WORLD HEALTH ORGANIZATION
ORGANISATION MONDIALE DE LA SANTÉ

WHO/SE/74.67
ORIGINAL: ENGLISH

THE MYSTERY OF THE SMALLPOX CASES IN THE LAFIT MOUNTAINS, EQUATORIA PROVINCE, SUDAN

by

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In January 1974, Public Health Officer Gaafar Kibaida, during active search for possible smallpox cases, discovered evidence of possible smallpox cases occurring as recently as November 1973 in the Lafit Mountains of eastern Equatoria Province, Sudan. If confirmed, this would have been 11 months after the last detected case of smallpox in Sudan. The results of the detailed investigations which followed are described as, previous to this episode, no more than eight months had elapsed in a country between detection of its presumed last case and discovery of a hidden, unsuspected focus.

Background

As recently as 1972, smallpox was highly endemic in many areas of eastern Equatoria Province, the part of the province east of the River Nile (Fig. 1). Smallpox eradication activities in this area were intensified when the agreement of March 1972, brought an end to civil disturbances in Southern Sudan. By June 1972, smallpox eradication efforts in Equatoria Province were in full operation. The last confirmed case of smallpox in Equatoria Province had an onset of rash in November, 1972; the last confirmed case of smallpox in Sudan was in Bahr El Ghazal Province and had an onset of rash in early December 1972.

During 1973-1974 extensive surveillance activities were conducted in Eastern Equatoria from the beginning of the dry season in December. The purpose of these activities was to make sure that no smallpox foci remained in the area. In December 1973, special surveillance teams thoroughly searched the eastern-most Kapoeta District. During the search, reports were received of current and/or recent smallpox cases, but investigations of these reports proved that they were groundless in every instance.

During January 1974, special surveillance teams under the supervision of P. H. O. Gaafar Kibaida actively searched Torit District. This district is particularly difficult because it contains a number of high and rugged mountain ranges. All are inhabited and most are known to have experienced smallpox epidemics as recently as 1972. In mid-January, evidence was uncovered of a smallpox chain of transmission that appeared to have existed in the Mura and Dorik areas of the Lafit Mountains (north-east of Torit Town) until as recently as October or November 1973.

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In February 1974, the WHO adviser travelled to the suspect area in the company of P. H. O. Kibaida in an effort to more fully document the outbreak.

The Lafit Mountains (Figs. 2 and 3) are a narrow range of mountains about 45 miles long, that run south-east to north-west. The mountains are not exceptionally high (the highest peak being 1939 meters) but they are very rugged. There are exactly 40 villages existing in the Lafit Mountains. Thirty-eight of these villages are located on the mountains themselves. One village (Lalanga) is located at the foot of the mountains, while another (Iboni) is located partly at the foot of a mountain and partly on the mountain. Most of the villages can be reached by a climb of about 30 minutes. On other mountains in Eastern Equatoria, small settlements are usually scattered randomly over the entire mountain, but in the Lafit Mountains almost the total population was found in the 40 villages.

From Torit it is possible to travel by road in a complete circuit around the Lafit Mountains (Fig. 2). From late April until November this road is not motorable due to the rains and thus visits to the area are normally confined to the period December to April.

The population of the Lafit Mountains

The Lafit Mountains are populated almost exclusively by the Lafit tribe. The Lotuka people to the west and the Taposa to the east are traditional enemies and so historically, the Lafit have not normally ventured far from their mountain homes. During the disturbances, however, most of the people became refugees and many settled in Kapoeta Town, some stayed in Torit and Juba and some travelled as far as Uganda. At the end of the disturbances in March 1972, the Lafit refugees returned and most of the present population consists of returnees.

Recent history of smallpox in Lafit Mountains

According to information gathered from villagers in the Lafit Mountains, smallpox cases occurred during 1971 at Loming and Lalanga, in the south-eastern section of the mountains. During 1972, there were smallpox cases in the area from Logotok to Megajik on the eastern side of the mountains and from Ngaboli to Idoli on the western side. The reported smallpox cases in 1973 were apparently confined to the Mura area, but may have included the villages of Dorik Mountain (Irenge and Locharo).

From this description it would seem that the 1973 cases of smallpox in the Mura area might have represented a progressive spread of an existing smallpox outbreak from other parts of the mountain range. It is equally possible, however, that smallpox was imported into the Lafit Mountains during 1972 from Kapoeta District, or that both occurred.

The last confirmed smallpox case in Equatoria Province was in November 1972, at Karkamugi in Kapoeta District (Fig. 2) where many cases of smallpox are known to have occurred that year. Karkamugi, Riwato and Maggos, the most densely populated part of Kapoeta District, are only about 50 to 70 miles from the Lafit Mountains. Taposa tribesmen frequently travel from the Riwato area to the Lafit Mountains with their cattle. In fact, during active search in the Lafit Mountains, some Taposa tribesmen were encountered. They said that they could walk to Riwato in two days from Lafit.

Smallpox could also have been imported to Lafit when the refugees returned from the Kapoeta area. It was not until June 1972, that Smallpox Programme personnel were able to begin work in the Kapoeta area and by that time, refugees were already being taken back to Torit District by lorry. It is worth noting that P. H. O. Hassan Babiker, who helped with mass vaccination efforts in the Lafit Mountains after the Mura focus was discovered, claims that some of the persons with pock marks of smallpox that he saw at Dorik Mountain were persons he had seen in quarantine in Kapoeta when he was working there in 1972.

Previous surveillance work in the Lafit Mountains

In February 1973, a WHO Adviser visited the Lafit Mountains with a surveillance team. The team was accompanied by a sub-chief responsible for the Megajik area of the Lafit Mountains. The team drove from Torit through Loronyo around the northern tip of the mountains to Megajik and returned by the same route. During this tour, the team vaccinated in Mura, Kabbirong, Lokobokobok, Lochara, and Irenge; that is, in the very villages thought to have had smallpox up to October or November 1973. However, no evidence of current smallpox was found during this tour.

Evidence supporting the view that smallpox cases existed in the Lafit Mountains during 1973

For search purposes, the Lafit Mountains can be considered to consist of ten separate mountains. On each of these mountains there are several villages, the largest of which is the headquarters for the mountain and the site of a school and medical facility, usually a dressing station.

The plan for search in the Lafit Mountains called for a visit to each of these main villages - Megajik, Mura, Irenge (on Dorik Mountain), Ngabole, Yaki Yaki, Lalanga, Logotok, Iboni, Ghaba, and Idali. It was during the course of these surveillance activities that the Mura focus was discovered.

The surveillance team was fortunate to have for a guide a known and respected Lafit man named Amadeo, who is headmaster at the school at Megajik and who is responsible for establishing sub-grade schools in all the Lafit Mountains. In addition, Amadeo is General Secretary of Lafit Union, a tribal organization responsible for establishing services in the area.

Mura village is located just north of Megajik in the north-eastern part of the mountains (Fig. 3). There are three villages in the Mura area - Mura, Kabbirong, and Lokobokobok. The population of these three villages is no more than 1000 persons and the population is distributed evenly among the three villages. The villagers have regular contact with the villages of Dorik Mountain to the north (Irenge and Locharo) but not much contact with Megajik to the south.

The villagers in the Mura area stated that there was an outbreak of smallpox in the area that apparently began some time during the latter part of 1972 and lasted until the end of November 1973. The date of the last surviving case can be fairly reliably placed as recovering during the first part of November 1973. Eight other persons having pock marks of smallpox were seen in the area who, when their case histories were related to that of the ninth person, could be presumed to have had smallpox in September or October 1973. These nine cases were all from either Mura or Kabbirong villages.

Two recovered smallpox cases were seen in Locharo (Dorik Mountain) who gave histories of having had smallpox in June and August 1973, but these cases could not be linked to the Mura cases on the basis of the information gathered.

No other recovered cases were seen in the Mura area, but there may well have been more. No house to house search was carried out to find recovered cases as many villagers fled into the mountains whenever the surveillance team approached their village. In addition to the nine definite recovered cases of smallpox in the Mura area, there were about 25 people who said they had had smallpox. None, however, had pock marks.

A list of 25 persons said to have died from smallpox between Christmas 1972, and Christmas 1973, was compiled through the questioning of villagers in the Mura area. All deaths occurred in Kabbirong village and six were said to have occurred after the onset of the last known surviving victim. Below is the list.

No.	Name	Age	Sex	Stage of Rash at Death
1.	Attori Ighie	45	F	12th Day
2.	Idowa Elwagba*	35	F	5th Day
3.	Khettig Simoni	6	M	4th Day
4.	Laitim Loadogha	1	M	4th Day
5.	Monia Atwari*	17	F	8th Day
6.	Ngidosie Victorio	6	M	4th Day
7.	Ngidosie Bitollo	7	M	4th Day
8.	Anyaiza Hiwarak	25	F	9th Day
9.	Oneogo Joseph	1-1/2	M	4th Day
10.	Ladieta Thomas	6 mos.	M	4th Day
11.	Ekingha Victorio	6	F	4th Day
12.	Hidodok Lewto	5	F	4th Day
13.	Ijovaih Lotum	6	F	8th Day
14.	Lokoro Oromo	30	F	5th Day
15.	Son of Idowa (No.2)*	3 mos.	M	5th Day
16.	Son of Idalieno	1	M	8th Day
17.	Logogho Ohghoio*	50	M	4th Day
18.	Hajanga Nario	7	M	8th Day
19.	Abbalore Masio	3	M	12th Day
20.	Imolala Lonyolo	2	F	8th Day
21.	Silvatore Loyata	3 mos.	M	4th Day
22.	Lolia Lotim	5	M	8th Day
23.	Lasor John	9 mos.	M	5th Day
24.	Saramiena Oatin*	35	M	2nd Day
25.	Aibala Badsiele*	1	F	2nd Day

* Said to have died from smallpox after the recovery of the last known surviving case.

Reliability of the information

Regrettably, the information provided by the villagers is of doubtful reliability. The villagers in the Lafit Mountains have little concept of time. They are not able to reckon according to dates or even according to the number of weeks or months that may have elapsed since a given event. Two events to which the people could relate were (1) Christmas, and (2) the cultivation season (e.g., beginning of the rains, end of the rains, end of the harvest). Smallpox victims were asked such questions as "How tall was the grass when you were sick?" and "How many Christmases have passed since you were sick?" The following is a discussion of the reliability of the key pieces of information supporting the view that smallpox existed in the Lafit Mountains during 1973.

A. Recovered case of smallpox said to have been infected in early November 1973

The most recent case of smallpox among the nine recovered cases seen in the Mura area was said to have been in the scabbing stage on 5 November 1973. This would place the onset of rash in the third or fourth week of October. This piece of information is one that appears to be reliable and is the primary basis for the belief that smallpox may have existed in the area during 1973. All other information, which is less reliable, has been considered in relation to this one, seemingly concrete fact.

The basis for confidence in the reliability of this piece of information is as follows. Amadeo, the guide, stated that he was in Torit Town on 5 November 1973, to collect his salary. Because the payment of salaries is an important monthly event, it is felt that Amadeo would accurately recall this date.

Because of his position, Amadeo is frequently contacted by members of his tribe whenever they have problems. On 5 November 1973, a man contacted Amadeo in Torit Town and told him that his son had a rash disease that at that time was in the scabbing stage. This information was not passed on to the authorities and was forgotten by him until he accompanied P. H. O. Kibaida to the Mura area and the story of the smallpox outbreak began to unfold.

The victim of the rash disease described to Amadeo, was seen by P. H. O. Kibaida in Kabbirong on 14 January 1974. The victim was a young boy (Lokinga) about 15 months of age who bore unmistakable signs of having had smallpox although there was no remaining depigmentation. He had no smallpox vaccination scar.

B. Placing the date of infection for the eight other former smallpox cases seen in Mura Area

For this task, the surveillance team had the services of a student on vacation from a Senior Secondary School at Rumbek. This student had been in the Mura area during the period September-October 1973. He had returned to Rumbek but came back to Lafit at Christmas time. This student, the recovered cases in question, and other villagers all placed the time of infection of these cases as prior to the infection of Lokinga. By relating the time of the infections to the harvest season, it was determined that the cases had all occurred during September and October 1973. The Rumbek student confirmed this and although he had not seen the active cases, he said he had heard of the cases at the time.

C. The two alleged 1973 smallpox cases in Locharo

The two alleged 1973 smallpox cases in Locharo cannot be substantiated satisfactorily. The two persons in question definitely were former smallpox victims. One of them, a teacher, said he had smallpox during August, 1973. The second person, a woman, said she was infected two months before the teacher. Other villagers seemed more than willing to agree with whatever the teacher said. The teacher was a man of marginal training. He may have had smallpox in 1973, but he might also have had it in 1972. These two cases could not be linked to those of the Mura area.

D. The list of deaths due to smallpox

The list of deaths was compiled by questioning the villagers of the Mura area. The villagers were shown pictures of smallpox and were asked if anyone had died while having the disease between Christmas 1972 and Christmas 1973. During the questioning it was learned that during the same period of time an outbreak of diarrhoea had occurred in the Mura area. This, however, was taken into consideration when compiling the list of smallpox deaths. Villagers being questioned were shown pictures of the stages of smallpox rash and were asked to identify the stage at which the patient died. All those said to have died before the early pustular stage were not considered to be smallpox cases.

Among the nine surviving 1973 smallpox cases, the last one to have been infected was Lokinga. During the questioning of the villagers, however, it was stated that there were six more smallpox cases in Kabbirong with onsets of illness after Lokinga but that they had all died. All six of these cases had been observed by at least one of the villagers questioned. The Rumbek student confirmed this story of six smallpox deaths after Lokinga was infected, but it should be noted that he was not present in the Mura area at the time they were supposed to have died. He said that he learned of the deaths and the cause of the deaths when he returned to Mura at Christmas time.

Of the 25 deaths on the list, the time of the first death could not be accurately established but since it was after Christmas 1972, and was the first of the 25 deaths, it is guessed that it occurred some time in the early months of 1973.

Summary of evidence supporting the existence of 1973 smallpox cases

The evidence for a 1973 outbreak of smallpox in the Lafit Mountains can be summarized as follows: (1) A young boy with definite physical evidence of smallpox and who can be said with fair reliability to have been in the scabbing stage of the disease during the first week of November 1973. (2) Eight other persons who also definitely had experienced smallpox and who gave histories of having had the disease during the two months prior to the time this young boy was ill. (3) A list of 25 people said to have died from smallpox between Christmas 1972 and Christmas 1973. This list is complete with names, ages, and stage of rash at death.

This evidence is fairly strong. However, there is enough contradictory evidence to cast some doubt on whether the outbreak in question occurred during 1973 or during the previous year.

Evidence contradicting the view that smallpox existed in the Lafit Mountains during 1973

This evidence can be summarized as follows:

1. Regina Idowa, one of the nine recovered cases, insisted that she had experienced smallpox during 1973, about two months before Lokinga, the boy who is said to have been in the scabbing stage of the disease during the first week of November 1973. Regina has a small child. When asked if the child was born before or after she developed the disease of smallpox, Regina stated that the child was born five days after she developed the rash. Other villagers, including the student from Rumbek, confirmed that the child was very small when Regina was ill. The onset of illness was established as September, based on the status of the harvest at the time she was ill. If this date is correct and if the child was born shortly after Regina developed the rash, the child's age at the time of questioning (February 1974) would be about 5 months. However, in February 1974, the child had a full set of teeth and was beginning to walk and thus was obviously more than one year of age. No-one seemed

able to reconcile the discrepancy. Assuming that the child was born shortly after Regina developed smallpox, Regina's illness occurred sometime late in 1972 or about one year earlier than the time claimed. If her illness was indeed two months before Lokinga's this would place the outbreak in 1972 instead of 1973. No amount of questioning was able to resolve this contradictory evidence. This proved most frustrating to the investigators.

Regina's child showed no signs of having had smallpox, although Regina insisted that he had. She said that because of smallpox the child had something wrong with its eyes. The child's eyes appeared normal, although he did seem to have some sort of trouble seeing and focusing.

2. During the visit of the WHO Adviser and his team to the Mura area in February 1973, no active smallpox cases were discovered. As the work of the WHO Adviser in question was notably thorough and reliable, it seems unlikely that he would have failed to discover the outbreak.

3. The high ratio of alleged deaths due to smallpox, compared to the number of observed recovered cases, is certainly unusual. This may reflect simply the unreliability of the information. It is possible also that many, if not all the deaths reported occurred earlier than 1973 and/or were due to an ailment other than smallpox.

4. Curious also is the fact that after the last recovered case there were said to be six additional smallpox cases, but that all were fatal. While it seemed probable from the information provided that the six did die after the infection of the last recovered smallpox case, it is not certain that these six persons died of smallpox.

5. Finally, it is worth noting that the youngest recovered smallpox case (and the last one, i.e. Lokinga) is old enough such that illness could have occurred in 1972 rather than 1973.

Measures taken to ensure that no active smallpox cases remain in the Lafit Mountains

In mid-January 1974, when P. H. O. Kibaida first encountered evidence of smallpox in the Lafit Mountains, he immediately contacted the SEP office in Juba which dispatched vaccination teams to the area. During active surveillance, all 40 villages in the Lafit Mountains were vaccinated and the villagers were questioned about the presence of smallpox at that time. Since almost the entire population (certainly more than 90%) of the Lafit Mountains resides in these 40 villages, the search can be considered very thorough. No evidence was found of current smallpox cases. A total of 3924 vaccinations was given during the mass vaccination of which 1586 were primary vaccinations. Obviously vaccination coverage in the area was poor prior to this campaign.

A further search will be conducted during the first week of April and, at the end of November 1974, a final search will be made.

Conclusion

During a routine surveillance tour undertaken in January 1974, a surveillance officer of the Sudan SEP uncovered evidence suggesting that active smallpox cases existed in Sudan during 1973. This evidence was uncovered in the Lafit Mountains of Eastern Equatoria, Southern Sudan. The focus apparently died out on its own. This information is of particular interest to Sudan SEP authorities because it had been felt that the last case of smallpox in Sudan occurred in December 1972.

The reliability of the evidence supporting the view that there were smallpox cases in the Lafit Mountains during 1973 is questionable and there is enough contradictory evidence about the time of infection to raise the possibility that the cases occurred in 1972 rather than 1973. On balance, however, it is felt that the evidence supporting the view that there were smallpox cases in the Lafit Mountains during 1973 is strong enough to warrant continuing careful surveillance.

While there is no smallpox in the Lafit Mountains now, it is certain that at sometime during the two-year period 1972-1973, there was smallpox in the Lafit Mountains that never came to the attention of Sudan SEP authorities. The chain of transmission may have sustained itself for more than a year and might have continued up to the present time. That it came to the attention of SEP Personnel, though belatedly, during routine surveillance activities in a difficult area demonstrates (1) that the surveillance team was doing a first-class job of active surveillance, and (2) the importance of carrying out thorough, methodical, and complete active surveillance even if more than a year has passed since the last confirmed case of smallpox.

FIG. 1 SUDAN


NORTHERN
KASSALA
KHARTOUM
BLUE
NILE
DARFUR
KORDOFAN
ETHIOPIA
UPPER
NILE
BAHR EL
GHAZAL
EQUATORIA

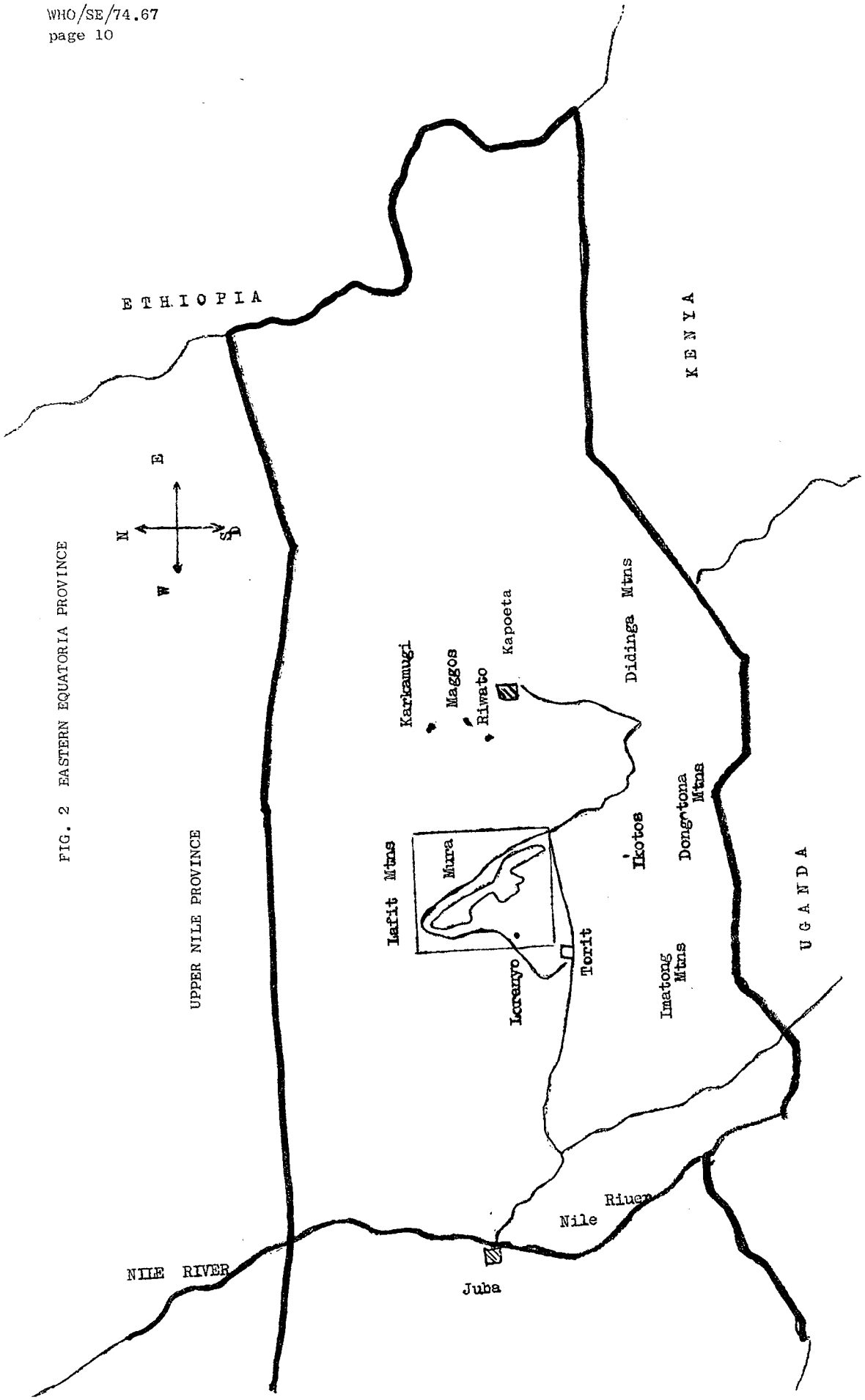
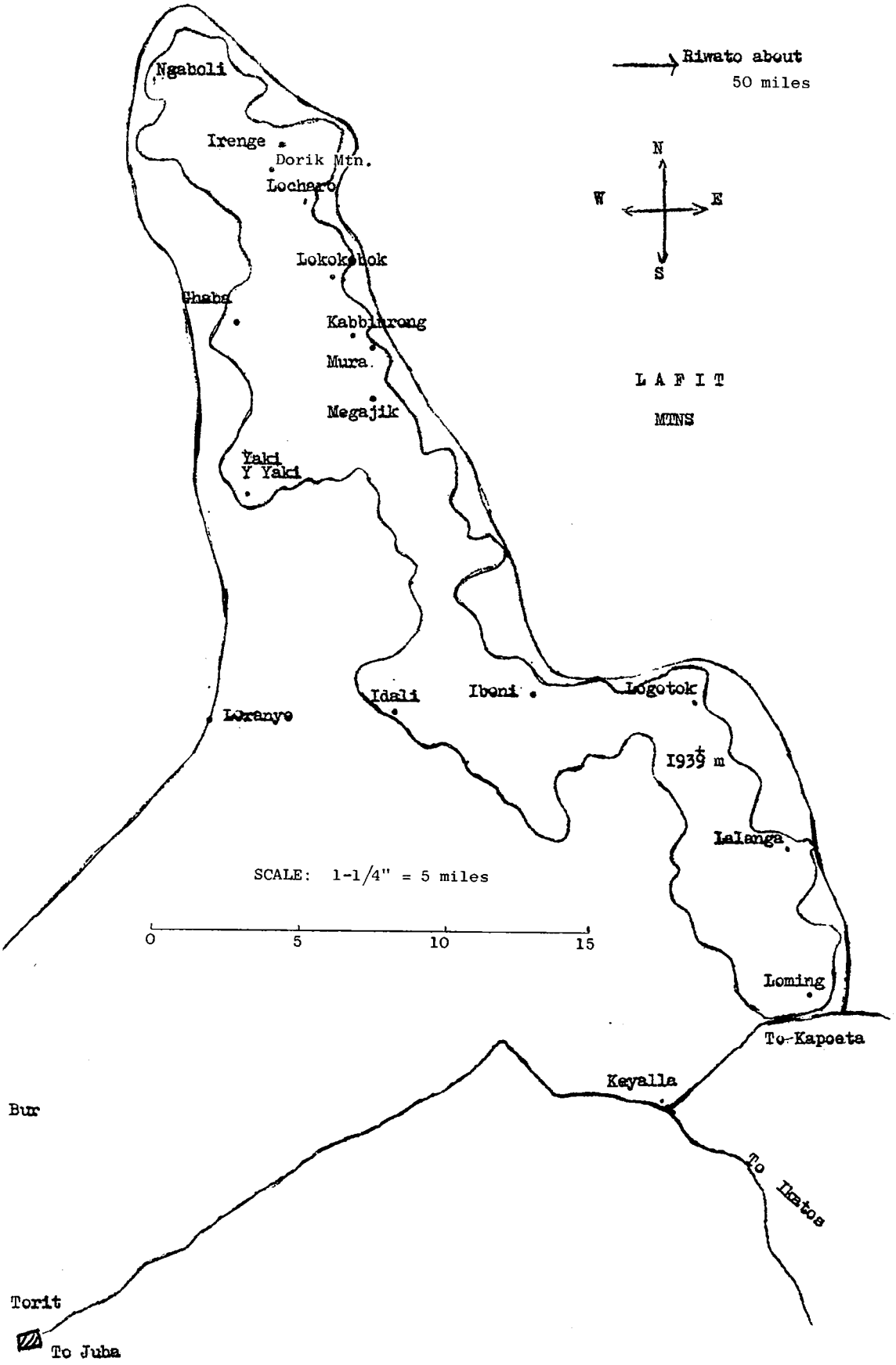


FIG. 2 EASTERN EQUATORIA PROVINCE

FIG. 3 THE LAFIT MOUNTAINS



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