and Samwiri Mukasa were my godfathers. Shortly after my baptism King Mwanga heard that a European, Bishop Hannington, had come through Busoga and arrived at Luba's.

When he heard that he sent Lwanga Wakoli, the Sabadu of the gate porters, and he went to kill him, and when I, Apolo Kagwa, heard the king's orders I sent Maliko Sekajija (now Mako Mutesa) and he went and told Mackay that they had gone to kill him. And without any delay he brought ivory and cloth to redeem his life, because Mackay knew our customs that whenever a person came under the king's condemnation we used to bring presents as compensation for him and he would be released, hence Mackay did this too. But King Mwanga did not accept them, and they went and killed the Bishop on the 29th day of the month of October 1885.

Now there was one of the king's servants, Balikudembe the Musalosalu, he was a great friend of the king, and a Roman Catholic.

He said to the king, 'Sir, why are you going to kill a European, whom your father would not have killed?' The king did not answer him and he did not say any more. But immediately after he had said this the king fell ill with inflammation of the eyes and slight fever. Then when the Katikiro Mukasa came to see the king and to inquire after his health, he told him what Balikudembe had said to him. Then the Katikiro Mukasa, without any delay, seized him and said, 'Do you abuse the king with the bones of his father?' and they carried him off to the executioner, the Musigula Mukajanga, and he burned him alive.

And that was the cause that led to King Mwanga hating those who embraced the religion of Jesus Christ our Lord. And many wanted all the more to read and to believe with all their hearts. And when they had killed

the Bishop, the king's houses and treasures were burned, and the people were afraid that the houses were burned owing to the king having killed the European.

Now after the burning of the king's houses, he went to Munyonyo, and when he arrived there the chiefs accused the Christian readers to him saying that they killed a serpent and a sheep, and boiled them together, for a feast. When the king heard that he tried to find some occasion from which he might condemn them.

Then without waiting he went to hunt hippopotamus on the lake, and when we came back from the hunt the king asked about a boy, Tomasi Muwafu, the son of the Katikiro Mukasa, saying, 'Where has he gone?' and they told him that he had gone to Kisule the blacksmith. When the king heard that, he was furious and sent to fetch him, and when they brought him he bound his arms with a rope and came with him into his treasury-house, and he found me, Apolo Kagwa, there and asked me 'Where are my spears?' and I replied 'We took them to the blacksmith Kakoza to be polished' and he said 'Where is a sword,' and I answered 'Here is one,' taking it down and giving it to him, and he drew it and left the sheath in my hand. Then he was about to cut Tomasi Muwafu with it, and asked him 'Now then tell me the name of your teacher,' and he said, 'Sebugwawo Semukutu taught me.' Thereupon they went to fetch that boy Sebugwawo Semukutu. When they brought him to the king, he was seized and made to lie down in the court yard, and the king took a spear and wounded the boy and then handed him over to the executioner Mukajanga saying 'Take him away and kill him.'

After giving him these commands, he arrested me, Apolo Kagwa, but he did not spear me, but took his spear and hit me on the head, striking me thrice, and then seized me and I was beaten with thirty stripes perhaps. I don't very well remember, because after he had beaten me he commanded three men to kick me, after they had tied my hands, whilst I lay on the ground, and they took all the skin off me and I was all but dead, and only came round after they had untied me.

After they had kicked me, they lifted me up and carried me out like a corpse and put me in a house, and he told me 'Never read again.' Directly after he had said this to me my friend Mukasa Nyonyintono came, and he (the king) asked him saying 'Where were you all the time I was fighting?' And he ordered him to be taken to Sebata, to be mutilated; and they carried him off at once.

Now the evening was drawing on; and he commanded the executioners to count all his servants' beds and said, 'Let none of their occupants be missing in the morning.' So they set a guard over the whole Lubiri (palace), and they allowed nobody to go out, only people who came in were allowed to pass.

In the morning the king came into his treasury, and sat down, and called all the Lubiri boys, and they went into the court yard and the king said, 'Let those who read separate themselves and sit on one side,' and they did so, and he said to them, 'Do you know how to read?' And they agreed, saying 'We do.' Then he commanded them saying, 'Mukajanga shall carry you

off,' and he was in the act of doing so when a Roman Catholic boy called Waswa denied saying, 'I do not read.' The king said, 'I know him to be a reader, carry him off and kill him.' Now there was a Protestant boy Musa Mukasa who had been thoroughly instructed in the religion of our Lord, and the king said, 'Do not take him to the place of execution he is too strong.' So he was killed at Munyonyo.

The names of some of those who were killed were as follows :

#### PROTESTANTS

- |                          |                            |
|--------------------------|----------------------------|
| 1. Nuwa Walukaga.        | 6. Mukasa Iwa Kisiga.      |
| 2. Alexander Kadoko.     | 7. Kifamunyanja.           |
| 3. Fred Wigram Kiza.     | 8. Muwanga Nijiri.         |
| 4. Robert Munyagabyanjo. | 9. Sabagabo we Kitegombwa. |
| 5. Mbwa Omusamula.       |                            |

#### ROMAN CATHOLICS

- |                  |                         |
|------------------|-------------------------|
| 1. Lwanga Gonza. | 11. Kalemba.            |
| 2. Tuzinde.      | 12. Mawagali.           |
| 3. Kirigwajo.    | 13. Banabakintu.        |
| 4. Serunkuma.    | 14. Kiwanuka.           |
| 5. Ludigo.       | 15. Kibuka.             |
| 6. Kizito.       | 16. Bazekuketa.         |
| 7. Mugaga.       | 17. Kagwa Omugowa.      |
| 8. Gyavira.      | 18. Sebugwawo Semukutu. |
| 9. Buza.         | 19. Mukasa Kiriwawanvu. |
| 10. Ngondwe.     |                         |

But those who were killed were over forty in number. After the king had killed them others were mutilated, and when they recovered the king returned from Munyonyo to Mengo, and the persecution quieted down somewhat, and many learned in their own houses the religion of Christ. Later on the king forgot what had passed and took Nyonyintono whom he had mutilated and gave him Kisalosalu, and took me Apolo Kagwa whom he had beaten, and gave me the stewardship.

Now the power of God overcame King Mwanga. The number of Christians who were continuing in concealment came to an end, and they had a certain amount of freedom. After this the King Mwanga wanted to go to Natete in Budu, and he went off on his journey to Budu; but when he was returning from Budu he stayed a night at Buwalala at Katabalwa (Muguluma's house, the Mohammedan); and many people accused him, Muguluma, of murder. Thereupon Muguluma was arrested and they searched for corpses and could not find any, so he was acquitted. Now when Muguluma saw that they brought an unsuccessful charge against him, he understood that the Christians also were accused without reason, wrongfully. Then he proceeded to feign friendship with the Christians, and many Mohammedans did the same, in order to accuse the Christians to the king of eating snakes (a species known as *amatemankima* or monkey killers) but they refuted the charge.

Now at this period the king determined a second time to arrest the readers and kill them. When the Christians and the Mohammedans heard this they refused to be arrested, they agreed together and the Mohammedans said, 'It was we who recently brought the accusation against you but we too understand that the king wants to kill us. We had better fight against him and drive him out and set up another king that we may preserve our religion well.' The Christians consented to this proposal, and in the month of September we waged war and King Mwanga was driven out, and skilfully escaped and made his way to Sukuma in his canoe Waswa. Now after we had chosen Kiwewa and he was made king, one month elapsed and the Mohammedans made war on us and drove us out, and God showed us a good pathway and we went to Ankole.

There were about one hundred and fifty of us, and when we got to Ankole, the King Ntale treated us very kindly and gave us gardens at Kabula. Through the power of God we, who were but few in number, were joined by many Christians who followed us from Uganda to Ankole; even those who knew but little about reading came, and we were more than fifteen hundred. Now after we had increased in numbers, and learnt to read, our religion grew in power, because after our separation those who only read a little became much more diligent, and many who had not yet endeavoured to read were thoroughly well instructed. Then we saw that we had increased by two hundred more and we decided to come and fight the Mohammedans, and we fought with them about eight months and drove them out about the 5th of October 1888. Kalema's capital was here at Lunguja and we conquered him, and the power of God grew amongst us. Then, when we made a distribution of chieftainships, every chief taught his people, and we took heed to further instruction and took much pains to continue teaching many people who learnt the religion of Jesus Christ.

But in the month of January 1891 we fought with our friends the Roman Catholics. Now at that time Stanislas Mugwanya was Kimbugwe, but he did not take counsel well as he was himself anxious to fight; after some delay they made war upon us that they might have the whole of Uganda for themselves, but God had mercy on us and we routed them, and they went to Budu, and, when we called upon them to go, the land was quiet, and we were able to read much more. At times on a Sunday there would be baptized eighty or a hundred or more people, this would take place every Sunday. Now some people left the Protestants and became Roman Catholics meaning to wage war and bring back once more the old customs of polygamy, etc.; and they found it was difficult to do it openly so they said, 'Let us fight and drive out all who love the Europeans who load us with burdens.' Now Mwanga went to Budu on 6th July 1897.

However we found those who were making this secret arrangement gathered together in Budu, and we fought with them and conquered them, and Mwanga went into German territory, and we returned and chose Daudi, his son, to be king. After a short time the Nubians rebelled, and we fought in that campaign which led to the death of many of the true faith; that blow was a terrible one. And when we conquered the Nubians, in the year 1898,

we settled down in peace, and people earnestly set to work to read, but later on they became lazy and the missionaries at Namirembe determined to teach the children and instruct them in writing, and in this God displayed His power, and more and more people came to be taught the Word of God. And some of the older people charged them saying, 'It is good for you older people too to be further instructed, and so learn the Word of God, and writing and arithmetic.' So many came to school but some of them seemed as though they wanted mere knowledge without caring for the writing only; and yet there were many who truly loved the Word of God. Again there are many who want to learn trades only, in this country, and they have set their heart on learning every kind of work. Also there are unprofitable young men and women, who do not want to be married nor to work, but wish to be Mohammedans in order to have several wives and the young women to be married for a short time only and then to run away with another man."

(*Uganda Notes*, May 1902, p. 35; June 1902, pp. 43-44; January 1903, p. 6; October 1903, p. 54; November 1903, pp. 59-60).

(27)

#### ARRANGEMENTS FOR THE CORONATION, 1902

"The Katikiro left Mengo on the 6th May to attend the Coronation. Accompanying him were the Rev. E. Millar, Mr. Prendergarst, and Ham Mukasa as his private secretary. Captain Hanlon is to take over the conduct of the party on their arrival in England, from Mr. Prendergarst, who is on sick leave. They were accompanied as far as Mombasa by the Bamasaza Kago, and Kimbugwe, and by the Rev. Batolomayo Musoke. A telegram from the Katikiro states that all arrived at Mombasa on the 14th, and the party for England were to sail on the 17th.

During the Katikiro's absence, Samwili the Kangawo is to take his place. He is well known as a conscientious and good worker, and we wish him all success in his very difficult position.

The Katikiro has taken amongst other presents for the king, two magnificent tusks weighing 170 and 140 lb. They cost him over Rs. 200 duty at Entebbe."

(*Uganda Notes*, June 1902, p. 39.)

(28)

#### CIRCULAR ISSUED BY COL. BRUCE TO C.M.S. MISSIONARIES, ENTEBBE, 15th MAY 1903

"DEAR SIR,

I have received the permission of the Bishop to write to you to ask your assistance in regard to a point affecting sleeping sickness. I find that this plague is like the Fly disease of South Africa. It is caused by a similar kind of parasite and is possibly carried from man to man by some insect as the Fly

disease is carried by the Tsetse Fly. Now I find a species of Tsetse Fly along the shores of the lake and in the islands. It may be that sleeping sickness is carried by this fly. In that case where the fly is found there would also be found the disease, and where none of these flies were found there would be no disease. I am trying to make out the distribution of this fly, and would be much obliged to you if you could inform me if it is found in your district. I should also like you to add the information as to in what kind of place the fly is found, marsh, banana planting, bank of river, lake, etc., what time it bites during the day or night, if it frequents bush or open places, and if it is numerous. What animals does it bite?

Further, if sleeping sickness occurs in the same places, distinguishing of course between cases that have been infected at a distance and those that have been infected in the place.

The best way to catch them is by means of a small butterfly net, they can easily be killed by a squeeze and then placed in a small envelope or piece of paper with the name of the place and date of capture written on it. These small envelopes could be packed in a small box or tin and sent to me from time to time.

You will agree with me that if the insect carrier could be found we would be a little farther on our way to devising some means of prevention. I may add that the natives call the fly *Kivu*.

Now I am afraid I am asking you to put yourself to some trouble, but I am also sure you are interested in this dire plague and will be glad to help for the sake of the people.

Yours most truly,

(Signed) DAVID BRUCE,  
Lt.-Col., R.A.M.C."

(*Uganda Notes*, June 1903, p. 31.)

(29)

#### MWANGA—THE LATE KING

"The news of the death of Mwanga caused very little feeling among the Baganda, who, one might almost say, seem to have practically forgotten his existence, having enjoyed the rule of the infant Daudi Cwa now for five years.

True there are those among the real heathen Baganda who have never really acknowledged the new King, for they would say 'How is it possible for a successor to be put upon the throne while his father is yet alive?' The idea of exiling a king—however bad a tyrant—is not conceivable to them. They have been accustomed to worshipping their king as the representative of their gods, and so his will was law even if it meant (as it often did, even in Mwanga's day) wholesale execution of his subjects.

When one reviews the life and acts of Mwanga there is little room for regret at his death. He had sinned much, and had reaped for himself a very bad harvest, and his last years must have been full of regret if not of remorse.

He was not even considered a good successor to his father, though living as he did in more enlightened times, he had every opportunity for exercising any talents he might have possessed. There were none of the kingly qualities that one finds, however latent, in most dusky potentates. His whole desire was to please himself, and the good government of his country probably never so much as occurred to him as worthy of consideration.

In the matter of religion he was very fickle, and it is difficult to say whether at any time of his life he entertained any sort of desire to benefit by the faith of any religion. He never truly espoused the Protestant cause, and one doubts whether he ever attached himself seriously to either of the Christian parties. His attachment was purely political.

Had he not rebelled at the last, he would probably have lived to rule over a prosperous and happy people. But he was not the type of man to desire, much less foster, improvement or progress in any shape or form. Having lost for ever under the new regime all claim to absolute power over the lives of his subjects, he sought by every chance that offered to expel the Europeans who had come to control and curb his rule. From the first, he was in his heart antagonistic to everything European.

It was he, it will be remembered, who ordered the foul murder of Bishop Hannington, a piece of audacity which his father Mutesa would never have dared entertain.

On his succession to the throne in 1884 he commenced his plan by first persecuting the missionaries and their converts, and many of the latter were at his command burned to death. The European missionaries he treated as his inferiors, and even as slaves, ordering them to do this and that on pain of exile or even worse punishment. And for some time they were actually prisoners in their own houses.

It was in the following year, on 29th October 1885, that the assassination of the Bishop occurred, while on his road through Usoga to Uganda. In 1886 was the great persecution of the Christians. Two years later the few missionaries who were in the country actually fled for their lives, so serious had the position become for them. After a short time the missionaries returned, but only in time to find the Christians and Mohammedans had risen against the king who they had heard was planning their destruction. He fled to the south of the lake, where he professed himself a Roman Catholic, returning later to win back the throne. He was restored in October 1889.

But the country had become agitated and restless, and internal strife became the order of the day during the next few years, culminating in the terrible Nubian revolt, the history of which is only too well known to our readers. It was by throwing in his lot with the Nubian rebels that Mwanga brought upon himself the loss of his throne. Having once rebelled and been forgiven and restored, he could not in any case expect a repetition of such magnanimity. Finding his cause lost, he fled into German territory, but was shortly after captured.

This was in 1897, the year in which Daudi succeeded to the throne. Mwanga was transported to Mombasa, and more recently removed to the Seychelles Islands where he met his death.

One almost wishes that before his end he might have been permitted to visit his old kingdom for a brief period and see for himself the wondrous changes God has wrought in these few years that have passed since the stormy days of his kingship."

(*Uganda Notes*, July 1903, p. 35.)

(30)

### A FOOTBALL MATCH

By H. T. C. WEATHERHEAD

"During a recent holiday in Busoga I took part in a football match between Iganga and Jinja. This is, I suppose, the first real match amongst the natives. The Iganga men walked over to Jinja with Mr. Skeens and Mr. Owrid who played on their side, while Mr. Buckley, Sergeant Moss and myself played for Jinja. But there was no resisting the Iganga team; they beat us handsomely by 9 goals to 1. The point of interest is in the fact that there seems to be a certain discipline at work for these men to learn to keep their places at football, and that some *esprit de corps* is engendered which is a great thing amongst naturally indolent people. Football may be a means of grace."

(*Uganda Notes*, September 1903, p. 46.)

(31)

### ENTEBBE

By REV. J. J. WILLIS, C.M.S. *Acting Chaplain*

"There was nothing very remarkable a few years ago about the quiet wooded headland running out into the lake on which stood the native village of Ntebe; and he would have been a bold prophet who could in those days have foretold the rapid changes so soon to be effected by the touch of the strong hand of civilization.

Its natural beauty, combined with its fine defensive position, and its proximity to Mengo, doubtless contributed to the decision of His Majesty's Government to adopt Entebbe as the official capital of the country.

The importance of Entebbe is self-evident. Not only is it the seat of His Majesty's Commissioner, but it is, at least for the present, the Port of Uganda, through which the tide of civilization is rapidly pouring into the country. As a new town, and in every respect a European town, it moves ahead of and gives the lead to all inland districts. It is the headquarters of the Indian and Goanese traders, attracting a large and motley crowd from many quarters. The streets and houses suggest a busy coast town. Indian troops, traders and mechanics; Swahili masons and servants; hut-tax labourers from Unyoro and far inland parts of the Protectorate; grass-clothed Baziba in search of work; Nubi soldiers; Europeans and Goanese crowd

its streets, and make it difficult to realize that one is in Uganda. Even the Baganda themselves seem anxious to denationalize themselves, adopting as far as possible everything Swahili, language, dress, religion; so that the official capital of Uganda tends to become every day less like Uganda and more like the coast.

The population, so essentially<sup>1</sup> cosmopolitan, is difficult to estimate, for it is so constantly fluctuating. The steady stream both from and to Mengo never ceases from sunrise to sunset, while Entebbe itself is a beehive of constant activity, a striking contrast to other places in Uganda where the old order still holds sway."

(*Uganda Notes*, September 1903, p. 47.)

(32)

#### INTRODUCTION OF EGYPTIAN COTTON

"We hear that the Uganda Development Company Limited, which was delayed in its formation on account of Mutungo having been given up, is now being definitely floated.

Mr. Borup who is now on his way out has visited Egypt to study the subject of cotton growing and is, we hear, bringing out three tons of cotton seed with him, with a view to encouraging the natives to grow cotton systematically, the Company, of course, promising to find them a market for it by purchasing it for export."

(*Uganda Notes*, December 1903, p. 64.)

(33)

#### BOTANICAL GARDENS, ENTEBBE

"Mr. J. Mahon, in his report on exotic plants of economic interest in the Botanic Gardens at Entebbe, published in January 1903, gives some results of recent experiments. Recognizing that the natural supply of rubber must, sooner or later, be exhausted, varieties of imported rubbers have been tried. The Para rubber, the Central American rubber, and the Ceara rubber are all reported to be growing freely; and the Lagos Silk rubber is growing fairly well. Of varieties of coffee tried the *Coffea robusta* (a valuable Congo species), Maragogipe (a hybrid Brazilian sort), and native coffee from Sesse are all reported well of. The record of tea is not so satisfactory, the rainfall not proving sufficient. However, in the neighbourhood of the Ruwenzori mountains, where the rainfall is very much heavier than in Uganda, the prospects of tea growing are, according to Mr. Scott Elliot, the naturalist and traveller, much more hopeful. Mr. Mahon calls special attention to the unexpectedly good results obtained with cacao, a plant which has never yet been grown commercially at an altitude of over 4,000 feet, but which, in Uganda, seems to thrive well. Vanilla grows moderately well, but the elevation of the country is against it. Of varieties of fruits planted, the pineapple, especially, does

well. It is as yet too early to report with any certainty on timber, but of a variety planted, the most conspicuous success is the Mlanji cedar from Nyasaland, specimens of which, though only three years old, have already reached a height of fifteen feet.

Fibre of various kinds promises to be an increasingly useful commodity in the future.

*Sansevieria*, or Bowstring Hemp, was valued in London at £25 a ton. *Raphia* palm is extremely abundant and can be propagated to any extent by traders here at a trifling cost. Ramie or 'China grass' is growing well and seems well suited to the country. Specimens of cotton sent home were favourably reported on in Manchester."

(*Uganda Notes*, December 1903, p. 64.)

## NOTES

### MOTHER KEVIN

By NELSON F. M. KUSAMBIZA

I WAS an African Platoon Commander with the East African troops in the South East Asia Command. As you know, in Burma all supplies had to be brought to the fighting troops by air.

When I was with the 28th (E.A.) Infantry Brigade in the 7th (U.) Bn. K.A.R. all the Africans in that unit used to call those Dakota planes by the nickname of *Mama Kevin*, remembering the hospitality rendered by Mother Kevin to unfortunate lepers in Uganda. In the same way these Dakotas brought supplies to us in the jungle while we were fighting the Japanese; whenever we saw them in the air we knew that Mama had brought rations to us. Throughout the 11th (E.A.) Division the name for these planes was *Mama ndege*.

### MORE ABOUT H.M.S. UGANDA

MEMBERS of the Society who were interested in the note on "The War Record of H.M.S. *Uganda*" contained in Vol. 11, No. 1, of the *Journal*, will be glad of the supplementary information given below which deals with her service after transfer to the Royal Canadian Navy:

"H.M.C.S. *Uganda* was commissioned on 21st October 1944 in Charleston, U.S.A., where she had been undergoing refit. Actually she had been under the command of R.C.N. officers since 25th July, when Cdr. H. F. Pullen, O.B.E., R.C.N., took over. He assumed his permanent appointment of executive officer on 15th August when Captain E. R. Mainguy, O.B.E., R.C.N., took command.

Sailing from Charleston on 24th October, the ship made her first acquaintance with Canada during a brief visit to Halifax. She left the latter port 30th October for Greenock, Scapa and, finally, the Tyne, to complete refit. She 'worked up' at Scapa during two weeks in December, stored at Greenock and, on the first day of 1945, headed for her assignment in the Far East.

On 5th January *Uganda* put in to Gibraltar but continued on to Malta the same day. By the middle of the month she was working up at Alexandria. Aden was left astern 17th February as she again headed east. She put in at Fremantle on 5th March, then continued without delay to Sydney. The end of the month found her at Maunus, her crew very much on their toes as the teamwork they had developed across the months approached its first serious testing. At Leyte, on 6th April, *Uganda* joined Task Force 57 of the British Pacific Fleet.

Action was not long in coming. On 14th April, with the senior officer

in H.M.S. *King George V*, T.F. 57 conducted operations against the Skeshima-Gunto island group, south-west of Okinawa. The island of Miaka came under the special attention of *Uganda's* guns.

On 14th and 15th June, when Truk, former heart of Japanese naval operations, was subjected to continuous sea and air attack, *Uganda* again played her part. She was one of four cruisers in company with the carrier, *Implacable*, the others being *Newfoundland*, *Swiftsure* and *Achilles*. Between *Implacable's* planes and the guns of the cruisers, Truk's naval, shore and air installations were subjected to severe punishment that drew very slight retaliation.

In the dying days of the war, on 27th July, *Uganda* was detached to Eniwetok and returned to Esquimalt via Honolulu. She reached the Canadian port 9th August. From here it was decided that she should make the first peacetime cruise of the re-organized R.C.N. Cdr. (now A./Capt.) Pullen was succeeded by Cdr. E. W. Finch-Noyes, R.C.N., as executive officer on 10th November, but the ship continued under the command of Captain Mainguy on the 18,500 mile circuit of South America.

Sailing from Esquimalt 5th February 1946, the cruiser called at San Diego, Magdalena Bay, Talara, Callao, Valparaiso, Falkland Islands, Montevideo, Rio de Janeiro, Recife, Trinidad and Cristobal before her return on 17th May. She was the first Canadian warship to round Cape Horn and, in fact, the first Canadian ship to 'show the flag' in the majority of the ports mentioned. The trip was an unqualified success. Everywhere the visitors were most enthusiastically received and the exchanges of courtesies were somewhat more than formal gestures. Both in the South American press and at home *Uganda* received a large amount of publicity of a high quality."

#### AN ANGLO-GERMAN AGREEMENT RELATING TO TRAFFIC ON LAKE VICTORIA, 1890

By SIR JOHN MILNER GRAY

**B**ELOW is given a translation of an agreement which was reproduced in German in the *Deutsches Kolonialblatt* for 1891 (Vol. II, p. 261). Whilst the text of the agreement is in German, the descriptions given below the names of the signatories are in English. I have no information as to the language in which the document was originally drawn up.

As a passage in Franz Stuhlmann's *Mit Emin Pascha ins Herz von Afrika* (p. 104) shows, news of the Anglo-German Convention of 1890, which delimited the respective spheres of interest of Great Britain and Germany in East Africa, did not reach Bukoba until after this local agreement had been signed and Ernest Gedge had left Bukoba to return to Buganda. The object of this local agreement was to endeavour by a system of ship's passes to check the traffic in arms and ammunition across Lake Victoria.

Ernest Gedge, who signed the agreement on behalf of the Imperial British East Africa Company, had accompanied Jackson in the expedition which left Mombasa in 1889 and reached Buganda in 1890. He had been left behind

in Buganda to watch British interests when Jackson returned to the coast with envoys from Mwanga, who were sent to ascertain what was the international situation in East Africa *vis-à-vis* Great Britain and Germany.

Emin Pasha had finally evacuated the Equatorial Province of the Sudan early in 1889 and had accompanied Stanley to Bagamoyo on the east coast. In 1890 he had taken service with the German Government and had been given charge of an expedition sent to open up stations on Lake Victoria. He had established the station at Bukoba a few weeks before the subjoined agreement was signed.

## AGREEMENT

Bukoba,

8th December 1890.

In the interest of the German territories and those of the Imperial British East Africa Company an agreement with the following instructions is set out for all necessary purposes :

1. No boats, canoes or ships of whatever type shall proceed from British waters to German territory without having received the written permission of the British Company's agent and shall in any event, if such permission is received, sail under the flag of the said Company.

2. All boats, canoes, and all other kinds of vessels, which sail from German waters to British territory, shall in like manner be furnished with written permission from the German representative (*Beamte*) and shall in like manner sail under the flag of the Imperial German Empire.

3. Boats and canoes used for missionary purposes shall in all cases follow these instructions.

4. In case of infringement of these instructions the boats, canoes, etc., shall be seized and together with their cargoes shall be taken into custody.

(Signed) ERNEST GEDGE,  
Imperial British East Africa Company.

(Signed) DR. EMIN PASCHA,  
Commanding Imperial German Expedition  
to the Lakes.

## CORRESPONDENCE

### DELMÉ-RADCLIFFE'S MOVEMENTS IN 1899

The Hon. Editor, *The Uganda Journal*.

SIR,

On learning that you were reprinting R. M. Bere's paper on Awich in Vol. 10 of the *Uganda Journal*, I took the opportunity of a recent visit to the library of the Royal Geographical Society to consult Delmé-Radcliffe's paper on his activities in the Nile Province (*vide* p. 488 of *Uganda* by Thomas and Scott), and of this there is perhaps no copy locally. It is of considerable interest chronologically.

He says, briefly, "In June, 1899, when at Mumias, I received orders to proceed to the Nile Province or Nile Military District to take over Civil and Military charge from Colonel Martyr who had returned after having established stations at Wadelai, Lamogi, Affuddu and Fort Berkeley. Of these stations, the first to be occupied by us, Lamogi, was abandoned, Affuddu shifted to a better site at Nimule, and Fort Berkeley moved to Gondokoro, which was the head of navigation at low water. Colonel Ternan, as I passed through Kampala, requested me to survey as much as possible and lent me a very good plane-table with telescopic alidade beside which I had a 3 in. mountain theodolite, a pocket sextant and a few sketching instruments. I then measured a base, with a steel tape, near Affuddu and near Wadelai. From this, triangulation was extended by theodolite and carried on by plane-table, mapping being done at 2 miles to the inch with 100 ft. contours. At old Wadelai, here and there, remains of Emin's burnt ivory were found. Lamogi is about 16 miles south of Fatiko."

Thus Delmé-Radcliffe could not have been present at the capture of Kabarega, which was by Col. Evatt's force on 9th April, 1899 (*Uganda Journal*, Vol. 6, p. 131), although he gave the mutineers the *coup de grace* on 25th July, 1901 (*vide* p. 133, *ibid.*). My impression is that Kabarega was never really established in Bunyoro after the encounter with Thruston in November, 1894 (see Thruston, *African Incidents*, p. 228). His base was already in Lango in March, 1895 (*Uganda Journal*, Vol. 6, p. 129; Vandeleur, *Campaigns*, p. 94).

By the way, if you search the Foreign Office Prints of the 1901-2 period you will come upon an interesting incident—one of the British officers under, I think, Capt. Harman, was recommended for the V.C. for a very fine piece of work. Unfortunately (reading between the lines) he had blotted his copy-book in other directions.

Yours faithfully,

H. B. THOMAS.

48 Cranston Avenue,  
Bexhill on Sea.  
4th August, 1946.

## OBITUARY

### DR. "JACK" COOK<sup>1</sup>

IT will be with deep regret that many will hear of the death of Dr. J. H. Cook on 19th September last. This applies more particularly to those of an older generation of whom, alas, but too few are left with us. To them the name of Dr. Jack, as he was familiarly and affectionately called, is a treasured and abiding memory, not only, or even chiefly, for the wonderful cures he wrought among them, but for his splendid and sincere Christian character which showed itself in every act of his busy life. A brief account of his life may be of interest to those who were not privileged to know him personally.

He was born on 30th May 1871 and was thus a few months over seventy-five when he died. Our mother, for we were brothers, was born in 1830 and educated such of her large family (she had thirteen children) as survived to the age of school life in the rather strenuous fashion of the pre-Victorian age. We were expected to read and write by four years old. French and Latin quickly followed and at eight years we began Greek. Mother's father, the late Rev. Edward Bickersteth, Rector of Walton, near Ware in Herts, was a firm believer in the education of women, and tutors who rode out from London twice weekly instructed his daughters as well as his sons in the liberal sciences and languages. Thus it came to pass that our mother learnt Hebrew in her 'teens, surely an unusual acquirement even in those days. She was a talented authoress and wrote many books. She was an excellent teacher and, in spite of many serious illnesses, survived until 1918, dying in her eighty-eighth year.

Our father was a successful and busy physician, well known in Tunbridge Wells, and ever mindful of his children's education with strictness but much love. To be reared under such auspices no doubt exerted a powerful influence on the future "Dr. Jack".

Jack and I went to the same Dame School in 1875, and proceeded thereafter to Heath Mount School, a private school for boys on Hampstead Heath. From there we both won scholarships at St. Paul's Public School, founded by Dean Colet in, I think, 1515. Old Paulines were unusually common in Uganda and, indeed, founded a Society. It was then in its original position opposite St. Paul's Cathedral though, shortly after, it was moved to Hammer-smith, Kensington, where it still is. There, where he always beat me in Classics, we spent six happy years. Jack would no doubt have followed the family tradition and won a scholarship to Cambridge, but his health failed him and, threatened by goitre, he was sent the long sea voyage to Australia, a three-months' trip in a sailing vessel. He made many warm friends there, and was cured, but it cost him a Cambridge education, since he was compelled to stay in London for health reasons. Nothing daunted, he entered London University and cleared the board of gold medals, becoming M.S. (gold medalist), F.R.C.S., M.B., B.S., M.R.C.S., L.R.C.P., and finally started a successful consultant practice.

<sup>1</sup> With acknowledgments to *The Uganda Herald* of 2nd October 1946.

Then followed a dramatic change in his plans. In 1896 I had left for Uganda and, moved by my accounts of the need there, he threw up his brilliant prospects in England and joined me, less than three years after I had started. If during my fifty years' connexion with Uganda I had been privileged, under God, to do only that one deed of encouraging my brother to come out, I should feel that I had not failed entirely in my life work.

I must pass more rapidly over the rest of the story. For twenty years Jack and I worked together in the happiest of unions. Much of it is described in "Uganda Memories". His influence on Mengo Hospital was marked from the day of his arrival and we can note also his wonderful surgical skill, his help in establishing the Mengo Medical School, the Nurses' Training College and the Maternity Training School. When failing health compelled his retirement in 1921, his talents but took a wider sweep when he assumed the responsible post of Secretary of all the medical missions of the Church Missionary Society.

His last illness was a mercifully swift one; one month ago he had a "stroke" and injured himself in falling. Nursed with the utmost devotion in Hampstead Hospital, where he had been at one time a consultant surgeon, he passed peacefully away on 19th September, in "sure and certain hope" of a glorious resurrection.

Of one thing we may be certain. "Whatever record leap to light, he never shall be shamed." We suffer grievous loss by his passing, but we gain immeasurably by his example.

ALBERT R. COOK.

## REVIEW

### "LIVINGSTONE'S LAST JOURNEY" (By SIR REGINALD COUPLAND)<sup>1</sup>

With this book, the first copies of which reached Uganda during 1946, the Beit Professor of Colonial History at Oxford has put us once more in his debt by a further addition to his series of studies of East African history. The decline in Livingstone's mental as well as physical powers due to ill-health from an early stage of his last journey is clearly brought out. In this age of "de-bunking", it is satisfactory to record that Livingstone's reputation emerges unscathed from these pages as perhaps the greatest Briton who ever worked in Africa. On the spotless, even in these days, no spot can be found. The tale's slow heightening of poignancy as it moves to the final tragedy remains, as ever, incomparable with anything else in the annals of exploration except Scott's journal of his last journey.

It is inevitable that with the compression of the record of seven years' travelling into a book of 257 pages, much that is of interest has had to be omitted, but it is disappointing that no reference at all is made to Livingstone's contacts with the Baganda, which are of great significance for the history of Buganda. A good deal of space is devoted to the old personal controversies centring round the relationships between Livingstone, Kirk, Stanley, and others; but although Sir Reginald has been able to make use of documents not previously available in presenting a balanced picture, it is doubtful how far future historians will be interested in these arid disputes. One would prefer to have seen the space used in an attempt to dovetail Livingstone's records into the histories of the peoples through whom he passed, peoples who, before long, will be forming parts of young nations and from whom historians will perhaps spring who will need all the assistance they can get from interpretations of the early records. It is particularly to be regretted that historical science is not dealing with these aspects while oral tradition, and even living memory, still stretch back to the protagonists in these events. The reviewer, while on tour in this year of 1946, talked with an African who could remember, and still give personal descriptions of, Stanley and Emin. It may be of interest to future historians to record the impressions which Stanley made on this observer some seventeen years after his doings which are described in this book. He is described as having the appearance of an old man, evidently prematurely aged beyond his years. His Swahili was fluent. In response to particular questions as to whether he was known for a quick and impetuous temper, such as emerges from the record in Professor Coupland's and other books, it was replied that he made no such impression on the Baganda; but this evidence, of course, comes from a much later period of his life.

In Professor Coupland, East Africa must congratulate herself that she has found an able and influential interpreter of her documentary relics from the European end. She has not yet found the historian of her peoples.

G. B. MASEFIELD.

<sup>1</sup> Published by Collins, 1945. Price in Great Britain, 12s. 6d.

# SCIENTIFIC SUPPLEMENT

ANNOTATED AND ILLUSTRATED KEYS  
TO THE KNOWN FLEAS OF EAST AFRICA

BY

G. H. E. HOPKINS, M.A., F.R.E.S.



# ANNOTATED AND ILLUSTRATED KEYS TO THE KNOWN FLEAS OF EAST AFRICA

By G. H. E. HOPKINS, M.A., F.R.E.S.

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## INTRODUCTION

The term East Africa, as employed in this paper, comprises the territories of Kenya, Tanganyika, Uganda and Zanzibar. The fleas of this area (other than more or less cosmopolitan species) are mostly different from those of other parts of Africa, though doubtless many of the fleas of Somaliland and Abyssinia will prove to occur in northern Kenya and perhaps some more West African species will be found in western Uganda,<sup>1</sup> so that the area, besides being a convenient one geographically, is also a fairly definite zoological division. A curious feature in the flea-fauna of the area is the apparent absence of indigenous bird-fleas; it is as yet far too early to state that no bird-fleas (with the exception of the cosmopolitan *Echidnophaga gallinacea*) occur in East Africa, but I have collected a number of nests of several species of birds shortly after the young had flown, and have not succeeded in obtaining any fleas from them.

In view of the enormous importance of fleas in connection with plague it is not surprising that the fleas of rodents have been much more intensively collected than those of other groups of animals in East Africa; in spite of this fact several new species have been described from rats within the last few years, and doubtless more species will require description in the future. The fleas of Uganda and much of Kenya are fairly well known, and Zanzibar is so small and uniform that the small amount of collecting that has been done there is probably fairly adequate, but we know almost nothing about the fleas of Tanganyika Territory.

The object of the keys given below is to enable workers on plague to do provisional identifications of their flea-material on the spot. For this reason, except where the keys have been taken unchanged from previous publications, stress has been laid so far as possible on characters which, though probably

<sup>1</sup> This country has, as might be expected from its position and climate, strong West African elements in its fauna, though this fact is not as yet reflected in the known fauna of fleas.

unimportant from the point of view of the exact relationships of the species, are easily visible and enable the different species to be quickly separated. For the same reason the key to the genera ignores the different families into which fleas are divided and the keys to the species ignore the groups within the genus, since it is much easier to divide fleas into genera than into families and (as is so often the case with insects) much easier to identify a species than to place it in its proper group. I would urge on any one who may make use of these keys the importance of having the provisional identifications checked by a specialist except in the case of the commonest species; even in the latter instances checking is desirable if the fleas were collected on an unusual host. It must be remembered that we do not know all the East African fleas and that many species are by no means easy for even a skilled entomologist to determine if he is not a specialist in this group.

The majority of the characters used in the keys are shown in Fig. 1; other characters are shown in the remaining figures and a reference to the appropriate figure will be found in the sections of the keys in which these characters are employed.

Most of the figures have been copied (with the kind permission of Dr. Jordan) from previous publications.<sup>1</sup> A few of the keys are borrowed complete from previous publications and acknowledgments of such borrowings are made; in other instances individual sections of keys which are primarily original are borrowed, and in these cases I have considered the general acknowledgment made here to be sufficient.

In the notes on species no attempt has been made to give a full synonymy; references have been confined to the original description and such later descriptions or notes as are likely to be useful to a worker in East Africa.

## SOME POINTS IN THE BIONOMICS OF FLEAS

### THE EARLY STAGES

Fleas, like all the higher insects, pass through the stages of egg, larva and pupa. The female scatters her eggs more or less at random; they are often laid while the flea is on the host but are not fixed to the hair or feathers and so fall off. Numerous eggs are laid in small batches,<sup>2</sup> the female usually feeding in the interval between laying two batches of eggs. Very frequently a small amount of blood is essential to the newly-hatched larva, and this is provided by the faeces of the adult fleas, which contain a large proportion of undigested or partially-digested blood; frequently the female defecates in the immediate neighbourhood of the egg which she has just laid and thus ensures that the resultant larva shall have a supply of this essential item of its diet. The life-history has been worked out in the case of only a few of our East African fleas; in these the egg-stage lasts about a week. The newly-hatched larva is a very minute, rather hairy, active grub which crawls about

<sup>1</sup> Figs. 11, 13, 14, 24, 40, 42, 43, 48, 65-110, and 113-146 are from publications by Jordan and Rothschild. Fig. 1 was drawn for me by the late Mr. E. G. Gibbins. The remaining figures are my own.

<sup>2</sup> *X. cheopis* has been found to lay from three to four hundred eggs in batches varying from two to six.

among dust and feeds on the vegetable-matter contained in the dust; in captivity bran is a very suitable diet for flea-larvae. The larval stage is surprisingly long, lasting at least five or six weeks in the few East African species which have been investigated; at the end of this period the larva spins a cocoon of silk mixed with dust or grains of sand and changes into a pupa. This stage usually lasts a week or less, after which the adult flea is ready to emerge. In other parts of the world (and different species of fleas) it is stated that the complete pre-adult period may be as short as seventeen days or as long as considerably over a year.

It is believed that in some cases the fully-developed flea requires a stimulus before it will emerge from the cocoon, and that this stimulus is provided by the vibration caused by some animal moving in its vicinity. This is stated to be the reason why people entering a house which has been closed up and uninhabited for a long period are often attacked by hordes of voracious fleas.

The abundance of fleas is largely determined by humidity and temperature in their breeding-places. For each species there is an optimum temperature-humidity relation, any deviation from which is unfavourable to the species. A moderate degree of humidity is essential.

#### HABITS OF THE ADULTS

*Food.* Adult fleas feed exclusively by sucking the blood of warm-blooded animals (mammals and birds). Some species are strictly confined to one host but many occur normally on a wide variety of related hosts; most species, in the absence of the preferred host, will feed on the blood of unrelated animals, often including man, but it is commonly the case that feeding on an unusual host shortens the life of a flea.

In considering the host-preferences of fleas it must be borne in mind that in some cases (at least in East Africa) these are rather with regard to size (and, to some degree, habits) of host than to its species. As an example, the common flea of hares in East Africa is also the common flea of cats, dogs, goats, sheep, and a wide range of wild Carnivora; it occurs on many of these hosts, including cats, goats and hares, in such numbers as to put it beyond doubt that these are not accidental occurrences. Similarly, fleas which normally infest house-rats will readily transfer to field-rats if these come into association with the former, and vice versa. Transfer of a species normally parasitic on one species of field-rat to another (or to a shrew) is very common, but a rat-flea is very unlikely to find a *permanent* home on a much larger rodent such as a hare. Because of this free transfer of fleas between different kinds of rats the number of fleas characteristic of field-rats found on house-rats and vice versa is a very useful indication of the degree of association between the two communities, and hence of the degree of likelihood of plague being transferred from the house-rats to the field-rats and of the probability of these latter playing any part in the spread of the disease.

*Transmission of plague.* It is important to remember that there are great differences in the ability of different species and genera of fleas to carry

plague. Some species appear to be inefficient vectors even between rat and rat, and some of the field-rat fleas (*Dinopsyllus lypusus*, for instance), though known to be capable of carrying plague from rat to rat and doubtless perfectly capable of extending this capacity to man, are so reluctant to bite man as to make it improbable that they play any real part in the causation of human plague. Even within the genus *Xenopsylla* some species are known to be efficient vectors of plague in nature, whereas others are inefficient; the reason for this is not known but it obviously gives great importance to the correct identification of the fleas found on rats. The problem is still further complicated by the fact that a flea which is incapable of transmitting plague efficiently in one set of climatic conditions may be quite an efficient vector in a different climatic environment.

*Longevity.* The length of life of an adult flea on its preferred host has been determined in the case of *Pulex irritans*, which Bacot kept alive for a maximum period of 513 days by giving daily feeds of human blood; unfavourable conditions of temperature or humidity will greatly shorten this period. Newly-hatched fleas are able to survive for long periods without ever having fed: in a series of experiments carried out in Nairobi I found that unfed newly-hatched specimens of *Xenopsylla brasiliensis*, kept in a moist atmosphere at 20° Centigrade, would survive for a maximum period of over six weeks and *X. cheopis* for nearly as long, the average time of survival in both species being about three weeks (Hopkins, 1935). This faculty is obviously of great value to the flea since it enables it to survive if no host is immediately available in the breeding-place. The period of survival of fleas infected with plague is obviously of the very greatest practical importance: Bacot and Martin, working with *X. cheopis*, kept "blocked" fleas (i.e., fleas unable to feed because of a culture of plague-bacilli blocking the proventriculus) alive in a moist atmosphere for 50 days at 10-15° C. and for 23 days at 23° C. It is clear that, given suitable conditions, a "blocked" flea might live for several months. In many cases the blockage is incomplete and in such cases the flea can feed and may be expected to live even longer; such a flea is highly infective.

*Powers of locomotion.* Another factor of considerable practical importance is the distance to which a flea can jump. Patton and Evans (from whose book much of the biology given above is extracted) state that fleas can jump at least 4 inches vertically and seldom more than 6; they quote as exceptional a statement that *Pulex irritans* can jump 7½ inches vertically and 13 inches horizontally, and state that in practice a drain 8 inches wide, filled with disinfectant, is an efficient barrier.

*Degree of parasitism.* As has been stated above, all fleas are parasitic on mammals or birds, but the degree of parasitism varies considerably between different genera of fleas and even between the sexes of a single species. In the less parasitic forms the fleas spend most of their time in the nest of the host, only infesting the latter from time to time when they require a meal. In the next degree the fleas spend practically the whole of their time on the body of the host but are free to wander about on it at their will. The next stage is well exemplified by the "stick-fast flea" (*Echidnophaga gallinacea*)

of poultry; in this insect and its allies the male is active and is somewhat rarely found, whereas the female, though quite capable of locomotion, is practically devoid of the jumping-powers for which fleas are justly renowned and anchors herself so firmly to the skin of her host by means of her very large and somewhat modified mouth-parts that it is difficult to remove her without injury. The last stage is reached with the "jigger" (*Tunga penetrans*); in this species, again, the male is active and infrequently seen; the female, when newly-hatched, rather closely resembles the poultry-flea, but after burrowing into the skin of her victim she swells enormously and becomes a mere bag of eggs without any power of locomotion and quite unable to emerge again.

### CONTROL OF FLEAS

The best method of control of fleas is obviously to have no suitable places in which they can breed. Deposits of dust are the most suitable, and for this reason rugs or mats (because easier to clean) are preferable to large carpets in places where fleas are troublesome. Dogs or cats allowed to sleep in the house should have special bedding so that this can be shaken and placed in the sun at frequent intervals. In bad infestations it is desirable to burn all dust instead of merely throwing it out and to scrub the floors with a kerosene-soap emulsion. I once had to deal with a very bad infestation of fleas in a room inhabited by a cat; I scattered a couple of handfuls of paradichlorobenzene over the floor (the cat having first been removed) and the room was then sealed up for twenty-four hours. This treatment was entirely effective. It is much preferable to other forms of fumigation as the vapour is not harmful to man (it is so pungent that it is impossible to stay in a room under treatment) and can be used by anyone. Very little of the paradichlorobenzene volatilizes and the remainder can be swept up and used again. In native huts, which cannot be sealed up, the most successful treatment appears to be "gassing" with Cyanogas, which gives off the very deadly gas hydrogen cyanide on exposure to moist air. This treatment, however, requires expensive apparatus and expert supervision and is not suitable for use by the individual householder.

Adult fleas on a host may be killed by washing the animal with saponified coal-tar creosote preparations or a carbolic soap, or by rubbing pyrethrum or powdered naphthalene into the hair. In the latter case the fleas are mostly only stupefied and the treatment should be carried out over sheets of newspaper so that they can be collected and burnt. The pyrethrum-kerosene sprays largely used against mosquitos are effective against fleas but are somewhat irritating to delicate-skinned animals. The use of DDT has of course been suggested against fleas on cats and dogs, but it should on no account be used in solution in oil because this sometimes causes the death of the animal from DDT poisoning. Fowl-fleas, being readily visible and not active, are best treated by painting them with kerosene or vaseline. In all cases of control of fleas on the host, care should be taken to prevent the substance used getting into the animal's eyes.

## NOTES ON TECHNIQUE

Since many species of fleas begin to leave a dead host as soon as it starts to cool, it is essential, when carrying out flea-surveys, either that the host should be brought in to the laboratory alive or that some means be taken to prevent the fleas leaving the body. For this reason a satisfactory flea-survey cannot be done with nipper-traps; such a survey is a useful preliminary, giving information as to the species of fleas to be expected in the area and on the hosts concerned, but it gives no accurate information on the very important point of their numbers. Two methods are available: the first (and best) is to use cage-traps, which are brought to the laboratory in closed bags (linen, canvas or strong cotton) large enough to hold one trap comfortably; the second method is to make use of rat-drives and to put each rat, as soon as killed, into a similar but smaller bag; only one rat should be put into each bag.

On arrival at the laboratory the bags, with their contained rats, are treated with either chloroform or cyanogas and both the rats and the bags are then examined for fleas. If chloroform is used the amount required to kill the rat is somewhat large; it can be reduced by releasing the rat from the trap into the bag and breaking its neck while in the latter (a process at which Africans rapidly become very expert). Should the rats be required alive for experimental purposes, it is possible, with a little ingenuity, to gauge the dose in such a way that the fleas are killed or rendered unconscious whereas the rat is not permanently affected.

The fleas are obtained partly by searching the inside of the bag and partly by examination of the fur of the host, the latter being readily carried out by "combing" the fur with (for instance) a microscope-slide. They can be preserved in 70 per cent. alcohol. For examination they must be cleared by boiling, preferably in a water-bath, in a test-tube containing a 10 per cent. solution of caustic potash. This is a somewhat delicate operation, since overboiling results in the destruction of the specimen, but a little practice will soon indicate when a flea is sufficiently cleared. For routine-work the fleas are best mounted (after clearing) in lacto-phenol, while specimens required for retention are mounted in Canada balsam in the ordinary way. An alternative method of clearing is to place the fleas direct into concentrated carbolic acid, which clears them in a few days and in which they can be examined; this method has the merit of being simpler and practically fool-proof but, apart from the unpleasant effects of handling the acid it has the disadvantage that in many cases the spermatheca of the female flea is not visible in full lateral view, as is commonly essential.

## KEY TO THE GENERA OF EAST AFRICAN FLEAS.

- |    |   |    |
|----|---|----|
| 1. | A comb <sup>1</sup> present on head (genal comb) or pronotum or both (Fig. 92)  | 10 |
|    | No comb on head or pronotum (Fig. 1)  | 2  |
| 2. | Anterior margin of head strongly angulated; club of antenna elliptical; thoracic tergites extremely short, all three together shorter than first abdominal tergite (Figs. 2, 3) | 3  |

<sup>1</sup> A comb is a series of spines or spine-like setae arranged in a line; the genal and prothoracic combs, when present, are always composed of large spines and are therefore conspicuous, whereas the combs sometimes found on the abdomen are composed of minute spines.

- Anterior margin of head smoothly rounded; club of antenna subglobular; thoracic tergites longer than first abdominal tergite (Figs. 1, 4, 5) 4
3. Hind coxa with a patch of short spines on the inside (Fig. 15) *Echidnophaga* (p. 141)  
Hind coxa without such spines *Tunga* (p. 140)
4. Mesopleuron (portion of side of thorax immediately above middle leg, = *em* + *eps* of mesothorax) with an internal rod-like thickening running from base of coxa upwards and dividing mesopleuron longitudinally (Fig. 1) 5  
Mesopleuron without such thickening (Fig. 6) 8
5. Genal margin of head bearing a large pointed hook; pronotum much longer than mesonotum (Fig. 4) *Pariodontis* (p. 143)  
Genal hook short, obtuse, or absent; pronotum shorter than mesonotum 6
6. Metepisternum (episternum of metathorax) fused with metasternum (Fig. 11) *Synosternus* (p. 144)  
Metepisternum separated from metasternum (Fig. 1) 7
7. Middle of outer surface of club of antenna segmented down to ventral outline; hind coxa gradually narrowed posteriorly from middle to apex and with comb near apex (Fig. 8) *Procaviopsylla* (p. 143)  
Club of antenna not segmented on outer surface; hind coxa not strongly pyriform and with comb anteriorly nearer to middle than to apex (Fig. 7) *Xenopsylla* (p. 144)
8. Genal margin of head with a strongly-developed blunt tooth (Fig. 5) *Moeopsylla* (p. 142)  
Genal margin without any tooth 9
9. Well-sclerotized (and therefore dark-coloured); 3rd to 6th sternites each bearing at least three large bristles on each side (placed as in Fig. 1) *Pulex* (p. 142)  
Poorly-sclerotized (pale); these sternites without bristles *Delopsylla* (p. 143)
10. Genal comb absent (Fig. 84) 11  
Both combs present (Fig. 92) 14
11. Bristles of postmedian row on abdominal tergites and metanotum shaped like a short straight sword (Fig. 88); only one antepygial bristle present; eye absent *Xiphiopsylla* (p. 154)  
Bristles of abdomen and metanotum not as above but hair-like; eye sometimes developed; more than one antepygial bristle present, at least in female 12
12. Eye vestigial *Stivalius* (p. 155)  
Eye well-developed 13
13. Frontal tubercle large and leaf-like (Fig. 63); combs of minute spines present on some of abdominal segments *Listropsylla* (p. 155)  
Frontal tubercle minute; abdominal combs absent *Libyastus* and *Nosopsyllus* (p. 152)
14. Eye well-developed 15  
Eye vestigial or absent 18
15. Genal comb more or less horizontal, confined to ventral margin of head and remote from eye (Figs. 65, 69) 16  
Genal comb nearly vertical; eye very close to base of most dorsal spine of genal comb (Figs. 92, 93) 17
16. Apex of genal process bearing a short stout spine (Fig. 65); head of spermatheca of female roughly pear-shaped (Fig. 67) *Ctenocephalides* (p. 150)  
Apex of genal process without a spine (Fig. 69); head of spermatheca roughly spherical (Fig. 68) *Aphropsylla* (p. 152)
17. Spines of genal comb wedge-shaped (Fig. 92) *Chimaeropsylla* (p. 163)  
Spines of genal comb phylliform (leaf-shaped), broadest near apex (Fig. 93) *Hypsophthalmus* (p. 163)
18. Anterior margin of head bearing two or three short stout spines (Fig. 142) *Leptopsylla* (p. 164)  
Spines in this position, if present, not stout 19
19. Genal comb horizontal, confined to lower margin of head, composed of at most three spines 20  
Genal comb strongly oblique, composed of five spines, the vestigial eye simulating a sixth (Figs. 99, 101) *Dinopsyllus* (p. 156)

20. Genal comb composed of three more or less pointed spines; maxilla normal, sharp-pointed (Fig. 112) *Ctenophthalmus* (p. 158)  
 Genal comb of two (rarely three) blunt spines; maxilla usually truncate and much expanded at apex (Fig. 143); on bats only<sup>1</sup> 21
21. Maxilla sharp-pointed; head and prothorax very short, the former semi-circular (Fig. 145); genal comb (in the only known East African species) with three spines *Thaumapsylla* (p. 166)  
 Maxilla truncate; head and prothorax long (Fig. 143); genal comb always of only two spines 22
22. Occiput (hinder half of head) with conspicuous dorsal incrassations<sup>2</sup>; (Fig. 143); abdomen entirely without combs *Lagaropsylla* (p. 164)  
 Occiput without incrassations, abdomen with combs which may be very strongly developed or very inconspicuous 23
23. Combs of abdomen on segments 1-5, very conspicuous and composed of numerous large spines; no comb on mesonotum *Oxyparius* (p. 165)  
 These combs only on segments 1-3, inconspicuous and composed of one to two very small spines; a vestigial comb of two very small spines on mesonotum *Rhinolophopsylla* (p. 165)

### Genus TUNGA

*Tunga penetrans* Linnaeus, *Syst. Nat.*, ed. X, p. 614 (1758).

Jordan and Rothschild, 1906, p. 67, Pl. 4, Fig. 28.

Patton and Evans, p. 528, Figs. 284, 285.

Our only member of this genus is the much too familiar "jigger" (Fig. 2, 16). In addition to the character given in the key this species differs from the members of the genus *Echidnophaga* in the shape of the head, which descends from the angular projection in a smooth single curve, whereas in *Echidnophaga* this curve is double and the front of the head has, in consequence, a much blunter outline.

The "jigger" is stated to be native to South America, whence it was accidentally introduced into Africa. Males are rarely seen, but I have captured them on several occasions in circumstances which suggest strongly that this sex attacks man in exactly the same manner as more normal fleas. The female bores under the skin of man and some other animals (pig, dog, etc.) and there swells, as her eggs mature, to the size of a small pea. It is sometimes believed that the "jigger" breeds under the skin, but this is not the case; if a "jigger" embedded under the skin be carefully examined a minute black spot will be seen in the middle of the blister, this is the tail-end of the female protruding through the tiny hole which she made in entering. Through this hole the eggs are laid and fall to the ground, where the larvae feed on the organic matter in the dust like those of other fleas with more normal habits. The presence of the "jigger" under the skin causes intolerable itching and if neglected may lead to much more serious consequences; Africans minus toes as a result of neglected and infected "jigger"-lesions are no uncommon sight in some areas. The usual site of attack is under the toe-nails, but this is by no means the only part attacked, specimens may occur on the ball of the foot and in the fingers, and I have seen extremely heavy infestations in the elbows of Africans. In extracting a "jigger" great

<sup>1</sup> Bat-fleas have been very little collected in East Africa, and other genera and species are to be expected. Not all have the characteristic truncate maxilla, but in all known species except *Thaumapsylla dina* the genal comb is of only two spines.

<sup>2</sup> Patches of thicker chitin.

care is necessary to avoid breaking it, as the mouth-parts are very firmly fixed in the flesh and the head is, therefore, easily separated from the body and left behind. After extraction the cavity should be treated with iodine or some other disinfectant.

### Genus ECHIDNOPHAGA

The rugged outline of the front of the head in members of this genus is very characteristic and should enable them to be easily recognized.

Though closely related to the "jigger", members of the genus *Echidnophaga* very rarely attack man and they do not burrow in the skin of their hosts, though they anchor themselves very firmly to the skin by means of their mouth-parts—hence the popular name "stick-fast flea" which is applied to one species of the genus.

#### KEY TO THE EAST AFRICAN SPECIES

(Chiefly after Jordan and Rothschild).

- |    |  |                      |   |
|----|--|----------------------|---|
| 1. | Fifth tarsal segment with one apical ventral seta.   | <i>E. aethiops</i>   |   |
|    | This segment with two apical ventral setae (Figs. 9, 10)   |                      | 2 |
| 2. | Second lateral seta of fifth tarsal segment midway between first and third (Fig. 9); a small pale-coloured species | <i>E. gallinacea</i> |   |
|    | This seta nearer the first than the third (Fig. 10); a much larger and darker species                              | <i>E. larina</i>     |   |

*Echidnophaga gallinacea* Westwood, *Ent. Monthly Mag.*, xi, p. 426 (1875).

Jordan and Rothschild, 1906, p. 52, Pl. 1, Fig. 1; Pl. 2, Fig. 14; Pl. 3, Fig. 21; Pl. 4 Fig. 27.

Patton and Evans, p. 539, Fig. 287.

This species (Figs. 9, 33) is by far our commonest representative of the genus, occurring in all four territories. It is a cosmopolitan parasite of poultry and occurs infrequently on wild birds and not uncommonly on rats in some areas, also occasionally on other hosts including hyaenas, caracal and aardwolf (*Proteles cristatus*), and rarely on man. In America it is stated often to occur in sufficient numbers as to kill young chickens and, occasionally, adult fowls; in many other cases egg-production and rate of growth of fowls are seriously reduced by the attacks of this flea. Specimens of this species are found almost exclusively on the head and neck of the host. Females enormously outnumber males in collections, the proportion of males in an extensive series of surveys in Kenya never exceeding 10 per cent. in any locality and usually being much below that figure, though for short periods of time this proportion might be much exceeded.

*Echidnophaga larina* Jordan and Rothschild, 1906, p. 49, Pl. 1, Fig. 12; Pl. 2, Fig. 18; Pl. 3, Fig. 25.

This species (Fig. 10, 12, 15, 34) is widely distributed in East Africa. It is primarily a parasite of pigs of various species, both wild and domestic, but also occurs not uncommonly on dogs and various other hosts. Besides those from pigs, I have examined specimens collected from porcupines near Nairobi and in Karamoja, and from spotted and striped hyaenas and hunting dog (*Lycaon pictus*) in various parts of Uganda. In Tanganyika the species

has been recorded from warthog, spotted hyaena, civet (*Civettictis civetta*) and a hare (*Lepus victoriae*).

*Echidnophaga aethiops*, Jordan and Rothschild, 1906, p. 51.

A rare species known only from a few specimens collected from bats. In East Africa it is known only from Kenya, but very probably occurs in the other territories also.

### Genus PULEX

The absence of the internal chitinous rod strengthening the mesopleuron and running upwards from the base of the coxa (cf. Figs. 6 and 1) at once separates *Pulex* from most of the genera with which it might be confused. From *Delopsylla*, which it resembles more closely than it does any of our other genera, it is easily separated (besides the characters given in the key) by the much greater development of the occipital tuber (which forms an obvious break in the dorsal outline of the head) and by the different shape of the spermatheca of the female (cf. Figs. 35 and 37) and the terminalia of the male (Figs. 18 and 21).

*Pulex irritans*, Linnaeus, *Syst. Nat.*, ed. X, p. 614 (1758).  
Jordan and Rothschild, 1908, p. 7.  
Patton and Evans, p. 530, Fig. 282.

*Pulex irritans* (Figs. 6, 18, 35), the cosmopolitan parasite of man, is our only representative of this genus and appears to be very rare in East Africa, where the commonest flea found on man is a member of the genus *Ctenocephalides* (p. 150). *P. irritans* occurs uncommonly on rats in Kenya, and the collection of the Uganda Section of Medical Entomology contains a short series collected from a dog at Entebbe. It is possible that the climate of East Africa is too hot for this species, which is not found in the plains of India. As the specimens from the dog are the only ones ever recorded in Uganda, it seems likely that the dog (and the fleas) had been recently imported.

### Genus MOEOPSYLLA

*Moeopsylla sjoestedti*, Rothschild, 1908b, p. 3, Pl. 1, Figs. 3-5.

This (Figs. 5, 17, 36) is the only known species of the genus, and was described from specimens collected from the wart-hog (*Phacochoerus aethiopicus*) in Tanganyika. I have taken it from the same host in Uganda.

All the segments are short, giving the flea a very rounded appearance in lateral view. In this respect it resembles *Echidnophaga* but the shortening is much less marked. The shape of the head (Fig. 5) at once distinguishes *Moeopsylla* from both *Echidnophaga* and the other genera with which it might be confused, while the extraordinary spermatheca of the female (Fig. 36) is entirely unlike that of any other species known to me. The shape of the terminal segments of the male (Fig. 17) is also highly characteristic.

Genus **DELOPSYLLA**

*Delopsylla crassipes*, Jordan, 1926a, p. 385, Figs. 1, 2.

*Delopsylla* is another genus containing only one species. The flea (Figs. 21, 37) is abundant in Kenya on the spring-hare (*Pedetes surdaster*) and will doubtless be found in the other territories where forms of *Pedetes* occur; it is found only with extreme rarity on other hosts and I am convinced that the few instances of such an occurrence are due to transfer of the fleas from *Pedetes* to the other host in the laboratory.

*Delopsylla* is unlikely to be confused with any genus except *Pulex* and some of the numerous differences are given in the account of the latter genus (p. 142). *Pulex* never, in my experience, occurs on the spring-hare.

Genus **PARIODONTIS**

*Pariodontis riggenbachi*, Rothschild, 1904, p. 611, Pl. 8, Figs. 19, 20; Pl. 9, Fig. 24.  
Jordan and Rothschild, 1908, p. 14, Pl. 2, Fig. 1.  
Jordan, 1926b, p. 603.

Of the two known species of this genus only *P. riggenbachi* (Figs. 4, 38) is African. Its host is the porcupine (*Hystrix cristata*) and on this host the species is common in some areas.

The enormous size of the flea and especially the great length of the thoracic tergites (Fig. 4) at once separate it from any of our other combless genera, as also does the long and sharp genal hook (Fig. 4).

Genus **PROCAVIOPSYLLA**

The members of this genus occur on species of "rock-rabbits", "dassies", or hyraxes of the genera *Procavia* and *Heterohyrax*. They have been recorded from other hosts, but their occurrence on these is probably entirely accidental. They are very similar to *Xenopsylla* but differ by the characters given in the key; in addition the penis-plate of the male (Fig. 22), and spermatheca of the female (Fig. 39) are different from those of any East African species of *Xenopsylla*. Only two forms of the genus are known from East Africa; they are perhaps only geographical races of one species, but the fact that both forms are recorded from the area round Nairobi and from Naivasha makes this somewhat doubtful.

## KEY TO THE KNOWN EAST AFRICAN FORMS.

1. Labial palp longer than maxillary palp. *P. isidis*.  
Labial palp at most as long as maxillary palp. *P. procaviae*.

*Procaviopsylla isidis*, Rothschild, 1903, p. 313, Pl. 5, Figs. 2, 6, 8.  
Jordan and Rothschild, 1908, p. 56, Pl. 2, Fig. 16; Pl. 4, Fig. 11; Pl. 6, Fig. 3.

This form (Figs. 22, 39) occurs in Abyssinia and in northern Kenya as far south as the Rift Valley, Mount Elgon and near Nairobi.

*Procaviopsylla procaviae*, Fox, *Hygienic Lab. Bull.*, No. 97, p. 8, Pl. 2, Figs. 1-5 (1914).  
Jordan, 1926b, p. 605.

This form replaces *P. isidis* in Kenya from the Rift Valley southwards into Tanganyika. Neither form has been obtained in Uganda, though many hyraxes have been examined.

Genus **SYNOSTERNUS**

The present genus appears to be rare in East Africa and is unknown to me. It has been revised by Jordan (1926b, p. 606).

## KEY TO THE SPECIES.

(After Jordan).

1. First abdominal tergite with two rows of bristles; 5th tarsal segment with minute hairs on sole (Fig. 14). *S. pallidus.*
- First abdominal tergite with one row of bristles; 5th tarsal segment without such hairs (Fig. 13). *S. somalicus.*

*Synosternus pallidus*, Taschenberg, *Die Flohe*, p. 65, Pl. 1, Fig. 9 (1880).

Jordan and Rothschild, 1908, p. 35, Pl. 3, Fig. 4; Pl. 4, Fig. 9; Pl. 5, Fig. 8.

Jordan, 1926b, p. 607.

The recorded hosts of this species (Figs. 11, 14,) are chiefly hedgehogs and Carnivora; occurrence on the latter is probably accidental. The species is not known from our area, but occurs on the White Nile and may turn up in northern Uganda.

*Synosternus somalicus*, Jordan and Rothschild, 1908, p. 37, Pl. 3, Fig. 8.

Jordan, 1926b, p. 607, Fig. 37.

This species (Figs. 13, 40) is recorded in our area from Kenya (Voi and Euaso Nyiro) from the ground-squirrel, *Xerus rutilus rufifrons*. A single specimen has been recorded from Uganda (Masaka) from domestic dog, but I suspect some mistake about the locality.

Genus **XENOPSYLLA**

This is by far the most important genus from the medical aspect, because it contains the principal vectors of plague in the tropics. The most recent revision is that of Jordan (1926b, p. 609); this includes all our species except *robertsi*, *sarodes* and *bantorum*, and references to it under the separate species are omitted. *Xenopsylla* is best distinguished from related genera by the characters given in the key. The genus is characteristically parasitic on rats and other small rodents and, in our area, specimens found on other hosts (including man) must be regarded as stragglers. Unfortunately, however, this straggling is of very great importance since it is by far the commonest method by which plague is transferred to man. When a rat dies of plague (or from any other cause) the fleas leave it and seek another host. As this second host they greatly prefer another rat but if most of the rats in the vicinity have died of plague or have fled from the disease the fleas will transfer themselves to any other warm-blooded host available. The degree to which alternative hosts are suitable varies according to the species of flea, some rat-fleas refusing to bite man even when starving while others do so with but little reluctance. When man is living in intimate contact with rats the chances that he will become the alternative host (and thus a victim of plague) are very considerable.

The genus *Xenopsylla* contains a large number of East African species, some of which are rare or occur on uncommon hosts, whereas others are much the commonest fleas to be found on house-rats.

## KEY TO THE EAST AFRICAN SPECIES

- |     |  |  |
|-----|--|--|
| 1.  | Males  | 2  |
|     | Females (this sex of <i>X. sarodes</i> unknown)  | 15   |
| 2.  | Penis-plate enormous, with a large sharp-pointed dorsal apical projection (Figs. 28, 29)   | 3  |
|     | Penis-plate much smaller, usually with dorsal projection much less marked or absent  | 4  |
| 3.  | Eighth abdominal sternite with a very conspicuous group of twelve large coarse bristles (Fig. 19); apical margin of penis-plate slightly concave (Fig. 29).  | <i>X. crinita</i> (p. 147)   |
|     | Eighth sternite without large coarse bristles; apical margin of penis-plate convex (Fig. 28)   | <i>X. tortus</i> (p. 147)  |
| 4.  | Penis-plate rounded and very broad at tip (Figs. 23, 24)   | 5  |
|     | Penis-plate much narrower, either cutlass-shaped or straight-sided   | 6  |
| 5.  | Penis-plate much wider near apex than at base (Fig. 23); occipital groove deep, its outline more or less undulate (not found inland)   | <i>X. astia</i> (p. 148)   |
|     | Penis-plate but little wider near apex than at base (Fig. 24); occipital groove less deep, its outline more regular  | <i>X. nubicus</i> (p. 149)   |
| 6.  | Antepygidial bristle placed on a long pedestal (Fig. 1); penis-plate as in Figs. 25 or 27.   | 7  |
|     | Antepygidial bristle either submarginal or placed on a very short pedestal; penis-plate not as in Figs. 25 or 27   | 9  |
| 7.  | Eye much reduced; bristles of $p^1$ of clasper all more or less hair-like; $p^2$ of clasper broad, considerably expanded at $\frac{3}{4}$ of distal margin (Fig. 72)                               | <i>X. sarodes</i> (p. 147)   |
|     | Eye not reduced; $p^1$ of clasper with at least one of the bristles very stout and peg-like; $p^2$ of clasper much narrower, of almost uniform width   | 8  |
| 8.  | Penis-plate broader, broadening rather rapidly from base, broadest in middle and usually with both sides convex (Fig. 27)  | <i>X. robertsi</i> (p. 146)  |
|     | Penis-plate narrower, broadening very gradually from base, broadest near tip, dorsal side straight or (more commonly) concave (Fig. 25).   | <i>X. brasiliensis</i> (p. 146)  |
| 9.  | Penis-plate extremely narrow, with sides roughly parallel (Fig. 32)  | 10   |
|     | Penis-plate broader and usually not with parallel sides  | 11   |
| 10. | Ventral arm of ninth sternite not dilated at end (Sudan, likely to occur in northern districts of Kenya and Uganda)  | <i>X. niloticus</i> (p. 149)   |
|     | This arm strongly dilated at end (Fig. 20)   | <i>X. humilis</i> (p. 149)   |
| 11. | Penis-plate without dorsal apical projection, its apex rounded, sides of plate roughly parallel (Fig. 31).   | <i>X. versuta</i> (p. 148)   |
|     | Penis-plate with dorsal apical angle at least not rounded and usually with a sharp-pointed projection, sides of plate not roughly parallel   | 12   |
| 12. | Eye very much reduced, its horizontal breadth less than that of apex of second segment of maxillary palp; (penis-plate very like that of <i>X. cheopis</i> , Fig. 30)                              | <i>X. debilis</i> (p. 149)   |
|     | Eye much broader than apex of second segment of maxillary palp   | 13   |
| 13. | Penis-plate cutlass-shaped (Fig. 30); antepygidial bristle submarginal   | 14   |
|     | Penis-plate not cutlass-shaped (Fig. 26); antepygidial bristle on a very short pedestal  | <i>X. difficilis</i> (p. 149)  |
| 14. | Process $p^1$ of clasper short and truncate, setae arranged more obliquely and transversely; ventral arm of 9th sternite little widened towards apex (Fig. 71)                                     | <i>X. bantorum</i> (p. 148)  |
|     | Process $p^1$ of clasper longer and much more triangular, with its posterior margin concave and the setae arranged more longitudinally; ventral arm of 9th sternite widened towards apex (Fig. 73) | <i>X. cheopis</i> (p. 147)   |
| 15. | Head of spermatheca narrower or but little wider than base of its tail   | 16   |
|     | Head of spermatheca obviously wider than base of its tail  | 19   |
| 16. | Head of spermatheca and base of its tail of about equal width, spermatheca roughly U-shaped (Figs. 41, 42)   | 17   |
|     | Base of tail of spermatheca much wider than its head (Figs. 43, 44)  | 18   |
| 17. | Spermatheca very large and with very long tail (Fig. 41); seventh sternite with a row of six bristles on the two sides together.   |  |
|     | Spermatheca much smaller, especially tail (Fig. 42); seventh sternite with more than six bristles in the row   | (pp. 147, 148)<br><i>X. bantorum</i> and <i>X. cheopis</i><br><i>X. versuta</i> (p. 148) |

- |     |  |   |          |
|-----|--|---|----------|
| 18. | Eighth sternite on each side usually with fewer than twenty-eight bristles on outer surface; base of tail of spermatheca as a rule strongly ventricose (Fig. 43) | <i>X. nubicus</i>                                   | (p. 149) |
|     | Eighth sternite usually with more than thirty bristles; base of tail of spermatheca usually less swollen (Fig. 44) (not found inland)                            | <i>X. astia</i>                                     | (p. 148) |
| 19. | Tail of spermatheca darkened to about one-half (Figs. 45, 46)  |   | 20       |
|     | Darkening of tail of spermatheca almost confined to base (Figs. 47-49)   |   | 21       |
| 20. | Base of tail of spermatheca very swollen, roughly globular (Fig. 45).  | <i>X. brasiliensis</i>                              | (p. 146) |
|     | Base of tail of spermatheca but little swollen, (Fig. 46)  | <i>X. robertsi</i>                                  | (p. 146) |
| 21. | Head of spermatheca very oblique, egg-shaped (Fig. 47)   |   | 22       |
|     | Head of spermatheca not or but little oblique, more or less globular or quadrate   |   | 24       |
| 22. | Basal abdominal sternite without lateral bristles, or at most with one   | <i>X. humilis</i>                                   | (p. 149) |
|     | This sternite with two or three lateral bristles besides ventral ones  |   | 23       |
| 23. | Seventh sternite with 19-28 bristles on the two sides together (Sudan, but likely to occur in the northern part of our area)                                     | <i>X. niloticus</i>                                 | (p. 149) |
|     | This sternite with only 10-13 bristles on the two sides together   | <i>X. difficilis</i>                                | (p. 149) |
| 24. | Eye much reduced; head of spermatheca globular (Fig. 48)   | <i>X. debilis</i>                                   | (p. 149) |
|     | Eye reduced but at least as broad as apex of second segment of palp; head of spermatheca somewhat quadrate (Fig. 49)   | <i>X. crinita</i> and <i>X. tortus</i> <sup>1</sup> | (p. 147) |

*Xenopsylla brasiliensis*, Baker, *Proc. U.S. Nat. Museum*, 27, pp. 378, 379.  
 Rothschild, 1914, p. 84, Figs. 1, 4.  
 Patton and Evans, p. 532, Figs. 283, C & F.

*X. brasiliensis* (Figs. 1, 25, 45) is one of the two species of the genus which are known to be important vectors of plague in East Africa, the other being *X. cheopis*. The present species is of very wide distribution throughout the territories, occurring very commonly on house-rats (chiefly *Rattus rattus* and *Rattus (Mastomys) coucha*) and not uncommonly on field-rats where contact between these and the house-rats is sufficiently close. In contrast to *cheopis*, it is primarily the flea of rats caught in native huts and is comparatively rare in towns; it is almost certainly the chief carrier of plague in most areas with purely African populations. Roberts (1936) has shown that there is a considerable amount of evidence that this is correlated with the habits of *Rattus rattus*, rats living in earth burrows being infested with *cheopis* and those living in roofs or walls with *brasiliensis*.

*Xenopsylla robertsi*, Jordan, 1936, p. 300, Figs. 60, 61.

This species (Figs. 27, 46) was first found on *Rattus rattus* at Keruguya and Embu, both on the south side of Mount Kenya. I have since seen it in numbers from the western part of Masaka district and the adjoining part of Ankole district, Uganda. This is a very interesting case of discontinuous distribution, because the flea has not been found in any other locality although a number of rat and flea surveys have been done in the intervening area.

The male very closely resembles that of *brasiliensis* but is separable by the form of the penis-plate (Fig. 27). The female (Fig. 46), though running down in the key with *brasiliensis*, is more likely to be confused with *crinita*, from which it is readily separable by the greater extent of the darkening of

<sup>1</sup> Dr. Jordan kindly informs me that he is unable to find a satisfactory distinction between the females of these two species but that, on the whole, *X. crinita* has more bristles, particularly on the metepimeron and the eighth tergite.

the tail of the spermatheca and by the more rounded form of the head of this organ.

The part which *robertsi* may play in the carriage of plague is as yet unknown, but it occurs in very considerable numbers and must obviously be taken into account in examining the plague-problem in the particular areas in which it occurs.

*Xenopsylla sarodes*, Jordan, 1937a, p. 286, Fig. 70.

The penis-plate of this species (Fig. 72) was not included in the original description, but Dr. Jordan kindly informs me that it is "like that of *X. brasiliensis*, long and narrow and slightly concave on the dorsal side". The female is unknown.

The only known specimen was collected on the Northern Guaso Nyiro, North Kenya, from a mouse, *Saccostomus isiola*.

*Xenopsylla tortus*, Jordan and Rothschild, 1908, p. 53, Pl. 5, Fig. 4.

This species (Fig. 28) is known in our area only from Kenya. The known hosts are *Cricetomys gambianus* (giant rat) and *Praomys arborarius* (*Rattus auricomis*). The spermatheca of the female is similar to that of *crinita* (Fig. 49).

*Xenopsylla crinita*, Jordan and Rothschild, 1922, p. 266, Fig. 258.

The male (Figs. 19, 29) could hardly be confused with that of any other species, but the female (Fig. 49) is apparently inseparable from that of *tortus*. The species is known from Kenya and from Zanzibar and occurs commonly on the giant rats of the genus *Cricetomys*, but not on other hosts. Examination of very many specimens of *Cricetomys* in Uganda has not produced this flea.

*Xenopsylla cheopis*, Rothschild, 1903, *Ent. Mo. Mag.* (2), 14, p. 85, Pl. 1, Figs. 3, 9; Pl. 2 Figs. 12, 19.

Rothschild, 1914, p. 85, Figs. 2 and 5.

Patton and Evans, p. 532, Figs. 283A and D.

Jordan, 1938, pp. 112 to 114, Fig. 55.

*Xenopsylla cheopis* (Figs. 7, 30, 41, 73) is the most important plague-flea in most parts of the tropics, though in the rural plague-areas of East Africa it is extremely uncommon. The distribution of *cheopis* in East Africa is of exceptional interest, for it is possible to distinguish a northern and a southern zone (the boundary between which, in Uganda, is roughly the line of the Victoria Nile) in which the distribution of this flea is very different. In the northern zone *cheopis* occurs abundantly on house-rats and field-rats, often in the absence of *Rattus rattus*, but in the southern zone the flea occurs only in areas where *R. rattus* is present, and is very uncommon on field-rats and even on those specimens of *R. rattus* which live in African huts. It seems that there have been at least two different invasions of East Africa by this flea, one from the north, down the Nile valley and independent of *Rattus rattus*, and the other from the east coast. This second invasion probably took place about fifty years ago and the flea came in with *R. rattus* and was

spread chiefly by modern methods of transport such as the railway, lake steamers and lorries.

The male has a very characteristic penis-plate (Fig. 30), but is only separable from that of *X. bantorum* by the characters given in the key. The penis plate is also very similar to that of *X. debilis*, but the latter species is at once separated by its greatly reduced eye. The female (Fig. 41) is inseparable from that of *bantorum*, but could hardly be mistaken for that of any other species except *X. versuta*, the differences from which are given in the key.

*Xenopsylla bantorum*, Jordan, 1938, p. 112, Figs. 54, 56, 57.

This form (Fig. 71) is of unusual interest. It has been stated above that *X. cheopis* in the southern zone of East Africa is mainly an urban flea and is very uncommon on field-rats. During the course of a rat-survey at Tororo (in the southern zone in eastern Uganda) Mr. T. W. Chorley set a few traps in the open, far from any buildings, and obtained a small number of specimens of a field-rat (*Aethomys kaiseri* ssp.) which were rather heavily infested with a flea which appeared to be *X. cheopis*. The occurrence was so unusual that I was not satisfied as to their identity and submitted the specimens to Dr. Jordan, who described them as *X. bantorum*. There appear to be no other differences between the males of these two forms than are described in the key, and the females are indistinguishable.

*X. bantorum* is known to occur in Kenya (Nakuru) and in Uganda (Tororo, Teso, Busoga, Buruli and Ankole), but it is likely that it is much more widely distributed, because it is probable that most records of *X. cheopis* from field-rats in the southern zone really refer to *X. bantorum*. Dr. Jordan considers that *X. bantorum* was present on East African field-rats before *cheopis* invaded the area. The spread of *Rattus rattus* and *X. cheopis* is still in progress and Dr. Jordan has found evidence of hybridization between the two fleas in Kenya, which suggests that *bantorum* will eventually be absorbed by *cheopis*.

*Aethomys kaiseri* is the principal host of the flea, but it also occurs on *Arvicanthis abyssinicus* and on the orange-toothed mole-rat, *Tachyoryctes*.

*Xenopsylla versuta*, Jordan, 1925, p. 100, Fig. 8.

The male of this somewhat uncommon species (Fig. 31) has a penis-plate unlike that of any of our other species. The spermatheca of the female (Fig. 42) is not unlike that of *cheopis*.

The species has been obtained from squirrels (*Funisciurus* sp. and *Paraxerus ochraceus aruscensis*) in Tanganyika. The original specimens were also taken from a squirrel (in Angola), so squirrels are probably the preferred hosts, but I have had one specimen from *Rattus rattus* and two from *Rattus (Mastomys) coucha ugandae* in Kigezi district, Uganda.

*Xenopsylla astia*, Rothschild, 1911, *Ent. Mo. Mag.*, 18, p. 117, Fig. 1.

Rothschild, 1914, p. 84, Figs. 3, 6.

Patton and Evans, p. 352, Figs. 283B and E.

This Oriental species (Figs. 23, 44) has been introduced into East Africa and is still confined to the coast (Mombasa, Dar-es-Salaam and Zanzibar).

It is rather rare in Mombasa, where it occurs chiefly on the brown rat or ship-rat, *Rattus norvegicus* (also confined to the coast) but also on *Rattus rattus*. Both *X. astia* and *R. norvegicus* were probably introduced in dhows.

The penis-plate of the male (Fig. 23) is very characteristic, but the female (Fig. 44) could easily be mistaken for *X. nubicus*.

*Xenopsylla nubicus*, Rothschild, 1903, Pl. 2, Figs. 10, 16.

Both sexes of this species (Figs. 24, 43) closely resemble *X. astia*. The species appears to be uncommon in most parts of East Africa. In Kenya it has been recorded from the Nakuru district and Maseno (northern Kavirondo). In Uganda I have collected it in Chua, Teso, Mubende, western Masaka, several localities in Bunyoro and in the lower parts of West Nile, where it is common; it appears to be absent round Kampala. Its principal hosts are gerbils of the genera *Tatera* and *Taterillus*, but it is also found (probably accidentally) on a wide variety of field-rats and on other hosts, particularly Carnivora.

Although it so much resembles *astia* the differences are of importance, for *nubicus* has been shown to be an efficient vector of plague in West Africa, whereas in India *astia* has been proved to be a very poor transmitter of the disease.

*Xenopsylla humilis*, Jordan, 1925, p. 101, Fig. 10.

This species (Figs. 20, 32, 47) and the two following resemble each other rather closely. *X. humilis* appears to be the East African representative of *niloticus*, a Sudanese species which has been erroneously recorded from East Africa, but it not unlikely to occur in the north of our area. Both occur primarily on gerbils of the genus *Tatera* but also on other rats, including *Rattus rattus*. *X. humilis* is not uncommon in certain parts of Kenya (particularly from Machakos to the coast), and it occurs in north-eastern Tanganyika. A specimen from north-western Uganda (Lango district) which I determined as this species (*E. Afric. M. J.*, 10, 1933, p. 179) is actually a female *X. brasiliensis* with a distorted spermatheca.

*Xenopsylla difficilis*, Jordan, 1925, p. 101, Fig. 11.

This (Fig. 26) and the next species are apparently rare in East Africa. *X. difficilis* is known from Uaso Nyiro and Voi in Kenya and from the Kilimanjaro area of Tanganyika; it has only been captured on hosts of the genus *Tatera*. The spermatheca of the female is like that of *humilis* (Fig. 47).

*Xenopsylla debilis*, Jordan, 1925, p. 101.

Only recorded from Kenya (Uaso Nyiro and Aberdare Hills), on *Tatera nigricauda* (and a probably accidental occurrence on *Oenomys* sp.). The male has a penis-plate very like that of *cheopis* (Fig. 30), but is at once separable by the reduced size of its eye; the spermatheca of the female (Fig. 48) is quite unlike that of any of our other species.

## Genus CTENOCEPHALIDES

Until recently this genus was known as *Ctenocephalus*, and almost all the references to it in the literature are under this name, which unfortunately proves to be preoccupied. It is easily distinguished from any other genus except *Aphropsylla* by the position and character of the genal comb and from *Aphropsylla* by the characters given in the key.

## KEY TO THE EAST AFRICAN SPECIES

- |    |  |   |   |
|----|--|---|---|
| 1. | Hind tibia with 7 to 8 dorsal notches bearing stout setae, inclusive of apical notch (Fig. 59).  | <i>C. canis</i>                         | 2 |
|    | Hind tibia with only 6 such notches  |   | 3 |
| 2. | Males  |   | 6 |
|    | Females  |   | 3 |
| 3. | Greater part of frons vertical and nearly straight (Fig. 65); large process of clasper with about 8 large setae on its face (Fig. 66)            | <i>C. craterus</i>                      | 4 |
|    | Frons not vertical, strongly rounded; this process of clasper with not more than 4 large setae (Fig. 60)   |   | 4 |
| 4. | Fifth segment of fore tarsus at least as long as second, third and fourth together (Fig. 58)   | <i>C. crataepus</i>                     | 5 |
|    | This segment shorter than second, third and fourth together  |   | 5 |
| 5. | Fifth foretarsal segment with two spiniform bristles on ventral side (as in Fig. 58); manubrium of clasper but little widened at apex (Fig. 60). | <i>C. felis strongylus</i>              | 7 |
|    | This segment with five or six spiniform bristles on ventral side (Fig. 62); apex of manubrium more distinctly widened (as in Fig. 61).           | <i>C. connatus</i>                      | 8 |
| 6. | Third to sixth sternites with 2 setae on each side, placed as in Fig. 1  |   | 7 |
|    | These sternites with 3-4 setae on each side  |   | 8 |
| 7. | Fifth segment of fore tarsus at least as long as second, third and fourth together (Fig. 58); spines of genal comb rather short and stout.       | <i>C. crataepus</i>                     |   |
|    | This segment shorter than second, third and fourth together; spines of genal comb longer and slenderer.  | <i>C. felis strongylus</i> <sup>1</sup> |   |
| 8. | Most anterior spine of genal comb less than half as long as the second   | <i>C. connatus</i>                      |   |
|    | This spine much more than half as long as second (Fig. 65)   | <i>C. craterus</i>                      |   |

*Ctenocephalides felis strongylus*, Jordan, 1925, p. 98.

This tropical African subspecies of the European cat-flea (Figs. 55, 60) is by far our commonest member of the genus. It has usually been misidentified as *C. canis*, which also occurs in East Africa but is rare; nearly all the references to *C. canis* in the economic literature on East African fleas refer to the present form.

*C. felis strongylus* is abundant on dogs and cats in East Africa and also on goats and sheep; in Tanganyika it has been recorded (under the name of *C. canis*) as infesting sheep in such numbers as to cause the death of the animals. The form also occurs commonly on many wild hosts of medium or large size, such as leopard, serval cat, civet, hares, genets, hyaenas and several species of the mongoose group, and not infrequently on rats; it is by far the commonest flea to be found on man in our area, where it almost completely replaces *Pulex irritans* in this respect.

<sup>1</sup> The female of *C. felis felis* has the head slightly more than twice as long as broad, whereas in *C. felis strongylus* the length is less than twice the breadth.

The typical subspecies, *C. f. felis* Bouché, has been introduced into East Africa but is rare and probably has not succeeded in establishing itself. It is the common flea of cats in temperate regions, and is also found on dogs and other hosts.

*Ctenocephalides canis*, Curtis, *Brit. Ent.*, 3, No. 114, Figs. A-E, 8 (1826).  
Patton and Evans, p. 513, Fig. 274B.

The common dog-flea of Europe (Figs. 54, 59, 61) has been found on newly-imported dogs in Kenya but has apparently not established itself in any part of tropical Africa. The pre-adult stages of this species in the United States are stated to occupy from 17 to 38 days. As noted above, most of the East African records of the species are erroneous.

The species has been proved capable of transmitting plague from rat to rat.

*Ctenocephalides crataepus*, Jordan, 1925, p. 98.

This species (Figs. 56, 58) occurs commonly on ground-squirrels of the subgenus *Euxerus* of *Xerus*; some of the type-series are stated to have been taken on a rat in addition but this record is probably due to artificial straggling,<sup>1</sup> for in the course of nearly twenty years' work on East African fleas I have not found *C. crataepus* on any host but members of the subgenus *Euxerus*, nor any other flea on members of this subgenus. This point is of very great importance, for it has been alleged that ground-squirrels may play an important part in the spread of plague in East Africa; I am convinced that they play no part whatsoever.

*Ctenocephalides craterus*, Jordan and Rothschild, 1913, p. 533, Figs. 6, 7, 8.

The true host of this species (Fig. 65, 66, 67) would appear to be a tree-hyrax, *Dendrohyrax arboreus crawshayi*; the flea was described from a long series taken from the hyrax and single specimens found on two other hosts. The specimens were collected in the Aberdare Hills, Kenya.

*Ctenocephalides connatus*, Jordan, 1925, p. 98, Fig. 5.

A single male of this South African species (Figs. 57, 62) has been recorded from a hare in Tanganyika Territory, but I suspect the record to be erroneous. In Uganda I have frequently found on wild Carnivora male specimens of this genus which had as many as five spiniform setae on the under surface of the fifth foretarsal segment, and which I identified as *connatus*. Doubts were aroused by the fact that all the females (and many of the males) were always *C. felis strongylus*, and that intermediates with three or four spiniform setae sometimes occurred. On submitting specimens to the late Professor J. Wagner, he kindly informed me that on head-chaetotaxy all the specimens are *C. felis strongylus*, and I suggest that the Tanganyika record was probably based on a similar abnormal male of this form.

<sup>1</sup> *i.e.* straggling due to approximation of the hosts in the laboratory, as opposed to natural transfer from host to host in the field. A similar instance is recorded under *Delopsylla crassipes*.

Genus **APHROPSYLLA**

This small genus was, until recently, included in the last, from which it differs by the characters given in the key and by the fact that the genal comb does not start at the oral angle (i.e., near the base of the maxillary palp) but at a point considerably behind this (cf. Figs. 65 and 69). It contains two species, both of which occur on the mountains of East Africa.

## KEY TO THE SPECIES.

- |    |                                      |                      |
|----|--------------------------------------|----------------------|
| 1. | Genal comb with 7-9 spines (Fig. 69) | <i>A. conversus</i>  |
|    | This comb with 10-11 spines          | <i>A. wollastoni</i> |

*Aphropsylla wollastoni*, Rothschild, 1908a, p. 76, Pl. 1, Figs. 1 and 2.

Described from two male specimens obtained on Mount Ruwenzori from "a mouse"; the female is still unknown.

*Aphropsylla conversus*, Jordan and Rothschild, 1913, p. 531, Figs. 3, 4, 5.

This species (Figs. 68, 69, 70) was described from single specimens collected in the Aberdare Hills, Kenya, on *Dendrohyrax arboreus crawshayi*, *Genetta tigrina stuhlmanni* and *Lophiomys* (erroneously recorded as *Lophuromys*) *testudo*. It is uncertain which of these is the true host, but it is quite possible that the flea has a wide range of medium-sized hosts.

Genera **LIBYASTUS** and **NOSOPSYLLUS**

These genera, both of which were formerly included in *Ceratophyllus*, differ from all others known from East Africa, except *Listropsylla*, by the possession of a comb on the prothorax but not on the head, coupled with the presence of a well-developed eye; from *Listropsylla* they differ in the frontal tubercle not being large and leaf-like. The two genera are so similar that it is convenient to deal with them together.

## KEY TO THE EAST AFRICAN SPECIES.

- |    |   |                          |
|----|---|--------------------------|
| 1. | Males (this sex of <i>N. incisus</i> unknown)   | 2                        |
|    | Female (this sex of <i>L. hopkinsi</i> unknown)   | 5                        |
| 2. | Movable process or "finger" of clasper very short, more than half as broad as long (Fig. 78A)   | <i>N. fasciatus</i>      |
|    | This process longer, breadth less than half length (Figs. 74-77)  | 3                        |
| 3. | Movable process of clasper narrow, almost straight (Fig. 77)  | <i>L. piger</i>          |
|    | This process broader, strongly "beaked" at its apex   | 4                        |
| 4. | Fixed process of clasper concave on its posterior margin just above the pair of large bristles; these bristles very near its apex (Fig. 76) | <i>L. hopkinsi</i>       |
|    | This process convex at this point; the large bristles widely separated from the apex of the process (Fig. 74, 75)                           | <i>L. infestus</i>       |
| 5. | Spermatheca with head roughly spherical (Figs. 79, 80)  | 6                        |
|    | Spermatheca with head roughly cylindrical (Figs. 81-83)   | 7                        |
| 6. | Seventh sternite divided by a narrow sinus into a rounded-triangular upper lobe and a broader truncate lower one (Fig. 79)                  | <i>N. incisus</i>        |
|    | Seventh sternite not thus divided (Fig. 80)   | <i>N. fasciatus</i>      |
| 7. | Seventh sternite with a narrow and rather deep sinus (Fig. 83)  | <i>L. infestus</i> (p. ) |
|    | This sinus broad and shallow (Fig. 81)  | <i>L. piger</i> (p. )    |

*Nosopsyllus fasciatus*, Bosc, 1801.

Jordan and Rothschild, 1921b, p. 180, Figs. 165, 166.

This species (Figs. 78, 78a, 80) is apparently very rare in East Africa; I have seen only one pair obtained from *Rattus rattus* at Kyambu, near

Nairobi, Kenya, and a male from the same host at Nairobi. It has doubtless been recently introduced and has presumably not effected a secure settlement. In Europe and other parts of the world it is a common species on rats. It readily bites man and is probably the species which was responsible for the great outbreaks of plague in Europe in the past. Our climate is probably too hot for it. The female is easily separated from that of *incisus* by the absence of the deep sinus which is present on the seventh abdominal sternite of the latter.

*Nosopsyllus incisus*, Jordan and Rothschild, 1913, p. 536, Fig. 9.

Only the female (Fig. 79) of this species has been described. It has been taken in some numbers on field-rodents in the Aberdare Hills, Kenya, and I obtained a few specimens from *Grammomys dryas* ssp. in Kigezi, Uganda. It is evidently confined to fairly high elevations, the only elevation at which I have collected it being 7,800 feet.

The female differs from that of *fasciatus* in having the seventh abdominal sternite divided by a deep sinus; this sternite in *fasciatus* is slightly variable in shape but never with a deep and narrow sinus. The spermatheca of *fasciatus* is also somewhat variable but usually has the head distinctly larger than in *incisus* and the tail narrows perceptibly towards the tip in *incisus* but not in *fasciatus*.

*Libyastus infestus infestus*, Rothschild, 1908b, p. 4, Pl. 1, Figs. 6, 7.  
Jordan and Rothschild, 1913, p. 537, Figs. 10, 11.

This form (Figs. 74, 82) was described from specimens collected on "*Funisciurus ganana*" (a misidentification of *Paraxerus ochraceus* ssp.) on Mount Kilimanjaro, and has been taken on Mount Kenia from *Heliosciurus keniae*.

*Libyastus infestus duratus*, Jordan, 1931, p. 145, Figs. 1, 2.

This more southern form of *infestus* is easily distinguished in the male by the different shape of the movable process of the clasper (Fig. 75) and in the female by the stouter form and shorter tail of the spermatheca (Fig. 83). It was described from specimens collected at several localities in Tanganyika (Modehani, Ukinga; Igale; Rungwe Mt.) from *Aethiosciurus byatti laetus*, *Heliosciurus mutabilis shirensis* and *Cricetomys gambianus viator*, the specimen on the last-named being doubtless a straggler from a squirrel.

*Libyastus piger*, Jordan, 1925, p. 105, Figs. 21, 22.

This (Figs. 77, 81) is also a squirrel-infesting species; it was collected in the Mabira Forest, Uganda, from "*Funisciurus* sp.", which probably means *Paraxerus (Tamiscus) emini* although *Funisciurus pyrrhopus* ssp. occurs in the forest.

*Libyastus hopkinsi*, Jordan, 1943, p. 31, Fig. 1.

This very rare species (Fig. 76) is only known from a single male obtained in the Bubale Forest, Kigezi, Uganda, on a squirrel, *Funisciurus carruthersi tanganyikae*.

Genus **XIPHIOPSYLLA**

This genus is at once separated from any other occurring in our area by the sword-like setae of the metanotum and abdominal tergites (Fig. 88). All the species were described from Kenya and none are known to occur elsewhere with the exception of *X. lippa*, of which I have seen specimens from the Uganda side of Mount Elgon and from the Kigezi district, and *X. hyparetes*, which has been taken in the Belgian Congo. The genus occurs only at fairly high altitudes. I have not had it below about 6,000 feet, but Dr. J. I. Roberts obtained specimens of *X. hyparetes* in Keruguya district, Kenya (4,200-5,200 feet).

The hosts of all the species, except *X. apriona*, are small field-rodents, with a special preference for rats of the genus *Lophuromys*.

## KEY TO THE SPECIES

- |    |   |  |
|----|---|--|
| 1. | Males (this sex of <i>apriona</i> is unknown but will probably differ from any of the other species by having only 12 spines in the pronotal comb)<br>Females   | 2<br>4                                   |
| 2. | Pronotal comb with 16 spines; long movable process ("finger") and manubrium of clasper both comparatively broad; stem of ninth sternite with a distinct "elbow", head of this sternite much longer than broad (Fig. 89)<br>Pronotal comb with 14 spines; finger and manubrium of clasper both much narrower; stem of ninth sternite without "elbow", its head only slightly longer than broad (Figs. 88 and 90) | <i>X. hyparetes</i><br>3                 |
| 3. | Movable process (or "finger") of clasper distinctly curved forwards near apex; ventral apical angle of eighth tergite distinctly produced (Fig. 88)<br>Finger of clasper almost straight; ventral apical angle of eighth tergite not produced (Fig. 90)   | <i>X. hippia</i><br><i>X. lippa</i>      |
| 4. | Spermatheca with head roughly spherical, passing abruptly into tail (Fig. 85); pronotal comb of 12 or 16 spines<br>Spermatheca with head pear-shaped, passing gradually into tail (Figs. 86, 87); pronotal comb of 14 spines  | 5<br>6                                   |
| 5. | Pronotal comb of 16 spines; apices of abdominal segments serrate<br>Pronotal comb of 12 spines; apices of abdominal segments smooth (Fig. 85)   | <i>X. hyparetes</i><br><i>X. apriona</i> |
| 6. | Seventh sternite with incrassation (appearing as a darker patch) situated ventrally (Fig. 86)<br>Incrassation of seventh sternite situated laterally, proximal to the sinus of this sternite (Fig. 87)  | <i>X. hippia</i><br><i>X. lippa</i>      |

*Xiphiopsylla apriona*, Jordan and Rothschild, 1913, p. 543, Fig. 16.

This species (Fig. 85) is known only from three females collected from a mole-rat (*Tachyoryctes* sp.) on Mount Kenya.

*Xiphiopsylla hyparetes*, Jordan and Rothschild, 1913, p. 542, Fig. 15.

This species (Fig. 89) was described from a single specimen of each sex, the male from Mutaragwa, Aberdare Hills, Kenya, and the female from Mount Mikeno, Belgian Congo. The former was taken from *Lophuromys aquilus* and the latter from *Lophuromys* sp.; I have seen two males from Keruguya district, Kenya, from *Rattus (Mastomys) coucha* ssp.

*Xiphiopsylla hippia*, Jordan and Rothschild, 1913, p. 542, Figs. 12, 13, 14.

This species (Figs. 84, 86, 88) is known from a number of specimens collected on the Aberdare Hills and Mount Kenya, and a single male from 11,000 feet on Mount Elgon. The known hosts are *Lophuromys aquilus*, *Praomys tullbergi jacksoni*, *Otomys tropicalis elgonis* and *O. jacksoni*.

*Xiphiopsylla lippa*, Jordan, 1933, p. 68, Figs. 16, 17.  
Jordan, 1939, p. 47, Fig. 5.

This species (Figs. 87, 90) was described from specimens captured at Nakuru on *Lophuromys aquilus*, the specimens being those recorded by Symes and Hopkins (1932) as *X. hippia*. In addition to those taken on *Lophuromys*, others were captured on *Rattus rattus* and *Otomys angoniensis*. I have seen specimens from *Otomys jacksoni* at 11,000 feet on Mount Elgon and a female from *Dasymys helukus* in Kigezi district, Uganda.

### Genus STIVALIUS

The presence of a comb on the thorax but not on the head, coupled with the vestigial nature of the eye, at once separates this from any of our other genera except *Xiphiopsylla*. From the latter genus *Stivalius* differs in having the bristles on the abdominal tergites and metanotum normal (hair-like).

Two<sup>1</sup> species are known from our area, both of which appear to be uncommon. They appear to occur mainly on field-rats.

#### KEY TO THE EAST AFRICAN SPECIES

- |    |  |                    |
|----|--|--------------------|
| 1. | With three abdominal combs (on segments II-IV) | <i>S. sellatus</i> |
|    | Without abdominal combs                        | <i>S. torvus</i>   |

*Stivalius sellatus*, Jordan and Rothschild, 1923, p. 304, Fig. 301.

Described from a single female collected in eastern Uganda (Bubungi, North Bugishu) on "a rat" and not obtained since.

*Stivalius torvus*, Rothschild, 1908a, p. 77, Fig. .  
Jordan and Rothschild, 1922a, p. 251, Fig. 241.

This species (Figs. 50, 91) was described from specimens collected in Uganda from *Thamnomys dryas* and *Dasymys medius*, and is well-distributed, though apparently scarce, in Kenya and Uganda, where it occurs on a variety of rat-hosts, chiefly of the field species but occasionally including *Rattus rattus* and *Rattus (Mastomys) coucha*. The elevations at which it is found are of the order of five or six thousand feet.

### Genus LISTROPSYLLA

The comparatively enormous size of the frontal tubercle (Fig. 63) separates this genus from any other known from East Africa. The tubercle is apparently movable and may be seen either projecting from the front margin of the head or retracted within a cavity in the margin.

<sup>1</sup> Dr. Jordan kindly informs me that records of *S. afer* in East Africa are erroneous and refer to *S. torvus*.

The two East African representatives of the genus are stated by Jordan and Rothschild (1913) to be probably not more than geographical races of one species. *L. stygius* Rothschild was described (1908a, p. 77) from a single male collected on "a mouse" on Ruwenzori; males from the hills of Kenya, Kilimanjaro and eastern Uganda (*L. dolosus* Roths., 1907, p. 175) differ only in the shape of the long movable process of the clasper (Fig. 64), which is slightly narrower and has the long ventral bristle placed at  $\frac{3}{5}$  instead of at  $\frac{2}{3}$ . Females collected in Kigezi, western Uganda, were recorded as *dolosus* but I have now obtained both sexes from Kigezi and the males show that the form there is *stygius*. The females of the two forms are indistinguishable (Fig. 53).

The species apparently occurs on a wide range of small rodents, mostly field-rats but occasionally including *Rattus rattus*. The lowest elevation at which I have obtained it is about 5,400 feet and the highest 7,800 feet.

### Genus **DINOPSYLLUS**

This rather large genus is purely African and most of the species occur in East Africa. They are mainly parasites of field-rats but may also occur commonly on house-rats living in contact with the former. Only one species (*D. lypusus*) occurs (in East Africa) below about 5,000 feet, and the lowest altitude at which I have obtained it is 2,043 feet (at Butiaba), but Symes (1932) records it in small numbers from Mombasa.

The enormous size of these fleas, coupled with the presence of both genal and pronotal combs, readily separates them from any of our other genera.

#### KEY TO THE EAST AFRICAN SPECIES

- |   |                               |
|---|-------------------------------|
| 1. Males (this sex of <i>D. hirsutus</i> unknown)   | 2                             |
| Females (this sex of <i>D. grypurus</i> and <i>D. kempfi</i> unknown)   | 8                             |
| 2. Long movable process of clasper concave dorsally, almost parallel-sided (Fig. 102)   | <i>D. grypurus</i> (p. 158)   |
| This process convex dorsally, much wider in middle than at ends   | 3                             |
| 3. Ninth sternite with a continuous row of long bristles (Fig. 100)   | <i>D. semnus</i> (p. 157)     |
| This sternite with the row of bristles interrupted, the gaps at most containing minute bristles   | 4                             |
| 4. Apical edge of eighth sternite strongly excavated so that the ventral angle becomes strongly produced (Fig. 104)   | <i>D. apistus</i> (p. 157)    |
| Apical edge of this sternite at most ( <i>D. kempfi</i> ) slightly excavated, ventral angle rounded   | 5                             |
| 5. Surface of body densely reticulated, especially when seen by reflected light, dorso-ventral lines densely but minutely denticulate (Fig. 105)  | <i>D. echinus</i> (p. 157)    |
| Only dorso-ventral lines distinct and these not denticulate   | 6                             |
| 6. Head short and rounded, vestigial frontal tubercle exactly in centre of frons (Fig. 99)  | <i>D. kempfi</i> (p. 158)     |
| Head longer, vestigial frontal tubercle above centre of frons (Fig. 101)  | 7                             |
| 7. Ninth sternite usually with a wide gap containing only minute bristles between the distal and median series of long bristles (Fig. 107); combs on second and third abdominal segments seldom with more than 6 spines | <i>D. lypusus</i> (p. 158)    |
| Gap between distal and median rows of bristles on ninth sternite containing one long bristle in addition to minute ones (Fig. 106); combs on second and third abdominal segments with at least 8 spines                 | <i>D. longifrons</i> (p. 157) |
| 8. Spermatheca with a prominent dorsal hump (Figs. 109, 110)  | 9                             |
| Spermatheca smoothly rounded dorsally (Fig. 108)  | <i>D. apistus</i> (p. 157)    |

9. Surface of body densely reticulated, especially when seen by reflected light (these three species average very much larger than any of the others, but size is a very variable character in all species) 10  
Only dorso-ventral lines distinct 12
10. Comb of third abdominal segment with at least eight spines; dorso-ventral lines densely but minutely denticulate *D. echinus* (p. 157)  
Comb of third abdominal segment usually with not more than five spines; dorso-ventral lines not denticulate 11
11. Seventh abdominal tergite abruptly dilated below antepygidial bristles into an almost rectangular lobe *D. hirsutus* (p. 157)  
This lobe much less marked, its outer margin an obtuse-angled triangle (Fig. 103) *D. semnus* (p. 157)
12. Bristles on metepimeron (which simulates first abdominal sternite, c.f. Fig. 11) more than 28 and forming one continuous or almost continuous series *D. longifrons* (p. 157)  
These bristles less than 26 and generally forming two rows or patches with a fairly wide break between them (Fig. 111) *D. lypusus*<sup>1</sup> (p. 158)

*Dinopsyllus echinus*, Jordan and Rothschild, 1913, p. 563, Figs. 31, 32.

This species (Figs. 105, 109) is apparently not very uncommon at high elevations. It is known from Kenya (Aberdare Hills, Mount Kenya and Igembi Hills), from Uganda (Kigezi) and from the Lake Kivu area of the Belgian Congo. I have not seen it.

*Dinopsyllus hirsutus*, Rothschild, 1908a, p. 78, Pl. 1, Fig. 4.

A rare species known only from a single female obtained on Mount Ruwenzori. The host was *Hybomys univittatus lunaris*.

*Dinopsyllus semnus*, Jordan, 1937b, p. 329, Figs. 104, 105.

Jordan, 1939, p. 46, Fig. 4.

This species (Figs. 100, 103) is very closely related to *D. hirsutus*, which it perhaps represents in Kigezi.

It is known only from a single pair collected on Mount Sabinio, Kigezi, south-west Uganda on *Cricetomys* (probably *emini proparator*).

*Dinopsyllus apistus*, Jordan and Rothschild, 1913, p. 569, Fig. 35.

*D. eremus*, Jordan and Rothschild, l.c., p. 574, Fig. 39.

The specimens originally described as females of this species were subsequently found to belong to *D. lypusus*, the true female of *apistus* being that described as *D. eremus*.

This species (Figs. 104, 108) was described from specimens collected in Kenya (Mount Kenya and Igembi Hills), Uganda (Kigezi) and the Lake Kivu area of the Belgian Congo; I have seen three specimens from the Uganda side of Mount Elgon, at 7,000 feet, and thirteen from Kigezi, at 5,800 and 6,890 feet. It seems to be very local even at suitable elevations. The known hosts include *Lophuromys aquilus*, *Thamnomys* sp., *Otomys* sp., *Praomys tullbergi jacksoni*, *Rattus coucha ugandae*, *Heliosciurus keniae* and *Rattus rattus*; nine of my Kigezi specimens were from the last-named host.

*Dinopsyllus longifrons*, Jordan and Rothschild, 1913, p. 566, Figs. 33, 34.

This species (Figs. 101, 106) is widely distributed in Kenya and Uganda, but only at rather high elevations. I have not encountered it below 5,600 feet.

<sup>1</sup> The row of bristles is apparently always continuous in *longifrons* but occasional specimens of *lypusus* lack the break.

Known localities in Kenya include the Aberdare Hills, Rumuruti, Mount Kenya and the Nakuru district; in Uganda it occurs in Kigezi district and on Mount Elgon. A single female has been recorded from Mbarara in the Ankole district of Uganda, but this is far below the elevations at which the flea usually occurs and I think there must be some mistake about the record.

The hosts include many species of field-rats, and the flea is also occasionally found on house-rats.

*Dinopsyllus lypusus*, Jordan and Rothschild, 1913, p. 570, Figs. 36, 37.

I suspect that this form (Figs. 107, 110, 111) is a lower-altitude subspecies of *D. longifrons*. In my experience it does not occur above 6,900 feet but entirely replaces *longifrons* below 5,600 feet, while between 5,600 and 6,900 feet there is a zone in which both forms occur and in which certain specimens are intermediate and impossible to place with complete certainty under either form. *D. lypusus* is abundant in nearly all parts of Kenya and Uganda (excluding those at too high an elevation) in which detailed flea-surveys have been done, and also occurs in Tanganyika. It is primarily a flea of field-rats, showing no particular preference between the different species and genera, and also occurs not uncommonly on house-rats where contact with the field-rat population is close.

*Dinopsyllus grypurus*, Jordan and Rothschild, 1913, p. 572, Fig. 38.

Only the male of this species (Fig. 105) is known; it possible that the female is indistinguishable from that of *D. lypusus*. The species is known only from the Aberdare Hills, Kenya, the known hosts being *Dendromys nigrifrons* and *Crocidura fumosa*.

*Dinopsyllus kempfi*, Jordan and Rothschild, 1913, p. 574, Fig. 40.

Known only from a single male specimen (Fig. 99) collected in the Aberdare Hills on *Claviglis microtus saturatus*.

### Genus CTENOPHTHALMUS

The present genus is distinguished from all others in our area except *Leptopsylla* and *Thaumapsylla* by the fact that the number of spines in the genal comb is three (Fig. 112); *Leptopsylla* differs by possessing short stout spines on the anterior margin of the head (Fig. 142) and in *Thaumapsylla* the spines of the genal comb are broad and blunt (Fig. 145).

The genus contains a large number of East African species and several species may occur on the same individual host,<sup>1</sup> so that it is often difficult to associate the sexes of closely-allied species and in several instances the association is doubtful; in one or two cases only one sex is known.

The genus is normally parasitic on field-rats, but occurs not uncommonly on house-rats where these have come into contact with the field-rat population. Two species appear to be particularly associated with mole-rats of the genus *Tachyoryctes*, the remaining species do not seem to exhibit any very definite host-preferences, but some appear to be commoner on members of the genus

<sup>1</sup> I have taken four species of this genus off one individual rat.

*Lophuromys* than on other field-rats. By far the most widely-distributed species in our area is *C. cabirus*. Most of the other species are confined to high or fairly high elevations.

## KEY TO THE KNOWN EAST AFRICAN SPECIES

- |     |  |                      |          |
|-----|--|----------------------|----------|
| 1.  | Males  |                      | 2        |
|     | Females  |                      | 15       |
| 2.  | Mesonotum laterally with only two rows of bristles, there being a large naked area between these rows and the base; fixed process of clasper ( $p^1 + p^2$ ) enormous, not divided by a sinus (Fig. 113)         | <i>C. cophurus</i>   | (p. 161) |
|     | Mesonotum with three rows of bristles and additional small bristles on sides as well as back, besides basal row; fixed process of clasper much smaller, often divided by a sinus into two lobes                  |                      | 3        |
| 3.  | Head of movable process of clasper ( $p^3$ ) with apex strongly emarginate so as to form two projections (Fig. 114)  | <i>C. singularis</i> | (p. 161) |
|     | Apex of head of this process not or weakly emarginate  |                      | 4        |
| 4.  | Posterior angle of head of movable process strongly produced (Fig. 115)  | <i>C. edwardsi</i>   | (p. 160) |
|     | This angle not or very slightly produced   |                      | 5        |
| 5.  | Head of movable process widening towards its apex, which is more or less quadrate  |                      | 6        |
|     | Head of movable process narrowing towards its apex, which is pointed or strongly rounded   |                      | 10       |
| 6.  | Movable process very small, its head very much narrower than length of pygidium (Fig. 116)   | <i>C. eximius</i>    | (p. 161) |
|     | This process much larger   |                      | 7        |
| 7.  | Ninth sternite with four short stout spines on the apical portion of its ventral margin (Fig. 118)   | <i>C. acanthurus</i> | (p. 163) |
|     | Ninth sternite with no stout spines, though it may bear slender bristles   |                      | 8        |
| 8.  | Ninth sternite much broadened towards apex (Fig. 117)  | <i>C. lycosius</i>   | (p. 163) |
|     | Ninth sternite not or only very slightly broadened towards apex  |                      | 9        |
| 9.  | Fixed process of clasper divided by a very shallow sinus into two lobes (Figs. 119, 122, 123)  | <i>C. modicus</i>    | (p. 162) |
|     | This process undivided, its dorsal outline convex (Fig. 120)   | <i>C. evidens</i>    | (p. 161) |
| 10. | Head of movable process of clasper very narrow and its apex distinctly pointed (Figs. 121, 129)  |                      | 11       |
|     | Head of this process broader and its apex rounded off  |                      | 12       |
| 11. | Head of movable process a triangle with its base nearly half its length; fixed process of clasper divided by a small but distinct sinus into two unequal portions (Fig. 121)                                     | <i>C. eumeces</i>    | (p. 161) |
|     | Head of movable process much narrower; fixed process without any such sinus, its dorsal edge almost straight (Fig. 129)  | <i>C. stenurus</i>   | (p. 161) |
| 12. | Fixed process of clasper divided by a distinct sinus into two lobes (Figs. 125, 126, 127)  |                      | 13       |
|     | This process without any such sinus (Fig. 124)   | <i>C. audax</i>      | (p. 160) |
| 13. | This sinus very deep; portion of upper edge of head of process which bears small setae short and strongly rounded (Fig. 125)   | <i>C. cabirus</i>    | (p. 162) |
|     | The sinus narrower and shallower; seta-bearing portion of upper edge of process much longer and nearly straight  |                      | 14       |
| 14. | Head of movable process broader; sinus of fixed process smaller and shallower (Fig. 126)   | <i>C. bacopus</i>    | (p. 162) |
|     | Head of movable process narrower; sinus of fixed process wider and deeper (Fig. 127)   | <i>C. segregus</i>   | (p. 162) |
| 15. | Seventh sternite of abdomen bearing a posterior row of at least 8 long bristles and an anterior row of bristles some of which are also long (Figs. 128, 141); labial palps extending nearly to apex of fore coxa |                      | 16       |
|     | Seventh sternite with at most 7 bristles in the posterior row; labial palps hardly extending to apical third of fore coxa  |                      | 17       |
| 16. | Seventh sternite with 12-14 bristles in the posterior row (Fig. 128); basal abdominal sternite with 3-6 bristles   | <i>C. audax</i>      | (p. 160) |
|     | Seventh sternite with 10 or less bristles in the posterior row (Fig. 141); basal abdominal sternite with 1 bristle (apparently sometimes none)   | <i>C. edwardsi</i>   | (p. 160) |

17. With 4 antepygidial bristles; vestigial eye unpigmented, inconspicuous  
*C. eximius* (p. 161)  
18
18. With 3 antepygidial bristles; vestigial eye usually black and conspicuous  
Eighth tergite of abdomen with a very regular row of 3-6 stout black bristles in addition to more proximal bristles, no bristles on distal edge of segment (Fig. 131); mesonotum laterally with only two rows of bristles, there being a large naked area between these rows and the base  
*C. cophurus* (p. 161)  
19
19. Eighth tergite with at least one of the most distal bristles placed on distal edge, the row usually less regular and less conspicuous; mesonotum with three rows of bristles and additional small bristles on the sides as well as back, besides the basal row  
Eighth tergite with a conspicuous pair of bracket-shaped thickenings near its proximal margin on each side, having the appearance of belonging to the 7th sternite (Fig. 132)  
*C. singularis* (p. 161)  
20
20. Eighth tergite without bracket-shaped thickenings  
Distal margin of 7th sternite not divided into two lobes, with a median broadly triangular projection from which the sclerite slopes gently in both directions, the slope (especially below the projection) faintly concave (Fig. 133)  
*C. modicus* (p. 162)  
21
21. Distal margin of this sternite distinctly divided into two lobes by a sinus which may be deep and narrow or broad and shallow  
Lower portion of upper lobe of 7th sternite produced into a moderately acute triangular "cape" (Figs. 134, 136)  
22
22. Lower portion of upper lobe not produced thus, either without any projection or the projection broad and rounded  
Sinus of margin of 7th sternite very narrow; head of spermatheca obviously longer than tail (Fig. 134)  
*C. evidens* (p. 161)  
23
23. This sinus very broad; head of spermatheca not as long as its tail (Fig. 136<sup>1</sup>)  
*C. eumeces* (p. 161)  
24
24. Tail of spermatheca obviously shorter than its head  
Tail of spermatheca at least as long as its head  
26
24. Sinus of 7th sternite forming a broad rounded bay (Fig. 135)  
*C. bacopus* (p. 162)  
25
25. This sinus a narrow, roughly triangular, bay (Figs. 137, 138)  
Eighth sternite narrow and acuminate (Fig. 137)  
*C. cabirus* (p. 162)  
26
26. Eighth sternite broader and with apex blunt (Fig. 138)  
*C. acanthurus* (p. 163)  
Head of spermatheca pear-shaped, markedly wider at base than at junction with tail; sinus of seventh sternite a moderately deep triangular bay (Fig. 139)  
*C. olbius* (p. 163)  
Head of spermatheca with almost parallel sides; sinus of seventh sternite a shallow situation (Fig. 140)  
*C. segregus* (p. 162)

*Ctenophthalmus audax*, Jordan and Rothschild, 1913, p. 546, Figs. 17, 18.

This species (Figs. 124, 128) was collected on Mount Kinangop (Aberdare Hills, Kenya) on *Tachyoryctes audax*, and I have seen numerous specimens from the same locality and host. Casual specimens have been collected off other hosts but it is quite clear that (unlike most species of the genus, which are very catholic in their host-preferences) *C. audax* is confined to the mole-rat and that the two records from other hosts are due to accidental straggling.

*Ctenophthalmus edwardsi*, Jordan, 1937b, p. 329, Figs. 102, 103.

Jordan, 1939, p. 43, Figs. 2, 3.

Described from a series of both sexes (Figs. 115, 141) collected at 11,000 feet on the eastern side of Mount Elgon on a mole-rat, *Tachyoryctes ruddi* and on *Otomys jacksoni* (on the latter doubtless accidentally), later obtained in numbers from the same form of mole-rat at Kapretwa, in the

<sup>1</sup> The specimen shown in Fig. 136 has the tail of the spermatheca somewhat shrunken; in normal specimens it is almost exactly similar to that of *C. olbius* (Fig. 139).

foothills of Mount Elgon, near Kitale. It is somewhat remarkable that the mole-rat flea of Elgon should be so different from that found on the Aberdares.

*Ctenophthalmus cophurus*, Jordan and Rothschild, 1913, p. 556, Figs. 27, 28.

This species (Figs. 113, 131) is known from a large number of specimens captured in the Aberdare Hills, the Igembi Hills and on Mount Kenya on many species of field-rats. Dr. Jordan informs me that a single male collected on the Uganda side of Mount Elgon at 12,000 feet may represent a new subspecies.

*Ctenophthalmus eximius*, Jordan and Rothschild, 1913, p. 558, Figs. 29, 30.

The distribution of this species (Figs. 116, 130) is evidently a wide one. It was described from specimens collected in the extreme south-west of Uganda (the Kigezi district) and in the neighbouring parts of the Belgian Congo, and is common in the Nakuru district of Kenya; I have also seen specimens from the Uganda side of Mount Elgon. The lowest elevation from which I have seen it is 5,400 feet and the highest 7,800, but very little collecting has been done above the latter elevation. It occurs on a wide variety of field-rats, perhaps particularly on *Lophuromys* spp.

*Ctenophthalmus eumeces*, Jordan and Rothschild, 1913, p. 548, Fig. 19; p. 554, Fig. 26 (female erroneously attributed to *lycosius*).  
Jordan, 1936, p. 301, Figs. 62, 63.

Originally described from specimens obtained on Mount Kenya and from the Igembi Hills to the north-east of that mountain, this species (Figs. 121, 136) is common in the Nakuru district of Kenya and I have seen specimens from 11,000 feet on Mount Elgon. It occurs on a very wide variety of field-rats but appears to have some preference for hosts of the genus *Lophuromys*.

*Ctenophthalmus stenurus*, Jordan, 1937b, p. 329, Fig. 101.  
Jordan, 1939, p. 42, Fig. 1.

Known only from a single male (Fig. 129) collected at 11,000 feet on the eastern side of Mount Elgon on *Rhabdomys pumilio diminutus*. The female may be expected to resemble very closely that of *C. eumeces*.

*Ctenophthalmus singularis*, Jordan, 1936, p. 302, Figs. 64-66.

This species (Figs. 119, 132) is only known from elevations of 6,500 to 12,000 feet on Mount Elgon, whence a number of both sexes were collected from *Rhabdomys pumilio diminutus*, *Lophuromys aquilus*, *Otomys jacksoni* and *O. tropicalis elgonis*. All the specimens except one female were from 9,000 feet or above and it is quite possible that the record at 6,500 feet is erroneous. The female possesses a very unusual character in the double bracket-shaped incrustation of the eighth tergite.

*Ctenophthalmus evidens*, Jordan, 1929, p. 165, Figs. 1, 3.

Originally described from specimens collected in the Belgian Congo, this species (Figs. 120, 134) occurs in Kigezi at altitudes between 6,400 and 7,800 feet. It has also been recorded from Lango district, Uganda, but

Dr. Jordan tells me that the single female on which this record is based is probably *segregus*. The hosts from which I have obtained it are *Lophuromys aquilus*, *Arvicanthis abyssinicus* ssp. and *Lemniscomys striatus massaicus*.

*Ctenophthalmus modicus modicus*, Jordan, 1933a, p. 349, Figs. 68, 70.

This close relative (Figs. 119, 123, 133) of *C. evidens* was described from specimens collected in Kenya (Nakuru and Kisii).

The known hosts include *Lophuromys aquilus*, *Otomys angoniensis* and *Rattus rattus*.

*Ctenophthalmus modicus elgonensis*, Jordan, 1938, p. 114, Fig. 58.

This subspecies (Fig. 122) was described from specimens obtained from *Lophuromys aquilus* at Sipi (6,500 feet) on the Uganda side of Mount Elgon.

*Ctenophthalmus cabirus*, Jordan and Rothschild, 1913, p. 549, Figs. 20, 21.

This species (Figs. 11, 125, 137) has a very wide distribution in Kenya and Uganda and throughout a large part of our area it is the only member of the genus which occurs. This appears to be the case in Kenya at Nairobi, at Machakos, and in Northern and Central Kavirondo, and in most parts of Uganda. In the mountains *cabirus* apparently does not occur (the highest point at which I have obtained it is 7,800 feet) and this is also the case in parts of northern Uganda, where it is apparently replaced by *bacopus* and *segregus*. At Kisii it occurs together with *bacopus* and *modicus*, and in the Nakuru district and Kigezi it is one of a large number of species. In most areas this is a common species, occurring frequently on almost all the commoner field-rats and not uncommonly on house-rats when the latter come into free contact with the field-rat population. I have not had it from below 3,000 feet and Kenya records support a suggestion that it probably does not occur much below this altitude.

Dr. Jordan informs me that the record of the very closely-related *C. ansorgei* from Kenya is erroneous.

*Ctenophthalmus bacopus*, Jordan, 1933, p. 350, Figs. 69, 71.

This species (Figs. 126, 135) appears to be rather rare, but it seems to replace *cabirus* in the Lango district (northern Uganda) and females have been recorded from Kisii and Nakuru. Its hosts are various species of field-rats.

*Ctenophthalmus segregus*, Jordan, 1937b, p. 332, Figs. 107, 108.

This species (Figs. 127, 140) is very closely related to *bacopus*, which it apparently replaces in the Acholi, West Nile and West Madi districts of northern Uganda, where it is apparently the only representative of the genus. I have also had it from Serere, Teso district, where it is accompanied by *C. cabirus*. The known localities are all between about 3,000 and 4,300 feet. The known hosts are *Arvicanthis abyssinicus* ssp., *Lophuromys sikapusi pyrrhus* and *Rattus (Mastomys) coucha ugandae*. A large number of further specimens have been collected since the species was described and prove beyond doubt that the sexes are correctly associated.

*Ctenophthalmus acanthurus*, Jordan and Rothschild, 1913, p. 551, Figs. 23, 24.

*C. acanthurus* (Figs. 118, 138) seems to be primarily a species of fairly high altitudes. It has been obtained in some numbers from the Aberdare Hills, and occurs on Mts. Kenya and Elgon (at 6,500 feet) and in the Nakuru district. It occurs on field-rats and shows no obvious preference among them.

*Ctenophthalmus lycosius*, Jordan and Rothschild, 1913, p. 554, Fig. 25.

This species (Fig. 117) is known from the Aberdare Hills, from the Nakuru district and from Kabete, near Nairobi. The female originally attributed to it has been shown to belong to *eumeces* and I suggest that *C. olbius* is possibly the true female of *lycosius*. The species occurs on field-rats and on *Rattus rattus*.

*Ctenophthalmus olbius*, Jordan and Rothschild, 1923, p. 306, Fig. 306.

Known only from a single female (Fig. 139) taken from *Oenomys bacchante* in the Aberdare Hills. I have suggested that it may be the female of *lycosius*. The specimen is abnormal in possessing three antepygidial bristles on one side and four on the other. In the key to the species of the genus the fairly safe assumption has been made that the normal number of these bristles is three.

#### Genus **HYP SOPHTHALMUS**

This genus has some resemblance to *Dinopsyllus* but is immediately distinguished by the presence of a fairly well developed eye (Fig. 93). In addition the terminalia of the male (Fig. 95) and the spermatheca of the female (Fig. 98) are very different from those of *Dinopsyllus*, and the flea is very much smaller. The sole East African species, *H. campestris* Jordan and Rothschild (1913, p. 578, Figs. 42, 43, 44), was described from a pair obtained in Kigezi district, south-west Uganda from *Otomys* sp. and a single female from the Igembi (Jambeni) hills north-east of Mount Kenya, off *Thamnomys* sp. (probably really *Grammomys* sp.). I have obtained a number of specimens from Kigezi and a few from the adjoining parts of the Belgian Congo, but the species seems always to be rare. The lowest elevation from which I have obtained it is 5,400 feet and the highest 7,800 feet. The hosts include *Arvicanthis abyssinicus*, *Dasymys bentleyae medius*, *Grammomys surdaster*, *Lemniscomys striatus massaicus*, *Lophuromys aquilus*, *Oenomys bacchante* and *Rattus rattus*. Four specimens were obtained by examination of a large number of *Rattus rattus* and four from a very much smaller number of *Lemniscomys striatus massaicus* (the other hosts only providing one each), which suggests that *Lemniscomys* may be a preferred host.

#### Genus **CHIMAEROPSYLLA**

This striking genus is easily recognised by the shape and position of the genal comb (Fig. 92). The terminalia of both sexes (Figs. 94, 96, 97) are also characteristic.

*Chimaeropsylla potis potis*, Rothschild, 1911, p. 270, Figs. 1-3.

This form (Figs. 94, 97) was described from specimens obtained in Nyasaland from an elephant-shrew, *Rhynchocyon cirnei*. The only subsequent records are from Tanganyika (from a genet which had perhaps recently killed an elephant-shrew) and from the Shimba Hills, Kenya.

*Chimaeropsylla potis stuhlmanni*, Jordan, 1943, p. 32, Figs. 2-4.

The Uganda subspecies of *C. potis* (Fig. 96) differs in the male chiefly by the longer movable process of the clasper. Females of the two forms are extremely similar, but in the present form the lobe of the seventh sternite is much less prominent and its distal edge is almost straight (contrast Fig. 97). The only known specimens of this form (three males and one female) were obtained from an elephant-shrew, *Rhynchocyon s. stuhlmanni*, collected in the Mabira Forest, Kyoga, Uganda, by Father F. J. Straeter.

### Genus LEPTOPSYLLA

Easily separated from any of our other genera by the short stout spines on the anterior margin of the head (Fig. 142).

#### KEY TO THE SPECIES

- |                              |                       |
|------------------------------|-----------------------|
| 1. Genal comb of four spines | <i>L. segnis</i>      |
| This comb of three spines    | <i>L. aethiopicus</i> |

*Leptopsylla segnis*, Schoenh., *Kon. Vet. Nya. Handb.* (1816).  
Patton and Evans, p. 529, Figs. 281A, B.

Possibly more familiar under its former name, *L. musculi*, this species is a cosmopolitan parasite of the European house-mouse, *Mus musculus*. It has been introduced into Kenya with its host but is as yet only known from Nairobi and Keruguya, although the mouse occurs in Mombasa. The flea occurs also, less commonly, on *Rattus rattus*, but does not appear to have spread to the field-rats.

*Leptopsylla aethiopicus*, Rothschild, 1908b, p. 5, Pl. 1, Figs. 8, 9.

Unlike the last, this species (Fig. 142) is indigenous and is found in Kenya, Tanganyika, Uganda and the Belgian Congo. Though apparently commoner at high elevations (Aberdare Hills; Mount Elgon; Kibonoto, Kilimanjaro; Mount Kenya; Kigezi and the Kivu area) the species is also found in lower areas, as I have seen a few specimens from near Kampala. The normal hosts are field-rats but the species has occurred in some numbers on *Rattus rattus* in Kigezi.

### Genus LAGAROPSYLLA

This and the following two genera are at once separated from all others in our area by the peculiar truncate maxilla (Fig. 143). Together with *Thaumapsylla* they represent the family Ischnopsyllidae, which is found exclusively on bats. The genera belonging to this family may at once be recognized by the shape and position of the spines of the genal comb, which

are placed very far forwards on the lower margin of the head and are much flattened and slightly expanded towards the apex. In the only other genus (*Hypsophthalmus*) which has genal spines remotely resembling those of the Ischnopsyllidae, the comb is placed almost vertically (Fig. 93). *Thaumapsylla* (together with some other genera not known from our area) does not possess the characteristic truncate maxilla and our one species of this genus is the only known exception to the rule that the Ischnopsyllidae (unlike all other fleas known from our area) have only two spines in the genal comb.

*Lagaropsylla* is separated from all the other bat-fleas with a truncate maxilla by the presence of dorsal incrassations (appearing as conspicuous dark patches) on the hinder part of the head.

There is some evidence which suggests that the bat-fleas may be highly specific in their choice of hosts and it is a great pity that these latter are seldom properly identified by flea-collectors.

*Lagaropsylla incerta*, Rothschild, 1900, p. 38.

This species (Fig. 143) is the only member of the genus known from our area and appears to be the only common bat-flea in Uganda. It occurs on insectivorous bats; the types were found on *Nyctinomus brachypterus* but the usual host in Uganda appears to be *Hipposideros caffer*. On this host the species is common, but I have not found it on other species of bats.

#### Genus **OXYPARIUS**

This genus is completely characterized (in our area) by the possession of very conspicuous combs of large black spines on the first five abdominal segments, a character which distinguishes it from all our other Ischnopsyllidae. Our only known species, *O. isomalus* Waterston (1915, p. 109, Figs. 4, 5) was described from South Africa, where it occurs on a small insectivorous bat, *Miniopterus natalensis*. Mr. T. H. E. Jackson and I collected a long series from *Miniopterus natalensis arenarius* Heller in a cave in the foothills of Mount Elgon (Kapretwa, Kitale area).

#### Genus **RHINOLOPHOPSYLLA**

Separated from *Lagaropsylla* by the absence of dorsal incrassations on the occiput and the presence of combs on the abdomen, from *Oxyparius* by the fact that these combs are much reduced (consisting of only 1-2 pale-coloured spines on segments 1-3) and from *Thaumapsylla* (which also possesses reduced combs) by its truncate maxilla and much longer head.

The sole species known from our area, *R. ectopus* Jordan (1937b, p. 329, Fig. 106; 1939, p. 48, Fig. 6) was described from a single male (Fig. 144) collected from a small, undetermined, insectivorous bat in the cave at Kapretwa which is mentioned under *Oxyparius isomalus*. Mr. T. H. E. Jackson and I subsequently collected a series of both sexes of the flea from *Myotis tricolor* Smuts in the same cave.

Genus **THAUMAPSYLLA**

Separated from all our other members of the Ischnopsyllidae by the pointed maxilla and from all other fleas by the shape and position of the genal spines. The presence of three such spines is unique in the Ischnopsyllidae, even the other known species of *Thaumapsylla* having only two.

*Thaumapsylla dina*, Jordan, 1937a, p. 290, Figs. 78, 79.

The male type of this species (Figs. 145, 146) was obtained from a fruit-bat, *Rousettus lanosus*, on the western side of Ruwenzori; the same species of bat occurs on the Uganda side of Ruwenzori and another member of the same genus is abundant there, so the flea is certain to occur in Uganda. Mr. G. R. Cunningham van Someren has recently obtained two pairs of *T. dina* from a fruit-bat (*Eidolon helvum*) in a cave under a waterfall on the Ndurugu River, at 8,000 feet near Ruiru, Kenya.

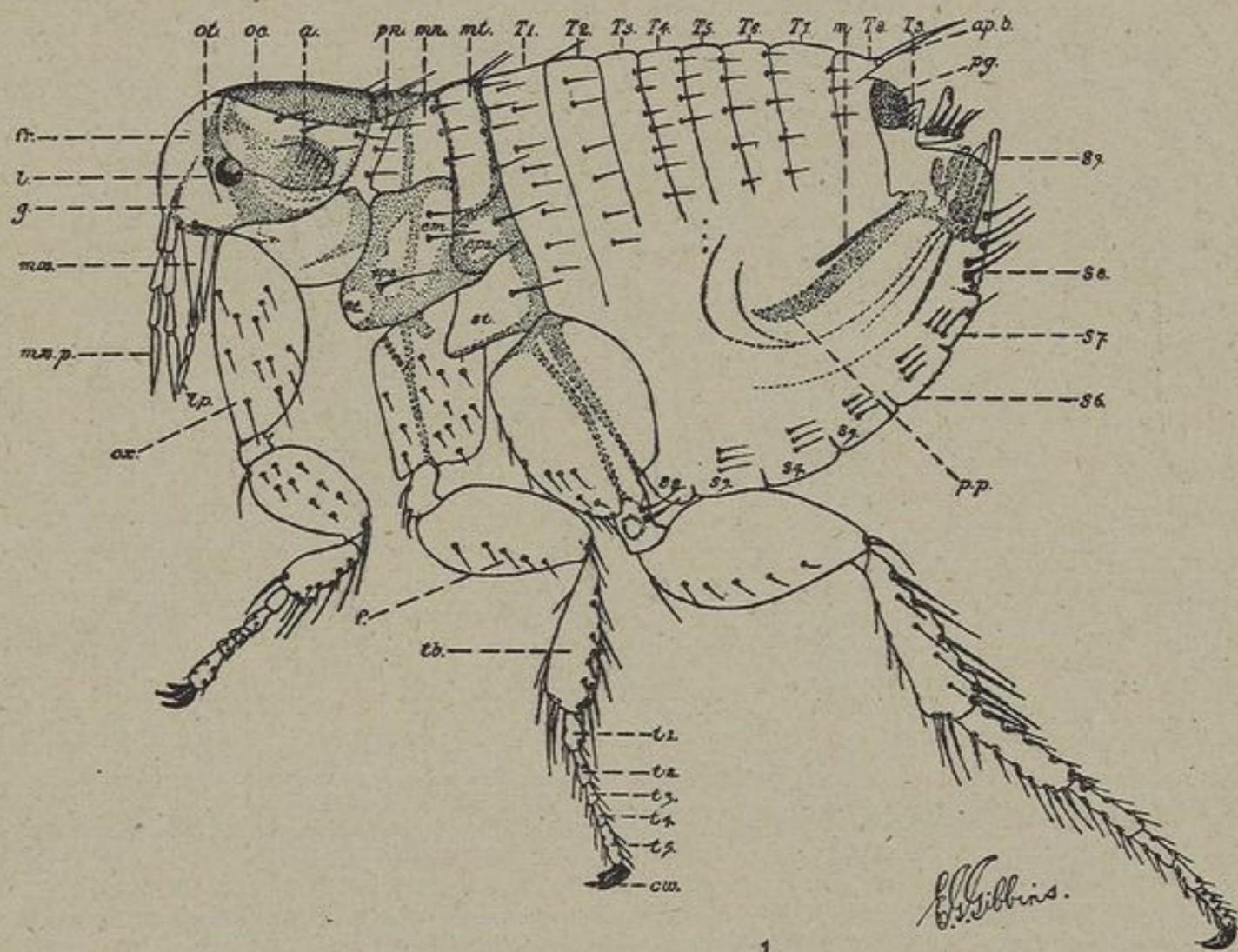
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#### REFERENCE LETTERS TO PLATES

|       |                       |         |                       |
|-------|-----------------------|---------|-----------------------|
| a.    | antenna.              | mt.     | metanotum.            |
| ap.b. | antepygidial bristle. | mx.     | maxilla.              |
| c.    | comb.                 | mx.p.   | maxillary palp.       |
| cw.   | claw.                 | oc.     | occiput.              |
| cx.   | coxa.                 | o.t.    | occipital tuber.      |
| e.    | eye.                  | p.      | penis.                |
| e.d.  | ejaculatory duct.     | p 1-3.  | processes of clasper. |
| em.   | epimeron.             | pg.     | pygidium.             |
| eps.  | episternum.           | pn.     | pronotum.             |
| f.    | femur.                | pp.     | penis-plate.          |
| fr.   | frons.                | S1-S10. | sternites of abdomen. |
| f.t.  | frontal tubercle.     | sp.     | spiracle (or stigma). |
| g.    | gena.                 | st.     | sternum.              |
| g.h.  | genal hook.           | t1-t5.  | tarsal segments.      |
| l.p.  | labial palp.          | T1-T9.  | tergites of abdomen.  |
| m.    | manubrium.            | tb.     | tibia.                |
| mn.   | mesonotum.            |         |                       |



1

PLATE I

Fig. 1. Male *Xenopsylla brasiliensis*, showing most of the structures used in the keys.

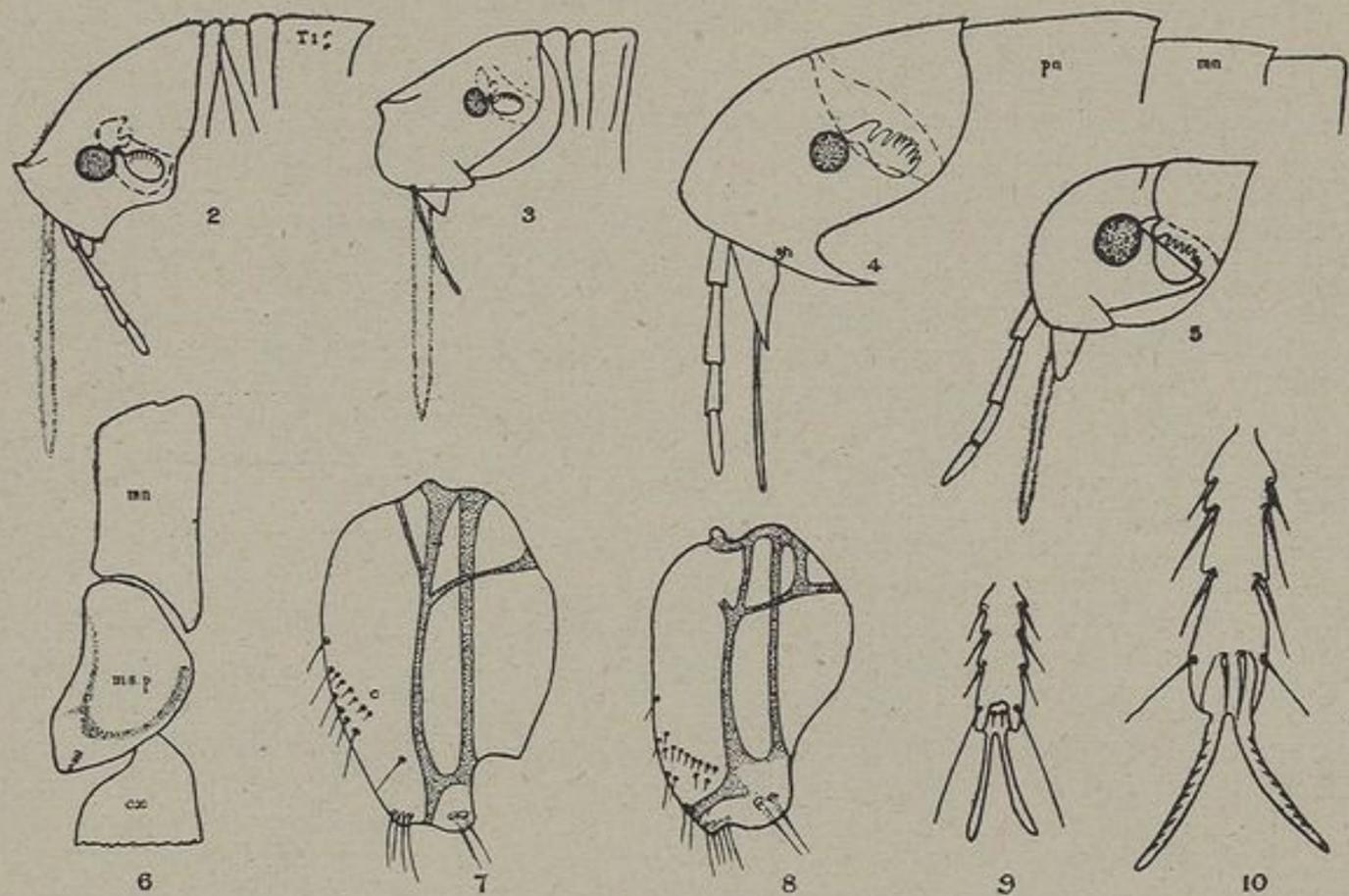


PLATE II

- Fig.
2. Head, thoracic tergites and first abdominal tergite of female *Tunga penetrans* (chaetotaxy omitted).
  3. Head and thoracic tergites of female *Echidnophaga larina* (chaetotaxy omitted).
  4. Head and thoracic tergites of female *Parodontis riggenbachi* (chaetotaxy omitted).
  5. Head of female *Moeopsylla sjoestedti* (chaetotaxy omitted).
  6. Mesothorax of *Pulex irritans* (chaetotaxy omitted).
  7. Hind coxa of *Xenopsylla cheopis* (inner aspect).
  8. Hind coxa of *Procaviopsylla isidis* (inner aspect).
  9. Fifth hind tarsal segment of *Echidnophaga gallinacea*.
  10. Fifth hind tarsal segment of *Echidnophaga larina*.

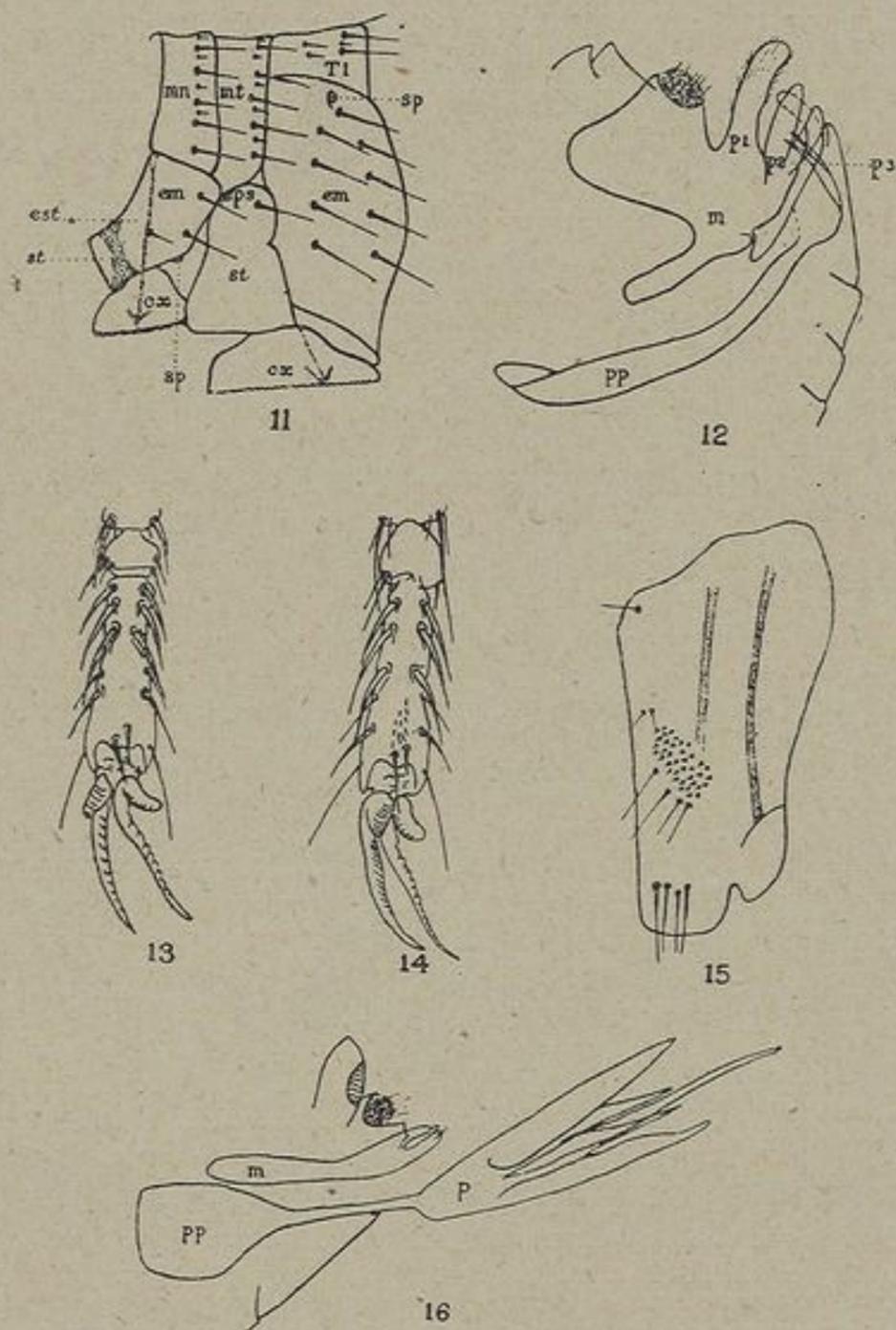


PLATE III

- |   |   |
|---|---|
| <p>Fig. 11. Mesothorax, metathorax and first abdominal segment of <i>Synosternus pallidus</i>.</p> <p>12. Male terminalia of <i>Echidnophaga larina</i>.</p> <p>13. Fifth tarsal segment of <i>Synosternus somalicus</i>.</p> | <p>Fig. 14. Fifth tarsal segment of <i>Synosternus pallidus</i>.</p> <p>15. Hind coxa of <i>Echidnophaga larina</i> (inner aspect).</p> <p>16. Male terminalia of <i>Tunga penetrans</i>.</p> |
|---|---|

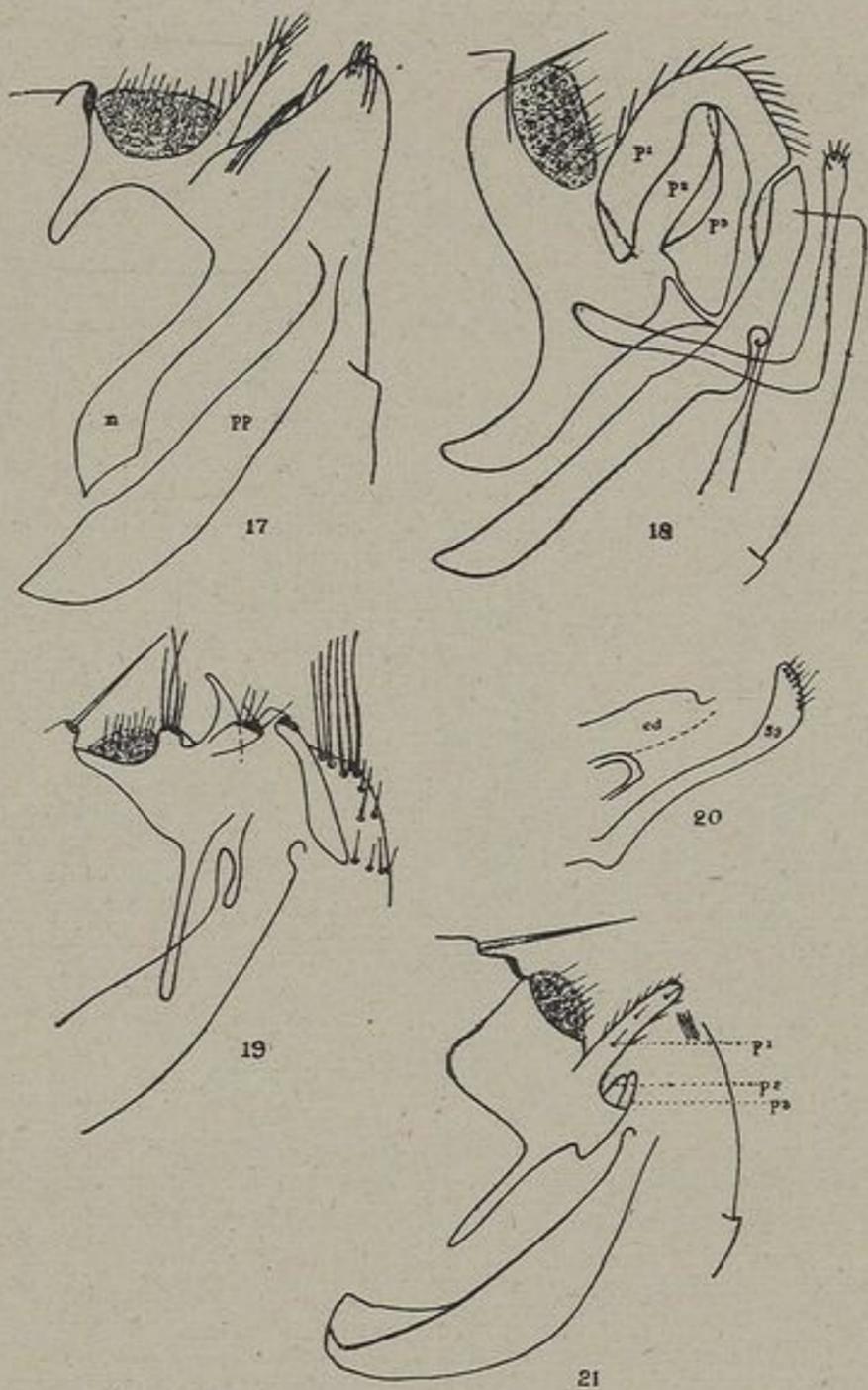


PLATE IV

- Fig.  
 17. Male terminalia of *Moeopsylla sjoestedti*.  
 18. Male terminalia of *Pulex irritans*.  
 19. Male terminalia of *Xenopsylla crinita*.

- Fig.  
 20. Ejaculatory duct and 9th sternite of *Xenopsylla humilis*.  
 21. Male terminalia of *Delopsylla crassipes*.

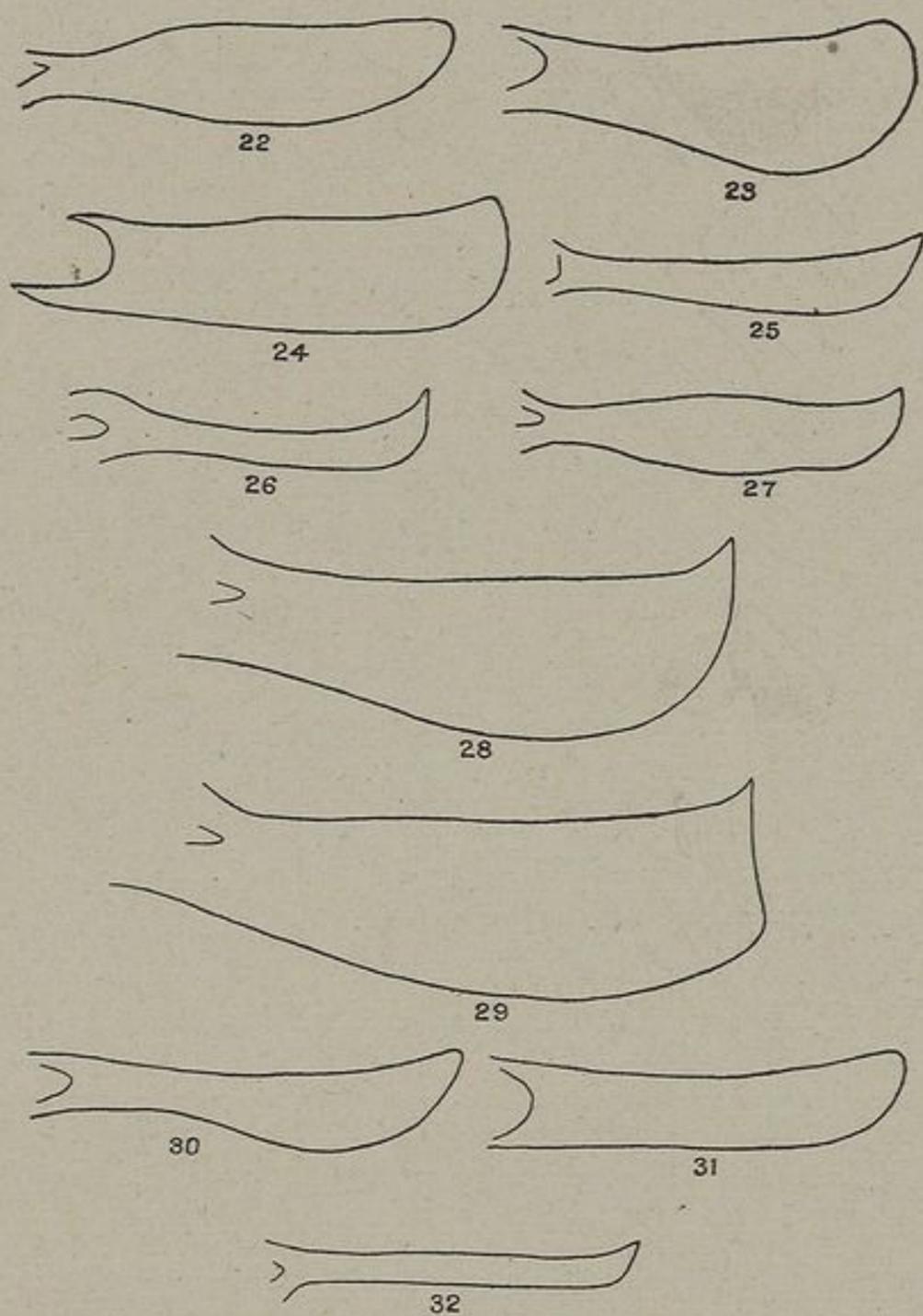


PLATE V  
 (All figures to same scale)  
 PENIS PLATES OF MALE FLEAS.

- |      |     |   |      |     |                             |
|------|-----|---|------|-----|-----------------------------|
| Fig. | 22. | <i>Procaviopsylla isidis.</i>             | Fig. | 27. | <i>Xenopsylla robertsi.</i> |
|      | 23. | <i>Xenopsylla astia.</i>                  |      | 28. | <i>Xenopsylla tortus.</i>   |
|      | 24. | <i>Xenopsylla nubicus.</i>                |      | 29. | <i>Xenopsylla crinita.</i>  |
|      | 25. | <i>Xenopsylla</i><br><i>brasiliensis.</i> |      | 30. | <i>Xenopsylla cheopis.</i>  |
|      | 26. | <i>Xenopsylla difficilis.</i>             |      | 31. | <i>Xenopsylla versuta.</i>  |
|      |     |   |      | 32. | <i>Xenopsylla humilis.</i>  |

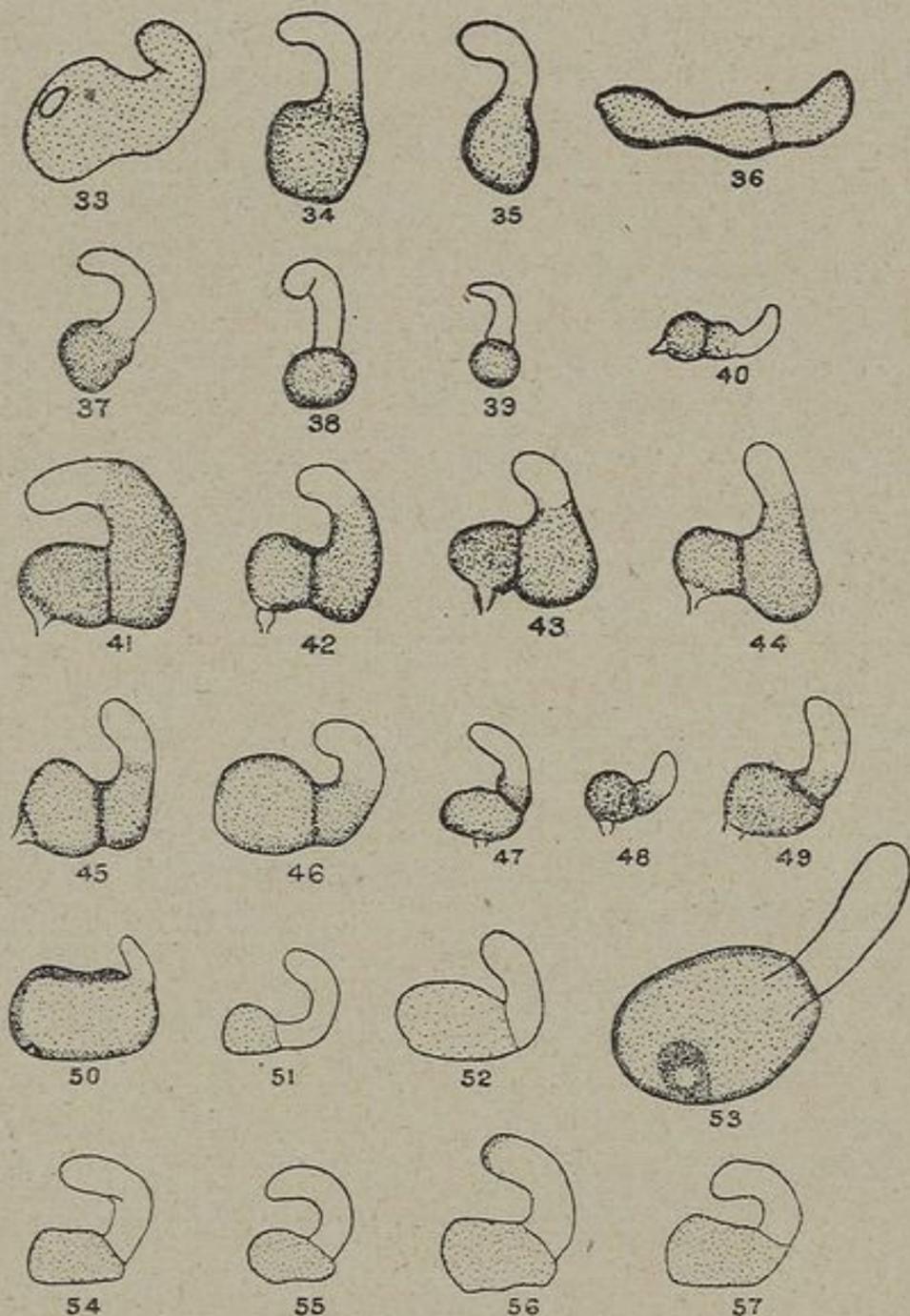


PLATE VI

SPERMATHECAE OF FEMALE FLEAS.

- |  |                                     |  |
|--|-------------------------------------|--|
| Fig. 33. <i>Echidnophaga gallinacea.</i> | Fig. 41. <i>Xenopsylla cheopis.</i> | Fig. 51. <i>Lagaropsylla incerta.</i>        |
| 34. <i>Echidnophaga larina.</i>          | 42. <i>Xenopsylla versuta.</i>      | 52. <i>Leptopsylla aethiopicus.</i>          |
| 35. <i>Pulex irritans.</i>               | 43. <i>Xenopsylla nubicus.</i>      | 53. <i>Listropsylla dolosus.</i>             |
| 36. <i>Moeopsylla sjoestedti.</i>        | 44. <i>Xenopsylla astia.</i>        | 54. <i>Ctenocephalides canis.</i>            |
| 37. <i>Delopsylla crassipes.</i>         | 45. <i>Xenopsylla brasiliensis.</i> | 55. <i>Ctenocephalides felis strongylus.</i> |
| 38. <i>Pariodontis riggenbachi.</i>      | 46. <i>Xenopsylla robertsi.</i>     | 56. <i>Ctenocephalides crataepus.</i>        |
| 39. <i>Procaviopsylla isidis.</i>        | 47. <i>Xenopsylla humilis.</i>      | 57. <i>Ctenocephalides connatus.</i>         |
| 40. <i>Synosternus somalicus.</i>        | 48. <i>Xenopsylla debilis.</i>      |  |
|  | 49. <i>Xenopsylla crinita.</i>      |  |
|  | 50. <i>Stivalius torvus.</i>        |  |

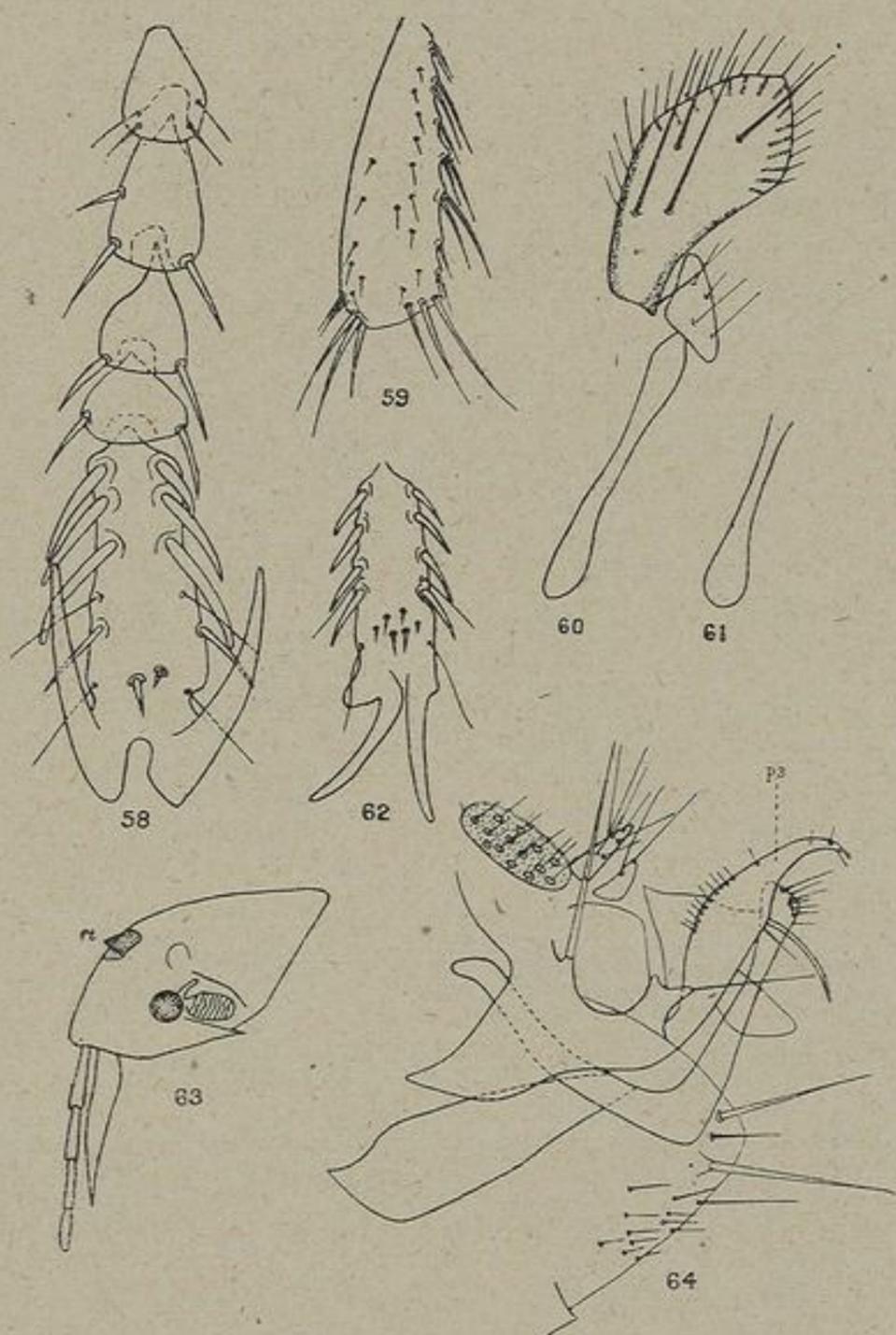
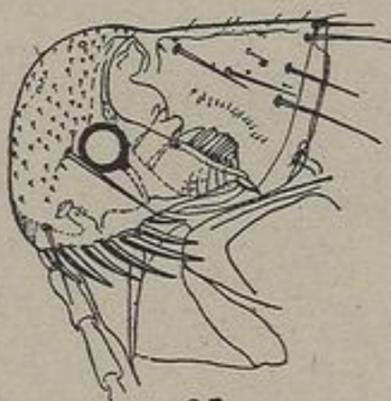


PLATE VII

- Fig.  
 58. Fore tarsus of *Ctenocephalides crataepus*.  
 59. Hind femur of *Ctenocephalides canis*.  
 60. Process of clasper and manubrium of *Ctenocephalides felis strongylus*.  
 61. Tip of manubrium of *Ctenocephalides canis*.

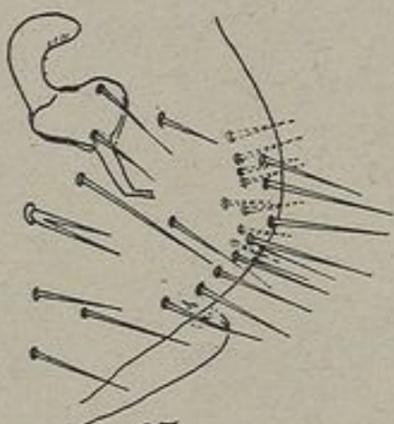
- Fig.  
 62. Fifth segment of fore tarsus of *Ctenocephalides connatus*.  
 63. Head of female *Listropsylla dolosus* (chaetotaxy omitted).  
 64. Terminalia of male *Listropsylla dolosus*.



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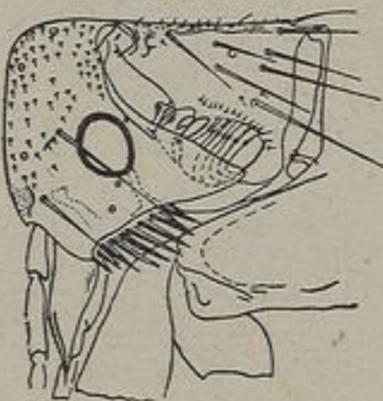
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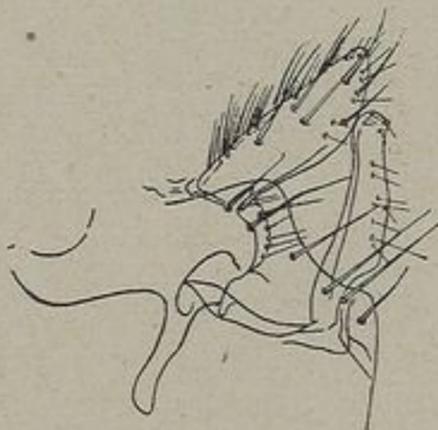
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## PLATE VIII

- Fig. 65. Head of male *Ctenocephalides craterus*.  
66. Terminalia of male *Ctenocephalides craterus*.  
67. Terminalia of female *Ctenocephalides craterus*.
- Fig. 68. Terminalia of female *Aphropsylla conversus*.  
69. Head of male *Aphropsylla conversus*.  
70. Terminalia of male *Aphropsylla conversus*.

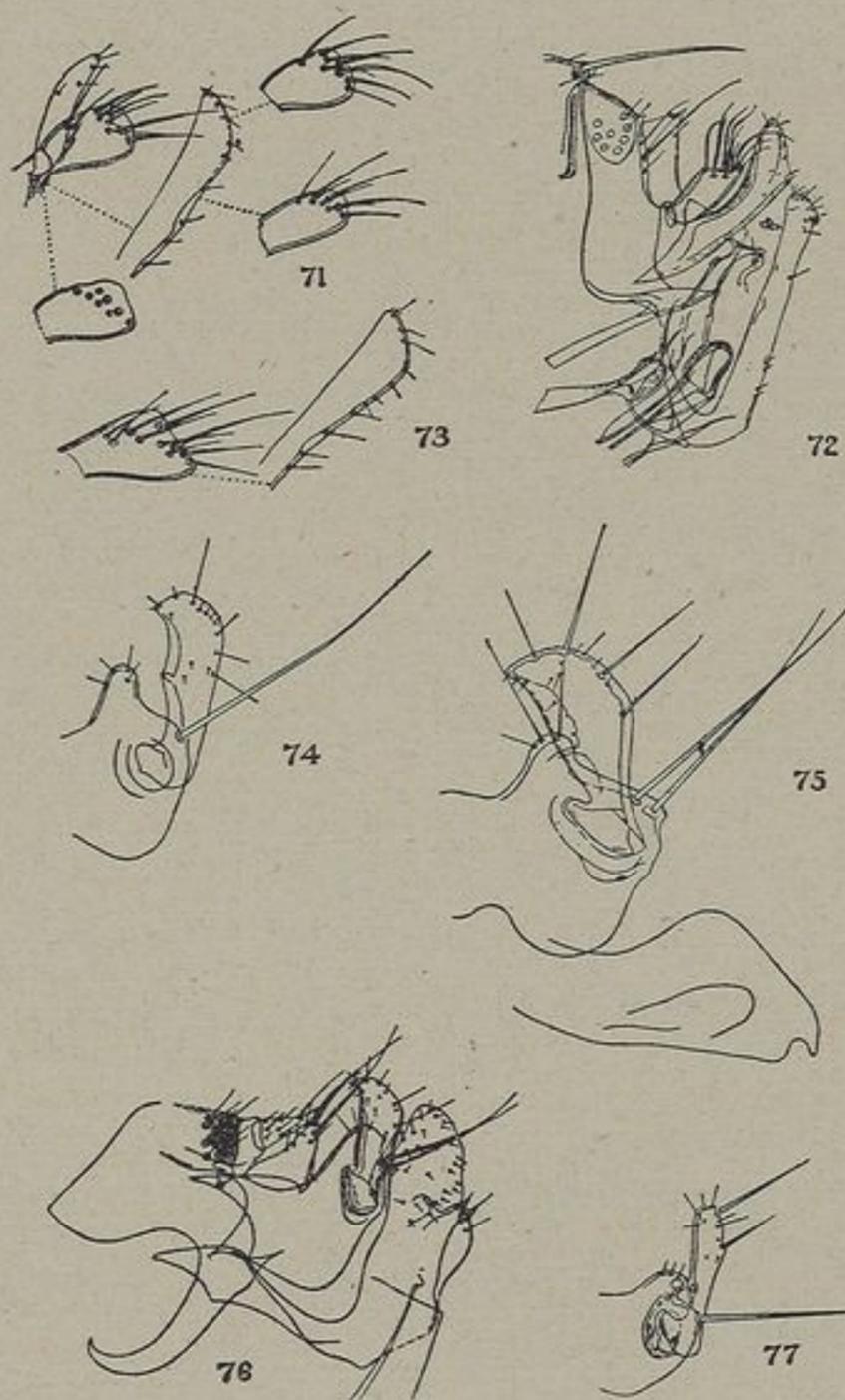


PLATE IX

- |  |   |
|--|---|
| <p>Fig.<br/>71. Male <i>Xenopsylla bantorum</i>, processes <math>p^1</math> and <math>p^2</math> of clasper, and 9th abdominal sternite.</p> <p>72. Terminalia of male <i>Xenopsylla sarodes</i>.</p> <p>73. Male <i>Xenopsylla cheopis</i>, process <math>p^1</math> of clasper and 9th abdominal sternite.</p> | <p>Fig.<br/>74. Clasper of male <i>Libyastus infestus infestus</i>.</p> <p>75. Clasper of male <i>Libyastus infestus duratus</i>.</p> <p>76. Terminalia of male <i>Libyastus hopkinsi</i>.</p> <p>77. Clasper of male <i>Libyastus piger</i>.</p> |
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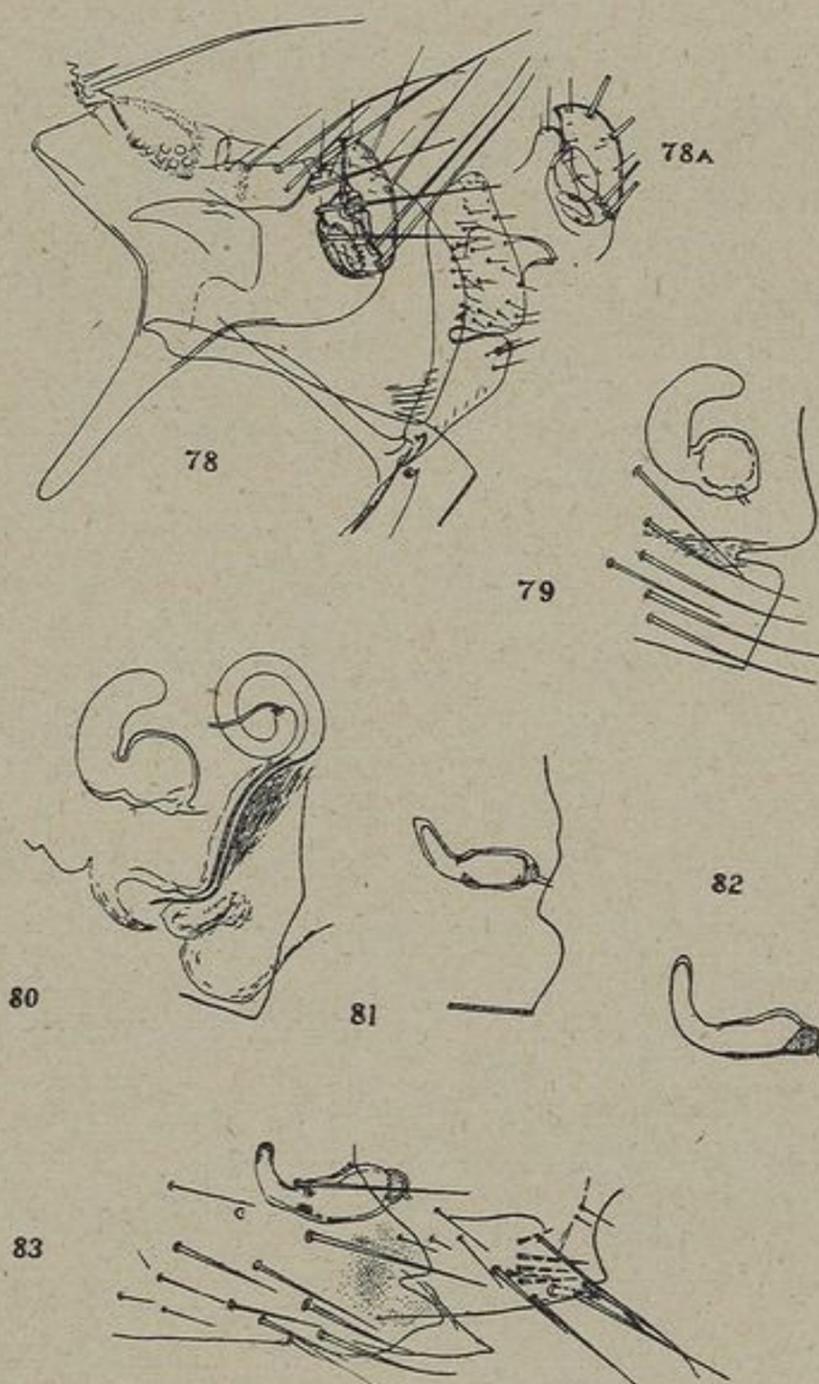


PLATE X

- |   |  |
|---|--|
| <p>Fig.<br/>78. Terminalia of male <i>Nosopsyllus fasciatus</i> (78A. Clasper of another specimen).</p> <p>79. Spermatheca and 7th sternite of female <i>Nosopsyllus incisus</i>.</p> <p>80. Spermatheca and 7th sternite of female <i>Nosopsyllus fasciatus</i>.</p> | <p>Fig.<br/>81. Spermatheca and 7th sternite of female <i>Libyastus piger</i>.</p> <p>82. Spermatheca of female <i>Libyastus infestus infestus</i>.</p> <p>83. Terminalia of female <i>Libyastus infestus duratus</i>.</p> |
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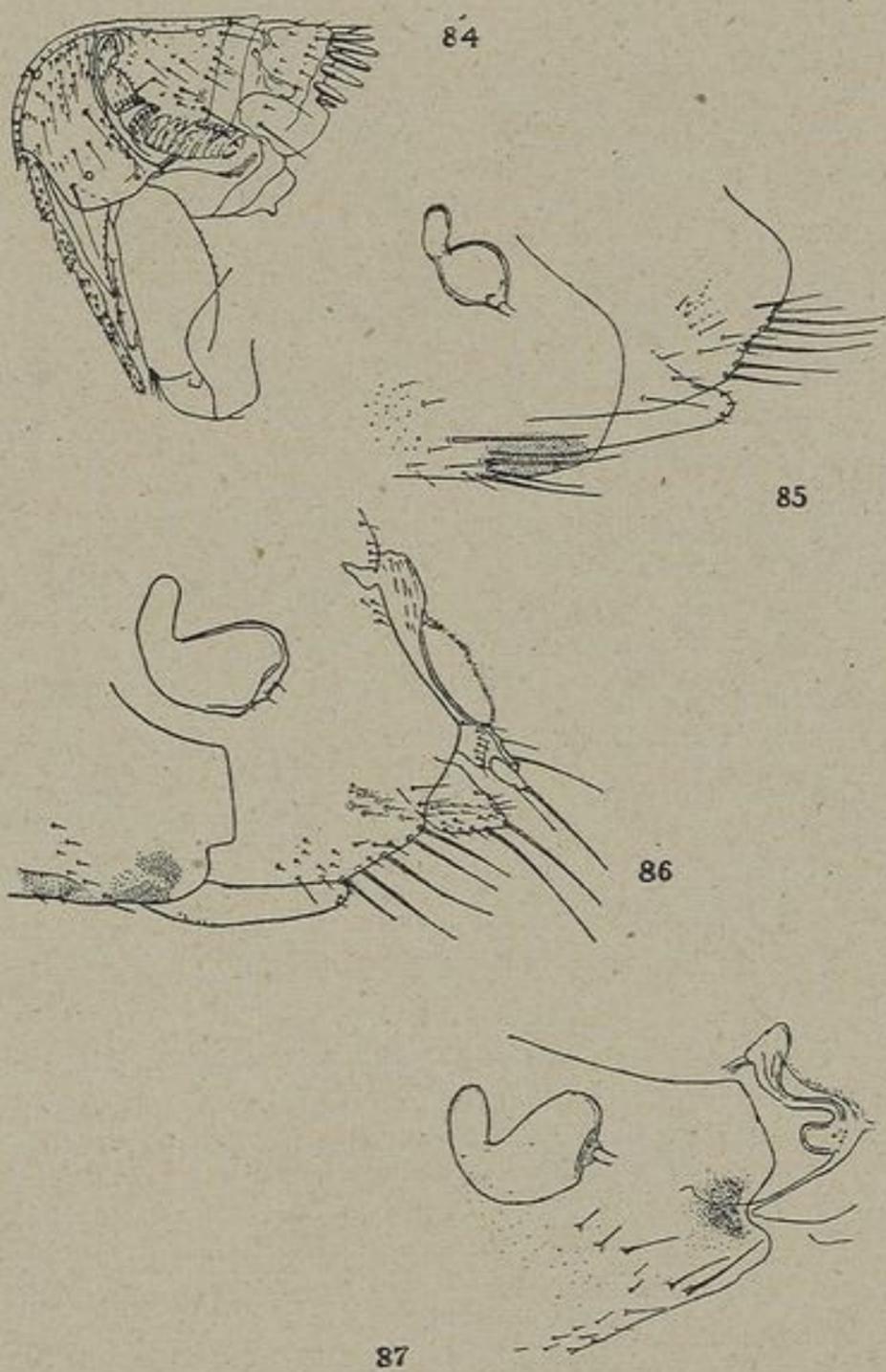


PLATE XI

- Fig.  
84. Head of male *Xiphiopsylla hippia*.  
85. Terminalia of female *Xiphiopsylla apriona*.

- Fig.  
86. Terminalia of female *Xiphiopsylla hippia*.  
87. Spermatheca and 7th sternite of female *Xiphiopsylla lippa*.

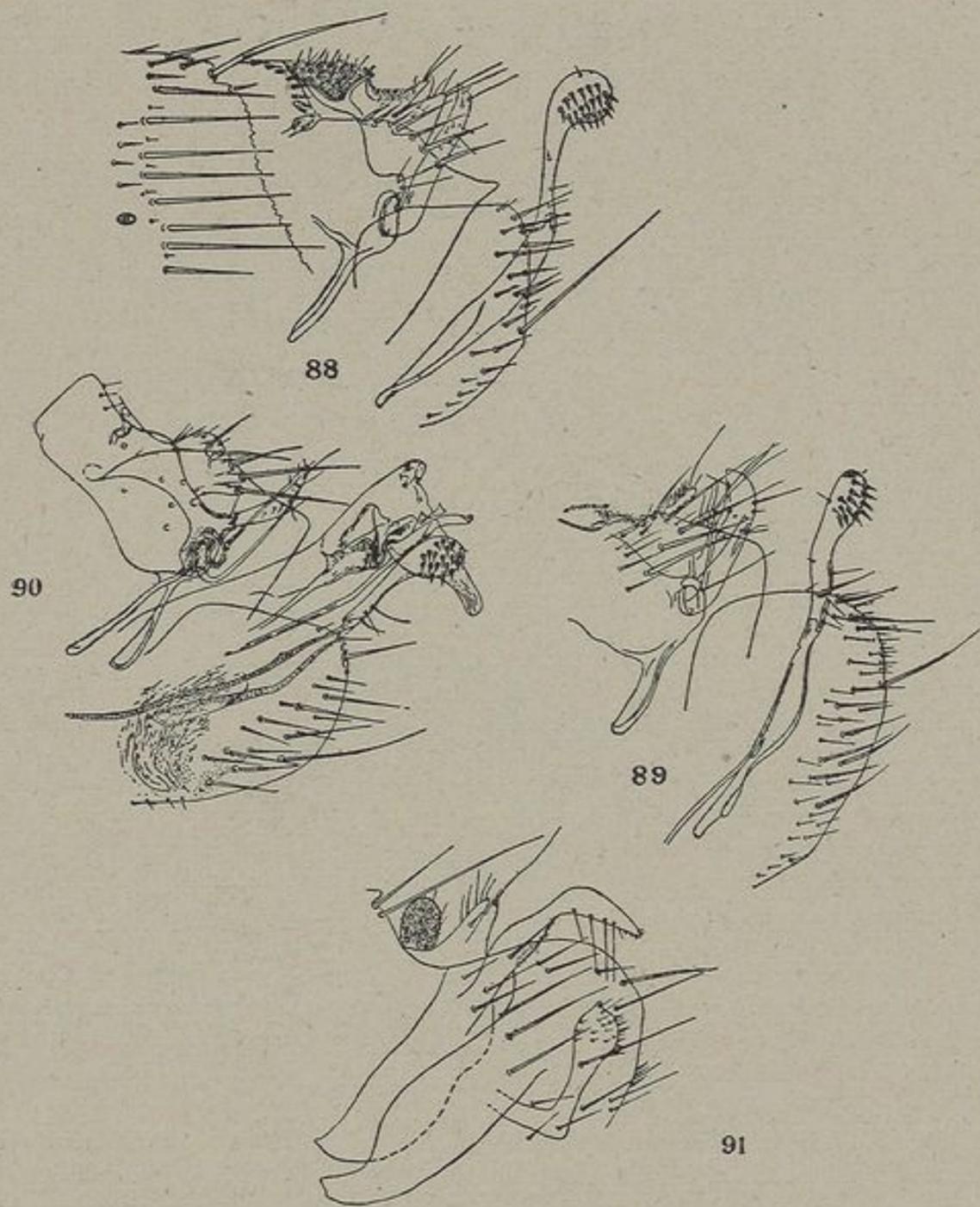
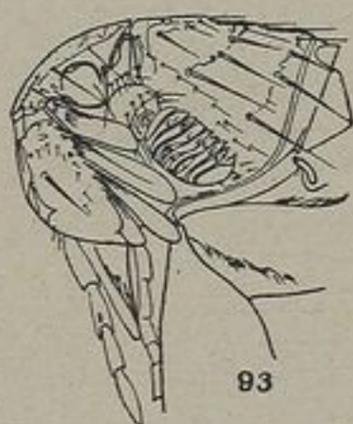


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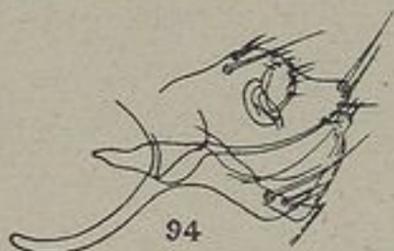
- Fig.  
 88. Terminalia and part of abdomen of male *Xiphopsylla hippia*.  
 89. Terminalia of male *Xiphopsylla hyparetis*.  
 90. Terminalia of male *Xiphopsylla lippa*.  
 91. Terminalia of male *Stivalius torvus*.



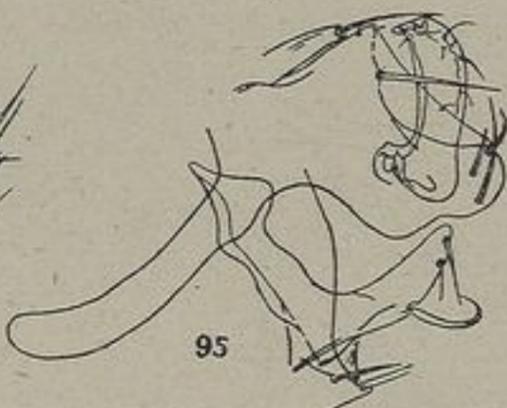
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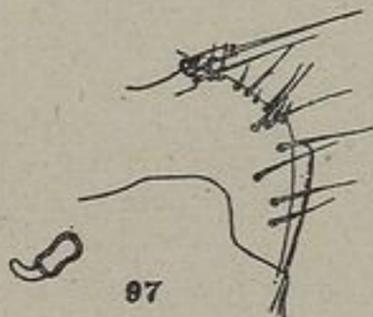
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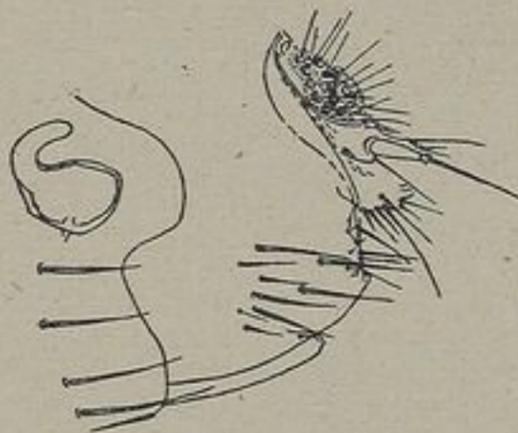
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PLATE XIII

- Fig.  
92. Head and prothorax of male *Chimaeropsylla potis potis*.  
93. Head of female *Hypsophthalmus campestris*.  
94. Terminalia of male *Chimaeropsylla potis potis*.  
95. Terminalia of male *Hypsophthalmus campestris*.

- Fig.  
96. Terminalia of male *Chimaeropsylla potis stuhlmanni*.  
97. Terminalia of female *Chimaeropsylla potis potis*.  
98. Terminalia of female *Hypsophthalmus campestris*.

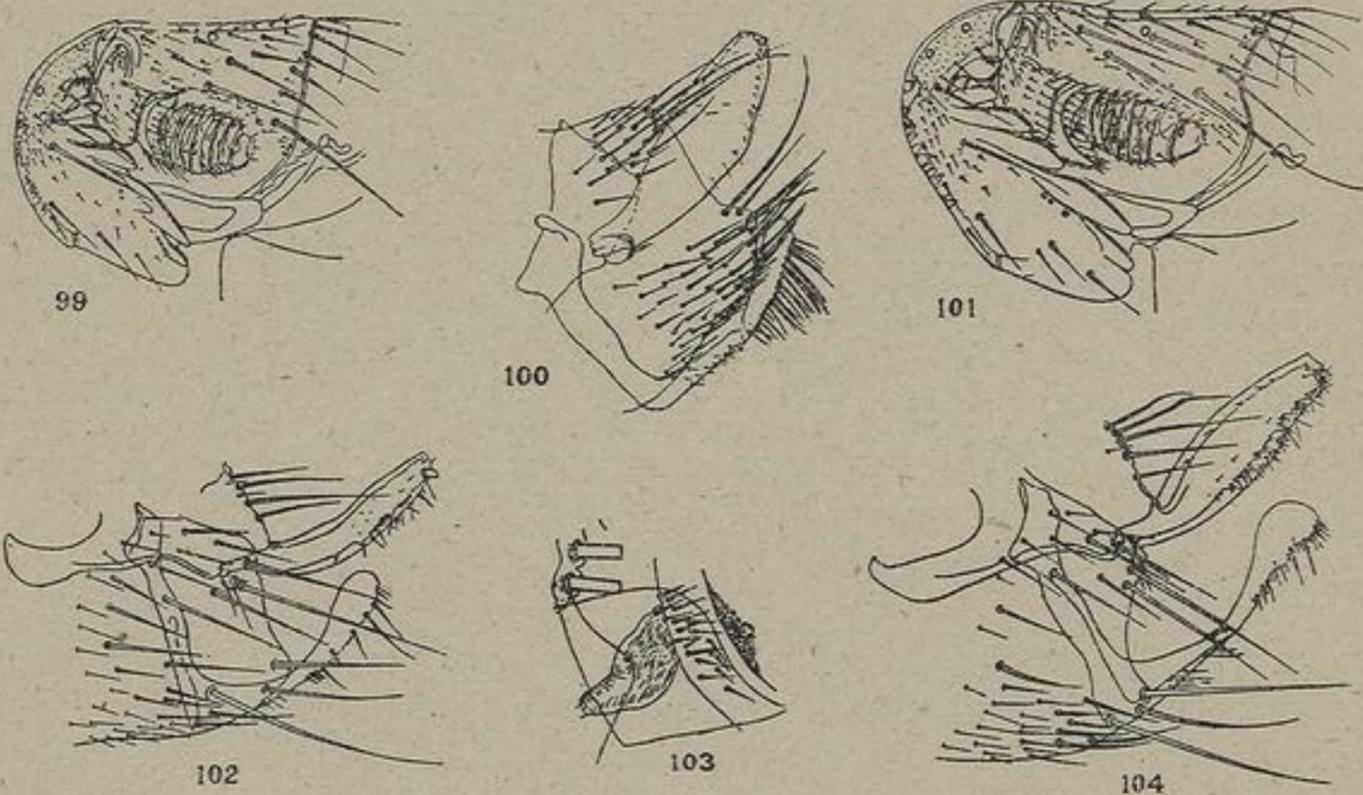
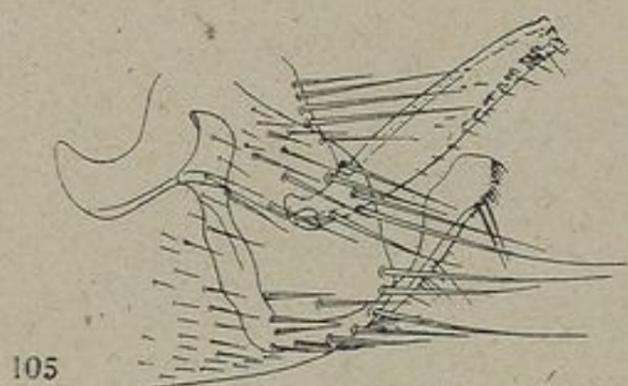
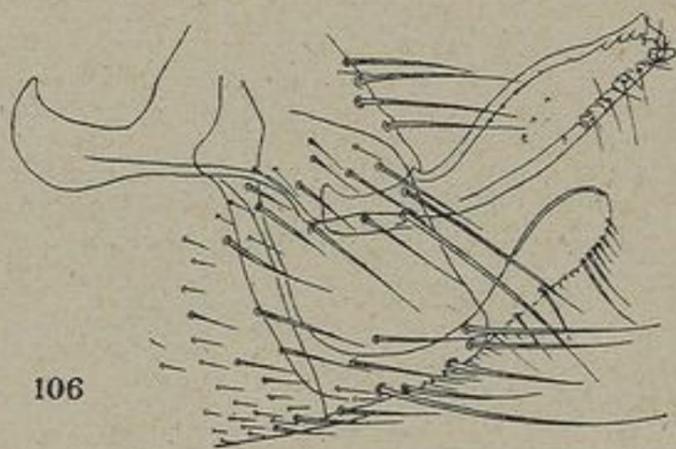


PLATE XIV

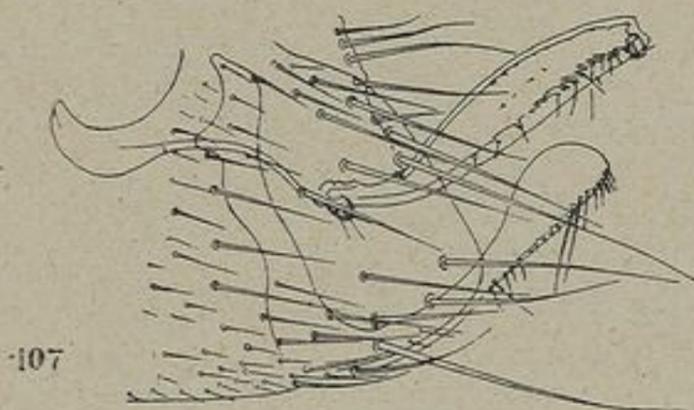
- Fig.  
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 100. Terminalia of male *Dinopsyllus semnus*.  
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 103. Portion of 7th and 8th abdominal tergites of female *Dinopsyllus semnus*.  
 104. Terminalia of male *Dinopsyllus apistus*.



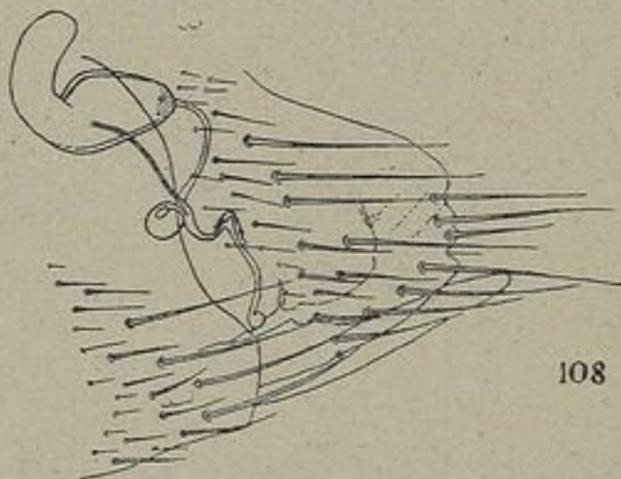
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PLATE XV

- Fig.  
105. Terminalia of male *Dinopsyllus echinus*.  
106. Terminalia of male *Dinopsyllus longifrons*.  
107. Terminalia of male *Dinopsyllus lypusus*.  
108. Terminalia of female *Dinopsyllus apistus*.

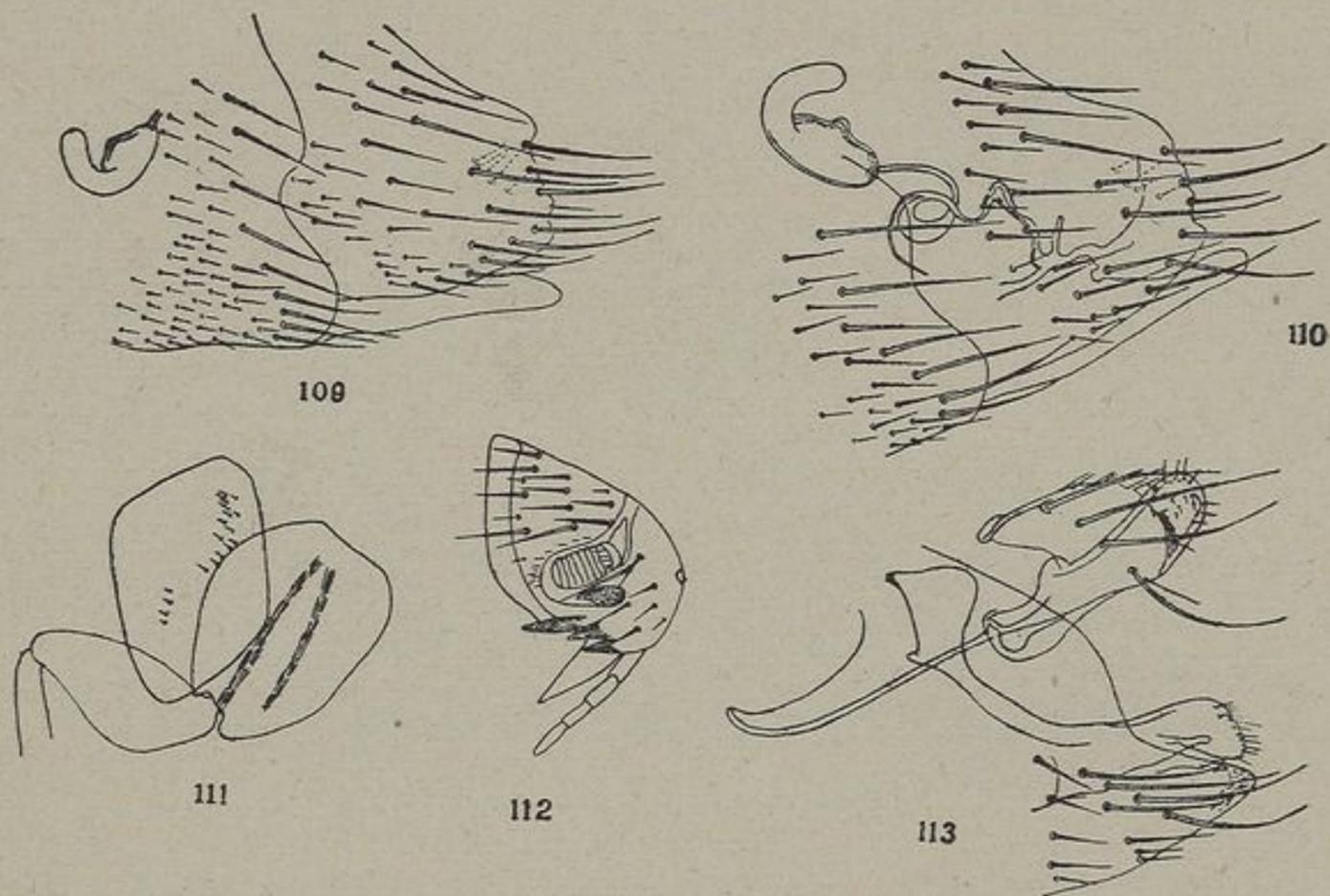


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- Fig.  
 109. Terminal abdominal segments of female *Dinopsyllus echinus*.  
 110. Terminal abdominal segments of female *Dinopsyllus lypusus*.  
 111. Metepimeron (and part of right hind leg) of female *Dinopsyllus lypusus*.  
 112. Head of female *Ctenophthalmus cabirus*.  
 113. Terminalia of male *Ctenophthalmus cophurus*.

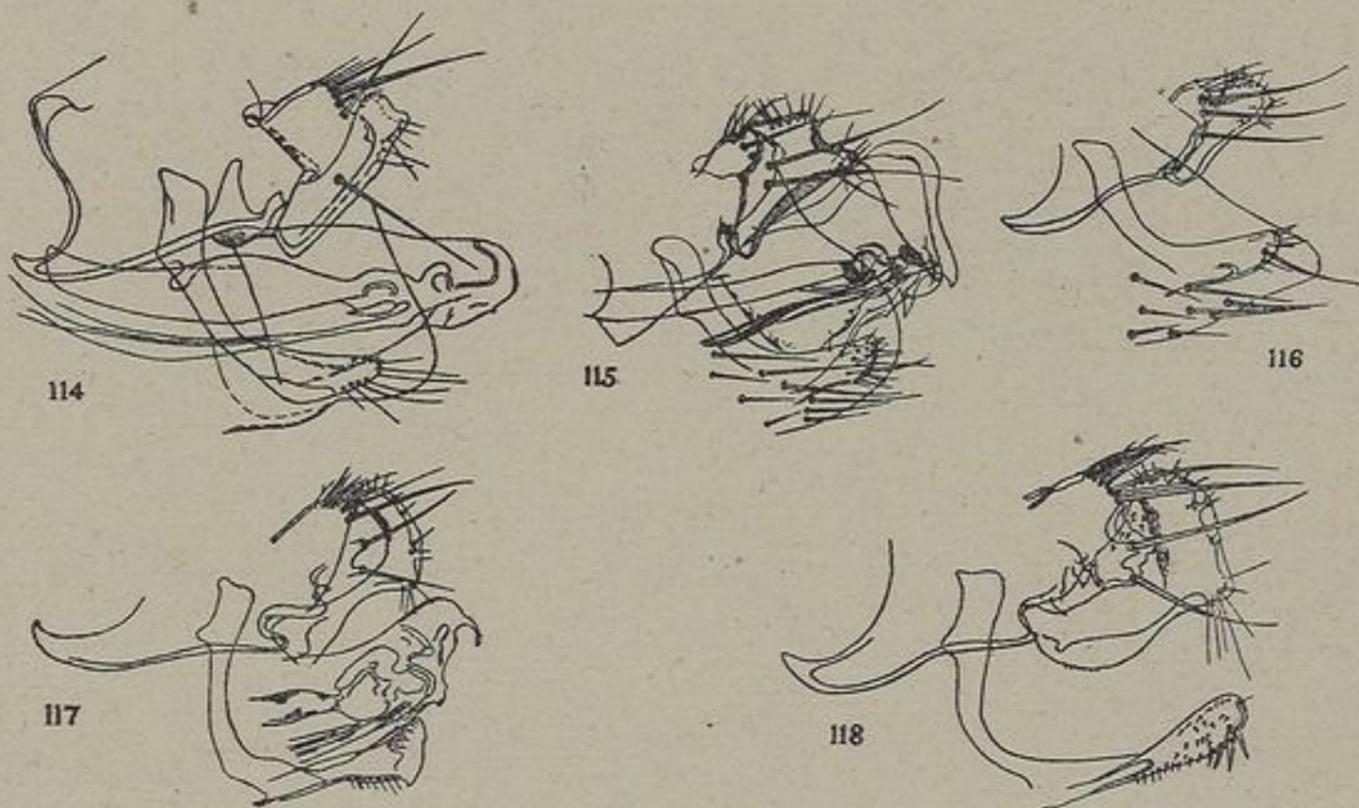


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 116. Terminalia of male *Ctenophthalmus eximius*.  
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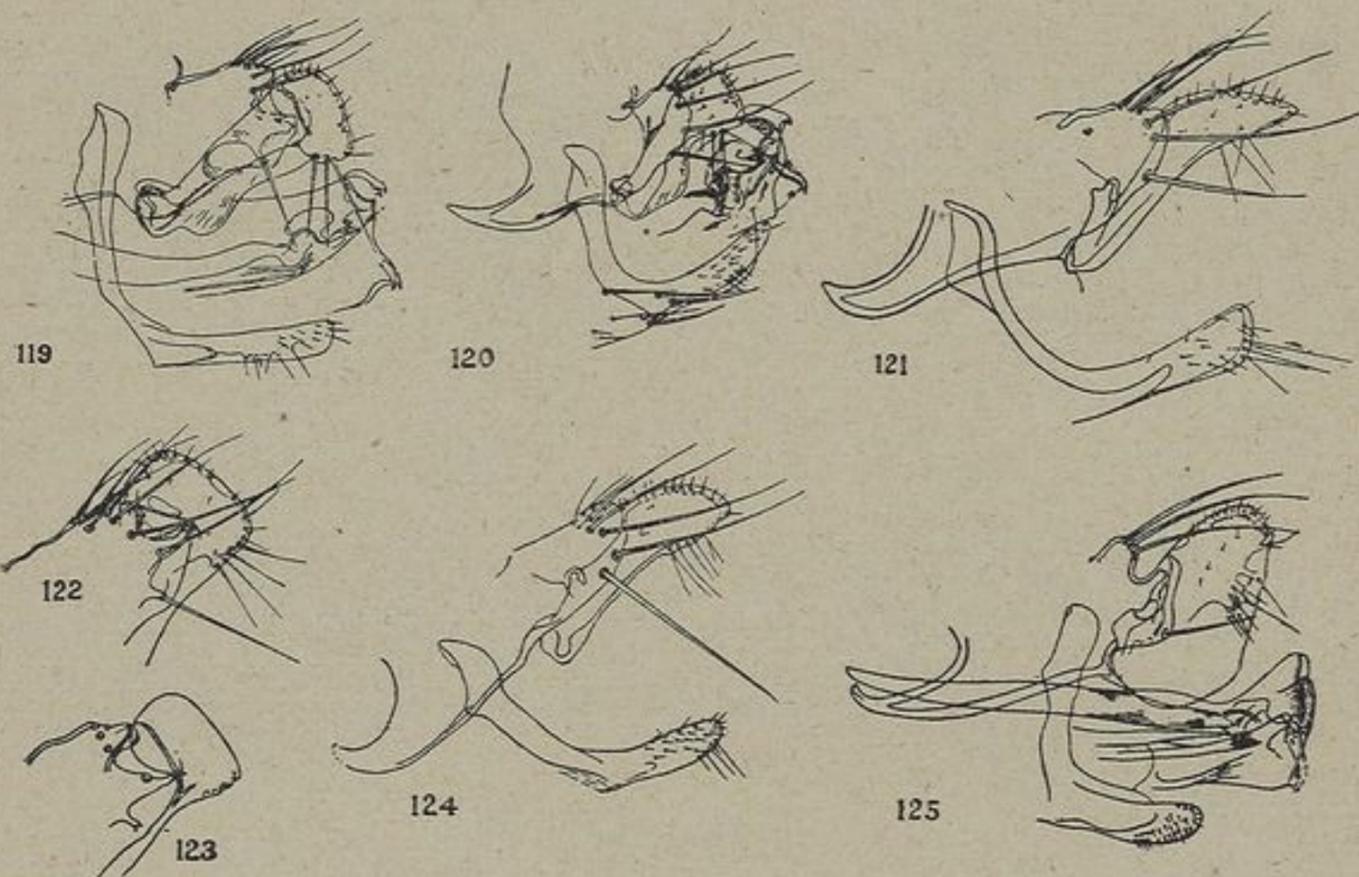


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 124. Terminalia of male *Ctenophthalmus audax*.  
 125. Terminalia of male *Ctenophthalmus cabirus*.

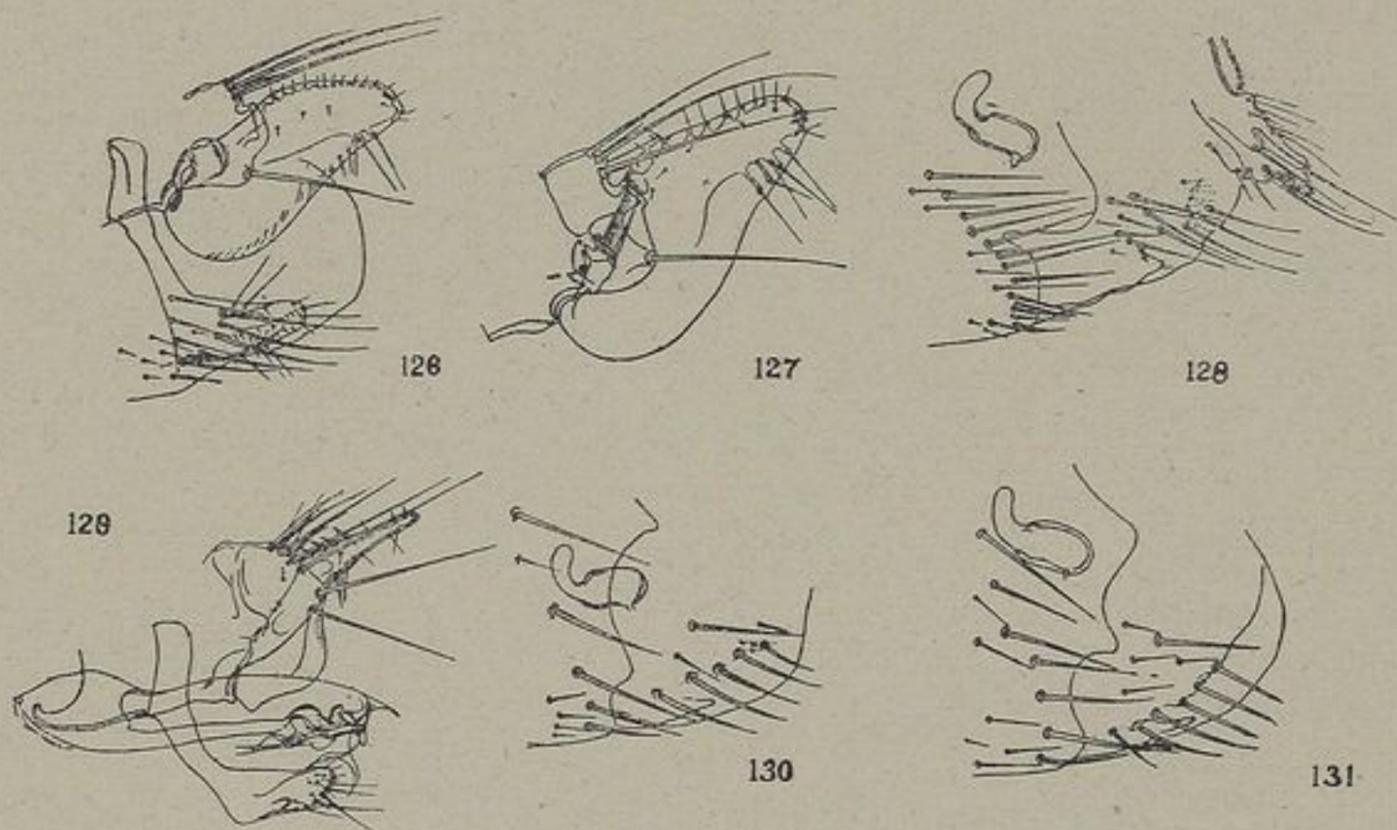


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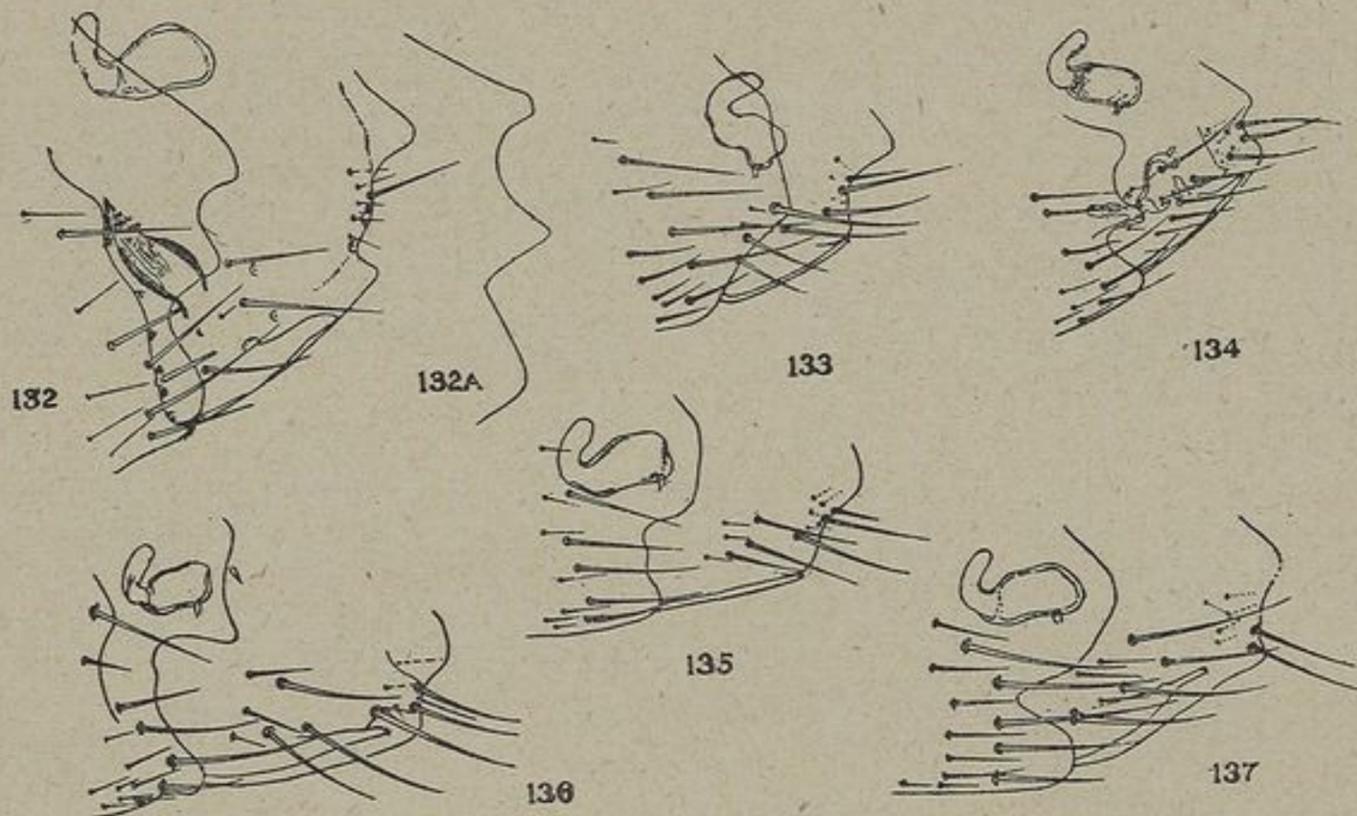


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- Fig.  
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 136. Terminalia of female *Ctenophthalmus eumeces* (tail of spermatheca distorted).  
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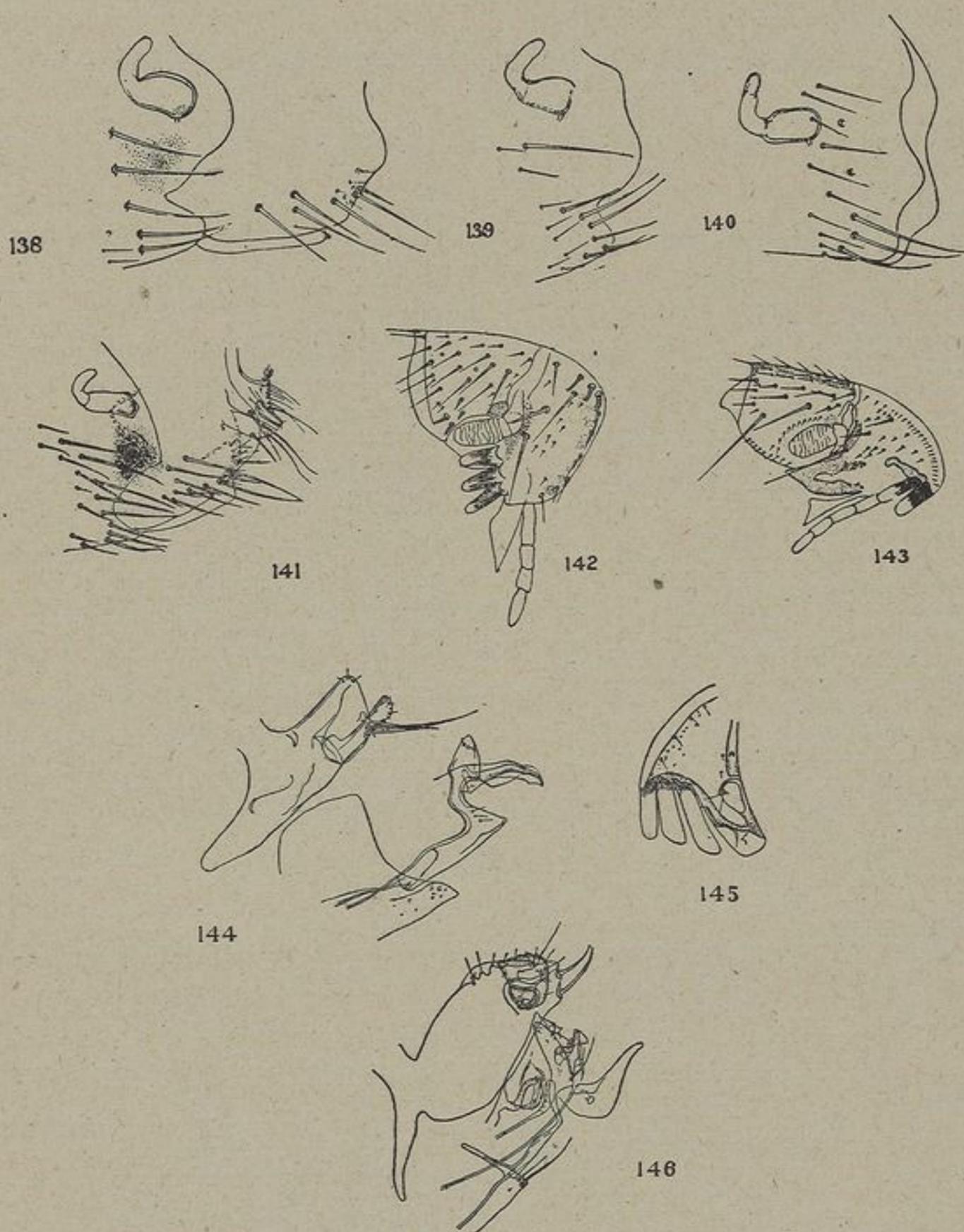


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