

TANGANYIKA NOTES AND RECORDS

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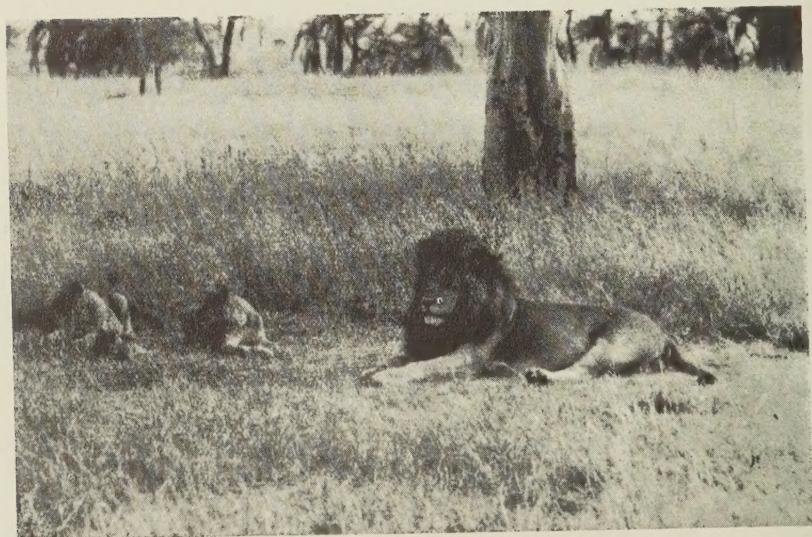
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Game Studies.

Editorial Note

IN PRESENTING the fourth number of *Tanganyika Notes and Records* it is gratifying to be able to record a continued increase in the interest taken abroad in the journal. Applications for back numbers from Europe and America have been so numerous that copies of our first issue are no longer available. It is, however, of even greater importance that our local circulation should increase likewise, and subscribers are urged to point out to acquaintances who may borrow their copies the advantages of buying their own.

Mr Norman Forster has pointed out an error which appears in his article published in our third number entitled "A Note on some Ruins near Bagamoyo." The recesses of the panelling illustrated in Fig. 4 are described in the letterpress as measuring "nine feet by six feet." The description should have read "nine inches by six inches." We offer our apologies to Mr Forster and to our readers for this mistake.

The Introduction of Trout into Tanganyika

By H. Fraser

THERE are few pastimes more fascinating than trout fishing and fewer still which can give unfailing enjoyment to people of all ages. You can begin trout fishing when your hand is large enough to grip the butt of a rod, and when it is palsied with old age you will continue to cast your line with unabated keenness. But it is not necessary to begin young; the art can be acquired at any time in the course of one's life, and if the opportunity does not present itself early the only regret is for the years of enjoyment which have been lost.

The fascination of trout fishing is not only in pitting man's knowledge and cunning against nature, and in the thrill of capture, but his sport leads the fisherman into the most attractive places, for the instincts of the trout require it to live in the more secluded streams where the water comes clear and cool from the mountains. The sound of the stream as it splashes over rocks and gurgles round the moss-covered boulders, and the glint of it when caught by a ray of sun struggling through the trees, are in themselves sufficient reward for an arduous walk over rough hill paths.

The appeal is, therefore, so great it is little wonder that when certain keen and irrepressible fishermen first set eyes on the charming streams of our Tanganyika mountains they swore by all the gods of the Salmonidæ that they would not rest until they had them teeming with lively trout. They well knew the difficulties of the task they had set themselves, for is the trout not one of the most fastidious of all the fish tribe, inhabiting only the clearest brooks and the least accessible lochs and streams in the colder parts of Europe? Yet these pioneer fishermen of Tanganyika proposed to bring their future prey across the Equator and settle them in streams in Central Africa.

I shall describe how they accomplished their task and how by experience the technique now followed in raising and transporting trout fry in Tanganyika has been evolved. A brief description of the life history of the trout is necessary to give a proper understanding of how this apparently impossible undertaking was carried out.

In the spawning season the female makes her way up-stream in search of a gravelly bed (known as "redds"), where with a fanning movement of her tail and aided by the current a hollow is scooped out. Here the ova are extruded and fertilized by the milt deposited by the male fish. Several hundred fertilized eggs develop at each spawning place, the rate of development being governed by the temperature of the water. At fifty-four degrees Fahrenheit ova take forty-five days to hatch, two days longer for each degree colder and two days shorter for each degree warmer, up to a limit of sixty to sixty-one degrees, over which they will not hatch at all. At forty-two degrees

incubation is arrested but development is resumed as soon as the temperature rises above this point. Under natural conditions in Europe, therefore, ova fertilized in autumn do not normally hatch out until the temperature of the water rises in the spring—a wise provision of nature which synchronizes the birth of the trout with the emergence of the insects on which it feeds.

The hatching egg releases the alevin which is about half an inch long and has a semi-transparent bag, known as the yolk sac, attached to the forward part of the abdomen. At this stage the young fish is unable to feed but derives nourishment from the yolk sac, which is gradually absorbed as the alevin increases in size. At the end of ten days the yolk sac is completely absorbed and the young fish, which is now about three-quarters of an inch long has to fend for itself. It now begins to feed on microscopic organisms in the water and, as it grows, small aquatic and semi-aquatic insects are taken. The rate of growth, however, depends on the quantity of food available.

In trout hatcheries in Europe artificial spawning grounds are laid down and “eyed ova” can be purchased. An “eyed ovum” is the trout egg which has reached that stage of incubation when the eye of the embryo is visible through the semi-transparent shell as a small black dot about the size of a pin-head. The ovum at this stage is the size of a small pea, the healthy egg being translucent and the dead egg readily distinguished by its yellow or white opaque appearance.

In the eyed stage the embryo is protected from jars and jolts by the horny outer shell and is capable of withstanding very low temperatures. Taking advantage of this condition therefore, the eyed ova can be purchased from a hatchery in batches of several thousand and shipped in cold storage to the most convenient port in Tanganyika. The box in which the ova are packed contains a number of perforated trays on which the ova are laid and protected with damp moss. Between the trays and the side of the box there is a space of about three inches which is kept packed with ice. In spite of the low temperature the ova are very liable to attack by fungus and this necessitates careful daily examination of the trays throughout the voyage and the removal of all dead and infected ova.

Before a batch of eggs is entrusted to the tender care of the ship’s butcher, however, considerable organization is necessary, and as is so often the case in dealing with nature, things do not always work out according to plan. A mild winter in England may result in rapid development of the ova which would lead to their arrival in Tanganyika during the rains when rapid transport from the coast to the potential trout stream is liable to be fraught with very considerable difficulties. In these circumstances it is sometimes necessary to obtain the ova from Norway so that the eggs arrive in Tanganyika in May or June when the water here is cooler, and transport arrangements are less liable to be disorganized.

Rivers suitable for stocking have to be carefully selected. The water temperatures are taken at different times of the year and the beds of the streams

examined for food and suitable spawning grounds. If a number of streams over a wide area are to be stocked it is necessary to select a site and erect a hatchery, but if only a single stream is to be stocked the ova may be hatched out in specially constructed boxes placed in the stream itself.

The site selected for a hatchery is generally accessible by a motor road to facilitate rapid transport of the ova and of the fry when the time comes to move them to the various rivers and streams. The building is erected on a piece of level ground at the stream side and so situated that water can be led from a point higher up the stream and pass through filters, splash box and hatching troughs. The lay-out of the apparatus required for a complete hatchery comprising hatching troughs, and ponds to accommodate the fry, can best be understood by reference to the sketches on the following pages. The filter boxes, splash box, and troughs are made of one-inch boards and the only other materials required are four lengths of three-inch piping, a few barrels of cement, some perforated zinc, and a liberal quantity of nails and tin-tacks. The filter boxes, splash box and hatching troughs are painted with a black varnish to facilitate cleaning and to prevent fungal infection, but no preservative containing tarry constituents may be used.

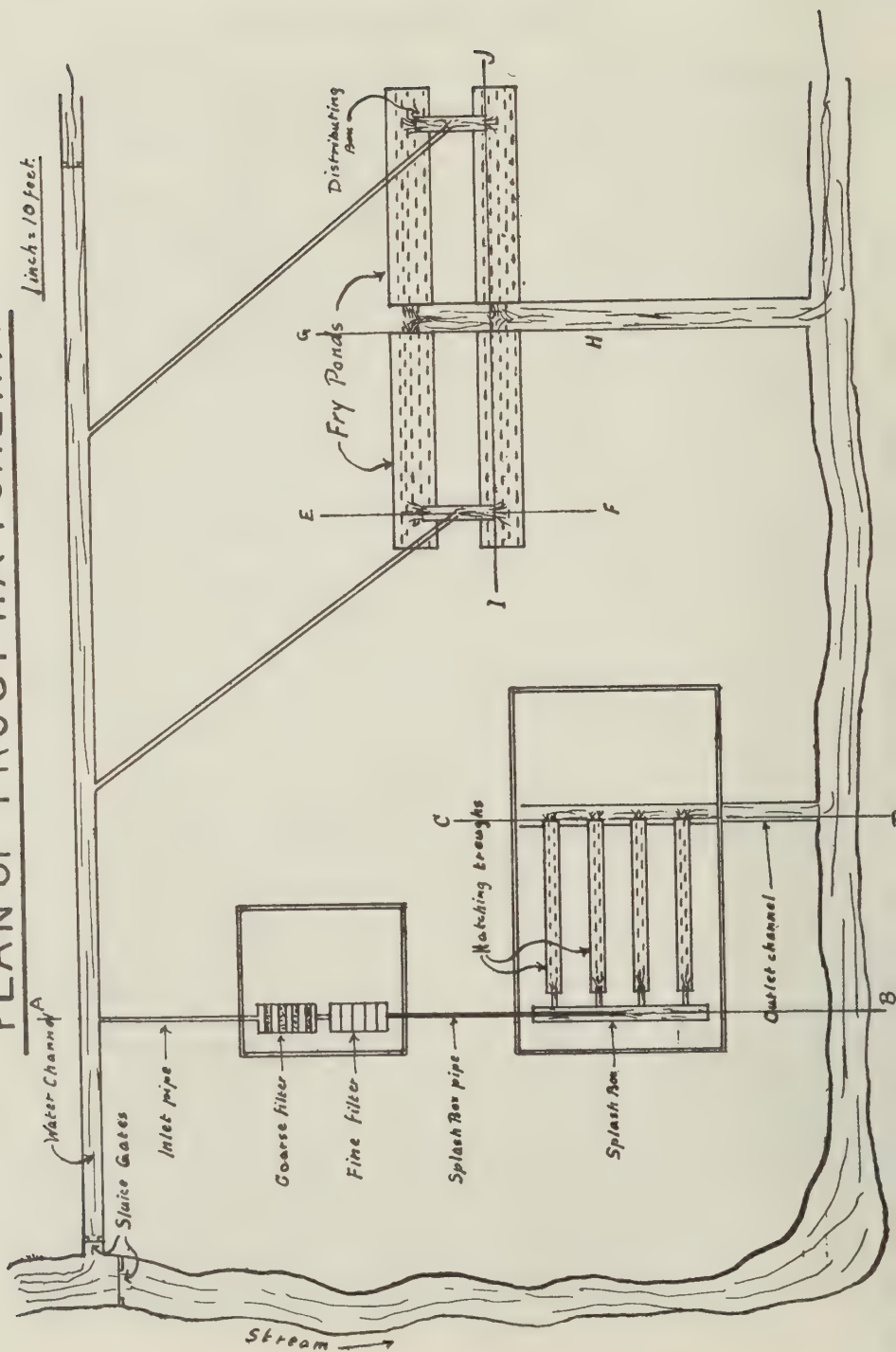
When the construction is complete a trial is necessary to ensure that an adequate flow of water passes through the hatching troughs and that the filters are working properly. The coarse filters are comprised of a number of frames stuffed with coconut fibre and the fine filter consists of several flannel screens. The filters can readily be removed for cleaning. The object of the filters is to prevent silt carried down by flood water reaching the hatching troughs and injuring the ova or alevins.

On arrival at port of a consignment of ova the box is packed with fresh ice and conveyed by the quickest possible means to the hatchery. The usual method is to convey the box by air to the nearest landing ground and thence by motor car. An additional supply of ice accompanies the travelling box to replenish that used in packing, and for use at the hatchery.

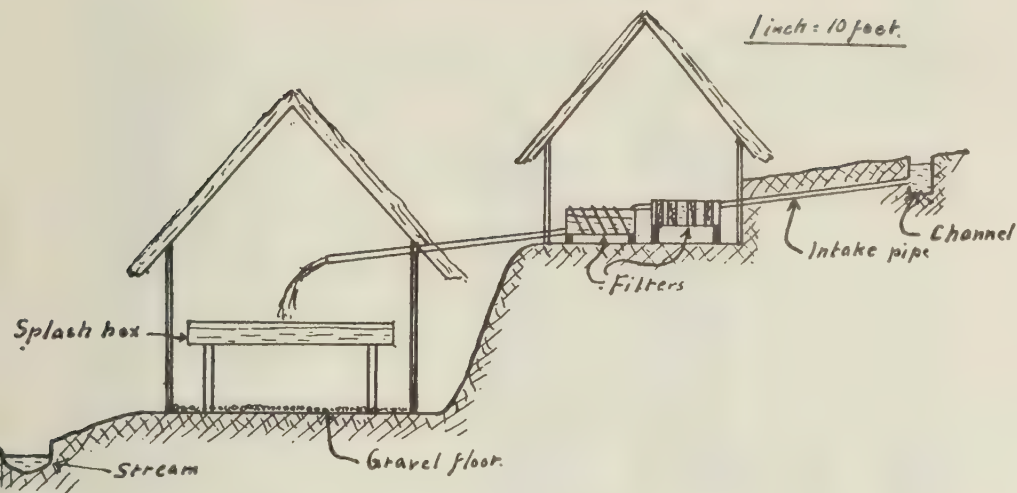
When the ova have been brought safely to the hatchery they are taken from the trays and placed in water, which by means of the ice has been brought to the same temperature as the inside of the box. Water is then added very gradually until the temperature of the ova is brought up to the temperature of the water passing through the hatchery. That is, from approximately forty to fifty-seven degrees Fahrenheit. The process should take from three to four hours. When they have been brought to the required temperature the ova are laid carefully in the boats in the hatching troughs where a continuous stream of water passes gently over them. The flow is regulated so that the ova are not unduly disturbed or swept together in a bunch at the ends of the boats. The eggs are now carefully gone over and all the dead ones are picked out. The most convenient way of doing this is to draw them out with a piece of quarter-inch glass tubing operated like a pipette. The dead eggs are counted and the number removed noted at the end of each day. In this way any

PLAN OF TROUT HATCHERY.

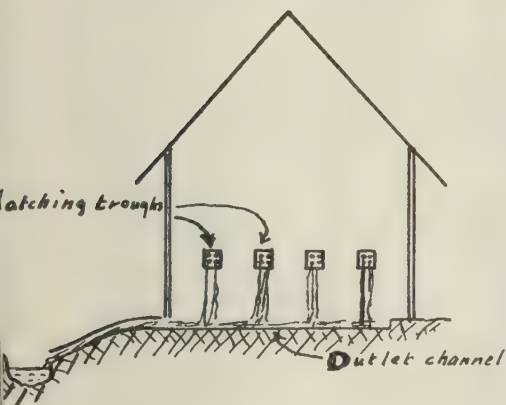
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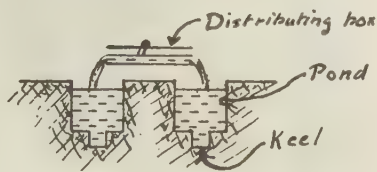
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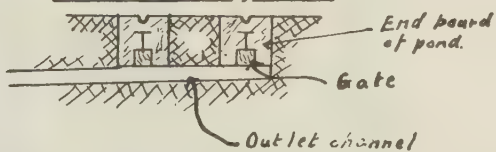
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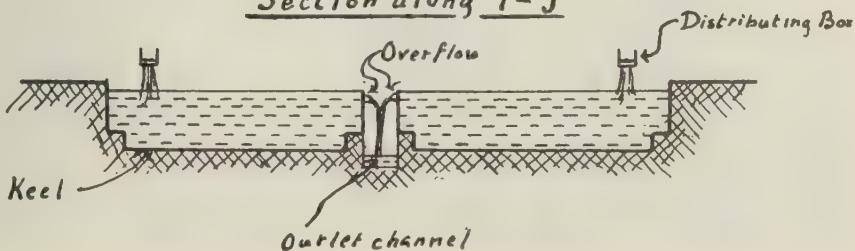
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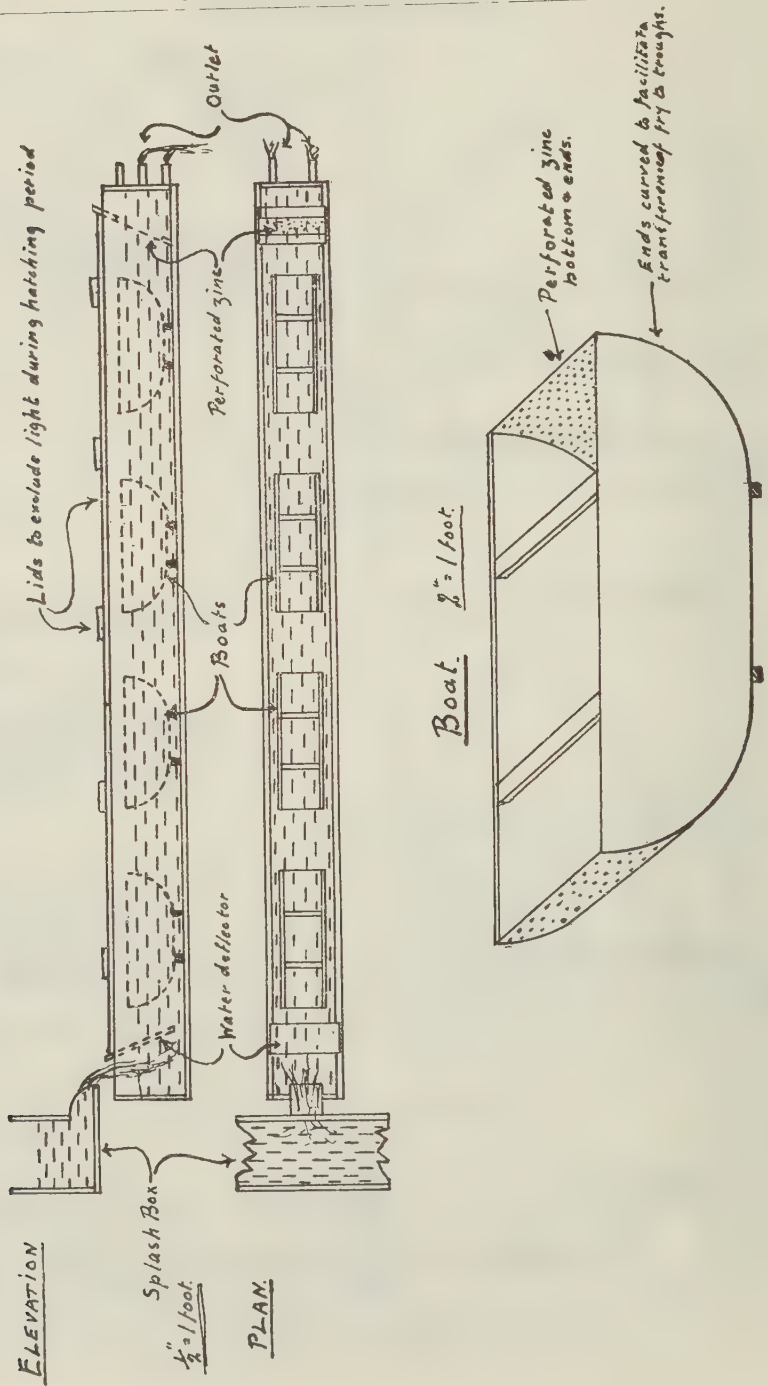
Section along G-H



Section along I-J



Detail of Hatching Trough.



abnormally high death rate is promptly observed and the cause investigated. The temperature of the water in the hatching troughs is taken morning and evening and also recorded. During the hatching period lids are placed over the troughs to exclude light.

Under normal conditions the water temperature is fifty-six to fifty-eight degrees Fahrenheit and the eggs begin to hatch three to four days after being laid down in the hatching boats. The horny shell of the ovum splits, the head of the alevin appears and as the split lengthens the tail is freed. After a vigorous struggle the yolk sac is finally released from the shell and the emergence of the young fish is complete. It not infrequently happens, however, that the alevin has some difficulty in freeing itself from the shell and has to be helped by a gentle flick with the end of a feather.

During the first few days the alevins lie on their sides, congregated together in groups, but as the yolk sac is absorbed they become increasingly active. When newly hatched the alevin is about half an inch long and it has grown about one-tenth of an inch by the time the yolk sac is absorbed. This normally takes about ten days and when the supply of food material contained in the yolk sac is almost exhausted the young fish begin to separate, swim dorso-ventrally, and hunt round the boats apparently in search of food.

By this time all that remains of the yolk sac is a slight swelling in the forward part of the abdomen. The reserve supply of food material which it brought with it from the egg has been consumed, and the young fish must now learn to feed itself. At this stage it is necessary to begin supplying food in a form easily taken up by the young fish. The most suitable food is parboiled chicken's liver which is grated into the hatching troughs and drifts through the water in a thick cloud. The young fry will soon be seen darting to and fro seizing the morsels of food. It is essential that the food be reduced to very fine particles or some of the fry will be found to take pieces larger than they can swallow or digest, with fatal results. Hardboiled egg is also sometimes fed as fry food but the dietetic properties of liver are much superior.

Among every hatch of alevins there is always a number of "spinners." These are alevins which do not straighten out when hatched but remain curled up in the embryonic form. They can live until the yolk sac is absorbed but then they die of starvation as they can only swim with a spinning motion and are unable to dart and seize the food as it drifts past them. "Spinners" are therefore removed as soon as they are observed in the hatching troughs.

For the first fourteen days from the time the eggs are laid down the hatching troughs are examined four times daily and all casualties removed. Normally the death rate will be found to be heaviest during the hatching period, and early in the feeding stage, when a number of the weaker fry are tilted out of the boats and given the free run of the hatching troughs. At this stage it is a good plan to grade the fry, placing the largest and smallest in separate troughs, otherwise there is a danger of the strongest seizing all the food at the expense of the weaklings. The fry are fed six times a day and the

troughs cleaned out twice daily to get rid of silt and uneaten food. When the fry are one and a half to two inches long they may become overcrowded and should be removed to the fry ponds, which are situated in the open, close to the hatchery building, as shown in the sketch of the lay-out of the hatchery.

Convenient dimensions of the ponds are fifteen feet long, three feet wide and three feet deep. Each pond has a recess or keel one foot wide, and one foot deep running down the centre. A gate is provided at one end of each pond to allow the water to be drained off, but is so placed that the keel cannot be emptied of water. When fry have to be removed from the ponds therefore, the water can be drained off, and the fish can be more easily netted in the confined space of the keel. The ponds have to be cleaned out about every second day and the keel enables this to be done without removing the fish.

When the fry are first transferred to the ponds they are distributed according to size to avoid unfair competition for food. Feeding is continued in the ponds but now they are able to take large particles of food and minced ox liver can be substituted for fowls' liver. Freshwater crabs can probably be found in the stream and these broken up make excellent food and are readily taken by the fry. On one occasion a swarm of locusts came down near a hatchery and for once this pest was made to serve a useful purpose. Thousands were caught, put through a mincer and devoured voraciously by the trout.

Artificially reared fry average two and a half inches three months after hatching. The size at which they should be put into the streams depends on circumstances. The larger the fry the better their chance of survival when they are required to fend for themselves, but when the streams to be stocked are situated at long distances from a hatchery the transport of fry over three inches is expensive since they require much more space than the smaller fish. It is usual, therefore, to keep fry destined for nearby streams in the ponds until they are four to five inches long and transport those for distant streams when they are two to three inches.

The stocking of streams a hundred miles or more from a hatchery necessitates the use of an apparatus for aerating the water, and fish must be protected from being hurled violently against the sides of the containers during the journey. Fry are transported in eight-gallon or four-gallon milkcans which are fitted with cylindrical flannel bags weighted at the bottom and prevented from sagging by means of wire hoops. The cans are filled with fresh water and the fry are netted into the flannel bags. A four-gallon can will take seventy-five fry two to three inches long and an eight-gallon can, one hundred and twenty-five. For a journey which may take six hours or more it is necessary to maintain the supply of oxygen in the water. This is effected by means of the aerators, which are pressed steel cylinders three feet long and six inches in diameter. The cylinders are fitted with a motor tyre valve and an outlet tap, such as is used on a pressure lamp, by which the escape of air can be regulated. From the tap air is led by rubber tubing through a hole in the lid of the milkcan and attached to a filter candle. The cylinder is filled with compressed air up

to a pressure of about seventy pounds by means of a motor car pump and when the tap is opened the air passing through the rubber tube is distributed evenly through the water by the filter candle. A pressure of seventy pounds is sufficient to aerate the water for about three and a half hours. It is necessary to stop from time to time during the journey to see that air is passing evenly, neither too much nor too little, and that the fry are as comfortable as circumstances permit. If the supply of air is too great the fish lie at the bottom of the container and if it is insufficient they come up to the surface and gasp. The air supply must accordingly be regulated to the needs of the fish.

In transporting fry it is frequently necessary to descend to low warm altitudes before ascending again to the streams it is intended to stock. To avoid warm temperatures, therefore, the journey in such cases is undertaken at night and to reduce the danger of the water becoming too warm the cans are placed in boxes and packed round with sawdust or straw. It has been found that the colder the water the less oxygen is required.

Before the arrival of the fry, paths are cleared from the road to the stream and along the stream banks to suitable planting places which have been previously selected. These are sheltered backwaters and inlets where the young fish can establish themselves undisturbed. If no natural inlets can be found it may be necessary to dig out bays in the stream bank.

On arrival at the stream some of the water is poured from the can and water from the stream added in order to accustom the fry gradually to a change in temperature. If the water in the fry cans has been overaerated it is advisable to diminish the air supply for some minutes before transferring the fry to the stream. If the fry cans have been underaerated the fish should be placed in the stream with as little delay as possible. With efficient transporting apparatus of the type described losses should not amount to more than five per cent on a journey occupying six hours.

This completes the story of how rainbow trout have been introduced into some of the streams in the cooler parts of Tanganyika. It is merely a description of how the methods evolved by the pioneer fishermen have been carried out. To their perseverance and ingenuity in overcoming many difficulties we are indebted for the privilege of enjoying trout fishing in various and widely scattered parts of this territory, and in taking this opportunity of expressing his appreciation of the work they have accomplished, the writer is sure that he has the support of all the trout fishermen in Tanganyika.

The Rufiji River

By R. de la B. Barker

ACCORDING to geography the Rufiji river extends from the Rufiji delta on the shores of the Indian Ocean to the confluence of the Luwegu and Kilombero rivers, which is on the eastern border of Ulanga (formerly Mahenge) district and the western boundary of Liwale district. If the natural and upper main stream of the Rufiji system (the largest river system in East Africa) the Kilombero, called also in places the Ulanga, was with its western beginning, the Ruhuji (quite reasonably written in geography and its maps as the Rufiji) we would have an uninterrupted Rufiji river flowing all the way to the sea from Njombe or the Livingstone mountains near Lake Nyasa.

The name "Nile" has been stretched half-way down Africa by the fervour of men seeking its source and contributing to geography. Nile tributaries, actually separated from the Nile of Egypt by large lakes, have been called the Albert Nile, the Somerset Nile, the Victoria Nile and the Alexandra Nile. The latter, the largest river feeding Victoria Nyanza, is now more prosaically accepted as the Kagera and flows from the highlands of Ruanda disputing the remote source of Nile waters with those of its southern tributary, the Ruvuvu, rising from the mountains near the north of Lake Tanganyika.

The Rufiji, curtailed on maps and not allowed to rise anywhere than at the boiling junction of two of its big tributaries, would, if given any of the Luwegu, Kilombero or Ruaha risings, be found to have its source near Songea on the western borders of the territory, or near Tabora.

The "water-tight" compartments which intertribal fear created along the water-joined areas of the Rufiji basin, causing different tribal names for the same waters, obtain to-day in published geography. Incidentally all along the vast Nile system the original nomenclature of the native inhabitants still holds in their vernacular, where they know the "white" Nile as the Bahr-el-Jebel above Lake No and as the Bahr-el-Abiad below it. Natives in the Ulanga district frequently call the map-marked Rufiji above the Pangani rapids the Kilombero, and even their present administrator does at times, so that nomenclature here overlaps.

Rufiji is unfairly denounced by collective minds influenced by the strong consensus of opinions resulting from those of many thousands of Europeans who chanced to see Rufiji during its flood period of 1917 when British troops were in that theatre of operations in the war. Normal conditions are less generally known and seasonal change gives the area months of favourable phases when visitors with guides might find much enjoyment, thrill and benefit from rambling about the riverain scenes of East Africa's most important river.

During spate conditions steamers might ascend the Rufiji (in 1927 one did), but in the dry season the river becomes shallow and large canoes find difficulty in navigating it above Utete towards the end of the year. A stern-wheeler steamer was used on the river by the Germans, but was sunk by British shellfire in 1917 at Ngahoi, eighty miles from the coast. In 1928 it was repaired and refloated, being used again until the disastrous flood of 1930 after which economic conditions due to the "crisis" did not warrant the service it supplied. This vessel was called the *Kitamondo*, which in native vernacular is a small hippopotamus.

The German captain of the *Kitamondo*, when returning from Mohoro on a mule after being entertained there one night before British occupation, encountered lions when nearing Kilindi, where his vessel was moored. His mount stampeded with fright throwing him, and the lions devoured the fallen rider. Beside the road on the nine-mile route from Kilindi to Mohoro on the Kilwa road there is a stone marking the place.

The main coastal telegraph line crosses the river at Kilindi where, as the name implies, there is deep water. High steel masts mounted on each bank, with climbing rungs for repairers' use, are landmarks for approaching river craft. With all the river's destructions and vagaries these masts and this crossing of the line at high level has never been interrupted since installation, which speaks well for the engineering done.

The section of the Rufiji river I know is that between the Pangani rapids and the ocean. To me it has been a peculiarly fascinating feature of mother earth. Over years the seasons, phases, moods of this live pervading creation have impressed me as though it were a personality, so that I know why negroes sang about "Old Man River" on the Mississippi. The Rufiji is also a highway of human traffic and Arabs penetrated along its banks long ago planting mango trees which are monstrous with age to-day. Unlike most other African rivers the Rufiji possesses long pleasant shady banks often with roads leading below avenues of mango trees. The Zambesi swamps which prevent human appreciation of its waters from the shores are similar to the environs of many other waters of Africa. The Rufiji is, however, free from these extensive mosquito breeding afflictions and many a village is prettily situated on high banks facing the river. The government camp at Maremba faces a bend and affords two delightful views of the sand-banked reaches the river adopts in the dry season, with game forest climbing to the Matumbi mountains as an impressive background. In the still hours of the night when forty-foot canoes travel by moonlight or starlight to reach the delta at the right turn of the tide or to avoid the fierce sun of the hot months, the songs of the Rufiji canoe-men paddling or rowing with paddles and oars rapping or knocking time to their mellow lilt are reminiscent of the barcarolle (boat song) from the *Tales of Hoffmann* or again of the popular song "Old Man River." Near the delta when crews are sometimes keeping awake with great effort so that they may reach their dhow ports before the tide turns against them, their voices assume a

sleepy and fateful sadness which impresses one deeply. An old man in Zanzibar whose duties were to knock on the doors of the faithful in the eerie hours of the mornings so that they should rise to pray to Allah had the same note of sleep-denied pathos and kismet within it.

The flowing river is merely one feature of the waterways of the district which have charmed me, for my ramblings, unlike those of other residents of Rufiji, have not been ordered by duty and have taken me about the uninhabited and secluded places where placid lakes and ponds have been peopled by wild animals and birds, where hippo walk abroad by day mowing with their wide pendulent square mouths the lawn-like grass beneath the shade of huge trees nourished by the neighbouring waters. The tree roots are often wide, ramifying, bleached by the sun after periodic washing from the action of waves before a strong sea wind. No river spate season comes here to tear the trees out by their roots and yet most of these lakes are actually cast off horseshoe bends of the river. Others are depressions into which abnormal floods have ponded up water so that it has entered and destroyed treed valleys and in some cases wide cultivations. Dead trees with their tops protruding from the water are seen for many years in such lakes and make dangerous snags for canoes to run on. Many a time has my craft reared high in the air and my rifle spat wastefully into the water above a greasy rotting chunk of wood, much to the amusement of my men who, however, would have small amusement to register when the object below was the rump of a rising and malicious hippopotamus.

Some of these Rufiji lakes have been scoured out in recent years. Telford in his report of 1928 remarked about the lakes near Maremba where a pre-war flood, I think the one called *faia* by the natives, created the hippo-haunted waters of Poka, Makarungi and the almost circular horseshoe lake at Nsheke. *Mvita*, a following flood, created similar lakes near the river above Utete and Telford said the next creation of lakes in the flood to come with the every-dozen-years-or-so expectancy would be near Logeloge. This in 1930 proved to be the case. Telford explained how the river height during floods so developed that it broke through its self-deposited and ridged banks so many miles further up-stream from the last breach. Experiment with mud models of rivers and a watering-can for making miniature floods are interesting in this respect. The ridge he speaks of is higher than the land on each side and is built by the settled silt from the slacker water at the sides of the river, often enmeshed in vegetation and losing its speed in consequence. Since 1930 the Rufiji has had very high spate seasons ending with the record flood of 1936. Incidentally the Rovuma river suffered its record flood this year* as well. I saw places there where former villages and cultivations occupied for generations had disappeared this year* with the scouring of the turbid seas rushing down from the interior. The almost ancient settlement and trading site of Ndundu on the north bank of the Rufiji, midway between Utete and the delta, has also disappeared.

*i.e. in 1936.—EDITOR.

After these floods tree snags strew the river in places and make navigation a dangerous business. In 1935 a large canoe laden with cotton seed struck a snag opposite Utungi Estate and turned over losing the entire cargo and a large tarpaulin. The passengers and crew were rescued by some miracle, for among them were women who could not swim. Sometimes the extremities of these snags protrude above the water and warn canoes. Once I saw a water-wagtail apparently dancing in the air an inch or two above the innocent looking water without using its legs or wings. Its tail was "wagging" merrily and I shaded my eyes against the sun glare on the water until I noticed the bird was riding a thin stick like a circus bare-back rider, bending cleverly with each rhythmic action of the stem. Our tiller was thrust over and we missed the branches below the surface to which that stick belonged. I thanked the wagtail for marking the danger.

Canoeing down the river is singularly pleasant at the right time of the year. Poling up-stream is tedious. Then a motor boat with its unpleasant noise and vibration is better. Often, journeying along on the full river nearer the delta, one feels quite detached from the world. Water, water all around and all day long. Sometimes when bound for the sea we notice the prow is pointing at the setting sun, which conveys the winding nature of the course to one's mind.

When the river is slack there are tranquil mornings with quiet limpid waters winding by beaches and sand-banks white under the sun, strewn with preening birds and sun-bathing crocodiles whose cold-blooded bodies need solar treatment as most reptiles do. Distant red-banked cliffs below dark, sombre masses of mango tree vegetation, make impressive backgrounds to the vistas in these reaches. Hippo, ponderous and lazy, lie with their chins on each other's backs and necks supporting their heavy bulky heads, while two or three of their number sport or fight in a cloud of spray near by, from which raucous watery grunts and bellows emerge at times. Canoes coming and going with rhythmic song, knock and stroke, scarcely notice the domestic affray of pachyderms. A flight of pure white birds in the distance with fitting snowy reflections in the mirror-like water draw the appreciative eye. Sometimes pelicans come swimming by with curious eyes and swift paddling feet. Terns write weird lines on the surface of the river as they swoop low picking up water with their dipped bills, reminding one of the device which is lowered from express engines in England to collect water from troughs between the rails. Pratincoles fringe sandy islands and goliath herons stand sentry-like along the shores, sounding the hours with their hoarse notes.

How different a flood year when the waters, sometimes coming in bright, sunny weather, having taken a month to descend from the far interior with the final up-country burst of the rainy season, drive all the alluvial flat dwellers into the tops of their houses where they live on the rafters till the water subsides. Sometimes when the houses are not high enough or sufficiently strong hasty departure by canoe is imperative and, where canoes are not available or

too small or the collapse of the building sudden, tragedy results. After these floods the Rufiji inhabitants do not lament their lost rice but grow bumper crops of maize and cotton in the silt deposit left by the receding waters.

How different, again, from all this and what recreation is available beside my hidden secret lakes where the water is so still and clear with precipitation that I make excellent tea and sit on a shady bank watching the yawning jaws of crocodiles protruding from the verdant carpet of water flowers and plants which cover the leeward half of the water. Some of the larger lakes have this aquatic growth in their leeward ends at times and an aeroplane pilot who flew over one such corner thought from his condescension that it was "scum" and described it as such. Telford may have flown over this water and here may lie the reason why he so incorrectly mentioned "stagnant" water in river-side lakes. So much subterranean water infiltrates about the Rufiji valley that a shaft dug almost anywhere exposes pure, clean water. Where lily pads grow and leaf-walkers or jacanas trot about, the finest water is found. Sometimes it is astonishingly deep close by tree-grown and rooted banks and it was here a savage spate or flood Rufiji once tore and scoured.

The fertile Rufiji flats commence about one hundred miles from the sea where the river emerges from bush-clad, rocky hills. Here, according to geologists, the Rufiji once flowed into a salt-water estuary which has been slowly filled over the ages by silt-laden waters from its wide interior basin drained by its ramifying tributaries so that alluvial deposit now constructs the wide fertile valley and delta we know to-day. This floor of riverain sand and mud, patched and marked or lined with lakes, bits of old beds and semi-circular waters, is bounded on the north by the Magongo hills and on the south by the Matumbi mountains, the western portion of which, called the Kichi hills, intrudes a foot northwards to the river. This is the only hilly encroachment into the flats between the sea and the gorge and on its big toe, as it were, Utete boma is built. Against the western side of this toe the angry river has scoured savagely against the obstacle, exposing a shore of clean washed rocks mid strong forest and creating an extensive wooded lake which overflows during the wet season through a channel turning eastwards into the present river at Utete. On the side of a smaller toe a mile or so east from the Utete station is a boiling spring whose waters when cooled are the drinking commodity for the boma. Further along another toe is now a mere stump having been eroded every year by the river so that fifty-foot cliffs exposing gory red soil make spectacular scenery for the passing river craft. The river bank road from Mohoro (near the apex of the delta) to Utete on the south of the river has been interrupted here by a breach of some miles. Where it ends abruptly at the cliff edge it shows that the course has changed southwards in twenty years to a distance of about one thousand yards despite the opposition of this high, hard terrain.

Entering the Rufiji gorge in the west one sees a mountain to the north upon which are hot sulphur springs whose waters descend to make wide bare

flats so impregnated with mineral salts that vegetation will not grow and a natural landing ground for aeroplanes results. Rhinoceroses wander across this flat in broad daylight and the grave of Selous lies a mile or two to the north. At the mouth of the gorge, game from the Selous reserve which borders this "knee" of the river on the west and north come to drink at all hours and I have watched buffalo, elephant and other large animals standing about on the sandy shores undisturbed and content.

A dozen miles west the river's course turns south and soon are seen the boiling and leaping waters in the narrow channel through black, water-worn, shiny rock, which makes the Pangani rapids. Here the river is said to have risen eighty feet during a flood spasm in 1930 confined as it was between sloping hills of rock. Fish gather in large numbers near these rapids and natives make camps in the wilds here at certain seasons to obtain them. Canoes never attempt to navigate this place. A hippopotamus who did, or who may have been caught by the current above them when lazing carelessly, was carried within this cauldron crack, dashed to death and bowled upon a shelf where his carcass lay rocking at each wave blow from the dashing stream. The depth of this channel must be very great in places to permit the waters of the river to slip by.

Here some thought of a barrage or dam was entertained to conserve Rufiji waters for irrigation. It would, I believe, not present the difficulties other successfully dammed gorges have done. (A few miles up-river there was once an extensive area of cultivation since carried away by floods causing a whole settlement to migrate in search of more alluvial flats for growing their crops. Coal exists across the river from this point.)

Here my knowledge and experience of the geographic Rufiji ends. This year,* however, I saw its rightful upper waters known as the Kilombero and written as a tributary, but whose alluvial flats, vegetation and scenes are so similar to those of the Rufiji that it seems to be the same stream despite the fact that between it and the coastal river there is a section of the water flowing through rocky, sandy, wildernesses, for more than a hundred miles. On another shelf of mother earth, as it were, we have another navigable river with forty-foot canoes and a riverain population possessing the traditions of water-dwelling folk and living in much the same way as those of the easterly waters. In fact the Kilombero or Ulanga has a more extensive system of navigable waters than the Rufiji (not including the delta) and the stream is more channel-like with fewer tree snags and slower currents. Fishing is more extensive and an established trade is carried on with fish, smoked and dried over fires and carried afar every year. Kilosa is the principal market.

Hippo and crocodile abound and in the upper waters the Ndamba hunt hippo with harpoons and relish the flesh. Birds seen on the Ulanga are those of the Rufiji. The annual flood expansion of the Kilombero is greater than that

*In 1936.

of the Rufiji, where terrific quantities of water may sweep to the sea through present and old and freshly scoured channels, but do not spread across the valley from hills to hills as they do in Ulanga.

A game ranger crossing the flooded Kilombero a few years ago took two days to do so in a well-manned canoe. On a submerged island he saw seven elephant living in the water which reached their bellies. Their food available was swamp grass and there they remained for some time as amphibious as hippopotami.

Migrant Birds in Tanganyika Territory

By R. E. Moreau

Introduction — I. Migrants within the African Continent. Long-distance migrants; Local migrants — II. Migrants to and from Madagascar — III. Palaearctic Migrants (from Europe and Asia): Sources of the Palaearctic migrants; Nature of the migrants' journeys; Moults, sexual and bodily conditions of the migrants; Summary ecology of the migrants while in Tanganyika; Systematic list of Palaearctic migrants.

INTRODUCTION.

IT WILL be apparent to any one resident in Tanganyika, especially in the drier parts, that the bird population around them is by no means the same throughout the year. Birds of all sorts are more numerous in some months than in others. Certain conspicuous species make themselves obvious for a few days or weeks and disappear again. Some of these movements occur every year at about the same date, others seem to be more irregular. It is indeed only in evergreen forest that the bird population changes little in composition throughout the year; in all other types of country it appears that, broadly speaking, the lower and the worse distributed the rainfall the greater the fluctuation in both the numbers and the composition of the bird fauna. I do not think the seasonal variation in bird population has ever been described for an East African locality; but recently a quantitative study, which breaks quite new ground, has been made by Winterbottom⁽³⁹⁾ at Mazabuka in Northern Rhodesia. Comparable work in Tanganyika would be valuable. The present paper is only qualitative.

Three main groups of birds contribute by their movements to this state of flux: (1) Palaearctic migrants, that is, species nesting in Europe and Asia and moving south when breeding is over; (2) species that never leave Africa, but perform more or less extensive journeys within the continent; (3) birds that move between Africa and Madagascar. As the birds of the first group are in some ways the most interesting, and they certainly provide the most striking and clear-cut phenomena, they will receive the fullest treatment; the others will be disposed of more briefly first.

In writing this paper I have drawn upon the works cited in the bibliography, on my own notes accumulated since 1928 and on unpublished data from the various correspondents mentioned in the text. To them, and especially to members of the Game Department, to Arthur Loveridge, who has sent me much information in advance of the published report on his African collection, and to E. G. Rowe, I express my thanks. I am also indebted to C. H. B. Grant, who is working on the birds of Africa at the British Museum (Natural History),

for reading the whole manuscript critically and for providing additional records.

Personally, I should have learnt more about the migrant species if I had not been living continuously at Amani, which, as a locality of high rainfall and heavy forest, has a stable bird population. A small compensating advantage is, however, that when non-resident species, particularly African birds, do appear in the Amani clearing we can be sure that to reach us they have made a definite journey of at least some miles and have not merely shifted their feeding-grounds by a few hundred yards. This impression of genuine migration is heightened by the comparative frequency with which birds come to our lighted windows at night, as if to lighthouses at sea. By this means many birds, including several rarities, have been obtained, some of them alive; and I take the opportunity of thanking my colleagues at Amani, who so often secure for me birds that come to their quarters.

It is unfortunately true that a large part of the ornithological literature of East Africa gives no more than a bare statement of the species collected. For a study of this nature its value is in consequence particularly limited. Very little is recorded about the kind of country in which different species of migrants have been found. It is also true that the available information of all kinds is badly distributed over the territory; most of it relates to the Northern, Tanga and Iringa Provinces. This work has moreover brought home to me that extremely little has been recorded of the nesting of storks, herons, ducks and geese within our boundaries. When more is known it is probable that several of the species accepted in the following pages as non-breeding visitors will be found to be residents subject to merely local movement. There is a great field for work in filling the gaps in our knowledge that are displayed so abundantly in the course of this paper.

I.—MIGRANTS WITHIN THE AFRICAN CONTINENT.

In the semi-arid country at the edges of the Tropical Zone a seasonal immigration of many kinds of birds to breed in the well-defined rainy season is a striking phenomenon, comparable with the influx of birds into Europe in the spring. On the edge of the Saharan desert belt this great seasonal migration has been particularly well dealt with by Lynes⁽¹⁷⁾. South of the Zambezi, where also numbers of species appear and disappear seasonally, the phenomena have been discussed most recently by Roberts⁽²⁰⁾. Only during the last few years has it been realized that similar movements of hardly less importance take place in the lowest latitudes. No one, except Chapin⁽³⁾, appears to have discussed them generally in the Equatorial region. He is concerned primarily with the Belgian Congo, but his discussion goes a long way towards illuminating the problems of East Africa also.

Although they differ only in degree, not in kind, a separation of these intra-African migrations can usefully be made, so far as Tanganyika is concerned, into two main types: long-distance migration, in which as a rule

the species concerned completely evacuates the territory, or a large section of it, for a particular season; and local migration, what Roberts⁽³⁰⁾ calls "restlessness."

Long-distance Migrants.—The systematic list reproduced below contains all the species which, it appears from Selater or Chapin, might be long-distance migrants to be seen in Tanganyika, and also certain other birds which there is, I think, good reason to include. All except the swallows happen to be non-passerine species. It will be seen how surprisingly little we still know about some of the noisiest and most obvious birds of the territory.

The movements of the cuckoos mentioned are particularly complicated and mysterious. The migrations that are the most clear-cut and intelligible are those of Abdim's stork, two bee-eaters, the grasshopper buzzard and a nightjar, all of which breed during the rains of the Sudan summer and afterwards come south. On the other hand an equal number of species, including swallows and, again, a nightjar and a bee-eater, make a northward movement after breeding with the early rains in latitudes well south of the Equator.

It is clear that on the whole these long-distance migrations are connected with breeding in the rainy season either north or south of the Equator; but while it is obvious that species breeding on the edge of the Sahara would be obliged to move in the dry season it is by no means clear why they should migrate so far as they do; or that the motive for some of the other species can be equally strong.

I find that the bee-eaters and the nightjar on this list, that spend the off-season in northern Tanganyika, get through their moult here, just like the members of these families that come from Europe and Asia.

* * *

SPHENORHYNCHUS ABDIMII. Abdim's Stork.

This black and white stork is very well known in flocks all over the inland parts of the territory for the warmer half of the year, and during the same season it occurs southwards as far as the Cape. So far, however, it has been found breeding only north of the Equator and between May and September, in a great belt of semi-arid country from the Yemen through the Sudan, where its nests on the huts are characteristic objects, to Senegal, with a southward extension through Uganda to Entebbe⁽³¹⁾.

ANASTOMUS LAMELLIGERUS. Open-bill Stork.

Chapin⁽³⁾ thought this bird nested only south of about latitude 14°S. June to August; so that the Open-bills in the Sudan, December to June, would be birds that had migrated across the Equator and those recorded from various localities in Tanganyika⁽²⁸⁾ would also be off-season visitors from the south. I have, however, seen them in flocks in the Tanga Province all through the year.

Recently it has been reported⁽¹³⁾ that Open-bills nest at Kisumu March to June, and W. O. Harvey informs me that they nest on islands in fresh-water

lakes between Kilwa and the Rovuma, i.e. about latitude 10°S. Doubtless other such breeding places remain to be discovered, and the Tanganyika birds may be merely local, not long-distance, migrants. In fact I have heard on good native authority that they breed on swamps near Tabora.

ARDEA MELANOCEPHALA, the Black-headed Heron.

It has been recorded as not breeding east of Lakes Victoria and Tanganyika, but visiting the rest of East Africa to the coast⁽³⁾. Actually, however, it can be seen in the Tanga and Northern Provinces throughout the year; Sjöstedt⁽³³⁾ found a nest with well-grown young on the 30th June in the Northern Province and Loveridge⁽⁶⁾ a nest at Tabora on the 13th December.

SARKIDIORNIS MELANOTUS. Knob-bill Goose.

It is an extraordinary thing that this conspicuous bird, known to everyone who has done any duck shooting, has not been found breeding further north than Southern Nyasaland—then in a broken-off *Hyphaene* palm a mile from water⁽²⁾—although it ranges right up to the Sudan. In Kenya and Uganda it appears sporadically, always in parties. I have seen adult birds in Northern Tanganyika in May, August, January and February, always in parties, either on lakes or gleaning in old maize fields. Sjöstedt⁽³³⁾ records adults round Kilimanjaro in November, and a "young bird" in August. Until someone finds this goose breeding in the Territory we have to consider it an off-season migrant from the south, with enough non-breeding birds every season for some to make an appearance in East Africa all through the year.

BUTASTER RUFIPENNIS. Grasshopper Buzzard Eagle.

Only known to breed in the Sudanese semi-arid belt, but migrating in its off-season, November to March, as far south as Morogoro^(3 13).

CUCULUS CLAMOSUS. Black Cuckoo.

Much remains to be learnt about this bird, which usually proclaims its presence by a melancholy call of two, or usually three, whistles in crescendo, the last very long-drawn. Sclater⁽³¹⁾ gives its range as Abyssinia and Sierra Leone, south to the Cape, "apparently breeding (October to March) in the southern half of its range, and wintering (March to September) in the northern half." Its Nyasaland status is a "regular visitor," constantly calling, but not proved to breed, September to March⁽²⁾. The Kenya records fall in the period April to October⁽³⁴⁾, and thus are complementary to the South African and Nyasaland dates.

Unfortunately the evidence from the several specimens I have handled from the Tanga and Northern provinces, and my sight records, cover the period 20th January to 20th May, which is somewhat in conflict with the above conclusion. Moreover, Sjöstedt⁽³³⁾ collected it in the Northern Province in December and Loveridge⁽⁶⁾ at Kilosa in January. In the Usambara mountains the Black Cuckoos make themselves obvious each year between about 15th January and 15th March, calling on the edges of evergreen forest. Later, when the rains have broken, they are noisy for a few weeks in the semi-arid thorn-bush at the western foot of the mountains. None of my specimens (which do

not happen to include any of the thornbush birds of April and May) have been in breeding condition or in moult; but at Loliondo Rowe got a female with an egg in the oviduct, a proof of local breeding, on 14th May, a date when the species is supposed to be wintering in our latitudes after breeding in South Africa. Moreover, the species is breeding in Abyssinia in the same month, May⁽⁴⁾.

There is a likelihood that the birds seen in Northern Tanganyika do not visit South Africa at all and belong to an East African breeding stock indistinguishable in plumage from the South African. This gains some support from the fact that the call of the Black Cuckoo in Portuguese East Africa as described by Vincent⁽³⁷⁾ is quite different from that I have heard in northern Tanganyika.

CUCULUS SOLITARIUS. Red-chested Cuckoo.

Another of these noisy parasitic cuckoos whose appearances and disappearances present something of a problem, although none of the authors mentioned in the first paragraph of this part regards it as a long-distance migrant. Nevertheless, Belcher⁽²⁾ reports it in Nyasaland as only a non-breeding visitor, October to February, which may have some connection with the population breeding in Iringa in February⁽¹⁷⁾. In Kenya all the records seem to fall within the period October to May except for young birds in July⁽³⁴⁾. The published records for the species in the northern half of Tanganyika^(6 28 33) agree with the Kenya findings, and so does Rowe's and my own experience of the bird. I have found it locally common and noisy in the Tanga and Northern provinces, October to May, in breeding condition, October to February, and some, though not all, specimens in postnuptial moult, April and May. These cannot be either the Nyasaland or the Kenya individuals.

Do these Tanganyika birds emigrate after May or are they merely so silent and secretive that they escape observation until the next breeding season? There is an immigration into Abyssinia to breed about July⁽⁴⁾.

CLAMATOR JACOBINUS SERRATUS.

Ornithologists have always been puzzled by the fact that there are in Africa several forms of parasitic cuckoo similar in size, in bill and in their upper parts, but differing in the colouring of their underparts and with overlapping geographical ranges. The birds with white or buffy underparts were called *C. jacobinus* (i.e. *C. pica*), and of them Selater⁽³¹⁾ remarks that they are "widely distributed . . . from Senegal . . . to the Zambezi . . . , March to October; south of the Zambezi . . . October to March." Birds with grey on the throat and breast were called *C. hypopinarus*; they were supposed to spend the period October to March south of the Zambezi and in Nyasaland; then to leave for winter quarters that were unknown but for the fact that two specimens had been collected at the foot of Ruwenzori in May⁽³¹⁾. Birds with black underparts, which were called *C. serratus*, were also held to breed in South

Africa October to March and then disappear to unknown winter quarters⁽³¹⁾. Meanwhile Whistler⁽³²⁾ had shown that in India white-breasted cuckoos (*C. pica*), which are common breeding birds there and undistinguishable from African specimens, disappear in the winter. Thus three forms all spend the same breeding period in South Africa, thereafter disappearing to somewhere in the north where they may or may not commingle with visitors from India. Two of the forms, *pica* and *hypopinarus*, certainly occur in Tanganyika.

Recently Grant and Mackworth-Praed (*Ibis*, 1937, pp. 402-5) have followed Bates in suggesting on the basis of the foregoing facts, and also because they find intermediates between the forms, that these birds should not be regarded as separate species at all, but merely as varieties of one subspecies, which in accordance with the rules of zoological nomenclature must bear the oldest name, *C. jacobinus serratus*.

Grant and Mackworth-Praed at the same time resummarize information on the dates of occurrence of each form. It is apparently correct that the black form has never been taken in Tanganyika. But their extension of the off-season range of the grey-breasted bird from Selater's sole locality of Ruwenzori (May) to Abyssinia (April) and the Sudan (July) can be carried much further; Loveridge tells me of specimens of grey-breasted birds in Central Tanganyika in November and December, in Kenya, December and April; and I have had grey-breasted birds in Northern Tanganyika within the same season. Thus the *C. hypopinarus* variety is in reality widespread in East Africa at the same season as in South Africa. Probably, therefore, there are at least two distinct populations, each with its own movements, though we know nothing of any breeding north of the Zambezi.

The East African distribution of the *jacobinus* (*pica*) variety as given by Grant and Mackworth-Praed is also very far from complete. They restrict the Kenya occurrences within the period May to November, but specimens taken in December, January and April, have already been recorded⁽³⁴⁾. Tanganyika is not included in their range of *C. jacobinus* (*pica*) at all, but in fact there are numerous published records^(17 18 28 33) and Loveridge's specimens are far from being the first, as has been suggested⁽⁶⁾. Without exception the dates fall in the period December to April. My Northern Tanganyika records of this form cover exactly the same season, and all relate to silent non-breeding birds in worn plumage or very slow and irregular moult—like the February birds of extreme Southern Tanganyika⁽¹⁹⁾ and on the Central Line⁽⁶⁾. This influx of non-breeding birds into Northern Tanganyika fits in strikingly with Whistler's hypothesis that the Indian population migrates to Africa after breeding in the northern summer; and clearly the birds, also non-breeding, that are so common in Darfur June to September⁽¹⁶⁾ must have quite a different origin.

Thus no form of the group now called *Clamator jacobinus serratus* has so far been shown to breed anywhere in Tanganyika. The grey-breasted birds

must be migrants from some part of Africa; some, at least, of the white-breasted most probably come from India.*

CLAMATOR CAFER. Levaiillant's Cuckoo.

This, a much bigger bird than *jacobinus*, is considered to be a non-breeding visitor in Kenya⁽²⁴⁾. There is in fact no published evidence that it breeds anywhere between Abyssinia and South Africa except in Iringa February to March⁽¹⁷⁾, on the east side of Lake Nyasa in May⁽¹⁹⁾ and in Mozambique⁽³⁷⁾. Fuggles-Couchman tells me, however, that he has taken a female in breeding condition at Kilosa in April. My few records from the Northern and Tanga provinces are all February to April, when the birds are in postnuptial moult. The published records for Tanganyika as a whole all fall in the period December to June^(6 28), within which this cuckoo is also known as a non-breeding visitor to Nyasaland⁽²⁾. Moreover, both Pakenham and E. D. Barr (*in litt.*) have found that it appears at Kigoma and in Uvinza in November, when it is moulting. As the Abyssinian breeding season is with the rains, July to September⁽⁴⁾, it is not unlikely that the Kenya and Northern Tanganyika birds come from there, while the Southern Tanganyika birds, in the east up as far as the Central Line, represent a different population breeding there and with their own movements.

HALCYON LEUCOCEPHALA SWAINSONI. Grey-headed Kingfisher.

It has been stated^(3 31) that this bird is found in the rainy season, October to March, south of about latitude 14°S., and that it moves north to the area Kasai-Ruwenzori April to September. Apparently it has still not been found breeding, though Chapin⁽³⁾ thinks this takes place at the northern end of its range, i.e. alongside *H. l. leucocephala*. Altogether, much more needs to be learnt about this bird. For one thing a specimen of mine from Moat, in the range of another subspecies, *H. l. hyacinthina*, has been identified as the supposedly migrant *swainsoni*, and its date is 18th November, when this form "should" be in South Africa.

MEROPS NUBICUS subsp. Carmine Bee-eater.

The typical subspecies of this magnificent bird breeds in the Sudanese semi-arid belt March to August and in the off-season occurs in small flocks through coastal Kenya and Tanganyika as far south as the Rufiji^(3 31). My dates for this bird in the Tanga Province are 21st November to 4th March. Loveridge's fall within the same period⁽⁶⁾. Like the other bee-eaters it takes most of its food while in flight and I have watched it adroitly sweeping small locust-hoppers off the tips of long grass. It is a keen attendant at bush fires, venturing almost into the flames after insects that are driven out by the heat.

*Since writing the above I have heard from R. H. W. Pakenham that at Kigoma (*C. jacobinus* (i.e. *pica*, the white-breasted variety) becomes abundant at the end of October; he then noted pairs and shot a female with an enlarged ovary. These extreme western birds (in Tanganyika) may belong to a population different from that occurring in the rest of the territory; the date of the influx accords with a possibility that they might be birds coming south from spending their off-season in Darfur and the Sudan.

The other form, *M. nubicus nubicoides*, breeds across Africa south of about latitude 12°S. April to July (in the dry season) and thereafter moves northwards into south-western Tanganyika and up the side of Lake Tanganyika to its head⁽³⁾. But it seems to be unknown in the centre of the territory and not to come in contact with the northern form anywhere.

AEROPS ALBICOLLIS.* White-throated Bee-eater.

A small species that apparently breeds only in the Sudanese semi-arid belt during the rains July to September. Later, November to April, they are recorded in Uganda, Kenya and Tanganyika at least as far south as the southern shore of Lake Victoria and Dar es Salaam⁽³¹⁾. My Tanga Province notes agree. During this period (only) I have often found them sitting singly on telegraph wires, kapok trees or sisal poles. Specimens collected in December were in full moult. It is of interest that this species seems, like *Merops n. nubicus*, to "winter" only below about four thousand feet, thus securing a high minimum temperature, as it most certainly does during its breeding in the Sudan summer.

CAPRIMULGUS INORNATUS. Plain Nightjar.

Sclater⁽³¹⁾ gives no indication that this is a migrant, but Chapin⁽³⁾ considers that although its range extends south to the northern Belgian Congo and Tanganyika it breeds only in the Sudanese semi-arid belt (during the rains July to September) and thereafter moves south. In my experience it is common in northern Tanganyika January to March, finishing moult in January; but males on 11th and 12th March (Tanga and Engare-Nairobi) had gonads surprisingly enlarged if they were to breed no nearer than the Sudan. The range of the species has recently been extended to Iringa in January⁽¹⁷⁾, where Lynes got a bird probably only three months old—which again suggests the possibility that the species breeds somewhere later than July to September and nearer than the Sudan.

COSMETORNIS VEXILLARIUS. Pennant-winged Nightjar.

Breeds in the southern half of Africa, including all Tanganyika (e.g. Kasulu, Grant *in litt.*) except a narrow strip along the northern border, during the early part of the rains, September to November or December⁽³⁾. About February they leave for "winter" quarters in Uganda and west to Lake Chad. Iringa birds in January were finishing their postnuptial moult⁽¹⁷⁾, so apparently they travel in new plumage.

I know of no evidence to support the conclusion by Friedmann and Loveridge⁽⁶⁾ that the bird is always present in northern Tanganyika.

PITTA ANGOLENSIS REICHENOWI. Angola Pitta.

In conjunction with the nature of the records from neighbouring territories, the fact that these gorgeously coloured birds have come to lighted windows in

*Grant (*in litt.*) considers that the subspecies *A. a. major* cannot stand.

Amani every year since 1932 between 1st May and 10th June—with empty stomachs—has led me to the view that they must be long-distance migrants^(23 32). Their range is from the Transvaal to Uganda but in South Africa they are known to be only seasonal visitors⁽²⁹⁾. The Amani specimens are in neither moult nor breeding condition. It is uncertain in which direction they are travelling; but as they appear in the Uganda forests, the northern end of their range, with the rains in June and July and are absent during the dry season⁽³¹⁾, it is probable that the Amani migrants are on their way from the south. There is evidence that they may breed near Mikindani about December⁽⁹⁾ and elsewhere in southern Tanganyika (*Pitman in litt.*).

HIRUNDO A. ANGOLENSIS. Angola Swallow.

Said to be an immigrant from Angola to breed with the rains November to May in extreme western Tanganyika, Bukoba (*Grant in litt.*) Kasulu and Rungwe⁽³¹⁾. It has recently been recorded (without date) also from the eastern side of Lake Nyasa in Matengo⁽¹⁹⁾.

HIRUNDO ATROCAERULEA. Blue Swallow.

Breeds in a long strip of country from Natal northwards and inland to round the head of Lake Nyasa. Lynes⁽¹⁷⁾ thinks some of the south-western Tanganyika birds may be permanently resident there, but the main bulk of the species apparently migrates to Uganda for the off-season June to September^(2 3), presumably traversing western Tanganyika.

HIRUNDO ALBIGULARIS and *H. CUCULLATA*, the White-throated and the Larger Stripe-breasted Swallows are two species that, according to Sclater⁽³¹⁾, breed in South Africa September to March and then disappear to winter quarters which are still unknown. Both species, and especially the latter, might turn up in Tanganyika.

Local Migrants.—The water-bird populations are particularly unstable, as might be expected. Different species find their optimum conditions in different depths of water and so on. Moreover, some bodies of water covering hundreds or even thousands of acres occasionally dry up altogether. Every one interested in duck-shooting is familiar with the variation in numbers even on the waters that appear most suitable.

The land birds' movements are determined more obscurely than the water birds', but a good many of them clearly fall into two main categories: those which bring the birds into areas favourable for their breeding (usually where the rains have broken), and those which are on foraging expeditions. In northern Tanganyika, with two rainy seasons, the movements, especially of the first kind, are more complicated than in the south, where there is only one. But to the extent to which they are connected with the rains they are seasonal and fairly regular.

In most dry areas the list of birds that move about a great deal would probably be longer than those that do not, and most of them belong to the

first category, the breeding migrants. In a semi-arid locality of Usambara of which I have some knowledge I should say that the population of the small insectivorous birds, the woodpeckers, shrikes, warblers and tits, varies least; while on the other hand at the beginning of the rains there is an immense influx of several species of weaver-birds, which breed and a few weeks later depart again. The most conspicuous of them all in this respect is the Black Buffalo Weaver (*Bubalornis albirostris intermedius*), which builds great bulky nests of interlaced thorns, rears its young and vanishes again for at least eight months. In this same locality itinerant parties of hornbills (*Lophoceros nasutus*) come and go, finch-larks are absent for months at a time. Harlequin and Button Quail arrive to breed when the grass is long, and afterwards disappear completely. Several species of parasitic cuckoos come to profit by the rush of reproductive activity during the rains of April and May but are absent in the dry season. Where all such birds spend their off-season I have no idea, though so far as I can ascertain most of them, for example, the Buffalo Weaver, can be found somewhere in the Northern Province or just over the Kenya border all through the year. For several reasons I think it unlikely that they breed at both ends of whatever their range may be, but proof must wait many years until bird-ringing is common in Africa.

I am not aware of any published references to bird movements of this sort in Tanganyika except by Lynes⁽¹⁷⁾. He has recorded his opinion that in the Iringa highlands several species, a crane (*Creopopsis egregia*), a sunbird (*Chalcomitra senegalensis*), a cuckoo (*Lampromorphia klaasi*) and a quail (*Coturnix delegorguei*), are breeding visitors in the rains, while others, a lark (*Tephrocorys cinerea*), a finch-lark (*Eremopterix leucopareia*), a swallow (*Hirundo griseopygia*) and a sandmartin (*Riparia paludicola*), seemed at the same season to be only travelling through northwards, not resident. All these forms are, I think, present somewhere in Tanganyika throughout the year, but better knowledge may show that some of them should be classified as long-distance migrants.

Of the foraging migrants the chief are fruit eaters, especially the Amethyst Starling (*Cinnyricinclus leucogaster*) and some of the pigeons. The most conspicuous among the latter is the big blue pigeon, *Columba arquatrix*, with yellow bill and white spots on the wings. Apparently it breeds only in highland forest, but in the off-season it wanders even to the coast. Among insectivorous birds the Wattled Starling (the "Lesser Locust Bird"), *Perissornis carunculatus*, congregates wherever locusts or grasshoppers are plentiful.

Except the quails, the numerous gallinaceous birds of the territory are not, so far as I know, subject to much local movement. All three quails: the African (*Coturnix c. africana*), which breeds especially on the short turf of highland areas, the Harlequin, *C. delegorguei*, which inhabits savannah and thornbush, and the much rarer Blue Quail, *Excalfactoria adansoni*, have strong seasonal movements that need elucidation. Towards the end of each year a migration, in which all three species take part, passes through the

Tanga Province in such numbers that in ten days as many as a dozen quail have been brought to me, killed by striking wires or, more often, coming into lighted rooms at night. So far we do not even know which way this migration is going; though from the fact that the males have much enlarged gonads, the females have not, and none of the birds are in moult, I suspect that they may be travelling south, to meet, and breed, during the rains then advancing from the southern borders. But in the semi-arid parts of the Tanga Province great numbers of Harlequin Quail appear again and breed about April, as soon as the rains have brought the grass up sufficiently to hide them; and a few weeks later the mountain grasslands of Usambara are locally occupied by *Coturnix africana*. Captain M. S. Moore tells me that on the Serengeti both the Harlequin Quail and the Button Quail (*Turnix sylvatica lepurana*) "appear in great numbers in January, when the grass is about a foot high and running to seed." They pair in early March and at the end of the long rains (end of May) a great many young birds are about. "In the hot dry season many disappear but there are always a few odd ones." That the quail are seasonal migrants is confirmed by the experience of neighbouring countries^(2 13), but even in Kenya, where the ornithology is so much better known, their movements are obscure.

Whether there is much altitudinal movement with the seasons we do not at present know. I think that it is probably not important generally, though Lynes thought it applied to a few species in Iringa, and there are examples at Amani. Here a swallow, *Hirundo abyssinicus unitatis*, nests most of the year round but disappears for the three coldest months, while the Swamp Weaver, *Amblyospiza albifrons unicolor*, is here, and breeding, only from October to March. On the surrounding plains it can be seen throughout the year.

Some of what must, I think, be classified as only local movement, partakes of one of the characteristics of long-distance migration in that it occurs at night. At Amani I have nocturnal records of several African species not to be found by day at any season within a dozen miles at the least. They include queleas, Amethyst Starling, a pipit (*Tmetothylacus tenellus*), three species of quail, and a plover, probably the black-winged (*Stephanibyr melanopterus*).

II.—MIGRANTS TO AND FROM MADAGASCAR.

The species concerned are few and Madagascar birds do not form an important element of the bird life of Tanganyika at any season. That regular migration between Madagascar and Africa should exist at all is, however, of much interest and is not generally recognized. Apart from incidental reference by Selater⁽³¹⁾, Chapin⁽³⁾, Lavauden⁽¹⁴⁾ and Delacour⁽³⁾ have dealt with the subject.

In the list that follows I have included not only the regular migrants, the journeys of which are known to include Tanganyika, but also those which from their occurrence in neighbouring African areas are practically certain to

visit Tanganyika and to be only awaiting recognition here. Finally, for the sake of completeness, I have added the African species that in Madagascar are apparently only vagrants from Africa, but are likely to have come from Tanganyika.

It will be seen that at least four species, a squacco heron, a broad-billed roller, a cuckoo and a bee-eater, having nested in Madagascar during the rains there, regularly come to spend their off-season, approximately May to October, in East and Central Africa. None of them except the roller has been recorded south of the Rovuma. It appears then that these four species, the direction of which across the Mozambique channel is north-east, are actuated by the same stimuli as the intra-African migrants discussed in Section I, and are in fact closely analogous to the group of species, also including members of the cuckoo and bee-eater families, that travel north from South Africa at much the same season.

ARDEOLA IDAE. Madagascar Squacco Heron.

Has been taken on the African mainland from May to October. The only Tanganyika records are at Dar es Salaam^(3 6), but since the bird reaches Elgon and the Belgian shore of Lake Tanganyika it must occur elsewhere in this territory.

IXOBRYCHUS MINUTUS PODICEPS, the Madagascar race of the Little Bittern, has been reported from Zanzibar⁽³⁶⁾ and therefore may be expected on the coast of Tanganyika.

ARDEA GOLIATH, Goliath Heron.

ARDEA MELANOCEPHALA, Black-headed Heron.

Both African species that are occasional in Madagascar⁽⁵⁾.

SARKIDIORNIS MELANONOTUS, Knob-billed Goose.

ANAS PUNCTATA, Hottentot Teal.

It is not clear whether or not these two species breed at all in Madagascar. Delacour⁽³⁾ merely remarks on their general distribution in the island; but according to Lavauden⁽¹⁴⁾ they are to be seen there in very great abundance during the local rainy season, which begins in November. Some of the birds that breed in south-east Africa on the abundant standing water that follows the long rains must therefore cross to Madagascar in the off-season.

ELANEUS C. CAERULEUS, the Black-shouldered Kite, is an African species that has occurred in Madagascar⁽⁵⁾.

FALCO CONCOLOR, the Sooty Falcon, immigrates into Madagascar in large numbers in November⁽¹⁴⁾. Some of the birds may possibly be Tropical African breeders, but it is more likely that they all come from the sub-tropical desert belt of North Africa and the Near East⁽²⁵⁾.

CUCULUS POLIOCEPHALUS ROCHII has been recorded as a non-breeding visitor to East Africa from Madagascar between June and September. The East African coastal specimens of the Little Cuckoo have, however, recently been shown⁽⁸⁾ to belong to the Indian form, *C. p. poliocephalus*, not to *rochii*, and there appears to be no certain record of the Madagascar bird within the borders of Tanganyika. Since, however, *rochii* has certainly reached Uganda and the eastern Belgian Congo⁽⁸⁾ between October and April there is little doubt that it occurs within our limits.

EURYSTOMUS GLAUCURUS. The Madagascar Broad-billed Roller.

Has been recorded on the African continent and in Pemba as a non-breeding species between April and November. In Chapin's sketch-map⁽³⁾ the bird is shown as occurring throughout Tanganyika Territory. The only actual record I can trace within our borders is from the shore of Lake Nyasa; but since the species reaches the central and north-eastern Belgian Congo it presumably travels over most of the territory. It must surely cross the southern part of our coast, because on its way to Africa it passes the Comoro Islands. The fishermen in the Mozambique channel hear it at night as it flies croaking overhead⁽¹⁴⁾.

MEROPS S. SUPERCILIOSUS.

The Madagascar Bee-eater is known to nest in Madagascar, the Comoros and Pemba (not Zanzibar). On the African mainland it has been found breeding at Beira (*Ibis*, 1911, p. 705) and there is also an early record from Abyssinia⁽²⁸⁾, which it is desirable to confirm. Throughout the intervening country, and as far west as Ruwenzori, this bee-eater appears between May and September⁽³⁾—latest date in northern Tanganyika 4th October⁽³³⁾—but there is no evidence that it breeds; and even in Nyasaland and northern Portuguese East Africa it is known only as an off-season visitor^(2 37). It appears that there must be a big immigration into Tanganyika about May and the likeliest source of the bulk of the birds is Madagascar. While they are here they may be seen usually in pairs or small parties, on trees or wires; and lately (13th July) I saw twenty-one of them resting on a sandbank left dry in a creek by the ebb-tide. In the field this bird can easily be confused with the Palearctic race, *Merops s. persicus*, which, however, it hardly overlaps in date. The best distinction between the two is provided by the throat, which is white in the Madagascar bird, yellow in *persicus*.

Friedmann and Loveridge⁽⁶⁾ think two Dar es Salaam specimens are different from Madagascar birds and should be called *M. s. ruficapillus*. But as these authors make no attempt to designate a geographical range for this supposed form or to examine its status in Africa, and the specimens are dated 1st July, i.e. within the recognized period of the off-season influx, their remarks can, for the present, only be disregarded.

PHEDINA BORBONICA MADAGASCARIENSIS, the Madagascar Martin, has been described by Vaughan⁽³⁶⁾ as an "off-season visitor" to Pemba (not Zanzibar). If this is correct, it might be expected to turn up on the Tanganyika coast. Vaughan adds, however, that he has met with the bird in Pemba "mostly between November and March," but also in August and September. Thus it is in Pemba throughout the Madagascar rains, which is the season favoured by most species, including the Madagascar-African migrants mentioned earlier in this list, to breed. This fact, combined with the length of the period covered by the Pemba records, makes me suspect that *Phedina* may actually be a rare resident in Pemba, not a migrant.

ANDROPADUS I. INSULARIS.

This Sombre Bulbul is stated by Delacour⁽³⁾ to have been thrown up on the Madagascar coast by a storm. If the subspecific identification is correct

it came from somewhere north of Dar es Salaam. If not, it might have come from anywhere south to Lourenzo Marquez. Any one familiar with the way this bulbul sticks to its beloved bushes will wonder how it ever got carried out to sea.

III.—PALAEARCTIC MIGRANTS.

For Kenya and Uganda a valuable annotated list of Palaearctic migrants is in existence⁽³³⁾. Up-to-date avifaunal lists, which include all the migrants, are available, or in course of publication, for the other countries neighbouring Tanganyika, namely, Nyasaland⁽²⁾, Northern Portuguese East Africa⁽³⁷⁾, Northern Rhodesia⁽²⁷⁾, Belgian Congo⁽³⁾ and the Zanzibar Protectorate^(26 36). Nothing of this kind can be consulted for Tanganyika; the information in Selater's general list of birds found in Africa⁽³¹⁾ can, however, be supplemented from an excellent compilation of Grote's^(10 11), which deals with all the species known to reach Africa from Europe and Asia.

From Grote's bibliography it appears that he omitted to draw upon two previously published works that contain records of Palaearctic migrants in Tanganyika^(15 33), the latter being a rich source for the Kilimanjaro area. Moreover since Selater and Grote made their compilations several other contributions, that give incidental records of Palaearctic migrants, have been made to the ornithology of the territory^(1 6 7 8 17 18 19 21 22 23 24 32).*

I am also able to include unpublished records of my own (indicated in the list by my initials); the specimens concerned have been identified at the British Museum.

I find that one hundred and fourteen forms of Palaearctic birds, belonging to ninety-seven species, can be admitted with certainty to the Tanganyika list. About a dozen more forms that have been reported cannot be accepted without reservation for reasons I shall indicate in the systematic list: some of the birds are very unlikely to occur; others, like the Spotted Cuckoo, are present all the year round, and breeding, in Africa, as well as in Europe and Asia, so that the origin of individuals seen in Tanganyika cannot at present be satisfactorily determined.

The Tanganyika list is, as would be expected, slightly shorter than the combined Kenya and Uganda list⁽³⁵⁾. New forms are, however, still being added; and certain birds, particularly the Dunlin (*Erolia a. alpina*), Black-tailed Godwit (*Limosa l. limosa*) and River Warbler (*Locustella fluviatilis*), which have been recorded both in Kenya and in countries south of Tanganyika, are certain to be discovered within our borders in course of time. It must again be emphasized that the records of migrants in Tanganyika are still scanty and badly distributed.

For the sake of brevity I shall in subsequent pages use "winter" in the sense understood by a resident in the North Temperate Zone.

*Since these lines were written Grote has published a third valuable compilation: "Neue Beiträge zur Kenntnis der palaearktischen Zugvögel in Afrika," *Mitt. Zool. Mus. Berlin*, 22, pp. 45-85, 1937, in which he has incorporated the relevant records from (1), (17), (21), (32).

The Sources of the Palaearctic Migrants.—Nearly all the Palaearctic forms on the Tanganyika list, not only the species, but the subspecies also, have a breeding range that extends over a great part of Europe and of Asia as well—some even as far as North America. Consequently, with very few exceptions it is impossible to define with any approach to certainty the country, much less the locality, from which the birds of any particular form wintering in Tanganyika may come. The highest degree of localization attainable is with a reed-warbler only known to breed in Mesopotamia; and next to that a few subspecies, for example, a nightingale the summer home of which is limited to Transcaucasia and Persia. An extension of the system of fixing identification rings on birds will, in course of time, provide more information; but up to the present the only “ringed” birds that have been recovered in Tanganyika are White Storks (from Denmark, Germany, Poland and Hungary).

“Water birds”—mainly waders, ducks and terns—which account for thirty-seven of the ninety-seven Palaearctic species on the territory’s list, are on the average even less localized in summer than the “land birds.” They breed at higher latitudes and tend to be circumpolar.

While no certainty is yet attainable regarding the source of our winter visitors, certain broad conclusions may be reached. On analysing the one hundred and fourteen forms accepted for the Tanganyika list we find that the breeding ranges of eighty-seven (thirty-one of them water birds) include Eastern Europe and Asia Minor, and of eighty-four (thirty-three of them water birds) Western Asia (i.e. Western Siberia, Turkestan or Persia). These figures compare with only fifty-seven (twenty-three of them water birds) that occur in any of the countries lying west of Central Europe. I conclude that the majority of the Palaearctic birds visiting Tanganyika come from Eastern Europe and Western Asia, i.e. from approximately north and north-east of the territory, rather than from north-west. That there is a strong current from the east is confirmed by the fact that seven forms on our list, a plover, two cuckoos, a nightjar, two shrikes and a wheatear, are not known to breed anywhere nearer to East Africa than Central Asia; while two falcons actually spend the summer on the far side of Lake Baikal, distant seventy degrees of latitude and some five thousand miles. There is no comparable evidence that purely West European forms seek East Africa: two, a Spanish form of the Common Cuckoo and the British Yellow Wagtail, have been recorded, but neither is acceptable at present, for reasons that will be mentioned. Personally I see no reason to believe that birds from the British Isles or other areas west Central Germany contribute appreciably to the winter population of East Africa.

There is no doubt that in the summer our winter visitors are widely distributed in latitude. Some breed no further north than Asia Minor and the southern shores of the Caspian; others, mostly wading birds, seek the shores of the Arctic sea.

The Nature of the Migrants' Journeys.—In the past it was commonly held that migrants travelling to and from their winter quarters were concentrated on routes only a few miles wide, among which the Nile Valley was a great favourite. Later work has shown that this conception reflected rather a concentration of observers than of birds. It is now certain that, with a few exceptions, the birds belonging to any particular form may be found travelling on a broad front. I have been forced to the conclusion⁽²⁰⁾ that numerous birds cross the entire width of the Libyan Desert, and in fact that a large proportion of all those which cross the eastern Mediterranean on their way to tropical Africa see nothing of the Nile Valley. Other observations indicate that a large volume of migration passes through the length and breadth of Arabia, to enter Africa across the Red Sea and the Gulf of Aden. This would be the most direct route for birds breeding in Turkestan and round the Caspian. Finally, on a recent voyage in early November when for most of the way from Guardafui to Mombasa we kept at least one hundred miles off shore, migrants of several species were seen each day. I discuss these surprising observations elsewhere⁽²³⁾; and the only conclusion I can come to is that the birds we saw had flown across the Arabian Sea from the eastern Hadramaut or the region of the Persian Gulf, with or without a rest on Socotra. Since the weather conditions were in no way abnormal I think this may be a regular migration; and, if so, it is of great interest as the longest unbroken sea-crossing annually performed by a number of different land birds. Much more evidence is, however, needed before this conclusion can be regarded as established. I would be greatly interested to hear of any birds seen on a voyage between Mombasa and Guardafui, especially out of sight of land. The noon position of the ship on the day of observation is a valuable detail.

From what has been said above it appears that in autumn the birds converge on East Africa from a wide sector. Each seems to travel with little regard to the advantages or disadvantages presented by the seas or deserts across which its flight takes it. The direction of migration is of course mainly southerly, but there is also a definite and general westerly drift. Most of the Tanganyika visitors that breed in Western Asia—in Persia, Transcaspia and Turkestan—do not seek India at all in winter. Moreover it is remarkable that several forms, the Sedge-Warbler, the Landrail, several shrikes, a subspecies of Spotted Flycatcher, the Common Redstart, the Common Rockthrush, the Barred Warbler and the Honey-buzzard, the breeding ranges of which extend eastwards as far as Central Asia, do not in winter visit India, which is due south of their more easterly breeding populations. These must instead make some thirty degrees of westing to reach their winter quarters in East Africa.

While it is undoubtedly the rule that a species migrates on a broad front, probably not much less than the width of its breeding range, there are a few exceptions, of which the most remarkable is the White Stork. Practically none of the Central and East European breeding birds cross the Mediterranean;

instead they converge on the Bosphorus, fly round the eastern end of the sea, come down through Syria, Palestine and Sinai, and year after year cross the Gulf of Suez in immense concentration at its narrowest part, between Tor and Shadwan Light. Having reached the African continent they continue south on more divergent lines.

I do not propose to deal here with the habits of the various species while actually migrating. A few points are worth mentioning. The air-speed of most small birds does not much exceed thirty miles per hour and most migration ceases when the wind rises above the same speed—presumably because the turbulence becomes excessive. It follows that even under the most favourable conditions a ground-speed of over sixty miles per hour is hardly attainable by small birds. Some species always migrate in flocks, others alone; some call incessantly, others are silent. A good deal of movement over both land and sea takes place at night. In the Temperate Zone much information has been obtained from the birds that are attracted to lighthouses. Records from these sources are much rarer in tropical Africa, partly because foggy nights, on which lighthouses prove so much more attractive to birds, are almost unknown on the coasts. At Amani, where the houses are lit with electric light and mountain mist is occasional at all seasons, it is not unusual for migrants, especially warblers, to enter at night.

We have at present no volume of evidence on the question whether or not old birds precede young in autumn. Observations in Egypt tend to show specific variation in this respect. As regards the dates of arrival in Tanganyika we can say little more than that the main body of most species has arrived by the end of October and has left by the beginning of April, but some individuals of many different species arrive at the beginning of September and do not leave before May. A few non-breeding birds of most species, especially White Storks and waders, do not make the spring journey at all and may be found hanging about in East Africa throughout the northern summer. For this reason "earliest and latest dates" are of no value when they are concerned, as they usually are, with odd birds, and I have not burdened the systematic list with them. At the same time it is true that certain species regularly precede the others; the earliest is probably the Common Swift, notoriously one of the first to leave its nesting locality, which reaches Tanganyika before the end of August.

The Moulting, Sexual and Bodily Condition of the Migrants.—Before their spring and autumn journeys the Palaearctic migrants lay on stores of fat which are expended in the unusual exertions, often on short rations, of their long flights. In the species, such as the Spotted Cuckoo and Avocet, breeding both in Africa and elsewhere, but not distinguishable into subspecies, it is probably a safe conclusion that abnormally fat birds taken in tropical Africa in the northern spring are on the point of leaving for distant nesting-grounds; and the occurrence of such birds is the best evidence we have at present for including these species on the list of migrants as well as the list of residents.

Some species fatten much more obviously than others : I have found cuckoos on 1st April that were almost impossible to make into decent skins ; yet of three shrikes collected together on 21st April one, a *Lanius isabellinus phoenicuroides*, was very fat, while two *L. c. collurio* were not.

On the interesting question of the moult and gonad state of migrants while in tropical and South Africa hardly anything seems to have been published for all the hundreds of specimens collected, except the few that fortunately happen to apply to Tanganyika^(6 17 19). I am also able to draw on records of the few score specimens I have handled.

Except among the waders the vast majority of birds get through their moults in either their summer or their winter quarters and thus travel with their full complement of feathers.

Practically all the young birds of the year, which in all probability supply fully half the winter visitors,* migrate in their juvenile plumage and undergo a complete moult, i.e. of tail and flight feathers as well as body plumage, in their winter quarters. The same thing happens with the adults of most non-passerine species ; certainly, from my records, in nightjars, cuckoos, swifts, bee-eaters, falcons and honey-buzzards. On the other hand most passerines (the great division to which all the "ordinary small birds" belong) appear to get through their complete moult as soon as their nesting is over, and to make their autumn migration in fresh plumage. Before they leave Africa again many, such as the wagtails, undergo a so-called "pre-nuptial" moult of the body feathers, in the course of which the bright spring plumage is assumed. An exception to these generalizations is provided by the shrikes, the adults of which always arrive with very worn feathers. The Garden Warbler appears to be in a class by itself, in that it arrives with fresh plumage and goes through another complete moult before its departure in spring ; on the other hand its very near relative the Blackcap, which also arrives in fresh plumage, has not been found here in wing-moult at any time during its stay.

Of the birds, young or old, that moult in Tanganyika, a large proportion get through the operation between the beginning of December and the end of February, that is, before they begin serious northbound movement. The advantage of this arrangement is doubtless that it must be much easier to lay up stores of fat when the strain of moulting is over. I have records of a number of birds, including Honey-buzzard, Garden Warbler, *Lanius isabellinus*, Olivaceous Warblers, that were still not through their moult by 21st March, but all were in the last stage, with at the most three primaries still to renew. A Common Whitethroat only halfway through its moult on 21st April was certainly an abnormality.

Since Rowan has shown that the state of the gonads (sexual organs) is correlated with the migration impulse in certain North American species, it becomes of great interest to determine whether in Africa the initiation of the return in spring can be connected with a change in the gonads. Pending

*Cf. Vogelzug, Jg. 6, pp. 177-182, 1935.

microscopical investigation of Tanganyika material I should tentatively answer this question in the negative. I have never seen a specimen in which the sexual organs remotely approach their breeding size. The most that can be said is that in a proportion of the birds that are on the point of departure or are actually on passage the organs of the males, though not of the females, show a very slight enlargement over their minimum mid-winter size.* But of two male birds collected on the same day from the same migrating flock one may show this slight enlargement and the other not. The few plovers I have examined in Tanganyika in spring show a tendency to greater enlargement than other birds (as Ticehurst noted also in India). A particularly interesting example is a female Caspian Plover (*Charadrius asiaticus*) with an appreciably enlarged ovary on the 19th March near Korogwe; that is, while still some four thousand miles from the nearest part of its breeding range. Among passerines the Blackcap is somewhat exceptional; males with gonads not fully deflated are met with all through the winter.

Singing, which is usually regarded as intimately connected with nesting, is commoner in winter quarters than would have been expected. Blackcaps may be heard occasionally from December onwards. Willow-warblers sing at least as early as the middle of February. The Turkestan and the Persian forms of the Common Nightingale both sing finely, though not at night, in early March. I have heard a Sedge-warbler in full song on 23rd March. On the other hand Garden-warblers and Olivaceous Warblers apparently utter only a sub-song, though they do this copiously. I have never heard the familiar cuckoo call in Tanganyika.

Pairing probably does not take place in winter quarters to any appreciable extent. The only species in which I have at present any reason at all to suspect it are the Nightingale and the Shoveller. But careful observation on this point is needed.†

Summary Ecology of the Migrants while in Tanganyika.—Little attention has been given in Africa generally to a study of the type of country and the climates favoured by Palaearctic wintering birds. A comparison of the environment selected by each species while in Africa with that in which it breeds is an interesting study for the future; it cannot be dealt with adequately until recoveries of ringed birds are numerous. Care must also be taken to distinguish birds that are actually wintering where they are met with from birds that are on passage, for the latter turn up in all sorts of accidental situations, irrelevant for this purpose, and misleading.

It can, however, be said that to some extent the environment selected for winter quarters in Tanganyika bears a similarity to the birds' summer habitat :

This is exactly the conclusion reached by Cheesman() (p. 607) in Abyssinia, which is, of course, much nearer the birds' breeding-ground; but since the above was written Rowan has kindly informed me, in advance of publication, that on histological examination the gonads of specimens I obtained for him shortly before their departure in the spring of 1937 show "various stages of spring recrudescence."

†It has been suggested that two *Falco naumanni* obtained with one shot near Mwanza in November were "a mated pair"(*); but as this kestrel is so gregarious on migration the "pair" may only have been a fragment of a flock dispersing in winter quarters.

swamp-dwelling birds are found in swamp vegetation; Grey Wagtails on mountain torrents; Blackcaps and Garden-warblers in the edges of evergreen forest; Nightingales in closed bush; Red-throated Pipits on soft trampled mud; Yellow-bellied Wagtails on short grass; Wheatears on bare soil or eroded land. With practically no other exceptions (apart from water birds), the remaining species that winter in Tanganyika, from Willow-warblers to Kestrels, can only be said to favour savannah or thorn-bush. Further observation will probably distinguish some more specific preferences.

Many species of wading birds winter both on the coast and by inland waters; the four species of duck only inland. All the water birds occurring inland show a preference for standing water, and within this limitation they are astonishingly widespread, on pieces of water of all sizes and every degree of isolation and permanence; but they are, I think, generally least numerous on fresh water at low altitudes.

In our present state of knowledge any pronouncement on specific climatic preferences must be highly tentative. I think that a few species, particularly Blackcaps, Garden-warblers and Swallows, winter only in highland country, usually over four thousand feet and with maximum temperatures not exceeding about 30°C. (86°F.). A few others, such as Willow-warblers and Yellow-bellied Wagtails, may be predominantly, though I know they are not exclusively, highland.

Most species have an extensive altitudinal range, from sea-level to quite six thousand feet. The winter ranges of at least three species, Tree Pipit, Common Wheatear and Willow-warbler, extend to ten thousand feet. The water birds in general show a wide altitudinal range, but very few of the migrant ducks seem to winter below about three thousand feet.

Although everywhere in the territory the migrants strike the hot season, those that seek the southern part encounter somewhat different conditions from those that winter in the northern. In Iringa, for example, the migrants arrive towards the end of a seven-months dry period, and then from about the end of December they experience frequent rain almost until their departure. In the Northern and Tanga provinces, on the other hand, the migrants arrive just in time for the short rains, they undergo a dry spell in January and February, and leave when the long rains are working up. Differences in the abundance of food can hardly fail to be correlated with these climatic differences.

From these considerations we should expect the wintering population to do a good deal of shifting about the country. This is borne out by observation. Several species, such as Bee-eaters and White Storks are conspicuously itinerant; other less obvious forms, such as Warblers and Wheatears, have demonstrated their mid-winter mobility by isolated birds coming to light at Amani or appearing there for a single day in December and January. Indeed, it is possible that only a small proportion of the total wintering population is really sedentary during its stay in Tanganyika.

The relations between the migrants and the local residents, especially with reference to the available food supply, remain to be studied. I can offer only a few notes. Individually the immigrants and the residents seem to succeed as a rule in ignoring each other. I have no evidence that they are ever in close association, for example, as members of the otherwise heterogeneous foraging parties that may be met with occasionally in thorn-bush as well as in forest. I have noted examples of complete mutual toleration: an African Mountain Wagtail (*Motacilla clara*) on the same rock as an immigrant Grey Wagtail (*M. cinerea*); European and African nightjars feeding over and resting on the same few yards of road. I have on the other hand seen a resident Shrike (*Lanius collaris humeralis*) vigorously pursuing a Lesser Grey Shrike (*Lanius minor*); but the former is a pugnacious bird at all times.

Except for the few carnivores, and the Garden-warbler, which largely depends on small berries, the migrant species are insectivorous. Where winter visitors are very numerous, as for example, the storks, harriers, kestrels, rollers, swallows, wheatears and wagtails in the Mbulu Highlands in January, it seems at first sight that competition between the migrants and the residents must be severe. But it is possible that in very completely cleared and eroded land the shortage of nesting-sites is sufficient to limit the resident population below the numbers that could be supported; so that the migrants are in fact utilizing a surplus of food. This conclusion must certainly be applicable with full force to the wading birds that winter in Tanganyika, because the resident birds of corresponding habits are so few. In natural savannah, where in the northern winter African and Palaearctic birds, such as shrikes, of overlapping food habits, occur side by side, I doubt whether the migrants form a large percentage of the population. The whole subject needs quantitative treatment by someone living in a dry area. There, not only must the available food supply vary with the rain, but the pressure on it vary from two main causes: from the shifting of the migrants and from the nesting activity of the residents, which, being concentrated on the rainy season, falls in southern Tanganyika, and to a lesser extent in northern, within the period of the migrants' stay.

Since they feed on insects the migrants are probably of economic value to East Africa. They are most obviously useful in locust destruction; white storks have long been recognized as the most valuable of all species; rollers, bee-eaters and shrikes consume numbers of locusts; while Mr D. Sturdy tells me that flocks of yellow-bellied wagtails may be seen concentrating on small hoppers.

* * *

Systematic List of Palaearctic Migrants.

NOTE.—To minimize repetition, specific references are given below only for information modifying or amplifying that contained in the summaries of Sclater⁽³¹⁾ and Grote⁽¹⁰⁾, and habitat preferences are stated only when they are for types of country other than savannah and thorn-bush.

CICONIA C. CICONIA. White Stork. Passage migrant and itinerant winter visitor at all altitudes, collecting in immense flocks when there are concentrations of locusts and following them pertinaciously.

CICONIA NIGRA. Black Stork. A winter visitor and passage migrant in very much smaller numbers than the White Stork.

ARDEA CINEREA. Grey Heron.

ARDEA PURPUREA. Purple Heron.

ARDEOLA RALLOIDES. Squacco Heron.

NYCTICORAX N. NYCTICORAX. Night Heron.

There is a resident population of all these species, which is said to be augmented by visitors during the northern winter.

IXOBRYCHUS M. MINUTUS. European Little Bittern. Recorded only from Kilosa in April⁽³⁶⁾, but perhaps not very rare as both winter visitor and passage migrant (since it occurs even further south). It is a skulking bird indistinguishable as a rule in the field from the resident African *I. m. payesii*.

PLEGADIS F. FALCINELLUS. Glossy Ibis. Flocks of hundreds of birds have been recorded at standing water round the base of Kilimanjaro⁽³³⁾ and I have seen them also at Mbulu in January. How many of these are migrants is uncertain, since the species has been found breeding on Lake Victoria⁽¹³⁾.

ANAS CRECCA. Common Teal. Not recorded south of the Sudan and Somaliland by either Selater or Grote, but found by van Someren in Tanganyika as well as Kenya⁽³⁵⁾. He kindly informs me that the Tanganyika localities from which he has seen specimens are Lakes Natron, Manyara and Eyassi. It must, therefore, be far from rare, especially in some years.

ANAS QUERUEDULA. Garganey. A winter visitor to lakes, collected round Kilimanjaro⁽³³⁾, in Mbulu⁽²¹⁾ and at Tabora⁽³¹⁾. It must occur also south of the Central Line as it has reached Nyasaland.

SPATULA CLYPEATA. Shoveller. A winter visitor to lakes and by no means so uncommon as has been supposed⁽⁶⁾. It was first collected between Kilimanjaro and Meru⁽³³⁾, later at Tabora (Grant *in litt.*) and at Kilosa⁽⁶⁾; Grant has seen it also in Bukoba and there were several on Tlawi Lake (Mbulu) in January 1935 (R.E.M.). Obviously it occurs throughout the northern half of the territory and since it has reached South Africa it may be expected in southern Tanganyika also.

DAFILA ACUTA. Pintail. A winter visitor to Tanganyika at least as far south as Tabora, from which the only specimen comes. I saw several on a lake at Mbulu in January.

FALCO SUBBUTEO SUBBUTEO. Hobby Falcon. Passage migrant and winter visitor throughout the territory^(1 6 17). While in East Africa it is very fond of flying termites.

FALCO VESPERTINUS AMURENSIS. Eastern Red-footed Falcon. Perhaps only a passage migrant. It apparently travels always in flocks, Birds in Iringa in February were already moving north⁽¹⁷⁾, I have seen them at Amani on the 30th March and Grote records them from Masailand in March and April. They have an immense journey, as they are not known to breed nearer than Lake Baikal. It is curious that *F. v. vespertinus*, with a breeding range

covering Europe as well as the western half of Asia, has not yet been taken in Africa east of the Great Lakes.

FALCO CONCOLOR, the Sooty Falcon, should almost certainly take its place in this list as a passage migrant bound for Madagascar⁽²⁵⁾.

FALCO T. TINNUNCULUS. European Kestrel. Winter visitor throughout, at all altitudes up to at least six thousand feet. Seen singly except when actually migrating.

FALCO NAUMANNI subsp. Lesser Kestrel. *F. n. naumanni*, breeding from Germany to Turkestan, is both winter visitor, up to at least six thousand feet, and passage migrant, still flocking over Rungwe as late as the 15th April⁽¹⁷⁾. *F. n. pekinensis*, not known to breed nearer than north China, certainly reaches East Africa and has once been collected in Masailand.

MILVUS M. MIGRANS. Black Kite. This subspecies from Europe and western Asia is difficult to distinguish from the resident African Black Kites. It is not specifically admitted for Tanganyika by Grote, but since it reaches South Africa (as a straggler) it is doubtless a rare passage migrant with us. However, this kite can now certainly be included in the Tanganyika list on the Mwanza specimens (17th October) determined by so careful a worker as Chapin⁽³⁾.

PERNIS APIVORUS. Honey Buzzard. Passage migrant and winter visitor, singly and not in large numbers but certainly not uncommon. It occurs at Amani each year in February and March. While in Tanganyika it consumes quantities of bee-grubs, as it does in its summer quarters, and also flying termites (R.E.M.).

AQUILA POMARINA. Lesser Spotted Eagle. Perhaps only a passage migrant. The sole Tanganyika record is by Lynes⁽¹⁷⁾, who saw flocks moving north at Iringa, 12th to 14th March.

HIERAETUS PENNATUS. Booted Eagle. The Amani specimen (26th January) is only the third East African record, the others being at Kampala⁽³²⁾ and Oldonyo Sabuk in Kenya⁽¹⁰⁾. As it has been taken in Natal⁽³¹⁾ its Tanganyika status is probably both passage migrant and winter visitor in small numbers.

BUTEO BUTEO VULPINUS. Steppe Buzzard. Passage migrant and also winter visitor—Iringa, January; Ukinga, March; Amani, January; and on the Central Line, November to February⁽⁶⁾. The diet is varied; birds, rats and lizards have been recorded as well as orthoptera and caterpillars^(1 17 32).

ACCIPITER N. NISUS. European Sparrow-hawk. Grote has fortunately verified the solitary specimen from between Kilimanjaro and Meru, which otherwise would be open to doubt, since the species is not elsewhere recorded south of Abyssinia nor included in the Kenya list. Another very small specimen recorded from Tanga in June⁽³³⁾ certainly requires re-examination before acceptance; especially at that date it might be the small resident Sparrow-hawk (*A. minullus tropicalis*).

CIRCUS MACROURUS. Pallid Harrier. Passage migrant and widely distributed winter visitor seen singly hawking over open grassland and savannah with sparse trees at all altitudes up to at least eight thousand feet. (R.E.M.)

CIRCUS PYGARGUS. Montagu's Harrier. Only certain record one from Masailand, but easily confused with *C. macrourus*. From its regular occurrence in South Africa as well as in Kenya it must be a passage migrant in Tanganyika.

CIRCUS AE. AERUGINOSUS. Marsh Harrier. A winter visitor to swamps and reed-beds, apparently not collected south of the Central line. Care is needed to distinguish this form, breeding in Europe and Asia, from the resident South African form *C. ae. ranivorus*, which ranges into the territory. The chief distinction is that in *ranivorus* the tail feathers and outer primaries are distinctly barred while in *aeruginosus* they are not.

PANDION HALIAETUS. Osprey. The records collected by Grote would make this a passage migrant and winter visitor both inland and on the coast, but caution is necessary in accepting this view as the Osprey is now known to be a resident on Lakes Tanganyika (Grant, *in litt.*), Victoria and Naivasha⁽³⁵⁾.

CREX CREX. Corncrake (Landrail). Winter visitor and passage migrant, apparently known only from round the Great Lakes.

PORZANA PORZANA. Spotted Crane. A skulking bird, easily overlooked. Only certain record Kilosa 14th April⁽⁶⁾, but, since it is not uncommon in South Africa, almost certainly a passage migrant in some numbers and probably a winter visitor also.

CHARADRIUS HIATICULA TUNDRAE. Ringed Plover. A winter visitor and passage migrant inland (up to at least six thousand feet) and on the coast. The birds belong to this Siberian race^(31 6) (Grant, *in litt.*).

CHARADRIUS DUBIUS CURONICUS. Little Ringed Plover. A widespread winter visitor, inland as well as on the coast.

CHARADRIUS MONGOLUS ATRIFRONS. Mongolian Sand-dotterel. Winter visitor on the coast in some numbers and also to Lakes Victoria and Tanganyika.

CHARADRIUS LESCHENAULTI. Great Sand-plover. Common on the coast in winter and also recorded from Masailand.

CHARADRIUS ASIATICUS. Caspian Plover. Winter visitor to the grasslands of the interior and also a passage migrant.

SQUATAROLA S. SQUATAROLA. Grey Plover. A not uncommon winter visitor on the coasts—arriving as early as 18th August, Pangani (R.E.M.). Also known from Lake Victoria.

ARENARIA INTERPRES. Turnstone. Winter visitor to the coast, not in large numbers, and also to the Great Lakes (Grant *in litt.*).

HAEMATOPUS O. OSTROLEGUS. Oyster Catcher. Winter visitor in small numbers on the coast.

RECURVIROSTRA AVOSETTA. Avocet.

HIMANTOPUS HIMANTOPUS. Black-winged Stilt.

Gregarious birds to be seen only on shallow inland waters. Both species breed in East Africa but the resident population is apparently augmented by winter visitors.

CAPELLA G. GALLINAGO. Common Snipe. A fairly numerous winter visitor to swamps in the Northern Province^(21 33), up to at least seven thousand five hundred feet.

CAPELLA MEDIA. Double Snipe. Passage migrant and common winter visitor to swampy ground at all altitudes up to at least eight thousand feet.

LIMNOCRYPTES MINIMA. Jack Snipe. One record from the Mbalagetti River (Serengeti) 19th February⁽²¹⁾.

EROLIA TESTACEA. Curlew Sandpiper. A winter visitor to the coast and to inland waters.

EROLIA MINUTA. Little Stint. A winter visitor on the coast and inland throughout, often numerous and on small and isolated waters^(17 24 33).

CROCETHIA ALBA. Sanderling. Winter visitor to the sea coast, also recorded from lakes.

PHILOMACHUS PUGNAX. Ruff. Winter visitor, mainly inland.

TEREKIA CINEREA. Terek Sandpiper. Apparently rare on the East African coast: once recorded from Dar es Salaam.

ACTITIS HYPOLEUCOS. Common Sandpiper. A most abundant winter visitor (but never in flocks) on the coast and inland up to at least seven thousand feet. It has a wider range of habitat than any other visiting wader; it is the only one to frequent mountain torrents, and it may be found even at roadside puddles and in irrigation channels a foot wide. The Common Sandpiper stays in Tanganyika during the northern summer more plentifully than any other Palaearctic bird.

TRINGA OCROPHUS. Green Sandpiper. Not recorded from Tanganyika by either Sclater or Grote but actually a widespread winter visitor, usually seen singly, on inland waters, especially the muddy edges of pools and cattle water-places, up to at least six thousand feet. Specimens have been recorded from Kilimanjaro⁽³³⁾ and Njombe⁽¹⁷⁾ and I have seen this species in Mbulu (five thousand seven hundred feet) and near Tanga.

TRINGA TOTANUS subsp. Common Redshank. Probably all the Redshanks that visit the East African coast in the winter belong to the race *T. t. eurhinus*, breeding in north-eastern Europe, Siberia and Central Asia⁽¹⁸⁾. In my experience Redshanks are uncommon; and their occurrence inland has not so far been substantiated by specimens.

TRINGA STAGNATILIS. Marsh Sandpiper. Passage migrant and winter visitor (non-gregarious) mainly round lakes and pools, up to at least six thousand feet.

TRINGA NEBULARIA. Greenshank. Passage migrant and winter visitor usually seen singly on the coast and on inland waters up to at least six thousand feet.

TRINGA GLAREOLA. Wood Sandpiper. Passage migrant and winter visitor with a similar distribution and similar habits to the Green Sandpiper.

NUMENIUS ARQUATUS subsp. Curlew. Evidently^(10 31) both the nominate form, breeding in Europe and Western Asia, and *N. a. lineatus*, which comes

from Central and Eastern Asia, are represented among the numerous curlew that winter in parties on the coast. Non-breeding birds are often to be seen during the northern summer and I have heard the characteristic call at all seasons, though never frequently. Curlew are not nearly so common on inland waters.

NUMENIUS PH. PHAEOPUS. Whimbrel. Occasional on inland waters and quite numerous on the coast, where Whimbrel are common in parties all the year round. Up to the present the bird has not been proved to breed on the shores of the Indian Ocean, but there is some reason to suspect it and the possibility should be borne in mind.

LARUS F. FUSCUS. Lesser Black-backed Gull. Recorded from the Great Lakes but apparently not from the coast.

GEOCHELIDON N. NILOTICA. Gull-billed Tern. A winter visitor on inland waters as far south as Lake Rukwa; rarer on the coast.

CHLIDONIAS NIGRA. Black Tern. Winter visitor to inland waters.

CHLIDONIAS LEUCOPTERA. White-winged Black Tern. Winter visitor on inland waters and also passage migrant. Recorded, moreover, between Kilimanjaro and Meru in July⁽⁸⁴⁾ and by Grant (*in litt.*) on the Malagarasi River (Kasulu district) in May.

CHLIDONIAS LEUCOPAREIA subsp. Whiskered Tern. Common on lake at Babati January⁽²⁴⁾. The European form winters on Lake Naivasha⁽³⁵⁾ but has not been recorded within the boundaries of Tanganyika. The possibility cannot be excluded, however, that the Babati birds may have belonged to the resident South African form *C. l. sclateri*, which is known to extend north to Nyasaland.

CUCULUS CANORUS subsp. Common Cuckoo. Cuckoos of this species are both passage migrants and winter visitors. *C. c. canorus*, the form breeding over most of Europe, has been obtained as early as the 26th August at Korogwe⁽¹⁰⁾. Practically all the other specimens from the territory are spring birds, but I have got it at Amani 24th November. I have observed numbers of cuckoos travelling in association, but not in defined flocks, through the Tanga Province each year at the end of March. Specimens collected from among them have all been identified as *C. c. telephonus*, the Asiatic breeding form. *C. c. bangsi*, breeding in Spain, has been recorded from western Tanganyika⁽¹⁰⁾ and from Amani⁽³²⁾ but as the separation of this form rests only on a small difference of size, the identifications cannot be accepted without reserve.* I doubt whether the "cuckoo" call is ever uttered in Tanganyika; from birds on migrations I have heard only the bubbling of the female.

CUCULUS P. POLIOCEPHALUS. Lesser Cuckoo. It has only been discovered during the last five years that this Cuckoo from beyond the Himalayas winters in East Africa in numbers⁽⁹⁾. Many pass through the Tanga Province at the end of November and again at the end of March. I have seen single birds throughout December at Amani, and since Vincent collected a specimen in

*Since this was written Grant and Mackworth-Praed (*Bull. B.O.C.*, 57, p. 89) have expressed the opinion that the Spanish race cannot be distinguished in Africa.

Mozambique⁽³⁷⁾ it most probably winters from one end of the territory to the other, though it may well be confined to the coastal strip.

CLAMATOR GLANDARIUS. Great Spotted Cuckoo. Status obscure and likely to remain so, because it is a bird with no geographical variation and an immense breeding range: Europe, Asia, Tanganyika⁽¹⁾, Nyasaland⁽²⁾ and South Africa⁽³¹⁾. It is not included by Grote in his list of species migrating to Africa; but van Someren⁽³⁵⁾ considers there is an influx of northern birds to winter in Kenya, and Selater⁽³¹⁾ gives it as a winter visitor throughout Africa.

CORACIAS GARRULUS GARRULUS. European Roller. Passage migrant and common winter visitor at all altitudes up to at least six thousand feet, usually in parties. Most often seen at Amani February and March. My latest date, 10th April, compares with 12th April for Kenya⁽³⁵⁾.

MEROPS APIASTER. European Bee-eater. Mainly a passage migrant but also an itinerant winter visitor up to at least six thousand feet. Invariably seen in flocks which utter a frequent whistling call.

MEROPS SUPERCILIOSUS PERSICUS. Persian or Blue-cheeked Bee-eater. Remarks under the preceding species apply exactly. I think the two species always keep in separate flocks.

CAPRIMULGUS EUROPAEUS subsp. European Nightjar. Small flocks of this nightjar occur in Kenya⁽³³⁾ but in Tanganyika I have found it only singly. Grote thinks most of the Tanganyika birds are on passage, but *C. e. europaeus*, the subspecies breeding over most of Europe, is certainly a winter visitor in no small numbers, at all altitudes up to at least six thousand feet—Mbulu⁽²⁴⁾, Iringa⁽¹⁷⁾. I have found it common also on the roads in the foothills of Usambara, especially in February and early March. The Turkestan form, *C. e. unwini*, must be a winter visitor and also a passage migrant, since it occurs in Kenya and reaches the Cape; but the only Tanganyika records are from Tanga (R.E.M.) 8th November and near Iringa 27th January⁽¹⁾. *C. e. meridionalis*, which breeds round the Mediterranean, is not recorded south of Kenya by Grote, but it has been reported from Pangani⁽³¹⁾, Kilosa 4th February⁽¹⁵⁾ and Singida⁽⁶⁾.

APUS APUS subsp. *A. a. apus*, the Common Swift, that breeds throughout the greater part of Europe, is an itinerant winter visitor in Tanganyika, and most probably a passage migrant as well. It is indistinguishable in the field from the resident *A. a. shelleyi*.

Apart from these, paler birds from Asia occur in Tanganyika in mid-winter and since they have been taken also in countries further south they are probably also passage migrants in small numbers. It appears that all the Swifts of this species breeding in Palaearctic Asia should be called *A. a. pekinensis* (cf. Selater and Meinertzhagen), the birds of Asia Minor described under the name *A. a. marwitszi* not being distinguishable. The only actual Tanganyika specimens I know of are one from the Wembere Steppe—recorded under the name *A. a. marwitszi*⁽¹²⁾—and two obtained for me by T. A. Baldock near Longido in January 1936, which have been identified as *pekinensis*. There

is also a doubtfully identified specimen from Mikindani (*Jnl. Orn.*, 1912, p. 529).

MOTACILLA C. CINEREA. Grey Wagtail. Recently discovered to be a winter visitor⁽²⁶⁾, at present known only on mountain streams at Loliondo (Rowe) and in the East Usambaras. My earliest and latest dates are 12th October and 14th March. The species has not been seen below three thousand feet.

MOTACILLA (BUDYTES) FLAVA subsp. Yellow Wagtail. Passage migrants and winter visitors, present locally in numerous flocks, chiefly on short grasslands above about four thousand feet. I have, however, seen a few in mid-winter (January) at Tanga. Subspecific identification presents great difficulties except for males in fresh spring plumage. *M. f. lutea*, from Turkestan, may be the common form generally. *M. f. flava*, the Central European race, has been recorded from Rukwa, Mikindani and Rungwe^(10 1). *M. f. thunbergi*, which nests in the high north, from Lapland across Siberia, has been reported from the extreme north-west of the territory, including Ukerewe. Finally, specimens of mine from both Usambara and Mbulu have been attributed to the British breeding race, *M. f. rayi*; but this is particularly difficult to distinguish from *M. f. lutea* and I have elsewhere given reasons for doubting whether *rayi* can occur in Tanganyika^(24 32).

ANTHUS TRIVIALIS. Tree Pipit. Passage migrant and winter visitor, always singly, throughout the territory, but perhaps avoiding altitudes below about three thousand feet. Found at nine thousand feet on the Kilimanjaro moorland⁽³³⁾.

ANTHUS CERVINUS. Red-throated Pipit. Winter visitor recorded only from Bagamoyo⁽¹⁰⁾ and round Kilimanjaro, where it was on open muddy ground⁽³³⁾.

MUSCICAPA STRIATA subsp. Spotted Flycatcher. The European form, *M. s. striata*, is a passage migrant and winter visitor at all altitudes up to at least six thousand feet. The Asiatic *M. s. neumanni* is a winter visitor with the same wide altitudinal range but it has not been found further south than the southern border of Tanganyika. These flycatchers always occur singly.

[The record of *M. s. tyrrhenica*, while not inherently improbable, cannot be accepted because the identification was not made after proper comparison⁽⁶⁾.]

FICEDULA HYPOLEUCA SEMITORQUATA. Half-collared Flycatcher. The recent discovery⁽¹⁷⁾ that this is a "fairly common winter visitor in Iringa" is of particular interest because this flycatcher had not previously been met with south of the Sudan and its winter quarters were unknown⁽¹⁰⁾.

MONTICOLA SAXATILIS. Common Rock Thrush. A winter visitor seen, always singly, with what I used to think surprising frequency, from sea-level to at least six thousand feet in savannah country throughout the territory. Its abundance becomes comprehensible now Grote (*Orn. Monatsber.* 45, pp. 33-41, 1937) has shown that in the winter the entire breeding population, from Spain to Afghanistan and China, seeks Africa between latitudes 15°N. and 10°S., excluding the Congo forest region. (I take Lynes's record of *M. solitarius* for

south-western Tanganyika⁽¹⁷⁾ to be merely a slip of the pen for *M. saratilis*, since the former species is not otherwise recorded south of Abyssinia.)

OENANTHE OE. OENANTHE. Common Wheatear. Winter visitor, always solitary, to the entire territory south to Iringa⁽¹⁷⁾ and Mikindani⁽¹⁰⁾ at all altitudes from sea-level to ten thousand feet⁽³³⁾. They prefer very open country and bare soil, whether on low hot steppe or above the timber line. In my experience they leave early, by the middle of March.

OENANTHE ISABELLINA. Isabelline Wheatear. Recorded only from Masailand, but it is not uncommon in the Tanga Province from December to 21st March (R.E.M.)

OENANTHE L. LEUCOMELA. Pied Wheatear. Once collected in Masailand.

IRANIA GUTTURALIS. White-throated Robin. Loveridge's Dodoma specimens⁽⁶⁾, 22nd December, form the sole Tanganyika record, and indicate that the species must be a rare winter visitor.

SAXICOLA RUBETRA subsp. Whinchat. A winter visitor as far south as the southern boundary but not in the eastern half of the territory, and probably not occurring below about four thousand feet. Some Tanganyika specimens have been ascribed to the typical race, which breeds over most of Europe, and others to *S. r. spatzi* from south-eastern Europe.

PHOENICURUS PH. PHOENICURUS. Common Redstart. The single record is from Bukoba⁽¹⁰⁾, and as the species is extremely rare in Kenya and Uganda⁽³⁵⁾ it is not likely to be met with often in Tanganyika.

LUSCINIA LUSCINIA. Sprosser Nightingale. Probably a widespread winter visitor in small numbers, but at present only recorded from the Northern Province and the east shore of Lake Tanganyika.

LUSCINIA MEGARHYNCHA subsp. Nightingale. This, the species to which the English bird belongs, is represented in Tanganyika by the forms breeding in Persia and in Turkestan respectively, both as winter visitors to the north of the territory. They seem to favour thickets such as line water-courses in savannah. The Persian subspecies, *L. m. africana*, received that name because, when it was first collected over fifty years ago near Moshi, and until it was found in its breeding area in summer, it was thought to be an African resident. Its discoverer, Fischer, has described how it was apparently paired and singing finely morning and evening, though not at night, during his stay at Arusha Chini, 10th to 22nd March. Schillings⁽³⁰⁾ states that he heard a number of males in fine song as early as December. In Tanganyika it is still known only from that neighbourhood, from Masailand⁽¹⁰⁾ and from Babati⁽²⁴⁾.

The Turkestan form, *L. m. hafizi*, has been collected only in closed bush near Tanga, where I found it apparently paired and in full song during the morning of 24th March⁽²³⁾. In view of the Kenya localities for *hafizi* it is possible that it winters nearer the coast than *africana*, and hence generally at lower altitudes, but the evidence does not warrant a definite conclusion.

SYLVIA COMMUNIS. Common Whitethroat. A winter visitor either very local or generally overlooked. The typical form, which breeds throughout Europe, has been recorded from Njombe⁽¹⁷⁾ as well as from the Northern Province and Dar es Salaam⁽¹⁸⁾. A specimen collected at Mkomasi in the Tanga Province on 21st April (R.E.M.) has been identified in the British Museum as the Asiatic form *S. c. icterops*, which has not hitherto been recognized south of Somaliland.

SYLVIA ATRICAPILLA. Blackcap. Recently discovered to be a winter visitor in some numbers from one end of the territory to the other^(17, 32). Grote considers that Blackcaps reach the tropics later than other warblers, but they were already in Mbulu by the 19th October⁽²⁴⁾. Their main habitat in Tanganyika is the edges of highland evergreen forest and I have even found them well inside the forest belt on Mount Meru. Their favourite altitudes are apparently about four thousand five hundred to seven thousand five hundred feet, though they are not uncommon at three thousand feet at Amani, which is abnormally cool. I have heard song in December, but not of full intensity.

SYLVIA BORIN. Garden Warbler. Common winter visitor with the same distribution and habitat as the Blackcap, and also a passage migrant. Commonest at Amani about 20th February to 1st April in small parties, which utter a good deal of subsong.

SYLVIA CANTILLANS ALBISTRIATA. Subalpine Warbler. Admitted for Tanganyika by both Selater and Grote, but as no locality is given in the original reference⁽¹²⁾ on which they base their inclusion, and as the species is not otherwise recorded from nearer than northern Somaliland, confirmation should be awaited.

SYLVIA NISORIA. Barred Warbler. Recorded from northern Masailand.

AGROBATES GALACTOTES SYRIACUS. Rufous Warbler. A winter visitor collected only at Moa⁽²³⁾ and Masinde⁽³¹⁾ (p. 481), but probably not uncommon in the thorn-bush inland towards Kilimanjaro. Easily confused with the resident Scrub Robins of the genus *Erythropygia*, to which indeed the Rufous Warbler is thought by some ornithologists to belong. Such a classification would be in accord with its habits, for in my experience it resembles them closely in its movements and moreover it gets most of its food on the ground.

HIPPOLAIS POLYGLOTTA. Melodious Warbler. Grote mentions a record from Bukoba with a doubt fully justified by the fact that no other African record exists nearer than Nigeria.

HIPPOLAIS ICTERINA. Icterine Warbler. Loveridge's specimens from Mwanza in December and Singida in February⁽⁶⁾ stand alone. Evidently the bird is a rare winter visitor.

HIPPOLAIS LANGUIDA. Upcher's Warbler. Winter visitor; one record near Moshi.

HIPPOLAIS PALLIDA ELAICA. Olivaceous Warbler. Not recorded within our limits by Grote but I have found it a not uncommon winter visitor in the Tanga Province (thorn-bush and savannah, at low altitudes, 18th November to 23rd March). A good deal of winter movement must take place because specimens have come to light at Amani on 2nd December, 4th December and

3rd February. As early as 16th January I have heard birds singing a low rambling subsong just like that of the birds breeding in Egypt when they first arrive there in spring.

ACROCEPHALUS ARUNDINACEUS subsp. Great Reed Warbler. Passage migrant and winter visitor to swamp vegetation. Specimens from Kilosa⁽⁶⁾, Njombe⁽¹⁷⁾ and the shore of Lake Nyasa⁽¹⁹⁾ belong to the European breeding form, *A. a. arundinaceus*. Other Tanganyika specimens have been attributed to *A. a. zarudnyi*, which breeds in Turkestan⁽³¹⁾.

ACROCEPHALUS GRISELDIS. Basra Reed Warbler. Winter visitor probably at low altitudes. In Tanganyika known only from the foot of the Ngurus, from Kilosa and from near Tanga in rank herbage, 24th March^(28 31 23).

ACROCEPHALUS SCIRPACEUS subsp. Lesser Reed Warbler. Both the western *A. s. scirpaceus* and the Asiatic *A. s. fuscus* (= *crassirostris*) have been recorded as winter visitors in the Northern Province. A bird of this species came to light at Amani, 27th April (R.E.M.).

ACROCEPHALUS PALUSTRIS. Marsh Warbler. Long known from both Kenya and South Africa, but only two published Tanganyika records, both winter birds in the extreme south and south-west^(17 19). It has three times come to light at Amani, 26th November, 10th January, 5th May (R.E.M.). Evidently a winter visitor throughout as well as passage migrant.

ACROCEPHALUS SCHOENOBÆNUS. Sedge Warbler. A passage migrant and a winter visitor to reed-beds from one end to the other of the territory. I have found it in song 23rd March. Latest record 1st May⁽³²⁾.

PHYLLOSCOPUS TROCHILUS subsp. Willow Warbler. Both the European *P. t. trochilus* and the Asiatic *P. t. eversmanni* occur in Tanganyika in winter, and the former is a passage migrant as well. The bulk are late in leaving: Sjöstedt⁽³³⁾ records a number at the foot of Kilimanjaro on 24th April and one came to light at Amani on 26th April. It is noteworthy that although *eversmanni* is not recorded south of Kenya by Grote, Lynes's birds from the Iringa district and mine from several localities have all been identified as this race. The western *P. t. trochilus* apparently occurs throughout the territory, as it has lately been recorded from the south-west⁽¹⁾, and is not segregated from *eversmanni*. The birds, usually in small parties, inhabit open tree vegetation of great variety, thorn-bush, secondary growth in cultivation and bush in subalpine moorland, at all altitudes from sea-level to eleven thousand feet, though apparently commonest above four thousand feet. They sing a good deal at least as early as the middle of February.

PHYLLOSCOPUS COLLYBITA ABIETINA. Chiff-chaff. Recorded only from the lower slopes of Kilimanjaro, 13th March⁽²²⁾.

HIRUNDO R. RUSTICA. European Swallow. A very numerous passage migrant in flocks, most obvious generally, I think, in the later half of March; for example, on 16th March N. R. Fuggles-Couchman at Kilosa has noted that swallows seemed "to fill the sky to right and left and upwards as far as

the eye could see." European swallows also winter in the territory but probably only at fairly high altitudes. I have found them locally numerous in January between five thousand and eight thousand feet (Mbulu highlands, Ngorongoro and Kilimanjaro). They do not occur at Amani (three thousand feet), nor winter and according to S. A. Evans make only occasional brief appearances at Mwapwa (three thousand five hundred feet). In my experience the wintering birds prefer open country, such as the mountain grassland round Ngorongoro and the heath above Machame, but I have also found them in the short-grass rides of the Nou Forest.

DELICON URBICA. House Martin. A passage migrant and, apparently in small numbers, a winter visitor.

RIPARIA R. RIPARIA. Sand Martin. Apparently a passage migrant, easily confused with resident African Sand Martins when seen in the air. The only Tanganyika specimens come from Lake Victoria.

LANIUS MINOR MINOR. A passage migrant found by me, and apparently others also, only in spring and at low levels in the eastern half of the territory.

LANIUS C. COLLURIO. Red-backed Shrike. Passage migrant and winter visitor in some numbers at all altitudes to at least six thousand feet. Like the other migrant shrikes, always seen singly. Although never wintering at Amani it appears there regularly during November and again between 23rd March and 22nd April. Some Tanganyika specimens have been ascribed to the doubtful race *L. c. kobylini* of the Caucasus and Persia.

LANIUS ISABELLINUS subsp. Red-tailed Shrike. Birds belonging to this Asiatic species are not uncommon winter visitors to the northern half of the territory, always solitary and perhaps mostly below about four thousand feet. Specimens from the base of Kilimanjaro, Dar es Salaam and Lake Victoria have been ascribed to *L. i. isabellinus*, the Central Asiatic subspecies^(33 10). My own specimens from the Tanga Province have been identified as *L. i. phoenicuroides*, which breeds further west. In my experience this shrike is particularly partial to small patches of bare cultivated ground which it likes to scrutinize from some perch.

LANIUS BOGDANOWI. Bogdanow's Shrike. This Central Asiatic species has once been collected in Africa, at Umbugwe, 15th November. (The record is not included by Grote, but accepted by Selater, following Hartert.)

ORIOULUS O. ORIOULUS. Golden Oriole. Common passage migrant usually in parties, and also winter visitor, probably not in large numbers. I have no mid-winter records, but Lynes⁽¹⁷⁾ found that in south-western Tanganyika they favoured highland forest. Rowe has noted these Orioles also in forest at Monduli, though they were then (24th October) probably on passage. As an illustration of how much more attention needs to be given in East Africa to the ecology of winter visitors it may be noted that Loveridge⁽⁶⁾ records the exactly contrary opinion that "they prefer open country to forest."

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Some East African Native Songs

By Hans Koritschoner

IT MAY be observed that the native is still singing and dancing up to an age at which we know only how to groan. Both males and females participate up to the most advanced stage of senility, especially in the songs and dances connected with tribal ceremonies. The native has songs for every event and for all the ceremonies of his religious or spiritual life. These are in part secret, for the initiates only, and in part public, where everybody may attend and join in the songs and dances. Besides the traditional *ngomas*,* others exist everywhere for the sole purpose of giving the people an occasion for singing and dancing.

The result is that every native knows an unimaginable number of songs, whatever may be his general abilities. His memory is remarkably trained in this respect. If a bard sings his latest poem to his public, all will chime in after three repetitions with such certainty that no spectator would notice that they had heard it just then for the first time. To realize fully what this means the reader may stop here and sing the third strophe of his national anthem.

The native knows no poetry that is not a song. The singer is at the same time the poet and the leader of the dance, but seldom the composer of the tune. He is free in the choice of his text. For instance in a hunter's *ngoma*, although that is a specialized affair, a bard is not restricted to game and hunting subjects, he may choose any actual event. Therefore it is impossible to recognize from the words of a song to which *ngoma* it belongs, but a tune can usually be ascribed to its correct *ngoma*, and a dance always.

As a rule the artist creates new words to a tune already in vogue. It is rare for a tune to be associated with one text only. I do not think that there is anything like an invention of new tunes. The existing material is continually being improved by small changes. It is noticeable that this is sometimes effected by nothing more than the alteration of a few notes. Such intermediate forms are sometimes abandoned after a few months but especially clever alterations become firmly established. When many intermediate links are lost, the tunes in use seem to be independent creations.

Unlike the text and the tune the rhythm remains constant for the same *ngoma*.

The *ngoma* may take two artistic forms; in one the music and dance play the chief part, in the other they are subordinated to the words. The songs belonging to the first kind are naturally short, often with the refrain longer than the actual text.

*The word *ngoma* means "drum," thence "dance," and in a metaphorical sense is used to mean a confraternity observing certain ceremonies and rules.

The refrain is the chorus to the bard's solo (also accompanied by the audience) and does not vary for each song in an *ngoma*. This may be the reason for the fact that European listeners have the impression that natives sing the same song for hours. But the songs are repeated only a few times and then the leader starts a new one; what remains unchanged is the refrain. A refrain may be fashionable for some time but may also undergo development independently of the songs.

In this kind of *ngoma* connections of vowels are often interpolated between the few words, a device comparable with our yodelling, but musically different. The accompanying dance is primarily and predominantly rhythmic and requires good lungs and strong muscles. (Examples: *Lingvamba* of the Ngoni, *Zero* of the Zigua, *Ndomole* of the Sagara, *Mpugi* of the Shambala and generally the nuptial dances.)

Very different are the songs of the second kind. They have a richly descriptive text. Into the simple musical frame new pictures are continually put and this forms the favourite occupation of these dancing poets. Here the dance is not complicated; no participant but the leader exerts himself. (Examples: many *ngomas* of the Sukuma and Nyanwezi, *Salenge* of the Nyiramba, *Lipuga* of the Mbunga, *Ipaha* of the Nyaturu and nearly all songs used in ceremonies.)

As so many songs are produced and there are no means of writing them down their term of life is short. It is difficult to find an old man who still remembers songs dating from the time when Europeans first came to East Africa.

Both rhyme and assonance are very rare. For a few exceptions see Velten: *Sitten und Gebräuche der Wasuaheli*.^{*} What distinguishes poetry from prose is not the formal but the spiritual element. Poetic licence extends only to changed and arbitrary accentuation of words if the rhythm demands it. The true elements of poetry are the parable, the allusion and the hidden meaning. As in our joke the enjoyment of the hearer comes from his own mental contribution, in quickly completing the logical connection purposely omitted.

The absence of any feeling for natural beauty is remarkable and so is the absence of love-songs. (I am aware of the *mashairi* and *utenzi* but these are typically coastal.)

Sexual matters bulk large in the art of the natives as they do in his life; but here it may be very difficult to understand his feelings. Since childhood he is a stranger to none of the natural functions. If he chooses a sexual theme for his song he does not go in for poetic freedom or make the most of the occasion. He is everywhere free and has everywhere his occasion. Lewdness is an invention of civilization.

In the following I give a few examples of songs. As I am here concerned with words I naturally have had to select songs from *ngomas* that have their centre of gravity in the text rather than in the tune and dance. This kind is

^{*}I omit in this paper anything showing marked Swahili or Arab influence.

mostly performed by the Sukuma and Nyamwezi and therefore my examples are taken from their *ngomas*. If it were possible to reproduce tunes I should make my selection mostly from songs of the Ngoni.

I give here only the translation of the texts and not the originals, which I wrote down at the time of hearing and could furnish on request. I must admit that I am not a linguist and that my original texts in points of phonetics and philology are no doubt incorrectly transcribed. I have always been interested in the matter rather than in the form, and I am here chiefly concerned to draw attention to instances of poetic beauty.

I am convinced that both in the tunes and in the texts of native songs a treasure worthy of discovery is laid up for the European ear. Numerous texts and a few tunes have, of course, already been published, but rather from the scientific than the artistic point of view.

Examples of Songs

War-Songs

Kisukuma.

Ngoma: Ikubagu, a very old *ngoma* not performed in these days.

Singer: Manigete.

The situation is that a man, with wife and child left his home and escaped into the bush, when the Europeans first entered his district. He calls the Europeans "Walifunuki" which means the men who are covered (with a hat), and children on account of their white colour. Eyes like wood means that the eyes of the Europeans looked on the native with fixed stare.

My child is crying.

It met a witchcraft doctor.

I took it on my back.

You my wife, mama Mgumba, stop here.

Let us expel him out of our house.

They have hot eyes, the men with the helmet.

Eyes like wood, eyes like the lightning.

But in the distance even God thunders

Without effect.

It is possible to beat them with spears.

They are still children without experience.

They have not seen the inland country.

Ngoma: Bufumu, about which I could say much. *Singer: Supira.*

A surprising song on account of its length and contents. It describes the progress of the invading Europeans and expresses the true feelings of the natives at this time.

It came with thunder.
 It pawed the ground
 The red bull
 Came with power.
 Zanzibar he left
 With gentle farewell
 Uhehe he passed with the rifle on the shoulder.
 In Ugogo he rubbed his horn on the termite hill.
 He still went on.
 In Unyanyembe he stamped on the toes of the people.
 The women talk at the well.
 They say: "My child is gone as a porter,
 They sent him back very thin."
 "Cease from such talk, my friend,
 If we are overheard we shall suffer.
 If your son is a man of pluck
 He may yet meet us here, still on the spot
 Like fruits fallen from the baobab tree.
 He will take food and recover."
 Our Sultans have arranged these things.
 The men of the street do not honour them.
 I tell you so even if you like it not.
 But you had better ask Kaniata.
 He knows all about it.
 He broke his spear to splinters on the rock.
 O mother, where are my arms?
 I throw them in a hole.
 Who is left to sharpen our arms?
 We are gelded bulls.

* * *

Kisukuma.

Ngoma: Kadigi. Singer: Mwana Magira.

The song is to be understood as a mockery at a father who agreed that his daughter should go to a European. The father is probably a singer or a follower of a rival *ngoma*, although not named here.

The first and third verses are put into the mouth of the father, in the second the mocking poet himself speaks.

I feel cuts in my heart
As if done with a razor.
I have an enemy, who is stronger than I.
My heart is gloomy.

Come on, you girls,
We will leave this house
And laugh. When we get home
There is much to tell of it.

My enemy in this struggle is the stronger.
He has eyes like a pouncing cat
Which has missed its mouse.
When he asks me for my daughter
I cannot resist,
She will be sent to him.

* * *

Kisukuma.

Ngoma: Taburu. Singer: Ndira.

The man who came from Unyanyembe is a European. Nairobi is only meant to express far distance and to indicate the kind of man who left with the girl. Mgika is the follower of the *ngoma* Ugika opposed to the singer's own *ngoma*. The Gika have the custom of putting on a lot of beads, mussels and small horns when they dance. The poet calls the European a Mgika because he likes to put on many things, binoculars, a watch on a chain and a bottle on a string.

My sweetheart I lost,
She is gone across the river.
My sweetheart has left me.
She is gone to Nairobi.
Her suitor was a man
Who came from Unyanyembe,
So people say, but if you want the truth,
He is a Mgika.
We hate each other,
Friendship between us is a useless thing.
We have been on friendly terms,
But what is now the good of it?
Friendship with a Mgika!
They will perhaps sue me
For having made this song.
But I will tell them
I have not made it.

The followers of the *ngoma* Ugika live in the northern districts of the Sukuma country, therefore the poet says that it is not true that the man came from the south, he must have come from the north.

* * *

Kisukuma.

Ngoma: Ikubagu. Singer: Kinungumika.

A song from the time when first the Europeans entered the country. The poet calls them men with wooden legs. The natives believed that on account of boots and leggings the Europeans were men without feet and legs.

Put on my feathers which I wear when I dance.
I leave to meet the men with the wooden legs,
With rifles on their shoulders.
May they all die! May they all burst!
If I die, grass will grow up
In the yard of my house.
Who else shall clean it?
I have none to follow me.
The women will cry: "He is gone
Who gave joy to the country."
Through the euphorbia hedge will blow the wind.
Kinungumika is dead.

* * *

Kinyamwezi.

Ngoma: Inyongo. Singer: Kisinsa.

An *ngoma* from the time when the Nyamwezi went to the shore as porters.

Driven out by poverty one man goes to hoe,
The other is like dust blown away to the coast
As porter.
For me my medicines are the coast.
I sitting at home am myself the whirlwind.
You the medicines may make foolish, but not me.

* * *

Kisukuma.

Ngoma: Vulugu, in former times a war-dance. Singer: Shigera.

Slender leopard is Sultan Tinde of Uduhe who defeated Sultan Huima of Uchunga (?), both places not far from Shinyanga.

This song has a special expressive tune and it is one of the few examples in which the tune is associated with one text only.

Slender leopard went out hunting
And struck down whatever he met.
He climbed a hill and saw
That his mighty enemies all lay dead.
We and our fathers were not yet born,
We bold men from Ukunku.
If we had been alive at that time
We too would have gone to the fight.

Songs in Competition

Two singers of the same *ngoma*, but leaders of different groups of members, agree to compete. On a chosen day they meet, after they have taught their followers the new songs. The groups sing in turn at some distance from each other. The victor is the singer who draws to his side the majority of the spectators. Many means apart from the songs are used to arouse the attention of the spectators. Often a Sultan himself may arrange such a "*ngoma ya shindano*" and act as umpire. Every insult inflicted on one singer by the other is allowed to pass without consequence. The singers make no secret preparations. Each one knows the songs of his opponent beforehand and may prepare a corresponding answer.

Kisukuma.

Ngoma: Pua. Singer: Kamlaki.

The poet says that Kasungi has given up his child; which means that he gave it free to the manipulations of witchcraft doctors who cut its head and had already taken the intestines.

They weep over the loss of Kasungi's child.
Look, it protrudes its eyes.
They buried it in the presence
Of many witchcraft doctors.
I said to them: "Give me the corpse,
To cut laces for my boots,
I beg you, or strips for my bed.
But, as I looked better on entering the room,
I saw the child's head had been cut,
And the intestines were gone.
Mother Sawo, cease weeping.
Water which has been spilled,
Who can pick it up?
Kasungi has given up his child
And now he tries to make for himself.
Arm loops and a garment from its skin.

Kasungi is the opponent of the singer and father of the child, mama Sawo its mother. The parents had actually lost a child two months before, and the effect of this pitiless song was that Kasungi for a long time refused to enter a *ngoma ya shindano*.

* * *

Kisukuma.

Ngoma: Ugika. Singer: Sagumbi.

Bin Hiwazu is his opponent. The singer describes his opponent as a fool, who is not able to meet a serious situation. He curses the skin, which is the last thing to be actually concerned with the death of his wife. On the other hand he describes him as a man quickly consoled over his loss.

Bin Hiwazu went to the coast.
 When he came back he cursed the skin,
 On which his wife had died.
 "Die, die," he exclaimed,
 "I do not want to see you.
 You have cheated me of my wife
 While I have been away.
 I find her already buried.
 I am furious.
 I cut you in pieces to make boots.
 You have left me here alone.
 I returned and missed her with whom I lived.
 If I think, I must weep.
 Father Hiwazu, have we finished
 With all the cattle?
 I will marry and even
 If it should be a gap-tooth
 She can blow up the fire."

* * *

Kisukuma.

Ngoma: Ugika. Singer: Lukara.

The singer describes the domestic troubles of his opponent without giving his name.

Two wives of a man have a quarrel.
 Insulting each other they say:
 "You stop him visiting me.
 Are you his mother?
 In former time he sought me."
 My friend Odisa, I tell you

These women are fighting
About the tail of a ram.
The younger gets the greater part,
The older is angry. She laughs:
"He! He! We become hermits here.
Perhaps I have been married only
To look after his food.
For whom am I reserved?
I shall leave here, he only makes me late."

Songs from Hunters' *Ngoma*

Kinyamwezi.

Ngoma: Brashi. Singer: Muhenga.

In the bush, in the deep forest
We do our work.
One hunter digs a hole
The other sets a trap.
We divide the meat with our pupils.
Another part we cut in pieces
And dry it over the fire.
We all die in the same way.
We hunters, let us be good comrades.

* * *

Kisukuma.

Ngoma: Vuege. This *ngoma* dates from the time when elephants were hunted by poisoned arrows. The tradition is still kept alive by a few members who meet occasionally to drink *pombe*. *Singer: Shigera.*

Away with your counsel
I've got accustomed to the life in the bush.
Wait a little. I will go for elephants.
Do not tell me that's stupid.

* * *

Ngoma: Urumba, a common hunter *ngoma* in the south-western part of Tanganyika Territory.

I killed a wild pig in the trap.
It cried: "Where is my father?
Lo! He too has been killed by the hunter.
But he died from an arrow.
Only I die by the noose."

Songs of a Boasting Character more numerous than the others

*Kisukuma.**Ngoma: Ugika. Singer: Milekwa bin Gumha.*

I have provided my eyes with the strong charm.
 I Milekwa, where I look with them
 Though it may be in the far distance
 Everything is alight.
 I was near to being beaten
 With stones on the way.
 I would be dead at this time and forgotten,
 I the son of Gumha.

*Kisukuma.**Ngoma: Nunguli, meaning the porcupine ngoma.**Singer: Madose.*

Binti Baru is the mother of the singer.

My rifle, O mother, has driven away
 The witchcraft doctors who oppose me.
 They went to the west, Binti Baru.
 I bend my head to weep, because some still remain.
 Now I will prepare my bow for the dance,
 Binti Baru, I bend my head to weep.

Ngoma: Pua. Singer: Kamunya.

The song is a parable and has nothing to do with hunger and rain. The meaning is that other people have no lovers, but he, the singer, has as many as he likes.

Hunger! Hunger! I Kamunya
 Feel nothing of it.
 The clouds are white,
 But no rain comes down
 To meet our desire.
 I have vegetables, I have cucumbers.
 My followers, at full moon, I tell you
 The hollow pumpkin and the cow's udder
 Will be mine.

Ngoma: Ugoyangi, snake charmers' ngoma. Singer: Lusuwa.

Kandi was formerly Sultan of Tinde.

Mpera a Sultan of Tinde.

These other poets are boasting without reason.
 They are children, which look for trouble.
 My rattles are strong. Who is their father?
 Kandi spoke the truth when he said:
 "Even if their drums sound like mine,
 They will never grow like trees."
 I am the King and walk like Mpera!
 Binti Hango and Binti Maganga
 The young girls are my helpers.

Songs of General Character

Kisukuma.

Ngoma: Salenge. Singer: Matonange.

A song of the Great War. A difference is made by the singer between "Mulungu," the God of the Europeans, and "Katavi," his own God, who is supposed to bring back the men.

Men fight in the land.
 The Germans and the English.
 The God of the Europeans alone knows,
 What business of cattle is theirs.
 But our God will bring back our men.
 Dig, O bin Makoma, trenches in Tabora.
 Others will arrive, the Belgians,
 Who eat men.

* * *

Kisukuma.

Ngoma: Uyeye, snake charmers' ngoma. Singer: Kuwingwa.

Masenga is the teacher of Kuwingwa.

I am hurt, father Masenga,
 Come as quick as you can.
 He cured me, the others were not able.
 I caught a snake.
 He brought the medicine and applied it.
 I Kuwingwa, I am very brave but careless.
 On the hill I was lying.
 Drunk with poison of the snake.

* * *

Kisukuma.

Ngoma: Uyanjayanja. Singer: Machalira.

I think that the last strophe is influenced by European ideas.

I have given up singing about men
 I am looking only for clouds.
 The millet has withered in the field.
 The world has gone from bad to worse.
 We die like fools.

Rest under a tree and you rise no more.
 By God, one day or another
 Clouds appear and you may say,
 Perhaps it will rain today.
 But the sun takes its walk through the sky,
 And no rain comes down, not even a little,
 To drive us into shelter.

When in these days the sky is absolutely clear,
 Even a fool knows that thus
 The world is undone.

There are people who murmur,
 But not we. Let him come and choose.
 You blame the witchcraft doctors,
 But it is just that the rain has failed.

* * *

Kisukuma.

Ngoma: Ugika. Singer: Mgakanzira.

I put Indian hemp in my pipe,
 Because I like to smoke it.
 Tobacco is not to be compared with it.
 My friends, mix it with the crust
 Inside the cooking pot and we will smoke.
 The tobacco smokers will fall down.
 If you tell them before, "It is strong,"
 They do not listen.
 They smoke and sleep with open eyes.

* * *

Kisukuma.

Ngoma: Ugika. Singer: Mgakanzira.

The drum of the chief calls to plant cotton.
 Gird up your loins, clean the fields,
 Then even the European will not be angry.
 On the day you get your money
 You will buy what you like,
 Cattle, or boots to put on.

Kisukuma.

Ngoma: Usayi. Singer: Kuwa.

Gumati is the brother of the singer ; he squandered the inherited property.

Gumati my brother, I told you
To take good care of the cattle.
I explained to him,
A quick fire leaves much ash.
Our father was a man among men,
Famous in the land.

Songs of *Ngomas* in which Tune and Dance play the Main Part

Kingoni.

Ngoma: Lingwamba.

A lover was charged with adultery. The headman Ulendi went to Songea to settle the case.

Sweetheart, let us kiss.
Child from Ugoni.
Ulendi went to the Boma
To settle important affairs.
O child from Ugoni.

* * *

Kimanyema.

Ngoma: Kisonge.

Ngoye, our spirit,
The Wakarunzi run away afraid
Drunk with *pombe*.

* * *

Kiluguru.

Ngoma: Kigoma.

Two days nothing happens,
The third day nothing happens.
I work on my monthly labour card.

* * *

Kipogoro.

The people who say my father is clever
Break up their huts and move to us.
The Europeans pass by the place.
They leave it to me to settle quarrels.
But if you meet an Englishman, say "Jambo."

Kishambala.

Ngoma: Bazara.

Shemsono cultivates the field near the road means that he has a daughter of the age to get married.

Strangers arrived, give the strangers water.

They came at night.

Shemsono cultivates the field near the road.

How is work?

* * *

Kishambala.

Ngoma: Ghononda.

It means, I have no sweetheart among the dancers.

I have no child

In the *ngoma*.

I go.

* * *

Kingoni.

Ngoma: Lingwamba.

My wife is very bad.

She looks this way and that.



Fig. 1—Ambatch canoe-raft.



Fig. 2—Jointed canoe.



Fig. 3—Gyassa at Port Said.



Fig. 5—Roman ship.

Some Notes on Ancient Means of Water Transport in relation to the Vessels of East Africa

By Arthur E. Robinson

FROM medieval times the distinctive characteristics of vessels trading on the East Coast of Africa have been compared with the descriptions of the Greek and Roman vessels by classical writers. In recent times there has been a tendency to discover traces of Egyptian culture in East Africa. Beyond an apparent outward similarity of design there is no evidence that Egyptian naval architecture had any influence on the designs of the East African craft found on the coast and inland during the last century.

The Egyptians never had a supply of trees suitable for building sea-going vessels. They evolved a system of construction which was suitable for long vessels of shallow draft and limited carrying capacity. Stronger vessels of deeper draft were built by the Aegeans and Greeks and it is a controversial question whether the first sea-going vessel journeyed first to or from Egypt or Syria.

The earliest form of water transport known was the raft. There are numerous kinds of rafts but for the purpose of this paper we need only deal with two, namely, the log raft and the reed or withy type. Fig. 1 represents a simple form of raft-boat of a very ancient origin in Africa. It was made from the stems of the ambatch tree (*Herminiera claphrozylon*) which grows on the Upper Nile. The young Shilluk kneeling in the craft was carrying market produce from the western bank to Taufkia when I photographed him. The raft is so light that it is carried from the water when not in use and placed end up in the sun to dry. The sharp bow is formed by the natural taper of the stems and the stern merely consists of the thick ends bound tightly together. The bottom is shaped like the arc of a circle and the maximum depth of the inside varies from twelve to twenty-four inches. They are uncomfortable to travel in as they are not waterproof. Sir H. Palmer informed me that similar craft were used on Lake Chad and I have seen donkeys ferried across the Nile on similar rafts made of doura stalks. There is an allusion to these rafts by the prophet Isaiah (xviii, v.1-2) and they are depicted on ancient Egyptian wall paintings of the fifth dynasty at Sakkara, etc. On Lake Tsana there were similar rafts thirty-five feet long which carried seven thousand pounds of coffee on a raised platform in the centre. Pliny (Book VI) stated that cinnamon was transported along the south-east coast of Arabia by means of rafts. These craft would probably be made of bamboos or logs and the cargo would be carried on a raised platform to obviate damage from water lapping over the edges.

The outrigger canoe (single or double outrigger) is an exotic product from India. Burton suggests that the outriggers were added to local dug-out canoes

in consequence of sharks upsetting these vessels*. The dug-out was a distinct advance on the raft. The hollowing of the tree trunk by means of fire or tools and the shaping of the hull became a fine art. Some of the Congo dug-outs were of exceptionally fine workmanship. A dug-out of hard wood made by the Anuaks from a single tree trunk is illustrated by me in *Man* (Feb. 1936, xxxvi, p. 40). Fig. 2 represents a primitive form of dug-out made by joining two doleib palm trunks by overlapping them at the widest ends. The joint is stitched with fibre and sinew. Although the joint is caulked with moss and clay these craft are very leaky and are liable to break in two.

Sails were invented at an early date but their use on the Nile above Halfa or the Equatorial lakes is comparatively recent. The pair-oared saucer-like barge found on the Blue Nile seems to be peculiar to that district only. The rudders of these Nile barges are of the Indian type and it is possible that the first of these vessels was constructed by Indian traders who settled on the Nile as consignees for Indian merchandise landed at Suakim. The Asiatic lateen sail (i.e. a triangular sail suspended from a yard) was introduced into the Mediterranean after the Moslem era. Prior to that period rectangular sails were in general use in European waters. One of the greatest achievements of the Moslems was their development of naval architectures, navigation and the necessary seamanship, so that Islam became known from China to the Atlantic Ocean. Fig. 3 represents a modern Egyptian coasting vessel (gyassa) leaving Port Said for Rosetta with coal (and thence to Alexandria

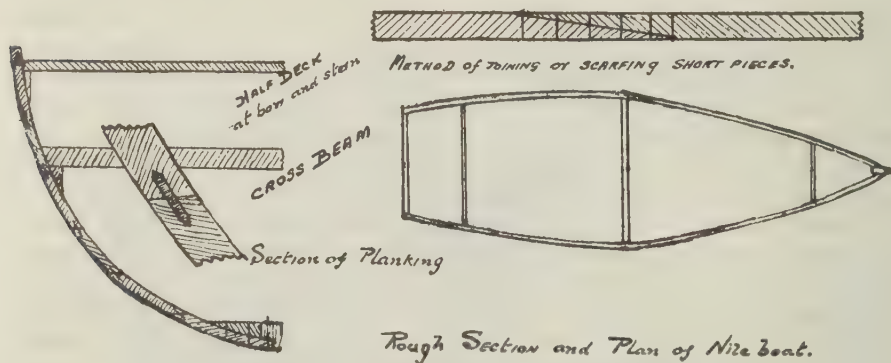


Fig. 4—Gyassa (Nile) showing method of construction

with rice) on her series of voyages from Egypt to Piraeus or Smyrna. There are fine models of these craft in the South Kensington Museum and it is not uncommon for the vessels of this class to sail from Alexandria to Wadi Halfa, and back. It requires no great stretch of imagination to picture one of these vessels sailing from Alexandria or Cairo to Suez on the reconstructed water-

*Commander Sumter visited the Comoro Islands during the famous cruise of the *Alabama*. He had driven the Yankee whalers from the grounds and burnt many. He described the local double outrigger canoes. ("Cruise of the *Alabama*," pp. 262, etc.)

ways (as they do) in the wake of the phantom ships of Hatshepsut, *en route* to Punt. Until recently these Nile gyassas were found at Tor and Jeddah. Turkish ships were double ended and over fifty years ago I saw a ship of this type at Constantinople with three masts, yards on each mast and lateen spanker. At that time there was a curious double-ended coaster to be met with in the Dardanelles. It had one mast with a square topsail on yards above a lateen mainsail. Over the stern projected some heavy planks similar to a counter. These boards were used to trim the vessel when running before the wind in a similar manner to that adopted by some of the tea clipper captains who moved weights aft to keep the bows up under a press of canvas. A curious clay model of a Minoan ship found at Knossos has a round stern with a pointed projection which may represent some similar contrivance. It is possible that the East African vessels with the overhanging stern are survivals of some method of trimming vessels when running before the wind. Those who have done any yachting with a spinnaker set will understand how important it is to keep the vessels stern down under such conditions.

Fig. 5 represents a typical Roman cargo ship such as those which sailed from the Red Sea to India in Pliny's time. This type was later than the Persian vessels which sailed from the Nile to the Persian Gulf or the ships of Alexander the Great. The Roman vessels had more beam in proportion to their length than their predecessors and it is probable that the overhang over the stern was used as a latrine. There are considerable differences between this model and that of Mr. Laird Clowes, but the distinctive types of Omani and Indian as well as those built on the East African coast may be traceable to these Roman ships which were improvements on those of their maritime predecessors. Roman ships seldom sailed by night and sweeps or oars were seldom used by merchantmen. They carried a load of from fifty to a hundred tons and made about fifty-five miles a day. They were clumsy and unwieldy vessels and like most early square-rigged ships could not sail close to the wind and were obliged to anchor or remain in harbour with a wind which was not abaft the beam. After the Portuguese occupied the coast several of their vessels were obliged to winter on the coast until the wind changed*.

The built ship was evolved from the dug-out in various countries under local conditions. Fig. 6 shows the possible type evolved in northern Europe and is taken from remains found in an archaeological excavation. The large built outrigger ships shown on the Java carvings⁽¹⁾ are developments of the outrigger canoe. The large canoes of the Equatorial lakes are similar efforts to carry a greater load than the one piece dug-out accommodates. The mere fact that the outlines of these Equatorial canoes seem to resemble archaic drawings in the Nile valley or even those of the Viking ships in Scandinavia, etc., is no evidence from which the original model can be traced. Design is largely a question of the material available and construction must be based

*Portuguese ships carried many black slaves who rowed the sweeps, hauled ropes and did all menial and heavy work. About two-thirds of the crew were negro slaves. Many of these deserted or fled from shipwrecks and formed clans among natives on the African coast.

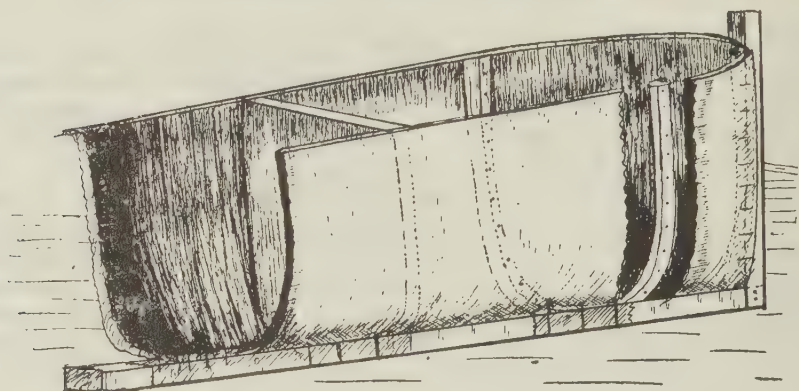


Fig. 6—Evolution of the Dug-out

therefore to meet local conditions. King Amenophis II of Egypt was buried in a dug-out canoe but this is exceptional. Egyptian vessels were built from numerous short pieces of the *sunt* tree. These were pegged by means of dowels in the method used in the construction of the Blue Nile barges, with or without fastenings of fibre, as described by Herodotus⁽²⁾ and Procopius⁽³⁾. The bottom was perfectly smooth as there was no keel and very little rise of floor. Fig. 7 shows a built barge about two hundred and twenty feet long which was made of short pieces of thick planking in this manner. It was used to transport two obelisks down the Nile. The original drawing is at Deir-al-Bahri.



Fig. 7—Barge with Obelisk

Fig. 8 represents an early drawing of an Egyptian ship which was probably built in Egypt from local timber and spars brought from Palestine or Syria. This ship was one of the fleet of King Sahu-ra (circ. 2800 B.C.). The most noticeable features are the double mast which is also found in India and further east, and the longitudinal hogging-strop or stringer which survives now (in steel) on most shallow-draft river steamers all over the world. This strop was made of thick ropes which were passed over queen posts and secured to each end of the ship. The ropes were tightened by twisting a lever which was kept in place by one of the posts. The vessel had three steering oars on the steerboard (starboard) quarter and seven sweeps or oars. The hogging-strop is also shown in the vessels of Queen Hatshepset, depicted at Deir-al-Bahri as loading at Punt some four thousand years later—a typical example of the unchanging East. The rigging and sail plan were different however. A single

mast was used and the sail was hung from a yard and laced to a boom or lower yard. The upper yard had two braces but only a single brace or spinning line is shown on the lower yard (boom). The foresails of the old Geordie colliers had booms of a similar character. A steering oar was lashed on each side of the vessel and these were worked by a tiller in a manner similar to that shown on the Roman vessel of Mr. Laird Clowes⁽⁴⁾. The ship of Queen Hatshepsut was much longer than that of the fifth dynasty and had fifteen rowers. An ornate curved lotus lily had replaced the flat plate or stern post in the older ship so that the similarity to the outline of a gondola disappeared. A similar stern is figured on a Greek trireme which is fitted with a beak or ram and is illustrated by Mr. Laird Clowes.

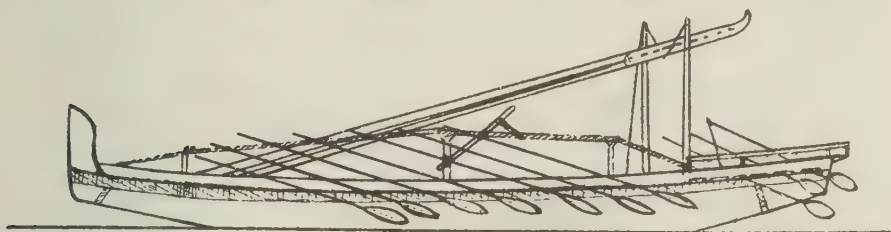


Fig. 8—Egyptian Ship

The disputed question of "banking" or "tiering" the oars in the triremes and quinqueremes is best solved by the fact that both systems have been proved to be practicable. Both types of ships existed as cruisers and battleships, the tiered ship being a heavier and less speedy craft.

Professor Breasted considered that the earliest ships in the Mediterranean had turned-up bows and sterns (i.e. double-ended) similar to Fig. 8. The early Aegeans copied this model, *vide* the swan neck type with goose head shown in Fig. 9. The Phoenicians introduced the underwater beak or ram and about the eighth century before Christ the Greeks copied this type. The result was a type similar to the well known pointed Morocco slippers which are called *markeb* (a ship). A wide rudder slung outside the stern on pintles replaced the steering oar. As Professor Mookerji⁽⁵⁾ has illustrated many ancient Indian coins and traced the development of Indian shipping from the ninth century before Christ it seems clear that the immediate ancestor of the East African types came from India. The East African craft are therefore very remotely connected with Egypt through evolution and are not direct morphological survivals.

The figure-head on ships seems to have been originally a protecting deity or the actual god after whom the ship was named. The vessel became the protégé or child of this deity and assumed a living entity which exists to-day in the minds of many sailors. Irrespective of its name, the ship is feminine and obeys the master, subject to the will of the supreme gods. The barge carrying the obelisks has a figure-head of the hyena. The seal of the Roman

Emperor Galba was a design of a dog looking out of a ship's prow⁽⁶⁾. In later times Christians had effigies of saints, but the Moslems, who were the great sailors of early medieval times, sternly discountenanced any images. The figure-head is therefore not Moslem but Pagan in origin, and the painted eye which appears on the bows of some vessels is a survival of the idea that the ship became a living thing under the influence of the winds.

In 1833 Captain Owen⁽⁷⁾ described the coasting craft with their flat bottoms, wall sides and sewn planks as copied from the Masoola boats of Coromandel and Malabar. He also commented upon the double outriggers he saw in the Comoro Islands. During one of his voyages he picked up a canoe containing four men who had been at sea for seventeen days and had travelled seven hundred and fifty miles to within eighty miles of the coast, on a trip from the

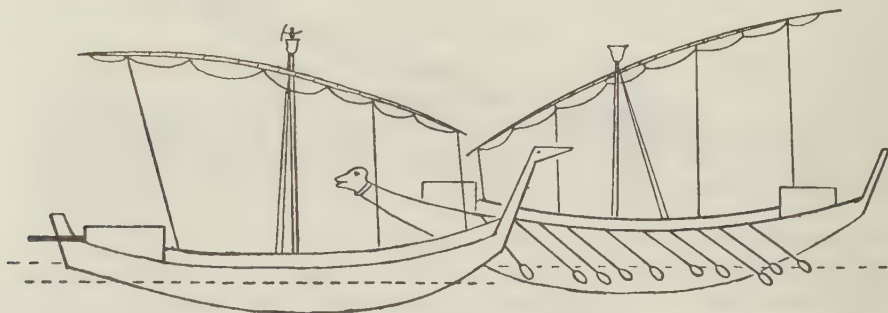


Fig. 9—Ships of Rameses Philistines

Seychelles. Burton identified the *ngalawa* with the monoxyles⁽⁸⁾. He described the Mutaifyat (Muntafiyah) with its hull three times its beam in length, pegged timbers, sewn with twine, raking mast and matting sail and long projecting stern as the lineal descendant of the Ploaria Rhapa (*Navicula Consuta*, Periplus, xvi). He identified the swan throat and arched bow with the "cheniscus" of the galley of the classics and applies the term "dhow" to a one-masted ship with a square sail. This he regards as a Phœnician type. The Baglas and Ganjas are natives of Cutch (whence peacocks were imported), and I suggest that these may be modified Roman designs.

Fig. 9 represents a Philistinian and an Egyptian ship of the period of Rameses III. The vessel with the lion figure-head is Egyptian and the swan neck (or camel-head) with goose head is a Gelans (Philistinian).

Some details of a technical character are necessary in respect to the rigging, shape of the sails and the processes adopted to change the course of the vessel or shorten sail, before comparisons can be made and the evolution of the East African shipping definitely determined. Speaking from memory, the dhows I have sailed in run up into the wind and the sheet is taken round forward of the mast before it is sheeted home on the other tack. In some of these craft the mainsail (or aftermost sail) is only used and set for this purpose. No reef points are shown in drawings of ancient Egyptian or Roman

ships and the only dhow's sails I saw so fitted belonged to the Eritrean Government. Viking ships were square rigged and the reef points enabled the crews to reduce the sail area to three-quarters or a half in case of heavy weather. The Mediterranean lateen sail is easy to handle as the yard is secured to the foot of the mast and works on the mast by a parrel. The sails are frequently laced to booms. These are, of course, modern innovations.

* * * * *

NOTE.—The great prehistoric dug-out found at Brigg, Lincolnshire, England, is over forty-eight feet long. It is hewn from a single oak log and is the finest specimen of a prehistoric ship known. It is now in the Hull Museum. The dug-out was used in England until comparatively recently. A dug-out canoe of pine eight and a half feet long was unearthed during excavations for the Hull Guildhall (T. Sheppard, m.sc., Director of the Hull Museums). It is dated to the period of Henry VIII.

There is a drawing of a large open vessel made of skins and wicker-work (with a bull's head figure-head) over thirty feet long in the Pepysian Library (Cambridge) dated 1670 with a square ended dug-out carrying two men in tow.

The Liverpool Museum (Shipping) has a special exhibit of models and full size craft showing the evolution of the dug-out to the built ship. The Māori canoe presents parallels to the construction and technique of the African Lake canoes.

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(²) *Euterpe*, 96.

(³) Dewing's edn. Book xix, pp. 185-8. The imports of timber into Egypt have been one of the most important items in the history of the country until the present time.

(⁴) "Sailing Ships", Part I, Plate IV. Plate V figures a Roman ship with a topsail. The buntlines are clearly shown but the clues are omitted.

(⁵) *Op. cit.* Special Plate.

(⁶) *Dio Cassius* (Loeb's edn.) II.

(⁷) Narrative of voyages to explore the shores of Africa, etc., pp. 72, etc.

(⁸) "Zanzibar", pp. 72-6, etc.

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Some Notes on *Utani*, or the Vituperative Alliances existing between the Clans in the Masasi District

By T. V. Scrivenor

WITH one or two important exceptions noted hereunder the origin of *utani* is lost in rather vague tradition which too often confuses the functions of the alliance with its inception. Two illustrations of its normal origin are given in the following examples, both of them cited by natives:—

(1) A stranger, of clan *A*, travelling through clan *B*'s territory, falls sick. Someone of clan *B* plays the good Samaritan, nurses him and physicks him, until his own people hear of his plight and come to take him away. On the foundations of this good deed is raised an *utani* between the two clans.

(2) Similarly, the stranger from clan *A* may hear that an elder of clan *B* has just died, and as an act of courtesy he attends and assists at the burial rites. Again, as a result of this gesture, an *utani* is established between the two clans.

In other words orthodox *utani* appears to be a formal extension from the particular to the general of mutual obligations incurred by individual members of two clans.

In Masasi orthodox *utani* is always between clans, never between tribes. There is an *utani* between the Yao section of the Amilasi clan and the Arope, which is a Makua clan; but there is no general *utani* between the Yao and Makua tribes as such. Every clan has at least one *utani*, often more. The Arope are particularly prolific in this respect. But an *utani* is always between two clans, never between three. For instance, the Amuni clan under Mwenye Namkumba are the *watani* of the Achikambanga clan under Mwenye Namagono, and the Erio clan under Mwenye Chisanga are also the *watani* of the Achikambanga. But the Amuni and the Erio are not *watani*.

There is, however, another form of *utani* which appears to be in origin a sort of peace treaty. There is a general *utani* between the Angoni and the Yao and Makua tribes of Masasi which was established after the Angoni raids towards the close of last century. There is a similar *utani* between the Nyamwezi and the Zaramu which is said to have been established after a successful raid by the former on the latter.

Theoretically the obligations are identical in both types of *utani*, and the writer's personal boy (a Nyamwezi) claims that when in Dar es Salaam he can always rely upon the hospitality and assistance of his Zaramu *watani* even to the extent of a gift of four or five shillings in cash if he is in real need of it. Also the Zaramu attend at the installation of the Mtemi of Unyanyembe.

But the *utani* between the Angoni and the *mataifa* of Masasi is hardly more than nominal. No Angoni representatives attend at the installation of a Mwenye, and it would be a rash Mgoni who presumed upon his *utani* to make free with the property of a Makua or a Yao, or to abuse him with the freedom usually allowed to *watani*.

The most obvious and dramatic quality of *utani* is this freedom of mutual abuse (*kutaniana* or *kutukanana*). One considerable authority holds that "abuse" is too strong a word and that *kutaniana* is no more than that slangy freedom of speech normally employed between close acquaintances. One native, a Yao, gave it as his opinion that there was a limit to what *watani* could safely say to each other, and that it would be useless to plead *utani* to obscene slander of another man's wife. But the contention that this vituperation is no more than schoolboy back-chat is hardly borne out either by the quality of the vituperation itself (which in less privileged circumstances would certainly justify an action for criminal defamation), or by general native opinion. In a recent native court case* (Chiwata B court) the plaintiff demanded damages from the defendant on the grounds that the defendant had abused him with *matusi*. The court found for the plaintiff and in passing judgment said that such a slander was only permissible between *watani* and that, as the parties in the suit were not *watani*, the defendant was liable for damages.

It does, however, appear that there is no special significance in this verbal licence except in that it is a clear indication of the closeness of the bond between *watani*. Both in quality and significance it probably approximates closely to the language of the Thames watermen of the seventeenth century whose solidarity as a class was notorious and whose epithets were noted with awe by Evelyn. Similarly, a singularly terse term of abuse (still in common use) is noted in Johnson's dictionary as "a term of endearment commonly used between sailors."

But this mutual vituperation is only the rather curious outward and visible circumstance of *utani*. The main functions of *utani* are three: (1) The burial rites of a clan elder. These must always be performed by the *watani* and not by the members of the clan. It is the especial duty of the *watani* to dig the grave and to perform the other more menial offices attached to the ceremony what time the members of the dead man's clan stand by and abuse them roundly. (2) The installation of the head of a clan. The actual election of a new clan head on the death of his predecessor is the business of his own clansmen. But as soon as he is elected his investiture and initiation is the business of a small body of *watani*. Apparently any available *watani* will do, although senior members of the *watani* clan would naturally take precedence. For instance, Mwenye Mkope, the present head of the Makua branch of the Amilasi clan, was actually installed by Mwenye Hatia of the Arope clan who are the neighbours and *watani* of the Amilasi. (3) Mutual assistance between the members of the two clans of an *utani*.

*No. 4/37.

In theory an Amilasi travelling through Arope country is entitled to free food, money and hospitality. He can, if he wishes, take any without asking and without rousing any ill-feeling or becoming in any way liable, either criminally or civilly, for his actions. This practical communism has, however, almost disappeared. In Masasi only two clans practise it conscientiously and under mission influence they respect each other's women. The two clans in question are the Erio, a Makua clan under Mwenye Chisanga, and the Achikambanga, a Yao clan under Mwenye Namagono. Any follower of Chisanga's travelling through Namagono's area can and does help himself to food and drink without so much as a "by your leave," and any follower of Namagono can do likewise in Chisanga's country; and the relations between the clans are excellent.*

Generally speaking, however, this aspect of *utani* has died out, and it probably never existed in so far as the *utani* between the Angoni and the *mataifa* of Masasi is concerned. Even the vituperative part of the alliance is dropping out of fashion among the rising generation. Only the constitutional functions of *utani* retain their original force.

*It is worth remarking that when a Wilson Airways' machine was recently in Masasi giving "joy-rides" to all and sundry, the only two chiefs who went up (and the only two who wished to go up) were Mwenye Chisanga and Mwenye Namagono.



Fig. 2—The mosque from the south.



Fig. 3—Inside the mosque: the remaining standing pillars.

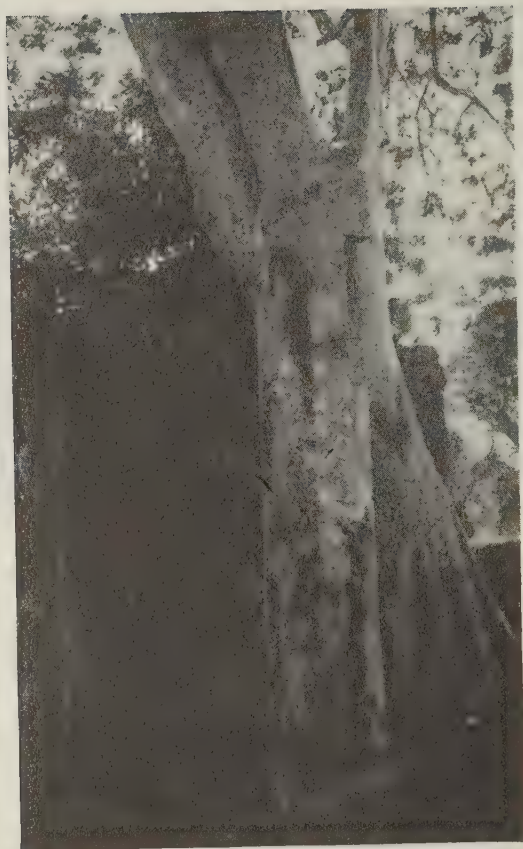


Fig. 4—The kibliah.



Fig. 5—The mosque from the north-west.



Fig. 6 —Disused well to the west of the ruins.

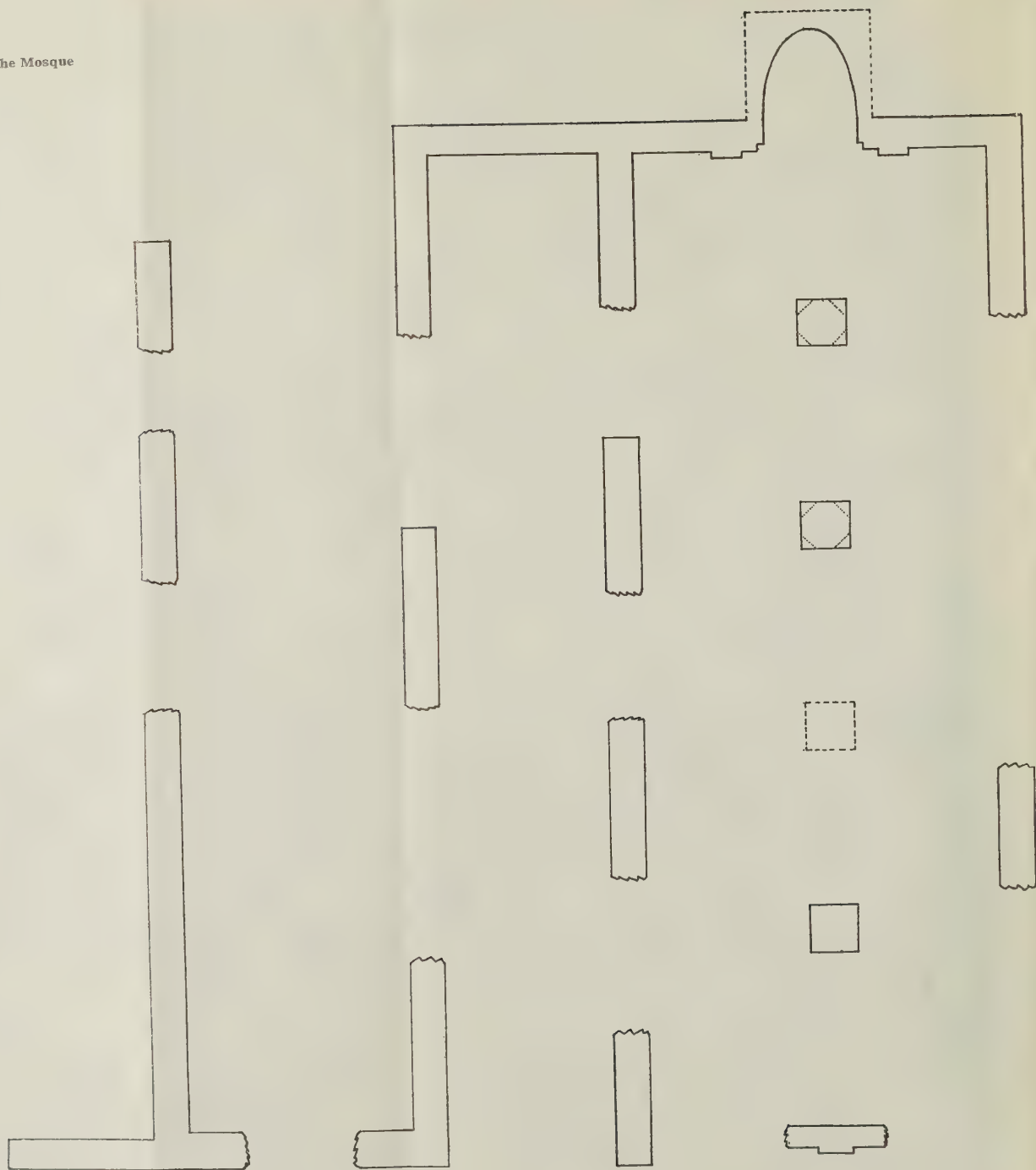


Fig. 7—A tomb to the south of the mosque.



Fig. 8—The east end of a tomb lying to the north of the mosque.

Fig. 1.—Plan of the Mosque



SCALE OF $\frac{1}{2}$ -INCH TO ONE FOOT = $\frac{1}{16}$



Notes on Some Ruins at Tongoni, near Tanga

By R. F. Stowell

TONGONI lies on the Tanganyika coast, approximately ten miles south of Tanga. The ruins consist of a mosque (*see* plan, Fig. 1) and a number of tombs. They lie some three hundred yards to the north of the present village, and are on the edge of a low cliff, at the foot of which is a mangrove swamp. The material of all the buildings is a close-grained coral rock, which is still quarried to a small extent from a creek to the south of the present village.

DESCRIPTION.

(a) *The Mosque* (*see* the plan, Fig. 1, and photographs, Figs. 2, 3, 4 and 5).—The accuracy with which the stone is cut is remarkable, particularly on the lintel of the *kiblah*, and on the faces of the hexagonal pillars. The width of the chambers appears to be governed by the length of the mangrove poles available for rafters. Niches for receiving the ends of the rafters are still visible at the top of parts of the walls, approximately eleven feet six inches from the ground. The plan shows details of the remaining walls and pillars. The shape of the outside of the *kiblah* is a matter of conjecture, as it is overgrown with particularly dense and thorny vegetation.

(b) *The Tombs* (*see* the photographs, Figs. 7 and 8).—These lie to the north, east and south of the mosque; one is actually placed in the angle formed by the north wall of the mosque and the back of the *kiblah*. The tombs illustrated are typical. The depressions or sockets on the face of the column shown in Fig. 7 contained pottery discs which, according to local memory, were removed by visitors in German times. The brick-like ornamentation above the pilasters on the tomb shown in Fig. 8 is characteristic of the majority of the other tombs.

The area covered by the tombs is roughly two acres in extent, being bounded on the west by a path running north and south close to the west wall of the mosque, and on the east by the cliff edge.

(c) *The Old Town*.—No tombs lie to the west of the mosque, but local natives state that there was at one time a considerable town on this side. The only traces of this now visible are two disused wells, one of which is shown in Fig. 6, and occasional rubble heaps of coral stone. The amount of stone incorporated into the wattle and daub walls of the houses in the present village appears to account for the absence of any clearer remains of the old houses: these lacked the sanctity accorded to the abodes of the dead.

TRADITION AND HISTORY.

It has not been possible to obtain any particulars about the builders, other than the tradition that the buildings were the work of early Persian invaders

from Shiraz. The following local legend contains a story of the origin of the Shirazi invaders; local tradition holds that the town was founded at approximately the same date as the Sultanate of Kilwa.

One Sultan Hasani bin Ali of Shiraz had a vision in which he was a rat with jaws of iron attacking the foundations of his house. He took this as a portent of the destruction of his country, and a warning to flee. The elders of his court scoffed at the vision, but he found believers among his immediate family and a section of his people. He and his followers embarked in seven dhows; these became separated during the voyage, and landed at different points along the East African coast, and settlements were made at these points. Kilwa is said to have been the chief of these, and Tongoni was, according to this story, settled at the same time.

A section of the present inhabitants of Tongoni claim Persian origin, but state that their ancestors did not settle at Tongoni direct from Persia. These people are called Makameuma; they take their name from one Makami bin Naamani who was Kadhi of Uma, Kilwa. He left Kilwa as an exile, with his family, after being deposed from office. After some wanderings along the coast his great-grandchildren settled at Tongoni. They found the old town completely deserted, and occupied the empty houses. At first they gave it the name of "Sitahabu," meaning "Better here than there," but as the memory of their ancestors' trouble at Kilwa faded the present name "Tongoni," meaning "The forsaken place," came into use. As this name indicates, these settlers found none of the builders of the old town; there is now no trace of the name given to it by the original settlers, nor any sign of their descendants.

The tombs are to this day held in very great respect, since an "Msharifu" is said to be buried there; supplication at his grave is said to ensure the fulfilment of wishes expressed in the proper form. There is, however, practically no evidence of the age of the buildings. The history of the present inhabitants has been obtained in some detail, but it offers no clue to the date of the ruins, since it definitely shows no evidence of the Makameuma obtaining the place by conquest. The legend given above is of no real assistance; it would seem really to belong to Kilwa, since it is told by people of Kilwa origin.

Two inscriptions were found on a tomb some distance from the rest, of different form and in better preservation. Only one of these is legible. The grave appears to be of considerably later date than the rest.

I have shown such evidence as I have to Mr R. L. Hobson, of the Department of Oriental Antiquities and Ethnography at the British Museum; he reports: "... there is no detail visible on the photographs which helps towards a date. Other recorded Mohammedan buildings in East Africa range from the twelfth to the fifteenth century. I showed the rubbings to Mr Fulton in the Oriental Manuscript Department, and he says the writing could not be older than the sixteenth century."

Iron Smelting in Fipa

By R. C. H. Greig

EVERY the casual observer is bound to notice scattered throughout Fipa district isolated structures of red earth which at first sight resemble dovecots, or "pill boxes." The fact that they are to be seen standing alone in the bush, as well as near villages, is bound to awaken one's curiosity. These structures, however, are not dovecots or relics of the war; they are the iron burning kilns of the Fipa.

Iron burning is still practised fairly extensively by the Fipa, and occupies a significant position in the tribe, both as a profession and as an economic influence. Although not a hereditary secret, the art of iron burning and forging is not known to everyone in the tribe. The experts will teach others and especially their children, but no one will presume to try his hand unless he is an accredited craftsman. Recognition of skill is necessary, for the kiln making and iron burning is communal work carried out under the direction of an expert who, with his group of helpers, provides beer and slaughters a cow for the occasion. Unless, therefore, there is acknowledgment that the craftsman knows his work, people will not be forthcoming to help him.

The making of the kiln is perhaps the largest part of iron burning, but once made a kiln will stand for many years. Two days' work by fifty men or more and their wives and children suffices to build a kiln, so there is not often an opportunity of watching the building operation, which is worth going a long way to see. It is for this work that beer is provided and a cow is slaughtered. The rest of the work is done by two or more craftsmen each of whom has about ten helpers.

Before the work starts the craftsmen go round the village and ask who are willing to assist in making the kiln. Having obtained a guarantee of a sufficient number of helpers the procedure used then to be to prepare the appropriate offering to the particular *maleza*. The Fipa are animists in belief and *maleza* is the term applied to demi-gods whose abodes are outstanding natural objects. *Maleza* is distinct from a term they also have for what may be compared to an omnipotent creator. The offering to the *maleza* was a goat which was sacrificed with great ceremony, usually led by the craftsman himself but, if not, by a priest of the *maleza*. Herbs and bones were prepared and put in a hole in the ground in the centre of where the kiln was to be built, and as the work proceeded the walls were sprinkled.

The craftsman would wear special clothes during the ceremony and throughout the work. Before the ironstone was dug out for use and after the work was finished there were other offerings attended with equal ceremony. When making sacrifices the custom was to offer part of the sacrificial object to the *maleza* and the rest was eaten by the assembled worshippers.

Missionary influence is strong among the Fipa, and the work might now begin with prayers led by the village teacher. Relics of the pagan ritual still survive, however, as in the case of the building which the writer witnessed a chicken was killed and eaten and one of its legs was hung up in front of the kiln, in the centre of which had been placed a jar with a basket cover. While the old men present were quite anxious to describe the ritual, the leading craftsman, a young Christian, afterwards offered the ingenious explanation that they merely ate a chicken when the work began and that its leg was hung up to show that the chicken was finished and it was no use asking for any more!

Kilns vary in size, but the normal one is about twelve feet high with a diameter at the base of about six feet, tapering to a diameter of about four feet. They are made from ant-heap and are built up without supports of any kind. The earth is first dug out of the heap and water is added. It is then thoroughly kneaded by the feet by a few men. This earth is left for about two days until it has dried to the right consistency. It is then thrown out on to flat ground, when the whole concourse of old men, women and children join in and, to the accompaniment of songs, trample it out ready for use. This process is, incidentally, very similar to the treatment given to the soil used for making tiles for government buildings, only, instead of it being flattened out on the ground, it is further kneaded by hand.

To do the building about a dozen men stand round in a circle and, starting with a thickness of about nine inches, they ram and plaster the earth together, finishing at the top with a thickness of about four inches. As the kiln gets higher a scaffolding of sticks is erected round it for standing on. Two days' hard work will complete the kiln which is then left for a month or so to dry.

The next process is to make pipes for leading in the draught and for draining the slag from the kiln. These resemble small field drainpipes and are also made from ant-heap. Using ashes as a separating material and long sticks as a core, the earth is plastered round and baked in the sun. When ready the pipes are broken into the necessary lengths. Meantime some helpers are making charcoal and bringing it to the kiln while others are digging out the ironstone from a nearby marsh, in which it is very noticeable during the rains by the colour of the water.

When the kiln is dry about ten slits are cut round the base at even intervals, in which the draught pipes are placed. More pipes are placed end to end in a circle on the bottom of the kiln. There are several pipes in each slit and at least two layers around the bottom of the kiln. The pipes in the slits connect with the joints of the pipes inside. The kiln is then filled first with charcoal to the depth of about a foot, then with a thin layer of ironstone, then another layer of charcoal, then a layer of wood, another layer of charcoal then a layer of ironstone again and so on until it is full. Two small pieces of burning charcoal are placed on the very top, after which the kiln is left.

On returning the next day one is astonished to find the whole inside red-hot



Placing draught pipes in the slits.



Kiln with heap of ironstone in the foreground—Draught pipes in background.

and emitting a low roar, while slag trickles out from the pipes at the bottom. A small peep-hole is provided through which can be seen the progress of the burning. At the end of another day the kiln has burnt out, and after it has cooled the iron is sorted out from among the ashes. This iron still contains a great deal of impurity and has to be treated further in a miniature blast furnace.

While the kiln is built near a convenient ant-heap in a place where there is plenty of fuel, the miniature blast furnace is placed near or in a village, and a small grass covering is erected over it. This is necessary to provide darkness so that the colour of the heat can be seen. The miniature blast furnace consists of a crucible made of ant-heap about a foot high and a foot in diameter, with four holes placed evenly round the bottom. Three of the holes are for the blast, which is provided by three pairs of goatskin bellows. Three old men sit round blowing alternately for hours at a time while the craftsman keeps the crucible filled with iron and charcoal. Out of the fourth hole slag trickles evenly and rapidly. The goatskin bellows are simply bags to which are attached reed pipes with clay nozzles. The open end of the bag is held together much in the same way as is done when paper bags are blown up and "popped."

After the blasting, the iron is pure enough for forging. The forging is the most exciting part of the whole work. A suitable large flat stone is used as an anvil and over it a grass hut is built. Round the stone are grouped two or three craftsmen, each with his little forge. The forge is simply a hole in the ground filled with charcoal and the blast is provided by one pair of goatskin bellows. As in the blasting, the old men do the blowing. Those who are doing the forging sit round waiting until the iron is hot enough. At a signal one man will lift the lump of iron from the forge with a pair of tongs and place it on the stone, then two men will start the hammering. Holding heavy stones in both hands above their heads they bring them down with all their strength, accompanied always with shouts as they hit the mark. The man holding the iron points with a rod to the place which is to be hit. With amazing accuracy they gradually beat the lump into shape and then flatten it out into a hoe or knife. When the iron has cooled, their place is taken by another group and, exhausted and perspiring, they throw down the stones and take their rest while the iron is heated once more. Sometimes one of the beaters will give up before the other, and rivalry takes place as to who can last the longer. The man who holds the iron on the anvil is the man who gets the hoe or knife when it is finished, but later he will take his turn at hammering for one of the others.

The whole operation is carried out with grim seriousness. There is no laughing and joking so common among natives. The muscular perspiring blacksmiths, almost naked, sitting round in silence and semi-darkness or shouting and grunting as they exert their strength, while sparks fly in all directions, provide an awe-inspiring if odorous spectacle.

One group will make two hoes in a day, and perhaps a bill-hook, knife or spear between times. The hoes are usually much larger than the ordinary native hoe seen in fields and shops, but smaller ones are also made. These are indistinguishable at a distance from the manufactured article. A large native hoe costs four shillings and the ordinary manufactured hoe two shillings. A larger manufactured hoe similar to the native hoe can, however, be bought from one trader in the district for four shillings. While most natives seem to agree that the native-made hoe will last more than twice as long as the two-shilling shop hoe, there is serious competition from the trader who supplies the superior four-shilling article. It is quite obvious though, whatever the case, that even in Fipa district where transport adds considerably to costs, native iron work will soon be displaced by manufactured goods. Apart from the work entailed in iron burning, the growing habit of going considerable distances either to seek work or to sell food breaks up the old yearly routine. At present there remain only about twenty kilns in use.

When iron burning was practised by many villages the craftsman had a position of merit in the tribe, for it was he who provided the tools for cultivating and weapons for war. He was then called a *silungu*, but for the propitiation ceremonies and while the work was in progress he was given the temporary title of chief. The first hoe made each year was always presented with ceremony to the chief, who gave the craftsman his special clothes in recognition of his position. Though prestige and ceremony have departed, the chiefs still receive a hoe every time the burning takes place, and if a craftsman goes into an area which is not his own in order to find good ironstone, he also presents a hoe to the local chief. In fact the craftsmen seem to get little profit nowadays. The work begins in the dry season and, if time permits before fields must be prepared, the helpers each make themselves a hoe and four hoes are made for the craftsman, one of which is given away to the chief. The others he may sell, but the demand is decreasing. The natives from the shore of Lake Tanganyika and from the Rukwa valley no longer come to the plateau as they used to, to make their purchases. It is so much easier to take a load of rice to an Indian store than to climb the escarpment.

It is said that iron burners of one tribe have affinity with those of another, but the writer has been unable to obtain any admission of this as far as the Fipa are concerned. That iron burning is practised only on the plateau is due, no doubt, to the abundance of ironstone which is found there and which is not found on the alluvial plains of the lake shore and the Rukwa valley. The natives only use stone dug from swamps and never attempt to cut it out from rocks. They are able to recognize the best ironstone, and one reason for building the kiln in the middle of bush is because good stone is found nearby.

It is a pity in some ways to see an established native industry such as iron burning dying out. One cannot help feeling for the craftsmen as they see their prestige lessening and their products being replaced by cheap imported

goods. On the other hand the work entailed in producing one hoe is probably greater than that required to grow enough extra food to buy a hoe. Of more importance, however, is the denudation of forest which is necessary for making the charcoal, and if the industry were to continue to flourish the Weald of Kent would have its parallel in Fipa. If the craft is dying out the forests are surviving and there is no doubt which is of the greater ultimate value to the tribe.

NOTE.—Knives made by these Fipa iron workers are on sale at the arts and crafts kiosk, Dar es Salaam.

Some Tales of Tanganyika Natives.

By Egon Fr Kirschstein

EVERYONE visiting Lake Tanganyika by the T.R.S. *Liemba* is most impressed by the mighty Kungwe mountain. Situated in the country of Buhorohoro on the eastern side of the lake, half way between Kigoma and Kirando, this giant mountain raises its steep double-topped head to eight thousand six hundred and twenty feet above sea level, thus considerably surpassing the surrounding high summits of the ridge.

According to the story told me by the natives of Buhorohoro, a tribe originally coming from the Belgian Congo, Mount Kungwe personifies the greatest demon on Lake Tanganyika. Unlike other demons, commonly less good-tempered, he is a wise old ghost who does no harm to the people of the country as long as they continue to sacrifice on his summit. Yet, unfortunately, he has two ill-bred and very troublesome sons: Katavi and Lubadyu.

The tale tells of a quarrel between Katavi and his father Kungwe long long ago, whereby Katavi split the father's head. That notch is visible to-day. Kungwe did not pardon the insult, but ordered Katavi to leave the country. In his anger Katavi threatened to create another Tanganyika somewhere else. Old Kungwe smiled contemptuously when he heard of such a boast by the outcast. Katavi, however, fulfilled his threat and made a new Tanganyika further inland, in that part of the country which is now called the Katavi Plain. This lake is, indeed, much smaller than Tanganyika, but there are waves and even hippos in the lake—just as in the big Tanganyika! Katavi is feared not only by the inhabitants of Buhorohoro on Lake Tanganyika, but also by the neighbouring tribes as far as Unyamanga south of the Rukwa valley. In the belief of these tribes he appears as a whirlwind spreading small-pox and other diseases. Moreover, he is held responsible for the failure of crops. No native villagers start cultivation unless they have prepared a narrow field for Katavi first. One frequently sees such miniature *shambas* of Katavi at the entrance to the villages in Unyamanga and on the Fipa plateau. The natives also erect small sacrificial huts devoted to Katavi. In one of these huts on the path across the Katavi Plain I found beads and copper coins as offerings by passers-by.

The Wabende in the hinterland of Karema again supply Katavi with a virgin girl as wife. She grows up as the well-respected spouse and priestess of Katavi, and nobody has the right to marry her. When she dies, another girl is offered to Katavi by his faithful worshippers. Women fearing infertility offer presents to Katavi's wife with a piece of cloth in order to please her lord and to obtain conjugal blessing.

Besides these wives of real flesh and blood, Katavi has also a consort in the world of spirits. A few years before the war, when I happened to pass

through Unyamanga, the witch-doctors were spreading amongst the villagers the rumour that the consort of Katavi had given birth to twins. This joyful event was celebrated for weeks by nocturnal dances, and during the whole time all villagers born as twins, or being the parents of twins, had to sleep outside their huts in the open air. No one who is not fully acquainted with native customs and mentality can imagine how much the entire tribal life of these peoples is dominated by the cult of Katavi and by the fear of annoying in some way the powerful, ill-humoured and vindictive demon.

On the Congo side of Lake Tanganyika it is the brother of Katavi, Lubadyu, an outlaw like himself, who plays a similar role. Kungwe had to repudiate this son for his malignancy one day, and since then Lubadyu, turned into a ghoulish, molests the population there. Sometimes both Katavi and Lubadyu visit the father, but only to quarrel with him. As soon as the fight starts, Kungwe wraps his double-topped head in dense dark clouds and torrents of muddy water run down his slopes into Tanganyika.

Another high mountain on Lake Tanganyika farther northward, Kabogo, is likewise a demon and the son-in-law of Kungwe. He married Kungwe's beautiful daughter Kambilinsofwe now known as a "ras" or cape on the lake.

It seems that all these names, as also the names of the summits surrounding Mount Kungwe, relate to once living persons. Kungwe and Kabogo were in former times, perhaps, mighty tribal chiefs before they entered the world of spirits as demons in the primitive mind of the natives. I know of a similar case from my stay in Ruanda in 1907-08, where a young German officer shot accidentally by a native soldier, when hunting elephants in the region of the Virunga Volcanoes was worshipped by the local natives as a ghost embodied by a recent small crater hill called Kananaharage (Bwana Maharage), this being the by-name given by the Wanyaruanda to the officer because in his life-time he was very fond of boiled beans. In the language of the Wanyaruanda "Kana" is identical with the Swahili word "Bwana".

EDITORIAL NOTE.—Dr Kirschstein's observations thus point in the same direction as the legends narrated by Stanley in his "Through Darkest Africa," II, pp. 11-14; namely, that man was a witness of important phases of rift valley tectonics the memory of which he has retained through the ages in his legends. The examples from Mount Kungwe are of particular interest, as this great landmark forms the south-eastern pillar of the well-known submerged ridge that crosses the lake diagonally and separates the present very deep southern from the equally deep northern basin by a belt of shallow water, in which depths, as insignificant as 136m., have been sounded in mid-lake.—C.G.

NOTES

A further Note on German Storks at Kiberege

By G. M. Culwick

IN THE last number of this journal I recorded the arrival at Kiberege in January of this year of storks in great numbers, and the discovery of the corpse of one bearing a German ring. For the benefit of those interested in birds, I am now able to add this additional note to the effect that the dead stork in question was ringed as a nestling at Mülsen, Kreis Fischhausen, East Prussia, on the 6th August 1936.

BOOKS REVIEWED

"Stone Age Africa." *An Outline of Pre-history* by L. S. B. Leakey. Oxford University Press, 1936. 218 pages including bibliography and index, twenty-eight figures in the text and thirteen plates.

This is a much wanted publication. The subject matter formed a course of ten Munro lectures delivered in Edinburgh last year. The author reviews the entire question of stone implements, rock pictures, craniology, etc., regarding the pre-Dr Leakey's views are accepted generally. Some of these the author admits are open. Much that has been written previously will require entire reconsideration if Dr Leakey's are accepted generally. Some of these the author admits are open to discussion. The theories regarding European and Asiatic land-bridges with Africa and the migration of fauna from Asia to Africa are dealt with. From his remarks on page 131 the Eastern Sudan compares unfavourably in respect to field research with Uganda, Tanganyika and the French possessions. None of the articles which have been published in *Antiquity* or *Sudan Notes and Records* are mentioned in the bibliography. It is noticeable that the camel or the dromedary does not appear in the Pleistocene fauna mentioned (page 23) for North Africa.

Traces of imported iron were found in the Gumban culture (Kenya) and Dr Leakey regards this as "Iron Age" rather than "Neolithic." He suggests that beads (of the Tel el Amarna type) and metal were introduced from the Sudan or Abyssinia when the local inhabitants were in the Stone Age cultural stage. A date of about 850 B.C. is suggested. The use of native or meteoric metal in the stone age is not dealt with.

The book is invaluable not only to all prehistorians but those resident in Africa who have opportunities of adding to the information now so ably presented.—A.E.R.

* * *

"Anthropology in Action." Brown and Hutt.

A most valuable experiment, conducted by two apparently most suitable men and set out in a most readable form for the benefit of all those who have the advancement of the African under the influence, the onslaught, of western capitalistic civilization seriously at heart. And one can only wish and hope that the suggestions of the last chapter, for further extended experiments of the kind described, will become reality *soon*; for in this, as in other directions, the time element is of paramount importance.

Thus, so far as the experiment and the book go, one can have nothing but praise based on admiration. But—and to such as me it is a large "but"—does this combination of the administrator and the anthropologist cover the whole ground towards the goal, so well and concisely described on pages 190-191? "If administration means anything, it means the guiding of a people in such a manner that their social and economic evolution will ultimately prove beneficial. The process of change should allow of adaptation to new conditions . . . (and) the

study of cultural change is not only essential to an applied anthropology but is the most important part of it."

Are we not overlooking the undeniable fact that tribal culture, so ably studied by the anthropologist in its momentary stage and in its dynamic changes, is inseparably tied up with physical environment which itself is likewise subject to a constant flux and, consequently, to dynamic change? To study this environment, its influence on man, its reactions to the activities of man, in short, to grasp man as an integrating factor of the earth's surface, is the high and admittedly difficult task that modern geography, that synthesis of all physical and biological sciences, has set itself.

Is it, therefore, not essential that the experimenting duet of the administrator and the anthropologist should be transposed into a trio in which the geographer would play an equally important part?

It may be that in Uhehe, at present, the problems and complications due to the geographical environment are less striking and, therefore, more easily overshadowed by the more immediate, purely cultural changes. And it is, therefore, regrettable that this first experiment could not have taken place in a district where environment factors are much more serious and important for a correct administrative guidance, as, for instance, in Sukuma-, Gogo- or Chagga-land. But even in the Uhehe experiment one misses the realization by the experimentors (or at least one cannot trace it in the text except perhaps in a short reference on page 15) that such vital factors as domestic water supplies or soil deterioration by the "plant-more-crops" policy, to mention only a few, are bound sooner or later to influence economic and thereby cultural and administrative evolution. It is suggested that a fuller grasp of the environment and of the trend lines of its physical changes through human occupation, which a trained geographer could easily have supplied, would have led to a somewhat different drafting, for instance, on page 135 (fertility and water) or page 227 ("plant more crops"); and that certain repeated notions regarding an apparent unlimited amount of land available for expansion would probably not have been made.

Another point, to my mind likewise of far reaching importance, is touched upon on page 57: "The dangers of turning the native rulers into mere clerks." If clerks there must be, let the rulers of all grades have clerical subordinates by all means; but see to it that the ruler himself is freed as much as possible from office duties in order that he may devote all his time and energy to being a leader, an adviser, an example to his tribesmen in the every-day sociological and economic requirements; duties which demand constant supervision and travel to the villages and fields, constant admonition and counsel, rather than the keeping of registers and files.—C.G.

* * *

"East African Plateaux and Rift Valleys," by Bailey Willis, Carnegie Institution of Washington. Publication No. 470, 1936, 358 pages, 72 plates, 16 text-figures.

One of the world-famed physical features that has attracted the attention and imagination of a large number of people is the System of Rift Valleys of East Africa. The late Professor J. W. Gregory focussed this attention in 1894 in a paper on the physical geography of British East Africa in the *Geographical Journal*. Then in 1921 he brought out his larger work, "The Rift Valleys and Geology of East Africa," in which the subject is dealt with systematically. This book is still the best epitome of the general geology of East Africa, though many advances in knowledge have been made in the interim. The work of Gregory in Kenya was to a certain extent followed by E. J. Wayland in Uganda, but Wayland developed

for the first time the importance of the peneplains and an hypothesis for the origin of rift valleys. Gregory explained the graben or trough-like valleys simply as the result of the release by tensional forces of an upwarped arch, the floor of the valley being considered to act in the same way as the keystone of the arch slipping down between more or less vertical faults. Before the International Geological Congress in 1929 Wayland propounded his new theory before a wider circle. At the same time Professor Bailey Willis was touring East Africa studying the rift valleys, and the fruit of his study is the scholarly work before us.

Professor Bailey Willis in general supports Wayland's theory of the explanation of the mechanism by the interaction of compressional forces, whose source is deep-seated and plutonic; and he brings out in startling relief the relationship of the peneplains. The study of the peneplains, however, had not been neglected by any of the official geological surveys, and Bailey Willis was able to draw largely upon the information gathered by their officers. A new note is struck by his introduction of an hypothetical force, which he terms *levity* in contrast to gravity:

"The analysis of existing theories and the suggestion of antithetic, opposed vertical forces, gravity and levity, led to the conclusion that a more inclusive review of the facts than was possible for any previous observer might develop a different and possibly more correct concept of the origin of the rift valleys as features of the uplifted plateaus."

The general plan of the work is logical; at the outset the historical and general aspects are outlined in sufficient detail. This is followed by the comprehensive explanation of the Wayland compressional theory with certain suggested modifications. The coastal region and the plateaux are then adequately described and their relationship to the Jurassic and Miocene peneplains shown. This leads to the more detailed description of each rift valley and the Gregory Rift Valley (the eastern rift) in particular. A section on Kainozoic vulcanism and the connection between tectonic and volcanic earthquakes completes a comprehensive study.

It is possible to refer to only a few of the conclusions in any detail, but it will be interesting to readers in Tanganyika to state the Professor's interpretation of the structure and the mechanism underlying the formation of the three lakes, Tanganyika, Rukwa and Nyasa. He says (page 225):

"The Tanganyika trough cannot be explained by any hypothesis in which tension, splitting or cracking apart (*Zerrung*, *Zerreissung*) is a major premise, because the facts, especially uplift, contradict that assumption.

"On the other hand, all the known facts, including peculiar details, are consistent with the assumption that the general structure is a result of vertical uplift and depression, modified locally and especially in the northern trough by compression resulting from the action of a force couple."

He considers that Mount Mbeya is an upthrust wedge or ramp, that the foundations of the mountain have been stiffened by intrusions and that at least part of the elevation may be due to intrusive uplift. He says (page 230):

"It is easy to pass from this reasoning to the assumption that the Rukwa trough is more or less an effect of tangential compressive stresses, but Grantham's observations along the unusually well-exposed fault scarp at the base of the north-eastern wall show that that fault hades to the downthrow and is necessarily a tension fault. Whatever part compression may have played in raising Mount Mbeya to its greater elevation, its influence upon the development of the Rukwa trough itself must be considered negligible or entirely lacking."

Lake Nyasa he thinks to have resulted from the combined action of both upthrust and gravity faults:

"Contrasting the top of the escarpment with the bottom we note that it is

a peneplain which has been raised to a maximum elevation of nearly 10,000 feet (2,900 metres), whereas the bottom, which is presumably the same peneplain, has sunk below its original position. The two sections have moved vertically in opposite directions and the connecting strip is the stretched escarpment. The faulting is all normal, hading to the downthrow; but only that which has resulted in subsidence is gravity faulting; the much greater effect of uplift is due to steep upthrust faulting. We thus have here, in the face of the Livingstone Mountains and the basin of Lake Nyasa, precisely the same effect as we observed in the coastal region of Tanganyika Territory, where the faults east of the Ruvu-Mombasa line are normal gravity faults, while those west of that line are normal upthrust faults." (Page 236.)

A very interesting corroboration of the compressional hypothesis is the result of gravity measurements made by E. C. Bullard of Cambridge University. A brief account of his researches is published in Bulletin No. 2, Geological Survey of Uganda, 1935. He states his conclusions thus:

"The Rift Valleys are therefore underlain by more light matter than is required for isostatic equilibrium, and if gravity and hydrostatic forces were given free play their floors would rise. This means that they are held under by the plateaux on each side which can only occur if there is sideways pressure. The Rift floor cannot have 'fallen in,' for if released it would rise, not fall. The gravity results therefore give what seems a conclusive decision between the 'tension' theory of Gregory and the 'compression' theory of Wayland."

Professor Bailey Willis has compiled a great deal of useful information which will form a basis for further study. It must be remembered that his visit lasted a few months only in East Africa, that he travelled in this time over a vast stretch of country, and that much of this was traversed on foot. At the same time both geological and topographical survey was then in its initial stages; very few areas had been mapped and the topographic data were in many cases unreliable. Consequently the Professor's individual field work was somewhat handicapped on this account and his conclusions should therefore be considered as a courageous attempt to elucidate a difficult problem. The geological world, and the geologists in Equatorial Africa in particular, are greatly indebted to him for this original and stimulating view of the peneplains and rift valleys of East Africa, the study of which has been considerably enhanced by the publication of this thoughtful work.—G.M.S.

* * *

"Uganda," by H. B. Thomas, O.B.E., and Robert Scott. Oxford University Press, 15/-.

This recent publication, which has been very favourably received by reviewers in the English and East African press, is something more than a semi-official handbook of the protectorate which lies on the north-western borders of this territory. It sets up a new and high standard for compilers of colonial handbooks. The dry bones of statistical information which are a usual, and for the average reader a repellent, feature of this type of publication are adequately covered by a wealth of interesting and out-of-the-way information, historical and otherwise, set down in an easy and readable style. The junior collaborator, Mr Scott, who has recently been transferred to the Palestine Administration, should be received there with great acceptance for (on the subject under review at any rate) "he speaks as one having authority and not as the Scribes and Pharisees."

It is almost impossible, of course, in a literary venture of this kind to avoid mistakes and omissions of greater or less importance. A writer in *The Uganda Journal*—the organ of the Uganda Society—has taken the authors to task for

their statement (at page 283) that among the Teso, alone of all the tribes of Uganda, there is no clan system. Another reviewer has pointed out that they have omitted to mention that the bandsmen of the Fourth (Uganda) Battalion, the King's African Rifles, are arrayed in kilts. But the exiguous nature of these criticisms is in itself a testimony to the general excellence and accuracy of this volume of over five hundred and fifty pages. Even Homer sometimes nods!

Homer, by the way, is not amongst the sources of information about Uganda drawn on by the authors, but Herodotus, Aeschylus, Aristotle and Ptolemy are. In addition they refer frequently to no fewer than four hundred modern authors whose writings have in some way touched on Uganda. The book indeed contains a mass of well-digested and authoritative information for all comers. The Tanganyika administrative officer will find a full description of a practical system of indirect rule somewhat different from and perhaps more advanced than that with which he is familiar. Those engaged here in the cotton business will find an ample account of the flourishing industry from which Uganda (which has been called the Land of Surplus Balances) draws more than eighty per cent of its annual income. The economist will no doubt be interested to read of the working of the "mailo" land system, possibly the only system of individual ownership of land on a large scale by African natives. The geologist, the agriculturist and the anthropologist will all find their tastes catered for in a competent and instructive way. Indeed, it is difficult to think of anyone at all with any interest in East African life and economy who will not derive advantage from this book. Even those curious people whose literary adventures are confined to poring over the maps or looking at the pictures which a book contains will find themselves adequately provided for in this work, which, by the way, contains numerous excellent photographs of wild game and native life. In short, whether the reader is interested in pygmies or polygamy, witchcraft or weaver-birds, gorillas or groundnuts, football or famines, lake-flies or lepers, he will find them all discussed in this remarkable compendium. Even the Bushe Commission receives its meed of praise and blame—but very discreetly of course.

To the present reviewer and indeed to all who know and love Uganda's green and pleasant land, one of the great attractions of this book is the knowledge and sympathy with which it is written. There is a local proverb: "He who drinks of the waters of the Nile will always return." The authors have obviously drunk deep and often. The reviewer of this book for an eminent English newspaper marvelled that such a pleasant and interesting work should have been written by two civil servants. He forgot that, given a modicum of literary skill, the main essential of writing a good and readable book is that one should know and love one's subject. Uganda, as African countries go, is small—just about as big as England and Scotland lumped together and not one-fourth of the size of Tanganyika. It is isolated—some half a thousand miles from the coast—and rather inclined at times to be parochially-minded. It is in many ways a backward place, for all its surplus balances—even in this year of grace 1937 Kampala, the capital, is still living in hopes, soon no doubt to be satisfied, of the blessings of electric light, tarmac roads, main drainage, automatic telephones, street pavements and a civic aerodrome. It has, however, many compensations—real greens and springy fairways for the golfer, an entire absence of ruts and potholes for the motorist, edible meat and fresh vegetables daily for the gourmet, no high politics, and complete racial and community friendliness, glorious flower gardens and constant refreshing rains—many of the great and little things indeed which serve to endear a country to those who live in it and to those who write about it so understandingly and comprehensively as Messrs Thomas and Scott have done in the volume under review. Their work has obviously been a labour of love, not lightly undertaken and very happily carried out.

The book is provided with an interesting bibliography and an adequate index, and in a series of appendices furnishes much compact information on a number of relevant matters for the statistically-minded.

It can be obtained locally from the Uganda Bookshop, Kampala, for fifteen shillings plus postage, or through any bookseller. The format of the book, like all those produced by the Oxford University Press, is excellent and altogether it can be recommended as very good value for the money.—M.W.

PUBLICATIONS.

The Editor acknowledges the receipt of the following publications:—

"Bantu Studies."

The African Observer.

United Empire (Journal of the Royal Empire Society).

Journal of the Royal African Society.

Annales du Musée du Congo Belge.

Deutsche Kolonial-Zeitung (Journal of the Deutsche-Kolonial Bibliothek, Berlin).

Bulletin of the World Economic.

Archives of Hamburg.

Journal de la Société des Africanistes (Journal of the Société des Africanistes, Paris).

CORRESPONDENCE

To the Editor, "Tanganyika Notes and Records."

Dear Sir,—In March 1934 a white stork (*Ciconia ciconia*) was found in the Itilima chiefdom of Maswa district. This bird had been ringed at the ornithological observatory, East Prussia, Rossitten Kuriſche, Nehrung.

In December 1936 another white stork (*Ciconia ciconia*) was found in the Ntussu chiefdom of this district. This bird had been ringed on the 9th July 1936 at the Musée Zoologique, Polonais, Varsovia (Pologne).

In March 1937 another stork was found in the Itilima chiefdom of this district which had been ringed at Viborg in Denmark.

In April 1937 another stork was found in the Itilima chiefdom of this district, having been ringed by the Université, Kaunas, Lithuanie.

* * *

The Editor, Tanganyika Notes and Records.

Sir,—The publication in your journal of articles on fishing off the coast of Tanganyika induces me to address, through you, those of your readers who are fishermen and to urge them to keep records of the fish which they may kill.

So far, little or nothing is on record available to the public either in this country or abroad and it would seem to be desirable that all information available and obtainable should be recorded so that fishermen may have some guide to which they can refer, showing where they are likely to get good sport and under what conditions they may reasonably expect to obtain it. There must be many keen big-game fishermen in England and in the United States who would be attracted to this coast were reliable records available to them.

Your journal would seem to be a very suitable vehicle for the publication of such records and information and, although it is primarily a record of things Tanganyikan, the fishing grounds of Pemba and Zanzibar are so closely related to our own that inclusion of records from those waters merits your consideration. I would, therefore, urge fishermen to keep records and submit them to you from time to time so that they can appear in your pages and a record for the whole coast be built up.

I suggest that records should include the weight of each fish caught, the date and hour, the bait used, the state of the tide, wind and sea; the locality and depth of the water, the speed of the boat and the number of lines out, distinguishing between hand-lines and rods. Information as to whether trolling was being carried out with the wind or against it should also be included and the temperature of the water should be noted.

In course of time and after records begin to come in it might be possible to compile a standard log-book and to induce one of the local printing concerns to produce it for sale at a reasonable cost.—Yours faithfully, "NGURU."

The Editor, Tanganyika Notes and Records.

Dear Sir,—I notice in your last number a letter from R.S. asking for information regarding the origin and antiquity of carved Arab doors commonly found on the East African coast. These are survivals of the Shirazi customs of privacy and seclusion of women. There is no doubt that after the last Persian occupation of Oman (after the Portuguese evacuation of Muscat) that there was a definite attempt to revive the stricter observance of the Shirazi forms of Islam. The local forms had become very debased and mingled with paganism and the worship of images, etc. This latter was due to the superficial effects of the Christian religion on the native mind and the exercise of the Inquisition by the Jesuits.

I doubt if any of the *doors* now existing date as far back as the seventeenth or eighteenth centuries, but the practice is, of course, much earlier, say tenth to twelfth centuries.

If the family histories of the people who still use these doors were obtained they might be of great value anthropologically, and to fill lacunae in the history of the territory.—Yours faithfully, ARTHUR E. ROBINSON.

* * *

The Editor, Tanganyika Notes and Records.

Dear Sir,—May I through the medium of your correspondence column draw attention to a remarkable phenomenon as yet unexplained—I refer to the strange illuminations or glows visible during the hours of darkness on Mpara Hill, near Kilwa in the Lindi Province? Not having visited the locality myself I will merely say that the glows are well authenticated, that they are visible by night and have been so as far back as native memory extends, and that they always appear at the same two places on the hillside.

The attention of the Geological Survey was first drawn to this phenomenon in March 1934 by Mr Alcock, District Officer at Kilwa. An extract from his letter runs thus:

“For some time past interest has been aroused by the appearance of two large fires on the side of Mpara Hill (a sketch taken from the Admiralty Chart No. 661 was included to show the position). Mpara Hill, situated some ten miles south of Kilwa Kivinje is four hundred and sixty feet high, rises steeply on its southern side and is an important landmark to navigators.

“The fires, which are only visible at night, have a dark reddish glow, an estimated width of at least a hundred feet, and generally have the appearance of ordinary bush fires. They are particularly visible from the water, while travelling near Kilwa Kisiwani. My attention was first called to these during the last rainy season, when I remarked that it was not the usual time for bush fires—whereon I was informed by all natives present that the fires were not the work of mankind but were of supernatural origin. An idea of the size of the fires may be gathered from the fact that they are visible from Mtandura twenty miles to the south. Natives living to the south of Kilwa unanimously agree that the fires are visible every night, year in year out, and that their origin is unknown. Old men state that the fires have been there as long as they can remember.

“These fires seemed of too dark and vivid a colour to be associated with ordinary marsh gas of which the writer has experience. I have observed the fires far out at sea about five times myself, and on one occasion observed smoke (or steam?) arising from the vicinity at about 4 p.m. An ordinary

signalling telescope showed this to be arising from the thick bush on the side of Mpara Hill.

"Taking a rough bearing from the Arab Fort at Kilwa Kisiwani on the line along which the fire at 'A' is visible, I had the opportunity on the 25th instant of making an extensive examination of the hillsides to the south and south-east of Mpara."

He goes on to relate the character of the hill, but he was unable to find any trace of burning. He noted a small spring about one hundred and fifty feet from the top of the hill and in the vicinity he collected samples of the water and the rock, both of which he sent for examination. His letter continues:

"The second fire is stated to occur in a cleft of the point of the hill called Mshela shown at 'B' on the plan. Time and the extreme difficulty of moving through the broken and thickly overgrown terrain prevented me from examining this point at all closely.

"The flat top and eastern slopes of Mpara Hill are cultivated and well populated. Since for years the natives have regarded the fires as supernatural, they are naturally loth to discuss the occurrences or to supply information. However a few tactful enquiries through the Liwali of Kilwa, who accompanied me, elicited some interesting statements from the *Wazee*. One old man says that the fires have been there as long as he can remember and that they are particularly vivid during the rains. Another states that he understood they came from the hollow trunk of a tree. With the exception of the rough path down to the spring mentioned and a hardly used track to Orero, natives do not go near the points 'A' or 'B' and, of course, nobody would dream of going there at night."

The samples received were carefully examined by Mr Oates who could find nothing in them to afford an explanation of the phenomenon but suggested that it might be due to phosphorescence. No member of the Survey has examined this region and the reports by German geologists, who visited this part of the territory before the war, record only sedimentary rocks ranging in age from Jurassic through Cretaceous to Tertiary in this region and no mention is made of this or any other similar phenomenon. Shortly after this communication was received from Mr Alcock, the well known German geologist, Dr Hennig of Tuebingen University, accompanied by Dr Nowack, another geologist from Vienna, visited Dodoma *en route* to Lindi to resume some investigation in the Tendaguru region where Dr Hennig had charge of an important geological expedition before the war.

Dr Hennig had not heard of these strange lights and was sufficiently interested to arrange to visit Kilwa Kisiwani on his way to Lindi and look into the problem. His time was too limited to make a complete survey. He confirmed the existence of the lights, but expressed the doubt that the lights were actually on the hill and thought that they only appeared so when viewed from Kilwa Kisiwani or from that direction. He suggested that the lights might be due to phosphorescence in the creek or to some emanation, probably marsh gas from the water between the hill and the station. He confirmed the presence of sedimentary rocks of Cretaceous (?) and Eocene age on the hill and in the vicinity but found nothing to explain the origin of the lights. His observations, however, prompt the suggestion that any future investigator would do well to take numerous and careful bearings upon the glows from as widely separated fixed points as possible so as to obtain their true positions by intersection.

After their localization it is clearly necessary to demonstrate whether they are the result of real conflagrations or due to some form of phosphorescence such as that emitted under certain conditions from special forms of mineral or of vegetable matter. If the phenomenon is attributable to phosphorescence then it will only be

observable at a distance and the difficulty of final solution of the problem will be greatly increased.

It is to be hoped that a full description of this interesting phenomenon—together with its explanation—will one day appear in the pages of *Tanganyika Notes and Records*.—Yours faithfully, E. O. TEALE.

