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EAST AFRICAN COWRIES.

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Instituut voor Zeewetenschappelijk onderzoek
Institute for Marine Scientific Research
Prinses Elisabethlaan 69
Bredene - Belgium - Tel. 059/80 37 15



R.R.O. Bell
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By P. R. O. Bally.

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THE COWRIES OF THE EAST AFRICAN COASTS (KENYA,
TANGANYIKA, ZANZIBAR AND PEMBA)

BY BERNARD VERDCOURT

(East African Agriculture and Forestry Research Organisation)

A desire has been expressed for a paper of this nature and there is an excuse for writing one since all the monographs of which those by Hildalgo, Melvill, Kiener, Reeve, Sowerby and Roberts are the most important are rare and out of print. It is just possible that at least one of the 2,700 papers which have been written about cowries deals with the East African coasts but if so, it is certainly not generally known. The most important work on the group is the recent "Prodrome of a Monograph on Living Cypraeidae" by Dr. F.A. Schilder and Dr. M. Schilder (Proc. malac. Soc., Lond., **23**, 119-231, 1938-9). The volume containing this paper is also out of print. All the species known to occur on our coasts are included in this present paper. Rarities have been included since they are needed for the museum collections.

The Cowries (Cypraeidae) form a family recognisable at a glance, the shells being colourful, polished, more or less ovoid, rounded on the back but flatter below; the base is crossed by an aperture extending lengthways and bordered by ridges or teeth, usually numerous. The spire of the shell is reduced or sometimes entirely absent when adult. There is no operculum or 'lid' closing the entrance of the shell as is the case in most families in the order to which the cowry family belongs. The mantle or part of the body which lays down the shell has two large side flaps which meet over the back of the shell when the animal is in motion thus resulting in the high polish so characteristic of the family. The structure of the shell and general appearance of the animal is shown in Figs. 1 and 2. The sexes are separate but identical in appearance.

At one time the family included several groups such as *Trivia* and *Erato* which are now referred to families of their own. The whole of the cowries were at one time included in the single genus *Cypraea* but this has now been split into numerous genera. Many species have been divided into races or subspecies. In the descriptive part of this paper these accurate names have been used. At the request of the editor English names* have been given to encourage beginners but the collector is recommended to give up this unscholarly practice once he becomes interested and to use at least the specific names. The racial names need not be used but are included here for completeness. There are 165 species of true cowries recognised at present (this number has been much exaggerated in some popular books) and 41 of these are recorded from our coasts by the Schilders, with three exceptions represented only by one subspecies ie. 44 forms in all. The writer has disregarded six of these records but recorded five other species,

*Those used by Wood (Index Testaceologicus, 1828) have been employed where suitable.

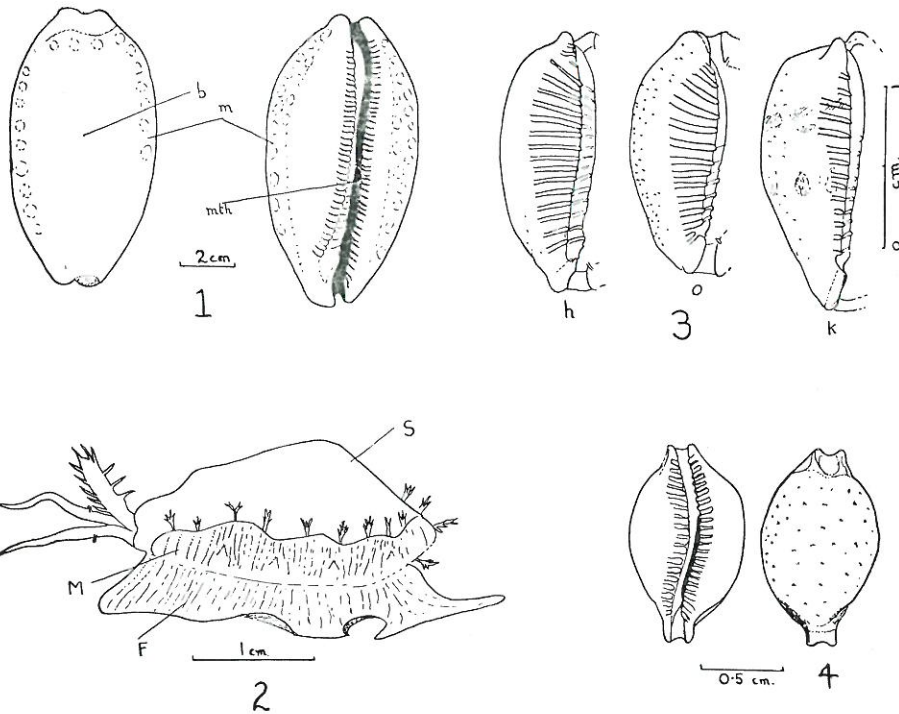


Fig. 1—Top and bottom views of a cowry, b=back, m=margins and mth=mouth.
 Fig. 2—A Money Cowry with the animal extended, F=foot, M=mantle and S=shell.
 Fig. 3—Columellar teeth of h : *Blasicrura hirundo*, o : *B. owenii*, and k : *B. kieneri*.
 Fig. 4—Top and bottom views of *Pustularia globulus*.

the total thus being 43. A few of these species were not available for illustration in either the writer's or the Coryndon Memorial Museum collection and the writer is indebted to the following persons and institutions who have kindly made donations or loans of material, or who have helped in other ways :— Mrs. Cockburn, Mrs. Ryall, Mrs. Finch, Miss Lewis, Mrs. Dingle, Mrs. Bailey, Miss Watkins, Miss Tudor, Mr. Barrow, Capt. Pitman, Mr. Mohinder Singh, Mr. Dickie, Mr. Berry, Mr. Clancey, Mr. Parsons, the late Col. Maxwell, Lt. Shelley, Mr. Bailey (Seychelles), Mr. K. D. Smith, Mr. R. C. Wood, The Peabody Museum of Natural History, Los Angeles Museum, The Pietermaritzburg Museum, and The Mauritius Institute.

The photographs are the work of Mr. C. F. Hemming and are largely responsible for whatever value this paper has.

A key based on the scientific classification of the family would not be of much practical value and the one devised is based chiefly on size and colour. After the species has been found from the key, the identification may be checked by referring to the brief descriptions of the species and to the plates. The index to species at the end of the paper refers to both plate and page numbers. It should be noted that juveniles can be identified only by using a comparison collection and the key will work *only* for fresh adult specimens. Juveniles may be told by their unfinished appearance; the edges of the mouth are sharp with only traces of teeth, the pattern is blurred and unformed and the spire is conspicuous. Worn shells should be discarded as unidentifiable and thrown away. Scientific nomenclature is that used by the Schilders and subsequent generic splits have not been utilized.

KEY TO THE EAST AFRICAN COWRIES

1	Shell 5 cm. long or more	...	2
1	Shell under 5 cm. long	...	11
2	Base of shell and/or teeth coloured	...	4
2	Base and teeth white, rarely an obscure blotch on the base	...	3
3	Sides of shell rounded when viewed from end. Lowermost spots purplish-black	... <i>Cypraea tigris</i>	
3	Sides of shell straight when viewed from end. Lowermost spots usually brown (Note: some forms of <i>C. vitellus</i> are over 5 cm. long but such specimens have not yet been recorded from E. Africa. They would key to <i>tigris</i> here but may be distinguished by having white spots on a brown ground.)	... <i>Cypraea pantherina</i>	
4	Teeth violet, back flesh-coloured	... <i>Cypraea carneola</i>	
4	Teeth not violet, back differently coloured	...	5
5	Shell cylindrical	...	6
5	Shell ovoid	...	8
6	Base and sides uniformly chocolate-coloured	... <i>Talparia talpa</i>	
6	Base and sides paler not chocolate-coloured	...	7

7	Shell 7 cm. long, back with brown rings	...	<i>Talparia argus</i>	
7	Shell 10-11 cm. long, back with obscure spots and minute white pinhead marks	...	<i>Callistocypraea testudinaria</i>	
8	Back with white line joining the extremities. This line has white blotches joined to it, see Plate 9	...	<i>Mauritia mappa</i>	
8	Back without a line or with a simple line with no blotches joined to it	...		9
9	Sides and base uniformly chocolate or purple brown	...	<i>Mauritia mauritiana</i>	
9	Sides and base white, tinted, or spotted	...		10
10	Base whitish, teeth brown. Shell 6 cm. long regularly reticulate	...	<i>Mauritia histrio</i>	
10	Base flesh-tinted, teeth brown. Shell 7.5 cm. long. The white spots on the back tend to be joined by white lines	...	<i>Mauritia arabica</i>	
11	Teeth violet, back flesh-coloured	...	<i>Cypraea carneola</i>	
11	Without the above combination of colours	...		12
12	Back with raised granules or pustules	...		13
12	Back without raised granules or pustules	...		14
13	Shell 1.4 cm. long, lilac with chestnut ends	...	<i>Staphylaea staphylaea</i>	
13	Shell 2-3 cm. long, pale brown with whitish pustules, ends not chestnut	...	<i>Staphylaea nucleus</i>	
14	Base or teeth coloured or spotted	...		15
14	Base and teeth white or slightly tinged only at the ends or sides	...		33
(N.B.—Several species are included in the key twice because this character is a little difficult and slightly coloured specimens might be included in either group.)				
15	Shell globular with produced ends, small 13 mm. long and 7.5 mm. wide, orange with brownish spots	...	<i>Pustularia globulus</i>	
15	Shell usually larger, never so globular, and ends much less produced	...		16
16	Base dark orange, back with numerous close white specks and chestnut spots, ends pale lilac	...	<i>Erosaria helvola</i>	
16	Not as above	...		17
17	Back with bands containing zigzag marks	...		18
17	Back without zigzag marks	...		19
18	Back brown or purple with bands of white zigzag lines; shell 1.6-2.8 cm. long, base whitish	...	<i>Palmadusta diluculum</i>	
18	Back fawn or yellow; shell 1.8 cm. long, base yellowish	...	<i>Palmadusta ziczac</i>	
19	Sides with clear violet spots, base flesh-coloured, teeth orange-salmon	...	<i>Cribraria chinensis</i>	
19	Sides without violet spots	...		20

20	Ends and teeth orange (actually teeth white bordered by fine orange lines), back with white spots often somewhat raised at the sides	...	21
20	Not as above	...	22
21	Teeth crossing the entire base	<i>Staphylaea staphylaea</i>	
21	Teeth not crossing the entire base	... <i>Staphylaea limacina</i>	
22	Sides, base and teeth all dark brown	... <i>Erronea onyx</i>	
22	Not as above	...	23
23	Sides uniformly chestnut or dark brown, middle of base and teeth white	... <i>Erosaria caputserpentis</i>	
23	Sides spotted, not as above	...	24
24	Teeth or grooves between them darker than the rest of the base	...	25
24	Teeth paler or the same colour as the rest of the base	...	28
25	Grooves between the white teeth brick-red, back spotted	... <i>Cypraea lynx</i>	
25	Grooves between the brown teeth whitish, back reticulate	...	26
26	Sides rounded shell cylindric; sides and base pinkish-slate, spotted with blue-black spots, more on one side than the other	... <i>Mauritia scurra</i>	
26	Sides more angled, shell ovoid; sides and base whitish or brownish with purple spots equally numerous on both sides	...	27
27	Shell humped, sides more vertical with spots rather large and more discrete	... <i>Mauritia histrio</i>	
27	Shell depressed, the sides extended horizontally (margined) with blue-black and brown spots running together. The dorsal reticulation and spots are smaller than in <i>histrio</i>	... <i>Mauritia depressa</i>	
28	Edges margined, the margins pitted or indented above, marked with spots and lines	...	29
28	Edges not or scarcely margined, not indented, spotted, but without lines	...	31
29	Each side with large squarish blotch of blue-black on margin; base spotted	... <i>Erosaria nebrites</i>	
29	Sides without large blotches but with the usual spots	...	30
30	Extremities with terminal chestnut blotches, back with brown spots and whitish specks	... <i>Erosaria gangranosa</i>	
30	Extremities not blotched, back with white spots often ringed with brown; sides and base violet tinted	... <i>Erosaria marginalis</i>	
31	Shell usually over 2.5 cm. long, base brownish flesh-coloured, grooves between teeth a little darker	... <i>Erronea caurica</i>	
31	Shell under 2 cm. long, base white or yellowish, grooves not darker	...	32

- | | | | | |
|----|---|-----|-----------------------------|----|
| 32 | Base yellow, sides with larger spots | ... | <i>Palmadusta felina</i> | |
| 32 | Base white often spotted, sides with minute dots
(N.B.—If the specimen has not yet been identified and you still think it has a coloured base continue with the key—a few species may have a tinge of colour below but still be included in the next part of the key.) | ... | <i>Blasicrura kieneri</i> | |
| 33 | Back clear yellow, white or greenish-yellow, unmarked or rarely with an orange ring. The sides of the base may be tinged yellow | ... | <i>Monetaria moneta</i> | |
| 33 | Back not as above, if with an orange ring then not yellow | ... | | 34 |
| 34 | Back with a conspicuous brown blotch on grey-blue ground, edges orange-brown | ... | <i>Blasicrura stolidia</i> | |
| 34 | Not coloured as above | ... | | 35 |
| 35 | Margins spotted with marks usually different from those on the back | ... | | 36 |
| 35 | Margins not spotted but back pattern may descend down to the margins | ... | | 45 |
| 36 | Shell conspicuously margined, with indentations round the margins which are also marked with raised dots and dashes; margins with a dark blotch on either side crossing the margin (absent in a rare variety) | ... | <i>Erosaria erosa</i> | |
| 36 | Not as above | ... | | 37 |
| 37 | Shell margined and pitted (rather obscurely) on one side; small 1.3-1.6 cm. long, ends blotched with chestnut or orange | ... | <i>Erosaria gangranosa</i> | |
| 37 | Without the above combination of characters | ... | | 38 |
| 38 | Back with bands of zigzag lines | ... | <i>Palmadusta diluculum</i> | |
| 38 | Back without bands of zigzag lines | ... | | 39 |
| 39 | Shell about 4 cm. long, back pale brown with white spots, sides with numerous dark brown spots | ... | <i>Erosaria lamarckii</i> | |
| 39 | Shell not as above, mostly under 3 cm. long | ... | | 40 |
| 40 | Back greenish-blue with very numerous distinct brown spots | ... | <i>Erosaria turdus</i> | |
| 40 | Back differently marked not spotted but often with minute speckles or 'freckles' | ... | | 41 |
| 41 | Shell about 2-2.7 cm. long, back with three interrupted transverse milky brown bands. Side spots sparse | ... | <i>Cribraria teres</i> | |
| 41 | Shell smaller differently coloured | ... | | 42 |
| 42 | Side spots large, base yellowish | ... | <i>Palmadusta felina</i> | |
| 42 | Side spots minute, base white | ... | | 43 |
| 43 | Extremities blotched brownish-lilac below, back brownish, side spots almost obsolete | ... | <i>Palmadusta fimbriata</i> | |
| 43 | Extremities blotched blackish above, back blue-green, side spots numerous | ... | | 44 |

44	Apical columellar teeth the longest (text fig. 3)	<i>Blasicrura kieneri</i>	
44	Middle columellar teeth the longest (see text for <i>B. owenii</i> (Sow.))	... <i>Blasicrura hirundo</i>	
45	Sides of shell and usually the edges of the base broadly dark brown or chestnut	... <i>Erosaria caputserpentis</i>	46
45	Sides pale, not as above		
46	Back bluish or pinkish with a bright orange-yellow ring (annulus)	... <i>Monetaria annulus</i>	
46	Back without a yellow ring	...	47
47	Back white with three strong chocolate-brown bands	... <i>Palmadusta asellus</i>	
47	Back without or with vague bands	...	48
48	Back brown speckled with white spots	...	49
48	Back not marked with white spots	...	50
49	Shell 2.5-5 cm. long, back milky-brown	... <i>Cypraea vitellus</i>	
49	Shell smaller, back brown with numerous round white spots	... <i>Cribraria cribraria</i>	
50	Shell elongate about 3 cm. long, slate with lines of dark purplish-black dots and dashes, ends orange (variable).	<i>Luria isabella</i>	
50	Shell under 2 cm. long, differently coloured	...	51
51	Back with faint pinkish-brown bands and very fine oblique orange hairlines which form angles near the margins (visible under a strong lens and when one knows what to look for they are just visible to the naked eye); not spotted	... <i>Palmadusta clandestina</i>	
51	Back whitish, freckled with pale brown, with obscure central band, ends with a conspicuous brownish-lilac spot on each side	... <i>Palmadusta fimbriata</i>	

DESCRIPTIONS OF THE SPECIES

Globular Cowry†

Pustularia globulus (Linn.) subsp. *brevirostris* Schilder

Description :—Shell globular with produced ends, 1.3 cm. long and 0.75 cm. wide, back orange often with brownish spots, base yellowish-orange, teeth pale, middle ones running together.

A very rare species, fresh specimens have been seen from the Seychelles (Bailey) and worn specimens from Likoni, Kenya (Ryall). Since the photograph of this species is poor a line drawing is also given (Fig. 4)

Grooved Cowry

Staphylaea staphylaea (Linn.) subsp. *laevigata* Dautz.

Description :—Shell ovoid 1.7-2.0 cm. long, back brownish-purple or greyish-brown, with small white spots and traces of raised whitish granules along the edges; extremities chestnut, base orange tinted, teeth extending across the base. Frequent to rare.

†NB Either spelling Cowrie or Cowry may be used.

Note :— This is a variable species which tends to merge with the next one. One form of it is sufficiently different to be remarked upon. This form is short about 1.4 cm. long, back grey-lilac with raised whitish granules. It corresponds with the descriptions of some of the eastern races and needs further investigation.

False Grooved Cowry

Staphylaea limacina (Lmk.) subsp. *interstincta* (Wood)

Description :— very similar to the smooth form of *S. staphylaea* but larger 2-2.7 cm. long, back purplish-brown with white spots; teeth not extending across the base. Frequent.

Wrinkled Cowry

Staphylaea nucleus (Linn.) subsp. *madagascariensis* (Gmel.)

Description :— Shell ovoid ends produced, about 2.6 cm. long, back with brownish pustules joined by ridges, whitish or pale lilac in worn shells; teeth extending over the entire base. Rare.

Malindi (Pitman); Dar es Salaam (Mohinder Singh); Shanzu (Finch).

Gangrene Cowry

Erosaria gangranosa (Dill.) subsp. *reentsii* (Dunker)

Description :— Shell small ovoid, 1.3-1.6 cm. long, back yellowish-brown or greyish with numerous whitish spots and a few obscure brown spots, ends with chestnut blotches on either side, sides whitish with obscure spots, one side margined and punctate. Ends orange below, rest of base white. Rare. I have seen no East African material. Schilder says rather rare. Specimens are probably in existence in some of the many private collections in the country.

Star Cowry

Erosaria helvola (Linn.) subsp. *argella* Melv.

Description :— Shell ovoid 1.8-2.8 cm. long, one side margined and pitted, back variable, turquoise or pale with close small white spots and larger superimposed chestnut spots in varying proportions, extremities pale lilac, margins and base orange-chestnut, a band just above the margins deep to very deep chestnut. Common.

Snake's Head Cowry

Erosaria caput-serpentis (Linn.) subsp. *caput-serpentis*

Description :— Shell ovoid, base flattened and margins angled, 2.7-3.6 cm. long, back whitish with a reticulum (network) of chestnut or dark brown (equivalent to white spots on a dark ground) and often a white line joining the pale ends; margins and edges of base dark brown or chestnut, middle part of base and teeth white. Common.

Margined Cowry

Erosaria erosa (Linn.) subsp. *erosa*

Description :— Shell ovoid, sides margined and ridged, 2.1-4 cm. long (much larger specimens occur in some other areas); back bistre or grey-

brown with numerous small whitish spots and a blue-grey line connecting the ends; margin with brown ridgelets and a squarish grey-brown blotch in the centre of each side crossing the margins. Base whitish with few orange-brown spots on one side. Teeth coarse extending to one margin. Frequent.

Note :— Another race or subspecies is supposed to occur rarely but I have not identified it amongst any material I have seen. A very striking variety lacking the side spots or blotches is represented in the Museum collections by two specimens — Dar es Salaam (Dingle) and Mombasa (Leete). The status of this needs further investigation.

False Margined Cowry

Erosaria nebrites Melvill

Description :— Very similar indeed to *E. erosa* but the blotches do not extend over the margins and are more chestnut than greyish. These blotches are often joined across the back by a darkish zone. The species is also more triangular and the base is tinted and spotted. Rare.

Note :— I have seen one unlocalised specimen from our coasts and it is identical with one which I have from Port Sudan. Schilder claims that the two should belong to different races *nebrites nebrites* and *nebrites mozambicana* but I see no difference in the solitary specimens I have seen; rather would I seriously question the absolute specific identity of this taxon from *E. erosa*.

Rare Margined Cowry

Erosaria marginalis (Dill.) subsp. *marginalis*

Description :— Shell ovoid 2.6 cm. long, back pale olive with white spots, some ringed with brown; sides and base tinted with violet, edges with purple dashes and dots. Teeth numerous. I have seen no specimens of this rare species from our coasts.

Lamarck's Cowry

Erosaria lamarckii (Gray) subsp. *lamarckii*

Description :— Shell ovoid about 4 cm. long, back bistre or pale brown with numerous whitish spots some of which have purple dots in them; and a pale line joining the ends. Margins and ends with dark brown spots, base pale. Frequent.

Thrush Cowry

Erosaria turdus (Lmk.) subsp. *turdus*

Description :— Shell ovoid, base rather flattened, about 3 cm. long, back pale greenish-blue with very numerous yellow-brown spots like a thrush; sides white with large spots and some indented dots near the ends, base and teeth white. I have seen no specimens from our coasts but the species is very abundant in the Red Sea.

Schilder records the nominate subspecies as frequent and the subspecies *zanzibarica* Sull. as rare on our coasts.

Ringed Cowry

Monetaria annulus (Linn.) subsp. *camelorum* (Rochebr.)

Description :— Shell ovoid 2-2.7 cm. long, back bluish, pinkish or greyish margined by a fine bright orange-yellow ring (ie an annulus); margins very pale flesh, base white. Abundant, one of the commonest cowries. It lives on sandy bottoms.

Money Cowry

Monetaria moneta (Linn.) aggregate.

Description :— Shell ovoid, 1.5-2.6 cm. long, white to deep yellow or greenish-yellow, base mostly white. Common. Schilder records only fossil *M. moneta* from East Africa but this must be a slip.

Note :— There is supposed to be a rarer species similar to *M. moneta* — *M. icterina* (Lmk.). This is reputed to be more elongate, larger and supposed to have minute differences in the teeth. I cannot satisfactorily distinguish these species nor have I been able to understand the supposed differences mentioned in Schilder's statistical paper on the genus *Monetaria*.

Onyx Cowry

Erronea onyx (Linn.) subsp. *adusta* (Lmk.)

Description :—Shell ovoid about 4 cm. long, back dark chestnut sometimes with obscure bands across and an obscure line joining the ends, base and sides dark brown, teeth red-brown. Rare. Two specimens in the Coryndon Museum. Mombasa (Tudor).

Thick-Edged Cowry

Erronea caurica (Linn.)

Description :—Shell ovoid or elongate-ovoid, 2.5-3.5 cm. long, rather thickened at the edges, back pale bluish or white densely mottled with khaki freckles, usually but not always with two pale bands readily distinguishable. Sides flesh-tinted, with dark purple-brown spots, base tinted with flesh colour, the grooves between the strong teeth being darker. Very abundant.

Notes :— There are two races recorded *elongata* (Perry) and *dracaena* (Born) but I have not distinguished these satisfactorily amongst the several hundred specimens I have seen. This species has often been wrongly determined in East Africa as *Luria lurida* a totally dissimilar Mediterranean species. Who began this absurdity I can not imagine! It has also been confused with *Cribaria teres* — the dorsal patterns are a little similar but the teeth are entirely different.

False Three-Banded Cowry

Palmadusta clandestina (Linn.) subsp. *passerina* (Melv.)

Description :— Shell ovoid about 1.7 cm. long, pinkish or pale bluish, faintly banded, ornamented with faint yellowish-brown hairlines which form angles here and there (a lens is needed to see them at first until one knows just what to look for). Rare. I have seen only three local specimens.

Three-Banded Cowry

Palmadusta asellus (Linn.) subsp. *asellus*

Description :— Shell ovoid 1.3-2 cm. long, whitish with three distinct bands of chocolate-brown across the back. Schilder does not record this from our coasts but I have seen about seven specimens of it. Rather rare.

Pale Zigzag Cowry

Palmadusta ziczac (Linn.) subsp. *misella* (Perry)

Description :— Shell ovoid 1.8 cm. long, back whitish with transverse brownish bands and darker intermediate areas of yellow or fawn zigzag lines, base yellow. Rare. Mombasa (Dickie).

Dark Zigzag Cowry

Palmadusta diluculum (Reeve) subsp. *diluculum*

Description :— Shell ovoid 1.6-2.8 cm. long, back dull purple or chestnut with two marked and one less distinct transverse band of white zigzag marks, ends with purple-brown marks, sides with chestnut spots, base white. Frequent.

Cat Cowry

Palmadusta felina (Gmel.) subsp. *felina*

Description :— Ovoid, about 2 cm. long, back blue-grey with obscure yellowish bands and abundant small khaki freckles. Sides with blackish-purple spots, ends with similar spots on either side, base and teeth yellowish. Rather rare but Schilder states 'common'.

Note :— Similar to the Swallow Cowries but side spots much bigger.

Small-Toothed Cowry

Palmadusta fimbriata (Gmel.) subsp. *durbanensis* Schilder

Description :— Shell ovoid or ovoid-elongate, about 1.5 cm. long, back whitish or faintly blue tinged, with numerous pale brown freckles and a double brownish band across the middle. The ends have a conspicuous purple-brown spot on either side. Base white, teeth small. Rare. Likoni (Ryall); Mombasa.

Note :—Specimens of this have been wrongly called *P. microdon* (Gray) in collections in Nairobi. Schilder records the race *chrysalis* Kiener of *microdon* as a fossil from Mombasa. The specimens I have seen are undoubtedly *fimbriata* which Schilder does not record from north of Mozambique.

False Swallow Cowry

Blasicrura kieneri (Hidalgo) subsp. *kieneri*

Description :— Shell ovoid 1.2-2 cm. long, whitish or yellowish on the back with three blue-grey zones partly separated by narrow crooked pale zones. There are irregular blotches and tiny spots of dark purple-brown and chestnut on the sides and fine brown specks all over the back. There is often a dark interrupted band crossing halfway across the back, and two purple-brown blotches at either side of the ends. Base and teeth whitish. The columellar teeth (i.e. the teeth on that side of the mouth that continues into the shell) are longer at the top (particularly the top three) than they are at the bottom (text fig. 3). Common.

True Swallow Cowry

Blasicrura hirundo (Linn.) subsp. *francisca* Schilder

Description :— Very similar to the last species but sides thicker. Back lacking the dark interrupted band, teeth rather fine about 16-17 columellar teeth in shells 17 mm. long. The columellar teeth are longest in the middle and gradually become shorter towards the ends (fig. 3). I have seen no specimens from our coasts.

Note :— In the Coryndon Memorial Museum there is an unlocalised specimen which *may* have been collected on our coasts. It is *Blasicrura owenii* (Sow.). It is similar to *hirundo*, but more ovoid, with the sides more margined. The marginal spots are more numerous and the teeth are longer and coarser, there being about 12 columellar teeth in shells 17 mm. long. *B. owenii* is recorded by the Schilders from Mauritius, Madagascar and Natal. The specimen agrees best with the Mauritian race which may well extend northwards but until further material has been collected this record remains dubious. *B. owenii* is figured in the plates and *B. hirundo* may be identified from fig. 3.

Square-Spotted Cowry

Blasicrura stolidus (Linn.) subsp. *diauges* Melv.

Description :— Shell ovoid margined on one side, about 3 cm. long, ground colour of back grey-blue with minute brown specks and a large trapezoidal brown mark about 1 cm. long in the middle of the back; there are two vertical brownish streaks on the side which is margined, and on the other side two less distant stripes join with horizontal stripes which extend to the ends. The ends and margins are spotted or marked with orange-brown and the base although predominantly pallid is faintly tinged with the same colour. The only fresh specimen I have seen of this rare species is a superb shell collected at Sandy Bay, Ukunda by Mrs. Parsons. Kilifi (Lewis, very worn shell).

Long Cowry

Cribraria teres (Gmel.) subsp. *alveolus* Tapp.

Description :— Shell ovoid-elongate 2.3-2.7 cm. long, back white with

palest blue tinge with numerous yellow-brown markings which may be described as forming three diffuse transverse bands and five to six longitudinal bands, none of solid colour. Sides and base whitish, a few brown spots on the sides. Teeth rather fine. Rather rare. Shanzu (Finch). Diani Beach (Watkins) and several unlocalised specimens.

Note :— This species is a little like *E. caurica* but has totally different teeth.

Violet-Spotted Cowry

Cribraria chinensis (Gmel.) subsp. *violacea* (Rous.)

Description :— Shell ovoid about 3 cm. long, back tinged bluish marked with fine khaki pattern, margins flesh-coloured with conspicuous violet spots, base flesh, grooves between the strong teeth orange-salmon. Uncommon.

Note :—also called *C. cruenta*, a later name.

Spotted Cowry

Cribraria cribraria (Linn.) subsp. *comma* (Perry)

Description :— Shell ovoid 1.6-2.2 cm. long, back brown with numerous round white spots giving a conspicuous speckled appearance. There are traces of three bands. The margins and base are pure white. The animal is scarlet. Rather rare. Shanzu (Finch), Malindi (Tweedie).

Isabelline Cowry

Luria isabella (Linn.) subsp. *isabella*

Description :— Elongated shell, more or less cylindrical, up to 3 cm. long, back pale slate or dull brownish-purple with longitudinal interrupted lines of dots and dashes in dark brown, ends orange, base white. Teeth numerous. Common.

Tortoise Cowry

Callistocypraea testudinaria (Linn.) subsp. *ingens* Schilder

Description :— Shell large, elongate 10-11 cm. long, back brown with brownish spots and white indented pin-point-like spots, base flesh-coloured or brownish, teeth white. Rare. Zanzibar, Jardini (Dingle). There is a fine specimen from the Mozambique Channel (Laing) in the Coryndon Museum.

Pheasant Cowry

Talparia argus (Linn.) subsp. *contrastriata* (Perry)

Description :— Shell elongate cylindrical, 7-8 cm. long, back pale brown, three-banded, covered with numerous brown rings, base ornamented with two or four large dark brown spots, usually two on either side of the

Bérnaya teulérei Caz. There is a dubious record of this from Zanzibar and it is here omitted. *B. fultoni* (Sow.) might also occur.

brownish mouth. Rare. The only local specimen I have seen is one from Malindi collected in the lagoon within the outer reef (Shelley).

Mole Cowry

Talparia talpa (Linn.) subsp. *imperialis* Schilder

Description :— Shell elongate about 6 cm. long, ground colour pale yellow with four broad brown bands, base dark chocolate brown, grooves between teeth pale. Frequent.

Map Cowry

Mauritia mappa (Linn.) subsp. *alga* (Perry)

Description :— Shell ovoid, pear-shaped 6-7 cm. long, back brownish to violet-brown with rows of hieroglyphics and a wide white line joining the extremities. This line is peculiarly branched with blotches joined to it by stalks, along its length. Base and sides white or pink, teeth rich orange. The sides have numerous small conspicuous purplish spots extending over the base. Schilder states 'rather rare' but I have seen no local specimens. R. Wood has collected it at Mombasa (*in litt.*), The one figured is a specimen from the Philippines.

Jester Cowry (also known as Green-Spotted Cowry).

Mauritia scurra (Gmel.) subsp. *scurra*

Description :— Shell cylindrical, sides rounded, about 4.3 cm. long, back blue-green with olive-chestnut reticulation. A line connecting the ends is not reticulate but of the ground colour. Sides and base pinkish-brown or slate. Lateral spots blue-black, more on one side than the other, teeth chestnut. I have seen only one specimen — Kilifi, Aug. 1953 (Lewis). This was collected on the outer reef in deep water at low tide. Schilder does not record this species from our coasts but as it occurs in Mozambique its appearance here is not surprising.

Arabic Cowry

Mauritia arabica (Linn.) subsp. *immanis* Schilder

Description :— Shell ovoid with flat base, about 7.5 cm. long but variable, back yellowish with irregular chestnut lines interrupted by scattered spots, also a pale line joining the ends. Sides bluish-white or flesh-tinted with large purple-black spots. Base bluish or flesh-tinted, teeth chestnut. Fairly common.

Harlequin Cowry

Mauritia histrion (Gmel.)

Description :— Similar to *M. arabica* but smaller, 5.2-6.2 cm. long, back with a regular netted (reticulate) pattern enclosing white spots, base white. Common.

Flattened Harlequin Cowry

Mauritia depressa (Gray) subsp. *dispersa* Schilder

Description :— Similar to *M. histrio* but much more depressed and sides distinctly margined and expanded. Marginal spots blue-black and brownish, superimposed and running together. Back chestnut, reticulate, but the spots in the reticulation and the side spots are much smaller than in *M. histrio*. Base tinted, teeth finer than in *M. histrio*. Extremes of this species are distinct but I have seen intermediates. I have seen a specimen from Dar es Salaam (Dingle) which matches exactly material from the Seychelles. The species is not recorded from East Africa by Schilder.

Black Humped Cowry

Mauritia mauritiana (Linn.) subsp. *mauritiana*

Description :— Shell ovoid with flat base and angled margins, about 8.5 cm. long, back dull purple and yellowish with a superimposed reticulation of chocolate brown, so that the general effect is chocolate with numerous fairly large pale round spots. Margins and base dark purple-brown, teeth dark chocolate, grooves pale, teeth white inside at one end (fossula). Frequent.

Tiger Cowry

Cypraea tigris Linn. subsp. *tigris*

Description :— Shell ovoid, large, 6.5-10.5 cm. long, back whitish with blue or yellow tinge, densely spotted with dark purple-black spots which run into each other and also a longitudinal brown curved line joining the extremities, base white. This species is very variable and very many colour variations occur — some almost unspotted. It is such a well-known species that it will not present any difficulty in naming. The name is a misnomer since no stripes enter into the pattern. Common, often on sandy bottoms. (Schilder states only 'frequent')

Panther Cowry

Cypraea pantherina Solander subsp. *pantherina*

Description :— Similar to *C. tigris* in many respects but less ovoid with the ends more produced and the sides vertical and not rounded. This difference in shape is quite constant and very distinct once it is appreciated. Shell about 6-7 cm. long. The colouration of the back is very variable indeed — white with brownish-purple spots is the most frequent, the lowermost spots being orange-chestnut and not blue-black as in *C. tigris*. Some shells are very different in pattern and even uniformly deep chestnut with only traces of spots showing through. The columellar teeth are finer and more produced than in *C. tigris*. Dar es Salaam (Dingle, Mohinder Singh). This species is common in the Red Sea and readily obtainable there. It has not been recorded from the E. African coast and these records need confirming by the finding of living specimens. They may have been thrown overboard at Dar or mixed in some way with other specimens. Its mention here must not be taken as a new record for our coasts.

Lynx Cowry

Cypraea lynx Linn. subsp. *lynx*

Description :— Shell ovoid 3-4.8 cm. long, ground colour pale buff or yellowish sometimes with a purplish tinge, covered with a mixture of small and large more or less round dark brown spots, base white, edges usually with dark brown spots, grooves between the white teeth orange or orange-red. Abundant.

Fallow Deer Cowry

Cypraea vitellus Linn. subsp. *dama* (Perry)

Description :— Shell ovoid 2.5-4.5 (rarely 5 or even 6 in specimens from other parts of the world) cm. long, back milky-brown with two rather obscure pale bands, marked with numerous white spots of various sizes. On one side of the shell near the margin there are numerous close vertical brown lines which are distinctive but rather obscure. Base white or whitish. Frequent to rather common.

Flesh-Coloured Cowry

Cypraea carneola Linn. subsp. *sowerbyi* (Anton)

Description :— Shell very variable in size and shape, 2.5-6 cm. long, back flesh-coloured with 4-5 darker bands, base pale, teeth bright violet. Very common.

It is hoped that this paper will enable the public to name any cowry they may find on our coasts. It must be emphasised that if this paper is used for identifying cowries from other coasts mistakes are likely to be made. A good collection of Cowries is now housed in a separate cabinet in the Bird Room of the Coryndon Memorial Museum and is available to the public on request.

ADDENDUM

Mr. R. C. Wood has informed me that he has collected *Erosaria poraria* (Linn.) at Mombasa. This species is not recorded by the Schilders for E. Africa and has not been included in this paper. Mr. Wood's information came too late for the species to be properly included but the following data will allow it to be recognised. Using the key it would run down to couplet 14 and then to 15. It can be differentiated from the species that follow by a couplet to be inserted as follows.—

16* Base of shell and margins pale lilac, mouth whitish,
back buff-brown with numerous white spots ring-
ed with brown ... *Erosaria poraria*

16* If base lilac then shell not coloured as above ...

To the description included in the couplet above may be added —
shell about 1.7 cm. long margined on one side, with a few indented pits
along the margin.

INDEX TO SPECIES

When the cowry has been named from the plates or the key the following index will show on which page the fuller description may be found. Since many people prefer to lump all the cowries in the one genus *Cypraea* the index is arranged by specific names only.

annulus	137, Pl. 3 & 4	limacina	135, Pl. 1 & 2
arabica	141, Pl. 11 & 12	lynx	143, Pl. 13 & 14
argus	140, Pl. 9 & 10	mappa	141, Pl. 9 & 10
asellus	138, Pl. 1 & 2	marginalis	136, Pl. 1 & 2
caput-serpentis	135, Pl. 7 & 8	mauritiana	142, Pl. 11 & 12
carneola	143, Pl. 13 & 14	moneta	137, Pl. 3 & 4
caurica	137, Pl. 7 & 8	nebrites	136, Pl. 5 & 6
chinensis	140, Pl. 3 & 4	nucleus	135, Pl. 1 & 2
clandestina	138, Pl. 3, 4, & 17	onyx	137, Pl. 13 & 14
cribraria	140, Pl. 7 & 8	owenii	139, t.f.3, Pl. 5, 6 & 17
depressa	142, Pl. 11 & 12	pantherina	142, Pl. 13 & 14
diluculum	138, Pl. 5 & 6	poraria	143.
erosa	135, Pl. 7 & 8	scurra	141, Pl. 9 & 10
felina	138, Pl. 3 & 4	staphylaea	134, Pl. 1 & 2
fimbriata	138, Pl. 1 & 2	stolida	139, Pl. 5 & 6
gangranosa	135, Pl. 1 & 2	talpa	141, Pl. 9 & 10
globulus	134, t.f.4, Pl. 1 & 2	teres	139, Pl. 7 & 8
helvola	135, Pl. 5 & 6	testudinaria	140, Pl. 15 & 16
hirundo	139, t.f.3	tigris	142, Pl. 15 & 16
histrio	141, Pl. 11 & 12	turdus	136, Pl. 3 & 4
isabella	140, Pl. 5 & 6	vitellus	143, Pl. 13 & 14
kieneri	139, t.f.3. pl. 5,6 & 17	ziczac	138, Pl. 5, 6 & 17
lamarckii	136, Pl. 7 & 8		

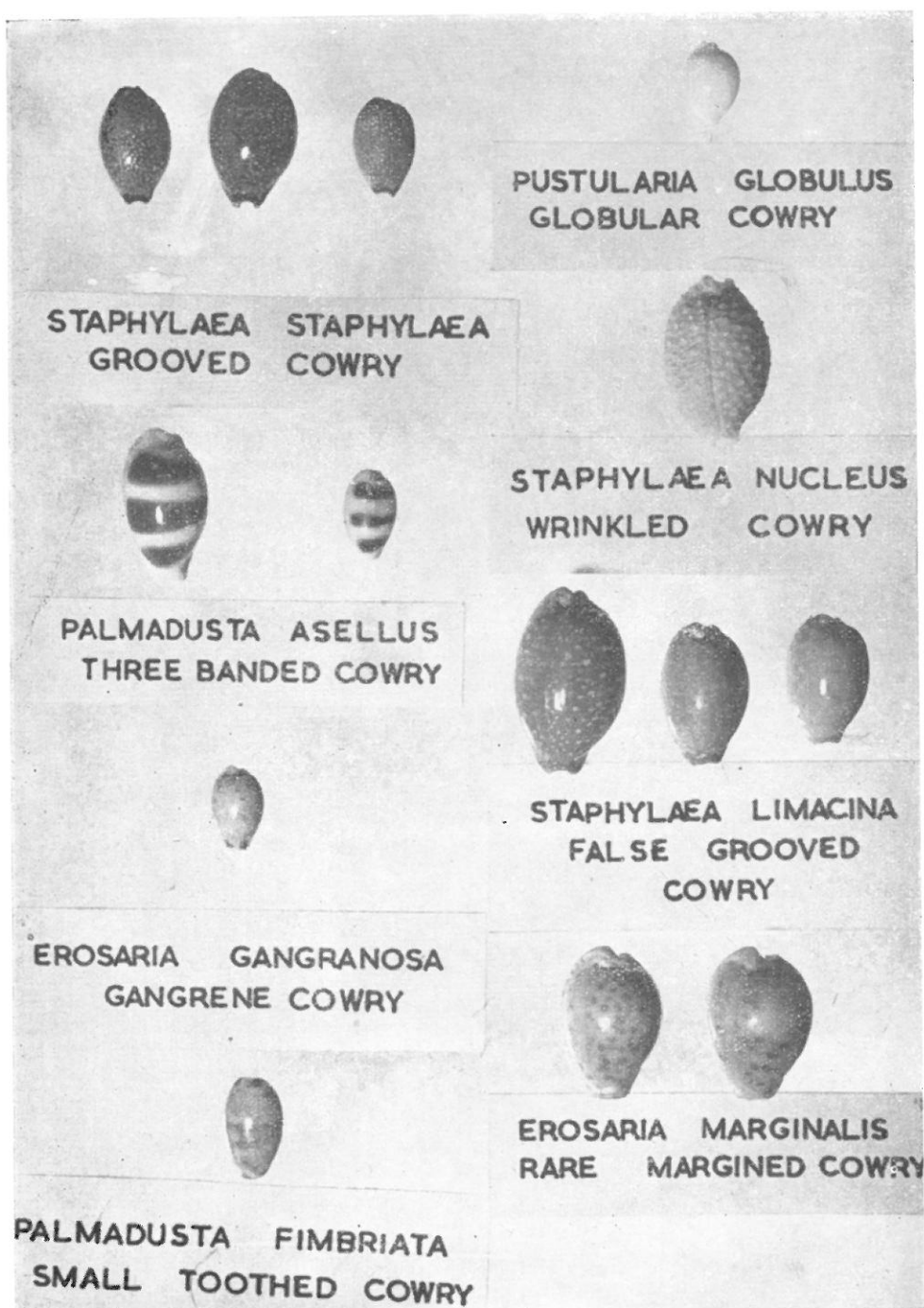


PLATE 1 "*East African Cowries (Natural Size)*"

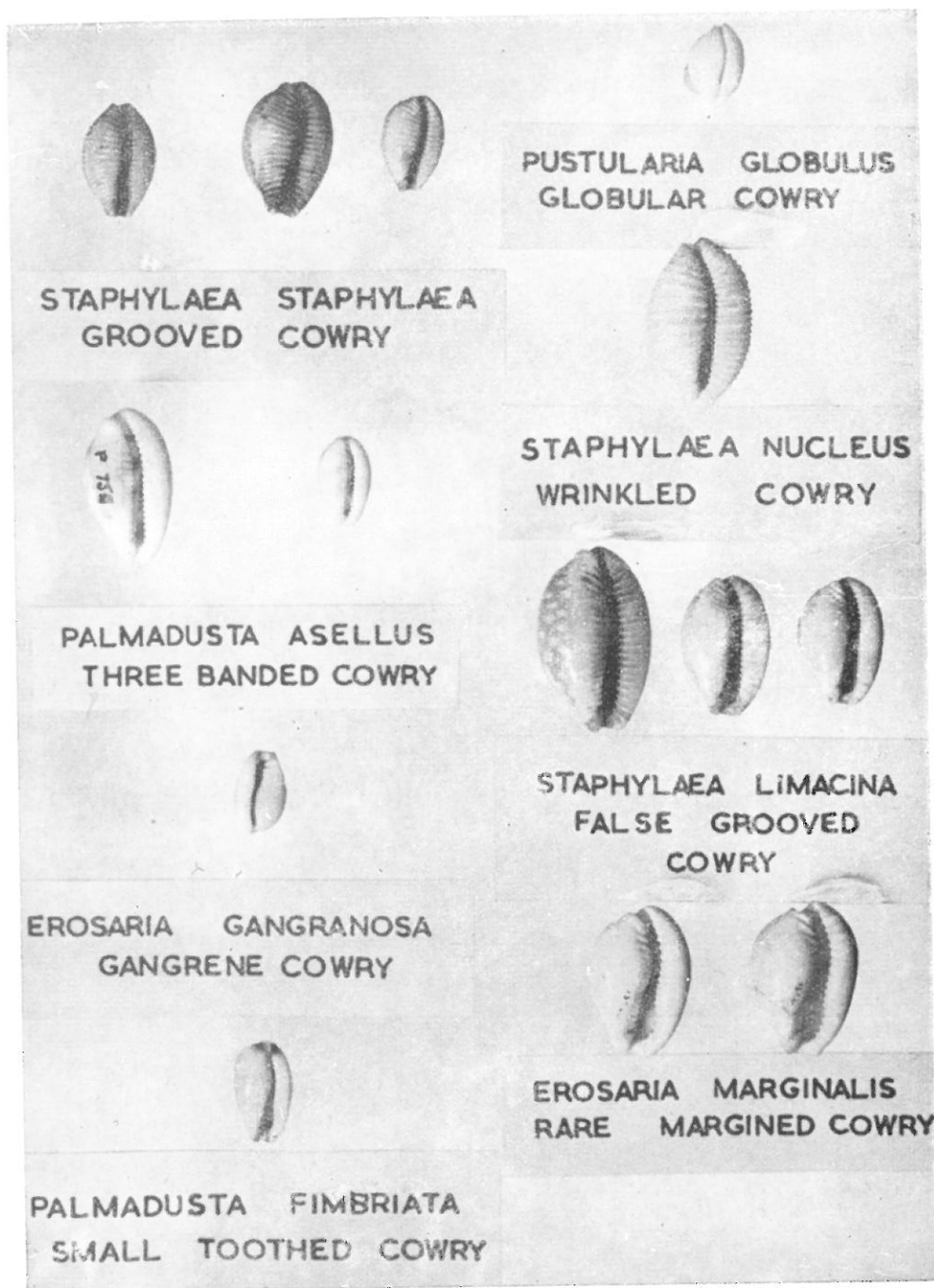


PLATE 2 "East African Cowries (Natural Size)"

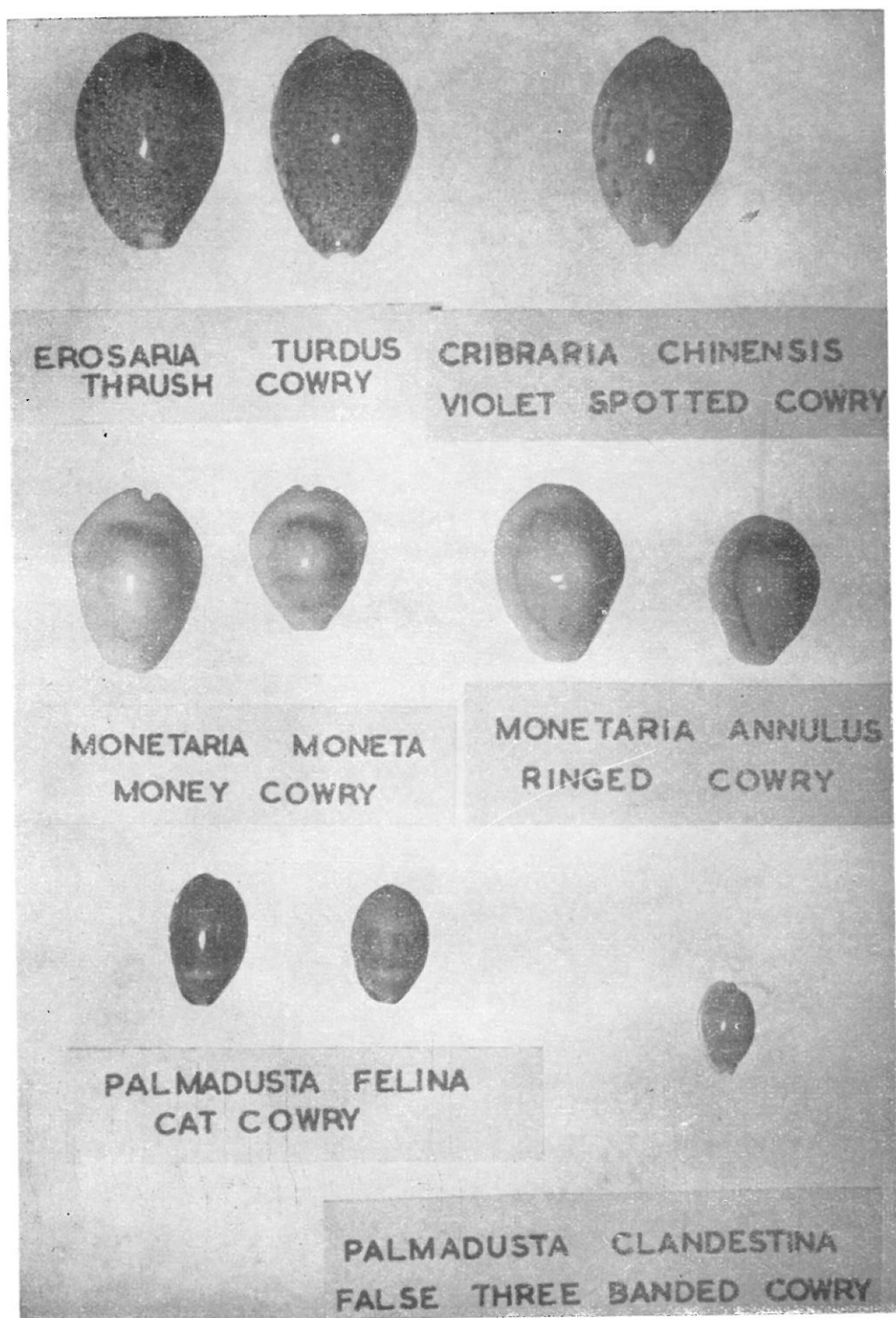


PLATE 3 "East African Cowries (Natural Size)"

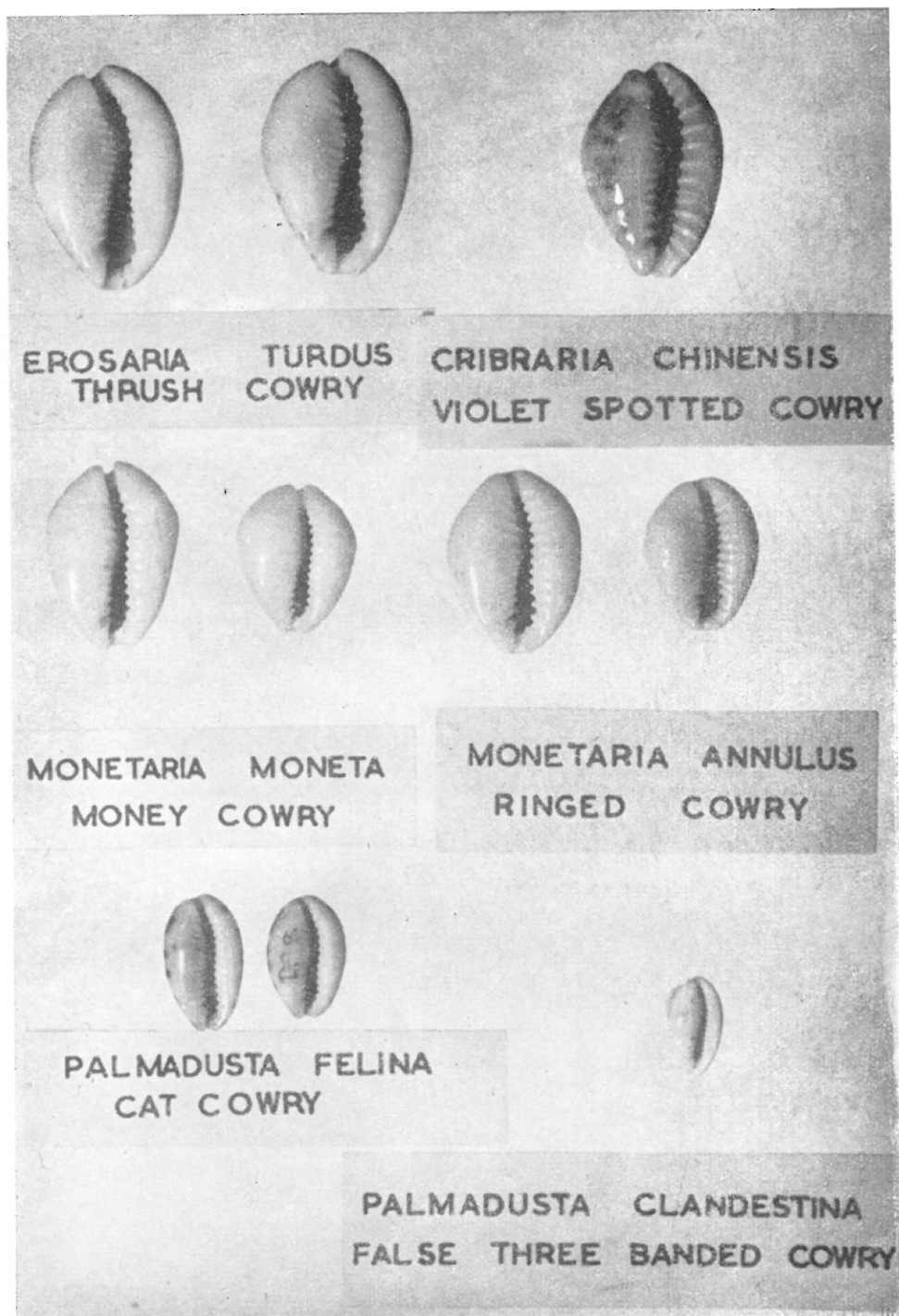


PLATE 4 "*East African Cowries (Natural Size)*"

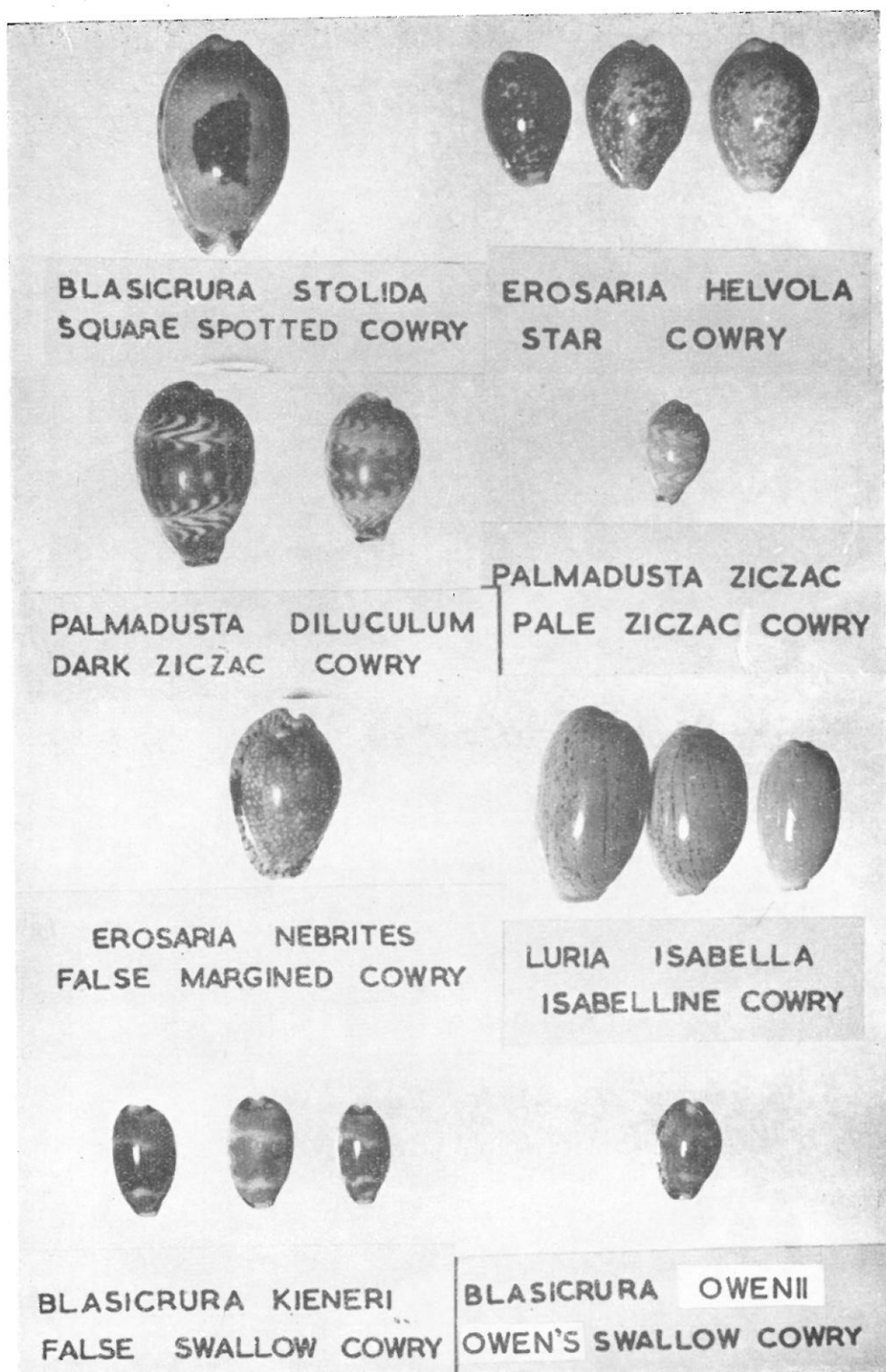


PLATE 5 "East African Cowries (Natural Size)"

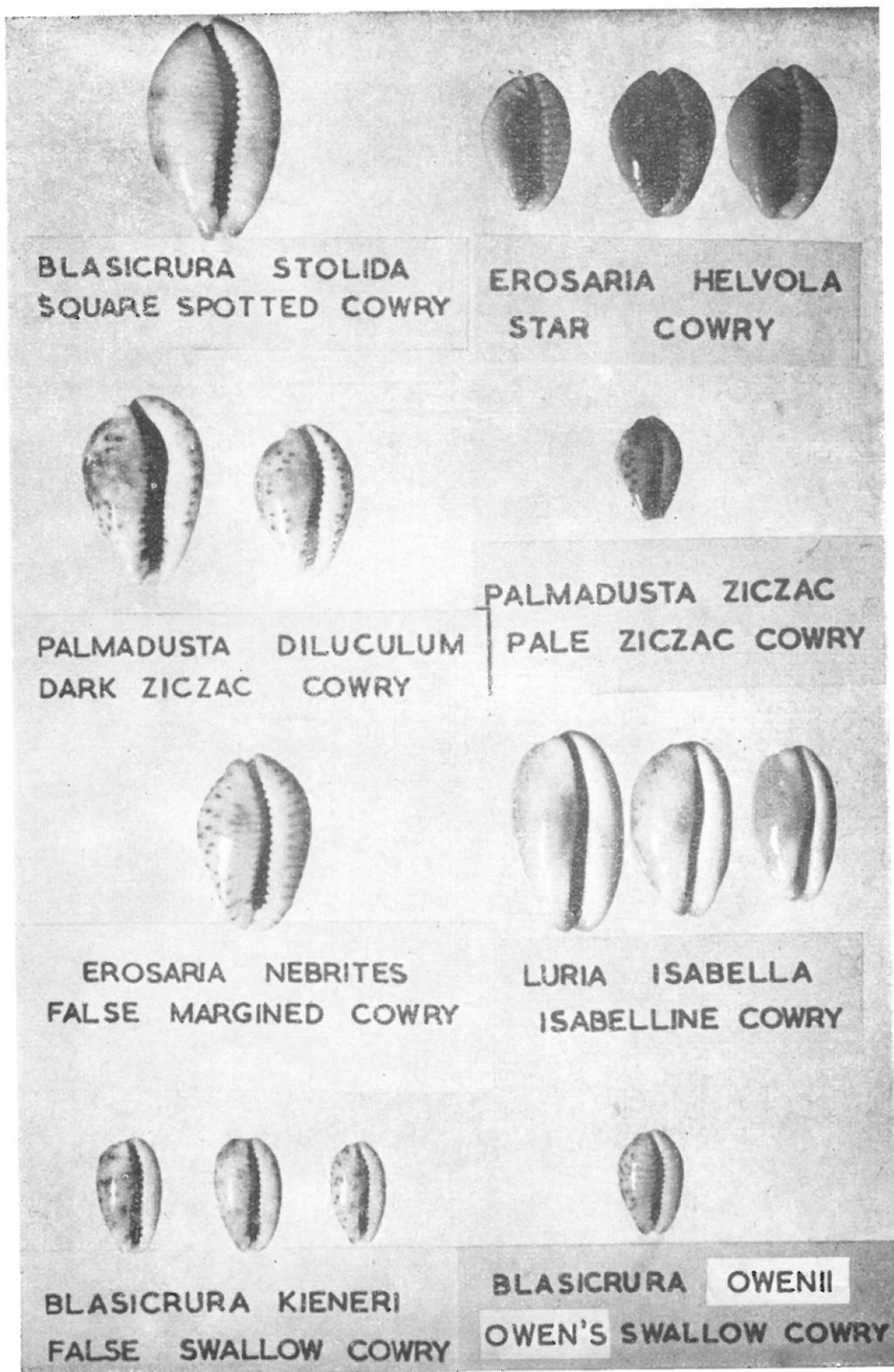


PLATE 6 "East African Cowries (Natural Size)"



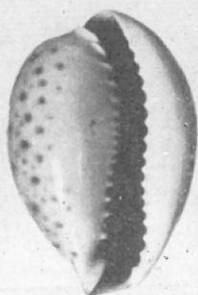
PLATE 7 "East African Cowries (Natural Size)"



CRIBRARIA CRIBRARIA
SPOTTED COWRY



ERRONEA CAURICA
THICK-EDGED COWRY



EROSARIA LAMARCKII
LAMARCK'S COWRY



CRIBRARIA TERES
LONG COWRY



EROSARIA EROSA
MARGINED COWRY



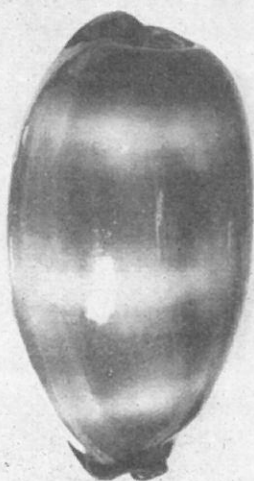
EROSARIA CAPUT-SERPENTIS
SNAKE'S HEAD COWRY



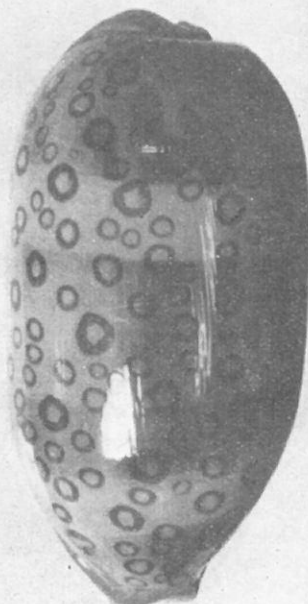
MAURITIA MAPPA
MAP COWRY



MAURITIA SCURRA
JESTER COWRY



TALPARIA TALPA
MOLE COWRY



TALPARIA ARGUS
PHEASANT COWRY

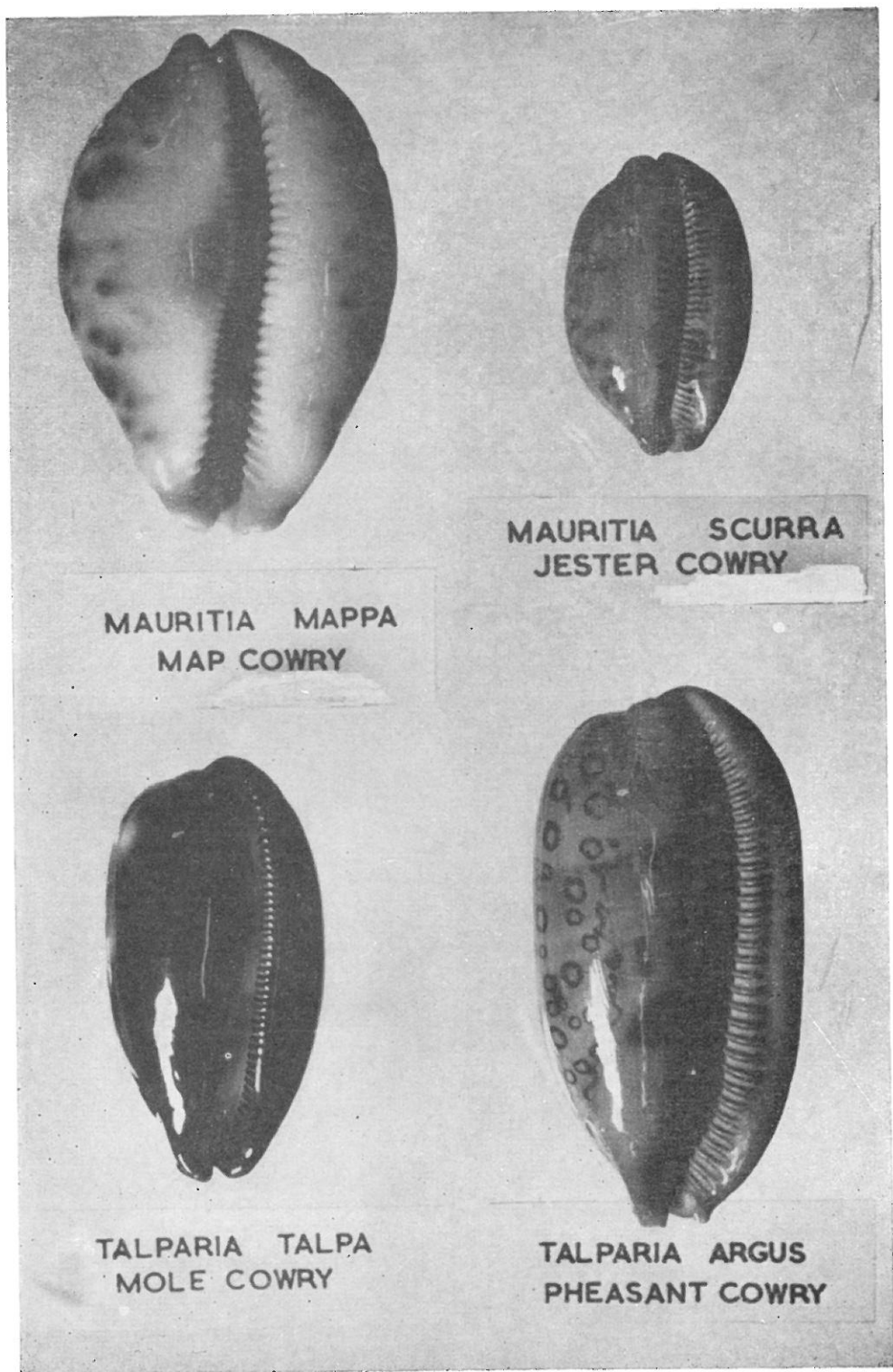
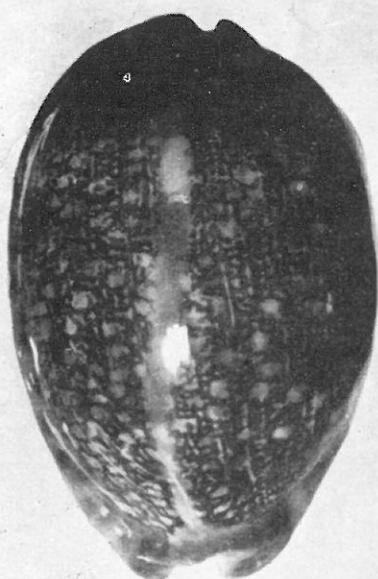
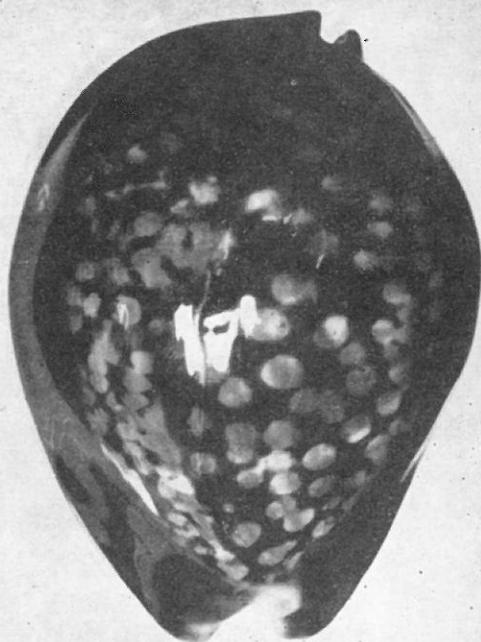


PLATE 10 "East African Cowries (Natural Size)"



MAURITIA ARABICA
ARABIC COWRY



MAURITIA MAURITIANA
BLACK HUMPED COWRY



MAURITIA HISTRIO
HARLEQUIN COWRY



MAURITIA DEPRESSA
FLATTENED HARLEQUIN COWRY

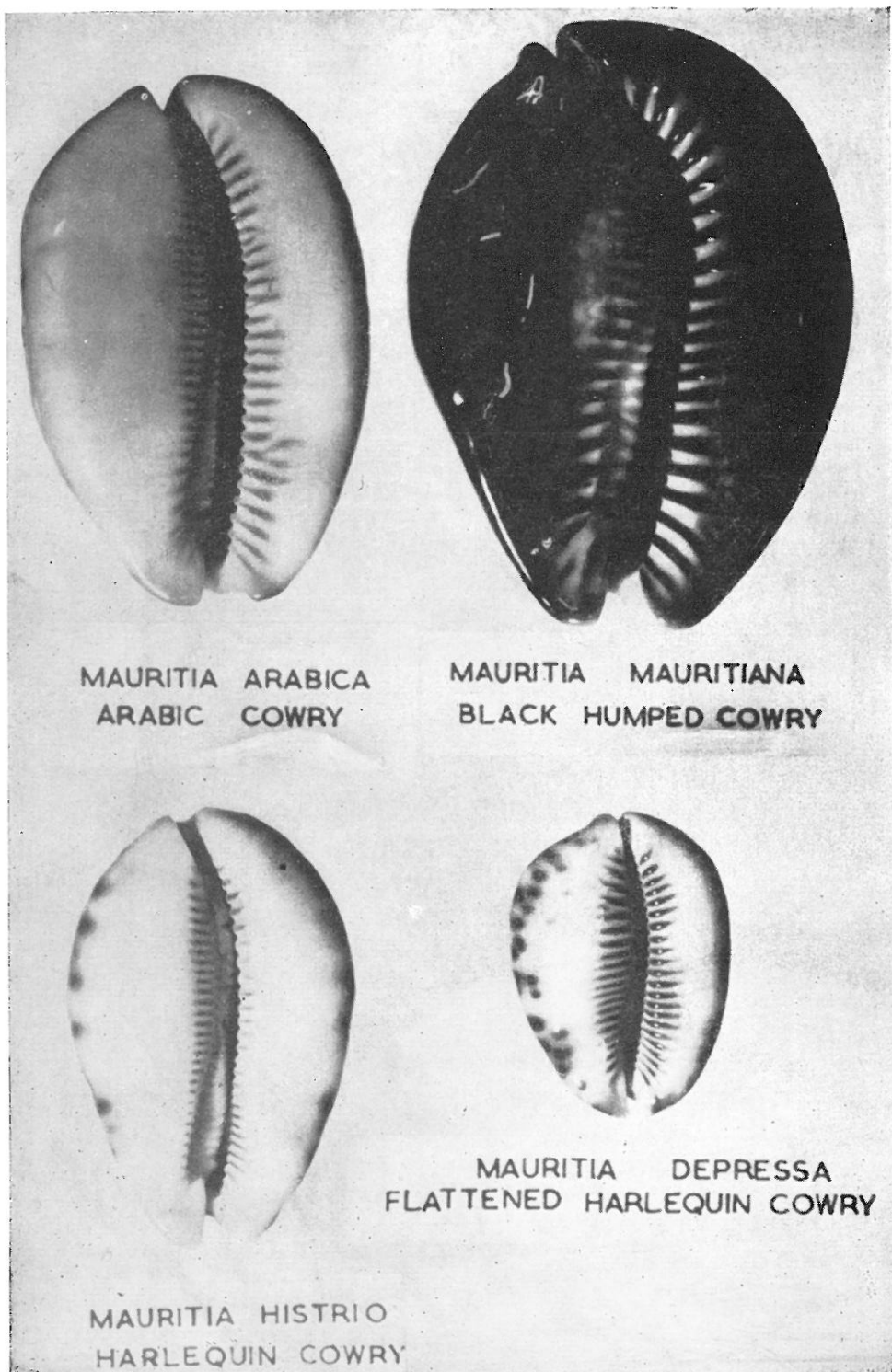


PLATE 12 "East African Cowries (Natural Size)"

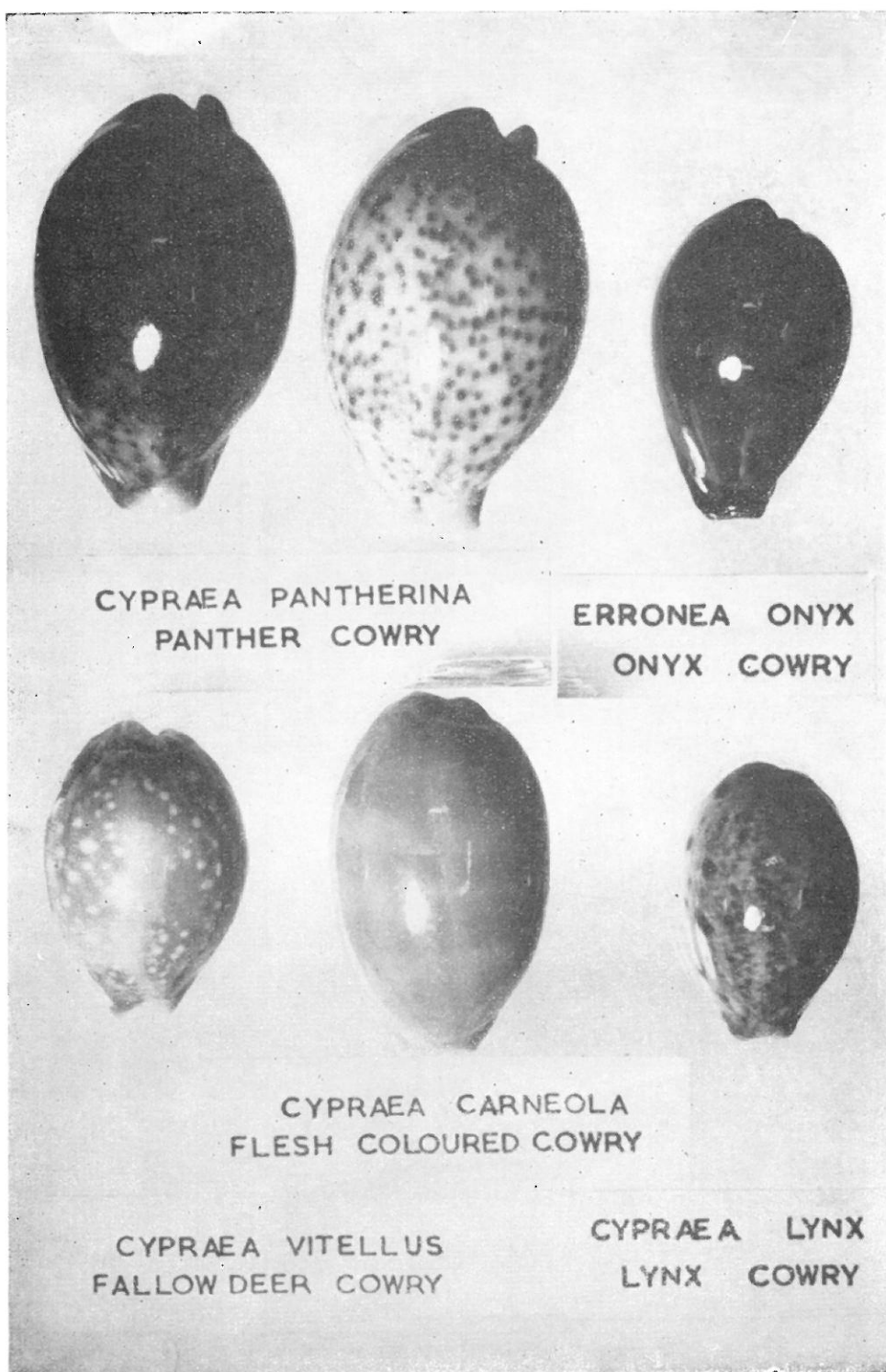


PLATE 13 "East African Cowries (Natural Size)"

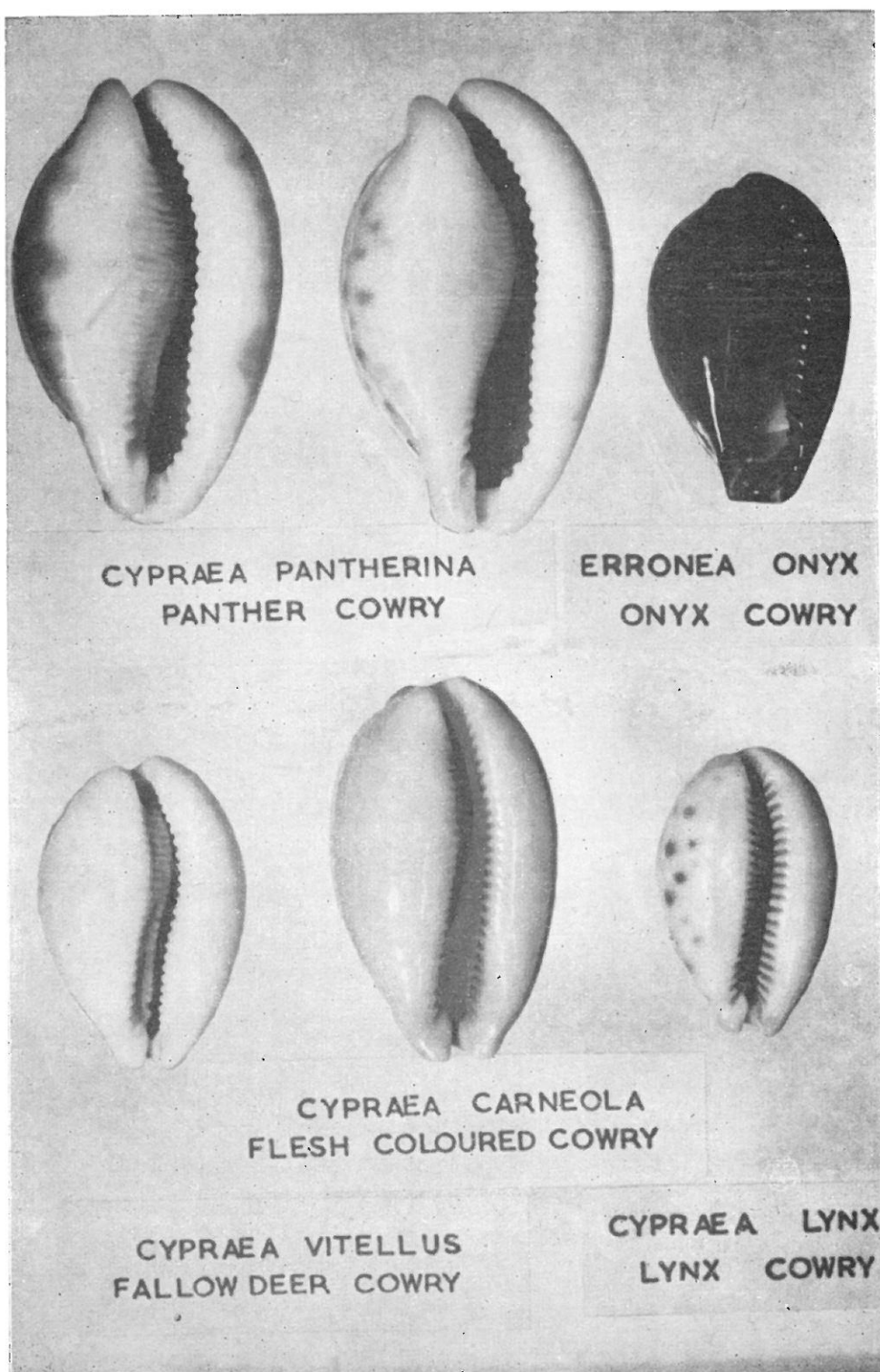
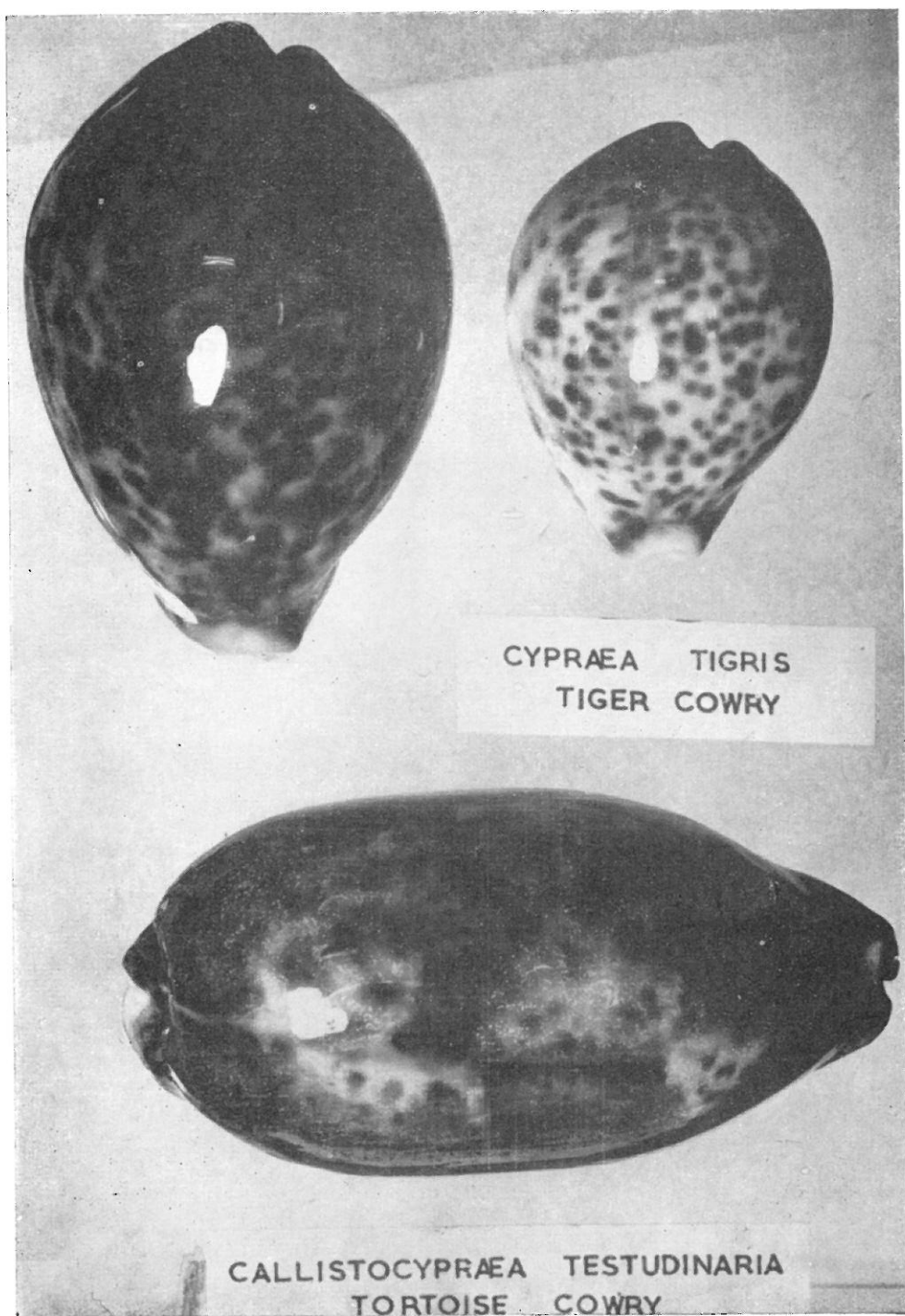


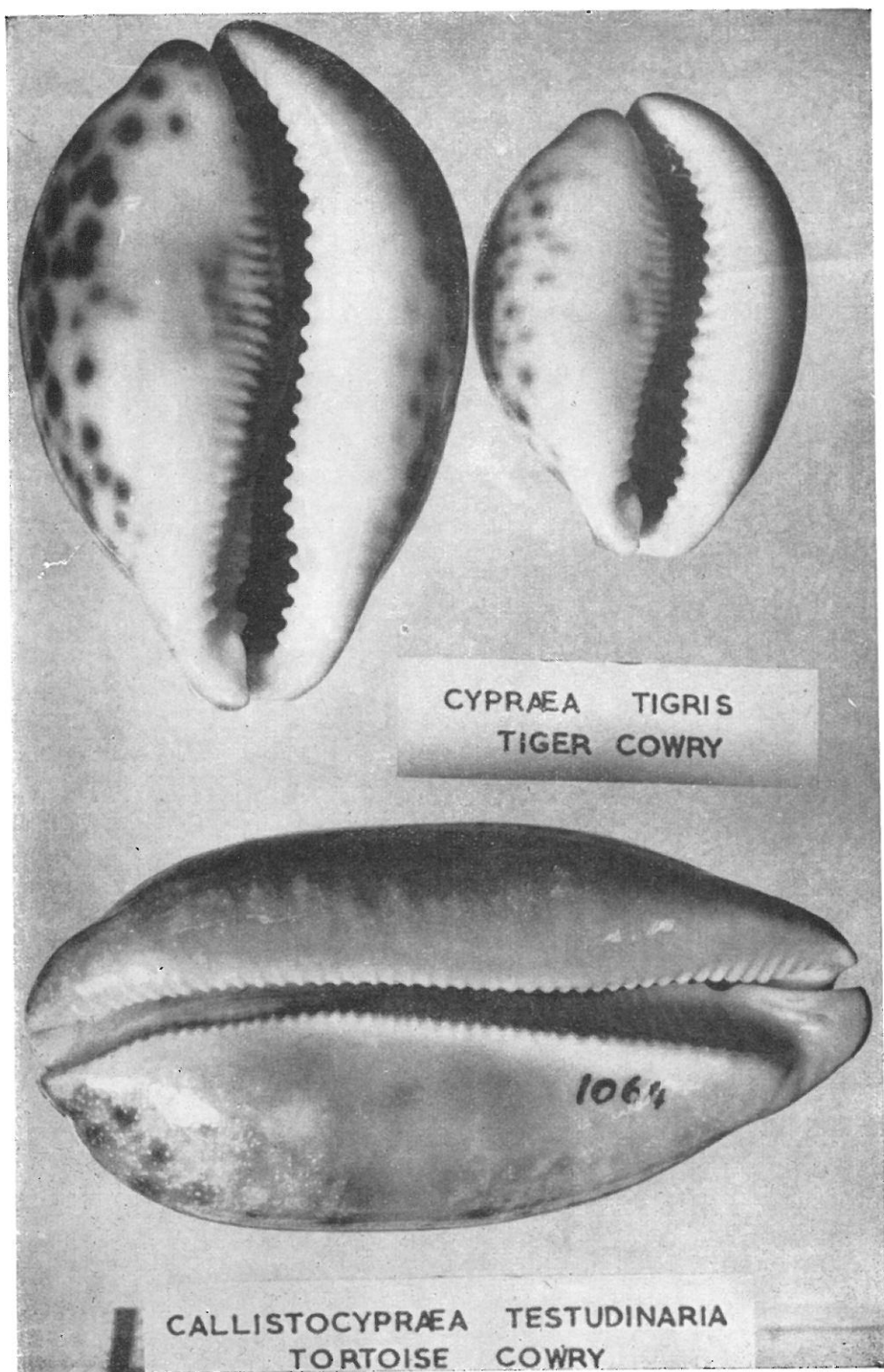
PLATE 14 "East African Cowries (Natural Size)"



CYPRAEA TIGRIS
TIGER COWRY

CALLISTOCYPRAEA TESTUDINARIA
TORTOISE COWRY

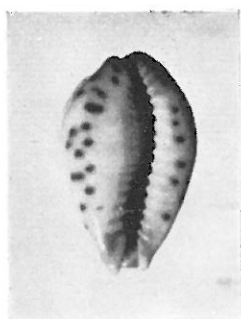
PLATE 15 "East African Cowries (Natural Size)"



CYPRAEA TIGRIS
TIGER COWRY

CALLISTOCYPRAEA TESTUDINARIA
TORTOISE COWRY

PLATE 16 "East African Cowries (Natural Size)"



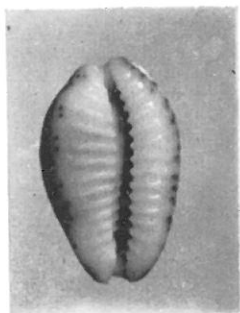
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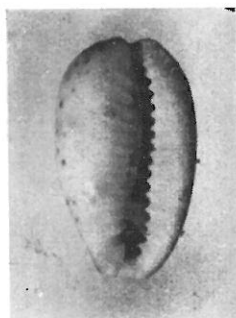
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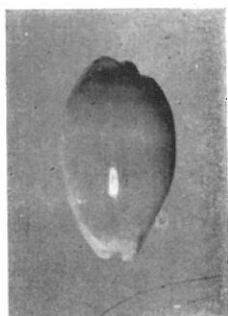
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d



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g

PLATE 17 "East African Cowries" (x 1.8)

a. *Palmadusta ziczac*, base.

d. *Blasicrura owenii*, base.

b. *Palmadusta ziczac*, back.

e. *Blasicrura kieneri*, base.

c. *Blasicrura owenii*, back.

f. *Palmadusta clandestina*, back.

g. *Palmadusta clandestina*, side.

