EXPLANATION OF PLATES XLIII.–XLVI.

SCALES OF FISH.

Reference Letters.

bc, bone-cell; *bt*, branching canaliculus; *cc*, branching cosmine canaliculus; *d*, denticle; *e*, enamel-like layer; *ed*, growing edge of scale; *g*, line marking growing edge at an earlier time; *gn*, ganoine; *hv*, horizontal vascular canal; *i*, inner bony laminæ of isopedine; *ir*, inner and older region; *ll*, inner laminated layer; *o*, outer ornament of ridges and spines; *oc*, outer cavity; *ol*, outermost or newest layer; *pc*, pulp-cavity; *r*, ridge; *sp*, spinelet on surface; *t*, tubercle; *tu*, tubule with branching inner end; *vc*, vascular cavity; *vch*, vascular chamber; *vl*, vascular layer; *vtc*, vertical vascular canal.

Plate XLIII.

Fig. 1. Enlarged outer view of scales on the head of *Thelodus*.
2. Similar view of scales on the tail of *Thelodus*.
3. Fragment of a plate of *Psammosteus paradoxus* Ag. Enlarged.
4. Vertical section of a plate of *Psammosteus arenatus* Ag. Enlarged, cam.
5. Section through the edge of a scale of *Osteolepis macrolepidotus* Ag. Enlarged, cam.

Plate XLIV.

Fig. 6. Section of a scale of *Eusthenopteron foordi* Wh. Enlarged, cam.
7. Section through the broken edge of a scale of *Rhizodus* sp. Enlarged, cam.
8. Similar section of a scale of *Rhizodus ornatus* Traq. Enlarged, cam.
9. Oblique view of surface of cleithrum of *Polypterus bichir* G. Enlarged.
Figs. 10 & 11. *Phaneropleuron curtum* Wh.; sections of scale. Enlarged, cam.
Fig. 12. Section of gular plate of *Cœlacanthus* sp. The outer cavities, *oc*, are covered over with a thin shiny layer. Enlarged, cam.

Plate XLV.

Fig. 13. Horizontal section, nearly parallel with the outer surface, of a scale of *Cheirolepis* sp. Enlarged, cam.
14. Surface views of the scale of *Rhizodus ornatus* Traq. A, Anterior edge of scale; B, posterior exposed region. Enlarged.
15. Outer region of sections of scale of *Gonatodus* sp. A, oblique; ganoine not shown. B & C, vertical to surface; B, towards centre of scale; C, at edge. Enlarged.

Plate XLVI.

Fig. 16. Fragment of bony layers of scale of *Lepidosteus osseus* L. Enlarged.
17. Central portion of vertical section of scale of *Heterolepidotus latus* Eg. Enlarged, cam.
18. Section through a cranial plate of *Amia calva*. Enlarged, cam.
19. Section through a scale of *Aspidorhynchus* sp. Enlarged, cam.
20. Section through the edge of a scale of *Eugnathus* sp. Enlarged, cam.
21. Section nearly parallel with the surface of a scale of *Acanthodes* sp. Enlarged, cam.

2. The Rudd Exploration of South Africa.—VIII. List of Mammals obtained by Mr. Grant at Beira. By Oldfield Thomas, F.R.S., and R. C. Wroughton, F.Z.S.

[Received July 18, 1907.]

Long as the region of Beira and the Pungwe River has been known as a paradise for sportsmen, no scientific collection of mammals appears ever to have been made there, and certainly our own National Museum has never received any specimens from the district. Consequently the present collection, obtained

by Mr. Grant for the Rudd Exploration, is of very great value as filling in the geographical gap between Inhambane, whence came the magnificent series enumerated in our previous paper, and the better known regions of the Zambezi and Nyasaland.

The results, from the point of view of geographical distribution, are in many cases most curious and interesting, and show the necessity for such systematic explorations as this of Mr. Rudd's before we can consider our knowledge on the subject to be at all complete. For example, in the case of *Petrodromus* one would have supposed that the same form would occur as at Inhambane further southwards, since a closely allied one is found on the coast further north in East Africa. But instead a member of quite another group—*P. tetradactylus*, an inhabitant of the higher inland region from Nyasa to S. Rhodesia—here reaches the East coast area, and isolates the Inhambane species from its northern ally.

Then, again, the *Georychus* is much more closely allied to the Bechuanaland *G. lugardi* than to *G. darlingi* of Mashonaland, intermediate in geographical position.

There are evidently therefore very many interesting problems still to be determined about the geographical distribution of the species, and about the faunal areas into which the country should be divided.

Twenty-nine species are included in the present collection, represented by 129 specimens, all, as before, added to the National Museum by the generosity of Mr. C. D. Rudd.

The collection was made in two localities, the one just outside Beira, and the other, Masembeti, on the Railway 23 miles from that place.

Mr. Grant's report on the region is as follows:—

"The Beira District may briefly be described as low lying, flat country, with patches and stretches of forest alternating with open plains dotted with palmetto, bamboo brakes and ant-heaps, and with vleis and lakes in the lowest parts.

"In the wet season the whole country, except the higher forested portions, is one vast swamp and the vegetation is both thick and high.

"Natives are few and scattered, as there is little habitable veldt on which crops can be grown.

"The climate during the wet season is by no means healthy, and although the thermometer may not always record high temperature, it is generally sultry and muggy. Collecting work is difficult and the damp heat is most enervating.

"Throughout the trip the weather was warm, average temperature 86° in the shade. There was plenty of rain, especially during the latter half, which was undoubtedly bad for trapping work; this combined with the scarcity of mammals in the district, and the ravages of ants which completely destroyed numbers of trapped specimens, prevented the collection made from being larger.

"The scarcity of mammals, especially the smaller ones, is probably due to the annual flooding of the country, as numbers must be drowned out and killed during the rainy season."

1. CERCOPITHECUS PYGERYTHRUS Cuv.

♂. 1743, 1746, 1794. ♀. 1744, 1745, 1793. Beira.

It is worthy of record that no. 1746, a mere baby in arms, the son of no. 1744 (*teste* the Collector) has, above the usual white brow-streak, a sandy-coloured streak separated from the former by an indefinite black one; this effect is produced by the fact that the hairs immediately above the white face-streak are black with yellow tips.

"Native name, 'Shoku.'

"Fairly common in all the forest and seen in troops of from six to perhaps a dozen or fifteen.

"Extremely wary and at the least sign of danger hiding in the tops of the trees and on the upper sides of the larger branches, where it is impossible to detect them; they can sometimes be secured by lying in wait where a troop has been seen to thus disappear.

"Diurnal only, and living on the wild fruits and berries."

2. CERCOPITHECUS ALBOGULARIS BEIRENSIS Poc.

P. Z. S. 1907, p. 701.

♂. 1761, 1781. Beira.

A new form described by Mr. R. I. Pocock on these specimens, and therefore to be credited as one of the discoveries of the Rudd Expedition. No. 1761 is the type.

3. GALAGO GRANTI Thos. & Wrought.

♀. 1695, 1696. Beira.

Both specimens are quite young.

"Native name, 'Sfenge.'

"Apparently not common.

"Frequenting the forests and breeding and sleeping in the hollow trees."

4. EPOMOPHORUS CRYPTURUS Pet.

♂. 1685, 1686. ♀. 1687. Masembeti.

These specimens undoubtedly represent the *E. crypturus* of Peters, the type locality of which was Tette. Whether this name is a synonym of *E. gambianus* as stated by Dobson, may be left to be decided when the genus is again thoroughly overhauled.

"Native name, 'Igoshe.'

"Observed only in the bed of the Masembeti R., where these specimens were disturbed from the overhanging trees, and shot.

"According to the natives it is common, and is constantly seen by them when the 'cachou' trees are in fruit."

5. Glauconycteris papilio Thos.

♀. 1777. Beira.

The present specimen in its white head and belly recalls very strongly the colour pattern of *G. variegatus*; it is, however, immature, and we think it safer at present to rank it, as we did the specimens from Inhambane (P. Z. S. 1907), with *G. papilio*.

"Native name, 'Sinyegetongi.'

"The specimen was the only one observed."

6. Scotophilus nigrita Schreb.

♂. 1773. ♀. 1769, 1770. Beira.

3 specimens in al.

The specimens are all immature; they possibly represent Peters's *Nycticejus planirostris*, and are apparently identical with the smaller form received from Inhambane.

"Native name, 'Sinygetongi.'

"This species was observed only on two or three occasions and is apparently rare near Beira."

7. Petrodromus tetradactylus Pet.

♂. 1772, 1790. ♀. 1702, 1723. Beira.

Peters's recorded localities were "Tette, Sena, Boror," and identical or very closely allied forms are found in Mashonaland, N. Rhodesia and Nyasaland. It is curious that the species at Inhambane, on the coast to the south of Beira, is a totally distinct species allied to *P. sultan* from Mombasa.

"Native name, 'Wierare.'

"Decidedly uncommon in the district.

"Inhabits the forests, especially the thicker parts where it has regular runs, in which these specimens were trapped.

"Both nocturnal and diurnal."

8. Crocidura sp.

♂. 1694, 1725, 1729, 1747. Beira.

Though much darker and slightly larger, these probably represent Peters's *C. hirta* from Tette.

"Native name, 'Majaje.'

"Apparently uncommon; inhabiting thick vegetation both in the forest and on the borders of vleis, lakes and streams."

9. Felis serval Schreb.

♂. 1749. Beira.

"Native name, 'Nsonsi.'

"Not uncommon; the spoor is often observed along the native footpaths.

"It is a rather wary animal and not easy to trap.

"Strictly nocturnal and often visiting the kraals at night for the chickens, &c."

10. Genetta sp.

♀. 1758. Beira.

Belongs to the group with a well marked internal cusp on p^3. May be *G. zambesiana* of Matschie, the type locality of which is given as "Boror, Nyassa."

"Native name, 'Mulimba.'

"Spoor of this species was seldom seen, showing that it cannot be plentiful.

"Found principally along the valleys of the streams and near vleis; also within the forest.

"Nocturnal in habits."

11. Mungos galera Erxleb.

♂. 1765. ♀. 1780. Beira.

"Native name, 'Slangane' or 'Ivugo.'

"Not uncommon in the low-lying parts, such as the vleis and the borders of lakes and streams.

"Nocturnal only."

12. Crossarchus fasciatus Desm.

♂. 1683, 1684. Masembeti.

"Native name, 'Madenbo.'

"Fairly common, especially at the River Masembeti; observed in parties of a dozen or more.

"It inhabits the forest where it is not easy to secure, more often being heard than seen, scampering away to the thick undergrowth.

"Diurnal only, living principally on coleopterous insects."

13. Funisciurus mutabilis Pet.

♂. 1754, 1756, 1764, 1774, 1782. ♀. 1716, 1748, 1750, 1791. Beira.

♂. 1679, 1680. Masembeti.

"Native name, 'Shindi.'

"Quite one of the commonest animals near Beira, and frequenting all the forests, especially the dead trees left in the native clearings, in the holes of which they apparently sleep and breed.

"Generally observed in pairs and sometimes family parties, very active and somewhat shy, hiding by laying itself along the upper side of a branch, where it is very difficult to detect them.

"The alarm note is a bird-like chatter, and their food apparently consists of the fruit and berries of the forest trees.

"Strictly diurnal."

14. Funisciurus sponsus Thos. & Wrought.

♀. 1789. Beira.

Quite similar to specimens from the type locality.

"Native name, 'Shindi.'

"This species is decidedly rare on the Beira side of the Pungwe and was only observed on two occasions, both times in the same small stretch of forest.

"Only four were observed altogether, three when the specimen sent was secured and one on another occasion.

"It was excessively wild, and in the thick forest difficult to observe or shoot."

15. Tatera lobengulæ de Wint.

♂. 1697, 1699, 1783. ♀. 1701, 1707, 1784. Beira.

These specimens are of the long-tailed type characteristic of Africa south of the Zambezi. Peters's *Meriones leucogaster*, which comes from the coast immediately north of the Zambezi, has a short tail. It is interesting to note that the Beira form is practically identical with that of Mashonaland, and totally distinct from that from the very much nearer Quillimane District, although the climatic conditions of the latter are practically the same as those of Beira.

"Native name, 'Banye.'

"Not common, inhabiting principally clearings and native lands, where in habits it is similar to its congeners in other parts of South Africa."

16. Pelomys fallax Pet.

♂. 1693, 1776. Beira.

♂. 1688. Masembeti.

These specimens show clearly that the length of the tail in proportion to the head and body varies considerably in this species; in all three cases, however, it is longer than the head and body combined. Peters records a length considerably shorter than the head and body and at the same time shorter than in any of these individuals; his figure, however, does not support the text, for in it the tail is almost though not quite equal to the head and body. In all other respects these specimens answer to the description of *P. fallax*, the type locality of which was Boror.

"Native name, 'Ibusi.'

"Not common. In habits it exactly resembles *Otomys irroratus*, like that species inhabiting the vleis, the banks of rivers and lakes and all damp places, also sometimes the long grass on the outskirts of the forest.

"No signs of nest or hole were, however, observed.

"Strictly diurnal and a vegetarian."

17. Arvicanthis dorsalis Sm.

♂. 1700. ♀. 1708, 1721, 1753. Beira.

"Native name, 'Ntanu.'

"Fairly common both in the forest and in the open country.

"Exactly similar in habits to its congener in Inhambane and elsewhere."

18. Mus chrysophilus de Wint.

♂. 1704, 1730, 1742, 1752. ♀. 1719, 1734. Beira.

"Native name, 'Banye.'

"Not common: in habits similar to its congeners in other parts of South Africa."

19. Mus sp. (multimammate).

♂. 1720, 1760, 1771, 1788. ♀. 1762, 1763. Beira.

"Native name, 'Shikwi.'

"Common everywhere, especially near native lands and kraals.

"Habits similar to those of the species in other parts of South Africa."

20. Cricetomys gambianus adventor Thos. & Wrought.

♂. 1791. Beira.

A young individual.

"Native name, 'Wipe.'

"Apparently scarce, as the specimen sent was the only one seen and I was unable to find any of their burrows."

21. Acomys selousi de Wint.

♀. 1678. Masembeti.

♂. 1710, 1728, 1737, 1759, 1768, 1785. ♀. 1706, 1740, 1741, 1766. Beira.

Three in al. Beira.

"Native name, 'Mdondaundo.'

"Very common everywhere both in the forest, the cane-brake, and the long grass in the vleis."

22. Saccostomus campestris Pet.

♂. 1727, 1786. Beira.

"Native name, 'Iwite.'

"Not uncommon in and around old or cultivated lands.

"Nocturnal and a vegetarian."

23. Saccostomus mashonæ de Wint.

♂. 1767. ♀. 1724. Beira.

24. Leggada minutoides A. Sm.

♂. 1757. ♀. 1711, 1733. Beira.

These specimens almost certainly represent the *Mus minimus* of Peters from Tette, Buio, &c.

25. Georychus beiræ, sp. n.

♂. 1709, 1712, 1713, 1717, 1795. ♀. 1714, 1731.

A *Georychus* about the size of *G. luyardi*, with a white frontal spot.

Size only very slightly smaller than *G. lugardi*.

Fur short (4–5 mm.) and soft.

General colour above between "ecru drab" and "drab-grey"; the hairs "slate-grey" at their bases with fawn-coloured tips. A white mark on vertex about half an inch in diameter, varying in shape individually, but generally an irregular pentagon; not produced backwards on to the neck. Colour below the same as above, but the fawn tips of the hairs less conspicuous.

Skull but slightly smaller than that of *G. lugardi* at the same age, but slighter; premaxillaries at the base of incisors distinctly narrower; nasals somewhat longer; posterior premaxillary process not meeting or even nearly meeting behind the nasals as in *G. lugardi*.

Dimensions of the type:—

Head and body 155 mm.; tail 14; hind-foot 25; ear 5.

Skull—greatest length 40; basilar length 33; greatest breadth 28; breadth across postorbital processes 12; across base of incisors 7·5; upper molar row 6·5; diastema 12·5.

Hab. Beira, Portuguese East Africa.

Type. Adult male. B.M. no. 7.6.2.98. Original number 1713. Collected by C. H. B. Grant, 28th Nov., 1906.

Mr. Grant obtained a fine series of this species (seven specimens). It is at once distinguishable from *G. darlingi*, which it resembles in colour pattern, by its much larger size; from *G. lugardi* (with which it agrees in size and general colour pattern) it may be separated by its frontal white patch, which is sharply limited to the crown, while in that species it tends to stretch backwards as a median white line on to the neck and shoulders. Besides the skull characters noted above, it may be added that the lambdoid crest makes a reentering angle where it meets the sagittal, while in *G. lugardi* it is a straight line at right angles to the long axis of the skull.

"Native name, 'Fungi.'

"Common and forming regular runs and mounds.

"In captivity they show curious *Mus*-like propensities in their method of feeding, sitting up on their haunches and holding the food in the fore paws as do the rats and mice.

"On the surface of the ground their movements are slow and undecided.

"Apparently strictly vegetarian."

26. Thryonomys swinderenianus Temm.

♂. 1739.

"Native name, 'Tishengi.'

"Common in all thick vegetation bordering the vleis and lakes in the open lands, and edges of forest and lands.

"Very difficult, however, to secure specimens, especially during the wet season when the vegetation is rank and high.

"A vegetarian and probably chiefly nocturnal."

27. Cervicapra arundinum Bodd.

♂. 1691, 1692. Masembeti.

"Native name, Isawy.'

"Not by any means common.

"Inhabits the open plains, especially the long grass bordering the lakes and vleis.

"Here the Reed-Buck is unusually wild and difficult of approach."

28. Cephalophus grimmi L.

♂. 1778, 1787. Masembeti.

"Native name, 'Nkwenkwi.'

"Decidedly scarce in the district, only some half-dozen were seen during the trip.

"The natives say that this country is too damp for it, and it is quite possible this is one of the causes of its scarcity.

"Also, according to them, all the Duikers near Beira are of the same remarkable fawn coloration as the two specimens secured.

"It lies up in the forest, feeding in the open plains at night."

29. Cephalophus hecki Matsch.

♂. 1779. Masembeti.

This is a pale-coloured animal with a dark median dorsal area, very different from the more southern *C. monticola*. It seems to possess all the characters attributed by Prof. Matschie to his *C. hecki*.

"Native name, 'Ngudo' or 'Sikwi.'

"Scarce near Beira, slightly more common at the Masembeti River.

"Found exclusively in the forest; in habits is apparently similar to its congener in Zululand and the Knysna."

3. Notes on Two African Mammals. By R. Lydekker.

[Received October 20, 1907.]

(Text-figure 205.)

The Cameruns Elephant.

Since my paper on the ears of African Elephants * was published, I have learnt that the young living elephant from the hinterland of the South Cameruns upon which Dr. Matschie founded *Elephas africanus cyclotis* is figured in a work by Dr. L. Heck entitled 'Lebende Bilder aus dem Reiche der Tiere,' and published in Berlin in 1899. The ear is well shown in Dr. Heck's plate (No. 146), which is reproduced from a photograph, and appears to have a more regularly curved margin than the ear from Congo

* Proc. Zool. Soc. London, 1907, pp. 380 *et seq.*