

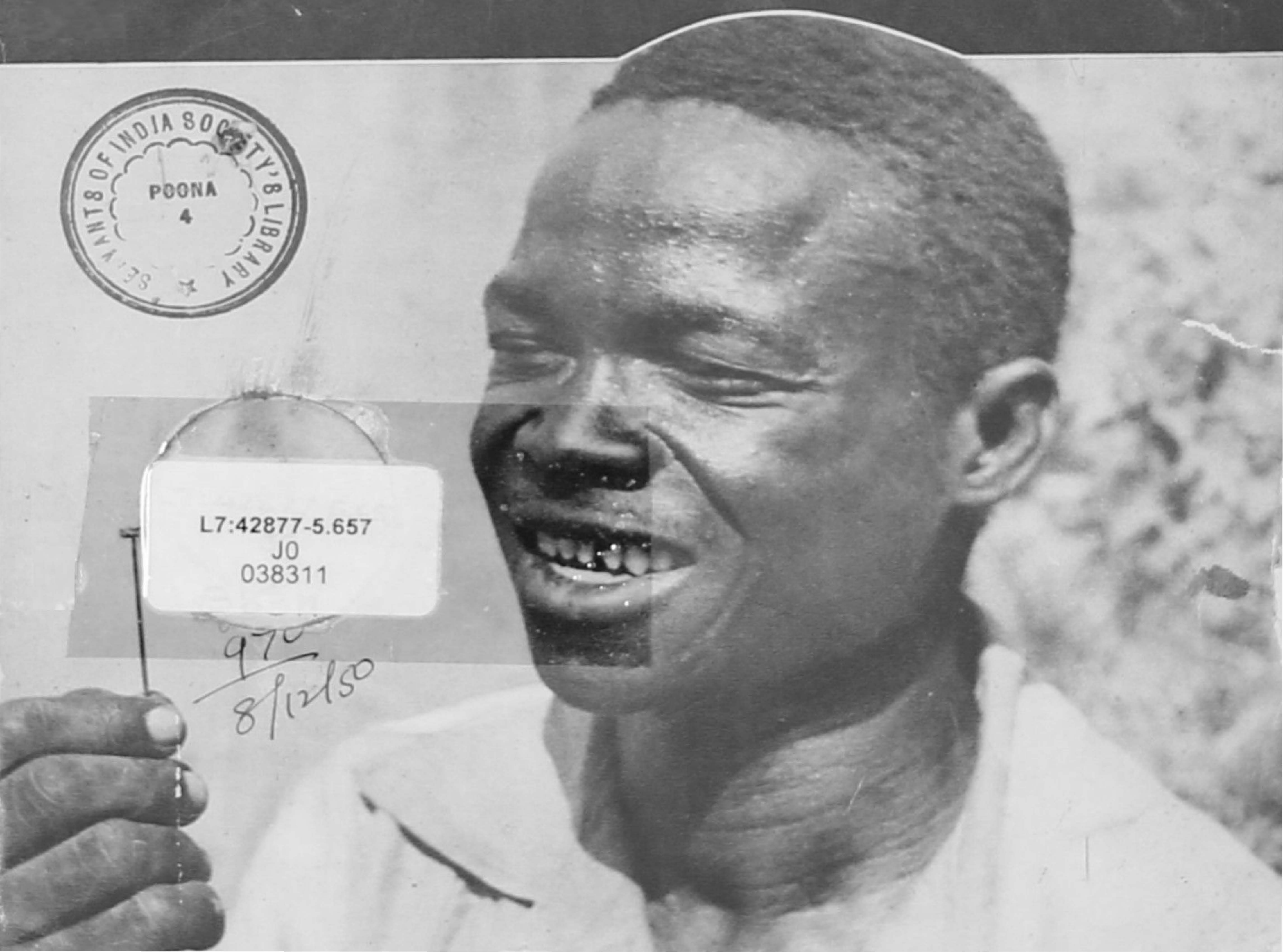
# FIGHTING A FLY

*The Story of the Campaign against  
the Tsetse in the Gold Coast*



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"Mallam" or "Professor" Ibrahim, as his colleagues call him, is the botanist in the Gold Coast's campaign against the tsetse fly. Here he examines the flowering shoot of a Shea Butter tree, one of the most valuable of trees in the Northern Territories. Expert knowledge of this kind is vitally important for ensuring the preservation of valuable timber and fruit trees when the bush is being cleared in the fight against the tsetse fly.

# FIGHTING A FLY

THE STORY OF THE  
CAMPAIGN AGAINST THE TSETSE  
IN THE GOLD COAST

*Written and illustrated with photographs by*  
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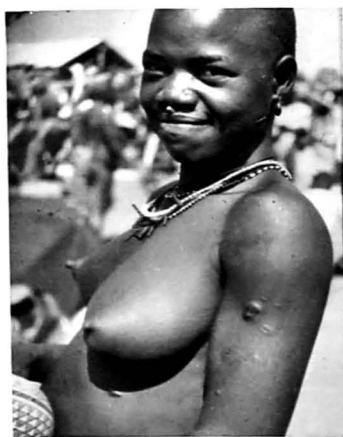


# THE PAST

The typical sleeping sickness case, a Lobi woman from Lawra, fallen asleep on the hospital steps while awaiting her turn in treatment. Such advanced cases cannot always be saved.

Ruins that follow in the wake of the disease. The last survivor, in 1938, of a village on the Kamba river that had been wiped out by sleeping sickness. Since the river was cleared of tsetse, in 1940-47, this village has been rebuilt.

# AND NOW



*Left:* A Lobi girl—formerly a sleeping sickness patient—now living happily in tsetse-free country. *Right:* A bright market scene in Topare, a productive town on the Kamba river which in 1938 was seriously threatened both in the health of its population and in the prosperity of its trade.

# FIGHTING A FLY

THE STORY OF THE CAMPAIGN AGAINST THE  
TSETSE IN THE GOLD COAST

by

K. R. S. Morris, D.S.c.

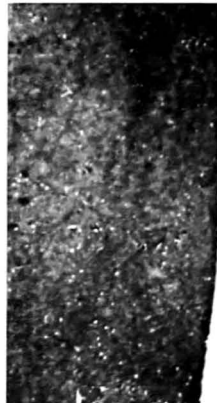
## The Crux of the Problem

**T**O live through a West African dry season is to understand why man's early civilisation developed on great rivers. Water is at a high premium in the vast savanna lands that lie beyond the Guinea forest. For six months of the year this country is held in a grip of arid drought. Not a drop of rain falls. The vegetation of the bush is parched and sere, and after the annual fires is left a blackened, leafless wilderness: no scorched earth policy could be more complete. The ground is baked to such iron hardness that to dig a small hole you need a crowbar! And if you go out at midday the heat literally rises up and hits you in the face. During this time of drought the only relief is to be found along the rivers, with their precious shade and still more precious water. It is small wonder that the existence of the inland tribes is bound up with the rivers.

So, in the north of the Gold Coast, beyond the Ashanti Forest, the three Volta Rivers and their tributaries form the very arteries for the life of the people. Here they get their water. The rich soil of the valleys affords them their best

## THE CAUSE OF THE TROUBLE

A tsetse fly (*Glossina palpalis*) feeding on a human leg. This is the fly that carries sleeping sickness to man and the similar "nagana" to cattle, sheep and horses.



farming and grazing land. Fish live in abundance in the deeper reaches. And those commodities on which their primitive household economy is based, timber, firewood, fruits, herbs and medicines, all can be found most easily along the rivers. Before the making of the roads these rivers were also the highways, and still are for the salt traders and fisher folk. Indeed, the French, who were the first to colonise the Upper Volta, in 1895, developed a regular barge traffic on the Black Volta whereby they revictualled their various outposts. But an alarming and fatal disease started up among the barge and canoe men, taking heavy toll of the crews and eventually spreading to the flourishing villages along the Volta itself. This was the dreaded sleeping sickness, carried from person to person by the tsetse fly, which swarmed in thousands in the dense vegetation along the river banks. By the beginning of the present century the disease had developed into a fierce epidemic, and most of the towns and villages along the upper Volta had been abandoned, those of the inhabitants who had not died shifting to new sites a mile or two

**HOW PEOPLE GET INFECTED.** Women and girls at a water hole in the middle of dense bush which is the tsetse's home. The flies will be biting one person after another, so if a person with sleeping sickness is among the crowd, the tsetse may easily pass on the infection to others.



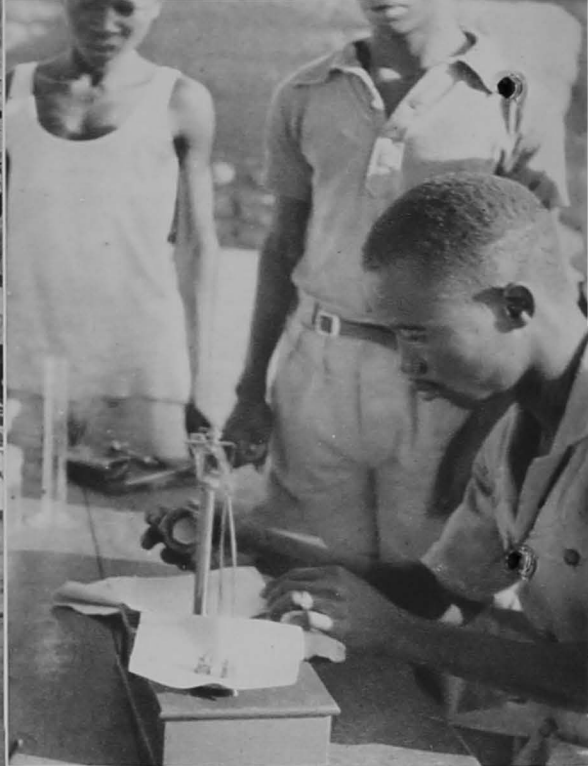


**HOW PEOPLE GET INFECTED.** A canoe crossing-place on a river whose banks are clothed with the thick evergreen bush haunted by tsetse in thousands which bite people whenever they come to the ferry.

back. It even forced the French to evacuate their headquarters, Kouri, the meeting place for their overland route from Senegal and their barge traffic on the Volta.

As the people moved back, however, they did not leave the waterside. They followed always the tributaries of the main river, as was inevitable in a country which is a desert for 6 months of the year. And here, also, were the river-haunting tsetse flies—so the fatal link was maintained, and instead of escaping from the menace, the people merely took it with them. During the next 30 years the spread became alarming, and by the time the French and the English had made thorough investigations, between 1937 and 1940, it was found to have developed into a pandemic with 30,000 square miles of country heavily infected—an area the size of Scotland.

The sickness was bad enough, with such severe depopulation being caused in places, but this was by no means the whole of the picture. In those parts



### TREATING THE SICK

*Left, top:* The inhabitants of every village are examined for sleeping sickness by skilled teams, built up and trained by Dr. George Saunders, O.B.E. In this picture the villagers are seen assembled in the early morning for examination.

*Left, centre:* The out-door pathological laboratory. Blood slides are taken from every person, stained, and examined under the microscope by highly trained African staff, usually from the same district.

*Left, bottom:* Those found infected are collected together on certain days when the mobile treatment team comes round to give them their injections. Note how half of the patients are dozing off.

*Above:* The drug for injection is weighed and prepared under sterile conditions by the mobile treatment team, who move round from village to village. Thus the sick have their treatment brought to them, instead of having to walk, perhaps miles, to a hospital. In this picture D. B. Venkumuni, who was awarded the Certificate of Honour for his work with Dr. Saunders, can be seen weighing out the drug.



which had been most heavily infected the people had by now left the river valleys altogether and were crowded onto the uplands and headwaters, the last places in Africa where a dense population is wanted. In the dry season there is no water nor grazing, and the farmland is neither adequate nor good. Over-population on these uplands has brought with it a host of evils; over-farming, over-grazing and deforestation, followed by erosion, poorer and poorer cropping, and resultant malnutrition, the root of so many of the African's ills. The only alternative is to move back to the river valleys, and this has happened in places. But the families which have moved back were doomed in advance. Renewed contact with the tsetse was bound to result, sooner or later, in the reappearance of the fatal sleeping sickness. Thus the tsetse fly has denied to the people those things most precious in Africa, water, grazing and good farmland. Its ravages are not to be measured in hospital statistics alone; the health and prosperity of the whole community are affected by its presence.

### **Facing Realities**

In a problem of such overwhelming human importance it is natural to turn first to solutions that give relief to suffering and stem the deadly toll in lives. By the nineteen-thirties there were several drugs that would cure sleeping sickness, especially if the patients could be treated in the early stages. But the possession of effective drugs is one thing, their effective administration is quite another. Their use in hospitals and treatment centres can save thousands of lives, but it cannot stem an epidemic of such magnitude; a sufficiently large proportion of the population is never touched in this way. There are the sick men at a distance, or those from small families who cannot be spared, these never attend or attend too late. There are also the early cases who do not yet feel ill. For this is an insidious disease, stealing silently upon the victim, who may be infected for several years before the onset of the typical sleeping symptoms cause him, or his relations, to realise that he is affected. There is an even more serious snag, inherent in the African's philosophy. He has his own doctors and his own medicines, in which he has the faith of long familiarity, and he is naturally not going to give these up for infidel, alien ways until he is thoroughly convinced. So it is no good waiting for the sick to come in, it is necessary to take our medicines to them, to make treatment as easy and as efficacious as possible. It was the Frenchman, Dr. Jamot, working in the terribly infected country of the Cameroons, who first put this idea into practice and developed the system of mass treatment. Teams of Africans are trained in precise methods of diagnosing the disease, involving examination of stained blood smears under the microscope, and in the preparation, under sterile conditions, of the drugs and their injection into the patients. All these processes are carried out under the rough and ready conditions of the bush, and the



#### RESEARCH ON THE TSETSE

*Left:*-Mallam Ibrahim, the Botanist, collecting specimens for the study of the particular vegetation of the tsetse's haunts. It is this exact study that has given the method of Selective Clearing by which the riverine tsetse can be quickly and cheaply eradicated from very big areas.

*Right:* Field Assistants surveying a river (the Kamba, Lawra District) for plotting accurate maps of tsetse distribution. Sleeping sickness was very bad here up to 1939, and one of these men, J. Aquah (sighting compass) has since died from this disease. The other, S. K. Sakara (taking notes) is still carrying on.

teams travel round the country, visiting every village, seeking out infected people and giving each one his proper course of treatment.

The splendid work of Dr. G. F. T. Saunders of the Gold Coast Medical Department in this field is now well known, especially in those districts of the Northern Territories and Ashanti where the disease has been such a menace.

Mass treatment on a large scale has had wonderful results, in both French and British Colonies, in reducing the epidemics to a low level, but it has not yet succeeded in finishing the job. Inevitably some cases are missed, others incompletely cured, and yet others will enter the country from places not yet dealt with. The tsetse is there to pass on these infections, and so the disease remains, not in spectacular amounts, but still a menace, and requiring constant vigilance lest a renewed flare-up should occur.

There is another, and very important, factor to be reckoned with. The fatal *nagana* of cattle and other domestic animals is carried by the same tsetse fly. Although there are resistant breeds of cattle in West Africa they are poor in physique and in quality and their resistance is never complete, but liable to break down at the least upset. So the tsetse not only brings its threat to human

life but prevents the keeping of good livestock and cuts off from the people the essential source of meat and milk for their diet, manure for their farms, and draught animals for the work. Here, then, lies the most serious failing in concentrating on the medical aspects alone. It leaves the river valleys still in possession of the tsetse. This is the enemy on which an attack has to be focused, an attack driven home to the point of extermination if the problem is to have a full and satisfactory solution.

### Preparations for the Attack

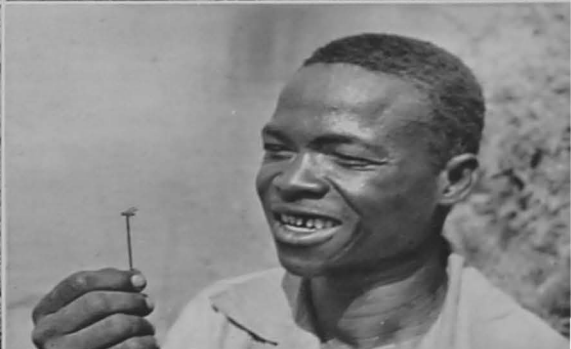
To arrive at the solution, the first essential was research on the broadest possible lines. Research conjures up pictures of well-equipped laboratories,

#### RESEARCH ON THE TSETSE

*Right, top:* Josiah Odobill, the trapping expert, with ex-Sergeant Braima Fulani, trap boy, examining a tsetse trap on the Black Volta. This special type of trap was developed during our experiments at Lawra, and is most effective, both for destroying dangerous flies at ferries, and for carrying on our observation on tsetse numbers and movement.

*Left:* Bang—down goes the net, and another fly is captured. The fly-boys, key men in the campaign, use themselves as bait, sitting patiently in the dense bush of the tsetse's haunt and catching the flies as they come to feed on their legs. But their work gives the essential basis for research on methods of attacking the tsetse.

*Right, bottom:* The Biter Bit!



rows of glistening bottles, balances and microscopes. There were none of these. The entomologist, faced with a problem of such magnitude and far-reaching effects, is not likely to get his answer out of a test-tube. His laboratory must be the vast African bush, his apparatus observation and deduction. For this it was necessary to get together a team of the right kind of observers. Here it must be mentioned that for the first seven years of this work the writer was alone, with no help but from Africans he trained himself, and finally, to get an assistant he had to marry one! And when the work started up in 1937, education in the north, where the big problems lay, was still in its early stages, and a well-educated Northern Territory African was in those days a rarity. The first work had to be done with boys who could only just read, write and add, or with complete illiterates. But in the work that now had to be undertaken, the location and catching of the flies, the study of the animals on which they feed, the recognition of the trees and plants of their haunts, the rural African is absolutely on his own ground, for he is a born naturalist. What is more, he is dead keen to learn and has that amazing memory of the isolated man, free from contact with Press and radio. Soon, boys with the education of a third-form schoolboy were giving in their reports with scientific precision: "Today 14 male and 5 female *Glossina palpalis* (our commonest tsetse) caught in a thicket of *Mitragyna inermis*"; and every one had learned better than to report having seen a "deer" or a "tiger" in the African jungle!

Thus a team of first-rate specialists was eventually built up. There is Ibrahim, the botanist, a Hausa of extraordinary ability, known as "Mallam", or "Professor", among his colleagues; his professional education started when, as a boy, he had to know the right kinds of grasses to cut for his father's horses. Basuglo, the chief naturalist, comes from such a remote village that it takes him four days to walk home, but he has imbibed, from uncles and cousins, every wile in hunting and trapping wild game and has a true hunter's instinct for predicting and interpreting their actions. Josiah, from a fishing village on the coast, has the fisherman's and sailor's neatness and practical ability, and after mastering every one of the team's techniques, is now the trapping expert. There is not space to mention them all. There are twenty skilled assistants who not only can identify the different species of tsetse and are familiar with their habits, but can take a survey team out into the field, maybe for two or three months on end, visiting the rivers and villages and recording accurately distances, directions, tsetse and vegetation and all those essential details on which knowledge has to be built up.

The most important of all, however, will always be the fly-boys. Many of them started twelve years ago, as mere nippers, at 4d. a day, and now have wives and families. But they are still fly-boys, working patiently day after day at a riverside swarming with tsetse, the nearby villages having, perhaps, 15 per

cent of their population suffering from sleeping sickness. They use themselves or each other as bait, catching the tsetse off their legs as they sit. Naturally some contract the infection. They are usually cured. This risk is inevitable and is accepted as part of the job, for only thus can the basic data on the life of the fly and its variations in seasons and localities be obtained. Such data will eventually give the clue for our attack.

### **Promise of Success**

In the first four years of the work, that is, by 1940, these teams of fly-boys, each under the fatherly charge of a fly-recorder, had surveyed 300 rivers and streams, spread over roughly 20,000 square miles of country. This volume of information was showing, quite clearly, the point of weakness in the tsetse's life-cycle which it might be possible to exploit on a large enough scale for mass extermination. These riverine tsetse, though ranging widely during the pleasant and cool time of the rains, shrink back to a narrow band of dense, evergreen thicket along the river banks under the harsh climate of the hot, dry season. They must seek out this cool, damp seclusion not only for their own survival but for that of their offspring. For the tsetse is not a prolific breeder, it produces but a single, full-grown larva at a time, and this will perish if it cannot find a suitable moist, sandy soil, well sheltered from sun and desiccating winds, into which it can burrow and spend a long, quiescent period as a pupa.

The experienced eye learns to recognise these breeding grounds. But exact study of their botany has shown something further. These dry season concentration sites are always marked by the presence of certain definite species of trees and shrubs which must, then, be essential for the survival of the tsetse here. The deduction is obvious. Remove these trees, and these only, and the tsetse and its pupæ must perish. Do this throughout a whole river system, leaving no dry season hide-outs for the fly, and the whole tsetse population of that area will sooner or later disappear. This is the method of Selective Clearing.

### **Success**

This method of tsetse control was tried out first on the Kamba River, a major tributary of the Black Volta, draining 600 square miles of the Lawra District in the extreme north-western corner of the Gold Coast. The recorders and fly-boys were well equipped to undertake this work—none better; they had been through all the initial stages of the investigation; their practised eyes were quick to spot the tsetse's haunts. So they were put in charge of the clearing gangs, 500 labourers were employed, armed with axes, machets, saws, and all the paraphernalia for bush clearance, and at the end of 1940 work was started. By the middle of 1942 over 100 miles of riverine vegetation had been cut and the last stronghold of the tsetse in the whole area had been cleared up.

The results were spectacular. Even as the area was being cleared the tsetse began to disappear, and by the time the whole river and its tributaries were dealt with, the heavy concentrations of flies that had so long held this valley as their stronghold had been completely wiped out. Now an experiment on the scale of 380,000 acres has more than a local value; it was hoped to base a much larger programme on its results, so it was essential to know exactly what was happening. For two years before clearing was started various points on the Kamba River were kept under constant observation and this observation has been continued ever since. Here are some of the facts gathered. In 1943, the first year after clearing, the biggest total catch of tsetse at any one point was six, and at many points it was one, two or nothing. Six flies in twelve months

#### ATTACK ON THE FLY

*Left:* Cutting out the particular type of evergreen bush along the river banks that forms the tsetse retreat. All the tall trees are left, but provided this form of Selective Clearing is carried out along the whole length of the rivers and their tributaries the tsetse die out completely.

*Right:* This Selective Clearing is a carefully organised technique and, if properly done in the early stages, subsequent maintenance is trivial. An important process after cutting the bush is to pile the brushwood and logs over the stumps and roots. These piles are left to dry completely before burning. A good burn will kill most of the stumps and save much subsequent trouble in maintenance.





#### ATTACK ON THE FLY

*Left, top:* Behind the lines. Each clearing section has its maintenance depot, which, as can be seen, is essentially mobile. It makes for high efficiency in clearing if the tools are kept sharp and in good repair.

*Left, bottom:* Maintenance of the clearings is now in the hands of the people, who turn out every third year and dig and burn any of the dangerous species of trees and shrubs that may be found regrowing. The Chief (left) is seen watching and encouraging the workers.

*Right:* Farming is the best form of maintenance and very many of the clearings are permanently reclaimed by farming. This is a real triumph, places which produced only tsetse 5 years ago are now producing crops of rice, beans, yams, and so on. The first picture shows an excellent crop of beans growing in a big Volta-side clearing. The second picture shows a garden with rice and bananas planted with contour ridging on the Furo stream close to Lawra.

of searching, in a place which had yielded from 3,000 to 7,000 tsetse a year, before clearing! In subsequent years, as the clearings became consolidated, even these few flies got scarcer and scarcer until during the past twelve months it has taken an average of 140 days for a boy to catch one tsetse. Whereas, on a neighbouring uncleared river, which has been kept under observation for comparison, 20,000 flies were caught last year, an average of 84 tsetse per day for one fly-boy. This is the true measure of the success of Selective Clearing.

The effect on sleeping sickness was equally striking. Over a thousand cases came to Lawra Hospital in 1938, and on injection days, once a week, a line

of patients 200 long stretched all round the hospital grounds, awaiting their turn. As an emergency measure, because of the gravity of the situation, the people were persuaded to turn out in hundreds, in 1939 and 1940 to clear, by communal labour, the dense bush around their waterholes and fords. The numbers of cases at once began to fall, and on the completion of full-scale eradication the fall became precipitate. In 1943 only 134 cases were treated and these came mainly from outside the cleared Kamba valley. There was no doubt about the efficacy of Selective Clearing, and during the next three years, that is, up to 1945, all the streams in Lawra District were dealt with in this way, giving 1,100 square miles of fly-free land. As was expected, the numbers of sick people fell and fell, until by 1949 only 12 cases were reported from the fly-free area, a 99 per cent reduction on the amount of the disease ten years ago.

What this means to the people can best be realised by looking at some of those villages where sleeping sickness was a serious menace at the time work was started. Villages on the Kamba River with populations of only 500 to 1,000 were sending in from 50 to over 90 cases a year up to 1938. During the past few years no more than one or two cases have come in from each of these villages; for the most part they are completely free. A severe epidemic started up at Tizza, centre of a good farming and grazing area just south of Lawra; 103 cases were reported from that town alone in 1938. Only one new case was found there in 1948. Most dramatic of all is the once prosperous little town of Gbare, which was being veritably wiped out by sleeping sickness. Between 1937 and 1939, 293 cases were sent to Lawra Hospital, and the population of 887 was halved by 1940. The tsetse were cleared out that year. In the past seven years this town has shown exactly five people with sleeping sickness, with not a single case since 1945.

### Following Up

The first, and the major part of the battle was won. There remained the task of consolidating and extending the gains. There were several objects in getting people back into the depopulated river valleys. The people themselves stood to benefit, agriculturally and economically. The population pressure on the overcrowded uplands would be eased. Most important of all, to have people living along the reclaimed rivers was the best insurance against a possible reversal. Man and tsetse are not compatible. When one gains the advantage the other goes down. We had already seen how the competition between tsetse and people for those vital waterways led to the latter's disappearance. Now that it was known how to get rid of the fly this very danger could be turned to man's advantage. The tsetse could be replaced by a healthy agricultural community who would, by their own activities in farming, wood cutting and so on, check the regrowth of the riverside thickets and so prevent any possible return of that pernicious fly.



To persuade the people to come back there was nothing to offer but advice! Resources in personnel and funds were not sufficient for elaborate schemes of settlement. Besides which it was still necessary to think in terms of the problem as a whole, in thousands of square miles. A solution which was expensive and which would require a large staff of experts could not be applied readily on so wide a scale. And does not elaborate planning tend to rob the African of those most valued qualities, initiative and responsibility? So advice was bestowed freely, with exhortations and cajolery. Judicious help was given here and there, with roads, dams, canoes at crossings, a pilot farm or two and a group of compounds where they were especially wanted. But behind the advice were the solid advantages offered by the riverside; the land, the timber, the grazing, above all the water. And so the people came trickling back, slowly at first, and always with some cautious attempts at farming before they settled. For the farmer the world over is the most conservative of men. He has to be; the test of his experiments may mean, not an empty larder, but an empty granary. The land proved its worth. Harvests on some Kamba farms were 40 per cent above the average for the district and showed much heavier yields than those from the impoverished uplands to the north. So the movement continued, and now 2,000 people have settled along different parts of the cleared river and 5,000 acres of new farmland have been broken. The cattle population of the district has more than doubled since the tsetse disappeared, and these herds are grazed and watered along the Kamba and its tributaries in places where their owners dared not take them ten years ago.

Meanwhile work has not stood still. A further 800 square miles of country have been freed from tsetse in the past two years, country containing two of the worst remaining epidemic centres in the north. Captain J. L. Stewart, the Director of Veterinary Services, gained 400 square miles of grazing in what was once heavily fly-infected country round the stock farms near Tamale. Damongo, headquarters for a projected Pilot Scheme in mechanised agriculture, has been given complete protection by a series of well-sited clearings. In all, 2,300 square miles of land have now been reclaimed, and the programme for the next few years aims at 500 square miles a year, or more if staff can be obtained.

What does all this cost? The first 1,100 square miles of Lawra District was rendered fly-free at an all-in cost of £4,500, and this has affected a population of 63,000 persons. One and fivepence a head is not a high premium. Since then prices have trebled and more, but even so, it costs only £15 to reclaim a square mile of country, less than 6d. an acre. What is equally important, the problem of maintenance is being solved by the farmer himself. Half the clearings are permanently reclaimed by cultivation, and instead of producing tsetse flies the streams and marshes are growing crops of millet, yams and rice. The rest are being looked after by communal labour, each chieftainship turning out its



*Left: THEN . . .* A branch of the upper Kamba river, in 1938, before clearing. The river banks are fringed with that dense tangle of vegetation which harbours innumerable tsetse, so the people were constantly bitten as they drew their water or washed. The neighbouring town of Ulu had 93 cases of sleeping sickness that year.



*Right: . . . AND NOW.* The same spot after clearing—the people free to draw water, wash and linger by the waterside without danger of a single tsetse biting them. Ulu has had only three cases of sleeping sickness in the past 5 years.

menfolk every third year to cut and burn any possible regrowth of black-listed shrubs. Thus, staff and resources can be deployed elsewhere, and the policy of attack is not slowed down by calls for defence. This is counted the real triumph in the work. An enemy is not properly conquered if he needs constant occupation forces to hold him down.

The final chapter starts, appropriately enough, where the story began, across the River Volta. Health and sickness observe no international boundaries. The Black Volta, which divides French territory from British, instead of dividing their problems forms their very backbone. So, since 1940, the Gold Coast workers have been in touch with the workers on the French side, and out of this has developed a close and harmonious co-operation. Results have been compared, work co-ordinated, and some of the French workers have been trained in "le Selective Clearing", which is now an accepted part in their own programme of control. The latest visitors were from Nigeria. This year their sleeping sickness entomologist came over at the time clearing was in full swing, to see what could be applied to, or modified for, the great problems of that country.

## Fresh Fields and Pastures New

The lure of this great continent has never been better expressed than in that old Greek proverb: "Africa always produces something new." This is the fascination that drives the enthusiast on, despite the difficulties of isolation, despite the discomforts of utterly primitive surroundings. The big problem to be faced now bristles with difficulties. It is the problem of the notorious game tsetse, *Glossina morsitans*, the first tsetse to be described, the bane of the voortrekkers and the early explorers. Their oxen died by hundreds when they entered the vast tracts of country occupied by this pest and known as "fly-belts". Horses were almost impossible to keep. It is not too much to say that it was the game tsetse that delayed so much of the early exploration, and certainly the opening up of East and Central Africa.

In the Gold Coast this *morsitans* and a close relative occupy 44,600 square miles, or two-thirds of the open country that might otherwise support valuable

**Left: HAPPY ME ...** The happy farmer, who settled on the Kamba river after it was cleared, and is getting crops a month or 6 weeks ahead of his friends who have remained on the overcrowded up-lands near Nandom and Lawra.

**Right: ... BUT NOT ME!** The dichard. A farmer who has refused to return to the cleared Kamba valley, but stays on in the village of Piri, meaning literally "a stone", situated on the uplands north of the Kamba river. It was to these upland villages that people from the badly infected Kamba region moved 10 to 20 years ago, when sleeping sickness was at its worst. Thus has arisen serious over-population and soil erosion problems in places such as Piri, with poorer and poorer harvests for the people. This photograph was taken on July 10th, 1949, the same day as the preceding picture, and it shows unmistakably the poor growth of corn in contrast to the farms in the cleared Kamba valley.



herds of sheep and cattle. Its characteristic of feeding mainly on game confines it to the wildest and less peopled places. These are the very places that offer the greatest opportunities for expansion and development. So, with an expanding population and the developments that are afoot, man and tsetse are likely to meet again in conflict. This time man will be prepared. Already the first success

*Top:* Harvest home from a farm on the Kamba at Lyssa, where the crops were 40 per-cent. above the average for the Lawra district.

#### FOOD IN PLENTY . . .

*Bottom:* Cattle can now water and graze with impunity along the cleared Kamba river, in places where their owners never dared take them before, when the water was hemmed in by the tangle of dense bush that held lion and leopard as well as tsetse in thousands.





... AND FISH!

Fishing, both amateur (*left*) and professional (*right*) is now a safe (and happy!) occupation on the Kamba river, with the impenetrable fringing bush, that held so many tsetse, now cleared away.

has been scored against *Glossina morsitans*; 160 square miles of land have been reclaimed and held. But one success alone is not being relied upon to guide in the bigger operations ahead, and so the research goes forward. This means, studying the tsetse *on its own ground*, which, of necessity, takes the worker into the wildest country, often trackless, with, maybe, 20 miles to the next village, if you are lucky and get your direction right!

This is being written in camp, after the carriers have had to do a trek of 20 miles which the map showed as 12. As the rain patters down, cook, in his bivouac, is making hartebeeste stew, most nauseating of meat, over a damp and smoky fire. Over in their own tent the fly-boys are joking and chatting away as they roast their hartebeeste steaks. Thirty days a month, and for a good many months in the year, they carry on cheerfully under such conditions. Here, after all, are the people who really count in the fight against the tsetse—these boys and their fathers, uncles and cousins—the hardworking, farming population of the north. Give them a lead, work out measures that can be incorporated into their ways of farming and living, build up healthy and prosperous communities, and the tsetse and all the evils that it brings will disappear. It has happened before. It is not too high a target for our aim today.



*Above:* Field Headquarters in the middle of Tumu district, miles from anywhere. A camp from which survey is carried on, with the cook's bivouac and the fly-boys' tent in background.





Dr. K. R. S. Morris tells you in this booklet something of the story of the campaign against the tsetse in the Gold Coast. Dr. Morris and his wife, Dr. Marjory Morris, Research Assistant in the department, have devoted many years to this work.

*Extreme left:* INTERNATIONAL ASPECTS. The Black Volta river, which divides the Gold Coast from the French Ivory Coast, instead of dividing our problems forms their very backbone. So international co-operation has been maintained since the beginning of the work. The French entomologist, Dr. Vilain, is stepping ashore on the Gold Coast bank of the Volta close to Lawra (the French bank in background), on a visit when he and his assistants spent some time studying our methods of tsetse control. Selective clearing is now an accepted method in their campaign. *Left:* Dr. Vilain is seen sitting outside our Lawra Laboratory next to Dr. Marjory Morris, who is Research Assistant in the Department of Tsetse Control. Standing right to left, are A. C. Nyante, now promoted to Administrative Assistant; one of Dr. Vilain's assistants; S. K. Sakara and B. K. Basuglo, Field Assistants; and seated on ground is Mallam Ibrahim, the Botanist.

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