# THE MAMMALS OF ZANZIBAR AND PEMBA ISLANDS

R. H. W. Pakenham

Suggested citation:

> Pakenham, R. H. W. 1984. *The Mammals of Zanzibar and Pemba Islands*. Harpenden: privately printed.

Pakenham's unpublished work on Zanzibar's mammals deserves to be made more widely available than it has been. This electronic version has been scanned from a bound copy sent to me by Eileen Pakenham in May 1994 (see below). I trust that its dissemination in this form would also have met with her husband's approval. And I hope that recipients will use it with the care and attention to detail that Pakenham devoted to his own research.

Martin Walsh
Cambridge
January 2006

9, Kirkwick Avenue,
Harpenden.
Herts. AL5 2QU.

17 May 1994.

Dear Mr. Walsh,

I am so glad to have found a copy of the Mammals checklist, & I know my husband would be very pleased for you to have it.

Yours sincerely,
Eileen Pakenham.

CONTENTS

# THE MAMMALS OF ZANZIBAR AND PEMBA ISLANDS

## Introduction

These two islands, covering some 1650 (85 x 39) and 1014 (68 x 23) sq.km. respectively, lie about 40 km. off the coast of East Africa, from 6° to 5° south of the equator. Their actual areas are considerably less than the product of their dimensions owing to the irregularity of their coastline. Politically they are now a part of Tanzania since the African revolution of 1964. The population, 479,235 (1978 Census: Zanzibar Is. 273,365; Pemba 205,870), are mainly agricultural and fishing people; there is much fertile land, as well as extensive bushland growing on old coral rock, and the islands are well watered. Further information on topography and climate is given in later chapters, but the paper omits sections on history, geography and geology which are adequately dealt with in the author's amplified checklist of the birds (1979). Moreau & Pakenham (1941) referred also to the vertebrate fauna of Mafia Island which lies close to the Tanzanian mainland coast, but Mafia is not covered here, even for comparative purposes, owing to lack of up-to-date information.

The check-list in Moreau & Pakenham's study of the land vertebrates of these islands, with its "Corrigenda & Addenda" (1942), provides the only check-list known to the author which aspired to completeness and scientific accuracy, and it showed that 3 mammals in Zanzibar and as many as 16 in Pemba were new records for the islands. The present list follows mainly the nomenclature and arrangement of Corbet & Hill (1980) down to species level. Theirs is the sequence adopted for orders and families, with the exception of the Macroscelidea, which are placed after the Insectivora by reason of association of idea, not of taxonomy. Within families, genera (and within genera, species) are arranged alphabetically, disregarding sub-families. Their distribution between the two islands is denoted by the initials Z and P.

Comparative analysis of the numbers of forms (species and sub-species) in the two islands as between 1942 and 1983 and the reasons for changes would serve no useful purpose, for differences are accounted for in various ways, of little significance. Other than introduced species, five are added to the Zanzibar Island list, and one to Pemba. In 16 cases generic or specific nomenclature has undergone review in the intervening years, though the animal itself is the same, and five of these have been synonymised with other species. One other, at best dubious, has gone to the Appendix of provisionally excluded species. The total number of 'species' (for this purpose treating Pemba and Zanzibar Cephalophus monticola as distinct) credibly recorded as now found in the islands (discounting 4 queried Pemba cases which may prove valid) is 54:31 in Zanzibar only, 6 in Pemba only, and 17 others in both islands. Included in these totals are 7 introduced species: shrew, civet, mongoose, a pig, a mouse and two

rats embracing several forms of R. rattus. Rattus and Mus species are commonly considered so ubiquitous that it seems fair, for the purpose of this count, to regard them, if present in one island, as present in both. Twenty-three of the 54 'species' are bats; further collecting could add several more to the bats and one or two to the other animals. Six wholly new records since 1942 are Crocidura flavescens (Z), Crocidura viaria (Z), Coleura afra (P), Cardioderma cor (Z), Scotophilus borbonicus (Z), and Cephalophus monticola sundevalli (Z) - the latter having escaped Moreau & Pakenham 1941 but recorded by Swynnerton & Hayman 1951. Opportunity has been taken to re-cast the list and to add comments and field observations.

Much of the information rests on the author's own collecting, as official duties permitted, from 1938 to 1945, with only some 20 specimens added in later years. Other sources are Dr. W.M. Aders' chapter in Pearce (1920:326-331), G.E. Dobson, J.T. Last, collection by Sir John Kirk, H.H. Swinny, Sir Claud Hollis, Col. Cosens, J.H. Vaughan, Dr. W.H.R. Lumsden and various German collectors and writers such as Voeltzkow, Neumann, Stuhlmann, Peters, von der Decken, Fischer, Matschie, Noack and no doubt a few others. Contemporary sources, amplifying information, are in the list of References. It is unwise to accept too readily Voeltzkow's 'record' of occurrence of species in these islands since it is prefixed by the uncritical remark that they had "become known to have occurred": some of these are now dubious or positively discredited. The recording of the natural history of the islands has been bedevilled by confusion as to whether the locality name "Zanzibar" referred to the island or the strip of the African mainland coast so named which, for most of the 19th century, was under the suzerainty of the Sultans of Zanzibar. Few collectors seem to have appreciated the need to differentiate between coastal and insular "Zanzibar" in recording the origin of their specimens. The author has relied, for identifications, largely on the determinations made by the British Museum (Natural History) and the Museum of Comparative Zoology, Harvard, and upon their advice. To ensure that no published work affecting the islands since the author left (1956) has been overlooked, "The Zoological Record" has been carefully scanned to the last published edition, 1982 (1979).

Appendix 1 comprises asterisked and unasterisked species. The latter are definitely excluded from the islands' list because reports by various authors of their occurrence are believed, for reasons given, to be erroneous. An asterisk signifies that evidence of the species' occurrence is unconfirmed and dubious though further investigation or collecting may substantiate it. Appendix 2 lists animals which have been reported by local informers but it has been impossible to secure specimens or discover what they are.

## Topography

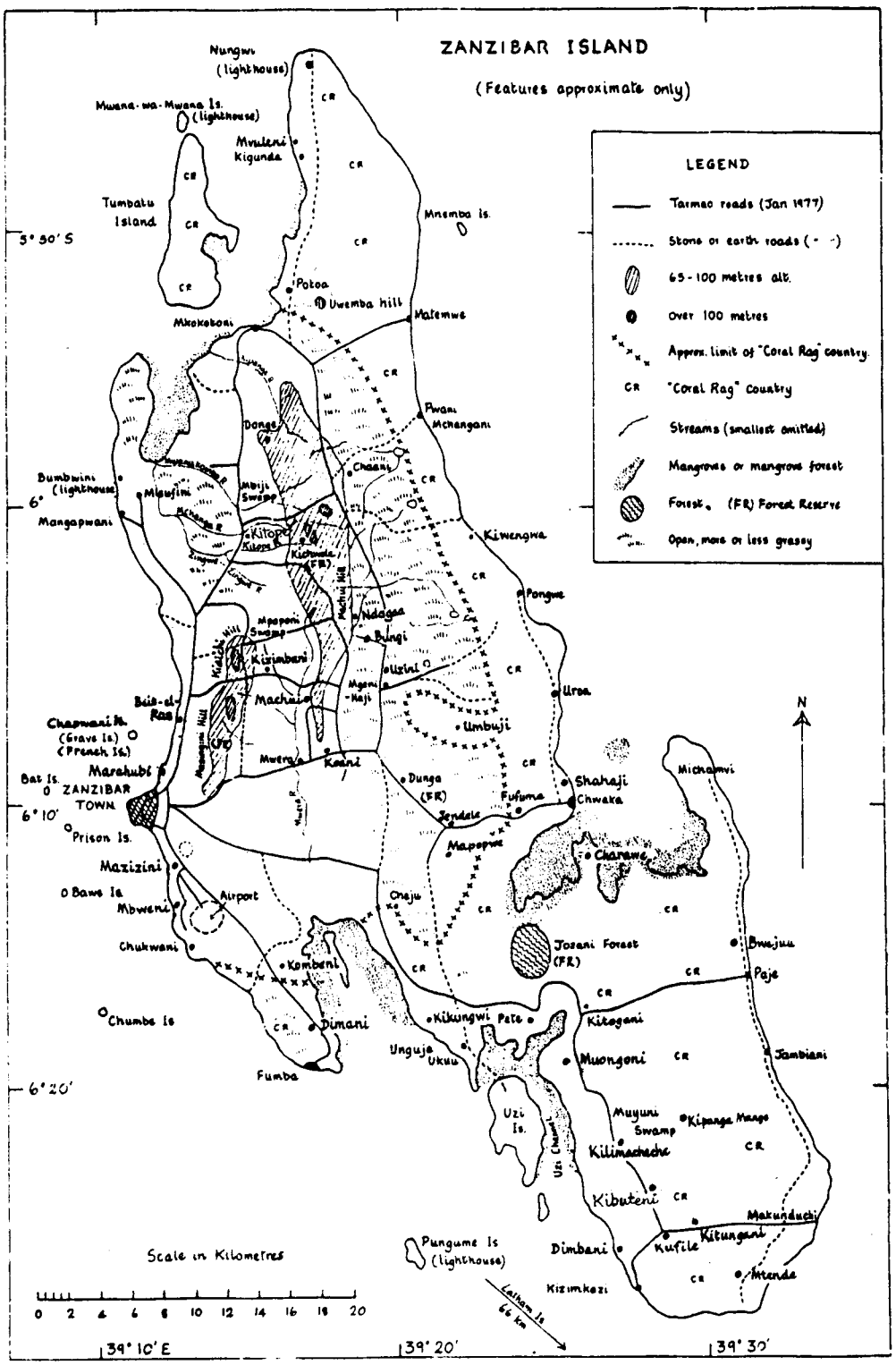
### Zanzibar

Zanzibar is a low-lying island with two fairly well-defined parallel ridges (Machui and Masingini) nowhere more than 110 m a.s.l., running north/south, slightly west of centre, through most of the northern half of the island. Virtually all the country between these ridges and the north and west coasts (about a third of the island) is very fertile and cultivated either with coconut and clove plantations or with food crops, with patches of bush here and there. ('Bush' usually means land carrying bushes and thickets, either isolated or continuous, about 2-3 m high, interspersed with trees).

A gently undulating coastal belt 5-6 km wide down the northeast and east side of the island and most of the south and south-central part, is covered with bushland upon old coral rock sparsely covered with variously sized pockets of soil, called locally the 'coral rag' country, but more correctly termed 'karst' (limestone). Throughout these areas the bush grows higher, more densely and is more woody than elsewhere. This is the country for elephant-shrews, duikers and suni antelope, leopard, squirrels, lesser bushbaby, and in places tree-coney. Shifting cultivation by local villagers - clearing, burning, planting of food crops - moves through parts of this bushland every few years, the gardens lasting in each case not more than about 4-5 years before the process is repeated elsewhere. Such procedure, though providing considerable but temporary increase in fertility, tends to cause this type of land, which is not water retentive, to revert (but not always) to grassland with little or no bush cover (Calton *et al.*, p.59).

A notable exception amid the eastern coastland bush country is the Jozani Forest, an area of dense tall damp forest on rich black soil, believed now to cover only about 2-4 sq. km. The Oxford University Exploration Club's 1972 expedition gave special attention to this point, and worked an area of 196 ha (Zanzibar Forestry Department quoted by Robins), although the expedition itself surveyed only 130 ha considered to be naturally forested, which was as far as the existing transects allowed penetration. Estimates of the forest's area had formerly been based largely on conjecture and was evidently greatly overstated (see Moreau & Pakenham 1941, who were informed of a possible maximum of 3240 ha; but there is little doubt that this figure included most of the mangrove forest on the north side). Access has been facilitated in recent years by division into a number of rectangular blocks of 600 x 200 m separated by paths 4 m wide, but the former inaccessibility favoured the preservation of its rich wild life. In 1972 there was an African head forester, but the inroads of untrained local woodcutters hamper orderly and economical control. Although the forest is stated to be now statutorily protected as a 'reserve' (forestry only), it is frequently disturbed by pig-hunting with firearms and dogs, open to public participation (E.B. Martin:

# MAP OF ZANZIBAR ISLAND



90-96). Martin says that the endemic Colobus monkeys here have been poached by immigrant tribesmen, and that 40 were exported to foreign zoos in the 1970s. It was always believed that this forest was the product of a silted-up creek running southwest from the mangrove swamps of Chwaka Bay to the Uzi Channel (Stockley 1928) but Robins (1976:230-232) advances a reasoned hypothesis that the forest was "formed in a mature limestone solution basin" as in the case of a similar, but much smaller, forest in Aldabra.

The large populated island of Tumbatu, lying off the extreme northwest of Zanzibar Island, is bush-covered and the home of some 6,500 rather exclusive folk who claim descent from the very early Shirazi settlers. These people have overflowed over the northern half of the main island and are renowned for their seamanship. Sykes monkey, tree-hyrax, greater galago and some species of wild bovid are found there, but reportedly not the red squirrel nor giant rat.

Zanzibar Town has an excellent supply of pure water, needing no treatment. The source is a couple of natural artesian springs. There are some small rivers (perhaps not more than 10-12 m across) flowing through lush vegetation, viz. Kipange, Mwanakombo, Zingwezingwe, Mchanga, Kitope, Mwera and smaller streams, deriving their water from the hills, and all running to the sea on the north or west except the Mwera river and a few lesser ones on the east which flow for a few kilometres and lose themselves in the ground. The coralline bed-rock is full of subterranean caverns which hold a lot of water, and some of these 'cave-wells' are quite spacious and supply pure, cool, fresh water for nearby villages. In some cases these caverns extend into narrowing tunnels which run quite a long way, frequented by bats. Scattered across the island are many swamps, large and small, a few swampy ponds, and some damp valleys suitable for rice or sugar cane. In the northern half of the island, east of centre, is a large discontinuous plain, at its northern end (Chaani) well covered with Borassus or Palmyra palm, Borassus flabellifer var. aethiopum, where peasants cultivate or tend cattle. Further south similar country reappears.

Pemba

A good central road runs from north to south, with many feeder roads to the more distant areas; but the configuration of Pemba is quite different from Zanzibar. The entire island west of a north/south line rather east of centre, and the whole of the south of the island, is broken up into innumerable little valleys and hills, the latter only 30-45 m high, except three or four in the south up to about 100 m, all thickly covered with plantations of cloves (mainly) and coconuts, interspersed with food-crops and occasionally bush. The clove is a thick-foliaged candle-shaped tree which may reach 21 m in height. The large size of the Pemba trees is due to the fact that the hurricane of

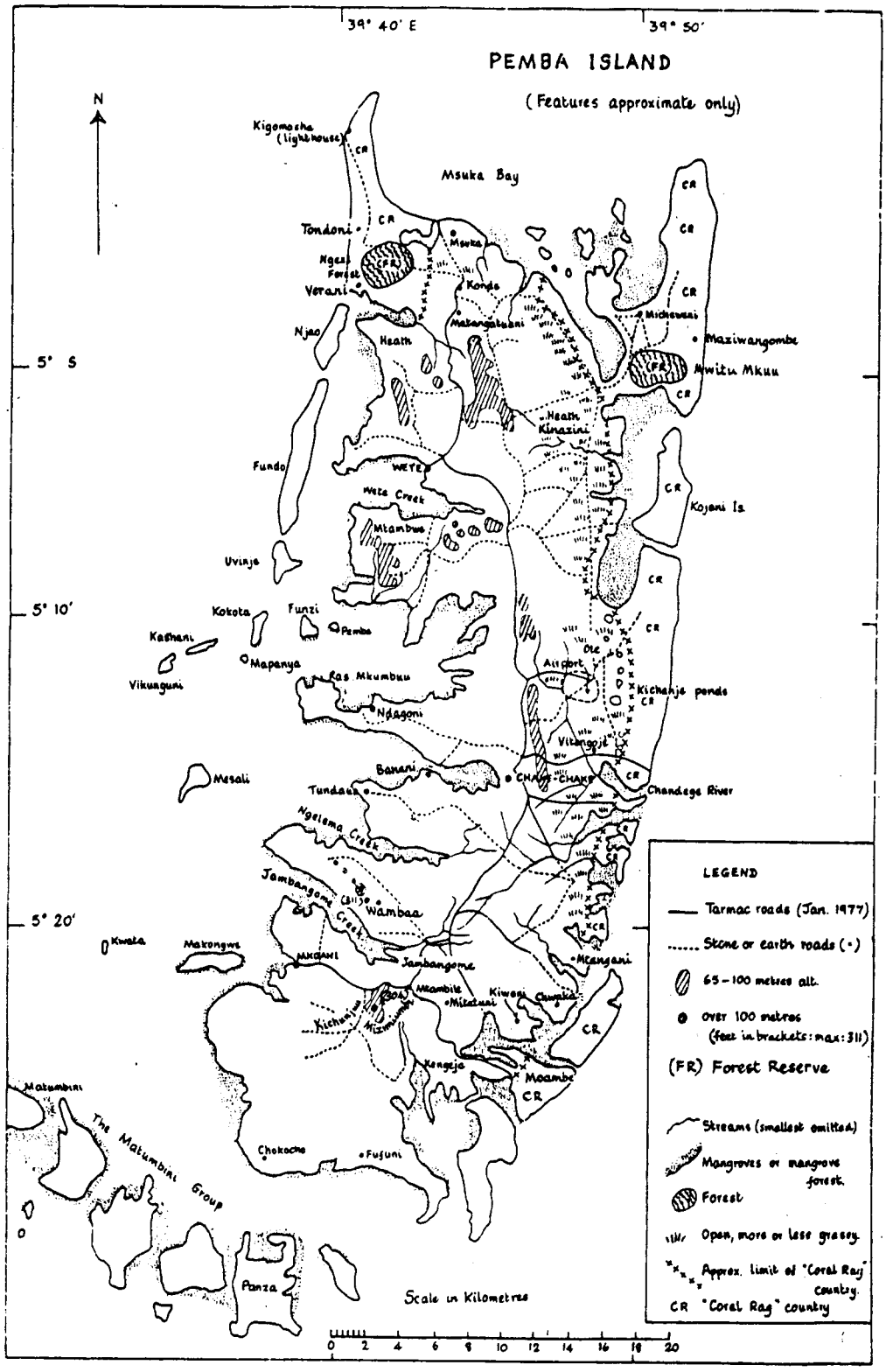
1872 which destroyed all the Zanzibar plantations missed Pemba Island. Rice is planted both on the hills and in the valleys.

In the northwest corner of the island is the Ngezi Forest (variously estimated as between 5 and 12 sq. km, probably nearer the former) which D.K.S. Grant, Conservator of Forests, Tanganyika, 1921-1938, considered (typewritten official report) unlike the mainland coastal forests, approximating more to the tropical rain-forest of the East African highlands, characterised by such plants as Dombeya sp. and Cono pharyngia. This forest more nearly approached, in Grant's opinion, the true 'selection' forest than any other he had seen. It is fairly dense, with close canopy formed by the taller trees, some of which reach 27-30 m, with clean boles of commonly 18-19 m. Undergrowth is fairly thick, and a stream flows through it. Despite Grant's opinion that Ngezi is 'the only forest in Zanzibar or Pemba worthy of the name', it feels desolate and devoid of life compared with the Jozani which teems with it. Voeltzkow (1923), in the early 20th century, formed exactly the same impression of the Ngezi. In recent years, government has experimentally introduced Red Colobus monkeys here from Zanzibar (with what long-term success is unkown) Mturi 1983. In the northeast of the island, at the rocky entrance to the Micheweni peninsula, is a smaller forest called the Mwitu Mkuu, probably no more than 2-3 sq. km, and not as tall as Ngezi. The rest of the island, that is the extreme northwest beyond Ngezi, extreme northeast, and down the east coast, is under rough grass, bushland, or forest in various stages of growth or regeneration from cultivation.

Throughout Pemba there is plenty of wet ground everywhere in valley bottoms - happy hunting grounds for the marsh mongoose - though there are no rivers comparable even to the Zanzibar ones. Small vegetation-choked water-courses, full of the giant aroid Typhonodorum lindleyanum, run into the mangrove-filled creeks that abound all round the much indented coastline or become absorbed in swamps. Some good-sized ponds in the east central part (Ole & Vitongoje areas) and one or two smaller ones in the northwest are frequented by interesting birds but infested with bilharzia-carrying snails.

Several colonies of tree hyrax are to be found in the extreme northwest of the island and on the islands of Njao and Fundo. Some of the islands off the south coast afford roosts for the large indigenous Pemba flying fox. Otherwise there are no special habitats save that Pemba duiker and feral domestic pig (relic of Portuguese occupation) may occur wherever there is sufficient bush or forest cover. The Pemba vervet monkey and the introduced Javan civet cat are ubiquitous, but remarkably there are no squirrels in Pemba.

# MAP OF PEMBA ISLAND



## Climate

The islands enjoy a fairly equable climate with a good rainfall and a breeze most of the year round save in the lull between the monsoons when it can be sultry and gusty. The seasonal rotation cannot be precisely stated as there is some annual variation, but normally the northeast monsoon, which brings in the hot season after a month or so of variable wind and rain, is blowing steadily by the end of October or early November, and up to the end of December rain is still fairly considerable and frequent (known as the 'Vuli' or short rains). December to March are the hottest, but not necessarily the driest, months, the least tolerable heat being in the last few weeks before the long or 'Masika' rains break, lasting usually from mid-March to mid-May. During this period the prevailing wind from the northeast gradually gives place to one from the south called the 'S.W. monsoon', though in these islands mainly, in fact, from the south-east. The heavy rains clear after the middle or end of May, and by June the fairly dry and cooler southern monsoon has set in, blowing steadily till the end of August. September is a month of vacillating wind and rain, leading to the opening of the short rains again in the unsettled weeks of early to mid-October.

Official records for 34 and 41 year periods show that rainfall in Pemba averages slightly more than in Zanzibar, but the figures vary considerably from year to year, and there is more rain in the central and western parts of both islands than in the eastern. Rainfall is, in fact, fairly well spread through the year; less falls June-October than November-March, but hardly a month passes, even in the 'driest' or hottest season, without several wet days.

As with rainfall, temperature records vary annually, but over the above periods of years the difference between the highest mean daily maximum and the lowest mean daily minimum in each island was no more than 7.98°C in Zanzibar (30.70°-22.72°) and 9.23°C in Pemba (32.00°-22.77°); and from year to year there is little contrast between the two islands, even when comparing such different localities as Zanzibar Town and Banani village in Pemba (both central west coast). On the other hand, during the same periods absolute maximum and minimum have reached respectively 35.0°C and 19.9°C in Zanzibar, and 37.8°C and 19.4°C in Pemba; but normally temperatures rarely exceed 34°C or fall below 21°C. Detailed statistics are given in Pakenham 1979:21-22.

The proximity of the islands to the equator means there is little significant difference in seasonal daylight length.

## Breeding

An effort has been made to assess roughly the seasonal periods favoured by species on which some evidence has accrued out of observation and collecting: specimens in milk or pregnant, and size of foetus; observation of bats and monkeys carrying the very young, and the size of juveniles able to run with their parents (monkeys, mongoose, leopard, pigs, etc). I am indebted to the Curator of Mammals at the London Zoo for advice on this. These observations are based on 24 species (in many cases several individuals of the same species): one insectivore (shrew), 9 bats (3 megachiroptera, 6 microchiroptera), 4 primates (including 3 monkeys), 3 carnivores (mongooses & leopard), one hyrax sp., 4 Artiodactyla (pigs, duiker, & suni), and 2 rodents (squirrel & rat).

It would seem, on putting together evidence from the above sources, that broadly speaking most mammals bear their young between late August or September and the end of December. This covers the end of the cool season and the period of the short rains and just the beginning of the hot season. A few species spill over from this period into the hot season (e.g. a bat, Rhinolophus caffer, found pregnant in February, and Sykes' Monkey into mid to end of January). Some species evidently breed from Feb/March to May instead of or as well as in the earlier period (not the same individuals): a very young bushbaby was observed at the end of April, born probably mid or early March; the Marsh Mongoose, Atilax paludinosus, breeds between mid-February and end of April - middle of the long rains (judging by the condition of a female and the capture of young abroad up to mid-May); 3 Giant Rat females, Cricetomys cosensi, pregnant and in milk in April/May; two Tree Coneys, Dendrohyrax validus, had double foetuses near full term on October 16, and another with a small one on April 1; and the feral pig, Sus scrofa, was breeding mid-March to early May, as well as the season early October to mid-December.

## Distribution and Endemism

Claim to endemic status is yielding, in several cases, to current scientific knowledge and thought in the past 40 years. In 1942 Moreau & Pakenham recognised 6 endemic mammal forms (only 2 as full species) in Zanzibar Island, and 2 in Pemba (1 full species). Subsequently the claim of several of these, especially of basically forest forms, has been questioned; Pakenham (1979) omitted one Zanzibar species and added two more subspecies. Kingdon (1971) has pointed out that Zanzibar and Pemba Islands, with their relatively high annual rainfall, were largely forested before the advent of cultivation, and that they seem to have escaped the climatic vicissitudes that destroyed forest conditions in other parts of coastal East Africa. He observes that thus certain species were evidently able to survive in the islands, developing some

differences from mainland forms. Allied species or races also survived in ecological "islands" of forested country on the African mainland, which became separated from the coast by belts of arid country. Cases in point in the islands are Petrodromus tetradactylus zanzibaricus (possibly), Colobus kirkii, Bdeogale crassicauda tenuis, Panthera pardus adersi, Dendrohyrax validus neumanni, Cephalophus adersi (though not endemic) and Neotragus m. moschatus. Herpestes sanguineus rufescens and Cricetomys gambianus cosensi, though regarded as subspecifically distinct, are not necessarily forest species. Opinion differs about their endemic status, and in most cases it is not above subspecific. The Pemba vervet monkey Cercopithecus aethiops nesiotes, formerly regarded as an endemic but now thought by some experts hardly to warrant subspecific separation, belongs to an African savanna-dwelling group. Subspecific endemism generally (save in special circumstances) would seem to be an increasingly insecure claim in the growing climate of historical and rational assessment; yet, if not overvalued, it may be the most convenient way of indicating an appreciable geographical distinction.

On Tumbatu Is. (Z) local inhabitants informed me that the following genera/species are absent from the island: Herpestes, Viverra, Viverricula, Potamochoerus, Paraxerus, and Cricetomys; but that they have Otolemur, Cercopithecus mitis, Cephalophus sp., and Dendrohyrax - also pythons. It is of some interest that there are no squirrels in Pemba, though widely distributed in Africa and two species (Heliosciurus rufobrachium and Paraxerus palliatus) occur in Zanzibar. The following, found in Zanzibar, are also absent from Pemba: the two elephant shrews (Rhynchocyon and Petrodromus), the lesser bushbaby (Galago senegalensis), Sykes' and Colobus monkeys (Cercopithecus mitis and Colobus kirkii), four carnivora (Viverra civetta, Herpestes sanguineus (possibly or rare), Bdeogale crassicauda, Felis pardus), the red river hog (Potamochoerus porcus), the forest duiker (Cephalophus adersi), and the suni (Neotragus moschatus). On the other hand, the marsh mongoose, Atilax paludinosus, is found in Pemba but apparently not in Zanzibar.

Pemba Island is, in its formation, a horst, separated from the African mainland by a channel varying in depth from 265 (in the north) to 469 fathoms (in the south), and, as far as can be judged, has been separated from Africa for about 4-5 million years (probably since between the Miocene and Pleistocene epochs), whereas the separation of Zanzibar Island from Africa by a channel of a depth of no more than about 14 to 35 fathoms, is barely older than the late Pleistocene (less than 2.5 million years ago). This aspect is more fully developed in Pakenham 1979:12-15.

## Conservation of wild-life

Swai (1983) and Mturi (1983), who have recently made surveys of the need and possibility of wild-life conservation in Zanzibar Is., have stressed the grave danger to natural life and resources posed by uncontrolled felling of timber, harvesting of other forest products, and the traditional shifting cultivation in the eastern and southern bush-lands. The Tanzanian population census of 1978 reveals a population explosion of 44% in Zanzibar Is. and 25% in Pemba since 1967, raising the overall population density per sqaure kilometre in Zanzibar Is. from 114.8 (1967) to 164.7 (1978), and in Pemba from 167.0 (1967) to 209.2 (1978). This decade follows the 1964 African revolution and political union with Tanganyika, a development which may have encouraged immigration from the mainland (unlikely to be repeated in the future on the same scale). In these circumstances, there is an urgent case for finding and enforcing a balance between the expanding human needs and the conservation of the steadily diminishing heritage of wild-life in these small islands. Swai and Mturi state that there are now four "Forest Reserves" in Zanzibar Is. (Jozani, Dunga-Jendele, Masingini, Kichwele) and two in Pemba (Ngezi, Mwitu Mkuu), but that this term relates to the protection of tree and plant life only, not to other forms of wild-life for which special provision must be made. The only animals enjoying general protection by law (Wild Animals Protection Decree, 1950) are said to be the Red Colobus monkey and the duiker Cephalophus adersi. Certain recommendations are made to remedy this imbalance, but Swai rightly emphasises that legislation is not enough without the support of generally educated public opinion (from school upwards).

Struhsaker & Leland (1980:214-215) go further and advocate not only giving Jozani Forest Reserve the status of a national park within which all forms of human exploitation would be prohibited, but also its extension on the north, east, and south sides, with reafforestation of the area between Jozani and the highway. They also recommend national park status for the Muyuni area and Uzi Is. and adjacent mangrove swamps (Silkiluwasha adds Muungwi) in order to conserve more examples of Zanzibar's natural heritage which is under heavy pressure. Further, they warn of the dangers to existing species by introduction of animals which could cause very severe changes in the ecosystem. Implementation of these recommendations calls for effective attention by central government. Silkiluwasha (1981) illustrates, by comparing the relative success and failure of conservation in Muyuni and Uroa areas, the unreliability of leaving such important matters to the judgement and action of local authorities.

## Abbreviations

The following abbreviations for names of persons and institutions are used in the text:

| | |
|---|---|
| AMNH | American Museum of Natural History |
| BM | British Museum (Natural History) |
| MCZ | Museum of Comparative Zoology, Harvard |
| MNHN | Museum National d'Histoire Naturelle, Paris |
| NMNH | National Museum of Natural History: Smithsonian Institution, Washington |
| NRVZ | Naturhistoriska Riksmuseet sektionen för vertebratzoologi, Stockholm |
| SMNS | Staatliches Museum für Naturkunde, Stuttgart |
| ZFMK | Zoologisches Forschungsinstitut und Museum Alexander Koenig, Bonn |
| ZM | Zanzibar Museum |
| ZMB | Zoologisches Museum, Humboldt University, Berlin |
| Mor | Moreau |
| Pak | Pakenham |
| P | Pemba Island |
| Z | Zanzibar Island |

## Acknowledgements

The author is greatly indebted for help from the staff of the Mammal Section of the British Museum (Natural History), particularly Mr. R.W. Hayman (1939-56) and Dr. G.B. Corbet, Mr. J.E. Hill (for much help throughout, chiefly on the Chiroptera), and Miss P.D. Jenkins (Soricidae); also to the BM(NH) at Tring for facilities afforded; to the late Mr. A. Loveridge (during the author's collecting in the Islands) and to staff of the Museum of Comparative Zoology, Harvard. He has drawn largely upon Meester & Setzer's "The Mammals of Africa" (1971-77), and records his gratitude for information or advice given by the following: Dr. R. Angermann (ZMB), Dr. Bequaert (MCZ, for identification of parasites); Dr. B.C.R. Bertram (Curator of Mammals, London Zoo); Curator of Peabody Museum (Salem, Mass.); Dr. P. Grubb (London); Dr. H. Hackethal (ZMB); Mr. D.C. Halsted (formerly U.S. Consul, Zanzibar); Mr. Himid Msoma (ZM); Dr. M.V. Hounsome (Keeper of Zoology, Manchester Museum); Dr. R. Hutterer (ZFMK: especially for help over Soricidae); Dr. J. Kingdon (Islip, Oxford); Mr. J.A.W. Kirsch (MCZ); Dr. K.F. Koopman (AMNH); Dr. W.H.R. Lumsden (Entebbe & Edinburgh); Mr. J.H. Miles Jr. (NMNH); Mrs. P.H. Napier (c/o BM); Dr. T.R. Olson (City Univ., New York); Royal Botanic Gardens, Kew (Enquiries Unit); Dr. B-O Stolt (NRVZ); Dr. M. Tranier (MNHN). Warm thanks are also due to the House Manager, Tatton Park, Knutsford, for loan of a Cephalophus monticola head from Lord Egerton's collection; to Professor Kalmus (Harpenden) for generous help in translation of German passages, to Mr. P.S. Gooch (Commonwealth Institute of Parasitology, St. Albans) for kind help in Portuguese translation, and to Mrs. C.M. Lapwood for her vital contribution in typing so well not only this paper but also that on the Islands' reptiles and amphibians. The British Ornithologists Union has most kindly allowed use of the maps of the Islands which appeared in the BOU Check-List No. 2, 1979, with a number of place names changed; and the use also, with suitable changes, of the Topography and Climate sections.

## LIST OF ADMITTED SPECIES

### Order INSECTIVORA

**Family Soricidae**

| | | |
|---|---|---|
| Crocidura flavescens nyansae Neumann | African giant shrew | Z |
| Crocidura fuscomurina sansibarica Neumann | Zanzibar pygmy shrew | Z,P,(E both) |
| Crocidura viaria suahelae Heller | Larger savanna shrew | Z |
| Suncus murinus (Linnaeus) | House shrew or Indian musk shrew | Z,P |

### Order MACROSCELIDEA

**Family Macroscelididae**

| | | |
|---|---|---|
| Petrodromus tetradactylus zanzibaricus Corbet & Neal | Four-toed elephant-shrew | Z (E) |
| Rhynchocyon petersi adersi Dollman | Black-and-rufous elephant-shrew | Z |

### Order CHIROPTERA
### Sub-order Megachiroptera

**Family Pteropodidae**

| | | |
|---|---|---|
| Eidolon helvum helvum (Kerr) | Straw-coloured fruit-bat | Z, P |
| Epomophorus minor Dobson | Little epauletted fruit-bat | Z |
| Epomophorus wahlbergi wahlbergi (Sundevall) | Wahlberg's epauletted fruit-bat | Z, P |
| Pteropus voeltzkowi Matschie | Pemba flying-fox (fruit-bat) | P (E) |
| Rousettus aegyptiacus leachii (A. Smith) | Egyptian or long-haired rousette | P |

### Sub-order Microchiroptera

**Family Emballonuridae**

| | | |
|---|---|---|
| Coleura afra (Peters) | African sheath-tailed bat | P |
| Taphozous mauritianus E. Geoffroy | Mauritian tomb bat | Z |

**Family Nycteridae**

| | | |
|---|---|---|
| Nycteris grandis Peters | Large slit-faced bat | Z, P |
| Nycteris hispida (Schreber) | Hairy slit-faced bat | Z |
| Nycteris macrotis luteola Dobson | Dobson's slit-faced bat | Z |
| Nycteris thebaica E. Geoffroy (?capensis A. Smith) | Egyptian slit-faced bat | Z |

**Family Megadermatidae**

| | | |
|---|---|---|
| Cardioderma cor (Peters) | Heart-nosed big-eared bat | Z |
| Lavia frons ?rex Miller | Yellow-winged bat | Z |

**Family Rhinolophidae**

| | | |
|---|---|---|
| Rhinolophus deckeni Peters | Decken's horseshoe bat | Z, P |
| Rhinolophus swinnyi Gough | Swinny's horseshoe bat | Z |

**Family Hipposideridae**

| | | |
|---|---|---|
| Hipposideros caffer caffer (Sundevall) | Sundevall's African leaf-nosed bat | Z,P |
| Hipposideros commersoni marungensis Noack | Commerson's leaf-nosed bat | Z, P |

**Family Vespertilionidae**

| | | |
|---|---|---|
| Eptesicus capensis grandidieri (Dobson) | Cape serotine | Z |
| Pipistrellus nanus nanus (Peters) | Banana pipistrelle | Z, P |
| Scotophilus borbonicus viridis (E. Geoffroy) | Brown bat | Z |
| Scotophilus nigrita (Schreber) | Yellow house-bat | Z, ?P |

**Family Molossidae**

| | | |
|---|---|---|
| Tadarida (sub-genus Mops) brachyptera (Peters) | Mozambique free-tailed bat | Z, ?P |
| Tadarida (sub-genus Chaerephon) pumila (Cretzschmar) | Little free-tailed bat | Z, P |

## Order PRIMATES

**Family Lorisidae**

| | | |
|---|---|---|
| Galago senegalensis zanzibaricus Matschie | Lesser bushbaby | Z |
| Otolemur garnettii garnettii (Ogilby) | Greater galago | Z, P |

**Family Cercopithecidae**

| | | |
|---|---|---|
| Cercopithecus aethiops nesiotes Schwarz | Pemba vervet or green monkey | P |
| Cercopithecus mitis albogularis (Sykes) | White-throated guenon or Sykes' monkey | Z (E) |
| Colobus kirkii Gray | Zanzibar red colobus or guereza | Z (E) |

## Order CARNIVORA

**Family Viverridae**

| | | |
|---|---|---|
| Atilax paludinosus rubescens (Hollister) | Kilimanjaro marsh mongoose | P |
| Bdeogale crassicauda tenuis Thomas & Wroughton | Zanzibar four-toed bdeogale or bushy-tailed mongoose | Z (E?) |
| Herpestes sanguineus rufescens Lorenz | Zanzibar slender mongoose | Z(E), ?P |
| Mungos mungo subsp.(? colonus (Heller) ) | Banded mongoose | Z, ?P |
| Viverra civetta schwarzi (Cabrera) | African civet | Z |
| Viverricula indica rasse (Horsfield) | The Rasse or Javan civet | Z, P |

**Family Felidae**

| | | |
|---|---|---|
| Panthera pardus adersi Pocock | Zanzibar leopard | Z (E) |

## Order HYRACOIDEA

Family Procaviidae

| | | |
|---|---|---|
| Dendrohyrax validus neumanni (Matschie) | Zanzibar tree hyrax | Z, P. (E both) |

## Order ARTIODACTYLA

Family Suidae

| | | |
|---|---|---|
| Potamochoerus porcus subsp. (probably daemonis Major) | Bush pig or Red river hog | Z |
| Sus scrofa Linnaeus | Wild boar | Z, P |

Family Bovidae

| | | |
|---|---|---|
| Cephalophus adersi Thomas | Zanzibar duiker | Z |
| Cephalophus monticola pembae Kershaw | Pemba blue duiker | P |
| Cephalophus monticola sundevalli Fitzinger | Sundevall's blue duiker | Z |
| Neotragus (= Nesotragus) moschatus moschatus(von Dueben) | Zanzibar suni or dwarf antelope | Z (E) |

## Order RODENTIA

Family Sciuridae

| | | |
|---|---|---|
| Heliosciurus rufobrachium dolosus Thomas | Red-legged sun squirrel | Z |
| Paraxerus palliatus frerei (Gray) | Red bush squirrel | Z |

Family Muridae

| | | |
|---|---|---|
| Cricetomys gambianus cosensi Hinton | Zanzibar giant rat or pouched rat | Z (E) |
| Mus musculus gentilis Brants | White-bellied house mouse | Z, P |
| Rattus norvegicus (Berkenhout) | Brown or common rat | Z, (P) |
| Rattus rattus (Linnaeus) subspp. | Black or house rat | Z, P |

Note ?Z or ?P = unconfirmed but credible report or record for the island.
(E?) = endemic status in question.
(P) = presence in Pemba assumed.

## LIST OF EXCLUDED SPECIES (App. 1, p. 61)

(asterisk signifies provisional exclusion, for reasons stated in text, subject to confirmation of occurrence)

### Order INSECTIVORA

| | |
|---|---|
| **Family Soricidae** | |
| *Crocidura gracilipes* Peters | White-toothed shrew |

### Order CHIROPTERA
### Sub-order Megachiroptera

| | |
|---|---|
| **Family Pteropodidae** | |
| *Cynopterus grandidieri* (Peters) | Grandidier's fruit-bat |

### Sub-order Microchiroptera

| | |
|---|---|
| **Family Emballonuridae** | |
| *Coleura seychellensis* Peters | Seychelles sheath-tailed bat |
| **Family Rhinolophidae** | |
| *Rhinolophus capensis* Lichtenstein | Cape horseshoe bat |
| *Rhinolophus fumigatus* Rüppell | Rüppell's horseshoe bat* |
| **Family Hipposideridae** | |
| *Asellia tridens* (E. Geoffroy) | Trident bat |
| *Triaenops persicus* (?*afer* Peters) | Persian trident bat* |
| **Family Vespertilionidae** | |
| *Kerivoula africana* Dobson | Tanzanian woolly bat |
| *Pipistrellus rueppelli* (J.B. Fischer) | Rüppell's pipistrelle* |

### Order CARNIVORA

| | |
|---|---|
| **Family Mustelidae** | |
| *Mellivora capensis* subsp. | Ratel or Honey-badger |
| **Family Viverridae** | |
| *Ichneumia albicauda* | White-tailed mongoose |
| **Family Felidae** | |
| *Felis* (*Leptailurus*) *serval* | African serval |

## Order ARTIODACTYLA

Family Hippopotamidae
*Hippopotamus amphibius* Linnaeus — Northern hippopotamus

## Order RODENTIA

Family Anomaluridae
*Anomalurus orientalis* — Flying squirrel

Family Muridae
*Lemniscomys striata* subsp. — Striped grass-rat*

Family Gliridae
*Graphiurus* (*Claviglis*) *murinus* subsp. — African dormouse*

Family Hystricidae
*Hystrix* sp. — Porcupine*

## Order LAGOMORPHA

Family Leporidae
*Lepus* sp. (? *capensis*) — (Brown or Cape ?) Hare

## SYSTEMATIC LIST

### Order INSECTIVORA

**Family Soricidae**
Crocidura flavescens nyansae Neumann African giant shrew Z

Crocidura flavescens (I. Geoffroy) 1827
Crocidura flavescens nyansae Neumann 1900

The above English name which I have assigned to this shrew is, like most vernacular names, purely synthetic and bears no scientific significance: it is, however, one of the largest among African Crocidura, a very varied and widespread genus. A new record for Zanzibar Is. is identified by Dr. R. Hutterer in 1983 from the skull of a juvenile individual taken by me on 8.v.37 from the stomach of a Black-shouldered Kite, Elanus caeruleus, shot at Zanzibar airport. This so-called "kite", which has been observed in Zanzibar in January, April, May, July and November, is believed to be a resident species: ornithologists in other parts of Africa have not reported a migratory habit or notable mobility. There is therefore good reason to suppose that this shrew and C. viaria were taken in the island and not brought across from the African mainland. C. flavescens is found throughout Africa, but the southern African race is smaller than those in central and eastern Africa.

Crocidura fuscomurina sansibarica Neumann Zanzibar pygmy shrew Z,P (E both)
S(orex) fusco-murinus Heuglin 1866 Leopoldina 5:36, in Nova Acta Acad.Caes. Leop.-Carol, Dresden. Meshra-el-Req, Bahr-el-Ghazal, Sudan. (Allen 1939:36).
Crocidura bicolor Bocage 1889:29 (see References)
Crocidura bicolor sansibarica Neumann 1900 Zool.Jahrb.Syst.13:544. Mojoni, Zanzibar Is. (Mor. & Pak. 1941:119. Z,P).
Crocidura sansibarica Neumann, Dollman 1915-16 Ann.Mag.nat.Hist.(8) 16:374. Zanzibar.
Crocidura fuscomurina sansibarica Neum., Hutterer 1983.

Endemic race in both islands. Type locality Mojoni (Muyuni), Z. Dollman (1915(8)16:374) raised Neumann's race C.b.sansibarica to specific status (C. sansibarica) on mistaken grounds that Neumann's description (1900:544) gave head & body length, without tail, as 86 mm whereas, in fact, he stated clearly nose to vent 46, tail 40 mm. My 6 Pemba specimens measured: HB ♂ 64, 5 ♀♀ 50-60 (av. 56); tail ♂ 49, 5 ♀♀ 42-50 (av. 44) mm: all appreciably larger than typical C. bicolor (HF & ear also slightly larger), and substantially larger than Neumann's type, though perhaps hardly enough to justify elevation to specific status. Dr. R. Hutterer

(of ZFMK, Bonn), in a recent review (1983) has shown that C. bicolor is a junior synonym of C. fuscomurina Heuglin 1865, the holotype of which, taken in southwest central Sudan, is in SMNS. This species is distributed through savanna country across Africa from west to east (Ethiopia) and southwards into southern Africa.

Possibly commoner in Pemba than in Zanzibar, Crocidura skulls were taken from stomachs of Black-shouldered Kites Elanus caeruleus (Desf.), one at Chaani plain 1934 and two at Zanzibar airport 1937 (BM id. as "Crocidura sp."). In Pemba I found this species at Kiwani, Moambe, Mitatuni, Mtambile, Mkoani and possibly Panza Is. where a small shrew was said to be the only mammal apart from bats and rats. Dead shrews found on paths give rise to the popular idea in south Pemba that they cannot survive crossing a path. The usual name for both Crocidura and Suncus is "panya-nyunga".

This shrew is found under earth clods, heaps of cut grass or dead weeds among cultivation, sometimes in very wet surroundings. Three kept in captivity for a short time remained still by day but were active at night (though diurnal habit is confirmed by capture by kites), exuded a strong musky odour, and appeared to have fed on small millepedes placed in the cage.

Crocidura viaria suahelae Heller  Larger savanna shrew  Z

Sorex viarius I. Geoffroy Saint-Hilaire 1834, in Bélanger: Voyage aux Indes-Orientales: Zool.:127. Senegal.
Crocidura viaria (I. Geoffroy), Wagner 1855:565; G.M. Allen 1939:46; Swynnerton 1959:188; Heim de Balsac & Meester 1977:25; R. Hutterer 1984; Hutterer & Happold 1983:56; Hutterer & Kock 1983:20.
Crocidura suahelae Heller 1912 Smithsonian Misc.Coll.60,no.12:6. Mazeras, British East Africa.

O. Neumann collected at Mojoni (Muyuni), Zanzibar Is., 8-12.i.1893, two specimens of a shrew referred to Crocidura gracilipes by P. Matschie (1895, Mammalia:33). Dr. R. Hutterer, who recently examined one of them, a skin/skull in ZMB, discovered that it is not gracilipes, and has referred it to C. viaria, a new addition to the Zanzibar list. This is a large pale species, of wide distribution through the savannas of Africa from west to east. Dr. Hutterer's 1984 paper (see References) clarifies the taxonomy of this and other species. He gives the mean measurements of 4 ♂♂ as HB 92.5, tail 60.5; and 6 ♀♀ as HB 90, tail 55.7, all of Senegal; and (Hutterer & Happold 1983:57) of 2 northwest Nigeria ♀♀ as HB 93 & 98; and tail 57mm. These differences of over 30 mm in mean HB, and over 12 mm in mean tail lengths, as compared with C. fuscomurina already known in these islands, allow no room for confusion.

Neumann's record of gracilipes was excluded by Mor. & Pak. (1941:125, Note 11) from their faunal list owing to lack of satisfactory evidence.

The occurrence of C. viaria at Zanzibar Is. was known hitherto only from the above specimens in the Berlin Museum reported by Neumann, but the stomach of the Black-shouldered Kite (see C. flavescens) taken on 8.v.37 at Zanzibar airport yielded also a skull of this species which Dr. Hutterer has assigned to the race suahelae.

Suncus murinus (Linnaeus) House shrew or Indian musk shrew Z, P

Sorex murinus Linnaeus 1766 Syst.Nat. 12th ed. 1:74. Java.
Sorex caeruleus Kerr 1792 Animal kingdom of Linn.:207 "Java & the other islands of the East Indies".
Crocidura albicauda Noack 1891 (nec Peters). Jahrb.Hamburg Wiss.Anst. 9:117. Zanzibar.
Pachyura leucura Matschie 1894 Sber.Ges.Naturf.Freunde,Berl.:205. "Zanzibar; zweischen der Küste und dem Victoria-See..."
Suncus caeruleus (Kerr) & S. leucura (Matschie), Mor. & Pak. 1941:119.
Suncus murinus Corbet & Hill 1980:31

An importation by sea traffic from south Asia (probably India or East Indies). Allen separates Suncus (Sorex) caeruleus (Kerr) of East Indies from Suncus (Pachyura) leucura (Matschie) of Zanzibar. Mor. & Pak. also differentiated these two forms, but Corbet & Hill synonymise all under Suncus murinus. Noack (1891) in Stuhlmann (1893) states that the latter obtained "Crocidura albicauda" in Zanzibar Oct. 1888 (though in fact this individual was quite distinct from a shrew from the Comoro Ids. described under the same name by W. Peters in Mber.K.Preuss.Akad.Wiss.Berlin 1867:885). Matschie (1894 & '95), referring apparently to the same Zanzibar specimen, found that its altogether different dentition showed it to be a Pachyura, not a Crocidura, which he then called P. leucura sp.nov., inhabiting both Zanzibar and mainland Africa.

My only Suncus specimens from the islands were identified by BM as S. caeruleus, later S. murinus, presumably the same as Stuhlmann's; but all Hamburg Museum's specimens and records perished in World War II. Swinny, Aders, Cosens, and Loveridge collected Suncus specimens in Zanzibar (in BM), ZM has 4 examples, and I had 6 from both islands. A fairly large shrew, average size HB 121, tail 75 mm; adults light brown, immatures grey, but several had brown and grey separated by a band or line in different parts of body or head. On 26.i, 5 were only half grown and 2 barely weaned. Several, kept a few days in captivity, were peevish, quarrelsome and aggressive to each other, provoked perhaps by trying circumstances. Termites, cockroaches,

grasshoppers, woodlice, and centipede were eagerly devoured. Kiswahili name in Pemba was "panya nyunga".

## Order MACROSCELIDEA

**Family Macroscelididae**
**Petrodromus tetradactylus zanzibaricus** Corbet & Neal Four-toed elephant-shrew Z (E)

Petrodromus tetradactylus Peters 1846 Verh.K.Preuss.Akad.Wiss.Berlin: 258. Tette, Mozambique.
Petrodromus sultan Thomas 1897 Proc.zool.Soc.Lond.:435. Mombasa (& ibid. 1898:928); Mor. & Pak. 1941:119, Z.
Petrodromus tetradactylus zanzibaricus Corbet & Neal 1965:64-66,68-70. Makunduchi, Zanzibar. Corbet & Hanks 1968:70. Zanzibar Is.

Treated by Corbet & Neal as endemic to Zanzibar Is., though they observe that the Mafia Is. form falls within the range of variation of both the Zanzibar and the mainland rovumae forms, with certain reservations: more material is needed. A fairly uniform population showing a mixture of the characteristics of P.t.sultan of coastal Kenya and Tanzania to Dar-es-Salaam, and P.t.rovumae of east Tanzania and northeast Mozambique (Corbet & Neal 1965). With great respect to these authors, I would question, however, whether this shrew was introduced deliberately from the East African coast by the Giriama (or other coastal tribe) as an item of diet since relatively few Giriama live in the island, and the bushlands of the east and south where Petrodromus is principally found are the stronghold of the indigenous Wahadimu who do not eat shrews. A few Waluguru (from near Morogoro), also shrew-eaters, do live at Makunduchi and elsewhere, but these shrews are in no way local to the south of the island. Corbet & Neal's alternative explanation of the presence of Petrodromus is the possibility of its being the product of hybridisation between the two mainland forms, which could have spread across to Zanzibar. This might have occurred during the late Pleistocene, upwards of 10,000 years ago, geologically no great length of time (Pakenham 1979:15), while the island was joined to the mainland. Whatever the manner of its origin, the status of this form is fully considered by Corbet & Neal (l.c.).

Several examples are in BM (coll. Swinny, Aders, Pakenham) and 2 in ZM without data. I found them (early morning and evening) at Chwaka & Shahaji, Jambiani, and Dimbani (Kizimkazi) but they probably occur throughout the thick bush of the east and south 'coral rag' country. Difficult to observe as they move very quietly, with the occasional rustle of a leaf, in the depths of the densest thickets

with very low ceiling (barely more than 30 cm), carpeted with dead leaves: suddenly with a flick of the hind feet and a crisp spring, they are gone. Kiswahili names "kigombo" (Chwaka) and "ngombo-panya" (Jambiani). Stomachs contained remains of termites and other insects and small lentil-like bush-fruit. Unknown in Pemba.

Rhynchocyon petersi adersi Dollman — Black-and-rufous elephant-shrew Z

Rhynchocyon petersi Bocage 1880 Jorn.Sci.Math.,Phys.e Nat., Lisbon, (1) 7:159. "Zanzibar" but actually Tanganyika (see Dollman, Ann.Mag. nat.Hist. (8)10:131. 1912).
Rhynchocyon adersi Dollman 1912 Ann.Mag.nat.Hist. (8)10:130. Zanzibar.
Rhynchocyon petersi adersi Dollman 1912, G.B. Corbet in Meester & Setzer 1971-77, Pt.1.5:2. Zanzibar & Mafia. Corbet & Hanks 1968:65. Zanzibar, Mafia.

Type taken in Zanzibar Is. by W.M. Aders 1912; this race occurs also in Mafia but not Pemba. Corbet & Hanks (1968:63-65) say that "Further collecting in the area between Kilwa and the Uluguru Mts. may serve to confirm or reject the specific separation of cirnei and petersi. On the other hand it is possible that extinction, perhaps recent due to deforestation, may have destroyed the evidence." J. Kingdon prefers to cover the forms in eastern Tanzania (including Zanzibar & Mafia Ids.) under the name R. cirnei petersi.

I found this species at Jambiani, Pete, Chwaka area, and Kigunda (Mvuleni); D.C. Halsted (U.S. Consul, 1979) saw it repeatedly at Mazizini, near Zanzibar Town (pers.comm.). Kiswahili names were "kigombo" or "njombo" (general), but more locally "ngombo-nunga" (Jambiani) and "kirodo" in the north (Kigunda & Mvuleni). Among the indigenous Wahadimu it is considered unlucky to be the first person to sight an elephant-shrew (probably either sp.).

This handsome creature frequents similar country to Petrodromus but less dense bush, is less electric in its reactions, less shy and more easily observed as it furrows among dead leaves, lifting its snout occasionally to feel for scent. Stomachs held insect matter, fine vegetable fibre, skinny shreds of (?) frog or slug, and fine white worms (parasites?); one contained two maggots, one alive, identified as Calliphorids. Observed at noon as well as early morning and evening. These shrews are also eaten by some mainland tribespeople (e.g. waluguru) living in Zanzibar (Town & rural areas). Study of more material over the wide range of Rhynchocyon will, no doubt, clarify its taxonomy.

## Order CHIROPTERA

### Sub-order Megachiroptera

Family Pteropodidae

Eidolon helvum helvum (Kerr) Straw-coloured fruit-bat Z, P

Vespertilio vampyrus helvus Kerr 1792 Linnaeus' Animal Kingdom 1 (1) xvii:91.

These bats roost on off-shore islands by day, flying across to the main islands at sunset. Many on Grave Is. and Bat Is. and possibly other islets, in Zanzibar harbour. I collected 4 ♂♂ and 2 ♀♀ (latter in highly advanced pregnancy, 13.xi) out of hundreds in tall thickets 4-5 m high on Grave Is., where they scrambled along the matted branches with great agility and speed to escape me. One ♂ had very dark lower face, throat and centre of breast and abdomen, but pale collar. Fur contained Nycteribiidae parasites. In Pemba I found a few hundred only, roosting in borassus palms, Borassus flabellifer, on Fundo Is.: coll. a ♂ & 4 ♀♀ (2 pregnant, 23.i). Pemba Arabs esteemed them a gastronomic delicacy, but apparently not so Zanzibar Arabs.

Epomophorus minor Dobson Little epauletted fruit-bat Z

Epomophorus minor Dobson 1880 Proc.zool.Soc.Lond. 1879:715. "Zanzibar".
Epomophorus labiatus minor, Allen 1939:56. Shoa to Tanganyika.
Mor. & Pak. 1941:118. Zanzibar.
Epomophorus minor, Corbet & Hill 1980:40. S. Ethiopia-Zambia, Malawi.

It is not clear whether Dobson's co-type specimen (BM no. 79.9.12.4, in spirit, coll. Robb) came from Zanzibar Island itself: probably so. One of Dobson's co-types "from Zanzibar" is in Lisbon national collection (Bocage: J.Sci.Lisboa 1897 (2) 5:137). Noack (1891, 1:58) records 2 ♀♀ taken at Kizimkazi (Z) 2.xii.88, and says that Boehm had dried skins from "Zanzibar". Matschie's record (1895:16) of this bat's occurrence at "Sansibar, Bagamoyo, Gonda" is perhaps less convincing; but Hollister (1918:71) records E. minor from Zanzibar, received from Dobson, and his frontispiece suggests that "Zanzibar" means the island. Apart from the above, I found no Zanzibar or Pemba material among E. minor, E. labiatus, or E. gambianus in BM. Mor. & Pak.'s 1941 acceptance of E. minor reinforces its inclusion in this list.

Epomophorus wahlbergi wahlbergi (Sundevall) Wahlberg's epauletted fruit-bat Z, P

Pteropus wahlbergi Sundevall 1846 Ofvers.K.Vetensk.Akad.Förh. Stockh. 3, no.4:118. Near Port Natal and in interior of Caffraria.
Epomophorus stuhlmanni Matschie 1899 Megachiroptera, Berlin Mus.:50. Kenya, through Tanganyika to eastern Cape.
(Pteropus haldemani Halowell 1846 Proc.Acad.nat.Sci.Philad. 3:52. W. Africa)
(Epomophorus neumanni Matschie 1899 Megachiroptera, Berlin Mus.:50 W. Africa to Kenya & Tanganyika. Lectotype from Mombasa, Kenya)

The form wahlbergi was distinguished from haldemani (syn. E. neumanni) mainly by the latter's rather smaller size (on average). An example of haldemani was taken in Zanzibar by Robb (BM no. 1909. 1.4.5: in spirit), by Weddell (U.S. Consul) 1911, and in Pemba 1940 by myself. Specimens from Tanzanian mainland and southern parts of the species' range have been referred mostly to wahlbergi, those from Kenya and more western and northerly parts of the range to haldemani, with an intermediate zone between. Scientific opinion now merges both in E. w. wahlbergi. BM has examples of wahlbergi from Swinny and Cosens (Chwaka, Z, 1919), Loveridge and Rowland Ward (Mkokotoni, Z, 1931). Voeltzkow also took 3 examples at Mkokotoni.

I collected this species at Kizimkazi (Z), a large number roosting c. 10 m up in a Loranthus outgrowth on a kapok tree, Ceila pentandra Gaertn. at a village amid thick bush: ♂♂ & ♀♀ together, with juveniles, a ♀ suckling young 27.xi; also recorded from Mkokotoni by Lorenz (coll. Voeltzkow). In Pemba I found them at Wete, in and near the township, frequenting heavy-scented flowering Millingtonia trees (M. hortensis) and banana groves, and at Mwitu Mkuu, Micheweni (thick bush & mangroves). The thin flutey call is heard widely in such habitats after dark. The silky white hairs of the epaulettes can be made to stand out like flower stamens. Kiswahili name "popo-uma", though "popo" covers all bats.

Pteropus voeltzkowi Matschie Pemba flying fox P (E)

Pteropus voeltzkowi Matschie 1909 Sber.Ges.naturf.Freunde, Berl.: 480. Pemba.

A form endemic to Pemba Is., the western limit of Pteropus, with congeners in other Indian Ocean island groups. Type taken by Voeltzkow at Fufuni, south Pemba. Of the Pteropus of the western Indian Ocean, Corbet & Hill (1980:38) place the species aldabrensis (Aldabra Is.), comorensis (Comoro Ids. & Mafia) and seychellensis (Seychelles Ids.) all under seychellensis, leaving P. livingstonei

(Comores), rufus (Madagascar) and voeltzkowi (Pemba) as distinct species. J.E. Hill, 1971, on the bats of Aldabra, also refers to all these except livingstonei. K. Andersen (1912:818) had considered comorensis (the Comores are only 600 km distant) to be the nearest form to voeltzkowi, their external features differing mainly in the latter's shorter ears, and the rich chestnut of its fur being confined to the apical portion of the hairs whose lower part resembled the ochraceous or buff of comorensis. However, in a few individuals I found the terminal half or two thirds of the hairs of the mantle, and the most part or all of those of head & neck, to be deep rufous. P. voeltzkowi's foxy red head, neck and mantle contrast strikingly with other Indian Ocean Pteropus, even with those of Mafia (barely 250 km off), and may be attributable to some factor in local conditions or even relative geological age of the habitat. Zanzibar's fairly 'recent' separation from the African mainland, though only 40 km south of Pemba, may account for the absence of any Pteropus there. Links between Pemba and the Malagasy area are explored in Pakenham 1979:53, the most notable flying vertebrate being the resident Scops Owl, Otus rutilus pembaensis Pak., which is very nearly related to the Madagascar O. rutilus c.1200 km away.

Hundreds of these large bats roost on islands off the south coast and fly across at sunset to forage all over southern Pemba; but roosts also exist in other parts of south Pemba, e.g. Jambangome (west), Mizimiumbi Hill (Kichunjuu, central), and Kiwani (east). Many roost, too, on the string of islands off northwest Pemba, crossing at dusk to spread over the northern parts. Andersen (1912, p.819), following Voeltzkow, implies in error that Fufuni is the only roost. They feed on various soft fruits such as mango, Mangifera indica L., even unripe; mzambarau, Syzygium Jambolanum DC; blossoms of mlangilangi, Cananga odorata Hook f. & Thomas, and kapok, Ceiba pentandra Gaertn.; and leaves of pawpaw, Carica Papaya L., stripping them down to midrib; etc. Agile climbers, they fight noisily over their food. There is tendency to baldness in old age. The flesh, locally considered a delicacy, I found to be poor eating. Absent from Zanzibar Is. Voeltzkow reported very numerous parasites on specimens from Fufuni: a lousefly ('lausfliege'), Cyclopodia greefi.

Rousettus aegyptiacus leachii (A. Smith) Egyptian or long-haired rousette P

Pteropus aegyptiacus E. Geoffroy Ann.Mus.d'Hist.Nat., Paris, 15:96 1810. Gizeh, Egypt.
Pteropus leachii A. Smith 1929 Zool.Journ. 4:433. Cape Town.
Rousettus leachii (A. Smith), Mor. & Pak. 1941:118. P.

Found by me in subterranean caverns in the coral rock in Fundo Is., Msuka, and Micheweni (north P). Many thousands hung from the cave roof, cluster on serried cluster like mussels: their dung rose to a mound nearly a metre deep, and the stench was overpowering. Young clung to the mothers' underside, apparently one to each (25.xii; 14 & 22.i.). Kiswahili name "popo-mgomba" owing to their fondness for bananas. These bats were regarded as the "askaris" (guardians) of the spirits of the caves, and their disturbance was seriously deplored by local people who feared that retribution would befall the village. These were the first records for Pemba Is.

## Sub-Order Microchiroptera

### Family Emballonuridae

Coleura afra (Peters) African sheath-tailed bat P

Emballonura afra Peters 1852 Reise nach Mossambique, Säugethiere:51. Tette, Mozambique.
Coleura afra (Peters), Thomas 1915 Ann.Mag.nat.Hist. (8)15:578. Mor. & Pak. 1941:125, Note 10.

A cave dweller. The only record seems to be an undated specimen in alcohol in ZMB (who have confirmed), taken by Fischer (believed, from circumstantial evidence, to be G.A.F.) at "Tschaka" (either Chwaka or Chake-Chake) in Pemba (cat. no. ZMB 67425). Nearest examples in BM are from Kenya coast where (as also at Lake Tanganyika) they frequented shoreline rocky caves. No record from Zanzibar Is.

Taphozous mauritianus E. Geoffroy Mauritian tomb bat Z

Taphozous mauritianus E. Geoffroy 1818 Description de l'Egypte. 2:127. Mauritius Is. Mor. & Pak. 1941:118. Z.

Noack(1891,1:64)records 3 examples (in spirit) taken by Stuhlmann at Zanzibar 28.xi.88; we know that Stuhlmann was in fact collecting in Zanzibar Is. Nov-Dec 1888. Matschie's reference (1895:26) to "Sansibar" may or may not be insular, being coupled with Pangani and Tabora, but ZMB has a skin & skull, no. 92372, of this species taken by Loveridge 18.vi.23 at Mkokotoni (Z). BM has examples from as near as Dar-es-Salaam and Mombasa, not Zanzibar.

Family Nycteridae

Nycteris grandis Peters — Large slit-faced bat Z, P

Nycteris grandis Peters 1870 Mber.K.Preuss.Akad.Wiss., Berlin:358. "Guinea". Mor. & Pak. 1941:118. Z, P.

I obtained this bat in both islands: 2 ♂♂ & a ♀ with large foetus 12.xi in ruined stone house at Shakani (Z); 3 ♂♂ in dark rooms of ruined houses at Wete and Chachani, Chake-Chake (P): first records from Pemba. BM has 2 spirit specimens from Dobson (Z): no. 1879.9.12.6, coll. Robb, and no. 1909.1.4.27 (latter from R.A.Med.Coll. collection under Dobson).

Nycteris hispida (Schreber) — Hairy slit-faced bat Z

Vespertilio hispidus Schreber 1775 Säugethiere. 1:169, 188. Senegal. Mor. & Pak. 1941:118. Z.

I obtained a ♀, suckling young 18.xi, from an extensive thicket near Marahubi Palace ruins (Z).

Nycteris macrotis luteola Dobson — Dobson's slit-faced bat Z

Nycteris macrotis Dobson 1876 Monogr.Asiatic Chiroptera:80. Sierra Leone.
Nycteris aethiopica luteola Thomas 1901 Ann.Mag.nat.Hist.(7) 8:30. Kitui, Kenya.
Nycteris luteola, Allen 1939 Zanzibar, Uganda, to Loanda. Mor. & Pak. 1941:118. Z.

Corbet & Hill (1980) synonymise N. luteola with N. macrotis, though Allen treats them separately. I took a number of specimens in Z. Is.: a ♂ from dark interior of ruined Marahubi Palace (infested with Thrombidiid larvae); 2 ♂♂ & 6 ♀♀ (one of these very young and one juv.4.xi) from dark interior of ruined Persian Baths, Kizimbani, where also some escaped down a latrine hole in the floor; 3 ♂♂ & 3 ♀♀ (one of each grey in colour) from a masonry subterranean tunnel under the old Beit-el-Ras Palace. BM has 2 spirit specimens of N. aethiopica (us) presented by Dobson from "Zanzibar" though neither determined as "luteola", nos. 1879.9.12.5. coll. Robb, and no. 1909.1.4.26 from R.A.Med.Coll. collection under Dobson.

Nycteris thebaica ? subsp. capensis A. Smith Egyptian slit-faced bat Z

(N. thebaica E. Geoffroy 1818 Description de l'Egypte. 2:119. Egypt)

Nycteris capensis A. Smith 1829 Zool.Journ. 4:434. South Africa
Nycteris (Petalia) fuliginosa Peters 1852 Reise nach Mossambique, Säugethiere:46. Boror, near Quellimane, Mozambique.

The race of this species in Zanzibar is not yet established in literature but is thought, on good authority, to be probably capensis: Dobson in 1878 so identified it. Voeltzkow reported it (1923) as "known to occur" in Zanzibar, possibly on the strength of Révoil's 7 examples of Nycteris fuliginosa Ptrs. (now a synonym of this subspecies) in the Paris Museum, taken in 1884 at "Zanzibar". This locality name may refer to Mozambique (Peters' type locality) interpreted broadly as embracing the mainland "Zanzibar" of that time. W. Peters claims to have taken N. fuliginosa Ptrs. "von der Zanzibar-Küste". (Mber.K.preuss.Akad.Wiss.Berl. 1867 (1866):885). I collected a ♂ & 2 ♀♀ at Kizimbani (Z) in dark recesses of the Persian Baths, in majority association with N. macrotis luteola and Rhinolophus deckeni (the 2 ♀♀ containing large and small foetus, 4.xi); also 5 ♂♂ at Mbweni (Z) in a ruined stone house; and 2 ♂♂ and a ♀ in a ruined house at Bungi. No other Z or P specimens in BM.

Family Megadermatidae
Cardioderma cor (Peters) Heart-nosed big-eared bat Z

Megaderma cor Peters 1872 Mber.K.Preuss.Akad.Wiss., Berlin:194. Abyssinia.

Corbet & Hill (1980) show its distribution as Ethiopia, north Tanzania, Zanzibar. R.W. Hayman & J.E. Hill in Meester & Setzer (Pt.2:20) also include Zanzibar in the range. The source of these records is uncertain but may be a ♂ & ♀ specimens (nos. 1882.2.6. 13-14) in BM spirit collection, taken by Kirk at "Zanzibar" ("island" not stated but there is a good chance they are insular). Occurs in north Tanzania about 500 km from Zanzibar. A new addition to this island's list.

Lavia frons ? rex Miller Yellow-winged bat Z

Megaderma frons E. Geoffroy 1810 (genotype) (See Ann.Mus.d'Hist.Nat., Paris. 15:192).
Lavia rex Miller 1905 Proc.biol.Soc.Wash. 18:227. Taveta, Tanganyika.
Lavia frons rex Miller, Mor. & Pak. 1941:118. Zanzibar.

Some authorities consider rex doubtfully distinct from nominate frons (being only slightly larger than the latter). This species was obtained in Zanzibar Is. by Stuhlmann 28.xi.88 (Noack 1891. 1:59), by Aders at Mbweni (Z) 10.ii.19, and by Loveridge's collectors 11.vi.23. ZMB has 3 alcohol specimens (with skulls) nos. 67877, 3265, & 67898, all taken at "Zanzibar", the last two by von der Decken, the first in 1860?, coll. unknown (not Stuhlmann). R.W. Hayman & J.E. Hill in Meester & Setzer (Pt.2. 20) say "L. frons has the distinctive habit of being semi-diurnal, hanging individually in bright sunlight from the outer branches of trees, swooping on passing insects and returning to a perch."

Family Rhinolophidae
Rhinolophus deckeni Peters Decken's horseshoe bat Z, P

Rhinolophus deckeni Peters 1868 Mber.K.Preuss.Akad.Wiss., Berlin: 705. Zanzibar coast.

During the past half-century some obscurity has rested over the taxonomy of certain Rhinolophus species, and the standing of augur, geoffroyii, deckeni, hildebrandti, with R. clivosus or independently, in the East African coastal context, has been in doubt. The position is now clarified, and all my specimens which were referred to these sub-species are now authoritatively placed by BM in the species R. deckeni. Habitats and data of my specimens were various:
Nos. 32-47 (Oct '38) in an underground cavern in coral rock country, Mvuleni Kigunda (Z). 2 ♂♂ & 14 ♀♀ of which 11 carried advanced foetus 9.x.
Nos. 60-61 (Oct. '38) ♂ & ♀ in dark interior of ruined Marahubi Palace (Z), in association with Hipposideros caffer; ♀ carried a large foetus 26.x.
Nos. 75-76 (Nov '38) 2 ♂♂ (Streblidae parasites in the fur) within ruined Persian Baths, Kizimbani (Z), in minority association with Nycteris macrotis & N. thebaica.
Nos. 239-241 (Mar '39) 2 ♂♂ & a ♀ (no foetus), in empty mud house, Wambaa (P), infested by ticks & lice.
No. 505 (Jan '40) ♂ in deep cave well in coral-rag country, Maziwangombe (P), in association with Hipposideros caffer.
No. 521 (Jan '40) ♂ from Mangapwani (P) without data.
Nos. 689-696 (Aug '42) 3 ♂♂, 5 ♀♀ (2 with very early embryos, about 4 mm), netted flying about the forest path after dusk, in Mwitu Mkuu, Micheweni (P).

Rhinolophus swinnyi Gough Swinny's horseshoe bat Z

Rhinolophus swinnyi Gough 1908 Ann.Transvaal Mus., 1:71.

First records for Zanzibar were 9 ♂♂ & 8 ♀♀ taken by me 1938-39 (in association with Hipposideros caffer) from a cavern running off the big cave-well south of Mangapwani. Now in BM and MCZ. 3 ♀♀ on 20.xi. carried a foetus.

Family Hipposideridae
Hipposideros caffer caffer (Sundevall) Sundevall's African leaf-nosed bat Z, P

Rhinolophus caffer Sundevall 1846 Ofvers. K.Vetensk.Akad.Förh., Stockh. 3:no.4:118. Near Port Natal.

Weddell got it 1911 in Zanzibar (Hollister, p.85), and I obtained a ♂ & 9 ♀♀ crossing a broad path in Jozani forest (Z) Sept 1938; 8 ♂♂ & 2 ♀♀ (one carrying large foetus 26.x) in a deep cave-well near Mangapwani Oct 1938, in association with Rhinolophus swinnyi, one ♂ & ♀ being rusty brown, the rest mousey grey; and 6 ad. ♀♀ from dark interior of ruined Marahubi Palace Oct 1938, in association with Rhinolophus deckeni, 2 being clear rust brown, 3 grey, and one intermediate. In Pemba (first records) I secured 4 ♂♂ (2 imms.) and 4 ♀♀ (1 imm.), adults wood-brown, imms. grey, in a long dark underground tunnel in coralline rock at Maziwangombe, Micheweni, Jan 1940; a ♀ in Mwitu Mkuu forest, Micheweni, Aug 1942; and a pregnant ♀ (Feb 1940) which had passed gracefully through my room at Wete every evening, alternately gliding and 'paddling'; it had parasites of Raymondia huberi Frauenfeld (Streblidae), id. by Dr. Bequaert, MCZ.

Hipposideros commersoni marungensis Noack Commerson's leaf-nosed bat Z, P

Phyllorhina commersoni var. marungensis Noack 1887 Zool.Jahrb.Syst. 2:272. Marungu, west Tanganyika.

ZM has 6 specimens (5 skulls) without data. I collected a ♀ from Miembeni, Zanzibar Town, 1939. BM has 2 Kirk specimens (from Dobson) and one from Aders 1914, all labelled "Zanzibar". In Pemba (first records) I took one hanging in a tree (Mkoani July 1939); one of 2 which returned repeatedly at dusk to rest head-downward on a coconut palm trunk (Mkanyageni Aug 1939); and another hanging on a clove bough eating a cockchafer (wing case 10 mm) had 3 small ticks on the ears (Wete Oct 1939).

Family Vespertilionidae

Eptesicus capensis grandidieri (Dobson) Cape serotine Z

Vesperugo pulcher Dobson 1875 Proc.zool.Soc.Lond.:471. "Zanzibar".
Vesperugo (Vesperus) grandidieri Dobson 1876 Ann.Mag.nat.Hist. (4) 18:500.
Eptesicus grandidieri (Dobson), Allen 1939:85. Mor. & Pak. 1941:118. Zanzibar.

G.M. Allen treats E. capensis separately, but Rosevear (1962: 272) regards grandidieri as a form of E. capensis: Koopman (1975: 404) agreed, adding that it is "probably valid as a subspecies". Dobson's type specimen, an adult ♀ in spirit with foetus in utero and examined by him in Paris Museum, was brought to Paris by Grandidier who collected it in Zanzibar Island (Dr. Tranier, Paris: pers.comm. Feb 1983). Matschie (1895:23) states that V. grandidieri is known only from Zanzibar, but BM's only specimen is a skin taken 1923 near Leopoldville, Congo, thus demolishing its claim to be a Zanzibar endemic (Pak. 1979:120).

Rosevear observed that this complex species, widely distributed in Africa, was so variable in its characteristics at subspecies level (in relation to climate rather than to locality) that available study material did not suffice for a permanent useful subdivision.

Pipistrellus nanus nanus (Peters) Banana pipistrelle Z, P

Vespertilio nanus Peters 1852 Reise nach Mossambique, Säugethiere:63. Inhambane, Mozambique.

Common in both islands. Gets its English name from its partiality to living in the vertical furled central frond of banana plants, though apparently not interested in the fruit: Kiswahili name is "popomgomba" (banana bat). One friend repeatedly found two together in each frond examined. On 29.x in north Pemba I watched 'pairs' chasing each other at dusk under mango trees. Flight is of a flickering haphazard nature. I took 24 examples in Pemba (Wete, Kinazini, Mkoani, Kiwani) and 8 from Mangapwani (Z).

Scotophilus borbonicus viridis (E. Geoffroy) Brown bat Z

Vespertilio borbonicus E. Geoffroy 1806 Ann.Mus.d'Hist.Nat.Paris. 8:201. "Ile-Bourbon" (more correctly Réunion Is.).
Nycticejus viridis Peters 1852 Reise nach Mossambique, Säugethiere:67. Mozambique Is.

Nycticejus burbonicus Geoff., Neumann 1900:539. Zanzibar Is.
Scotophilus borbonicus (E Geoffroy), Allen 1939:99. "Mauritius".
Scotophilus viridis, Corbet & Hill 1980:73. Tanzania, Angola, S. Africa.

Peters, who named Nycticejus viridis (1852), recognised it in von der Decken (1869.3(1):7) to be synonymous with Vespertilio borbonicus. This whole taxonomic entanglement is admirably elucidated by Hill (1980). Neumann (1900:539) collected 5 examples at Muyuni (Z) Jan 1893 (nos. 11399-11403), apparently the only record of its occurrence in this island, save for a juv. ♀, BM no. 1868.3.16.18, sent by Kirk from "Zanzibar", labelled "Nycticejus borbonicus". Neumann described it as "certainly the most beautifully coloured bat in East Africa". Experts differ as to whether Zanzibar individuals should be referred to S. viridis viridis or to S. borbonicus viridis. R.W. Hayman & J.E. Hill in Meester & Setzer (Pt.2:50) synonymise borbonicus (in part) with nigrita, and make viridis a race of S. leucogaster (E. & S.E. Africa). This illustrates the difference of opinion that exists in the taxonomy of this genus. This species is a new addition to the Zanzibar list.

Scotophilus nigrita (Schreber) Yellow house bat Z, ?P

Vespertilio nigrita Schreber 1774 Säugethiere 1:171. Senegal
See also C.B. Robbins (1978)

A ♂ & 3 ♀♀, taken May 1939 from Mangapwani (Z), coll. nos. 319-322, BM nos. 1955.303-306, were supplied to me by Sheikh Abdulla Said el-Kharusi who got them from banana plants. Kiswahili name is said to be "popo-mgomba"(banana bat, like Pipistrellus nanus). Kingdon says (1974. IIA:291) that "all observers have agreed that this bat is almost exclusively an eater of small beetles although it is quite a catholic feeder in captivity;" but Sheikh Abdulla assured me that he fed his four on bananas. BM also identified as this species my unnumbered undated (c. 1944) immature which the register shows as from "Pemba" but was later discarded. These seem to be the only examples recorded for the islands.

Family Molossidae
Tadarida (sub-genus Mops) brachyptera (Peters) Mozambique free-tailed bat Z, ?P
Dysopes brachypterus Peters 1852 Reise nach Mossambique, Säugeth.:59. Mozambique Is.

Neumann (1900:540) obtained 3 examples, "Nyctinomus brachypterus" (synonym ?) at Muyuni (Z; no. 11409). My own Pemba specimen (unnumbered) was referred initially to brachyptera but later to pumila. They occur up to 200 km inland from the Tanzanian coast. R.W. Hayman & J.E. Hill in Meester & Setzer (Pt.2:61) state that T. (M.) brachyptera Peters (1852) could possibly be an earlier name for T. thersites (Nyctinomus thersites Thomas 1903) - in whose range they include Zanzibar - and T. leonis (N. leonis Thomas 1908). All these three are listed as separate species by Allen (1939) and also by Corbet & Hill (1980:79) who give the range of thersites as "Sierra Leone - S.E. Zaire, Zanzibar": the latter are doubtful of the status of T. brachypterus of Mozambique.

Tadarida (sub-genus Chaerephon) pumila (Cretzschmar) Little free-tailed bat Z, P

Dysopes pumilus Cretzschmar 1820 Reise im Nördlichen Afrika. Massawa, Eritrea.
Dysopes limbatus Peters 1852 Reise nach Mossambique, Säugeth.:56. Mozambique Is.

Several have been taken in the islands over the past 60 years: very common. I collected 2 of the pumila form in Pemba (Wete, 1939, 1948); and of the limbata form 17 from Zanzibar (Town, Mkokotoni, Mangapwani) and 9 from Pemba (Wete, Mkoani, Jambangome), all from houses and house roofs. Loveridge's collectors, too, seem to have got limbatus (in ZM) at Chake-Chake (P) 1923. The form limbata was always called the "white-winged" variety and pumila the "dark-winged", but Ansell (1961:331) and Hollister (1918:98) say they are no longer distinguished by the paleness or darkness of wing membrane or by the amount of white on the underside, which are variable.

Tadarida is recognised to be the largest and most complex genus of the molossids, and the relationship between these forms and T. brachyptera is still uncertain.

## Order PRIMATES

### Family Lorisidae

Galago senegalensis zanzibaricus Matschie  Lesser bushbaby  Z

Galago zanzibaricus Matschie 1893 Sber.Ges.naturf.Freunde, Berl.:111 Yambiani (Jambiani), Zanzibar. Kingdon 1971,1:309-315.
Gelago senegalensis zanzibaricus, E. Schwarz 1931 Proc.zool.Soc.Lond. 10:7:55-56. Zanzibar & coastal areas of Tanganyika. Mor & Pak.1941: 118. Z.

Range extends through coastal areas of Tanzania, Kenya & Mozambique, but absent from Pemba. Dr. Lumsden of Virus Research Institute, Entebbe, who spent 3 weeks collecting in Pemba in 1954, failed to find evidence of this galago, despite offers of large rewards.

Matschis and Neumann both collected examples in Zanzibar Is., and I took 2 at Pete, near Jozani forest, 1938. Occurs also in Chwaka, Muyuni & Muongoni areas and probably fairly widely in the tall bush of the east and south. Kiswahili name "ndere". Immature taken on 10.xii. One stomach contained mostly insects; also a small furry bush fruit, possibly from Ipomaea, Convolvulaceae (Greenway, Systematic Botanist, Amani Agr.Res. Station). Besides the more usual chittering cry, it has a squirrel-like one, resembling Paraxerus palliatus but quieter, ending in the same chitter.

Otolemur garnettii garnettii (Ogilby)  Greater galago  Z, P

Otolicnus garnettii Ogilby 1838 Proc.zool.Soc.Lond.:6. No type locality, but generally accepted as Zanzibar: Thomas in Ann.Mag.nat. Hist. (8)20:48 1917; but see Schwarz (ibid. (10)5:49-50. 1930).
Otolemur agisymbanus Coquerel 1859 Revue et Mag. de Zool. (2)11:459. "Agisymbana Is., northern Zanzibar Is., E. Africa".
Galago crassicaudatus agisymbanus (Coq.), Mor. & Pak. 1941:118. Z,P.

The name "agisymbana" has long been a puzzle, but Moreau et al. (1946) resolved it. Ptolemy's map of Africa showed the whole central area of the continent, from coast to coast, marked "Agisymba" (its meaning still obscure), so that the name of this type locality signifies simply "tropical African island", to wit northern Zanzibar Is!

This galago, till fairly recently known as G. c. agisymbanus, was considered subspecifically distinct from mainland African forms, but Dr. T.R. Olson's detailed and comprehensive review (1979) of the genus Otolemur shows that the greater galago inhabiting Zanzibar,

Pemba and Mafia Islands and the entire East African seaboard from northern Mozambique to well up the Somali coast, should now be known as Otolemur garnettii garnettii, the East African smaller-eared greater galago, and that its two congeners are O. g. hindei in the Kenya highlands, and O. g. panganiensis found in numerous mountain refuges in northern Tanzania including the Kilimanjaro and Ngorongoro regions. Dr. Olson distinguishes this species from the large-eared greater galago, O. crassicaudatus, ranging from southern Africa through Angola, Zambia, Zaire and Tanzania, to the region of Lake Victoria. An abstract of the thesis was published (1981) in The American Journal of Physical Anthropology (4, no.2). Attention is invited, however, to E. Schwarz (supra) who considered that the skull and skin of the type specimen of Otolicnus garnettii was consistent with affinity with the southern form, Galago crassicaudatus.

Dr. Olson formed the opinion that any difference between examples from Zanzibar and Pemba and those from coastal mainland was no greater than that between examples from the two islands themselves. But he observed remarkable differences in habit pattern and behaviour between the species garnettii and crassicaudatus e.g. the latter frequently uses the ground for both feeding and travel, while the former seldom does so; difference in size may be a contributory factor. (I am grateful to Dr. Olson for allowing me to draw upon this information).

This galago is very common throughout both islands and also Tumbatu Is. (northwest Z) and Panza Is. (off south P). A clove-picker found a rough grass nest in a clove tree, possibly of this species. Juveniles were seen about in early Aug, and a very young one at end of Apr. Besides their diet of mangos, pawpaws and similar fruit, they will take milk in captivity.

Two galagos of unique colour (for P) were seen but not secured: one on south side of Mwitu Mkuu forest, Micheweni (P), of pale chestnut; another at Msuka bay (P) of pale brown, curled up in a high fork of a Casuarina tree. Search among BM's large collection failed to discover any Z or P specimens of such rich colour although a large number of Pemba skins tended to show a warmer brown or rust than most Zanzibar skins. Differences in pelage colour found among museum specimens from this galago's range show a high degree of variability. Inhabitants of Tumbatu Is. told me that their Otolemur are also of a warm brown colour. An Arab in Zanzibar had an albino in captivity.

Family Cercopithecidae

Cercopithecus aethiops nesiotes Schwarz  Pemba vervet or Green monkey  P

Chlorocebus pembae Matschie in Voeltzkow 1923, Reise in Ostafrika 1 (1):184. Pemba. (Nom. nud.)
Cercopithecus aethiops nesiotes Subsp.n. Schwarz 1926 Z.für Säugetierk. 1:42. Chake-Chake, Pemba. Allen 1939:142 P. Mor. & Pak. 1941:118 P. Swynnerton & Hayman 1951:300 P(E). P.H. Napier 1981:165 P.

P. Dandelot in Meester & Setzer (Pt.3:27-28) refers the Pemba form to C. pygerythrus nesiotes within the superspecies C. aethiops Linn. 1758, with habitats Pemba and Mafia Ids. W.C.O. Hill (1966 6: 535, 552, 562) has a similar concept. Following this arrangement embracing three 'groups' of western, central and northern African forms (C. a. sabaeus, C. a. tantalus, & C. a. aethiops) and an eastern and southern 'group', C. a. pygerythrus, Napier places the Pemba monkey, C. a. nesiotes, including Mafia in its range, under the C. a. pygerythrus grouping.

Kingdon (1971,1:213) lucidly says "the need to give expression to these greater or lesser distinctions" (i.e. as between the major types of C. aethiops, ranging over the southern, northern and far western savannas) "give rise to taxonomic difficulties. Consequently vervets have been split into several species by some taxonomists, partly in order to accomodate the subdivisions within the trinomial system, and partly on a supposed correlation of distribution with vegetation zones". Having regard to the particularly controversial nature of the taxonomy of the vervets, he treats all as one species, C. aethiops, and concedes that, while island populations such as C. a. nesiotes (Pemba) and C. a. excubitor (Mafia & Lamu) could justifiably be regarded as subspecies, they are clearly isolates of C. a. pygerythrus type.

Mrs. P.H. Napier (pers. comm. 24.vi.77) observed, in the light of the large number of specimens in the BM, that nesiotes' small size may be the only valid and consistent characteristic differentiating it from johnstoni (Tanzania, Kenya), and it is shared with another island race, C. a. excubitor, in Patta & Witu Ids., off northern Kenya. Further, writing of the whole C. aethiops group, she comments that "In view of this extensive integration of characters, the allocation of individual specimens to subspecies can only be extremely tentative and must be treated with reserve". For further clarification of the problem, reference is invited to Dandelot (1959) and Dandelot & Prévost (1972). There is clearly considerable divergence of view among the experts on the taxonomy of this species, and I accept Mrs. Napier's provisional view (the most recent) of the

nomenclature and range of the race nesiotes, with its probable extension to Mafia Is., and I refrain from claiming endemic status.

The Pemba vervet is to be found in many types of country all over the island, and in areas of large trees but apparently not usually in Ngezi forest. Aders (in Pearce 1920:327) says "rare in Zanzibar". In 1954 an Arab at Mangapwani (Z) told me that he had shot these monkeys in that area as they were more destructive of crops than C. mitis and more numerous than formerly. I also had reports of them in the regions of Dunga, Uzini and Ndagaa, but I personally never encountered them wild in Zanzibar; occasional sighting of a vervet in the island was usually attributed to escape from captivity as they were commonly kept as pets. G.E. Tidbury and I, visiting Mesali Is. (P) in 1940, found monkeys similar to those on the main island (no specimens taken). Mesali is 5-6 km from the nearest land (Ras Mkumbuu) with 30 fathoms of water between. One wonders how monkeys got there and survived, there being no obvious water supply. Wambaa villagers have seen vervets swim across Jambangome creek (c. 36 m) but Mesali is too far.

These vervets often forage on the ground near trees and have few natural enemies. Besides raiding food gardens, they have been seen eating the rind of "mwale" palm fruit (Raphia monbuttorum Drude - not known to be an important vitamin source) and the fruit of what a botanist thought to be Harungana madagascariensis (Lam. Family Hyperiaceae), a wild bush tree. Very joung juveniles were found Nov, Dec & Jan, and mothers were carrying infants 19.xi, 12.iii & 30.iii (suckling), and 18.vii (carried but also able to climb independently). Kiswahili name "tumbili".

Cercopithecus mitis albogularis (Sykes) White-throated guenon or Sykes' monkey Z (E)

Semn (opithecus)? albogularis Sykes 1831 Proc.zool.Soc.Lond.:106. Madagascar? (Type locality "Zanzibar Island" fixed by E. Schwarz, Ann.Mag.nat.Hist (9) 19:152. 1927).
Cercopithecus albogularis (Sykes) 1832 Proc.zool.Soc.Lond.:18-20. No locality. Osman Hill 1966, 6:414. Zanzibar (E).
Cercopithecus mitis albogularis (Sykes), Allen 1939:146. Mor & Pak. 1941:118. Zanzibar, Mafia. Swynnerton & Hayman 1951:300. Zanzibar & Mafia. Napier 1981:98. Zanzibar Is. (only).

This is the eastern and southern (East African) form of this species. The Zanzibar Is. race is smaller than mainland ones, and usually a less rich russet on lower back; lacking the wholly black crown of C. m. mitis, and greyer on head and shoulders; throat and collar pure white; restricted to Zanzibar Is. (O. Hill 1966,6:402,

414). Dandelot in Meester & Setzer (Pt.3) and Napier (1981) evidently confirm this limited range, although J. Kingdon (1971:155-161) extends it to eastern mainland Tanzania & Mafia Is. and southeast Kenya. I never found it in Pemba in many years travelling there; one report of its occurrence in north Pemba was never confirmed.

Very common all over Zanzibar & Tumbatu Ids., in forest, bush and cultivated country. Aders (in Pearce 1920) thought their retiring habit and sombre colour prevented easy detection; but, as one approaches, they utter loud gutteral barks; I heard also a deep boom, probably from an old male on guard. In Jozani forest I saw them in minority association with a troupe of some 40 Colobus. Females seen with enlarged teats 14.xi. Youngsters accompanied adults on 15.i, 8.ii & 8.iv. They are a formidable pest among food crops, and shoots were organised from time to time: on Tumbatu Is. (1934) a 2-day shoot with 4 guns accounted for 67. A monkey, if pressed, would sit motionless in a leafy part of a tree and allow the marksman to approach and take aim.

Usual Kiswahili name is "kima", but large old individuals are called "korwa". Ingrams (1931) records the name "ngedele" but I never heard it: may be a mainland name.

Colobus kirkii Gray  Zanzibar red colobus or guereza Z (E)

Colobus kirkii Gray 1868 Proc.zool.Soc.Lond.:180. Zanzibar Is. (E).

Despite opinions of some experts that this Colobus should rank as a subspecies of C. badius, P. Dandelot in Meester & Setzer (Pt.3:35) and Corbet & Hill (1980:89) accord it full species status, restricted to this island. Verheyen (1962:69) found, on the basis of craniometric study, that C. kirkii is easily separable from C. badius, and that they should be regarded as two different species. Kingdon, like Swynnerton & Hayman, treats it as an endemic race of C. badius and, after describing its unique markings and its habits, considers that present populations (of red Colobus in East Africa) are almost certainly rather ancient relics , and that, for reasons explained, their presence in a locality is a useful indicator of the ecological and climatic stability of their home forest. This theory has interesting implications, one being that the Jozani forest which lies in the silted bed of an ancient sea creek (but see Introduction: Topography for an alternative explanation) has avoided any significant degree of dessication over a very long period.

Though probably less numerous than early in this century, the Zanzibar Colobus is not nearly as close to extinction yet as some have thought, and its legal 'protection' is known and usually

respected by the local people, even when it occasionally raids food gardens. A recent assessment of total numbers (Silkiluwasha 1981) puts the figure at approximately 1400. Neumann (1900:532) found them numerous between Muyuni and Jambiani. In 1919 Swinny even collected one at Makunduchi; and Kirk gave the BM a specimen (no. 1868.3.16.1) from "Pangani village in Zanzibar, not mainland", a locality not identified. In 1933 I found this species in several areas in the northwest and northeast of the island, as well as in Jozani and the Chwaka and Charawe regions (in the latter with a reputation for damaging young coconut palms). Fifty years later Colobus has been recorded in groups of various sizes at a number of other localities (Silkiluwasha, 1981): Muungoni (15), Uroa (20), Muungwi (200), Kitogani (30), Kiwengwa (13), Muyuni (350), Uzi (300), Jambiani (70), Mapopwe (150), Jendele (50), Jozani (235), figures indicating numbers observed, and the first five named being the places in greatest danger of habitat destruction. These populations are naturally subdivided into anything up to ten (rarely more) groups comprising perhaps 10-20, or even more, members each, with a high proportion (c. 40%) of infants and juveniles. Silkiluwasha (1976) also remarks that these monkeys seem to move away seasonally from areas which they have been occupying. In 1977-78 experimental transfers were made from well stocked localities to new, possibly safer, areas in the monkeys' interest, viz. to Masingini (23) and Kichwele (13) in Zanzibar, and to Ngezi forest in Pemba (first introduction here). The experiment seems so far to have been successful (Silkiluwasha 1981; Mturi 1983). World Wildlife Fund conservationists are also planning to translocate experimentally, probably in 1984, two family groups of Zanzibar Colobus from Zanzibar to Rubondo (Is.) National Park, Tanzania, with the co-operation of the Game Department and the National Parks authority. The Oxford University Exploration Club (1974 Report: T.J. Kingston et al.) made some observations on the Zanzibar Colobus.

This species feeds almost entirely on tender leaves of trees, bushes and creepers, and unripe fruits (Aders, 1920:326, sustained one in captivity on leaves and unripe guavas). Silkiluwasha and Struhsaker & Leland enumerate trees and plants on whose foliage the Colobus feeds. They seldom survive long in captivity owing largely to unsuitable diet. A very quiet bird-like chirp, uttered at man's approach, expresses anxiety or enquiry. They frequently associate with Cercopithecus mitis. Females carrying very small young were seen by me 30.x & 14.xi, accompanied also by youngsters going independently; a pregnant ♀ was seen 18.xii. Kiswahili names are "punju" and "kima mweupe".

Undoubtedly man is their greatest enemy, and disturbance of this species' habitat or its destruction by timber felling or agriculture will bring extinction in due course. Shooting of a few

individuals by collectors is on record but this does not match other ravages. E.B. Martin (1978:91) records poaching of Colobus for the pot by immigrant Makonde tribesmen, and the trapping of 40 in the 1970s for despatch to European zoos where most of them died soon afterwards. Aders (1920) states that many exported to Europe had been taken from Jambiani. Gijzen et al. (1966) describe the fate of 7 Zanzibar Colobus received at Antwerp zoo in 1964, riddled with diseases, of which 6 died within months, and the seventh survived less than 2 years. Pig-hunting parties regularly rampage through Jozani forest, shooting and spearing anything, and local TV invites participation by all and sundry (Martin 1978:96). Such practices must stop if the Colobus is to be preserved.

## Order CARNIVORA

**Family Viverridae**

**Atilax paludinosus rubescens** (Hollister) Kilimanjaro marsh mongoose P

Mungos paludinosus rubescens Hollister 1912 Proc.biol.Soc.Wash. 25:1. Mt. Kilimanjaro, Tanganyika (at 4000 ft. = 1219 m).
Atilax paludinosus subsp., Mor. & Pak. 1941:119. P. Corbet & Hill 1980:102. Africa S. of Sahara.

Both C.G. Coetzee in Meester & Setzer (Pt.8:28) and Swynnerton & Hayman (1951:331) refer the Pemba form to this race. Very common all over Pemba which abounds in marshes, ponds and streams (but largely nocturnal): apparently absent from Zanzibar Is. which has less wetland than Pemba. I collected 4 ♀♀ (2 ad., 2 juv.), all in BM, the first records for Pemba. Kiswahili name is "chonjwe".

Adults are very dark brown but an Arab friend (Konde, north P) said some are 'black', some 'red': reference to BM skins shows none are really 'red', but some are lighter or warmer brown with pale throat and under neck. Younger ones, of softer brown than adults, have hairs of forehead, cheeks & throat white-tipped: my smaller juvenile (no. 326) had white-tipped hairs on both sides, merging to brown hindward of forequarters. Juveniles (not adults) also had chin & inner sides of hind legs tawny. A large ♂ was snared at entrance to a fowlhouse; said to be savage chicken killers, destroying a dozen without eating one. This individual (not retained) had body very dark brown, almost black, on back, legs & tail; flanks rather rusty; head & neck grizzled; edges of upper lip, chin & lower jaw whitish; throat whitish brown separated from whitish chin by a dark band (centre of chin also slightly dusky). Neck long, snout pointed, tail

broad and flattened at base. Foot impressions confirm those often seen in ditches. Measurements of freshly killed adult examples were: nose to base of tail - ♂ (skin not kept) 487; ♀♀ 470, 400 mm. Tails (base to tip) respectively 380, 250, 325 mm. An adult ♀ appeared to have recently given birth to young, 22.ii.

Three kittens were brought in 12 & 27.iv and 16.v. One of them, though very young (separated from mother by hunters) was very fierce, fiery-eyed, howled and bit, ran with back humped, and died 6 days later. It drank milk from a dish, ate a lizard and snails, but refused grasshoppers and a small dead snake. An adult was seen foraging on a seashore at dusk. A domesticated individual caught rats, could outrace a dog, and playfully nipped the feet of those it knew were afraid of it. A puppy-like yelp "waouw", occasionally heard after dark in forest, was attributed by locals to Atilax. Lombard (1958) has an interesting note on this species.

Bdeogale crassicauda tenuis Thomas & Wroughton Zanzibar four-toed bdeogale or bushy-tailed mongoose Z (E?)

Bdeogale tenuis Thomas & Wroughton 1908 Proc.zool.Soc.Lond. :168. Zanzibar Is.

BM had a spirit specimen sent by Kirk labelled "B. puisa, Zanzibar" registered BM no. 1869.1.26.3; and Neumann (1900:553) records B. puisa (described by Peters 1852) collected by him at Muyuni and Jambiani (Z). In both cases they undoubtedly had tenuis which was not described until 1908. The species occurs in Mozambique and eastern Tanzania (mainland) up to Kenya.

Kingdon (pers. comm. Oct 1977) rates the Zanzibar bdeogale as an endemic owing to distinctive characters of its dentition, skull and morphology. Swynnerton & Hayman take a similar view, though Coetzee in Meester & Setzer extends its range to mainland Tanzania. Relevant to this may be Kingdon's comment (3A:245) that "All members of this genus are subject to considerable variation in the amount of black on the guard hairs, and melanic tendencies are discernible both in individuals and in very localised populations"; and (p. 246) "The isolated Zanzibar Island mongoose, B. c. tenuis, which is smaller and darker (than nigripes & crassicauda) may be the most primative form, since the molar teeth show the least expansion". He attributes its differentiation from crassicauda to its relatively early isolation.

BM has three other specimens of B. c. tenuis, two from Aders and one from J.T. Last. ZM also has a skin taken by Loveridge. Aders (in Pearce 1920:329) said this bdeogale was "quite common around

Zanzibar Town", and informants at Kombeni (Fumba peninsula, Z) say they are still fairly common there. Pete (Z) villagers too were familiar with it in 1938. Kiswahili name is "kitu". For local (Z) African comparison of this species with the undetermined carnivore "uhange", see Appendix 2.

Herpestes sanguineus rufescens Lorenz  Zanzibar slender mongoose
Z (E), ?P.

Herpestes ornatus rufescens Lorenz 1898 Abh.senckenb.naturf.Ges., Frankfurt-a-M. 21:462. Zanzibar Is.
Mungos melanurus lasti Wroughton 1907 Ann.Mag.nat.Hist. (7) 20:114, 120. Zanzibar Is.
Myonax ratlamuchi rufescens (Lorenz), Allen 1939:223. Zanzibar Is.

The races of this species are recognised greatly to need revision, and the naming of the Zanzibar race as an island endemic is but provisional pending such review. C.G. Coetzee in Meester & Setzer (Pt.8:27) divides the forms of H. sanguineus into two groups (not implying subspecific connotation), viz. sanguineus section (drab brown to yellowish grey - NE, S. & W. Africa) and ratlamuchi section (reddish). The good series of sanguineus from Zanzibar in BM is much redder in tone than most others from East Africa. Hollister (1918, Pt.1:124) states that U.S.Nat.Mus. has an example of Mungos dentifer (Heller 1913. Smiths.Misc.Coll. 61(13):10) taken in Kenya, which agreed with the Zanzibar Mungos melanurus lasti Wroughton in having small lower premolars, a feature apparently unique among related forms. Coetzee in Meester & Setzer (loc. cit.) synonymises dentifer with H. sanguineus (as do Corbet & Hill 1980), but Allen (1939:221 & 223) and Swynnerton & Hayman (1951:329-330) separate them both taxonomically and geographically. Noack (1891:54) records H. gracilis var. ornatus Ptrs. taken by Stuhlmann at Mkokotoni (Z), now a synonym of H. sanguineus.

Common in Zanzibar Is. but said to be absent from Tumbatu Is. I never saw it in Pemba, though Ingrams (1931:427) says "rare in Pemba", and two Pemba Arabs assured me they occur but very rarely and resemble the Zanzibar form; they had seen them in north Pemba, and one was shot attacking a small fowl. Voeltzkow wrote of a small carnivore called "rambe", dweller in woodland & forest (see Appendix 2), but I never saw or heard of it.

Light on breeding season was the repeated sighting of 'pairs' going together (usually seen singly) in early & late September; also an obvious nest-hole less than 2 m. up a rough stone wall 2.xi, guarded by a growling parent within; and a very young one (? 1-2

weeks old) brought in 5.i. The latter did not relish milk at first but developed a passion for it and later raw meat. Stomach contents of specimens included small insects, grasshoppers, and a purple fruit with a hard stone like "zambarau" (Syzigium Jambolanum DC). Utterances of my pet were a conversational, rather querulous, murmur or whine as he ran along, a petulant cry when frustrated, and an angry warning growl. A delightful companion, mischievous, alert, quick to pounce, loved climbing and entering holes, tunnels & narrow places. Sadly he was killed by a dog after only 3½ months. Kiswahili name is "cheche".

Mungos mungo subsp., probably colonus (Heller) Banded mongoose Z, ?P

Viverra mungo Gmelin 1788 Linnaeus' Syst.Nat., ed.13, 1:84.
Crossarchus fasciatus colonus Heller 1911 Smiths.Misc.Coll. 56 (17):16. Kenya. See Aders in Pearce 1920:329. Zanzibar.
Mungos mungo subsp. Mor. & Pak. 1941:119. Z.

An introduced species, it occurs in various racial forms over most of Africa south of Sahara. Aders in Pearce (supra) says they were imported in large numbers from the African coast as pets; Neumann (1908:554) collected one in Zanzibar; and Matschie confirmed that they were frequently domesticated and very tame. Consequently any observed wild are doubtless due to escapes from captivity: seldom seen now. At Wete (P) I once saw and heard at night what was probably M. mungo, and heard another in undergrowth near the town: no other evidence from Pemba where they must be very uncommon. Kiswahili name is "ngucheiro".

Viverra civetta schwarzi (Cabrera) African civet Z

Viverra civetta orientalis Matschie 1891 Arch.f.Naturgesch.:57, Sect. A(1) 352. Neumann 1900:552. Coll. Zanzibar.
Civettictis civetta schwarzi Cabrera 1929 Mem.real.Soc.Espanola Hist. Nat. Madrid. 16:36 (Name orientalis preoccupied). Type loc. selected as Zanzibar by Schwarz: Ann.Mag.nat.Hist. (10) 14:261. 1934. Mor. & Pak. 1941:119. Z.

Coetzee in Meester & Setzer (Pt.8:17) points out that Ellerman et al. (1953) reduced Civettictis (see Mor. & Pak. 1941:119) to subgeneric rank under Viverra. Fairly common in Zanzibar Is. but said to be absent from Tumbatu Is.: does not occur in Pemba. My semi-adult example (no. 11), taken 28.vii, is in BM. Dr. Lumsden obtained one at Kibele Tunguu (Z). The civet secretion, as with Viverricula indica, was much valued by the Arabs for medicinal use,

but the same may not apply to the Africans since the revolution. This species is found across tropical Africa from east to west and as far south as Transvaal; the race schwarzi occurs in Tanzania and adjoining territories. Kiswahili name is "ngawa". Coetzee in Meester & Setzer (l.c.) mentions Lundholm's opinion in 1955 (after listing several forms) that "it is quite likely that the described forms listed above are not subspecifically valid" and that "sub-specific" differences may only represent a cline.

Viverricula indica rasse (Horsfield) The Rasse or Javan civet Z, P

Viverra rasse Horsfield 1821 Zool.Researches in Java, no.6. Java.
Viverricula indica rasse (Horsf.), Mor. & Pak. 1941:119, 125. Z,P.

Introduced. Includes "Viverra malaccensis Gmelin", coll. Neumann (1900:552) in Zanzibar; but Viverra megaspila, claimed as coll. Stuhlmann (Noack 1891:52) in Zanzibar Is., is either in fact a species belonging to India-Indochina-Malaya (Corbet & Hill:100) which was never in Zanzibar, or else is the same as Civettictis (Viverra) civetta schwarzi, the African civet. Aders in Pearce (1920:329, where he wrongly calls it a "Genet Cat") evidently used the name V. megaspila loosely referring to this species (see Mor. & Pak. 1941:125, Note 12, though Stuhlmann used the Kiswahili name "fungo" which refers to V. i. rasse).

Common in both islands. R.I. Pocock (Mor. & Pak. 1941:125, Note 18) found the form occurring in these islands to be indistinguishable from Javan and Madagascan specimens, and that it is remarkable that it is not an Indian or Malaysian race which has become established on the west side of the Indian Ocean. The name "indica" is misleading unless it refers to the "Indies". How the Rasse came to these islands, and especially the meaning of the word, may not be generally known; the following from Horsfield (1821) on Viverra rasse in Java may be of interest.

"The name Rasse, like many other Javanese names, is derived from the Sanskrit language .... 'Rasse', as employed by the Javanese, is a modification of "rasa", a term which signifies flavour or taste, or emotion arising therefrom, and hence perfumes generally. The secretion obtained from the Rasse, even a century ago, was a perfume much favoured by the Javanese, applied both to clothing and ....to the person. Even apartments and furniture of high-ranking folk were scented with it, and at feasts and processions the air was filled with the odour." Being so essential a feature of the national culture, it is not surprising that Javanese traders and colonists took civets with them across the Indian Ocean, introducing them

where they went, and that Rasse became the obvious scientific name. Ingrams tells (1931:78-87) how Idris, a 12th century geographer and historian, wrote of the ships of southeast Asia which, from earliest times, explored the western Indian Ocean and made settlements. Some Pemba legends indicate ancient and prolonged residence by "people of Jawa (Java)", and even a tribe in Madagascar is said to be "of undoubted Malay or Javan origin": the Rasse now exists there also. Prins (1956) traces the growth of popularity of civet perfume (originating from Arab pharmacy) in European courts and high society, introduced from Egypt and exploited by the Portuguese and the Dutch until finally Louis XIV suppressed the craze by his disfavour. But this western movement was apparently unconnected with the earlier one from the East.

In Zanzibar the Arabs prized the civet secretion as a remedy, usually taken internally, to reduce a swelling internal or superficial, if treated in the early stage.

This animal is frequently observed in early morning or late evening in semi-open grassy areas or woodland, and if one stood motionless it would pass very close, apparently unaware of one's presence. In Zanzibar Is. the local name is "fungo", but in Pemba (where Viverra civetta does not occur) more often "ngawa". Said to be absent from Tumbatu Is. BM has two Pemba specimens and one very large one from Zanzibar Town. A kitten brought in to me 29.iv had three cries: a shrill squeak (most frequently uttered), a plaintive mew, and occasionally a mongoose-like clucking or chirruping.

Family Felidae
Panthera pardus adersi Pocock  Zanzibar leopard  Z (E)

Panthera pardus adersi Pocock 1932 Proc.zool.Soc.Lond. :563.
Mor. & Pak. 1941:119. Z (E).
Felis pardus adersi (Pocock), Allen 1939:245. Zanzibar.

The Zanzibar leopard has always been regarded as a form endemic to the island. The main difference from the mainland forms, in Pocock's description, is that, although its yellowish tawny background colouring is only a little paler than the latter, all the rosettes are practically disintegrated into smallish rather closely packed spots, the small rosettes being indicated merely by darker yellowish tawny patches between some of the spots, and no solid rosettes on the thighs. Besides the type specimen taken by Aders, BM has another skin from Vaughan (Z), which is still paler in ground colour. Comparison of the latter (BM no. 1929.4.1.1) and the type

**Panthera pardus adersi** Pocock — **Zanzibar leopard**

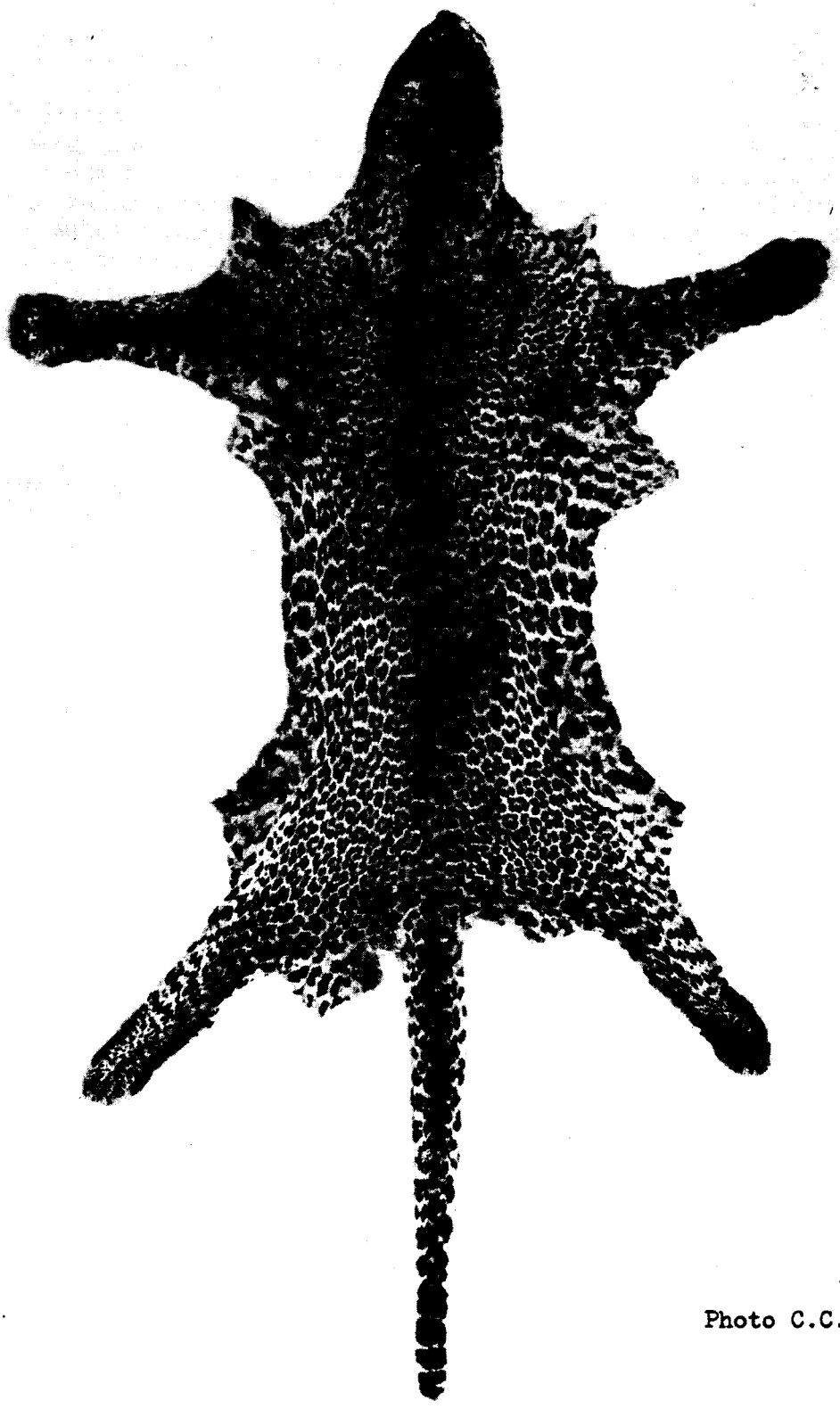


Photo C.C. Keddie

Fumba, Zanzibar Is. 20.vi.39. In MCZ, no.40953.

with ten BM specimens from western and northern Tanganyika, all probably referrable to the race suahelica (with some qualification as to those from the northeast), shows that, allowing for some individual variations, skins of all the latter are more heavily marked, ground colour tends to be more strongly tawny and rosettes more definitely grouped, than in the Zanzibar leopard (though two Kilimanjaro skins had a paler straw ground colour, more like the Zanzibar animal). But when Tanganyika skins were placed against the Zanzibar ones, separation of the latter was unquestionable on Pocock's criteria. Tail length of the dried skins from western and northern Tanganyika (745-830 mm) tended to be substantially more than the Zanzibar ones (620, 630 mm). A third Zanzibar skin, sent by me to MCZ in 1941, also tends to correspond to Pocock's description.

Dobroruka (1965) holds the view that P. p. adersi is not confined to Zanzibar Is., but that the leopards of the East African coastal region and of Nyasaland (Malawi) all belong to this race. He supports his claim of identity between the island and coastal leopards by comparing a photograph of a holotype P. p. adersi with Heck's photo of a leopard from Morogoro region, 102 km from the coast of Tanganyika; but even these seem to me clearly dissimilar, though the author himself finds "the pattern of spots corresponds completely with one another". After comparison of the skull of the Zanzibar leopard with those of western Tanzanian leopards, Dobroruka found no appreciable difference. I am in no position to comment, but Pocock (1932:564), after describing details, says "The (Zanzibar) skull is clearly much smaller than the average Tanganyika and Kenya skulls and would not, in my opinion, have reached, if full sized, the smallest male skull from Tanganyika entered in the table ....".

Dobroruka (1966) delineates the range, as he sees it, of P. p. adersi as from Transvaal northwards along the East African coastal areas with an extension up the Zambesi and Shiré rivers and the western surroundings of Lake Nyasa into central Tanzania, turning south of the Masai steppe territory of P. p. suahelica.

With due respect to these contrary opinions, the case for regarding the Zanzibar form as one with leopards throughout coastal East Africa would seem to me untenable, subject to comprehensive examination in the future. J. Kingdon (pers. comm. 1977) held the view that P. p. adersi is a valid subspecies and endemic, a very consistent and distinctive type, and that any morphs approaching it on the mainland would be essentially individual variants. In his 1977 vol. 3A (Carnivores), facing page 350, is a coloured plate comparing the African leopards from Ethiopia southwards to the Cape.

The Zanzibar leopard is certainly not extinct, as some seem to think. Since the 1964 revolution it has received relatively little attention except when it attacks domestic animals or humans: possibly fewer of the population have guns now. Halsted (U.S. Consul 1979) was of the opinion that the skins were not exported, though he saw several being tanned at the shoe factory. In 1943 an Abrab district commissioner gave me the following information on leopards known to have been killed 1939-43: 1939 Fumba 1, Mtende 2, Muyuni 1; 1940 Koani 1, Umbuji 1; 1941 Uroa 9, Mavuu Makunduchi 1; 1942 Uroa 1; 1943 Mkokotoni area 2, Kikungwi 1, Dimani 2 (one ♀ taping 5½ feet, 1067 mm, over all), Kufile 1. ZM has a mounted specimen, BM 2 skins from Aders (1919, the 'type') and Vaughan (1929), and MCZ one from ZM via Pakenham (Fumba, 1939). Leopards were observed as recently as 1980 and 1982 (Mturi 1983).

These leopards will climb trees, as on the African mainland. Local Africans catch them in stake cage traps, sometimes in nets set for suni antelope. Very rarely a leopard takes or attacks small children in cultivators' booths in the coral rag areas: in 1948 one at Uroa took 2 infants of 1-2 years (separate families), creating great fear, but was never caught. It was reported to be a 'kept' leopard whose master had vindictive designs on the families: such practice is commonly believed, and witch-doctors are also reported to use them. Kiswahili name is "chui". A leopard with 3 cubs was encountered in Nov 1948. Destruction of habitat will, of course, endanger the Zanzibar leopard as other species.

## Order HYRACOIDEA

Genua Procaviidae

Dendrohyrax validus neumanni (Matschie) Zanzibar tree hyrax
Z, P. (E both)

Procavia neumanni Matschie 1893 Sber.Ges.naturf.Freunde,Berl.:112. "Pangani forest", near Jambiani, Zanzibar.
Dendrohyrax adersi Kershaw 1924 Ann.Mag.nat.Hist. (9) 13:557. Ngezi, Pemba Is.
Dendrohyrax validus neumanni (Matschie), Allen 1939:444. Z. Mor. & Pak. 1941:119. Z, P.

Kershaw's D. adersi is now a synonym: he described his new species (type no. BM 24.3.8.12) as of "a handsome golden brown with snow-white underparts". Actually it is not at all typical of the Pemba hyrax, being very dark brown above, and the skin shows

evidence of brown markings on the white underside, as some neumanni have. Individual markings vary a good deal. BM has examples of neumanni from Swinny, Last, Aders, Loveridge, and Pakenham, mostly from Zanzibar and Tumbatu Ids. My two Pemba specimens appear brownish-grey due to preponderance of long pale hairs among the brown fur: Zanzibar examples, though browner, are less strongly so marked but have some of the long pale hairs, at least on the forepart of the body. They carry varying amounts of brown on the white underside. J.T. Last's specimens (1906) from Zanzibar Is. are of lighter brown.

Kingdon (1971. 1:345) considers that the distribution of this hyrax suggests a relic status, and that it may represent the earliest hyrax type adapted to live in true forest. At Zanzibar Dendrohyrax have been found at Tumbatu Is. (abundant), Muyuni area, and Kibuteni, near Makunduchi; in Pemba, at Kigomasha, Ngezi and Verani, Msuka (SW & NE sides), Njao & Fundo Ids. Solution of the mystery of Neumann's type locality "Pangani forest", unmarked on maps and unknown to Zanzibar residents, may lie in an elevated rocky spot marked "Kipanga Mango" on the map, about 4 miles (6.4 km) southwest of Jambiani (direction given by Neumann: Matschie 1875:91). "Ki" is a diminutive prefix, and "mango" might be a surveyor's note that a mango tree stood there (a landmark amid bush country on coral-rag).

Tree hyrax dwell in colonies in holes and clefts among the rocks but (Aders 1920:329) also in holes in trees. Leaving their holes just after dusk, they fill the air with sounds of scuttling, barking, squealing, and grunts: these activities (quieter later) continue into the earlier part of the day. Extraordinarily agile on trees, lianas and bushes despite the unlikely-looking pads on the soles of their feet, on which the digits are reduced to four in front and only three behind. They live almost entirely on leaves (including, on local information, "mjengo", "mtambuu" Piper Betel L. or possibly "mtambuu mwitu" Dioscorea sp. (Diosc.), and "uwanga" Tacca sp. or Maranta sp.); also young shoots high up in trees and at ground level. When in danger, it is their habit to 'freeze' where they are: this ruse is sometimes their salvation, sometimes their undoing. Ferocious in self defence. Some villagers eat the flesh, others have no taste for it: it is tough and goaty. I found hair lice in the fur but virtually no fleas.

Two ♀♀ taken i.iv each carried two well-developed foetuses, but another had only one small one on 16.x. A ♀ domesticated by Neumann produced two young. The Kiswahili name is "pelele".

Order ARTIODACTYLA

Family Suidae

Potamochoerus porcus subsp., probably daemonis Major. Bush pig or *Red river hog* Z

Potamochoerus choeropotamus daemonis Major 1897 Proc.zool.Soc.Lond.:367. Kilimanjaro, Tanganyika.
Potamochoerus porcus subsp., Mor. & Pak. 1941:120. Zanzibar, Mafia.

Common in less developed parts of Zanzibar Is., but is said not to occur in Tumbatu Is.; absent from Pemba. A skull (incomplete), my no. 565, was identified by Dr. G.M. Allen, MCZ, as this species. Very destructive of crops, they are hunted and poisoned to reduce their numbers, with little apparent effect. One whose leg was caught in a noose of "mchikichi" fibre (Oil Palm, Elaeis guineensis) at Jozani forest was gored to death by its fellows. A pair in this forest had young on 16.xii, possibly a few months old. Kiswahili name "nguruwe" is applied to all pigs, but at Mangapwani "nguruwe kitanga" was also used, the significance of which I do not know.

Sus scrofa Linnaeus Wild boar Z, P

Introduced: the tradition is that this species, originally the domestic pig, was brought into Pemba by the Portuguese who occupied the islands in the 16th century. They became feral and are now very numerous in the wilder parts of Pemba. Very destructive of crops, and persistently hunted. Said to occur in relatively small numbers in Zanzibar Is. where P. porcus predominates. Dr. Aders in Pearce (1920:328) states that he found no trace of striping on the young although Darwin had said that domestic pigs, turned feral in Jamaica, had resumed this aboriginal characteristic. A black piglet which I saw in Pemba had no trace of striping, but piglets and adults are often found with white on tail or feet or snout or chest or inside of legs: one was entirely white except for black hair on the back above the fore quarters. The majority, however, are quite black or sometimes grey; brown ones too are reported. A fine ♂, snared by its feet in Ngezi forest (P), weighed 45.7 kg (100 lbs. 12 ozs), and measured 1410 mm (snout to tail base), tail 241 mm. It charged, snapping its tether rope like string, and knocked me down several times.

So far as one can judge from dates of capture and size of piglets or foetuses, the breeding season seems to extend from about early Oct, through the short rains and hot season, to the long rains in Apr-

May. 3-4 foetuses have been found in sows killed. Kiswahili name is "nguruwe".

Family Bovidae

Cephalophus adersi Thomas — Zanzibar duiker — Z

Cephalophus adersi Thomas 1918 Ann.Mag.nat.Hist. (9)2:151 Zanzibar Is. Mor. & Pak. 1941:120 Z.

This duiker, whowe type locality is Chwaka (Z), is believed to be fairly common on the island and has been taken or observed at several localities in the east coast bushlands from Kiwengwa to Makunduchi. Not endemic as was formerly thought, since it is known to occur in the Arabuko-Sokoke forest near Malindi, Kenya coast (Haltenorth 1963:70, who calls it C. harveyi adersi, with range "Sansibar und schmaler Streifen der Kenia-Kueste"). Although that author regards adersi as a subspecies of harveyi (= natalensis), the provisional opinion of Ansell (1972, Pt. 15:33,34) is, on balance, that natalensis, callipygus, and adersi could be treated as a superspecies, but that, if further material of these forms became available, several could probably be reduced to synonymy. Consequently, for the present, adersi retains specific status. Kingdon (1982 3C:274-275) sees these small pockets of occurrence of adersi as examples of survival of ancient stocks from Africa's dwindling forests, by virtue of their isolation in ecological or marine islands, thus avoiding the competition of later forms. The same applies to a few other species such as Dendrohyrax validus.

A ♀ heavily in milk was shot at Bwejuu on 27.xii. Kiswahili name is "paa nunga".

A ♂ parasite taken from a host C. adersi in Zanzibar in 1943, and sent by the author to G.H.E. Hopkins at Nairobi, was described by F.L. Werneck as the holotype of Tricholipeurus pakenhami n.sp. in Rev.Brasil.Biol., 7 (1):101-105 Marco, 1947. Rio de Janeiro, D.F. Examined with the type was a ♀ allotype and a series of 7 ♂♂ and 7 ♀♀ received with them from Zanzibar.

Cephalophus monticola pembae Kershaw Pemba blue duiker P

Cephalophus melanorheus pembae Kershaw 1924 Ann.Mag.nat.Hist. (9)13: 556. Vitongoje, Pemba.
Cephalophus caerulus pembae Kershaw, Mor. & Pak. 1941:120 P.
Guevei caerulus pembae (Kershaw), Swynnerton & Hayman 1951:346 P.

The proliferation of names for this species and race has been baffling to one unversed in taxonomy and nomenclature. Monticola is the oldest name relating to the Blue duiker; Guevei is but a junior synonym of Philantomba, itself regarded by Ellerman et al. (1953:177) as a sub-genus of Cephalophus. This race was long considered a Pemba endemic, but some believe it occurs also on Mafia Is. Dr. P. Grubb, an authority on this family, is of opinion (pers. comm. Apr 1978) that "there is little evidence for the view that a distinct subspecies of the blue duiker occurs on Pemba alone or on Pemba & Mafia". Kenya National Museums, Nairobi, have a specimen said to be C. monticola (subsp. undefined), taken by J.S. Darling on Mafia Is. 1942. From Mafia BM has 2 skins and a skinless skull, labelled Philantomba pembae, from D. Vesey-Fitzgerald, and one ("C. monticola aequatorialis") from W.V. Harris. Mor. & Pak. (1941:120) extended the range to Mafia, probably following Vesey-Fitzgerald, but J. Kingdon (pers. comm. Aug 1978) states emphatically that "pembae is not the same as the animals found on Mafia unless the entire population of East Coast duikers are lumped ....". In the light of these differences of opinion, one hesitates to claim endemic status for the Pemba duiker, awaiting a comprehensive review of the whole family which may not be far off.

BM has 3 skins taken on Pemba by A. Loveridge and by A.C. Hollis (all called C. melanorheus pembae), and one by J.H. Vaughan (Guevei monticola pembae); and MCZ has 2 skins with skulls from me (nos. 40956-7). The above Pemba and Mafia skins have several features in common: dark or fairly dark woody brown above from nose to tail, paling on lighter brown vinous flanks to a white or silvery underside & under tail, and white inside ears. The degree of brown tinge on the white throat & neck varies, and on one Mafia skin white is difficult to discern in the stiffly folded ears. Some have a warm reddish tinge in the brown upper side, others have none; legs, too, vary in the amount of rusty colour. Conclusions on criteria and identity are difficult to reach without a larger series. My two ♂♂ from Ole (P) agree broadly with the above, and the larger pair of horns are 44-46 mm long, 15 mm diameter at base, with 5-6 pronounced rings on the lower half. One of Fitzgerald's Mafia skins (skulls) has small horns (35 & 30 mm).

These duiker were reported from northwest Pemba (Ngezi-Verani-Tondoni), and Mtangani-Chwaka-Kiwani in the southeast: no doubt they are in other parts too, especially down the 'afforested' east coast. Some are said by the local people to be reddish, others grey-brown, and some of both kinds to be "spotted". All are called "paa" or alternatively "chesi". Many are caught in snares of fine cord laid on the ground in their runs and attached to a bent sapling. Netting is not employed in Pemba.

Cephalophus monticola sundevalli Fitzinger  Sundevall's blue duiker  Z

Cephalophus pygmaeus sundevalli Fitzinger 1869 Sber.Akad.Wiss., Wien, math.-nat. 59(1):166. "Insel bei Zanzibar" (based on Sylvicapra monticola var., Sundevall).
Cephalophus caerulus sundevalli Fitzinger, Allen 1939:491.
Guevei caerulus sundevalli (Fitzinger), Swynnerton & Hayman 1951:346 Zanzibar and two small neighbouring islets.

Mor. & Pak. (1941:126, Note 24) excluded the record of this form from Zanzibar Is. as the only evidence seemed to be Kirk's two specimens in BM, labelled Cephalophus sundevalli, which they suspected not to be insular (they were in East Africa at the time, without access to BM), but the locality on the labels is "Zanzibar Island"; another Kirk specimen (part of skull, no skin), labelled "C. maxwelli", has locality "Zanzibar" only, no other data. BM no. 1929.4.1.1. from Zanzibar is registered as "Callipygus petersi". Lord Egerton of Tatton, Cheshire, collected an example of "Philantomba monticola" at Uzi Is. (Z) in June 1935, of which the mounted head alone (no. 452) remains, but Dr. Grubb has confirmed that it is of C. monticola, and thought the subspecies could well be sundevalli (impossible to be sure without the whole skin). This species was found as long ago as 1869, on one of the islets bordering Zanzibar harbour; and Matschie (1895, Mammalia:115) says that Fischer mentions C. monticola from "Sansibar" under the name "Ndimba".

There is thus little doubt that this duiker occurs on Zanzibar Is. Though Roosevelt & Heller (1915. 2:536), who recognised only the race hecki along the East African coast, considered that Kirk's specimens were of that race, indistinguishable from those from Mozambique coastal forests and the Shimba hills near Mombasa, Dr. Grubb (pers. comm. Mar 1982) is dubious of the name hecki and questions the validity of such identification. It is not yet definitely established whether the Zanzibar duiker is in fact identical with the Pemba one but from examination of the few Zanzibar specimens in BM I am doubtful,

especially because of the absence of really white areas on the underside, under tail and in the ears of the latter, which Pemba (and Mafia) individuals have. The last paragraph of the observations on Neotragus moschatus raises an interesting question of identity of the form recognised by the local Africans as "chongoume" and "paa kazi" as distinct from other "paa". These might be C. monticola.

Genus Neotragus

Neotragus (Nesotragus) moschatus moschatus (von Dueben) Zanzibar suni or dwarf antelope Z (E)

Nesotragus moschatus von Dueben 1846 in Sundevall: Öfvers.K.Vetensk. Akad.Förh., Stockh. 3:221. Chapani Islet, Zanzibar.
Cephalophus zanzibaricus Layard 1861. Cat.Mamm.Sth.African Mus. :71.
Nesotragus moschatus moschatus, Mor. & Pak. 120, 126 Note 25. Z (E).
Swynnerton & Hayman 1951:353. Z & its islets. (E).
Neotragus moschatus moschatus (von Dueben), W.F.H. Ansell 1972, in Meester & Setzer 1971-77 (Pt. 15:68). Zanzibar and Chapani & Bawi (not Bawane) Ids.

Confusing difference has prevailed in the use of the generic names Nesotragus and Neotragus. This species was formerly assigned usually to Nesotragus, but Neotragus is now preferred: (vide Ansell 1972, Kingdon 1971-82, Dr. P. Grubb (pers. comm. 1978), Corbet & Hill 1980; etc), although Allen (1939:498-499) treats them as distinct genera. Ansell 1972 (Pt. 15:68-69), while conceding that the nominate subspecies occurring in Zanzibar and its islets has been and may be treated as endemic, observed that Swynnerton & Hayman (1951:353) recorded it from Mafia also. He holds the view that all described forms (he lists five with their subspecies) are conspecific but that the validity of the subspecies is not very clear, and that their list should be regarded as provisional, collected material of all forms being apparently very limited. Believed to be absent from Pemba although Voeltzkow (1923) recorded it as "known to occur", possibly in mistake for Cephalophus monticola. Said to occur on Tumbatu Is.

Described in 1846 from a specimen taken on Chapani Is. (= Grave Is.), these antelopes were for some time believed to be confined to Chapani and Bawi Ids., small islets lying west of Zanzibar harbour, where Voeltzkow collected (Lorenz 1898:465). Layard was told that they had been placed there by "Col. Hamilton", evidently a mistake for Col. Hamerton, the first British Consul at Zanzibar and Agent of the East India Company, who served there 1841-57, died there and was buried on Grave Is. But in fact the suni is quite common in the

bush and forest country on the main island of Zanzibar, as Neumann testified as long ago as 1900 (p. 559) and Aders in Pearce (1920:328); but Kirk knew only the islet population, a few of which had quite large horns. Sclater & Thomas (1894-1900, 2:51 etc) comment on the very small amount of water the suni needs to subsist on, but there may be a source of water as Sundevall in 1806 wrote of Chapani Is. "fructibus dense tecta et fonte irrigata". They found gravid females in Aug & Oct, and questioned whether they may breed twice in the year.

A BM specimen from Speke ("Zanzibar Is." 1864) and from Kirk ("Zanzibar Is." 1874) are both coloured woody brown above, paler on neck & flanks, throat & underside dirty white, legs tending to pale chestnut, especially below the knee: overall a lighter, warmer brown than Cephalophus monticola. No detailed description of two sent to me from Dimani (Z), now in MCZ (nos. 40954-5). Roosevelt & Heller (1915, 2:550) say that in the Zanzibar form the white area of the upper throat is separated from that of the lower throat by a dark collar or bridge of the dorsal colour of the nape, and that the dorsal colour is decidedly rufous and grizzled rather than blackish or fuscous.

Local Africans do recognise a warmer coloured or reddish "paa" (not Cephalophus adersi) as "chesi" which might prove to be the lighter or redder examples of Neotragus. I have seen both adersi and this redder "paa" at Chwaka. See also Appendix 2, last paragraph. 'Suni' is said to be a Kichagga name (Mt. Kilimanjaro), but the local Kiswahili name is "paa" like Cephalophus.

## Order RODENTIA

### Family Sciuridae

Heliosciurus rufobrachium dolosus Thomas — Red-legged sun squirrel Z

Heliosciurus undulatus dolosus Thomas 1909 Ann.Mag.nat.Hist. (8)4:100. Mafia Is. Mor. & Pak. 1941:119 Z, Mafia (but see below).

E. Amtmann (Pt.6 1:5) states that H. r. undulatus (cf. Mor & Pak. 1941:119) occurs in northeast Tanzania but not in Zanzibar Is., and that H. r. dolosus is found in Zanzibar and Mafia but not in Pemba. Uncommon in Zanzibar but has been found in the areas of Michamvi, Chwaka, Jozani forest and Jambiani, in the east coast bush country. At Jambiani the local name was "furuma": here they recognised "furuma mweusi" (a darker form) and "furuma mweupe" (a paler form, less red on the underside). It was said to frequent coconut palms, eating the

nuts, and casuarina trees (I saw it feeding on the cones): insects and other organic remnants were found in stomach contents, as well as masticated cereal-like mash.

Paraxerus palliatus frerei (Gray) Red bush squirrel Z

Macroxus annulatus var. frerei Gray 1873 Ann.Mag.nat.Hist. (4) 12:265. "Zanzibar" (sent by Bartle Frere from "Zanzibar").
Funisciurus palliatus lastii Thomas 1906 Ann.Mag.nat.Hist. (7) 18:297. Zanzibar Is.
Paraxerus palliatus frerei, Mor. & Pak. 1941:119, 126 Note 19. Z, Mafia.

Found mainly in the bush country of the east and south of Zanzibar Is., although D.C. Halsted (U.S. Consul 1979) had these squirrels in his garden at Mazizini (3½ km south of Town). They have been taken in the areas of Uroa, Chwaka, Bwejuu, Jambiani, Muyuni, Makunduchi and Kizimkazi, but are said to be absent from Tumbatu Is: none in Pemba. They keep up an incessant clucking as they run about in the undergrowth and up and down trees. One ♀ was heavily in milk on 23.x. Stomachs contained lentil-like seeds and fruit kernels, and fleshy substances resembling contents of small snail shells: also found feeding on fruit of Screw-pine (Pandanus sp.). Kiswahili name is "chinde".

Family Muridae
Cricetomys gambianus cosensi Hinton Zanzibar giant rat or pouched rat Z (E)

Cricetomys cosensi Hinton 1919 Ann.Mag.nat.Hist. (9) 4:286. Zanzibar Is.
Cricetomys gambianus cosensi, Mor. & Pak. 1941:119, 126 Note 20. Z, P.

In his description of this new species, Hinton wrote "The Zanzibar Cricetomys is of quite exceptional interest ... The nearest geographical allies ... are the mainland forms ... C. g. enguvi and C. g. osgoodi; but these ... are animals of a wholly different type .. On the other hand, cosensi is clearly very closely allied ... to the geographically remote emini, differing from the typical race of the latter species in little beyond its paler colouration and thinner fur." (C. emini ranges from Sierra Leone to Lake Tanganyika, in rain forest: Corbet & Hill). Genest-Villard, in his 1967 revision of the genus Cricetomys, and after examination of 11 examples from Zanzibar (BM and Paris Museum), recognised C. g. cosensi to be the form endemic to Zanzibar Is. It has been obtained both in the Town and commonly in rural areas (Mwongoni, Kitungani, Kilimacheche, Chwaka, Pete, Kibuteni,

Makunduchi, etc.) but reported to be not on Tumbatu Is. One was an albino ♀. None recorded, to my knowledge, from Pemba despite enquiries throughout the island: it is not apparent on what grounds Mor. & Pak. (1941:119) included Pemba; Swynnerton & Hayman may have relied on this record.

Aders in Pearce (1920:330) says that the largest individuals may measure nearly one metre in total length. Said to do a good deal of damage to cassava crops. Pregnant ♀♀ were reported taken between mid Apr and end of May, and another ♀ at end of May was heavily in milk. Kiswahili name is "buku".

Mus musculus gentilis Brants White-bellied house mouse Z, P

Mus gentilis Brants 1829 Het Geslacht der Muizen:126. Egypt and Nubia.
Leggada bella vicina Thomas 1910 Ann.Mag.nat.Hist. (8) 5:88. Takaungu, Kenya.
Mus musculus subsp., Mor. & Pak. 1941:119 Z, P. (also Leggada sp. Z: p. 126, Note 21).

Introduced. Voeltzkow (1923) records Leggada aff. vicina Thomas among his list of animals which "have become known to occur" on Zanzibar (without quoting specific evidence); but Swynnerton & Hayman (1951) agree with Miller, Ellerman, Hill, and Carter in the view that there are no characters which distinguish Leggada from Mus: consequently Leggada and all its races are synonyms of Mus. Corbet & Hill (1980) take the same view. Matschie (1895:53) records Mus minimus Ptrs. coll. by Neumann at "Sansibar",probably the island as "Sansibarkueste" is distinguished under M. decumanus; but ZMB has no specimens of M. minimus or Leggada bella or L. vicina from Zanzibar or Pemba. Allen (1939) synonymises M. minimus Ptrs. with Leggada m. minutoides (A. Smith) - nothing to do with Mus musculus. Corbet & Hill rate M. minutoides as "probably an aggregate of sibling species".

ZM has two skins of Mus musculus without data, which may be assumed to be local. From Pemba I had 3 examples taken in the townships of Wete and Mkoani. Juvenile taken 7.ii. Kiswahili name is "panya", as for all Murinae.

Rattus norvegicus (Berkenhout) **Brown or common rat** Z, (P)

Mus norvegicus Berkenhout 1769 Outl.Nat.Hist. Great Britain, 1:5. Norway.
Rattus norvegicus, Mor. & Pak. 1941:119 Z.

A widely distributed species which has become introduced into Zanzibar over the years, and must be assumed to occur also in Pemba alrhough no specimens are yet recorded from there. D.R. Rosevear (1969:276) says it is a very different animal from R. rattus, can grow much larger, is relatively stout-bodied, short-tailed and small-eared. It can be dangerous and aggressive if cornered, and its favourite life-style is in drains and sewers (also, of course, entering houses). ZM has 7 examples, and MCZ one taken in Zanzibar Island by Loveridge in 1923; BM has 3 taken by Cosens at Zanzibar.

Gwynne et al. (1970:249) found "?R. norvegicus" in abundance on Latham Is. on their visit in 1967. They are a severe threat to the colonies of nesting seabirds on whose eggs and young they feed though one wonders how they survive between breeding seasons as there appears to be no fresh water and very sparse vegetation. They should be exterminated in the interest of this important seabird breeding locality. Kiswahili name is "panya" (for all rats).

Rattus rattus (Linnaeus) subspp. **Black or house rat** Z, P

Mus rattus Linnaeus 1758 Syst.Nat.ed.10. 1:61. Sweden.
Rattus rattus and subspp., Mor. & Pak. 1941:119 Z, P.

Introduced. Schwarz (1934:573) states that the three main types or mutations of the common house rat are Rattus r. rattus, R. r. alexandrinus and R. r. frugivorus. Analysis of the wild stock has shown that the latter form originated from northwest India and is connected by intermediate types with the other races found in India and Malaya. R. frugivorus entered Africa both across the ocean and up the Nile, and spread throughout the continent. In addition, two other races have been introduced into East Africa, R. r. wroughtoni and R. r. rufescens, the latter from southern India, and both have been found in Zanzibar and on the mainland.

Rosevear (1969:272), referring to the two forms R. r. alexandrinus and R. r. frugivorus, questions the subspecific status commonly accorded to them, and states that "they are in fact nothing other than colour phases, two or more of which have been known to turn up in the same litter". He then describes the varieties that occur

"under their appropriate names". Considering the wide range now of these forms of Rattus rattus and the vicissitudes they have encountered in spreading so far from their homelands, it would be surprising if a good deal of cross-breeding did not occur. Yet Schwarz (l.c.) expresses the view that "it looks as if the various types keep separate, and that they differ in their biology". This may be partly borne out by the fact that in Pemba I found frugivorus consistently vegetable feeders and living in the same kinds of trees (infra).

R. r. rattus (Linnaeus) Z (?P). Introduced. Admitted on ground of German specimens which satisfied Moreau in Mor. & Pak. 1941:119. Occurrence in both islands, of both the nominate race and the others, can probably be assumed because of the ubiquity of the species. At Kiwani (P) house rats were called "kocho" and, if very large, "buku" though the true "buku" (Cricetomys gambianus) is not known in Pemba.

R. r. alexandrinus (E. Geoff. & Audouin) Z, (?P). Introduced. Swinny obtained it in Zanzibar 1919 (BM specimen: "? alexandrinus"); also Neumann (1900:549).

R. r. frugivorus (Rafinesque) (?Z), P. Introduced. 14 specimens obtained throughout Pemba by Lumsden and myself. They habitually frequent the crowns of "mkadi" and "msanaka" (names for Screw Pine, Pandanus sp.) and "mkindu" (Wild Date Palm, Phoenix reclinata Jacq.) in which they build grass nests and could be heard squeaking constantly.

R. r. rufescens (Gray) Z, (?P). Introduced. Admitted on Schwarz's statement (supra). My no. 403 from Mkanyageni (P) was tentatively identified by MCZ as this subspies.

R. r. wroughtoni Hinton Z, (?P). Introduced. Admitted on Schwarz's statement (supra), and on Swinny's specimen (1919) in BM.

## MARINE MAMMALS

These should not pass unnoticed although this paper deals mainly with land mammals. Ingram (1931:421), who lived eight years at Zanzibar, recorded, in general terms, occurrence of whales ("rare" - very occasionally washed up on the east coast), porpoises and dolphins ("everywhere"), and dugongs ("rare") in Zanzibar waters, but without data or scientific pretensions. I observed "porpoises" at Pemba: near shore, Mkoani, Mar 1939, and between Wete and Fundo Is. Jan 1930. Schools of "pilot whales" (? Globicephala) beached themselves several times at Zanzibar. Frazier (Afr.J.Ecol. 1983, 21:115) quotes, without definite data, apparent records of Pseudorca crassidens (False killer whale) and Tursiops (Bottle-nosed dolphin) in or near Zanzibar waters.

Pilot whales stranded at Zanzibar harbour

## APPENDIX 1

### EXCLUDED SPECIES

(asterisk signifies provisional exclusion, for reasons stated in the text, subject to confirmation of occurrence)

### Order INSECTIVORA

Family Soricidae
Crocidura gracilipes Peters White-toothed shrew

Crocidura gracilipes Peters 1870 Mber.K.preuss.Akad.Wiss.Berl.:590. Kilimanjaro, Tanganyika.

P. Matschie (1895, Mammalia:33) records two specimens of this species taken by O. Neumann at Mojoni (Muyuni), Zanzibar Is. They are nos. 25488 & A5489 in ZMB. Dr. R. Hutterer, who recently examined no. 25488 (no. A5489 not found), pronounced it to be in fact an example of C. viaria (see note on this species). There is no other record of C. gracilipes in the islands. Rejected. It is assumed that no. A5489, if found, would also prove not to be of this species.

### Order CHIROPTERA

#### Sub-order Megachiroptera

Family Pteropodidae
Cynopterus grandidieri (Peters) Grandidier's fruit bat

Pteropus brachyotis 1839 Wagner Schuber's Säug.Suppl. 1:363.
Cynopterus brachyotis Gray 1849 Zool. 'Samarang'. Vert.:12 (see below).
Cynonycteris grandidieri Peters 1869 MB.Akad.Berlin:394. "Zanzibar"; Dobson 1878. Cat.Chir.B.M.:79; Andersen 1912:620.

Paris Museum has the skin of the type specimen (no. 436) of Cynopterus grandidieri (skull and foetus accompanying the type have disappeared), said to have been taken at "Zanzibar" in 1864 by A. Grandidier himself. Dr. Tranier (of Paris Museum) has assured me that this bat was taken by Grandidier in the island of Zanzibar in that year, for he was in Madagascar from 1865 onwards. K. Andersen

examined this type specimen and found it to be "in every respect ... indistinguishable from Cynopterus b. brachyotis" which inhabits India, S.E. Asia, and the Far East (Corbet & Hill 1980:40). Hayman & Hill (1971) in Meester & Setzer (1971-77) omit it, holding presumably that it is not an African mammal. It is puzzling how this bat came to be taken, if true, in Zanzibar, considering that its range is known to be oriental. Mor. & Pak. (1941:124) have a note on it.

## Sub-order Microchiroptera

### Family Emballonuridae

Coleura seychellensis Peters — Seychelles sheath-tailed bat

Described from the Seychelles Ids. in Mber.K.preuss.Akad.Wiss.Berl. 1869(1868):367, but was included in Voeltzkow's list of reported Zanzibar mammals, owing probably to the specimen presented to BM by Capt. Parish R.N., ostensibly from "Zanzibar". O. Thomas (1915) says that this Seychelles species is most unlikely to have been resident in Zanzibar. Capt. Parish's naval station would have included Seychelles, and probably the bat was caught there, or came aboard there and was captured on the ship at Zanzibar.

### Family Rhinolophidae

Rhinolophus capensis Lichtenstein — Cape horseshoe bat

Voeltzkow (1923) includes it in a list of species "known to have occurred" in Zanzibar Is, and Neumann (1900:538) claimed that one example of it (Sp. no. 11815) was brought to him at Muyuni (Z) among 30 Nycteris, but ZMB has no R. capensis collected by Neumann nor any example from Z or P: none in BM. Mor. & Pak. (1941:124) say, though the locality is not suspect, the identification is evidently incorrect since the species "seems to be restricted to the western part of the Cape Colony" (Andersen 1904, Ann.Mag.nat.Hist. (7) 14:382). Corbet & Hill give the range Zambia, Rhodesia, South Africa.

Rhinolophus fumigatus Rüppell — Rüppell's horseshoe bat*

Dobson (Proc.zool.Soc.Lond. 1879:718) mentions R. aethiops (BM. no. 1909.1.4.16, spirit specimen) as received from Royal Army Med. College collection (under charge of G.E. Dobson), labelled "Zanzibar" ('island' not stated). Aethiops is now considered a subspecies of R. fumigatus (type locality Shoa, central Ethiopia, but its race exsul was described from Kenya). No authentic specimens

from Z or P in BM. The range of fumigatus (Corbet & Hill) is Senegal-N. Ethiopia, southern Africa. W. Peters claims to have taken R. fumigatus Rüpp. "von der Zanzibar küste" (Mber.K.preuss.Akad.Wiss.Berl. 1867 (1866):885). Time may prove whether the record is valid. Provisionaly excluded.

Family Hipposideridae
Asellia tridens (E. Geoffroy) Trident bat

Rhinolophus tridens E. Geoffroy 1813 Ann.Mus.d'Hist.nat.Paris. 20:265. Description de l'Egypte. 2:130. 1818. Egypt.

Allen (1939:78) gives the range as "Northeastern Africa, Egypt to Zanzibar", and Corbet & Hill (1980:52) as Morocco, Senegal-Pakistan. Specimens in BM are from west & north Africa to Egypt, Middle East, and east Arabia. No mention of East Africa, and the reference to Zanzibar would appear merely to indicate approximate latitude: mainland "Zanzibar" of the 19th century extended up to the Tana River (almost into equatorial Somalia, say 2500 km south of east Arabia, but far removed from Zanzibar Is.). Paris Museum has one of this species in alcohol, collected by M. Rousseau at "Zanzibar"; date unknown, but Rousseau is known to have collected in East Africa between 1870 and the early 20th century. Despite this shred of evidence, it seems most unlikely that Asellia tridens would have been taken in Zanzibar Is., and the inference is rejected.

Triaenops persicus (?afer Peters) Persian trident bat*

Triaenops afer Peters 1877 Mber.K.preuss.Akad.Wiss.Berl. 1876:913. Mombasa.
Triaenops persicus var. afer Dobson 1879 Proc.zool.Soc.Lond.:716. "Zanzibar".
Triaenops persicus, Corbet & Hill 1980:52. Congo Rep., Mozambique-S. Arabia-Iran.

BM spirit collection has two from Dobson labelled "Zanzibar", nos. 1879.9.12.7, coll. Robb, and 1909.1.4.17 (no specific det. of this) from Royal Army Med. College collection under Dobson; but a third from Kirk labelled "Ushambola" is discounted since this is the old name of Usambara in northeast mainland Tanzania. Identification of all is correct, but locality of Dobson's specimens may or may not be insular. Excluded provisionally pending confirmation. This was also the conclusion of Mor. & Pak. 1941:124.

Family Vespertilionidae
Kerivoula africana Dobson — Tanzanian woolly bat

Kerivoula africana Dobson 1878 Cat.Chir.Brit.Mus.:335. "East coast of Africa (Zanzibar)".

Mor. & Pak. (1941:124) say of this species "The locality of the (apparently unique) type in the Paris Museum is given as "East coast of Africa (Zanzibar)" which presumably refers to the mainland." Paris Museum informs me (Apr 1982) that this type specimen seems to have disappeared. There is no evident reason to believe that the locality "Zanzibar" meant anything other than the mainland coastal strip of that name. Corbet & Hill give its range as "Tanzania" only. It is therefore excluded from this list.

Pipistrellus rueppelli (J.B. Fischer) — Rüppell's pipistrelle*

Vespertilio rueppelli J.B. Fischer 1829 Synopsis Mamm.:109. Dongola.
Vesperugo pulcher Dobson 1875 sp.nov.Proc.zool.Soc.Lond.:471. "Zanzibar".
Pipistrellus rueppelli, Allen 1939:95. Corbet & Hill 1980:68. Senegal-Tanzania-Botswana, Egypt, Iraq.

Dobson's type specimen of V. pulcher (BM no. 68.12.22.2, alc. specimen labelled Scotozous pulcher - a synonym of P. rueppelli, presented by Kirk ostensibly from "Zanzibar" without more precise locality) would appear to be the only Zanzibar record, though Corbet & Hill show that rueppelli occurs in Tanzania. Zanzibar Is. seems a dubious locality record (Hayman & Hill 1969:41) and Dobson's (Kirk's) "Zanzibar" in 1868 probably meant the mainland coast. This species is best removed from the substantive list pending confirmation.

## Order CARNIVORA

Family Mustelidae
Mellivora capensis subsp. — Ratel or Honey badger

One of the largest of the smaller carnivores, all black except for a silvery-grey back stretching its whole length from head to tail, it would be impossible to overlook if there were any in Zanzibar, but the only evidence is one specimen taken by Neumann (1900:554) near Zanzibar Town during his East African journey of 1892-95.

Though Matschie (1895:85) does not claim to have found it in the island, he gives the Kiswahili name in "Zanzibar" as "loma", which sounds as if local people knew it. These facts are puzzling, for so large and rather savage an animal is unlikely to be domesticated or imported for any reason. There are none in the islands now, though found in Mozambique, mainland Tanzania and Kenya. Definitely excluded from our list.

Family Viverridae
Ichneumia albicauda subsp. White-tailed mongoose

Lorenz (1898:462) lists Herpestes albicauda, a synonym of this species, as having been taken at Mkokotoni (Z) by Voeltzkow in his 1889-95 journeys. The skin, of a young animal with defective skull, was unlabelled; and, on being asked by Lorenz about its origin, Voeltzkow replied "Probably from Zanzibar". This seems to be the only ground for associating this species with Zanzibar; there must have been some confusion. It probably came from a mainland territory, for Neumann confirmed the identification as I. albicauda. Voeltzkow (1923) omits it from his list of mammals "known to have occurred in Zanzibar Is.", and it does not occur now. Definitely excluded.

Family Felidae
Felis (Leptailurus) serval subsp. African serval

Unknown from these islands. Mor. & Pak's (1941:125, Note 14) remarks adequately dismiss this species from further consideration. Voeltzkow (1923), who included "Zibethailurus aff. hindei" among animals "known" from Zanzibar, gives its Kiswahili name as "chui-marara". Erroneously recorded and definitely rejected.

## Order ARTIODACTYLA

Family Hippopotamidae
Hippopotamus amphibius Linnaeus Northern hippopotamus

Hesse et al (1937:51) state "The hippopotamus swims the strait between the mainland and Zanzibar, a distance of 30 km." As Moreau & Pakenham say (1941:126), this gives a most misleading impression of frequency. I know of no occasion when this has happened, though it may be possible that a hippo was once carried

out to sea by a mainland river in spate and found its way across to the island with the aid of the northward current which flows up the East African coast almost to the equator (Vaughan 1929-30:581). This occasionally happens to crocodiles. Definitely excluded from this list.

## Order RODENTIA

### Family Anomaluridae

Anomalurus sp. (? derbianus) — Flying squirrel

Anomalurus orientalis Peters 1880 Mber.K.preuss.Akad.Wiss.Berl.:164. "Zanzibar".

Peters' type specimen of A. orientalis is a sub-adult ♂ in ZMB (no. ZMB 5629) which was brought to G.A. Fischer (accompanied by A. Reichenow) by Africans on 2.xi.79; but, apart from saying "Hab. Zanzibar", Peters omits to say where the specimen was found (in 1879 "Zanzibar" extended onto the mainland). Although Dr. Fischer lived in Zanzibar Is. and practised medicine 1879-82, he made expeditions to the mainland, and analysis of his movements (J.f.O. April 1880, Heft 2:139-144) shows that in Oct 1879 they were bird collecting at Barawa (southern Somaliland coast) and southwards along the mainland coast of "Zanzibar" (also presumably some distance inland). Consequently if Anomalurus was brought to them on 2.xi, the chances are strong that they were somewhere in the coastal areas of Tanganyika (G.E.A.) rather than on Zanzibar Is. Anomalurus has never been suspected to occur in the island, where there is very little suitable habitat for it. Matschie (1895:45) found it at Monda, Nguru Mt. (northeast Tanzania) but does not mention Zanzibar Is. I conclude that it came from the mountains in eastern Tanzania, and reject it from the list.

### Family Muridae

Lemniscomys striatus subsp. — Striped grass rat*

BM has two spirit specimens reg. no. 1882.2.6.17-18, labelled "Mus (Isomys) pulchella, coll. Kirk", ostensibly from "Zanzibar", but this origin is dubious as there is no other report of L. striatus (current name) from the island, and in the 1880s "Zanzibar" sometimes meant the opposite mainland coast. Misonne (1974) in Meester & Setzer (Part 6:19) says of this species: "A common savanna species, also found in secondary forests, from Sierra Leone to northern

Tanzania ..." Kirk's specimen may be of subspecies ardens (Tanzania) or massaicus (Kenya) but is unlikely to be a valid Zanzibar record. Provisionally excluded pending confirmation.

Family Gliridae
Graphiurus (= Claviglis) murinus subsp. African dormouse*

BM has a spirit specimen collected by Kirk in "Zanzibar", labelled "Myoxus murinus", a synonym, reg. no. 1868.3.16.12. No other data and no other record from these islands. Widely distributed in Africa south of Sahara down to South Africa. Four races have been described from mountains in Kenya, and one from Tanganyika, and Kirk's locality "Zanzibar" may refer to the mainland. Alternatively this specimen might have been in the consignment received by BM from Kirk in 1868 including Mozambique material, and not have been insular at all; or it could be a valid Zanzibar species overlooked all these years. Misonne (1974) in Meester & Setzer (Part 6:35) says of it: "A common species; lives in trees, bushes and rocky places; feeds on insects, fruits, seeds. Often enters houses." Provisionally excluded pending confirmation.

Family Hystricidae
Hystrix sp. Porcupine*

There is little firm evidence of the occurrence of porcupines in Zanzibar Is. In my 27 years service there I never had direct evidence of one despite many safaris and enquiries. Neither BM nor MCZ nor ZM nor Kenya Museums have a porcupine specimen from Zanzibar. Swynnerton & Hayman (1951) and Kingdon (1971-78) both refer in a general way to the procupine said to occur in Zanzibar, but they may have accepted too readily Moreau & Pakenham's (1941:119,126) hint of inconclusive reports about porcupines:
(a) Voeltzkow (1923, Abt 1:301) states that Hystrix aff. galatea Thomas ("niungu") was among animals "hitherto known to occur in Zanzibar" ("Von der Insel Zanzibar sind bisher folgende Säugetiere... bekaant geworden"), but this is of little value (see Introduction).
(b) Voeltzkow (l.c.), writing of Pemba, says "I heard of a small mammal, 'nungu' as the natives call it, said to be not the porcupine of Zanzibar which Wapemba call 'schonga' ".
(c) ZM attendants informed me that in Dr. Aders' time (1912-30) a porcupine was brought in from the north of the island, but in 1939 I was told in the north that they do not exist there. Though "nungu" is Kiswahili for porcupine, the similar name of the cape in the far

northwest was ascribed to a spiny fish caught there called "bunju-nungwi".
(d) In 1939 a Survey Dept. worker said that some 10 years previously he found two porcupine quills in the bush near Kidichi. They might, of course, have been dropped by labourers from Tanganyika who use them for cap embroidery.
(e) In 1944, an African related that c. 1940 a porcupine was killed north of Mtoni in a reed-bed or swampy land among tall grass below Masingini-Kidichi ridge. It was eaten by the hunters. This narrator had never heard nor seen evidence of porcupines before.

From the above there seems to be some circumstantial evidence of a few porcupines in Zanzibar between 1900 and 1940 at least. I prefer to asterisk this record pending further confirmation.

## Order LAGOMORPHA

Family Leporidae
Lepus sp. (probably capensis) (Brown or Cape) Hare

BM has two specimens: one a very young animal in spirit, described in the register as "Lepus sp., purchased of Dr. Kirk", reg. no. 1868. 3.16.7: no data nor locality of origin save "Zanzibar". The other, also from Kirk, no. 1869.1.26.4, is a crumpled skin in poor condition, unidentified, undated but accessioned 1869, locality "Zanzibar". It is among similar skins labelled L. capensis, a savanna and open woodland species, common in East Africa, even Mozambique where Kirk was collecting shortly before 1868. Zanzibar has very little country capable of sustaining hares, and no report exists that hares have ever been known here. Population density and use of dogs would soon have eliminated them. Neither Voeltzkow nor other early collectors mention Lepus in the island. Rejected as mistaken locality.

## APPENDIX 2

### ANIMALS REPORTED BUT UNDISCOVERED

Of the following reported from Zanzibar and Pemba Islands respectively, some may (possibly but unlikely) be local names of species already known by other names, some possibly occurring but which have never come to notice, and a few possibly extinct from the islands. Names nos. 1-4 were given to the author in Zanzibar Is., nos. 5-8 to Voeltzkow (1903-05) in Pemba Is.

Zanzibar

1. Ushundwi. Name given at Pete, Z. Said to be like Herpestes but different.
2. Ukwiri. Name given at Pete. Said to be like Viverricula but different.
3. Uhange. Known at Pete and Kombeni, Z. Said to be of similar size to Bdeogale but redder, and of different character & habits. Others agreed about size but said it is marked like Viverra.
4. Chui-mwanzi. Possibly a local name for Panthera pardus but unlikely (Mangapwani, Z)

Pemba

5. Schonga. Said to be Kipemba name for "the porcupine of Zanzibar" but now porcupines are not known to exist in Zanzibar Is.
6. Chongea. Said to be a big civet cat but none is known in Pemba now larger than Viverricula indica.
7. Nungu. Despite its name, definitely not a porcupine. Voeltzkow suggests an Erinaceus sp. (hedgehog, found throughout Africa) but none is known to occur in the Islands. Some say a small hamster-like animal.
8. Rambe. Voeltzkow says "a little marten-like animal in the woods/forest". Possibly Herpestes?

. . . . . .

Col. Craster (1913) mentions, in his book on Pemba, that he observed one day a sort of wild cat "with a bright brown body striped with black, the size of a fox-terrier". This is certainly new unless it was a reddish Atilax but for the black striping which might have been a trick of the light.

. . . . . .

The bovidae "Chesi", "Chongoume" (horned), and "Paa-kazi" (hornless). The latter two, thought by locals to be ♂ and ♀ of one species, do exist and are probably Duiker or Dwarf antelope, but not yet identified as such or collected. All three (besides C. adersi) occur at Michamvi (Z) and are said by the headman there to be reddish brown.

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INDEX OF SPECIES LISTED (admitted and excluded)
omitting subspecific names