ANNALS OF THE Transvaal Museum.

MEDEDELINGEN VAN HET

VOL. BD. IV. OCTOBER, 1913. NO. DL. 2.

ON A COLLECTION OF BATRACHIA FROM MADAGASCAR MADE DURING THE YEAR 1911.

(*Plates IX and X, Text Figures 3 to 5, and Map.*)

By PAUL A. METHUEN, F.Z.S., and JOHN HEWITT, B.A. (Cantab.)

INTRODUCTION.

THE Batrachians recorded and described in this paper form the second part of the collection the first portion of which was recorded in this publication in 1912 (*vide* **10**). In the introduction in this paper we gave a brief account of the main regions of the island of Madagascar.

For lack of comparative material we have experienced considerable difficulty in determining some of the species represented in the collection, and in some cases we have even thought it advisable to leave the question of identification over until comparison with type specimens can be made. Thus for several species we do not claim that our identifications are final.

We wish here to express our thanks to the authorities of the University of Turin for having kindly sent us cotype specimens of *Mantidactylus alutus*, Per., and *Rhacophorus liber*, Per.

A large number of the specimens here recorded or described were collected by M. Herschell-Chauvin of Tamatave: his specimens are recorded from the localities Maroansetra, Folohy, Vokarakaro, and in some cases under "eastern region."

LIST OF THE BATRACHIA COLLECTED.*

Family RANIDAE.

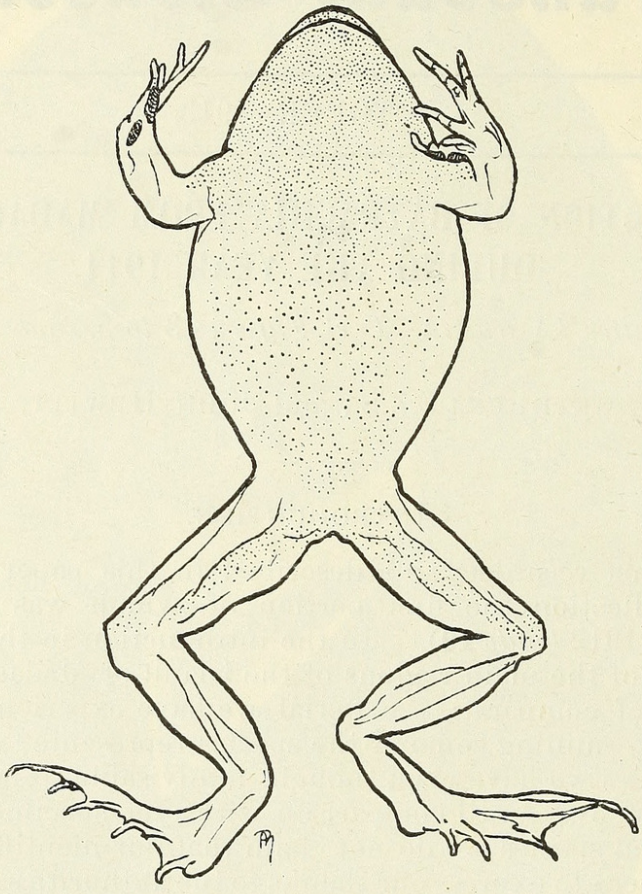
Genus RANA, L.

R. MASCARENIENSIS, D. and B. Thirty-four examples from various localities in the eastern region of Madagascar. As far as we can see these specimens are absolutely identical with those from South Africa. 889–923.

* After each species is given the Catalogue Number in the Transvaal Museum Collection.

R. LABROSA, Cope. Nine examples from Antolanbiby, near Betsioky, Province of Tuléar. All the specimens were obtained during the month of September below the surface near a small pond while excavating for subfossil remains of Lemuroids.

To the characters cited by Mocquard (**11**, p. 104) by which *R. labrosa* may be distinguished from *R. natalensis*, Smith, namely the presence of a round tubercle near the tibio-tarsal joint, and the nature of the dorsal cutaneous folds, we are able to add another character to be found in the males during the breeding season, a character which is not repeated in *R. natalensis*. Scattered all over the ventral surface in the male there



Text Fig. 3. Male *Rana labrosa*, Cope, showing asperities on ventral surface and on thumb.

are very small black spinous asperities which extend on to the thighs, arms, and upper side of the fingers: even on the dorsal surface these asperities occur sparingly; but it is on the thumb that these structures are most clearly seen, being developed as warts and spines set closely (text fig. 1). 930–938.

Genus MANTIDACTYLUS, Blgr.

Owing to the want of comparative material we have been forced to reject the idea of assigning a score or so of specimens to any known species after many ineffectual attempts to do so, although we have had access to the original descriptions of the species given by all the authors except that of F. Müller.* Moreover, after a careful study of the key given by Mocquard (**13**, pp. 55, 56), of the original descriptions especially those of Peracca, and of our own specimens, we believe that many of the species of *Mantidactylus*, as the genus is known at present, are separated by

* *Vide* Addenda (p. 60).

characters which are both ill-defined and elusive. In the case of species which are represented in our collection and of which we have no doubt as to their correct identification, there is exhibited a tendency to vary in some of the very characters to which Mocquard in his key has attached considerable importance (e.g. the webbing of the feet in *M. ulcerosus*, Bttgr.: the length of the hind limb in *M. biporus*, Blgr.).

M. MADAGASCARIENSIS, Dum. (= *Rana inguinalis* of Günther). Twenty-three examples, adults and juveniles, from various localities in the eastern region, including Analamazotra and Folohy.

In our series the markings on the back are distinct only in young specimens, which agree in this particular with the figure given by Boulenger (7, Pl. III, fig. 3). In most of our specimens the belly is quite smooth, but in some there is a suggestion of glandulation in the posterior part. The black inguinal spot as described for *Rana inguinalis* is invariably present in our specimens.

The colour of the posterior part of the thighs in life is orange streaked with black. The specimens taken at Analamazotra were found among the fallen leaves and débris of the forests.

Our largest specimen measures 53 mm. from snout to vent. 875–885, 948, 949, 951–956, 960, 962–964.

MANTIDACTYLUS LUTEUS, sp. nov. This species resembles superficially *M. madagascariensis*, especially in colour pattern, but is at once distinguished therefrom by the much shorter first finger.

Description.—Snout subacuminate : nostril nearer to end of snout than to the eye : *canthus rostralis* sharp, loreal region oblique and somewhat concave : breadth of interorbital space greater than that of upper lid: tympanum distinct, from half to two-thirds the diameter of the eye. Vomerine teeth in two short almost transverse or slightly oblique rows considerably behind the hinder level of the choanae. Fingers slender, the first very slightly less than equal to or slightly longer than the second, their tips dilated into moderate sized discs ; toes almost entirely webbed, their discs smaller than those of the fingers ; subarticular tubercles of digits well developed : inner metatarsal tubercle small or moderate in size ; no outer metatarsal tubercle. Tibio-tarsal joint of adpressed hind limb reaching well beyond the end of the snout.

Skin finely granular above, more strongly so on the upper lip : the upper surfaces of body and limbs with very fine dermal ridges, in places forming a reticulum, the ridges being beaded with minute granules : a strong inwardly curved fold, black margined externally, stretches from the upper eyelid on each side to a point about one-third of the distance from the eye to the vent : more laterally situated is a much weaker longitudinal fold extending from a point immediately adjacent to the posterior termination of the fold just mentioned and reaching almost to the base of the thigh on each side. The usual fold above the tympanum is present. A small dermal spur at the heel is present, but is sometimes inconspicuous: a similar dermal spur usually occurs at the angle of the mouth. Throat and breast smooth ; belly with glandular granulations : flanks with large glandular tubercles : inner surfaces of thighs granular, but not strongly so : males with a much elongated racemose gland on the under side of each thigh, the gland being minutely punctured all over.

Colour : upper surfaces dull magenta to brownish with various dark and light markings : a pale band, dark-bordered behind, extends between the anterior portions of the eyes : hind limb with dark cross bars : the neighbourhood of vent and hinder sides of thighs dark : the tibia inferiorly

with a black streak anteriorly and a somewhat broader one posteriorly, the latter continuous with a deep black band which runs along the inferior surface of the tarsus and over the soles and toes : a black streak under the forearm.

Length of largest specimen 46 mm. from snout to vent.

Nine examples, adults and juveniles, from Folohy (Herschell-Chauvin): type, a male, in the Transvaal Museum, No. 958. 886–888, 947, 950, 957–959, 961.

M. ULCEROSUS, Bttgr. (**2** and **6**). Eight examples, from the eastern region : localities Folohy, Ambilo, Ambatoharanana.

Our specimens combine the characters of *M. ulcerosus* with those of *M. betsileanus*, Blgr. (**7**, p. 460) especially in respect to the palmation of the toes which, though the webbing is usually to the extent of two-thirds to three-quarters, can in one specimen (No. 986) be described as half-webbed. Further, specimen No. 986 (a juvenile male) has the tympanum as large as the eye.

Though this series when examined in a purely mechanical way might be divided between *M. ulcerosus* and *M. betsileanus*, we believe that our specimens really belong to one species only.

We notice that a small outer metatarsal tubercle is present, and that the tibio-tarsal joint of the hind limb reaches the nostril. 985–992.

M. BIPORUS, Blgr. (**8**). Ten examples from Folohy. In young specimens of our series the tympanum may be only one-half the diameter of the eye, and the tibio-tarsal joint of the adpressed hind limb may reach between the eye and the nostril. 993–1002.

M. GUTTULATUS, Blgr. Nineteen examples from the eastern region : localities Ambohidratrimo, Analamazotra, and Folohy. This species was found in streams in the forests. Our largest specimen measures 105 mm. from snout to vent. 1003–1006, 1041–1055.

M. FLAVICRUS, Blgr.? (**8**). Two examples from the eastern region ; both are ill-preserved and have been assigned to this species with some doubt. 1007, 1008.

M. OPIPARIS, Per (**15**). Three examples ; locality Folohy. Two are juveniles, one indeed being without vomerine teeth. The specimen which we presume to be an adult (length 30·5 mm. from snout to vent) does not entirely agree with Peracca's description (p. 9), differing therefrom in the following respects. The feet are slightly more than half-webbed : the discs of the fingers are comparatively large (according to the original description they are moderate in size): the three longitudinal folds which are said to be present on the back are not developed in this specimen, although indications of the lateral fold can be recognized. The nostril in our three specimens is nearer the tip of the snout than the eye. And lastly the inner metatarsal tubercle is not prominent. 1009–1011.

M. ALBOFRENATUS, F. Müller ? (**14**). Five examples from Folohy and Ambilo. We note that the feebly webbed feet of this species separates it from any known species of this genus except *M. aerumnalis*, Per., which is said to have a much larger tympanum. 1012–1016.

M. GRANULATUS, Bttgr. (**4**). Five examples from Folohy. In two specimens the first finger is a trifle shorter than the second, and in these the disc of the first finger is smaller than that of the second. In both these specimens the tibio-tarsal joint of the adpressed hind limb reaches the end of the snout : the tympanum is fairly distinct and is about one-half

the diameter of the eye: the webbing of the feet is not more than two-thirds: the inner metatarsal tubercle in one specimen (No. 1022) is large, prominent, and almost shovel-shape. 1020–1024.

There are in this collection four other distinct species of this genus, which we are however unable to identify: thus there is a species which we have placed near *M. flavicrus* and *M. inaudax*, Per., and another near *M. lugubris*, A. Dum., and *M. ambreensis*, Mocq.: also a species we are unable to place at all, and another which is characterized by the feeble webbing of the toes and a somewhat glandular dorsal surface, but which is neither *M. aerumnalis* nor *M. albofrenatus*. These specimens would appear to be for the most part juvenile.

Genus RHACOPHORUS, Kuhl.

R. GOUDOTI, Tschudi. Three examples from Ambohidratrimo (forests of East Imerina). The two largest specimens measure 72 mm. from snout to vent. 1067–1069.

R. MADAGASCARIENSIS, Pet. A single specimen at Ambatoharanana. In life, colour above chestnut-brown, without the large irregular grey spots as given in the *Brit. Mus. Cat.* description (p. 91): tympanum about two-thirds the diameter of eye: vomerine teeth somewhat obliquely set on the palate: the nostril a trifle nearer the eye than the tip of the snout. Length from tip of snout to vent 63·5 mm. 965.

R. OPISTHODON, Blgr. Twenty-six specimens, mostly juvenile, from various parts of the island; localities: from the forests of the east, Ambilo, Brickaville, Tamatave, and a single specimen (No. 1095) from Ambatoharanana: from the south-west in the fringing forest along the Onilahy River, Tongobory, Andranolaho, and Maroamalona.

The *canthus rostralis* in what we presume to be the young of this species is not straight as described for the type, but is somewhat curved inwardly: the snout is also relatively shorter and the tympanum smaller. A single specimen (No. 1095), which measures 41 mm. from snout to vent, has been referred to this species with doubt; it differs from the rest of the series in having the tympanum scarcely more than half the size of the eye, and in that the skin on the back and on the upper part of the limbs is very finely reticulated and bears small scattered granules.

If the size of the tympanum is really of such importance as is attached thereto in Mocquard's key, immature specimens could not, we believe, be easily identified.

The largest specimen measures 83 mm. from snout to vent. 1070–1095.

R. MOCQUARDI, Blgr. (**9**). Four examples from Analamazotra and Ambatoharanana. The largest specimen measures 33 mm. from snout to vent.

In identifying these specimens we have attached considerable importance to the small size of the tympanum and to the large light spots on the flanks. We must add, however, that our specimens agree in the other characters given for this species. 1096–1099.

R. PULCHER, Blgr. (**7**, p. 467). A series of fifty-four examples mostly half and three-quarters grown; the largest specimen measures 33 mm. from snout to vent. This species is arboreal in habits.

The tympanum in this series is usually about half the diameter of the eye, but it may be not more than one-third. The tibio-tarsal joint of the adpressed hind limb reaches as far as the eye and in several specimens as

far as the tip of the snout. The vomerine teeth do not usually (if ever in adults) commence from the inner hinder edge of the choanae, being very distinctly and in some cases very widely separated therefrom. The colour and markings are given to much variation. The loreal region is not strictly vertical, being oblique and concave. The belly may be entirely smooth or it may bear glandular granulations: or, as in a few specimens, the whole of the ventral surface excepting the throat may be granular.

Localities: Ambatoharanana, Analamazotra, Ambilo, and Folohy. 1101–1154.

R. AGLAVEI, sp. nov. (Pl. IX). A single specimen, measuring 43 mm. from snout to vent, from the forests adjacent to Analamazotra.

Description.—Head depressed, snout rounded, head about as broad as long. Loreal region concave: *canthus rostralis* not sharply defined and curved inwardly: nostril on a raised prominence, nearer the tip of the snout than the eye. Interorbital space about as long as the distance which separates the nostril from the orbit. Tympanum distinct, its diameter slightly less than half that of the eye. Vomerine teeth in slightly curved groups of moderate size, the exposed portion of the vomers reaching very slightly in advance of the hinder level of the nares. Tongue of moderate size, with a pair of distinct pits of rather large size, which are distant from its anterior attachment about two-thirds of its total length.

Fingers, webbed at the base, the web extending as a light fringe all along the digits and developed as a slightly denticulated fringe on the outer digits: first finger considerably shorter than second: fourth finger extending further than the second.

Toes, between one-half and two-thirds webbed.

Tips of digits dilated into subtriangular discs, those of the fingers large and in breadth considerably greater than the diameter of the tympanum, except in the case of the disc of the first finger which is only slightly smaller than the tympanum.

A rather small inner metatarsal tubercle, elliptic, and slightly prominent; no outer metatarsal tubercle. Subarticular tubercles of digits very prominent, especially those of the fingers. The palms of the hands and the soles of the feet are closely granulated.

The tibio-tarsal joint of the adpressed hind limb reaches about as far as the nostril.

Skin: dorsal surface strongly and unevenly corrugated on the head, but somewhat smoother on the back and on the limbs: lower surface of body rather finely granulated throughout, that of femora rather more coarsely so.

A denticulated cutaneous fold borders the anterior limb from the outer finger as far as the elbow and the posterior limb from the outer toe to the ankle: four distinct cutaneous denticulations in a transverse line at the posterior end of the body just below the vent: an unbroken continuous fold on the flanks.

Colour: in life, mottled darker and lighter green, the general colour very effectively serving to conceal the animal amongst the lichen and moss which in this locality cover the bark of the forest trees: in its habits it resembles *Uroplates fimbriatus*, Schneid. which was also found in precisely the same locality. The present colour of this specimen, after having first been preserved in formalin and then transferred into spirit, is as follows: upper surface of head and body blue-black: limbs cross-barred, about four conspicuous transverse blotches on the thighs: hands and feet also cross-barred. Lower surfaces entirely pale, minutely speckled with dark brown.

According to Mocquard's key this species would appear to be related to *R. liber*, Per.; through the kindness of the authorities of the Turin Museum we have been able to examine a cotype specimen of this species, and we can say without hesitation that our own is quite distinct. We may say, further, that our species is different from any species of *Rhacophorus* known to us, as is evident from the presence of the distinctive cutaneous fold on the side of the body and on the limbs a character as far as we know which is not found in any other Malagasy member of the genus.

We have examined the diapophyses of the sacral vertebrae and the sternal apparatus, both of which we find to be typical for the genus.

Type, No. 1100, in the Transvaal Museum.

We have much pleasure in naming this species after M. Aglave, the Administrator of the Province of Andevoranto, in Madagascar.

Genus nov. MICROPHRYNE.

Diagnosis.—No vomerine teeth: digits with supernumerary phalanx: terminal phalanges bifurcated: outer metatarsals united: sternum and omosternum long and bony: pupil horizontal. Tongue rather small, bifid behind: basal attachment extensive, free for only a short distance behind.

Related to *Rhacophorus*, but separated therefrom by (1) the absence of vomerine teeth, (2) the united outer metatarsals, (3) the complete absence of webbing of the toes.

M. MALAGASIA, sp. nov. A single specimen from Folohy, collected by M. Herschell-Chauvin.

Description.—Head large, slightly depressed: about as broad as long: snout acutely rounded: *canthus rostralis* slightly incurved, but not sharply defined: nostril prominent nearer the tip of the snout than the eye. The loreal region oblique and concave. Eye moderately large. Interorbital space about equal to the distance between the nostril and the orbit. Tympanum small, scarcely half the diameter of the eye. Fingers entirely free, slender, dilated into discs, those of the first and second fingers of small size, those of the third and fourth of moderate size and of sub-triangular form. First finger distinctly shorter than the second: fourth extending further than the second. Subarticular tubercles prominent: the palms with a few small tubercles, and two large metacarpel tubercles near the wrist, and proximally to these a single smaller prominent tubercle; there is also a large elongated tubercle at the base of the first finger in a line with the two large metacarpel tubercles just described. Toes free, their tips only slightly dilated. A prominent elliptic inner metatarsal tubercle: a single small outer metatarsal tubercle, and in a line with this three distantly placed tubercles along the inferior surface of the tarsus, the first of the series being adjacent to this outer metatarsal tubercle.

Tibio-tarsal joint of adpressed hind limb reaches a little beyond the tip of the snout.

Skin: upper surface entirely covered with numerous warts of varying size and shape: in places, on the outer side of the forearm and thigh, at the angle of the mouth, and on the flanks, these tubercles have subspinose prominences. Below, belly and thighs granular: throat smooth.

Near the base of each thigh is a large glandular swelling, double on one side: since these swellings have apparently no pores, they may prove to be merely abnormal.

Colour in spirits: upper surfaces fuscous: whole of ventral surface pale: limbs obscurely cross-barred: hinder surface of the thighs and tibiae

with large white blotches. Lips crossed by two or three oblique dark bands on each side.

Length from snout to vent 20 mm.

We strongly suspect that this species belongs to the same genus as the frog described and figured by Böttger under the name of *Hemimantis horrida* (**2**, p. 282, and **6**, p. 492, Taf. III, fig. 14), and it is quite possible that the two are even specifically identical. According to Böttger's figure of the hand (*l.c.* Pl. III, fig. 14*c*) the second finger reaches further than the fourth, but in our species as already stated the second does not reach as far as the fourth; further the shape of the snout in the two species differs. If we are correct that *Hemimantis* (*Arthroleptis*) *horrida* belongs to the same genus as *Microphryne* it is of interest to note that the endemic Ranidae of Madagascar with one single exception (*Rana labrosa*) are all provided with supernumerary phalanges.*

Type, No. 1155, in the Transvaal Museum.

Genus RAPPIA, Gthr.

R. RUTENBERGI, Bttgr. (**6**, p. 510). Two examples, evidently juvenile, from the eastern region.

These specimens agree with Böttger's description (**6**, p. 510), but differ in the two following respects: the tympanum is more or less distinct, and the toes are about three-quarters webbed.

The larger specimen measures 16·5 mm. from snout to vent.

It is from consideration of the colour pattern mainly that we have referred our specimens to this species. 1156–1157.

Genus MEGALIXALUS, Gthr.

M. MADAGASCARIENSIS, D.B. Forty-three examples from the eastern region, and one from the plateau; localities include Ambilo, Folohy, Analamazotra, Ambatoharanana, Ambohidratrimo, and Tananarive.

In many of our specimens the snout is subacuminate rather than rounded, and in this respect some of the specimens would appear to agree better with *M. tricolor*, Bttgr. rather than with *M. madagascariensis*. Moreover the prevalence of bright yellow colouration would also appear to suggest the same conclusion (*vide* **13**, key to the genus, p. 65). We may point out, however, that no true conception of the original colour can be obtained by the examination of spirit specimens: thus though Mocquard (*l.c.*) describes for *M. madagascariensis* "Face dorsal finement ponctuée de noir sur fond grisâtre. Face ventral blanc sale," the colours of this species in life may be very different.

We have placed our specimens under *M. madagascariensis* for the reason that a small external metatarsal tubercle, said to be absent in *M. tricolor*, is present in our examples.

We note the following characters in our series. The tympanum may be hidden or distinct. The belly may be smooth or may have glandular granulations, or the belly and thighs may be distinctly granular. We find that this granulation of the belly and thighs is a very variable character (the granulation of these parts is often combined with the subacuminate

* We are not including *Rana mascareniensis*, as this species is very widely distributed in Africa and belongs to a group of the genus *Rana* which is characteristic of Africa; it has no allies in Madagascar, and is in all probability a comparatively recent immigrant to that island.

snout), and certainly cannot be used to distinguish *tricolor* from *madagascariensis*. The colour in our specimens has changed according to the preservatives used. Those preserved in formalin for some time and then changed to alcohol have now the colour as described for *madagascariensis* though in life they were as depicted in the sketch reproduced on Plate X. Some received lately had been preserved only in alcohol and still retain the colours as given for *tricolor*.

It seems to us well possible that these two species mentioned are not distinct.

A constant feature in the markings in our specimens is a broad black streak which passes from the tip of the snout to the eye, sometimes extending to the tympanum, and in one or two specimens continued as a broken line along the sides of the body in its anterior half. Many of our specimens have more or less distinct (in a few cases very distinct) granules at the angle of the mouth.

The webbing of the fingers in most of our examples might be described as one-quarter to one-half in extent, in which respect they would appear again to resemble *tricolor*. 1158–1201.

Family DENDROBATIDAE.

Genus MANTELLA, Blgr.

M. EBANAUI, Bttgr. (=*M. betsileo*, Grand. *fide* Mocquard, **13**, p. 66). Eleven examples from the eastern region. Our specimens agree exactly with the description and figures given by Böttger for this species (**6**, p. 519, Pl. V, fig. 20). 1202–1211, 1213.

In the collection there are also ten juvenile specimens of *Mantella* probably referable to this species. 1228–1237.

M. BARONI, Blgr. (Plate X). Twenty-eight examples from the eastern region : localities, Analamazotra, Ambohidratrimo, and Folohy.

In colouration our specimens agree precisely with the description given by Boulenger (**7a**, p. 106) : however, they differ therefrom in that the back is not strictly smooth, being in fact very finely chagrined. Except in the slight differences of colouration we are unable to recognize any difference between *M. cowani*, Blgr., and *M. baroni*, judging by the descriptions.

We note that the belly may be without any light spots, and that the black cross on the back in some is not clearly indicated. 966–984, 1220–1227, 1238.

M. AURIANTIACA, Mocq. Fourteen examples from Ambatoharanana.

In all our specimens with one exception there are granular glandulations behind the thighs ; in several there is a trace of a dorsal median fold or ridge on the back which starts on the head or between the shoulders and loses itself near the vent. The tibio-tarsal joint of the adpressed hind limb may (rarely) reach the eye. We note that the character of the nostril, being slightly nearer the tip of the snout than the eye, is constant in our specimens.

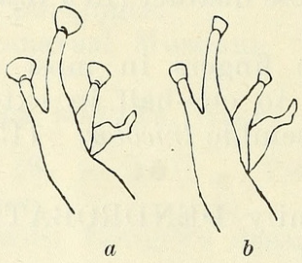
The orange-vermilion colouring in life of this species is soon lost after preservation. 1251–1264.

MANTELLA LAEVIGATA, sp. nov. (Text fig. 2). Seven examples from Folohy. The specimen now described as new we at first identified as *M. betsileo*, Grand., but as that species is placed by Mocquard as identical with *M. ebenaui*, Bttgr., of which we possess typical examples undoubtedly

distinct from those here described, we suppose that our specimens relate to a species hitherto unknown : further, judging from the description in the British Museum catalogue, *M. betsileo* differs from this new form in possessing " back minutely granulate " and in colour pattern (cf. especially the white line along the upper lip in *betsileo*) : moreover, the new species would seem to be quite distinct in the large size of the discs of the fingers.

Description.—Snout subacuminate, about as long as the diameter of the orbit : loreal region about vertical : *canthus rostralis* somewhat rounded : interorbital space broader than upper eyelid : tympanum more or less distinct, about two-fifths the diameter of the eye.

Fingers not as slender as in *ebenaui* : first not extending so far as the second. Toes moderate : tips of fingers and toes dilated into discs, those



Text Fig. 4.—Left hand from above of (*a*) *Mantella laevigata*, (*b*) *M. ebanaui*.

on the second, third, and fourth fingers comparatively large, greatest breadth of that on the third about equal to the diameter of the tympanum : discs on the toes of moderate size : subarticular tubercles of fingers and toes fairly prominent : both inner and outer metatarsal tubercles are present.

Hind limb carried forward along the body, the tibio-tarsal articulation reaches the eye.

Upper and lower surfaces of body and limbs entirely smooth, except the thighs which on the under surface have the appearance of being paved with large flattened granules.

Colour.—Upper surface of head and anterior half of the back shot with silver grey and olive, the sides and limbs blue-black, the two colours merging on the posterior half of the back : on the belly some light spots occur, and a few elongated light markings on the inner sides of the tibiae : throat and upper lip entirely black without any pale markings.

The largest specimen measures from snout to vent 25 mm.

Type, No. 1214, in the Transvaal Museum. 1212, 1214–1219.

Family ENGISTOMATIDAE.

Sub-Family ENGISTOMATINAE.

Genus CALOPHRYNUS, Tschudi.

C. CALCARATUS, Mocq. Seven examples from the south-west region ; localities, Antolanbiby (near Betsioky) and the Sakamena River between Betsioky and Ejeda.

Our specimens appear to be specifically identical with this species, but as they exhibit some characters which are not referred to by Mocquard in his description (**11**, p. 108), we have thought it best to give a full description drawn up from our examples.

Habit stout : size moderate : limbs short : snout short, blunt, almost truncated : tympanum hidden : a large rounded dermal swelling—sometimes indistinct—over the occiput : interorbital space about as wide as, or not as wide as, the upper eyelid is long. Nostril nearer the tip of the snout than the eye. A dermal fold from the eye to the shoulder.

Fingers free, toes webbed at the base : first finger shorter than the second, fourth the shortest : subarticular tubercles on fingers prominent, on toes less so but quite distinct : on palmar surface of hand three rather large flat rounded tubercles, the two outer partially united. The foot is longer than the head ; the inner metatarsal tubercle is large, prominent and shovel shape ; a large flat tubercle is present behind the heel : the inner toe has a very prominent subarticular tubercle, in form similar to but very much smaller than the large metatarsal tubercle.

The precoracoids, which according to Mocquard are stout in the genus *Calophrynus*, cannot be thus described for our specimens, in which these bones are comparatively slender.

The tongue which is entire behind is elongated and oval.

The skin above is smooth or verrucose; lower surfaces entirely smooth or slightly granular on belly and on underside of thighs.

The colour is variable; in living specimens a broad oblique band which may be white or pink passes from the eye to the base of the forelimb : upper surfaces darkish brown with lighter brown and whitish marblings : a dark chevron-shape band between the eyes passes on to the upper eyelids and on to the back. Lower surfaces whitish : throat marbled with brown. In one specimen the dominant colours above are dark brown, olive-green, and pink. The colour characters described for *C. brevis*, Blgr. remind us of those of our specimens : from this species, however, they are distinct in the greater length of the hands and feet.*

All these examples, save one, were taken together with *Rana labrosa* during digging operations (*vide* p. 2).

The largest specimen measures from snout to vent 34 mm. 939–945.

Genus SCAPHIOPHRYNE, Blgr.

S. MARMORATA, Blgr. Four examples from Ambatoharanana, found together on a tree under the bark, a few feet from the ground. The colour above in life is dark mottled green. The largest of our specimens measures 25 mm. from snout to vent. 926–929.

Sub-family DYSCOPHINAE.

Genus DYSCOPHUS, Grand.

D. ANTONGILII, Grand. Twelve examples from Maroansetra, on the east coast, taken in marshes. 1239–1250.

* On reading the account of specimens of this species from the north-west part of the island given by Andersson (1, p. 15) we have been led to conclude that a considerable amount of variation obtains for this species, though at the same time many of its peculiar characters are well enough defined. In the notes alluded to Andersson has described two folds, viz., "one to the shoulder and another to the groin, running along the sides of the body." We venture to suggest, however, that the second one of these folds may be due to contraction after death, since exactly the same phenomenon was noticed in our own specimens. In life these frogs have much the same habits and even appearance of our South African *Breviceps mossambicus*; they are very sluggish in their movements, and puff themselves up in such a way that they resemble more than anything else a very soft and pliable india-rubber ball. On preservation, however, the normal appearance in life disappears to a large extent.

Genus PLETHODONTOHYLA, Blgr.

P. NOTOSTICA, Gthr. Seven examples from Ambatoharanana. In some of these specimens the snout is rounded rather than pointed: in all the tympanum is distinct, its diameter being about equal to that of the eye: the feet are not absolutely free, there being a trace of the web at the base of the digits. 1265–1271.

Genus MANTIPUS, Pet.

M. HILDEBRANDTI, Pet. Two examples from the forests adjacent to Analamazotra. The terminal phalanges in these specimens are broadly Y-shape. 924–925.

Genus PLATYHYLA, Blgr.

P. GRANDIS, Blgr. A single example 60 mm. in length, from Ambatoharanana. Although this specimen does not agree precisely with the description of either of the two known species of this genus we have considered it best to look upon it as *P. grandis* and to note certain characters which it possesses.

In our example the skin is verrucose on the upper surface, especially between the eyes and on the snout, and is also tubercular on the flanks; the tympanum on one side is distinct, on the other side rather indistinct; the palatine teeth do not extend quite as far as the vertical of the inner corner of the choanae: however, the individual does not appear to be full-grown, and we think it probable that the teeth on the palatine bones do not show a full development. In other respects our specimen agrees with the description of *P. grandis* (**8**). 946.

Genus ANODONTOHYLA, F. Müller.

A. BOULENGERI, F. Müller. A single example, 17 mm. in length from snout to vent, from the eastern region, in the forests of Vokarakaro (district of Tamatave).

This specimen agrees with the account given by Mocquard (**13**, p. 74) except that the dorsal surface of the skin is tubercular and the ventral surface smooth save in the region of the posterior part of the belly and of the thighs where the skin is granular; further, the tympanum is distinct and the tongue rounded behind.

Though we are doubtful as to the correct identification of this single small individual, we are at any rate satisfied from an examination of its anatomy that it belongs to the Dyscophinae. 1272.

ADDENDA.

While this paper was in the press, we received a copy of F. Müller's publication (**14**) and are thereby able to add the following notes.

Mantidactylus albofrenatus, F. Müller.

Our five specimens undoubtedly belong to this species. In the two examples that appear to be adult (length of largest from snout to vent 27 mm.) the toes might be described as webbed at the base: the belly granulated or glandular: the throat and breast marbled with dark brown and dirty white; in one of these specimens there is a broad white vertebral line from the tip of the snout to the vent: in the other specimen the lips are barred with dark brown and dirty yellow: in neither specimen is there a distinct light streak below the eye and tympanum as described and figured for the type of this species.

Mantidactylus glandulosus, sp. nov. (text fig. 5).

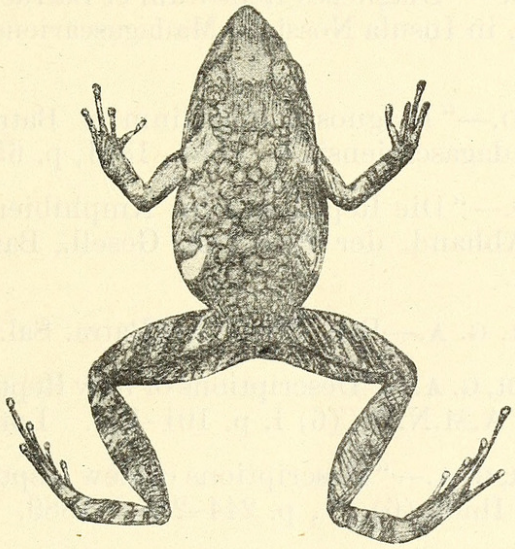
Three specimens from Folohy (Herschell-Chauvin) which we placed near *M. albofrenatus* and *M. aerumnalis* (*vide* p. 5). It would appear that this new species is closely related to

M. aerumnalis from which it differs essentially in the much smaller size of the tympanum and in the nature of the skin dorsally. It is also more distinctly related to Müller's species.

Description: head of moderate size: snout rather acutely rounded: *canthus rostralis* distinct, slightly curved outwards anteriorly: loreal region almost vertical, somewhat concave. Nostril situated just below the edge of the *canthus*, a little nearer the end of the snout than the eye; interorbital space about as broad as the upper eyelid is long. The tympanum, which is visible, is a half or a little more than a half the diameter of the orbit. Vomerine teeth in two groups between and behind the posterior level of the choanae. Tongue of moderate size, forked behind.

Fingers not particularly slender, their tips dilated into discs of small or of moderate size; first second and fourth fingers are subequal, but the second may be a trifle longer than the first, and the fourth a little longer than the second. The toes are about one-quarter webbed, their discs about the same size as those of the fingers. The subarticular tubercles are moderately prominent. There is a small but fairly prominent, somewhat elongated inner metatarsal tubercle: we cannot recognize an outer one.

The tibio-tarsal joint of the adpressed hind limb reaches as far as the anterior corner of the eye.



Text Fig. 5.—*Mantidactylus glandulosus*, sp. nov. Dorsal aspect.

The skin above and on the sides is remarkably glandular: between the eyes the skin is smooth, but the upper lip is granulate, and the glandulation of the back is carried on to the upper eyelid, the coggygeal region (which might better be described as granulate), and the upper and posterior parts of the thighs. The ventral surface is smooth. A fold from the eye over the tympanum to the shoulder is present.

Colour and markings of type specimen (in spirits); upper surface dark grey with dirty white spots: lips barred with these colours: a rather light region between the anterior portion of the eyes; a broad light part, extending on to and behind the forearm, is seen immediately behind the tympanum, above which it is continued as a light line to the eye. The posterior area of the flanks and the anterior portion of the thighs marbled or irregularly streaked with black and white. Limbs cross-barred. Below dirty yellowish grey: breast marbled with dirty white and dark brown: the thighs spotted with black.

In an other specimen (No. 1017) the skin above and below is considerably darker: there is also a light vertebral line starting from just behind the head and continued as far as the coggygeal region. In the third specimen, which is much smaller than the other two, a light vertebral line is also present: and there is besides a dark chevron-shape patch between the eyes. In this small specimen the glandulation on the back is indistinct.

Length from tip of snout to vent 23 mm.

Type, Cat. No. 1018, in the Transvaal Museum: cotypes 1017 and 1019.

Anodontohyla boulengeri, F. Müller.

Our single small specimen can with certainty be assigned to this species. The tympanum, however, is fairly distinct: and the tongue which we described as rounded has, we find on re-examination, the faintest trace of being broadly nicked behind. The tibio-tarsal joint of the adpressed hind limb reaches a point between the tympanum and the eye. The skin above has slightly raised ridges which are beaded with rather large to moderate size tubercles.—P. A. M.

LIST OF LITERATURE REFERRED TO.

(1) ANDERSSON, L. G.—"Reptiles and Batrachians from the North-West of Madagascar collected by V. Kaudern, 1906–1907." Archiv för Zoologi, Band 7, N:o 7, p. 1–15. Uppsala, 1910.

(2) BÖTTGER, O.—"Diagnoses Reptilium et Batrachiorum novorum a Carolo Ebanau in Insula Nossi-Bé Madagascariensis lectorum." Zool. Anz., 1880, p. 279–283. Leipzig.

(3) BÖTTGER, O.—"Diagnoses Reptilium et Batrachiorum novorum ab ill. Dr. Christ. Rutenberg in Insula Madagascar collectorum." Ibid., 1881, p. 46–48.

(4) BÖTTGER, O.—"Diagnoses Reptilium et Batrachiorum novorum ab ill. Antonio Stumph, in Insula Nossi-Bé Madagascariensi lectorum." Ibid., 1881, p. 358–361.

(5) BÖTTGER, O.—"Diagnoses Reptilium et Batrachiorum novorum Insulae Nossi-Bé Madagascariensis." Ibid., 1881, p. 650.

(6) BÖTTGER, O.—"Die Reptilien und Amphibien von Madagascar." Dritter Nachtrag: Abhand. der Senkenb. Gesell., Band XII, p. 435–558. Frankfurt aM., 1881.

(7) BOULENGER, G. A.—Brit. Mus. Cat. Batra. Sal. London, 1882.

(7a) BOULENGER, G. A.—"Descriptions of new Reptiles and Batrachians from Madagascar." A.M.N.H., (6) I, p. 101–107. London, 1888.

(8) BOULENGER, G. A.—"Descriptions of new Reptiles and Batrachians from Madagascar." Ibid., (6) IV, p. 244–248. 1889.

(9) BOULENGER, G. A.—"Descriptions of new Batrachians in the British Museum." Ibid., (6) XVII, p. 401–406. 1896.

(10) METHUEN, P. A., and HEWITT, J.—"On a Collection of Reptiles from Madagascar made during the year 1911." Ann. Transvaal Mus., vol. III, pt. 4. Pretoria, 1912.

(11) MOCQUARD, M. F.—"Sur les Reptiles recueillis à Madagascar de 1867 à 1885 par M. Grandidier." Bull. de la. Soc. Philom. de Paris. 8 ser., Tome VII, No. 3, p. 93–111. Paris, 1895.

(12) MOCQUARD, M. F.—"Sur une Collection de Reptiles recueillis à Madagascar par MM. Alluaud and Belly." Ibid., 8 ser., Tome VII, No. 3, p. 112–136. 1895.

(13) MOCQUARD, M. F.—"Synopsis des Familles, Genres et Especes des Reptiles écailleux et des Batrachiens de Madagascar." Nouv. Arch. du Museum, 5 ser., I, p. 1–110. Paris, 1909.

(14) MÜLLER, E.—"Siebenter Nachtrag zum Katalog der Herpetologischen Sammlung des Baslers Museums." Verhand. d. Naturf. Gesell., Tome X, p. 197–198.

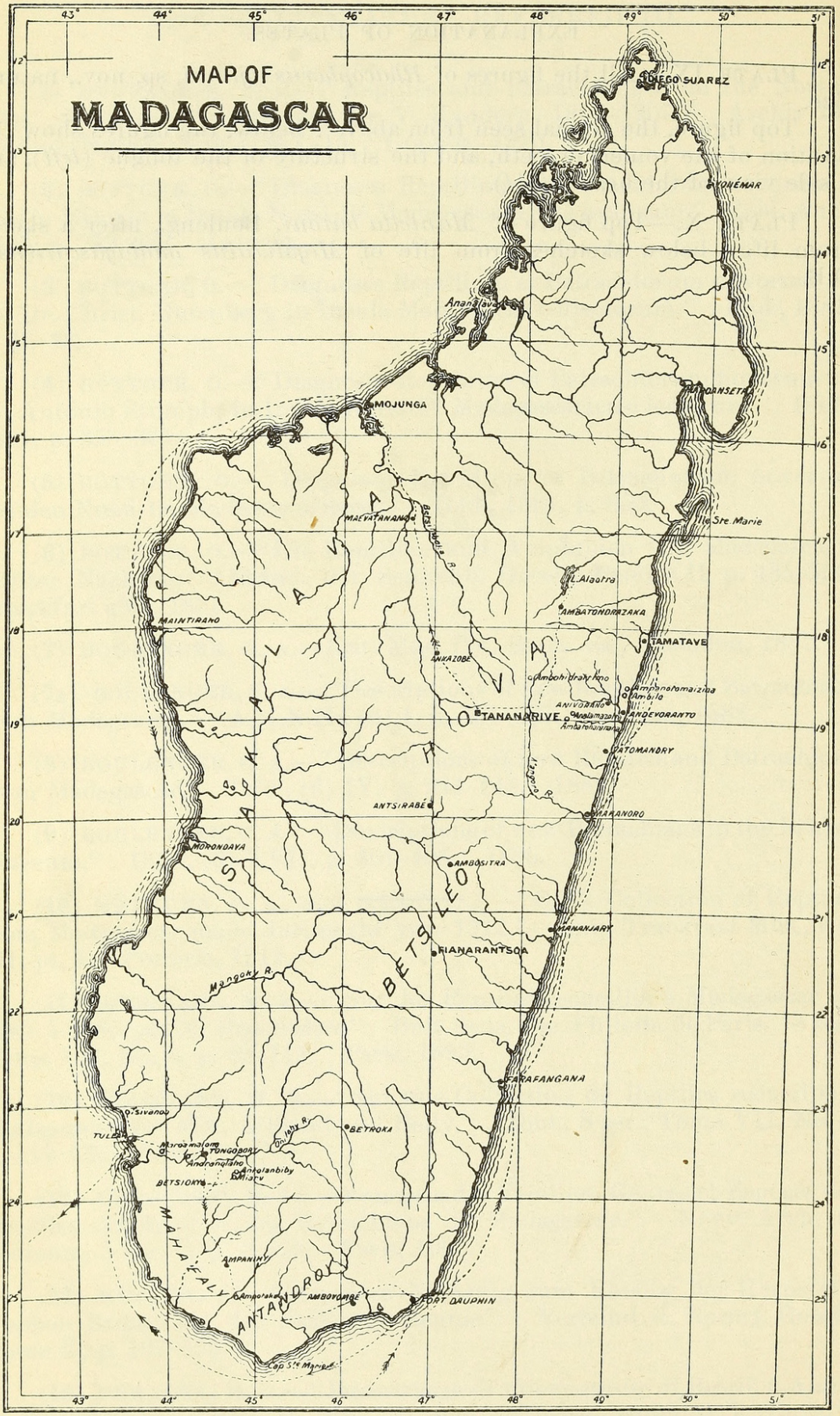
(15) PERACCA, M. G.—"Descrizione di nuove specie di Rettili e Anfibi di Madagascar." Boll. d. Mus. di Zool. ed Anat. comp. d. R. Univ. d. Torino, N. 156, pub. vol. VIII, p. 1–16, Turin, 1893.

EXPLANATION OF PLATES.

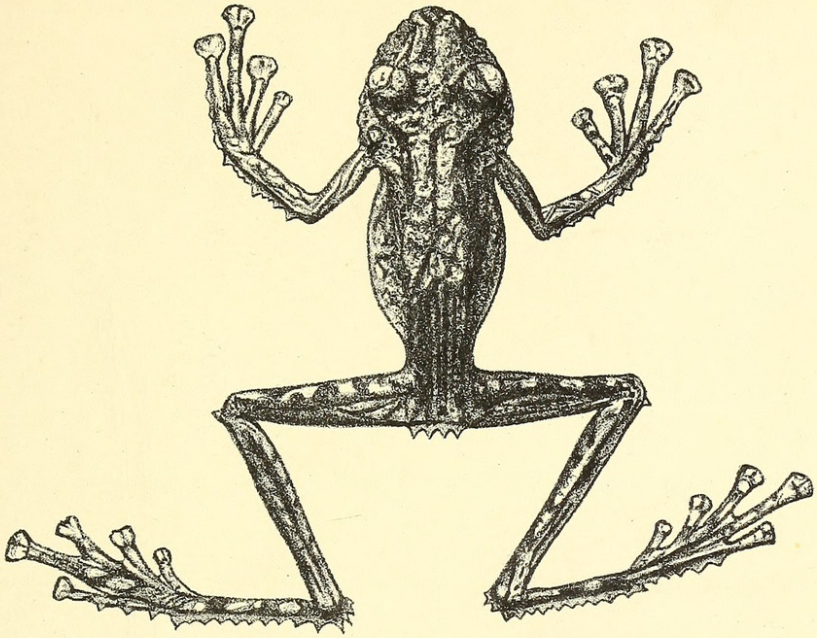
PLATE IX.—All the figures of *Rhacophorus aglavei*, sp. nov., natural size.

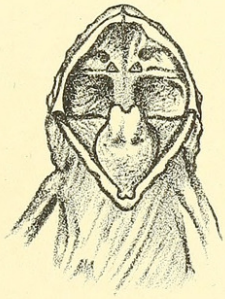
Top figure, the animal seen from above : below, the figures show the position of the vomerine teeth, and the structure of the tongue (*left*), and a side view of the head (*right*).

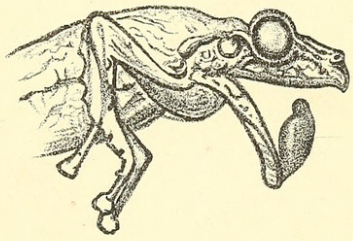
PLATE X.—Top figure of *Mantella baroni*, Bouleng., after a sketch from life; below sketches from life of *Megalixalus madagascariensis* D.B.



Map of Madagascar showing itinerary (dotted lines) and places mentioned in the text and in the preceding paper on Reptiles (**10**).

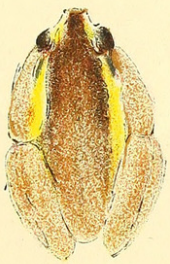






P. A. Methuen del. West, Newman lith.

RHACOPHORUS AGLAVEI, *n. sp.*



P. A. Methuen del.

Gov^t Printing Works Litho. Pretoria.

MANTELLA BARONI, *Blgr*: MAGALIXALUS MADAGASCARIENSIS D.B.

P.A.Methuen del. West,Newman chr.

MANTELLA BARONI, *Blgr*: MAGALIXALUS MADAGASCARIENSIS D.B.