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REVISION OF THE AFRICAN LIZARDS OF THE FAMILY GEKKONIDAE

BY ARTHUR LOVERIDGE

WITH SEVEN PLATES

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By Arthur Loveridge

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INTRODUCTION

The last general treatise dealing with all African geckos, was contained in volume one of the "Catalogue of Lizards in the British Museum (Boulenger, 1885). The present paper is an attempt to summarize all additional information published during the period 1885–1943 except for FitzSimons' important work: "The Lizards of South Africa," which, though published in 1943, did not reach me until 1944 as a result of war conditions. As this manuscript, with the exception of the Introduction, Indices, and Bibliography, was completed and typed in December, 1943, it scarcely seemed worth while to print the additional localities and other matter from FitzSimons' volume. In most instances we independently reached the same conclusions with regard to doubtful South African species. Where we differ, or for other good reason, FitzSimons' latest opinion is usually given in a footnote.

As most European publications for the war years 1940–1945 have not been received, some references to African geckos may have been omitted but every effort will be made to insert such references before this revision goes to press.

This revision, like its predecessors (1939–1944), is in no sense a compilation, but is based on an intensive examination of the material in the Museum of Comparative Zoölogy which possesses 27 of the 28 genera recognized, and 133 of the 204 species or races. In the List of Species (p. 7) an asterisk has been employed to indicate those

forms represented in the Museum's collection. Similarly an asterisk opposite a locality reveals at a glance from what places our material comes though failing to show the extent of the series.

Some idea of the increase in our understanding of African geckos since Boulenger's revision, may be gained from the fact that nearly four times as many forms are recognized today as were known sixty years ago. In those days apparently, the acquisition of knowledge for the purpose of appeasing mental hunger was considered adequate justification for the expenditure of time and energy involved. In this materially-minded and critical age one is not infrequently asked the *raison d'etre* for taxonomic studies, specifically: "What does it signify if there are 204 or 58 kinds of geckos in Africa? Why should civilized communities be called upon to support and staff museums, national or otherwise, for the purpose of settling these and kindred problems?"

Geckos, as predators, play a most useful role, not merely by destroying countless mosquitoes, sandflies, and termites, but also by attacking such unwelcome creatures as centipedes (*vide* p. 174). It is probable that we are only on the threshold of discovering the importance of geckos to mankind, hence the necessity for a proper understanding of the correct names and ranges of the many species.

The indigenous African is familiar with a limited variety of geckos, chiefly those dwelling on the walls of his hut or house. In general he regards them with dread, not only believing their bite is venomous but that they deliberately poison human food and drink; some geckos are alleged to cause leprosy by running over sleeping persons (*vide* p. 329 *et seq.*, etc.). That such ideas were accepted by Europeans as recently as 1788 is revealed by the title of a paper by Sparrman listed in the Bibliography. That such fantasies are now discarded and the natives can be assured their fears are groundless, is due solely to the sifting of evidence by inquisitive naturalists, coupled with the intensive studies of taxonomists.

Non-poisonous though geckos may be, certain thin-skinned house-haunting geckos are known to be the favorite food source of the pestilential sandflies (*Phlebotomus* spp.) some of which transmit disease-bearing organisms (*Leishmannia* spp.) to man. Where these investigations will lead, no one can say as yet, but when the investigators require to know the precise species of geckos involved, together with their distribution, it is to the taxonomist they will appeal for the necessary information.

In the course of this work it has been found necessary to propose four new names, viz.

Tropicolotes tripolitanus algericus subsp. nov.
Pachydactylus capensis rhodesianus subsp. nov.
Hemidactylus albopunctatus nom. nov. for *Teratolepis taylori* Parker
Pachydactylus laevigatus fitzsimonsi nom. nov.
for *P. l. tessellatus* FitzSimons preoccupied by *P. tessellatus* Werner

All generic and specific descriptions have been entirely rewritten on a standardized basis, and the species arranged as nearly as possible in their phylogenetic sequence as it appears to me. Consequently a number of geckos described as new species have had their status altered as follows:

Stenodactylus mauritanicus Guichenot becomes *S. sthenodactylus mauritanicus* Guichenot
Tropicolotes somalicus Parker becomes *T. tripolitanus somalicus* Parker
Tropicolotes occidentalis Parker becomes *T. tripolitanus occidentalis* Parker
Narudasia festiva Methuen & Hewitt becomes *Quedenfeltia festiva* (Methuen & Hewitt)
Hemidactylus chevalieri Angel becomes *H. bouvieri chevalieri* Angel
Hemidactylus boavistensis Boulenger becomes *H. bouvieri boavistensis* Boulenger
Hemidactylus ituriensis Schmidt becomes *H. fasciatus ituriensis* Schmidt
Hemidactylus fossatii Scortecci becomes *H. laticaudatus fossatii* Scortecci
Lygodactylus heeneni Witte becomes *L. angularis heeneni* Witte
Lygodactylus lawrencei Hewitt becomes *L. picturatus lawrencei* Hewitt
Lygodactylus depressus Schmidt becomes *L. picturatus depressus* Schmidt
Oedura halli Hewitt becomes *Afroedura karroica halli* (Hewitt)
Tarentola ephippiata O'Shaughnessy becomes *T. annularis ephippiata* O'Shaughnessy
Pachydactylus latirostris Hewitt becomes *P. mariquensis latirostris* Hewitt
Pachydactylus capensis werneri Hewitt becomes *P. weberi werneri* Hewitt

As a further consequence of these studies nearly fifty described forms or species appear to be unrecognizable. Some of these, and the reasons for thinking them synonyms, have been published in recent papers. A few others have been removed from the following list as FitzSimons (1943) had independently reached the same conclusions. The following, however, are believed to be referred to the synonymy for the first time.

Stenodactylus guttatus var. *hirouxii* Doumergue = *S. stenodactylus mauritanicus* Guichenot
Gymnodactylus moerens Chabanaud = *Quedenfeldtia trachyblepharus* (Boettger)
Pristurus migiurtinicus Scortecci = *Pristurus rupestris* Blanford
Pristurus c. laticephalus Scortecci = *P. crucifer* (Valenciennes)
Gonatodes dickersoni Schmidt = *Cnemaspis quattuorseriatus* (Sternfeld)
Hemidactylus hexaspis Cope = *H. frenatus* (Duméril & Bibron)

Hemidactylus fragilis Calabresi = *H. frenatus* (Duméril & Bibron)
Hemidactylus parkeri Loveridge = *H. puccionii* Calabresi
Hemidactylus stellatus Boulenger = *H. brookii angulatus* Hallowell
Hemidactylus bayonii Bocage = *H. brookii angulatus* Hallowell
Hemidactylus brookii var. *togoensis* Werner = *H. brookii angulatus* Hallowell
Hemidactylus zollii Scortecci = *H. flaviviridis* Rüppell
Hemidactylus sakalava Grandidier = *H. mabouia* (Moreau de Jonnés)
Hemidactylus benguellensis Bocage = *H. mabouia* (Moreau de Jonnés)
Hemidactylus mabouia var. *molleri* Bedriaga = ? *H. longicephalus* Bocage
Hemidactylus steindachneri Tornier = ? *H. longicephalus* Bocage
Lygodactylus bradfieldi Hewitt = *L. capensis* (A. Smith)
Phyllodactylus p. cronwrighti Hewitt = *P. p. porphyreus* (Daudin)
Oedura langi FitzSimons = *Afroedura p. pondolia* (Hewitt)
Oedura amatolica Hewitt = *Afroedura nivaria* (Boulenger)
Oedura karroica wilmoti Hewitt = *Afroedura k. karroica* (Hewitt)
Tarentola tuberculata Rosén = *Tarentola mauritanica mauritanica* (Linné)
Tarentola m. var. *angustimentalis* Steindachner = *Tarentola mauritanica mauritanica* (Linné)
Tarentola m. var. *facetana* Doumergue = *Tarentola mauritanica mauritanica* (Linné)
Tarentola m. sub var. *gracilis* Doumergue = *Tarentola mauritanica mauritanica* (Linné)
Tarentola m. sub var. *atlantica* Doumergue = *Tarentola mauritanica mauritanica* (Linné)
Tarentola m. var. *lissoide* Doumergue = *Tarentola mauritanica mauritanica* (Linné)
Tarentola m. var. *saharae* Doumergue = *T. m. deserti* Boulenger
Tarentola senegalensis Boulenger = *T. a. ephippiata* O'Shaughnessy
Tarentola a. var. *quadraticauda* Tornier = *T. a. annularis* (Geoffroy)
Tarentola gigantea (lapsus) Scherer = *T. delalandii gigas* (Bocage)
Tarentola d. var. *boettgeri* Steindachner = *T. d. delalandii* (D. & B.)
Tarentola d. var. *rudis* Boulenger = *T. d. delalandii* (D. & B.)
Pachydactylus capensis oculatus Hewitt = *P. maculatus* Gray
Pachydactylus maculatus albomarginatus Hewitt = *P. maculatus* Gray
Pachydactylus maculatus microlepis Hewitt = *P. maculatus* Gray
Pachydactylus mentalis Hewitt = *P. c. capensis* (A. Smith)
Pachydactylus montanus onscepensis Hewitt = *P. serval* Werner
Pachydactylus boulengeri Tornier = *P. tuberculosus* (Boulenger)

To settle these and other debatable points, it was often necessary to supplement the collections in the Museum of Comparative Zoölogy by borrowing material. For the loan of specimens, or for answering questions regarding them, I wish to avail myself of this opportunity to extend grateful thanks to my fellow curators F. Angel (Musée National d'Histoire Naturelle), C. M. Bogert (American Museum of

Natural History), D. M. Cochran (United States National Museum), E. R. Dunn (Academy of Natural Sciences of Philadelphia), V. F. FitzSimons (Transvaal Museum), H. T. Gaige (University of Michigan Museum of Zoology), R. Laurent (Musée Royal d'Histoire Naturelle), C. H. Pope (Chicago Natural History Museum), K. P. Schmidt (Chicago Natural History Museum).

I wish to thank Mr. Rodolfo Ruibal for testing the generic key with twenty-seven genera, also Major S. S. Flower for checking lists of untraced place names in Egypt and the Anglo-Egyptian Sudan; Major M. E. W. North for similar courtesies regarding those in Somalia (formerly Somalia Italia), and Dr. V. F. FitzSimons for help with South African localities not to be found in the invaluable gazeteer of his "Lizards of South Africa."

Locating place names has proved exceptionally troublesome, more especially in North Africa where early attempts at transcribing native pronunciations often produced results that can be found in no atlas. The matter was further complicated by English, French, or German renderings of the same name. Eventually I decided to adopt the spelling of the power ruling any given area, though even so a few exceptions may be found. To further insure uniformity I cut up a carbon copy of this paper, sorted all place names by countries, then after arranging them alphabetically pasted them on fresh sheets. This tedious but effective method was a great help in eliminating ambiguities. Where the accepted spelling differs from that of the collector, or collectors, the variants they employed are placed in parentheses after the preferred rendering.

Similarly the nearly 3000 abbreviated bibliographical citations were cut out and rearranged by author, date, and page. By this means when a figure had been transposed or a "3" typed as "8", the error was readily detected and corrected.

List of the Species Recognized

Family GEKKONIDAE

1825. *Geckotidae* Gray, Ann. Philos. (2), **10**, p. 198.
1871. *Gecconidae* Cope, Proc. Amer. Assoc. Adv. Sci., **19**, p. 236.
1883e. *Eublepharidae* Boulenger, Ann. Mag. Nat. Hist. (5), **12**, p. 308.
1884a. *Uroplatidae* Boulenger, Ann. Mag. Nat. Hist. (5), **14**, p. 119.
1884a. *Geckonidae* Boulenger, Ann. Mag. Nat. Hist. (5), **14**, p. 119.

For further synonymy see M. A. Smith (1935, p. 21). The following definition is adapted from Boulenger (1885d. Geckonidae + Eublepharidae + Uroplatidae), Camp (1923), and Smith (1935), who may be consulted for further details. The spelling GEKKONIDAE is based on that of the genus *Gekko*, Laurenti (1768, p. 43).

Habit more or less depressed; head not covered with symmetrical shields; eyes present, with vertical or round pupil, moving freely beneath a transparent membrane that is present in most species; eyelids vestigial or more or less well-developed and connivent; typpanum more or less distinct; dentition pleurodont, teeth numerous, small, hollow at base, with long cylindrical shafts; tongue moderately long and broad, villose, feebly nicked anteriorly, protrusable but non-

extensile; skin usually soft, that of the dorsum generally bearing granules or tubercles, more rarely imbricate, cycloid or hexagonal scales like those on the ventral surface; limbs well developed, pentadactyle or inner digit vestigial; digits very variable, clawed or clawless, the claws sometimes retractile; tail variable, cylindrical or depressed, or compressed and crested (as in certain male *Pristurus*), slender and tapering or thick and sometimes carrot-shaped, usually fragile, rarely prehensile.

Skull usually much depressed, bones thin, rarely coalescing with derm, osteoderms developed in supraorbital region of *Tarentola;* no bony postorbital or frontosquamosal arches; premaxillary single; nasals paired or single (in *Uroplates*); jugal vestigial; frontal single or with distinct suture; parietals paired or single; columella cranii present; pterygoids widely separated, toothless; mandible composed of five bones as angular and articular have coalesced; clavicle more or less dilated, or cylindrical (in *Uroplates*), frequently perforated proximally; interclavicle rhomboidal, cruciform, or reduced to a longitudinal bar (*Cnemaspis* and *Uroplates*); six cervical vertebrae; vertebrae with small condyles, amphicoelous with persistent intercentra or procoelous without intercentra; centra short, constricted medially, equal in width at ends; ribs long, frequently forming more or less ossified hoops around the abdominal region.

Mylohyoideus anterior usually in a single layer, only overlapped by constrictor colli in *Uroplates;* body muscles well-developed except in *Uroplates;* rectus abdominis normally extensive, limited in *Uroplates;* rectus superficialis rarely present except in *Uroplates*; hemipenes calyculate (Camp, 1923, pp. 297–298).

Remarks. Camp (1923, p. 296) places GEKKONIDAE in the section Gekkota of the division Ascalabota at the head of the suborder Sauria. However, he accords recognition to the Malagasy family UROPLATIDAE on the basis of their single nasal, simple clavicle, minute interclavicle, weak mylohyoideus muscle being largely overlapped by the constrictor colli, limited rectus abdominalis, and greatly reduced body musculature.

Mocquard (1909, p. 11) on the other hand, followed by M. A. Smith (1933, p. 16) regards *Uroplates* as a genus of GEKKONIDAE, the latter author pointing out that its interclavicle is no more reduced than in the African *Cnemaspis.*

The skulls of South African gekkonid genera are compared and discussed by Hewitt (1935, pp. 311–312) in relation to habitat. His paper should be consulted for details.

Brongersma (1934, pp. 161–167) has summarized our knowledge regarding the presence or absence of postanal sacs and ossicles in the family GEKKONIDAE. He discusses the various theories regarding their purpose, and lists nearly 140 species that he has examined. In addition to the African genera listed by Brongersma, I have examined ten others. Only in the genus *Ancylodactylus*, of which the male is unknown, is information lacking as to the presence of these postanal slits, but the close affinity of *Ancylodactylus* with *Cnemaspis* would suggest that they are present.

If so, then they are present in all African genera with the exception of *Saurodactylus*, *Quedenfeldtia*, *Pristurus*, *Lygodactylus*, and *Colopus*. Of these *Lygodactylus* alone is not a deserticolous, or at least an arid region, genus. It may have no significance as many desert-dwelling gekkonid genera possess postanal slits. In many gekkonid genera the sexes may be distinguished by preanal and or femoral pores being present in the males, absent in the females; unfortunately in some genera they are absent in both sexes.

With the exception of a couple of New Zealand genera (*Hoplodactylus; Naultinus*) that are reported to be ovoviviparous, all geckos are oviparous. The number of eggs laid by one gecko appears to be invariably two, though three have been reported for two African species by different observers. That the third egg was laid by a second gecko, interrupted during laying, seems more probable. That large numbers of female geckos of certain species resort to the same spot to lay is attested by the habits of *Lygodactylus conradti* of the Usambara Mountains.

My observations on the swimming abilities of *Cnemaspis a. africanus* in the same mountains, disprove Boulenger's (1885d) statement that no geckos enter water, for *Cnemaspis* will do so voluntarily when pursued.

Apart from the hissing of monitors, chameleons, etc., geckos are the only lizards that habitually utter sounds. These are presumably produced by sudden removal of the fleshy tongue from contact with the palate, resulting in a clucking or chirruping cry. The cries of various species have been rendered as gek-ko check-ko, chick-chick, tock-too, and tok.

Habits, however, are given under the particular species for which they were recorded. Not unnaturally the most complete observations have been made on various house geckos like *Hemidactylus flaviviridis*, *H. mabouia*, and *Ptyodactylus h. hasselquisti*, but interesting accounts of many other species will be found in the following pages.

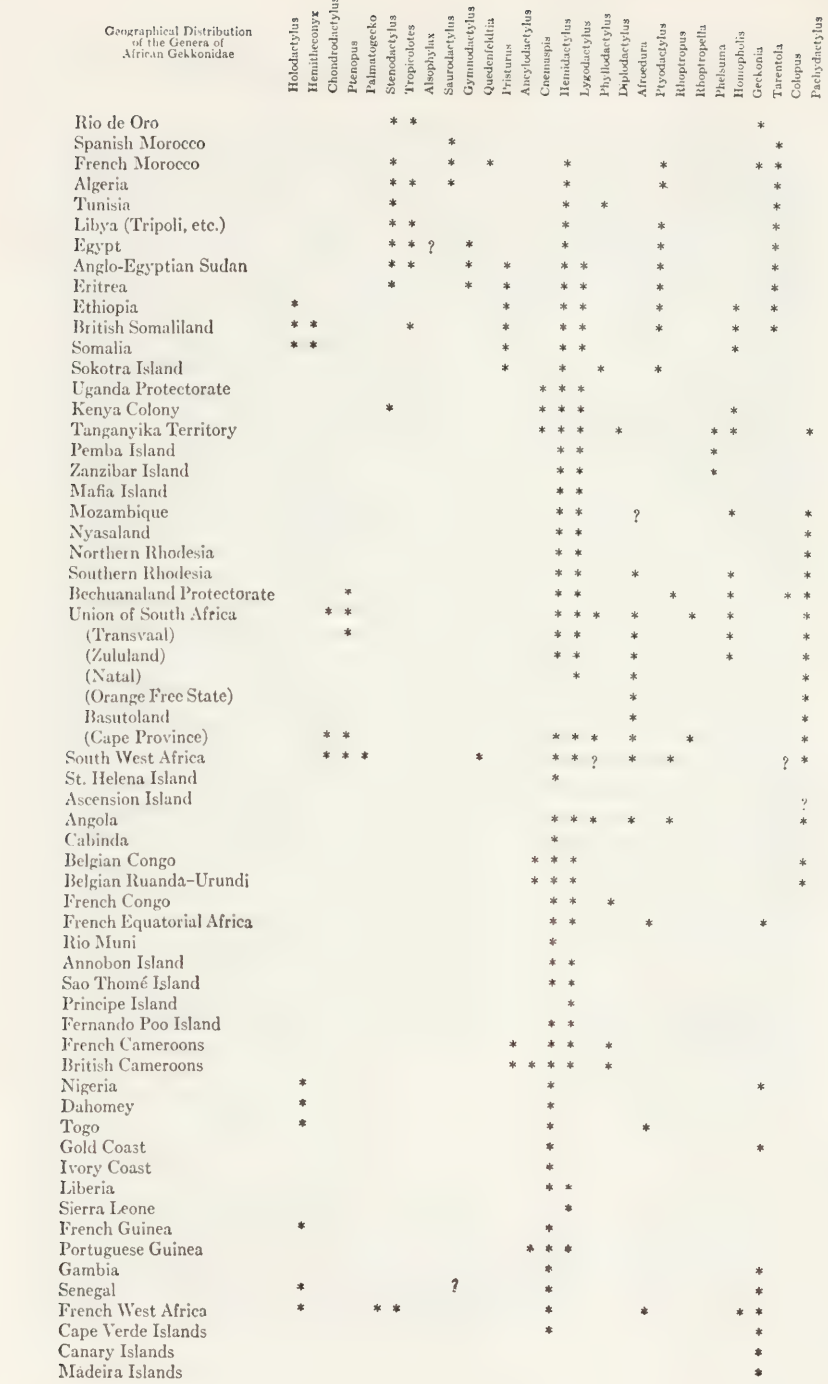
Range. The warmer regions of all continents, including the whole of Africa.

The Seychelle Islands are situated so far out in the Indian Ocean that they have not been considered as coming within the scope of this revision. Though a *Diplodactylus* occurring there has been included, the peculiar *Aeluronyx seychellensis* (Duméril & Bibron) is omitted.

In that curious work the "Faune de Senegambie. Reptiles," Rochebrune (1884a, p. 78) records the Malagasy *Uroplates fimbriatus* from five localities in the Senegal region. Worse still, he describes (p. 81, pl. ix, figs. 5–6) a carrot-tailed gecko as *Phyllurus blavieri* sp. nov. from four places in French West Africa. As pointed out by Rochebrune, its affinities are with *Gymnodactylus milii* (as *miliusii*) of Australia, from which continent Rochebrune's material may be assumed to have come. As the whereabouts of Rochebrune's types are unknown, I leave it to others to place this reptile.

In the accompanying chart showing the distribution in Africa of the various genera, it will be noted that French Somaliland is omitted. This is on account of the neglected state of the herpetology of that country for which I have failed to find a single record of any gecko being taken. This despite the fact that the adjacent territory of British Somaliland, with nine genera, is surpassed only by South West Africa with eleven. The number of genera is paralleled by a comparable richness in species, seeming to indicate that arid habitats are favorable to the speciation of geckos. Of course other types, such as the sylvicoline, cannot survive outside the moist montane forests to which they have become acclimatized.

Owing to the size of the Union of South Africa, as well as to the intensive study accorded its gecko fauna, this unit has been broken down into its component parts (shown in parentheses on the chart) and asterisks *repeated* under each Province from which the particular genus has been recorded.


Geographical Distribution of the Genera of African Gekkonidae
Holodactylus
Hemitheconyx
Chondrodactylus
Pteropus
Palmatogecko
Stenodactylus
Tropiculotes
Alsophylax
Saurodactylus
Gymnodactylus
Quedenfeldtia
Pristurus
Ancylodactylus
Cnemaspis
Hemidactylus
Lygodactylus
Phyllodactylus
Diplodactylus
Afroedura
Ptyodactylus
Rhoptropus
Rhoptropella
Phelsuma
Homopholis
Geckonia
Tarentola
Colopus
Pachydactylus
Rio de Oro
Spanish Morocco
French Morocco
Algeria
Tunisia
Libya (Tripoli, etc.)
Egypt
Anglo-Egyptian Sudan
Eritrea
Ethiopia
British Somaliland
Somalia
Sokotra Island
Uganda Protectorate
Kenya Colony
Tanganyika Territory
Pemba Island
Zanzibar Island
Mafia Island
Mozambique
Nyasaland
Northern Rhodesia
Southern Rhodesia
Bechuanaland Protectorate
Union of South Africa
(Transvaal)
(Zululand)
(Natal)
(Orange Free State)
Basutoland
(Cape Province)
South West Africa
St. Helena Island
Ascension Island
Angola
Cabinda
Belgian Congo
Belgian Ruanda-Urundi
French Congo
French Equatorial Africa
Rio Muni
Annobon Island
Sao Thomé Island
Principe Island
Fernando Poo Island
French Cameroons
British Cameroons
Nigeria
Dahomey
Togo
Gold Coast
Ivory Coast
Liberia
Sierra Leone
French Guinea
Portuguese Guinea
Gambia
Senegal
French West Africa
Cape Verde Islands
Canary Islands
Madeira Islands

KEY TO THE GENERA

(giving ranges in Africa only)

1. Both upper and lower eyelids well developed, connivent 2
   Upper eyelid more or less developed, lower distinct or rudimentary 3

2. Digits slender, long, compressed; claws between 4 scales; males without preanal or femoral pores; range: Ethiopia and Somaliland . . . . . *Holodactylus* (p. 20)
   Digits short, stout, cylindrical; claws between 3 scales; males with preanal or preano-femoral pores; range: Somaliland, also Nigeria to Senegal *Hemitheconyx* (p. 24)

3. Upper eyelid strongly developed, closing over eye with or without aid of lower 4
   Upper eyelid, if distinct, not closing over eye, at least lower eyelid rudimentary 5

4. Toes short, stout, subcylindrical, clawless, laterally edged with minute spinose granules; range: Bechuanaland to South West Africa . . . . . *Chrondrodactylus* (p. 28)
   Toes long, slender, depressed, clawed; laterally fringed with long spinose scales; range: Transvaal to South West Africa . . . . . *Ptenopus* (p. 31)

5. Digits webbed almost to their tips, covered with granules above; nasals swollen; range: South West Africa . . . . . *Palmatogecko* (p. 36)
   Digits free, or more or less webbed,[1] covered with scales above 6

6. Fingers long, not in the least dilated, clawed 7
   Fingers dilated in some part of their length, in a few species moderately throughout their length, the tip alone being slightly, though not invariably, broader than the feebly dilated basal part 15

7. Digits not angularly bent, straight, slightly compressed or (in *Quedenfeldtia trachyblepharus*) the basal portion depressed 8
   Digits slender, the distal joints forming an angle with the basal portion. 12

8. Lamellae beneath digits tricarinate 9
   Lamellae beneath digits smooth or tuberculately swollen; digits more or less laterally serrate but not fringed 10

9. Back (in African species) covered with small juxtaposed granules; digits with a lateral fringe of pointed scales, tips of digits tapering; range: Northern Africa south to Kenya and Mauretania. *Stenodactylus* (p. 40)
   Back covered with large imbricate scales; digits with a lateral serration but not fringed, tips of digits not tapering; range: Northern Africa from Sinai to Mauretania . . . . . *Tropicolotes* (p. 50)

[1] Webbed in a few species of *Hemidactylus* only.

10. Back covered with juxtaposed or subimbricate scales intermixed with tubercles; postanal slits present in both sexes; range: ? Egypt..... *Alsophylax* (p. 58)

    Back covered with juxtaposed granules, uniform or intermixed with tubercles; postanal slits absent in both sexes; males without pores..11

11. Digits slightly compressed, tapering; tail cylindrical; range: French Morocco and Algeria.....*Saurodactylus* (p. 59)

    Digits slightly swollen or distinctly depressed in their basal portion; tail depressed; range: French Morocco and South West Africa..... *Quedenfeldtia* (p. 66)

12. Pupil vertical; back and tail (in African species) with rows of sharply keeled tubercles; postanal slits present in both sexes; range: Egypt south to Eritrea.....*Gymnodactylus* (p. 62)

    Pupil round.....13

13. Back covered with uniform juxtaposed granules; postanal slits absent in both sexes; tail of male strongly compressed, that of female subcylindrical; range: Anglo-Egyptian Sudan east to Eritrea, south to Somalia and Sokotra.....*Pristurus* (p. 71)

    Back covered with juxtaposed granules intermixed with large tubercles; postanal slits present[1] in both sexes.....14

14. Basal portion of digits covered below with small scales except for a single large plate near distal joint, lamellae beneath distal phlanges; range: Cameroons.....*Ancylodactylus* (p. 83)

    Basal portion of digit covered below with large shields, lamellae beneath distal phlanges; range: French Guinea east to Kenya and Tanganyika Territory.....*Cnemaspis* (p. 85)

15. Distal digital joint compressed and rising angularly from within a digital expansion.....16

    Distal digital joint neither compressed nor rising from within a digital expansion.....17

16. Free distal digital joint long or short, rising from *within* the end of the digital expansion; thumb *usually* present and clawed; postanal slits present in both sexes; pupil vertical; range: Africa south of 20° N; Madagascar.....*Hemidactylus* (p. 95)

    Free distal digital joint short, rising from the end of a strongly dilated

[1] Assumed for *Ancylodactylus* of which the male is unknown.

discoid expansion, digits subcylindrical at base; thumb rudimentary, clawless; postanal slits absent in both sexes; pupil round; range: Africa from about 15° N. to 30° S.; Madagascar..... *Lygodactylus* (p. 193)

17. Fingers not or but slightly dilated on basal portion, but with a more or less strong distal digital expansion.....18
Fingers dilated throughout, even though moderately on basal portion, usually strongly towards apex.....20

18. Distal digital expansion furnished below with a pair of suctors separated by a longitudinal groove.....19
Distal digital expansion furnished below by numerous oblique or transversely dilated suctors.....21

19. Distal digital expansion covered above by scales which are strongly differentiated from those on the dorsal basal portion; range: Africa (islands on north and east; southern)..... *Phyllodactylus* (p. 237)
Distal digital expansion covered above by scales which are not essentially different from those on the dorsal basal portion; range: Madagascar; Seychelles; Sokotra, and equatorial Africa (possibly not distinct from *Phyllodactylus*)..... *Diplodactylus* (p. 251)

20. Distal digital expansion furnished below with a pair of suctors separated by a longitudinal groove, and slightly separated from one or two additional pairs of suctors on extremity of the basal portion which is otherwise covered by transverse lamellae or scales; range: Africa south of 8° S. in west, 15° S. in east..... *Afroedura* (p. 256)
Distal digital expansion (not always distinguishable from basal expansion) furnished below by transversely dilated scansors or lamellae.....23

21. Distal digital expansion furnished below by two groups of diverging fan-like scansors separated apically for reception of the retractile claw; range: Africa north of 10° N..... *Ptyodactylus* (p. 273)
Distal digital expansion furnished below by a series of transverse suctors resembling the transverse lamellae on basal portion; clawless.....22

22. Five well-developed toes, the distal digital expansion covered above by a median series of nail-like scales of which (omitting the small apical scale) the last is largest; pupil vertical; range: South West Africa and Angola..... *Rhoptropus* (p. 283)
Four well-developed toes, the fifth vestigial, the distal digital expansion covered above by a median series of nail-like scales of which (omitting

the small apical scale) the last but one is largest; pupil round; range: Little Namaqualand, Cape Province..... *Rhoptropella* (p. 293)

23. Pupil round; eyelid distinct as a circumorbital ring; digits clawless or with a vestigial claw; males with preano-femoral pores; range: Islands of the Indian Ocean (Pemba; Zanzibar, etc.) and Tanganyika Territory..... *Phelsuma* (p. 295)

Pupil vertical; lower eyelid usually absent or vestigial (except in *Tarentola*)..... 24

24. Fingers with retractile claws, that of the thumb minute and inconspicuous; males with preanal pores; range: East Africa from British Somaliland to Zululand; Madagascar..... *Homopholis* (p. 300)

Fingers with third and fourth only clawed or all clawless; males (except in *Pachydactylus tuberculosus*)without preanal or femoral pores..... 25

25. Toes with a lateral fringe of spinose scales, and strong claws rising from a prominent convex shield; head posteriorly casque-like, the casque produced laterally and sharply distinct from neck; range: French West Africa north to French Morocco..... *Geckonia* (p. 306)

Toes without a lateral fringe of spinose scales; claws present or absent; head not casque-like and only moderately distinct from neck..... 26

26. Claw-bearing distal joint of third and fourth fingers and toes compressed and upraised from the distal expansion; range: in Africa north of 5° N., including Madeira, Canary, and Cape Verde Islands..... *Tarentola* (p. 308)

No distal joints of digits compressed, all having a flat nail-like shield at the tip..... 27

27. Only two transverse scansors beneath tips of toes which are slightly tapering; range: Bechuanaland possibly west to South West Africa ..... *Colopus* (p. 334)

Three or more transverse scansors beneath tips of toes which are more or less dilated; range: Africa south of the Equator..... *Pachydactylus* (p. 338)

Genus Holodactylus

1893b. *Holodactylus* Boettger, Zool. Anz., **16**, p. 113 (type *africanus*).

Diagnosis. Digits free, long, slender, compressed, not dilated, tips somewhat tapering, covered above with scales, not denticulate later-

ally, below granular, clawed, the claws between four scales, claws of fingers very long and strong.

Pupil vertical; upper and lower eyelids well developed, connivent; dorsal lepidosis of small unequal or subequal, smooth, juxtaposed granules; tail swollen but depressed, constricted anteriorly, tapering posteriorly, covered above and below with small, juxtaposed, granular scales. Males without preanal or femoral pores.

Range. Ethiopia and Somaliland.

Key to the Species

Upper surface of head convex; rostral separated from nasal by 1–3 granules; nasal separated from its fellow anteriorly by 3–5 granules; upper labials 8–12; lower labials 9–13; adpressed hind limb reaches wrist or elbow of backward pressed forelimb ..... *africanus* (p. 21)

Upper surface of head flat; rostral separated from nasal by 5–7 granules; nasal separated from its fellow anteriorly by 8–14 granules; upper labials 13–18; lower labials 15–18; adpressed hind limb reaches elbow or axilla of backward pressed forelimb ..... *cornii* (p. 23)

Holodactylus africanus Boettger

1893b. *Holodactylus africanus* Boettger, Zool. Anz., **16**, p. 114: "Abdallah" i.e. Abdulla, north of Webi Shebeli, Ethiopia.
1895g. Boulenger, p. 166, pl. vii, fig. 2.
1896b. Boulenger, 1897, p. 8.
1897g. Boulenger, p. 277.
1898a. Boulenger, p. 716.
1898c. Boulenger, p. 914.
1905. Neumann, p. 391.
1905c. Tornier, p. 370.
1909c. Boulenger, p. 308.
1912b. Boulenger, p. 330.
1912a. Werner, p. 9.
1913a. Werner, p. 32.
1918. Calabresi, p. 123.
1927. Calabresi, pp. 26, 41.
1930c. Scortecci, p. 3.
1931b. Scortecci, p. 134, pl. iii, fig. 6.
1932b. Parker, p. 350.
1940a. Scortecci, p. 140 (20 in reprint).
1942. Parker, p. 37.
1915. *Holodactylus aculeatus* Calabresi, Mon. Zool. Ital. (Firenze), **26**, p. 238, fig. 2: Italian Somaliland (no definite loc.).

Native name. Galeka abadis (Somali: Neumann).

Description. Snout subtriangular, as long as, or slightly longer than, the distance between the eye and the ear-opening; latter small, vertically suboval, its vertical diameter one third to one quarter that of the orbit, a small white tubercle on its anterior border; head covered with small, finely ribbed or keeled granules, subequal except for a few enlarged ones on the snout where they are very variable, larger than those on the back; rostral subquadrangular, not quite twice as broad as high, with median cleft above or upper border emarginate with a single scale in the emargination; nostril in an entire or semi-divided circular nasal which is reduced above to a narrow rim margined by small scales, separated from the rostral and first labial by 1–3 granules, separated from its fellow anteriorly by 3–5 scales; upper labials 9–12; lower labials (8) 9–13; mental subquadrangular, subpentagonal, or rounded posteriorly; no postmentals or chin shields differentiated from the minute gular granules.

Back and limbs covered above with small, subuniform, smooth, rough or keeled, juxtaposed granules; limbs long, the adpressed hind limb reaching the wrist or elbow of the forelimb; ventral granules slightly smaller than the dorsal; on either side of the anal opening posteriorly a pair of enlarged conical tubercles; tail very variable (vide *Remarks* below).

Color. Above, light sandy gray to creamy yellow, uniform or variegated with reddish brown; eyelids edged with creamy white; from eye to eye across occiput an ill-defined, crescentic, dusky or reddish-brown band, followed on back by four others between fore and hind limbs, two or three more on tail. Below, whitish, uniform.

Size. Total length of a ♂ (Brit. Mus.), 106 (79 + 27) mm., of a ♀ (Brit. Mus.), 101 (76 + 25) mm., both being surpassed by an unsexed specimen (Milan Mus.) of 109 (83 + 26) mm., the type was immature, being 90 (72.5 + 17.5) mm.

Remarks. Calabresi (1918) herself referred *aculeatus* to the synonymy of *africanus*. She (1927) suggests that differences in tail length are attributable to sex, but Parker (1932b) disposes of this and postulates seasonal variation as a factor responsible for swollen tails. Later, however, he (1942) abandons this idea, his paper should be consulted for the arguments. He finds that tail length in relation to its breadth ranges from 2.8 to 5.3, while in percentage of body length there is a variation of from 29 to 38%, showing an almost regular decrease with growth. Like Scortecci (1931b) he invites attention to the variability of the granules as regards being smooth or keeled, this tendency

towards differentiation being somewhat geographic with the Guban mountain chain as a possible boundary line.

Diet. Carabid, Tenebrionid and Trochid beetles of large size were recovered from one stomach (Neumann), other geckos were found feeding on termites as they emerged from their nests at night (Taylor in Parker).

Temperament. Crawls about slowly on the sand at night (Neumann).

Habitat. During daylight this gecko may be found beneath stones in sandy regions of sparse vegetation at altitudes of from 2100–3500 feet. (Taylor).

Localities **Ethiopia:** Abdulla. **British Somaliland:** *Berbera —inland from; Burao; Dadab; Guban; [1]Gumboworen; Haiwanaebene near Golis Mountains; Haud; Nogal Valley; *Warabod (Warabot). **Somalia:** Balad (Beled), Webi Shebeli; Caitoi; Dabane (Dabanac); El Dere, 80 km. west of Obbia; *Gardo, Migiurtinia; Gelib to Margherita; Jumbo; Lugh; Migiurtinia; Mogadish; Negelli; Rahanuin country; Villaggio Duca degli Abruzzi.

Range. Eastern Ethiopia east to British Somaliland and Somalia.

Holodactylus cornii Scortecci

1931b. *Holodactylus cornii* Scortecci, Atti Soc. Ital. Sci. Nat., **70**, p. 137, pl. iii, figs. 3–5: Gardo and Obbia, Italian Somaliland.
1932b. Parker, p. 351.
1942. Parker, p. 37.

Description. Apparently agreeing with *africanus* except in those points cited in the key, also the granules on the head are said to be smaller than those on the back, a character of dubious value in a genus where much variation in size of scales occurs; certain differences in tail are also noted. The carefully detailed original description should be consulted.

Color. Above, whitish, grayish, or yellowish; canthus rostralis lighter; lower eyelid blue; from tip of snout to tip of tail a pale vertebral line flanked by broad brown stripes which are most distinct on occiput, nape and tail, especially where crossing the following series of broad, dark, transverse bands, the latter separated from one another by narrow interspaces, one across the snout, one across the

[1] Not traced on any map so possibly not in the country assigned.

orbital region and extending on to lower jaw, one across the occiput, one on the neck, four on the body are somewhat curved posteriorly, and three on the tail, the last broadest; flanks and limbs with scattered circular brown spots. Below, whitish, uniform.

Except for the ground color, this description is based on Parker's account of a fully adult ♀ from the Nogal Valley. See Scortecci also.

Size. Total length of cotype (Milan Mus.), 129 (94 + 35) mm., of a ♀ (Brit. Mus.), 123 (87 + 36) mm.

Remarks. Dedicating the species to Dr. G. Corni, then Governor of Italian Somaliland, Scortecci based his description on four cotypes, of which one was taken at Gardo together with five examples of *H. africanus*. That the range of the two species is largely coextensive seems likely since Parker (1932b) recorded one from the Nogal Valley where two female *africanus* were also taken though at slightly lower altitude. Later Parker (1942) expressed some doubts as to the distinctness of *cornii* though, judging by the description for I have seen no specimens, it would appear to be a perfectly recognizable species.

Localities. **British Somaliland**: Nogal Valley at 1400 feet. **Somalia**: Gardo, Migiurtinia; Obbia.

Range. British Somaliland south to Somalia.

Genus Hemitheconyx

1864e. *Psilodactylus* Gray (not Oken, 1816, for mammal), Proc. Zool. Soc. London, p. 61 (type *Stenodactylus caudicinctus* A. Duméril).

1893c. *Hemitheconyx* Stejneger, North American Fauna, No. 7, p. 163, footnote (new name for *Psilodactylus* Gray, preoccupied).

Diagnosis. Digits free, short, stout, cylindrical, not dilated, tips pointed, covered above with scales, not denticulate laterally, below granular, clawed, the claws partially retractile between three scales.

Pupil vertical; upper and lower eyelids well developed, connivent; dorsal lepidosis of small, unequal, flat, juxtaposed granules or scales and larger tubercles; tail swollen, not depressed, constricted anteriorly, tapering posteriorly, covered above with small, juxtaposed, flat scales and rows of enlarged, flattish or obtusely keeled tubercles arranged in regular longitudinal and transverse series, below by smooth juxtaposed scales. Males with preanal or preano-femoral pores.

Range. Somaliland, and again in West Africa from Nigeria to Senegal.

Key to the Species

Snout bluntly rounded; temporal scales not larger than occipital; lower labials 6–8; at most 2–3 slightly enlarged postmentals, usually no definite chin shields; dorsal tubercles surrounded by raised granules; males with 23–28 preanal pores; range: British Somaliland and Somalia..... *taylori* (p. 25)

Snout subtriangular; temporal scales larger than occipital; lower labials 9–11; 2–3 greatly enlarged postmentals surrounded by irregularly enlarged chin shields; dorsal tubercles surrounded by flat scales; males with 10–13 preano-femoral pores; range: Nigeria west to Senegal..... *caudicinctus* (p. 26)

Hemitheconyx taylori Parker

1930b. *Hemitheconyx taylori* Parker, Ann. Mag. Nat. Hist. (10), **6**, p. 603: Hegligab District, 2500 feet, British Somaliland.
1931b. Scortecci, p. 139, photo.
1932b. Parker, p. 351.
1942. Parker, p. 37.

Description. Snout bluntly rounded, as long as, or slightly longer than, the distance between the eye and the ear-opening; latter large, round, its diameter about half that of the orbit; head covered with regular polygonal swollen scales, each of which has a small central papilla, those on the temporal region not larger than those on the occiput; rostral subquadrangular, twice as broad as high, with median cleft above or upper border emarginate with a single scale in the emargination; nostril in an entire or semidivided circular nasal which is in contact with rostral and first labial, separated from its fellow by 4–5 scales; upper labials 7–8; lower labials 6–8; mental subpentagonal, sometimes bordered by 2–3 slightly enlarged postmentals, usually no definite chin-shields the adjacent granules but little larger than the gular granules.

Back and limbs covered above with small, polygonal, juxtaposed, raised granules, intermixed with numerous, enlarged, obtusely keeled tubercles which are largest dorso-laterally, where they are arranged in transverse triads; ventral scales rather irregular, cycloid, imbricate; males with an uninterrupted series of 23–28 preano-femoral pores; reproduced tail without marked annular constriction, shorter, more globular, and without enlarged tubercles.

Color. Above, pinkish cream; snout and sides of head smudged with darker; from eye to eye across nape a horseshoe-shaped dusky band, a second on lumbar region, a third on narrowed root of tail, and a fourth

near middle of tail, these bands, though very strongly marked in juveniles, tend to disappear with age and must be almost entirely absent in adults. Below, white, uniform, except for the last caudal band which alone is continued across the lower surface to form an annulus, that is not, or but incompletely, represented on a regenerated tail.

Size. Total length of ♂ type (Brit. Mus. 1930.5.9.1), 142 (94 + 48) mm., exceeded in length from snout to anus by a paratype ♂ of 110 mm., and ♀ of 105 mm.

Sexual dimorphism. An adult female of the same size as the last mentioned, exhibited a chevron-shaped series of 11 scales in the preanal region where a male would show pores (Scortecci).

Temperament. Lethargic during daylight, this gecko emits a cough-like sound when disturbed in its shelter beneath a stone (Taylor).

Aestivation ? In January Taylor found three apparently aestivating geckos together at a depth of three feet underground.

Habitat. More or less desert country at altitudes of from 2100 to 4100 feet.

Localities. **British Somaliland:** Bihen, Nogal Valley; Hargeisa; Hegligab District; Oadwenia; Oraogi, Buran District; *Sol Haud. (For exact lat. and long. of these localities see Parker, 1930b, 1942.) **Somalia:** Gardo, Migiurtinia.

Range. British Somaliland and Somalia.

Hemitheconyx caudicinctus (Duméril)

1851b. *Stenodactylus caudi-cinctus* A. Duméril, Revue Mag. Zool., p. 484, pl. xii: Senegal.
1851. Duméril & Duméril, p. 48.
1856d. Duméril, p. 489, pl. xviii, fig. 15.
1864e. *Psilodactylus caudicinctus* Gray, p. 61.
1884a. Rochebrune, p. 82.
1885d. Boulenger, p. 230.
1897b. Werner, p. 397.
1901c. Tornier, p. 71.
1902b. Mocquard, p. 415.
1917c. Chabanaud, p. 85.
1918b. Chabanaud, p. 160.
1922a. Angel, p. 39.
1893c. *Hemitheconyx caudicinctus* Stejneger, p. 163, footnote.
1912a. Werner, p. 10, figs. 1–5.
1919. Schmidt, p. 601.
1936h. Loveridge, p. 47.

Description. Snout subtriangular, as long as, or somewhat longer than, the distance between the eye and the ear-opening; latter large, oval, its vertical diameter about half that of the orbit; head covered with smooth, flat, polygonal scales, those on the temporal region larger than those on the occipital where they are very diverse; rostral subquadrangular, twice as broad as high, with median cleft above or the upper border emarginate with a single scale in the emargination; nostril in an entire or semidivided circular nasal which is in contact with rostral and first labial, separated from its fellow by 4–5 scales; upper labials 8–10; lower labials 9–11; mental subpentagonal, bordered by 2–3 greatly enlarged postmentals surrounded by irregular chin shields which merge into the gular granules.

Back and limbs covered above with small, polygonal, juxtaposed flat scales, intermixed with numerous, enlarged, obtusely keeled tubercles which are largest dorso-laterally, where they are arranged in transverse triads; ventral scales rather irregular, cycloid, imbricate; males with a series of 10–13 preanal pores; reproduced tails (see remarks by Chabanaud, 1918b).

Color. Above, pale grayish brown to yellowish white; lips and sides of neck faintly marbled with reddish; from occiput to base of tail a pale vertebral line interrupting the following crossbands; from eye to eye across nape a horseshoe-shaped reddish-brown band, across back two transverse ones, tail with three more, such bands being as broad as the interspaces between them. Below, white, uniform except for traces of subcaudal bands.

Size. Total length of largest (Brit. Mus.), 210 (130 + 80) mm., of a ♂ (Paris Mus.), 148 (85 + 63) mm., of a ♀ (Chicago Mus.), 139 (99 + 40) mm.

Remarks. Chabanaud (1918b) contends that his male with a 63 mm. tail actually exhibits the original tail for it measures only 9 mm. across, and that the great majority of tails are regenerate.

Sexual dimorphism. Adult females exhibit about 8 grooved scales in the preanal region where the males would show pores (Tornier), both sexes possess a pair of enlarged conical tubercles close to the posterior edge, but on either side, of, the anal opening.

Habitat. Between rocks.

Localities. **Nigeria:** *Bornu; Old Calabar; 15 miles south of Zungeru. **Dahomey:** Agouagon. **Togoland:** *Kete to Kratje; Mangu; Sokode Station. **French Guinea:** Kouroussa. **Senegal:** Guenoto; (Rochebrune's localities are ignored). **French West Africa:** Kati, 12 km. north of Bamako, Beledougou.

Range. Nigeria west to Senegal.

Folklore. Considered poisonous by the natives of Togoland (Tornier), and French Sudan (Angel).

Genus Chondrodactylus

1870b. *Chondrodactylus* Peters, Monatsb. Akad. Wiss. Berlin, p. 110, pl. –, fig. 1 (type *angulifer*).

Diagnosis. Digits free, short, stout, cylindrical, not dilated, tips obtuse, covered above with scales, laterally and below with minute spinose granules, skin beneath digital articulations and on palmar surface swollen, simulating pads, clawless.

Pupil vertical; upper eyelid well developed closing over eye, anteriorly distinct as a ring; dorsal lepidosis of small, unequal, flat, juxtaposed granules or scales and large tubercles; tail thick, subcylindrical, tapering. Males without preanal or femoral pores.

Range. Northwestern Cape Province west to South West Africa.

Chondrodactylus angulifer Peters

1870b. *Chondrodactylus angulifer* Peters, Monatsb. Akad. Wiss. Berlin, p. 111, pl.–, fig. 1: Hantam, Oorlogs River, Calvinia District, Cape Province.
1885d. Boulenger, p. 11.
1887. Strauch, p. 72.
1887b. Boettger, p. 140.
1888b. Fischer, p. 12.
1893a. Boettger, p. 21.
1898. Sclater, p. 102.
1910b. Boulenger, p. 456.
1910c. Hewitt, pp. 77, 82, 85.
1910a. Werner, p. 306.
1911b. Sternfeld, p. 396.
1911d. Sternfeld, p. 10, figs. 5–6.
1913. Hewitt & Power, p. 149.
1913a. Werner, p. 12.
1914b. Methuen & Hewitt, p. 124.
1935a. FitzSimons, p. 523.
1936. Lawrence, p. 37.
1936c. Parker, p. 131.
1937e. Mertens, p. 10.
1938. FitzSimons, p. 160.
1887c. *Chondrodactylus weiri* Boulenger, Proc. Zool. Soc. London, p. 340: Kalahari, Bechuanaland Protectorate.

1898. Sclater, p. 102.
1890d. Boulenger, p. 77.
1910c. Hewitt, pp. 78, 82, 85.
1911d. Sternfeld, p. 11.

Rochebrune's (1884a, p. 82) erroneous record from Senegambia is ignored.

Names. Ground gecko. Grond geitjie (Bushmanland: FitzSimons); "*//on*" the// representing a click similar to that used by riders in urging on their mounts (Bastard Hottentot: Methuen).

Description. Snout bluntly rounded, as long as, or slightly longer than, the distance between the eye and the ear-opening; latter large, an obliquely oval slit, its diameter half to three-quarters that of the orbit; rostral slightly broader than high, without median cleft above; polygonal scales on snout subequal to the largest on occiput; nostril between 3 nasals, the anterior in contact with its fellow; upper labials 8–11; lower labials 10–12; mental longer than broad; sometimes a few slightly enlarged granules in postmental region but no definite chin shields all posteriorly merging into the gular granules.

Back and limbs covered above with irregular flat granules and large obtusely keeled tubercles, the latter forming 14–16 irregular transverse rows; ventral scales unequal (5–13 corresponding to horizontal diameter of eye), cycloid, imbricate; limbs slender, the adpressed hind limb reaches the elbow or axilla; tail covered above with irregular flat scales and 6–8 rows of large conical tubercles, on either side of base of tail in both sexes are 2 enlarged tooth-like tubercles, their apices directed upwards, covered below with unequal, juxtaposed or subimbricate scales, tail shorter than head and body.

Color. Above, pale yellowish olive to brown; a dark streak from second labial to anterior corner of orbit and another from posterior corner around occiput though not quite meeting its fellow; from supraocular region a dark streak unites with its fellow on occiput to form a median line; back with four or five chevron-shaped dark bands, each edged posteriorly with darker brown and ochraceous orange; flanks with a series of pale spots just posterior to the lateral extremities of the dorsal crossbands; tail with four cross bars, the anterior brown and yellow, the posterior brown and white. Below, white, uniform.

In young geckos the dark brown and bright yellow banding contrasts conspicuously (FitzSimons). The color of preserved specimens fades rapidly to a more or less uniform light gray or whitish with scarcely distinguishable markings.

Size. Total length of ♂ (T. M. 15631), 165 (94 + 71) mm., of ♀

(M.C.Z. 21488), 127 (82 + 45) mm. The type (Berlin Mus.) was only 85 mm.

Remarks. Boulenger (1910b) himself questioned the validity of *weiri*, while Methuen & Hewitt (1914b) furnish an admirable table showing that variation in 22 geckos from the Great Karas Mountains and vicinity cover all the unstable characters cited as distinguishing *weiri*.

Diet. Chiefly termites (FitzSimons), orthoptera and a gecko (whose skull measures 10 mm. in length)in a 157 mm. male in M.C.Z.

Parasites. Mites (*Geckobia transvaalensis*) were found by Lawrence.

Defence. When molested these geckos frequently assume a threatening attitude, raising their heads, hissing loudly, and even springing clear of the ground with a sudden lunge to seize and tenaciously hold some offending object (FitzSimons).

Habits. Nocturnal, emerging to squat near the entrance of their holes. They are also said to leave their burrows after heavy rain, at such times great numbers may be seen about the plains. In walking the body is raised high from the ground, the tail carried even higher. The chirping attributed to this species by Methuen may be due to confusion with *Ptenopus* for FitzSimons (1935a) failed to notice it.

Habitat. Usually found in flat sandy regions, being particularly partial to dry ravines and their vicinity, occasionally in old houses (!). By day they remain in their holes which appear to have been originally excavated by scorpions and subsequently enlarged by the geckos to suit their own requirements. Each burrow is about a yard in length and holds a single gecko. Which burrows are occupied may soon be told with a little practice for Methuen dug a score from their retreats (Methuen & Hewitt).

Localities. **Cape Province:** Askham; Beaufort West; *Blaauwbosch, Gordonia; Carnarvon; Hantam, Oorlogs River, Calvinia District; *Henkries; Kalahari; Karroo; Kenhardt; Little Namaqualand; *Malmesbury; Touwsriver; Victoria West. **South West Africa:** Aus to Bethany; Bethany; Bullspoort; Naukluft Mountains; Great Fish Valley between Berseba and Keetmanshoop; *Great Karas Mountains; *Kanus to Nochaben; Konkiep; Kubub; *Luderitz Bay (Angra Pequena); *Maltahöhe; Sinclair Mine; Warmbad.

Range. Northwestern Cape Province west to South West Africa.

Folklore. Regarded by local inhabitants as fatally poisonous (FitzSimons).

Genus Ptenopus

1865a. *Ptenopus* Gray, Proc. Zool. Soc. London, p. 640, pl. xxxviii, fig. 1 (type *maculatus*).

Diagnosis. Digits free, long, slender, fingers compressed, toes depressed, not dilated, tips tapering, fingers laterally with spinose scales, toes laterally fringed with long spinose scales, below with slightly swollen transverse lamellae, strongly clawed.

Pupil vertical; upper and lower eyelids well developed, almost connivent; dorsal lepidosis of small, subequal, smooth, juxtaposed granules or scales; tail thick, cylindrical, tapering. Males without preanal or femoral pores.

Range. Bechuanaland Protectorate, with intrusion into northwestern Transvaal, and northern Cape Province west to South West Africa.

Key to the Races

Dorsal granules small, rounded; gulars distinctly granular; ventrals small, pointed posteriorly; range: Bechuanaland and northwestern Transvaal through Cape Province to Little Namaqualand ..... *g. garrulus* (p. 31)

Dorsal scales average larger, subhexagonal; gulars more or less hexagonal; ventrals average larger, usually hexagonal; range: Little Namaqualand, Cape Province, north to South West Africa ..... *g. maculatus* (p. 33)

Remarks. The ranges as defined above do not entirely accord with those given by FitzSimons (1943, pp. 13–14). This is due to the extensive area in which intermediates between typical *garrulus* and its poorly defined race occur. See *Remarks* under *P. g. maculatus*.

Ptenopus garrulus garrulus (Smith)

1849. *Stenodactylus garrulus* A. Smith, Illus. Zool. S. Africa, Rept., App., p. 6: Interior of South Africa.
1851a. Duméril & Duméril, p. 47.
1856d. Duméril, p. 488.
1885d. *Ptenopus garrulus* Boulenger (part), p. 15, pl. ii, fig. 2.
1887. Strauch, p. 68.
1893. Trimen, p. 80.
1898. Sclater, p. 102.
1910b. Boulenger (part), p. 456.
1910c. Hewitt, (part), pp. 78, 85.
1911b. Hewitt, p. 43.

1929. Rose, p. 115, fig. 74.
1933a. Power, p. 214.
1913. Hewitt & Power, p. 149.
1933a. Power, p. 214.
1937a. FitzSimons, p. 264.
1935a. *Ptenopus garrulus garrulus* FitzSimons, p. 524.
1935b. FitzSimons, p. 331.
1936. Lawrence, p. 37.

Further citations of "*garrulus*" will be found under *g. maculatus*.

Name. Eastern Whistling gecko (English).

Description. Snout bluntly rounded, as long as, or shorter than, the distance between the eye and the ear-opening; latter a small oblique slit, its length half to three-quarters that of the orbit; rostral about as broad as high, without median cleft above; granules on snout subequal to those on occiput and back; nostril between 2[1] nasals, the anterior in contact with rostral and first labial but separated from its fellow by 1–3[2] granules; upper labials 6–9; lower labials 6–9; mental as long as broad; no postmentals or chin shields all posteriorly merging into the gular granules

Back and limbs covered above with small, subuniform, smooth, juxtaposed granules, subequal to the ventral scales which are subuniform, flat, pointed posteriorly, juxtaposed; limbs moderate, the adpressed hind limb reaches the elbow or axilla; tail covered with uniform, roundish or squarish, flat, juxtaposed scales which are larger than those on body, on either side of the base of tail in both sexes, though smaller and less projecting in females, are 1–2 tooth-like tubercles, tail shorter than head and body.

Color. Above, pale chestnut brown, pale orange brown, buff, or cream color, variegated with orange or chestnut to reddish brown, pale yellow and an occasional purple fleck, such markings sometimes coalescing on tail to form ill-defined crossbars. Below, creamy white, throat bright yellow in adult males.

Size. Total length of type (Brit. Mus.), 83 (45 + 38) mm., surpassed by a ♂ (T.M. 15356), 86 (53 + 33) mm., a ♀ (M.C.Z. 41814), 67+ (46 + 21+) mm., tail regenerating. For table of average dimensions see FitzSimons (1935b).

Remarks. FitzSimons (1937a) says that there are now seven specimens in the British Museum regarded as types.

[1] Three in type according to Smith.

[2] 1 only in 75% of 23 specimens examined by FitzSimons, 2–3 in 87% of 8 specimens in M.C.Z. from four localities.

Parasites. No mites on 45 geckos examined by Lawrence.

Habits. Though here and there an individual male may maintain its chirping cry of *whick whick* intermittently throughout the day, it is in the late afternoon that these gregarious geckos "come to the entrance of their burrows, and with their heads just below ground level, set up a continuous chirping, which in such areas where they are numerous, proves almost deafening. As soon as darkness falls the noise invariably ceases." "Where these animals occur in large numbers, as at Kuke, the din they create is almost deafening, but fortunately does not last for more than the twilight period. During this time they are extremely difficult to localise, and it is only by the utmost stealth that they can be approached and observed. The majority of our specimens were captured at night, with the aid of a lamp. A few were also secured in the early morning just before sunrise, when they were found crawling about sluggishly on the sand, partially numbed with cold." (FitzSimons) For, being nocturnal, it is at night that they move over the desert in search of food.

Habitat. Dry sandy dunes and flats where, under the lee of small shrubs, this gecko lives in almost perpendicular burrows about a foot in depth.

Localities. **Bechuanaland Protectorate:** Damara Pan; Gomodimo Pan; Kaotwe Pan; *Kuke Pan; *Kyky on Nosop River. **Transvaal:** *Great Salt Pan near Waterpoort, Zoutpansberg District (where an intrusion of Kalahari fauna occurs). **Cape Province:** *Askham, Kuruman River; Graaf Reinet (record doubtful); Kakamas; Kenhardt; *Kimberly; Marydale; Orange River Station; Oup River; Prieska; *Rietfontein, northwest Gordonia; Upington; Zwart Modder River near Kimberly.

Range. Bechuanaland Protectorate, with intrusion into northwestern Transvaal, west through southern Kalahari region of Cape Province to the borders of Little Namaqualand where it meets with the western race.

Ptenopus garrulus maculatus Gray

1865a. *Ptenopus maculatus* Gray, Proc. Zool. Soc. London, p. 640, pl. xxxviii, fig. 1: Damaraland, South West Africa.
1868b. Cope, p. 321.
1865b. *Stenodactylus garrulus* Günther (not Gray), p. 149.
1867b. Peters, p. 235.
1885d. *Ptenopus garrulus* Boulenger (part), p. 15.
1886. Boettger, p. 10.

1887a. Boulenger, p. 479.
1888b. Fischer, p. 12.
1893a. Boettger, p. 21.
1894a. Boettger, p. 88.
1894. Fleck, p. 83.
1909d. Werner, p. 247.
1910b. Boulenger (part), p. 456.
1910a. Hewitt (part), pp. 58, 70.
1910c. Hewitt (part), p. 85.
1910a. Werner, p. 306.
1911. Lampe, p. 151.
1911d. Sternfeld, p. 11, fig. 7.
1913a. Werner, pp. 12, 29.
1914b. Methuen & Hewitt, p. 126.
1914a. Nieden, p. 450.
1935. Hewitt, p. 305.
1936c. Parker, p. 131.
1935a. *Ptenopus garrulus maculatus* FitzSimons, p. 525.
1937b. Mertens, p. 5.
1937e. Mertens, p. 10.
1938. FitzSimons, p. 160.

Description. As in the typical form, the sole distinguishing characters being those cited in the foregoing key, other alleged differences given by FitzSimons (1935a) are omitted as they found no support in our material consisting of 9 *g. garrulus* and 4 *g. maculatus.*

Nostril between 2 (rarely 3, *fide* Boettger, 1886) nasals, the anterior separated from its fellow by 1–2 (1 in all four M.C.Z. specimens, 2 in all eight of FitzSimon's) granules; upper labials 7–9; lower labials 7–9 (5 *fide* Werner in one gecko); on either side of base of tail 2 (3 *fide* Werner in one gecko) tooth-like tubercles.

Color. Above, pale grayish yellow or light pinkish brown to reddish brown, uniform or variegated with series of large dark brown blotches and small paler spots sometimes coalescing to form irregular dark brown to orange crossbars which are interrupted on the vertebral line; sides of neck and body with irregular brown or blackish markings. Below, creamy white.

Markings are more vivid in juveniles, but color very variable, conforming to nature of terrain (FitzSimons).

Size. Largest specimen (M.C.Z. 3721), 90 (56 + 34) mm., another of 90 (51 + 39) mm., is mentioned by Werner (1910a).

Remarks. Günther (1865) synonymized *maculatus* with *garrulus*, FitzSimons (1935a) revived it as a subspecies. Hewitt (1935), how-

ever, disagreed, saying that he could not recognize any geographical races. It seems to me that there are certain differences which are difficult to detect except in series, so that an arbitrary allocation of material from Little Namaqualand and South West Africa to *maculatus* appears advisable when in doubt and until such time as the matter may be more extensively investigated.

Anatomy. Skull, dentition and vertebrae are discussed by Cope (1868), basing his remarks on a gecko (M.C.Z. 725, now 3721) from "Cape of Good Hope." This was one of an extensive series of South African reptiles received from the South African Museum in the days of F. Layard's curatorship. Obviously they came from all parts of the present Cape Province though all bore the one locality "Cape of Good Hope." FitzSimons (1935a) is probably correct in suggesting that this gecko came from Little Namaqualand. Werner (1910a) reports a specimen with regenerated forefoot.

Enemies. One recovered from the stomach of a sand-snake (*Psammophis s. trinasalis*), as *furcatus*, by Werner (1909d).

Habits. These have been admirably described for this race by R. D. Bradfield, and serve to corroborate those of the typical form as given by FitzSimons. "They are very plentiful here (Quickborn), living in burrows excavated by themselves, one to a burrow. The gecko sits just inside the hole watching a space swept clear of leaves and pebbles, on the look-out for ants which seem to be its only food. every now and then, day or night, calling "squee-chi-chi-chi." The hole slopes down, forming three parts of a spiral to a depth of 15 inches, then divides into an upper and a lower passage. The upper passage ends blindly: the lower one, choked up at the junction, proceeds in the opposite direction and at the end the gecko may generally be found. This end is directly beneath the surface entrance, and the easiest way of securing the lizard is by digging vertically from the entrance to a depth of 15 inches. About January, many are to be seen on the surface for a few days." (Hewitt, 1935).

The different interpretations of the call are interesting, Fleck compares it to the sound resulting from the striking of two pebbles together and calls it "gack-gack." Boettger gives it as "schick-schick," which I suspect is his rendering of Sir A. Smith's "chick-chick."

Habitat. Found dwelling in close proximity to *Chondrodactylus angulifer.* Methuen's statement that it *shares* the burrows of the short-eared gerbil (*Desmodillus auricularis*), seems doubtful in view of the gerbil's temperament and liking for locusts.

Localities. **Cape Province** (Little Namaqualand only); Kamag-

gas—south of; Nieuwerust; Port Nolloth—east of; Richtersveld; Soebatsfontein. **South West Africa:** Alt Wasserfall Farm; Aus; Damaraland; Dassiefontein to Noakabeb; Great Fish River Valley between Berseba and Keetmanshoop; Haalenburg; *Kanus to Nochaben; *Keetmanshoop; Kuibis; *Luderitz Bay; Marienthal to Rehoboth; Narudas Süd Farm; Otjimbingue; Prince of Wales Bay; Quickborn Farm near Okahandja; Rehoboth; Rossing.

Range. Little Namaqualand, Cape Province north to South West Africa.

Genus Palmatogecko

1908. *Palmatogecko* Andersson, Jahrb. Nassau. Ver. Naturk. (Wiesbaden), **61**, p. 299, pl. iii, figs. 1a–c (type *rangei*).

1910a. *Syndactylosaura* Werner, Denks. Med.-Nat. Ges. Jena, **16**, p. 316, figs. 12a–b, pl. v, figs. 3–3c (type *schultzei* = *rangei*).

Diagnosis. Digits webbed almost to their tips, long, slender, the free distal joint angularly bent, covered above and below by uniform granules, terminating in soft, blunt, curved nails (homologous with the claw sheath of other geckos), true claws being absent or present on toes only.

Pupil vertical; eyelid distinct as a circumorbital ring; nasals swollen; dorsal lepidosis of small, subequal, smooth, juxtaposed granules; tail slender, cylindrical, distally compressed and tapering, covered above and below with small, subequal, smooth, juxtaposed granules. Males without preanal or femoral pores.

Range. Coast of South West Africa.

Palmatogecko rangei Andersson

1908. *Palmatogecko rangei* Andersson, Jahrb. Nassau. Ver. Naturk. (Wiesbaden), **61**, p. 299, pl. iii, figs. 1a–c: Luderitz Bay, South West Africa.

1910b. Boulenger, p. 457 (as *Pelmatogecko*).

1910c. Hewitt, pp. 82, 88.

1910b. Werner, p. 3 (as *rangi*).

1911b. Hewitt, p. 43.

1911. Lampe, p. 152.

1911d. Sternfeld, p. 18, figs. 15–17.

1913a. Werner, p. 12.

1915c. Werner, p. 331, fig.

1929. Procter, 1928, p. 917, fig. 1, pl. i.

1929. Rose, p. 115.

1934. Brongersma, p. 165.
1935a. FitzSimons, p. 525.
1935. Hewitt, p. 309.
1936. Lawrence, p. 37.
1936h. Loveridge, p. 48.
1937b. Mertens, p. 6.
1937e. Mertens, p. 10.
1910a. *Syndactylosaura schultzei* Werner, Denks. Med.-Nat. Ges. Jena, **16**, p. 316, figs. 12a–b, pl. v, figs. 3–3c: Prince of Wales Bay (♂) and Luderitz Bay (♀), South West Africa.
1935. *Palmatogecko* sp. Hewitt, Rec. Albany Mus., **4**, p. 312: Pforte, South West Africa.

Description. Head large, oviform, longer than broad, somewhat swollen in temporal region; snout rather acutely pointed, longer than the distance between eye and ear-opening, equal to that between eye and back of skull; ear-opening small or large, roundish or vertically oval, shielded above by a horizontal dermal fold; rostral slightly broader than high, without median groove above; a large quadrangular internasal; granules on snout subequal to those on occiput and back; nostril in a tubular cone-shaped ring formed of 2–4 nasals, the anterior separated from its fellow by 1–3 granules, separated from first labial by 1–2 granules; upper labials 12–16; lower labials 9–13; mental much longer than broad, narrower anteriorly than in the middle, rounded posteriorly; no post mentals or chin shields the granules in this region being but slightly larger than the minute gulars.

Back, limbs, and belly covered with small, subuniform, smooth, juxtaposed granules, those on belly somewhat flatter than dorsals; limbs slender, the adpressed hind limb reaches the elbow or just beyond; on either side of base of tail in males a series of 8–11 erect, compressed, tooth-like tubercles, smaller and inconspicuous in females; tail shorter than head and body.

For further variations, see *Remarks*.

Color. Above, yellowish white; nostrils rufous; a blue or black eyebrow streak; circumorbital ring primrose yellow with white edge; behind nostrils a dark brown semicircular mark whose arms are continued beneath orbits to nape; back with an irregular network of brown markings that may give rise to a pair of dorso-lateral lines that sometimes continue along tail; on the lower flanks from in front of shoulder to the angle between thighs and tail is a primrose yellow lateral band; limbs faintly speckled or uniform. Below, chalky white, uniform. Eye red above and below, black at sides, pupil a narrow, vertical black slit surrounded by pure white.

For a more detailed description of the eye, and a colored plate, see Procter (1929), though FitzSimons (1935a) feels that it fails to bring out the delicate, almost ethereal, transparency of the living gecko in which the eyeballs are visible through the crown, the viscera and vertebral column through the dorsal skin. His paper should be consulted as it contains a lengthy color description not utilised in drafting the above.

Size. Total length of type ♂ (Wiesbaden Mus.), 110 mm., surpassed by ♂ (Chicago Mus. 15454) of 123 (64 + 59) mm.; and *schultzei* cotype ♀ (Berlin Mus.) of 120 (68 + 52) mm.

Anatomy. The skull and postanal bones are discussed by Hewitt (1935).

Sexual dimorphism. The prominent, erect, tooth-like tubercles on either side of the base of the tail in males, are very low or absent in females.

Remarks. The species was named for its collector, Dr. P. Range, and *schultzei*, which Werner (1910b) himself synonymized, for Prof. L. Schultz. He remarks on its general similarity to *Stenodactylus petrii;* Andersson (1908) suggests relationship with *Ptenopus*, a view which the detailed studies of Hewitt (1935) apparently confirm.

Hewitt had a halfgrown specimen, collected at Pforte by Prof. N. J. G. Smith, which he thought might represent an undescribed species to be separated on the following characters:

Anterior nasal just in contact with first labial; mental anteriorly about as broad as in the middle; toes terminating in minute claws (at least in a young gecko measuring 43 mm. from snout to anus) Pforte young

Anterior nasal separated from first labial by a granule; mental much narrower anteriorly than in the middle; toes terminating in soft, blunt, curved nails without true claws (young then unknown)..... adult *rangei*

As the Pforte gecko had been examined by Dr. V. FitzSimons, I asked him for his views on its status. The reply which he gave, with customary kindness, is abridged as follows:

> The only difference appears to lie in the anterior nasal being in contact with the first upper labial, but as normally the anterior nasal and first upper labial are only narrowly separated, I place little significance on this character in a single juvenile specimen. The mental shield is usually distinctly narrower in front in adult *rangei*, but sometimes not noticeably so in halfgrown and juvenile specimens. Claws are present on the toes of typical *rangei*, so I was satisfied that the Pforte gecko was inseparable from *rangei*.

Procter (1929), whose lengthy paper should be consulted for further details, rather aptly compares the deeply webbed hands and feet of this gecko with those of certain North American salamanders of the genera *Eurycea* and *Oedipus* (i.e. *Thorius*).

Diet. Their natural food consists chiefly of harvesting termites (FitzSimons); though in captivity a preference was shown for beetles and grubs as opposed to winged insects (Procter); they will take flies, small butterflies, and worms (Werner, 1915c). FitzSimons suggests that they may absorb moisture from the sea breezes which constantly blow in their habitat where rain is almost unknown. Procter concluded that they lapped dew, as her captive geckos licked moisture from moss or stones though they would not drink from a pool.

Parasites. No mites on ten geckos examined by Lawrence.

Defence. See *Habits* below.

Temperament. Agile and nervous.

Habits. Werner (1915c) records that A. R. Uhlmann, by digging in the loose sand of a dune where a jackal had been scratching, opened up a hole in which lay coiled one of these geckos. On being disturbed the lizard rose high on its slender limbs, arched its tail, and, swaying to and fro, hissed and snapped pugnaciously. As Uhlmann remained quiet the gecko calmed down and commenced to dig with its fore feet, employing the hind feet to push the sand further back.

Procter (1929) describes how this digging is accomplished by a hand and foot, first of one side, then of the other, alternating them as they become tired, the webbed areas making excellent scoops, the opposable toe sometimes came into play and was also employed when climbing over stones. The completed burrow terminates in a chamber in which the gecko lies with its head facing the entrance. Procter suggests that should an enemy attempt to drag the owner out the prehensile tail probably clings to the chamber to act as a retarding factor; despite its prehensile nature it is dropped from the root. When running the body is held high off the ground by the stilt-like limbs and the webbed feet leave little or no track upon the sand.

Habitat. Seaward slopes of the sand dunes and rocky slopes which are covered with fine wind-blown sand along this inhospitable coast.

Localities. **South West Africa:** *Bundfeldschuk; *Kolmanskop; *Luderitz Bay; Namib Desert near Swakopmund; Pforte; Prince of Wales Bay; Swakopmund.

Range. South West Africa (coast).

Genus Stenodactylus

1817. *Ascalabotes* Cuvier, Règne Animal, **2**, p. 44 (substitute name for *Stellio* Schneider in its broad sense as equivalent to GEKKONIDAE).
1823. *Ascalabotes* Lichtenstein (part), Verz. Doubl. Mus. Berlin, p. 102 (type, by subsequent designation, *sthenodactylus*; preoccupied by Cuvier).
1826. *Stenodactylus* Fitzinger, Neue Class. Rept., pp. 13–14 (type *elegans* = *sthenodactylus* Lichtenstein).
1830. *Ascalabotes* Wagler, Natur. Syst. Amphib., p. 143 (designates *sthenodactylus* as genotype of *Ascalabotes* Lichtenstein).
1842. *Tolarenta* Gray, Zool. Misc., p. 58 (type *wilkinsonii* = *sthenodactylus* Lichtenstein).

Diagnosis. Digits free, long, straight, slightly compressed, not dilated, tips tapering, covered above with scales, those of the outer row pointed, projecting, forming a lateral fringe, below with a series of transversely dilated tricarinate lamellae, strongly clawed.

Pupil vertical; upper eyelid distinct, lower vestigial; dorsal lepidosis of small, subequal, smooth or rugose, juxtaposed granules or (in Asiatic species) scales, uniform or intermixed with tubercles; tail slender, cylindrical, tapering. Males with or without preanal pores.

Range. Arid regions of Asia (Sind to Syria) and northern Africa south to 3° N. (Lake Rudolf, Kenya Colony) in East, and 15° N. (Toueili, Mauretania) in West (Tornier's record from Bipindi, Cameroon, is rejected as due to mislabeling or an introduction).

Remarks. Anderson (1898, pp. 35–46) should be consulted for his careful studies which included examination of most of the types. In view of his reaching the conclusion that no "varieties" could be recognized, it may appear presumptious to offer the following key providing for separation of a western race—*mauritanicus*. However, though the characters employed may not prove 100% definitive, I hope that they may prove largely so, now that the confusion resulting from the non-separation of *petrii* has been overcome.

Key to the Species

1. Rostral excluded from nostril; internasal granules 0–1; granules in vertebral region slightly smaller than those on flanks; adpressed hind limb reaches to axilla or shoulder; on either side of base of tail a patch of white tooth-like tubercles with 5–6 in upper row; tail abruptly contracted behind basal swelling, then rapidly tapering to a fine point, range: Egypt west to Algeria ..... *petrii*
(p. 41)

Rostral usually bordering nostril; internasal granules 1–2; granules in vertebral region subequal to majority on flanks; adpressed hind limb reaches elbow or axilla, rarely the shoulder; on either side of base of tail a single row of 3–4, rarely 2 or 5, white tooth-like tubercles; tail tapering gradually from base to tip.....2

2. Nasals strongly elevated; dorsal granules subequal, low, smooth or slightly striated; adpressed hind limb reaches axilla, rarely the shoulder; range: Syria and Arabia; Egypt south through Sudan and Eritrea to northern Kenya Colony, in northwest to Tunisia.....*s. sthenodactylus* (p. 44)

Nasals feebly elevated; dorsal granules heterogeneous, conical, strongly striated; adpressed hind limb reaches elbow; range: (? Tunisia) Algeria west to Morocco and Mauretania.....*s. mauritanicus.* (p. 47)

Stenodactylus petrii Anderson

1827? *Trapelus savignyi* var. (not typica) Audouin, in Savigny, Descr. Egypte, Hist. Nat. Rept., **1**, p. 168, and Suppl. Rept., pl. i, figs. 4_1–4_3 only: Egypt.
1836. *Stenodactylus guttatus* Duméril & Bibron (part), p. 434, pl. xxxiv, fig. 2.
1887a. Boulenger, p. 479.
1891c. Boulenger (part), pp. 96, 107.
1894. Oliver (part), p. 106.
1894. Werner (not Cuvier), p. 76.
1887. *Stenodactylus Wilkinsonii* Strauch (not Gray), p. 67.
1920c. Chabanaud, p. 461.
1896. *Stenodactylus petrii* Anderson, Contr. Herpet. Arabia, p. 96: Tel el Amarna, Assuit Province, Egypt.
1898. Anderson, p. 45, pl. iv, fig. 7.
1898c. Boulenger, p. 913.
1909a. Werner, pp. 598, 628.
1911. Lampe, p. 151.
1913. Ghigi, p. 284.
1913. Hartert, p. 77.
1913a. Werner, p. 11, pl. – (though figs. more like *sthenodactylus*).
1914b. Werner, p. 335.
1923a. Angel, p. 205.
1925b. Flower, p. 939.
1929b. Werner, p. 21.
1931b. Vinciguerra, p. 250.
1932. Kuntze, p. 328.
1933. Flower, p. 760.
1934. Brongersma, p. 166.

1934. Mosauer, p. 52 (*petriei*).
1935e. Scortecci, p. 186.
1937. Zavattari, p. 530.
1899. *Stenodactylus guttatus wilkinsonii* Doumergue (not Gray), p. 532 (based on Strauch's record only).
1899e. *Stenodactylus stenurus* Werner, Zool. Garten. **40**, p. 16, fig. b: "Meraier, Tuggurth," i.e. Meraieur, n. of Touggourt, Algeria.
1903b. *Stenodactylus elegans* Andersson (not Fitzinger), p. 6.
1914b. *Stenodactylus elimensis* Barbour, Proc. New England Zoöl. Club, **5**, p. 79, pl. ii, figs. 1–2: Wadi Gharandel, Sinai, Egypt.

Name. Petrie's Gecko.

Description. Snout short, moderately pointed, longer than the distance between eye and ear-opening; latter moderate or small, roundish or vertically or horizontally oval, its diameter a third to half that of the orbit; rostral broader than, even twice as broad as, high, with median cleft above[1]; granules on snout flat or slightly convex, rugose, larger than those on occiput and back; nostril between first labial and 3 nasals, the anterior in contact with its fellow (Egypt) or separated from its fellow by 1 granule (Egypt; Tripoli); upper labials 9–15; lower labials 9–15; mental as long as, or shorter than, broad; no postmentals or chin shields differentiated from the gular granules.

Back and limbs covered above with small, subequal, smooth, slightly convex, juxtaposed granules, those on middle of the back being slightly smaller than those on flanks; ventral granules smaller than dorsals, juxtaposed; limbs slender, the adpressed hind limb reaching the axilla or shoulder; tail covered above with scales slightly larger than those on back, more or less strongly keeled, below with small roundish scales; on either side of the base of tail a patch of enlarged white tooth-like tubercles of which there are 5–6 in the upper row.

Color. Above, sandy yellow to pale fawn vermiculated with dark brown, such markings being most pronounced on head; sometimes a U-shaped brown marking from eye to eye around occiput but interrupted medially; sometimes an ill-defined band from ear along flank; tail alternately barred with darker and lighter. Below, white, except limbs and tail which are yellowish.

Size. Total length of cotype ♂ (Brit. Mus.), 105 (54 + 51) mm., cotype ♀ (Brit. Mus.), 113 (60 + 53) mm.

Remarks. Named for its discoverer, Sir William Mathew Flinders

[1] Which is continued to buccal border in type of *elimensis*.

Petrie. The longer and broader head, and additional row of scales on each side of the central row of digital lamellae, used by Anderson (1896) in distinguishing *petrii* from *sthenodactylus*, were later (1898) omitted from his key so possibly do not hold in series. Nor is there any constant difference in claw length as alleged by Werner when describing *stenurus* (1899) which he later synonymized (1909b) with *petrii*. I am inclined to think, however, that *stenurus* may prove recognizable as a western race when more material is available.

Longevity. Nine months at Giza Zoological Gardens (Flower).

Temperament. In captivity easily frightened with the result that it may refuse to eat for weeks, though kept at a constant temperature of about 25° C. (Kuntze).

Habits. In running this gecko raises the body high off the ground, remaining so when halted, at rest, however, it lies upon the sand with hind limbs stretched out on either side of the tail. The latter, normally extended, is nervously coiled and uncoiled first to right and then to left under the stimulus of excitement such as the sight of prey. The visual range is remarkable, and is more pronounced in artificial lighting than in daylight. One came creeping slowly on to a white cloth spread beside a lamp near the pyramids, till, with a final pounce, it captured, and subsequently devoured, a cicada. In captivity little interest was shown in food, decision being delayed so long that the mealworm was apt to crawl away (Kuntze and Werner).

Habitat. By day they may be found beneath stones or buried in sand on sandy tracts but not in the dunes (Hartert). In stony wastes between sand dunes and mountains near Ain Sefra (Werner). Large numbers were collected by moonlight in the desert near Tozzeur (Mosauer).

Localities: **Algeria**: Ain Sefra; Batna (*fide* Strauch; more probably southern Algeria); Biskra; Bou Saada; El Golea-Ghardaia-Ouargla triangle; Meraieur (Mairer; Meraier; Mraier; El Marayer); Oued Nsa (Nca) between El Alia and El Golea; Oued Saret between El Golea and Fort Miribel; Touggourt (Tuggurth). **Tunisia**: Craiba (Graiba); Tozeur. **Libya**: Gialo; Tazerbo; *Tripoli. **Egypt**: ? Atbara to Berber; Giza (Gizeh); Ismailia; Kantara; *Shammama Halt between El Alamein and El Hammam; Tel el Amarna; *Wadi Garundel (Gharandel), Sinai. **Anglo-Egyptian Sudan**: ? Wadi Halfa.

Range. Sinai, Egypt, possibly south to Anglo-Egyptian Sudan, west to Algeria.

STENODACTYLUS STHENODACTYLUS STHENODACTYLUS (Lichtenstein)

1823. *Ascalabotes sthenodactylus* Lichtenstein, Verz. Doubl. Mus. Zool. Berlin, p. 102: Egypt and Nubia.
1826. *Stenodactylus elegans* Fitzinger, Neue Class. Rept., p. 47 n.n. for *Ascalabotes stenodactylus* (sic) Lichtenstein.
1896. Anderson, pp. 77, 95.
1898. Anderson, p. 42, figs. 1 and 3, pl. iv, figs. 1–6.
1901. Steindachner, p. 326.
1904. Peracca, p. 2.
1908. Werner (part), 1907, p. 1827.
1909a. Werner, pp. 597, 628.
1913. Ghigi, p. 283.
1913a. Werner, p. 11.
1920. Ghigi, p. 201.
1921. Andres, p. 17.
1922. Zavattari, 1924, p. 15.
1923a. Calabresi, p. 8.
1929. Zavattari, p. 87.
1930a. Scortecci, p. 205.
1930a. Zavattari, p. 265.
1932. Kuntze, p. 327.
1934. Mosauer, p. 52.
1829. *Stenodactylus guttatus* Cuvier, Règne Animal, ed. 2, **2**, p. 58, pl. iv, fig. 2: Egypt.
1836. Duméril & Bibron (part), p. 434 (but not pl. xxxiv, fig. 2).
1845. Gray, p. 177.
1845. Rüppell, p. 301.
1851. Duméril & Duméril, p. 47.
1862b. Peters, p. 271.
1862b. Strauch, p. 24.
1874d. Peters, p. 66.
1876. Gasco, p. 115.
1879. Bedriaga, p. 35.
1880. Boettger, p. 194.
1880d. Peters, p. 306.
1881a. Peters, p. 365.
1884a. Rochebrune, p. 83.
1885d. Boulenger, p. 17, pl. iii, fig. 2.
1887. Strauch (part), p. 67.
1891c. Boulenger (part), pp. 96, 107.
1894. Oliver (part), p. 106.
1896e. Boulenger, p. 213.
1896. Francaviglia, p. 41.
1896b. Oliver, p. 119.

1897g. Boulenger, p. 277.
1897b. Werner, p. 405.
1899. Doumergue, p. 528.
1901. Gadow, p. 509.
1903. Mayet, p. 11.
1906. Barbier, p. 51.
1906. Kammerer, p. 135 (*non vidi*).
1913a. Werner, p. 11.
1915e. Boulenger, p. 79.
1916d. Chabanaud, p. 226.
1920. Mourgue, p. 233.
1923d. Loveridge, p. 843.
1924b. Loveridge, p. 8.
1927. Vinciguerra, p. 332.
1931. Gestro & Vinciguerra, p. 538.
1931b. Vinciguerra, p. 250.
1823[1]. *Agame punctue* Is. Geoffroy Saint-Hilaire, in Savigny, Descr. Egypté, Hist. nat. Rept., **1**, p. 129, pl. v, fig. 2: Egypt.
1827?. *Trapelus Savignyi* Audouin, in Savigny, Descr. Egypté, Hist. nat. Rept., **1**, p. 167, and Suppl. Rept., pl. i, figs. 3[1]–3[3]: Egypt.
1842. *Tolarenta Wilkinsonii* Gray, Zool. Misc., p. 59: Egypt.
1881a. *Stenodactylus guttatus* var *mauritanica* Peters (not Guichenot), p. 365.
1885d. *Stenodactylus wilkinsonii* Boulenger, p. 18, pl. iii, fig. 3.
1925b. *Stenodactylus stenodactylus* Flower, p. 939.
1935e. Scortecci, p. 185.
1937. Zavattari, p. 530.
1933. *Stenodactylus sthenodactylus* Flower, p. 760.
1936h. *Stenodactylus sthenodactylus sthenodactylus* Loveridge, p. 48.
1937. *Stenodactylus sthenodactylus mauritanicus* Zavattari, p. 530.

Further citations of "*elegans*, *guttatus*, *savignyi*, *sthenodactylus* and *wilkinsonii*" will be found under *S. s. mauritanicus* and or *S. petrii*, with both of which there has been much confusion. The citations listed above are referred to the typical form on the basis of locality or other data where available, doubtless some represent misidentifications of *petrii*, perhaps others from Tripoli or Tunis may be intermediates between *sthenodactylus* and *mauritanicus*.

Names. Spotted Gecko (English); *bors abyad* (Arabic, but applied also to *Tropicolotes*).

Description. Snout short, bluntly pointed, much longer than the distance between the eye and the ear-opening; latter moderate or small, roundish or vertically oval, its diameter a third to half that of the orbit; rostral slightly broader to once and a half times as broad

[1] See footnotes to *Ptyodactylus h. hasselquisti* (p. 275) and *Tarentola a. annularis* (p. 323).

as high, with median cleft above; granules on snout convex, rugose or keeled, subequal to, or larger than, those on occiput and back; nostril between rostral[1], first labial and 3 strongly swollen nasals, the anterior separated[2] from its fellow by 1–2 granules; upper labials 9–15; lower labials 8–15; mental as long as, or longer than, broad; no postmentals or chin shields differentiated from the gular granules.

Back and limbs covered above with small, subequal, flat or slightly convex, smooth or rugose, juxtaposed granules; ventral scales subequal to dorsals, juxtaposed; limbs slender, the adpressed hind limb reaching the axilla; on either side of the base of the tail in both sexes, though less pronounced in females, is a single row of 2–4 white tooth-like tubercles; tail shorter than head and body.

Color. Above, fawn or rich buff, occasionally a U-shaped brown marking from eye to eye around occiput; eyelid anteriorly has a white margin; irregular sides of the pupil bright yellow; crown and back with variable shades of purplish brown reticulations enclosing white or yellowish spots, a series of dark brown saddle-like markings or paired blotches present or absent; tail alternately barred with darker and lighter. Below, white, uniform; tail yellow.

Size. Total length of ♂ (M.C.Z. 9635), 78 (46 + 32) mm., from Sinai; of ♀ (Anderson), 94 (54 + 40) mm., from Egypt.

Remarks. See Anderson (1898, pp. 35–46) but remember that his excellent detailed description covers both *s. sthenodactylus* and *s. mauritanicus*. The presence or absence of a dorsal groove appears to be dependent on condition and is both present and absent in Egyptian material in the M.C.Z. The literature teems with comments on coloration and the spotting and barring of this variable gecko.

The criteria used by earlier workers for separating the forms were diverse, Boulenger (1915e), writing of a Misurata gecko which he calls *guttatus* says that it is referable to "var. *mauritanica*." As three specimens (M.C.Z. 21906–8) collected by Rholfs between Misurata and Tripoli are typical *s. sthenodactylus*, however, the reference, together with all others from North Africa east of Algeria, is listed under the synonymy of *sthenodactylus*. Perhaps intermediates occur in the Tunis-Tripoli region for Peters (1881a) referred some of Rholfs Tripoli material to *mauritanica*, causing it to appear in Zavattari's (1937) list for that area.

Longevity. Eight months at Giza Zoological Gardens (Flower).

[1] "may be partially or wholly excluded" according to Anderson (1898) who is probably including information from Werner who had *petrii*.

[2] In contact with its fellow in a gecko (M.C.Z. 5234) said to have come from Dalmatia, purchased from the dealer H. A. Ward.

Diet. Flies and mealworms in captivity at Heliopolis (Kuntze).

Defence. Effacing coloration and fragile tail (Kuntze).

Habits. In the desert these geckos lie flat on their bellies with the forefeet tucked inwards and under beneath the head, the hind limbs stretched out behind. At night, dazzled by lantern light, they would squat, merging with their environment to such an extent that only their shadows betrayed them. If disturbed they would rise high on their legs and rush hither and thither in search of concealment which they sought beneath the observer's boots (Kuntze).

Habitat. By day they rest concealed beneath stones lying on sand or gravel at the desert's edge (Anderson) or, in the Tunisian steppes where they were fairly common, beneath the dead limbs of *Opuntia* (Mosauer). However they occur in places where there is no such cover and so perhaps retire to the burrows of *Acanthodactylus*, according to Kuntze (1932) who gives an account of the capture of several.

Localities. **Tunisia:** Craiba (Graiba); Djebel Bou Hedma; Feriana; Foum Tatahouine; Gafsa; Hadjeb el Aioum; Hammam near Tunis; Houmt es Souk, Ile Djerba; Iles Kerkenna; Kairouan (Kairwan); Kebili; Kriz; Oued el Ftour, s. of Gabes; *Sfax; Tunis. **Libya:** Agedabia; Amseat to Seezza; Barca (Barka); Bardia; Bengasi; Bomba; Bondjem (Bongem); Bosco; Derna; El Agheila; El Faidia (Feteja; Ftaiah) near Derna; El Fogha; El Guarascia; El Gubba; El Mechili; Es Sahabi; Gara el Beda; Gialo-near; Giarabub; Kersa; Marak; Marmarica; Marsa Susa (Appolonia); Misurata; *Misurata to Tripoli; Sciati, Fezzan; Sidi el Garbaa; Sirtica; Tolmeta (Tolmetta); Tripoli; Zauia Mechili. **Egypt:** Abuson; Abydos; Alexandria; Cairo; Dahab, Sinai; Fayum; Giza; *Great Bitter Lake; Kom Ombo; Luxor; Mandara, e. of Alexandria; Mariut; Mersa Matruh; Nakbt el Hawa; Ramleh; Ras Abu Zenima; Ras Gharib; Sinai-northwest; Tel el Amarna; *Wadi Feran (Feiran); *Wadi Gharbeh; Wadi Natron. **Anglo-Egyptian Sudan:** Bayuda (Bejudah), Nubia; Durur; Kawa; *Port Sudan; Suakin; ? Wadi Halfa. **Eritrea :** Asmara; Cheren (Keren); Massaua. **Kenya Colony:** Lake Rudolf.

Range. Syria; Arabia; Egypt west to Tunisia, south to Lake Rudolf (Donaldson Smith coll.; Boulenger det.; in Genoa Museum).

Stenodactylus sthenodactylus mauritanicus Guichenot

1841. *Stenodactylus guttatus* Schlegel (not Cuvier), p. 110.
1881c. Lataste, p. 398.
1887. Strauch, p. 479.

1891c. Boulenger (part), pp. 96, 107.
1910. Pellegrin, p. 22.
1920c. Chabanaud, p. 461.
1924a. Chabanaud, p. 54.
1926a. Pellegrin, 1925, p. 316.
1926f. Pellegrin, p. 160.
1927a. Pellegrin, p. 261.
1927a. Pellegrin, p. 261.
1930e. Witte, p. 616.
1935. Laurent, p. 345.
1850. *Stenodactylus Mauritanicus* Guichenot, in Explor. sci. Algérie, Hist. nat. Rept. Poissons, p. 5, pl. i, figs. 1–1d: Oran, Algeria.
1862b. Strauch, p. 25.
1867. Lallemant, p. – (*non vidi*).
1884a. Rochebrune, p. 83.
1898. Anderson, pp. 39–40, fig. 2 (type).
1913a. Werner, p. 11.
1895. *Stenodactylus guttatus* var. *mauritanica* Koenig, p. 404.
1899. Doumergue, p. 530.
1899.? *Stenodactylus guttatus* var. *hirouxii* Doumergue, Soc. Géog. Arch. Oran, **19**, p. 532 (p. 96 of reprint), pl. v, figs. 7–7a: Méchéria, Algeria.
1902c. *Stenodactylus elegans mauritanica* Tornier, p. 665.
1910. Sternfeld, p. 11.
1919. Schmidt, p. 601.
1903. *Stenodactylus sthenodactylus* Günther (not Lichtenstein), p. 298.
1938b. Angel, p. 485.
1938. Angel & Lhote, p. 355 (as *stenonodactylus*).
1944b. Angel, p. 418.
1919. *Stenodactylus elegans* Schmidt (not Fitzinger), p. 598.
1929b. Werner, pp. 8, 21.
1931c. Werner, p. 275.
1935. Andersson, p. 5.
1937. Werner, p. 31.

Further citations of "*mauritanicus*" will be found under *A. s. sthenodactylus*. The citations listed above are referred to this race on account of locality.

Description. Snout short, bluntly pointed, much longer than the distance between the eye and the ear-opening; latter moderate or small, roundish or vertically or horizontally oval, its diameter a third to half that of the orbit; rostral broader than, even twice as broad as, high, with median cleft above; granules on snout convex, rugose, subequal to, or larger than, those on occiput and back; nostril between rostral, first labial and 3 feebly swollen nasals, the anterior separated

from its fellow by 1 granule; upper labials 9–13; lower labials 8–12; mental about as long as broad; no postmentals or chin shields differentiated from the gular granules.

Back and limbs covered above with small, subequal convex, rugose, juxtaposed granules intermixed with groups of slightly larger granules; ventral granules subequal to dorsals, juxtaposed; limbs moderate, the adpressed hind limb reaching the elbow; tail covered above with scales or granules larger than those on back, more or less strongly keeled, below with smaller keeled granules; on either side of the base of tail in both sexes is a single row of 3 white tooth-like tubercles; tail shorter than head and body.

Color. Above, pale brown, a U-shaped dark brown marking from eye to eye around the occiput; eyelid anteriorly has a white margin; crown and back spotted with white and dotted with black, a series of dark brown saddle-like markings or paired blotches present or absent; tail alternately barred with darker and lighter. Below, white, the chin, throat, flanks and tail sometimes vermiculated with brown.

Size. Total length of ♂ (M.C.Z. 29953), 79 (50 + 29) mm., of ♀ (M.C.Z. 29954), 75 (45 + 30) mm., while one of 100 mm. from Berguent, Morocco is mentioned by Pellegrin (1910).

Remarks. I am by no means certain that *hirouxii* should be synonymized with *mauritanicus* for I have seen no topotypical material. It was separated by Doumergue as follows:

Scaling slightly unequal..... *mauritanicus*

Scaling composed of unequal elements of which the larger are four times the size of the smallest, clearly visible to the naked eye and prominent like the tubercles..... *hirouxii*

Its type locality, Mecheria, surrounded by *mauritanicus* records does not suggest that *hirouxii* is anything but a variant of this very variable species.

If *mauritanicus* is recognizable as I believe, then Werner (1914b) is correct in suggesting that Günther's Rio de Oro, and Pellegrin's Mauritania records of *elegans* should be referred to this race.

Doumergue (1899) lists a specimen of *mauritanicus* from Foum Tatahouine, Tunisia, and Werner (1899), possibly on the basis of this record, speaks of it as occurring in Tunisia. It may well be the meeting place of the two forms and some Tunisian records assigned to the typical form may, on examination, be found referable to *mauritanicus*.

Breeding. In Algeria some young hatched about August 15th, on the 28th one such measured 48 (29 + 19) mm. (Doumergue).

Hibernation. Doumergue (1899), taking specimens in Algeria on

2.ii, 10.iii, 14.vi, 5.x, and 8.xii, concludes that they may be found the year round. His book might be consulted for further notes, but in habits this gecko differs little from the typical form.

Habits. Nocturnal, but basking on the sand for a time after sunrise. During the day these geckos bury in the sand where they may be found only by digging or raking, which, in the sand dunes of Ouargla, frequently resulted in captures (Koenig).

Localities.[1] **Tunisia:** Foum Tatahouine (*fide* Doumergue). **Algeria:** Ahaggar (Hoggar Mountains); Ain Sefra; Asselar, Tilemsi; Batterie espagnol; Bir Krafech (Knafès); Biskra; Bled Berrada; Fort Flatters; Geryville; Kralfallah; Laghouat; *Le Kreider (Khreider); ? Mecheria (type of *hirouxii*; see *Remarks*); Oran; Oued Adrar; Oued Dermel; Souf; Tahoua; Tanezrouft, w. of Silet. **French Morocco:** *Berguent; (Boguent); Bou Denib; Mahiridja, Moulouya Valley; *Oglet Sedra (Oglat Cedra); Taourirt. **Rio de Oro. French West Africa:** Beziah, Zemmour; Port Etienne; Tintan (Tintane); Toueili (Touail).

Range. (? Tunisia or) Algeria west to Mauritania, French West Africa.

Genus Tropicolotes

1880d. *Tropicolotes* Peters, Monatsb. Akad. Wiss. Berlin, p. 306, pl. –, fig. 1 (type *tripolitanus*).

1885d. *Stenodactylus* Boulenger (part, not Fitzinger), p. 16.

Diagnosis. Digits free, long, straight, slightly compressed, not dilated, tips pointed, covered above with scales, those on the outer row projecting, forming a serration but not a lateral fringe, below with a series of transversely dilated tricarinate lamellae, clawed.

Pupil vertical; upper eyelid distinct, lower vestigial; dorsal lepidosis of large, subequal, almost smooth or strongly keeled, imbricate scales; tail moderate cylindrical, tapering. Males with or without preanal pores.

Range. Western Arabia and Sinai Peninsula, Egypt, west through southern Algeria and Sudan to Rio de Oro and French West Africa.

[1] Peters (1881a) reported *mauritanicus* from Bondjem, Libya (saying that both specimens agreed with Guichenot's short-legged variety) so that Zavattari (1937) lists this race from northern Tripolitania. Possibly intermediates do occur in western Libya (i.e. Tripoli), the matter requires investigation. It will be noted also that both *petrii* and *mauritanicus* apparently occur together in many places. Tornier's (1902c) record from Bipindi, Cameroons, repeated by Sternfeld (1910) is omitted as either incorrectly labeled or artificially introduced.

Key to the Species

1. Dorsals smooth or faintly keeled, ventrals smooth; preanal pores said to be present in males; postmentals large 2
   Dorsals and ventrals strongly keeled; preanal pores absent 3
2. Adpressed hind limb reaches beyond shoulder; eyes slightly larger; range: eastern Sinai Peninsula . . . . . *nattereri* (p. 51)
   Adpressed hind limb reaches elbow or nearly to axilla; eyes slightly smaller; range: Sinai west through Egypt and Sudan to Algerian Sahara . . . . . *steudneri* (p. 52)
3. A pair of very large postmentals followed by a pair of large chin-shields . . 4
   A pair of large postmentals, but no really enlarged chin-shields distinguishable as such 5
4. Postmentals extending backwards to form a long suture with second lower labial thus entirely excluding chin-shield from contact with first labial; midbody scale-rows 42–48; range: Egypt west through Libya to Tunisia *t. tripolitanus* (p. 54)
   Postmentals usually not extending backwards as far as second lower labial so that the enlarged chin-shields are in contact with first labial; supraorbital scales juxtaposed, smaller than those on the interorbital region; midbody scale-rows 35–41; range: British Somaliland . . . . . *t. somalicus* (p. 55)
5. Postmentals extending backwards to form a short suture with second labial; supraorbital scales imbricate, smaller than those on the interorbital region; midbody scale-rows 44; range: Algerian Sahara . . . . . *t. algericus* (p. 56)
   Postmentals failing to reach the second labial; supraorbital scales imbricate, larger than those on the interorbital region; midbody scale-rows 40–41; range: Rio de Oro and adjacent French West Africa . . . . . *t. occidentalis* (p. 57)

Tropicolotes nattereri Steindachner

1901. *Tropicolotes nattereri* Steindachner, Denks. Akad. Wiss. Wien, **69**, **1**, p. 326, pl. i. figs. 2–2a: Bir al Mashi (Mashiya), and Nawibi, Gulf of Akaba, Sinai, Egypt.
1933. Flower, p. 762.

Remarks. This alleged species is doubtfully distinct from *steudneri* Peters; Steindachner himself suggesting that the slight differences were individual rather than specific. His two specimens were said to differ from *steudneri* only in the characters given in the key. Flower also questions its validity. In this connection it might be remarked that *steudneri* has been recorded fom Sinai.

Localities. **Egypt:** Nawibi, Sinai Peninsula.

Range. Western Arabia and eastern Sinai, Egypt.

Tropicolotes steudneri (Peters)

1869e. *Gymnodactylus steudneri* Peters, Monatsb. Akad. Wiss. Berlin, p. 788: Sennar, Anglo-Egyptian Sudan.
1885d. Boulenger, p. 34.
1876. Gasco, p. 113.
1885d. *Stenodactylus petersii* Boulenger, Cat. Lizards Brit. Mus., **1**, p. 18, pl. iii, fig. 4: Egypt.
1887a. *Stenodactylus steudneri* Boulenger, p. 480.
1891c. *Tropicolotes steudneri* Boulenger, p. 108.
1896. Anderson, p. 97.
1898. Anderson, p. 48, pl. iv, fig. 9.
1901. Steindachner, p. 326.
1908. Werner, 1907, p. 1827.
1914. Andres, p. 34.
1919. Schmidt, p. 601.
1921. Andres, p. 17.
1925. Flower, p. 939.
1931b. Vinciguerra, p. 251.
1932. Kuntze, p. 331.
1933. Flower, p. 761.
1935d. Scortecci, p. 191.
1935e. Scortecci, p. 186.
1937. Zavattari, p. 530.
1938. Angel & Lhote, p. 355.

Name. Steudner's Pigmy Gecko.

Description. Snout short, slightly pointed, longer than the distance between the eye and the ear-opening; latter small, roundish, its diameter about a quarter that of the orbit; rostral as broad as high, with median cleft above; granular scales on snout smooth, larger than those on occiput; nostril between rostral, first labial and 2 nasals, the anterior in contact with its fellow; upper labials 7–9; lower labials 6–8; mental as long as broad; a pair of large postmentals in contact on the median line and forming a suture with the first lower labial only, followed by 1 or 2 pairs of chin shields of which the anterior is in contact with the first and second lower labials followed by slightly enlarged granules posteriorly merging into the gular granules.

Back and limbs covered above with large, subequal, smooth or faintly keeled, imbricate scales; ventral scales subequal to dorsal, smooth, imbricate; midbody scale-rows 50–51; males with[1] 2 preanal pores; limbs moderately slender, the adpressed hind limb reaching the

[1] I have seen no males and take this from Anderson (1898).

elbow or nearly to the axilla; tail covered above and below with smooth or faintly keeled, imbricate scales; on either side of the base of tail are 2 white flattened tubercles; tail much longer than head and body.

Color. Above, sandy buff or brownish; a dark brown streak from nostril through eye to shoulder; occiput and back spotted with dark brown the spots tending to form cross bars, some paler speckling; limbs sparsely spotted; tail with brown cross bars. Below, whitish.

Size. Length of type (Berlin Mus.) from snout to anus 30 mm.; total length of *petersii* type (?) ♀ (Brit. Mus.), 51+ (28 + 23+) mm., tail reproduced; of another (Anderson), 68 (29 + 39) mm.

Longevity. 1 year, 10 months, 6 days at Giza (Flower).

Diet. Flower (1933) mentions *Lepisma* (so-called silver fish) as being about the only living thing seen in two habitats where he captured these pigmy geckos. In captivity, however, they ate one or two house flies daily.

Temperament. Agile and active, difficult to capture on account of its small size and coloration blending with surroundings (Anderson).

Habits. In captivity it was observed that they did not burrow into the deep sand of their vivarium, but passed the entire time on top of some rocks, looking very alert and making interesting and easily managed pets (Flower, 1933). The opposite view was expressed by Andres (1914) who evidently did not provide suitable conditions for his gecko.

Habitat. Stone-strewn wastes and sandy deserts where they may be found in holes such as those occupied by *Eremias*, or beneath stones (Anderson). Flower, who describes several habitats in detail, refers to one as "an absolutely barren, wind-swept, sunburnt, dry stony hill." In the Sahara, according to Lhote, they live on tree trunks (Angel), possibly this form is subspecifically distinct?

Localities. **Algeria:** Oued Igharghar on Amguid heights in central Sahara. **Libya:** Cufra; El Airenat; El Giof; El Telib; Es Zurgh; Et Tag. **Egypt:** Aburoash, Embaba District; desert east of Esna; desert east of Matana; Gebel el Anqabiya; *Gebel Mokattam east of Cairo; Giza; Helwan; Kalamshah, Fayum; Wadi Hof; Luxor; Philae; Sinai. **Anglo-Egyptian Sudan:** Halaib; Kosheh, Nubia; Sennar. (With regard to Sennar Flower (1933) gives reasons for doubting that the type ever came from there.)

Range. Sinai, Egypt and Sudan west to the Algerian Sahara.

Tropicolotes tripolitanus tripolitanus Peters

1880d. *Tropicolotes tripolitanus* Peters, Monatsb. Akad. Wiss. Berlin, p. 306, pl. –, fig. 1: Uadi M'bellem, Tripolitania.
1881a. Peters, p. 366 (reprint of last).
1891c. Boulenger, pp. 96, 108.
1894e. Boulenger, p. 722.
1896. Anderson, p. 97.
1898. Anderson, p. 47, pl. iv, fig. 8.
1899. Doumergue, p. 528, pl. v, fig. 6.
1903. Mayet, p. 12.
1909a. Werner (part), pp. 599, 628.
1913. Ghigi, p. 284.
1927. Calabresi (part), p. 38.
1929b. Werner (part), pp. 8, 21.
1929. Zavattari, p. 87.
1930a. Zavattari, p. 265.
1931b. Vinciguerra, p. 250.
1932. Kuntze, p. 331.
1933. Flower, p. 761.
1934. Brongersma, p. 166.
1937. Werner (part), p. 31.
1937. Zavattari, p. 530.
1885d. *Stenodactylus tripolitanus* Boulenger, p. 19.

Further citations of "*tripolitanus*" will be found under the races.

Name. Tripoli Pigmy Gecko.

Description. Snout short, slightly pointed, longer than the distance between the eye and the ear-opening; latter small, roundish or vertically oval, its diameter about a quarter that of the orbit; rostral broader than high, with median cleft above; granules on snout smooth or feebly keeled, subequal to, or larger than, those on occiput; nostril between rostral, first labial and 2[1]nasals, the anterior in contact with its fellow; upper labials 6–9; lower labials 6–7; mental triangular; a pair of large postmentals in contact on the median line, forming a long suture with the second lower labial and so excluding the adjacent large chin-shield from contact with the first labial.

Back and limbs covered above with large, subequal, keeled, imbricate scales, ventrals smaller than, caudals larger than, the dorsals; midbody scale-rows 42–48; limbs slender, the adpressed hind limb reaching the axilla; on either side of the base of tail 2 white tubercles; tail much longer than head and body.

[1] "3" in Boulenger (1891c) is a misprint.

Color. Above, pale yellowish; a dark brown streak from nostril through eye to shoulder; crown and back minutely speckled with dark brown and occasional indistinct white flecks; limbs and anterior third of tail like back, posteriorly with as many as sixteen broad brown crossbars. Below, whitish, uniform or tail yellowish spotted with dark brown.

Size. Total length of type (Berlin Mus.), 66 (28 + 38) mm., exceeded by one mentioned by Anderson (1898), 84 (35 + 49) mm.

Remarks. The type was collected by Gerhard Rohlfs and A. Stecher when *en route* to Cufra in 1878–9.

Diet. Vinegar flies, tiny spiders, very small mealworms, grubs and crickets (Mertens in Kuntze, 1932).

Longevity. Six months and still alive at Frankfurt-a-M. (Mertens).

Habitat. Beneath stones and among loose sand and pebbles in the vicinity of Giza pyramids (Anderson).

Localities. **Tunisia**: Djebel Bou Hedma; Foum Tatahouine; Gabes to Gafsa; Oum (Ocum) Ali near Gafsa; Taferma, between Gafsa and Tozeur. **Libya**: El Agheila; Gialo; Giofra; Sirtica; Uadi Mbellem. **Egypt**: Gebel Mokattam; *Giza.

Range. Egypt west to Tunisia.

Tropicolotes tripolitanus somalicus Parker

1901a. *Tropicolotes tripolitanus* Boulenger (not Peters), p. 48.

1942. *Tropicolotes somalicus* Parker, Bull. Mus. Comp. Zoöl., **91**, p. 46: At 42° 50′ E, 10° 20′ N, British Somaliland.

Description. Snout longer than the distance between the eye and the ear-opening; rostral broader than high, with median cleft above; granules on head keeled; nostril between rostral, first labial and 2 nasals; upper labials 7; lower labials 6; mental triangular; a pair of large postmentals in contact on the median line, adjacent chin-shields much smaller and widely separated and in contact with the first and second lower labials; no other enlarged chin-shields distinguishable as such.

Back, limbs and belly covered with large strongly keeled scales, of which 4 of the largest dorsals equal the distance between nostril and eye; midbody scale-rows 35–41; limbs moderate, the adpressed hind limb reaching the elbow; subdigital lamellae tricarinate.

Color. Above, gray brown; a dark brown streak from nostril through eye to above shoulder; back with a few darker flecks; tail with darker

and lighter crossbars. Below, whitish, with a very few, small dark dots.

Size. Total length of type ♂ (B.M. 1937.12.5.693), 63 (28 + 35)mm.

Remarks. Known to me only from the description of the eight types, from which the above description is adapted.

Habitat. Apparently confined to the very arid coastal zone where seven of these geckos were taken in the ground, the terrain being sandy, strewn with stones, and almost devoid of vegetation. Alt. 3000 feet.

Localities. **British Somaliland:** Biji and three other localities designated only by latitude and longitude in Parker's paper.

Range. British Somaliland.

Tropicolotes tripolitanus algericus subsp. nov.

1895. *Tropicolotes tripolitanus* Koenig (part, not Peters), p. 405.
1909a. Werner (part), pp. 599, 628.
1929b. Werner (part), pp. 8, 21.
1937. Werner (part), p. 31.
1920c. *Stenodactylus tripolitanus* Chabanaud (not Peters), p. 461.

Native name. Sambo nesariel (in Ahaggar region: Werner).

Holotype. Museum of Comparative Zoölogy, No. 27,485, an adult ♂ from Kenatsa (Kenadsa), south of Colomb Bechar, western Algerian Sahara, collected by the late Franz Werner, April 26, 1928.

Diagnosis. As given in preceding key.

Description. Snout short, slightly pointed, longer than the distance between the eye and the ear-opening; latter small, roundish, its diameter about a quarter that of the orbit; rostral broader than high, with median cleft above; granular scales on snout smooth, subequal to those on occiput; supraorbital scales imbricate, smaller than those on the interorbital region; nostril between rostral, first labial and 2 nasals, the anterior in contact with its fellow; upper labials 8–9; lower labials 8–8; mental triangular, as long as broad; a pair of large postmentals in contact on the median line, forming a short suture with the second lower labial; no other enlarged chin-shields distinguishable as such.

Back, limbs, belly and tail covered with large, subequal, strongly keeled, imbricate scales; midbody scale-rows 44; limbs slender, the adpressed hind limb reaching the axilla; on either side of the base of tail in males are 2 white spinose tubercles; tail much longer than head and body.

Color. Above, pale sandy white; a dark brown streak from eye to beyond shoulder; back with indistinct and broken brown blotches which tend to form indefinite wavy crossbars; tail with ten brown crossbars, yellow posteriorly. Below, whitish, uniform.

Size. Total length of type ♂ (M.C.Z. 27485), 63 (29 + 34) mm.

Remarks. This is the gecko referred to by Werner (1929b), taken at Kenatsa, which is about 1000 miles southwest of Tripoli and 1200 miles northeast of Rio de Oro, type locality of *occidentalis*, between which and *tripolitanus* it occupies an intermediate position. Whether the other four examples cited above and listed below, conform to the description is unknown.

Habitat. Beneath a stone in eastern mountains near Ferme Dufour.

Localities. **Algeria:** Ahaggar (Hoggar Mountains); Biskra; Ferme Dufour near Biskra; Figuig Oasis; *Kenatsa (Kenadsa).

Range. Algerian Sahara.

Tropicolotes tripolitanus occidentalis Parker

1903. *Tropicolotes tripolitanus* Günther (not Peters), p. 298.
1924a. Chabanaud, p. 54.
1942. *Tropicolotes occidentalis* Parker, Bull. Mus. Comp. Zoöl., **91**, p. 47: Rio de Oro.

Description. Snout longer than the distance between the eye and the ear-opening; rostral broader than high, with median cleft above; scales on snout feebly keeled; supraorbital scales imbricate, larger than those on the interorbital region; nostril between rostral, first labial and 2 nasals; upper labials 7; lower labials 6; mental triangular; a pair of large postmentals in contact on the median line, failing to reach the second lower labial; no other enlarged chin-shields distinguishable as such.

Back, limbs and belly covered with large strongly keeled scales, of which 4.5 of the largest dorsals equal the distance between nostril and eye; midbody scale-rows 40–41; the adpressed hind limb reaches to between wrist and elbow or elbow; subdigital lamellae tricarinate.

Color. Above, straw color; a brown streak from the eye to above the shoulder; back with brown blotches sometimes coalescing to form about seven indefinite, wavy, crossbars; tail with regular brown crossbars. Below, whitish; tail pale brown.

Size. Total length of type ♂ (B.M. 1908.6.13.15), 66 (30 + 36) mm.

Remarks. Known to me only from the description of the adult and juvenile male types, from which the above description is adapted.

Localities. **French West Africa:** Port Etienne. **Rio de Oro.**
Range. French West Africa and adjacent Rio de Oro.

Genus Alsophylax

1843. *Alsophylax* Fitzinger, Syst. Rept., pp. 18, 90 (type *Lacerta pipiens* Pallas).
1874. *Bunopus* Blanford, Ann. Mag. Nat. Hist. (4), **13**, p. 454 (type *tuberculatus*).

Diagnosis. Digits free, long, straight, slightly compressed, not dilated, tips pointed, covered above with scales, those on the outer row projecting, forming a serration but not a lateral fringe, below with a series of transversely dilated, tuberculately swollen, lamellae, clawed.

Pupil vertical; upper eyelid distinct, lower vestigial; dorsal lepidosis of small, smooth, juxtaposed or subimbricate scales, intermixed with large smooth or strongly keeled tubercles; tail moderate, cylindrical, tapering. Males with preanal, and with or without femoral pores.

Range. Asia (from Tibet to Arabia) and North Africa (? Egypt).

Remarks. It is with some misgivings that this genus is included in the African fauna. Its acceptance entirely depending on whether the types of *blanfordii* came from Egypt, as alleged by Strauch. Geckos are so subject to transportation on palm-thatched dhows carrying sand ballast that one hesitates to exclude the possibility that the types may have been imported accidentally. It certainly seems strange that no further examples of this common Arabian species have been recorded as taken in Egypt during the past sixty years.

Alsophylax blanfordii (Strauch)

1887. *Bunopus blanfordii* Strauch, Mém. Acad. Imp. Sci. St.-Pétersbourg (7), **35**, No. 2, p. 61, pl. ii, figs. 13–14: Egypt.
1896. Anderson, pp. 21, 22, 73, 75, 84, 88, 111.
1898. Anderson, p. 50, fig. 4.

Description. Snout short, rounded, longer than the distance between the eye and the ear-opening, latter moderate or large, vertically oval, its diameter about a third that of the orbit; rostral broader than high, with median cleft above; granules on snout unequal, convex, more or less subequal to the tubercles scattered among the minute granules on occiput; nostril between rostral, first labial and 2–3 nasals, the anterior separated from its fellow by 2–4 granules; upper labials 10–12; lower labials 9–11; mental longer than broad; no postmentals or chin-shields

though the postmental-sublabial granules are slightly enlarged while posteriorly merging into the gular granules.

Back and limbs covered above with small, unequal, smooth or feebly keeled, juxtaposed or subimbricate, granular scales intermixed with larger, strongly keeled, trihedral tubercles forming 14–16 more or less regular longitudinal rows; ventral scales faintly keeled, mucronate, imbricate; limbs slender, the adpressed hind limb reaching nearly to axilla or shoulder; digits inferiorly with 9–10 transversely dilated scales under first toe, 18–19 under the fourth; tail covered above with irregular smooth scales and 6 (3 + 3) rows of strongly keeled tubercles, each whorl of tubercles being separated by 2–3 rows of the smaller scales, on either side of the base of tail in both sexes is a single row of 2 white tooth-like tubercles; males with as many as 31 preano-femoral pores forming an ill-defined and interrupted series; tail longer than head and body.

Color. Above, sandy white, a reddish brown streak from nostril through eye to occiput where it forms a U-shaped mark with its fellow; head and lips more or less speckled with reddish brown; back spotted with reddish brown or the spots coalescing to form a series of broad crossbars; limbs also obscurely spotted or barred; tail distinctly crossbarred. Below, white, uniform.

Size. Total length of ♂ (Brit. Mus.), 112 (49 + 63) mm. from Hadramaut, a ♀ (M.C.Z. 9667), 105+ (52 + 53+) mm., from Akaba. The larger cotype (Petersburg Mus.) was only 83 (41 + 42) mm.

Remarks. Much more detailed accounts will be found in Strauch and Anderson, both of whom figure types. These two cotypes, originally in the collection of a Würtemberg prince, were forwarded by Erber to Strauch under the name of *Gymnodactylus scaber* to which, as also to *Hemidactylus t. turcicus* occurring in the same localities, it bears a strong superficial resemblance. Doubtless further references to its occurrence in Arabia may be found in the literature.

Range. Arabia and Egypt (see remarks about this under the genus).

Genus Saurodactylus

1843. *Saurodactylus* Fitzinger, Syst. Rept., pp. 18, 91 (type *Gymnodactylus mauritanicus* Duméril & Bibron, by subsequent designation of Boettger).

Diagnosis. Digits free, long, straight, slightly compressed, not dilated, tips pointed, covered above with scales, not denticulate laterally, below with a series of transversely dilated, smooth lamellae, clawed.

Pupil vertical; upper eyelid distinct, lower vestigial; dorsal lepidosis of small, smooth, juxtaposed granules, uniform or intermixed with tubercles; tail moderate[1], cylindrical, tapering. Males without preanal or femoral pores.

Range. French Morocco and Algeria.

Key to the Species

No enlarged tubercles among the subuniform dorsolateral granules; tail stout, swollen, not or but slightly longer than the head and body; anterior nasals *usually* in contact behind the rostral . . . . . *mauritanicus* (p. 60)

4–6 irregular rows of enlarged tubercles among the dorsolateral granules; tail slender, gradually tapering, *much* longer than the head and body; anterior nasals separated by a single granule . . . . . *fasciatus* (p. 62)

SAURODACTYLUS MAURITANICUS (Duméril & Bibron)

1836. *Gymnodactylus Mauritanicus* Duméril & Bibron, Erpét. Gén., **3**, p. 414: Algiers (some doubt that it came from the township).
1841. Schlegel, p. 138.
1862b. Strauch, p. 24.
1874. Boettger, p. 137.
1885d. Boulenger, p. 33.
1887. Strauch, p. 51.
1843. *Saurodactylus mauritanicus* Fitzinger, pp. 18, 91.
1883a. Boettger, p. 125.
1890d. Boulenger, p. 77.
1891c. Boulenger, pp. 96, 109, pl. xiii, fig. 1.
1893a. Boettger, p. 22.
1894. Oliver, p. 107.
1896. Doumergue, p. 477, pl. viii, figs. 5–5a.
1899. Doumergue, p. 525, etc. (reprint of last).
1908. Zulueta, p. 452.
1909a. Zulueta, p. 351.
1916e. Chabanaud, p. 228.
1917. Maluquer, p. 429.
1919c. Chabanaud, p. 566.
1926a. Pellegrin, 1925, p. 316.
1927a. Pellegrin, p. 261.
1931c. Werner, p. 276, pl. i, fig. 2.
1932. Ghigi, p. 208.
1934. Brongersma, p. 166.
1935. Hediger, p. 4.
1843. ?*Saurodactylus desertorum* Fitzinger, Syst. Rept., p. 91: Africa interior (Mus. Vindob. No description; *nomen nudum*).

[1] Though slender or swollen.

1845. *Goniodactylus ?Mauritanicus* Gray, p. 172.
1878. Müller, p. 638.

Another citation of "*mauritanicus*" will be found under *fasciatus*.

Description. Snout short, bluntly pointed, as long as the distance between the eye and the ear-opening; latter small, roundish or slightly oval, its diameter about a third that of the orbit; rostral broader than, sometimes nearly twice as broad as, high, with median cleft above; granules on snout convex, larger than those on occiput, subequal to those on back; nostril between rostral, first labial and 3, rarely 2, nasals, the anterior in contact with, rarely separated from, its fellow by 1 granule; upper labials 5-6; lower labials 5-6; mental large, as long as, or shorter than, broad; a pair of large postmentals separated or in contact on the median line; an outer pair of chin-shields well differentiated from the minute gular granules.

Back covered with small, subuniform, smooth, juxtaposed granules; ventral scales two or three times larger than dorsals, imbricate; upper portion of limbs with imbricate scales or subimbricate granular scales, lower portion like back; limbs moderate or slender, the adpressed hind limb reaching the elbow or axilla; tail covered above with scales which are larger than the dorsals, imbricate, below by heterogeneous scales of which the median series may be transversely dilated; no tubercles on either side of base of tail; tail slightly shorter or longer than head and body.

Color. Above, gray to reddish brown, a broad brown streak bordered with white above and below, at least anteriorly, from nostril through eye to shoulder or beyond; back uniform or spotted with darker, sometimes several longitudinal rows of dark-edged white spots; tail pale yellowish, spotted with brown or black, or brownish spotted with yellow. Below, whitish, uniform or throat dusky.

Size. Total length of ♂ (M.C.Z. 25138), 55 (28 + 27) mm., from Mogador; of ♀ (M.C.Z. 29937), 63 (34 + 29) mm., from Djebel Guelis. The unsexed holotype (Paris Mus.), was 59 (29 + 30) mm.

Habits. Not entirely nocturnal, having been seen at 5 p.m. in a stone-strewn shady forest (Doumergue), nor yet as active as other straight-toed desert geckos (Werner).

Habitat. Taken beneath a heap of, or single, stones (Doumergue) where they rest on the ground, never clinging to the stone as would a *Tarentola* (Werner; Hediger).

Localities. **Spanish Morocco:** Melilla; Tifazor; Inmehiaten River. **French Morocco:** *Agadir; Agaouz, Seqsaoua; *Asni, Grand Atlas; Chioderma (Schioderma) Plateau; Dar Anflous, Imi

nta Kandout; Dar Goudafi; Dar M'Zoudi; *Djebel Guelis; Djebel Hadid; Marrakesh; *Mogador; Oued Tensift; *Taforalt-Berkane Pass; Taroudant, Upper Sous Valley; Zaouia el Moktar. **Algeria:** Algerian Sahara; Algiers (? type loc.); Mizab, e. of Sebdou; Nemours; Sersou (Sersu); Tleta, Ozails.

Range. Spanish and French Morocco east to Algeria.

Saurodactylus fasciatus Werner

1929b. *Saurodactylus mauritanicus* Werner (not Duméril & Bibron), p. 13.
1931c. *Saurodactylus fasciatus* Werner, Sitzb. Akad. Wiss. Wien, **140, 1,** p. 276, pl. i, fig. 1: Djebel Zalagh, Fes, French Morocco.
1935. Hediger, p. 4.
1937. Hediger, p. 187.

Description. The type and topotype differ from *mauritanicus* only in the characters given in the key and in having the granules on snout somewhat larger than those on the dorsum, while the adpressed hind limb reaches the axilla in both. The coloring differs somewhat.

Color. Above, reddish brown, a broad brown streak, bordered with white above and below, from nostril through eye to ear; back with a series of dark brown dorso-lateral blotches (♂) which tend to form crossbars (♀) that are posteriorly edged with white; limbs and tail irregularly spotted with brown or white. Below, whitish, uniform.

Size. Total length of topotype ♂ (M.C.Z. 27349), ? (31 + ?) mm., of holotype ♀ (M.C.Z. 29935), 60 (27 + 33) mm. Werner's measurements of the latter were 60 (25 + 35) mm.

Remarks. In addition to the topotype and holotype taken by Werner, three other examples (Hediger coll.) are presumably in Basel Museum. The species is perfectly distinct, despite its close affinity to *S. mauritanicus.* If still in existence, the type of *desertorum* Fitzinger in "Mus. Vindob." should be examined.

Habitat. Beneath stones on a bush-grown slope (Hediger).

Localities. **French Morocco:** *Djebel Zalagh near Fes Festo; Moulay Idris; Fes to Ouezzan.

Range. French Morocco (region of Fes).

Genus Gymnodactylus

1825. *Gymnodactylus* Spix, Animalia Nova Novae Lacert. Brasil., p. 17, pl. xviii, fig. 1 (type *geckoides*).
1827. *Goniodactylus* Schlegel, Isis von Oken, p. 290 (type "*marmoratus* Kuhl" (Boie) Fitzinger).

1827b. *Cyrtodactylus* Gray, Philos. Mag. (2), **3**, p. 55 (type *pulchellus*).
1843. *Anomalurus* Fitzinger, Syst. Rept., pp. 18, 90 (type *miliusii* Duméril & Bibron = *milii* Bory de St. Vincent).
1843. *Dasyderma* Fitzinger, Syst. Rept., pp. 18, 92 (type *geckoides* Spix).
1843. *Cyrtopodion* Fitzinger, Syst. Rept., pp. 18, 93 (type *Stenodactylus scaber* Heyden).
1845. *Cubina* Gray, Cat. Lizards Brit. Mus., p. 175 (type *Gymnodactylus fasciatus* Duméril & Bibron).
1860. *Puellula* Blyth, Journ. Asiatic Soc. Bengal, **29**, p. 109 (type *rubida*).
1867. *Geckoella* Gray, Proc. Zool. Soc. London, p. 98, pl. ix (type *punctata* = *Gymnodactylus triedrus* Günther).
1868. *Dinosaura* Gistel, Blicke Leben Natur. Menschen, p. 145 (type *Stenodactylus scaber* Heyden. Preoc. by *Dinosaurus* Fischer-Waldheim, 1847).

Diagnosis. Digits free, long, slender, the distal phlanges more or less compressed and more or less forming an angle with the basal portion, not dilated, tips pointed, covered above with scales, not denticulate laterally, below with a series of more or less distinct scansors and transversely dilated lamellae, clawed, the claw between two enlarged scales of which the lower is more or less deeply notched under the claw.

Pupil vertical; upper eyelid distinct, lower rudimentary; dorsal lepidosis of small, subequal, smooth, juxtaposed granules, (uniform[1] or) intermixed with tubercles; tail depressed, tapering. Males with preanal[2] pores, both sexes with postanal sacs.

Range. Australia (inc. Pacific Islands); Asia (inc. East Indies); Europe (eastern Mediterranean), and Africa (Egypt to ? Eritrea).

Key to the Species

Dorsal tubercles large, each, if not in contact, separated from its neighbour by 1–2 small scales; ventrals in 16–20 longitudinal rows; scansors or lamellae under first toe 10–12, under fourth 22–26; range: Asia west to Egypt, south to ?Eritrea..... *scaber*.
(p. 64)

Dorsal tubercles small, each separated from its neighbour by 3–4 granules; ventrals in 24–28 longitudinal rows; scansors or lamellae under first toe 6–9, under fourth 15–19; range: Europe and Asia, introduced into North Africa)..... (*kotschyi*)
(p. 65)

[1] In some non-African geckos.
[2] Absent in a few non-African species, some of which have femoral pores.

Gymnodactylus scaber (Heyden)

1827. *Stenodactylus scaber* Heyden, in Rüppell, Atlas Reise Afrika, **1**, Rept., p. 15, pl. iv, fig. 2: Vicinity of Tor (i.e. Sinai, Egypt) and also from the Abyssinian Coast.
1836. *Gymnodactylus scaber* Duméril & Bibron (part), p. 421.
1862b. Peters, p. 271.
1876. Gasco, p. 113.
1885d. Boulenger, p. 27.
1893a. Boettger, p. 22.
1896. Anderson, pp. 70, 75, 77, 84, 89, 112.
1898. Anderson, p. 54, pl. v, fig. 1.
1933. Flower, p. 763.
1934. Brongersma, p. 165.
1843. *Gonyodactylus* (*Cyrtopodion*) *scaber* Fitzinger, p. 93.
1867a. *Gymnodactylus geckoides* Steindachner (not Spix), p. 17.
1875. Schreiber (not Spix), p. 482.
1868. *Dinosaura scaber* Gistel, p. 145.

Rochebrune's (1884a, p. 79) erroneous record from Senegambia is ignored. Asiatic citations are omitted from the above bibliography and have not been consulted for ecological or other data.

Name. Rough-scaled Gecko (or Rough-skinned Gecko: Flower).

Description. Snout long, rounded, longer than the distance between the eye and the ear-opening; latter large, vertically oval, its vertical diameter nearly, or more than, half that of the orbit; rostral twice as broad as high, with median cleft above; granules on snout convex, smooth, larger than those between the tubercles on occiput and scales on back; nostril between rostral, first labial and 3 nasals, the anterior separated from its fellow by 1 granule; upper labials 8–13; lower labials 8–12; mental about as long as broad; a pair of large postmentals in contact on the median line followed by 1–2 pairs of chin-shields; throat covered with somewhat unequal subimbricate scales.

Back and limbs covered above with small, unequal, smooth, subimbricate scales intermixed with large, strongly keeled, subtrihedral tubercles forming 10–14 regular longitudinal rows in contact with each other or separated by 1–2 rows of small scales; ventral scales larger, imbricate, in about 16–20 longitudinal rows; males with 4-7 preanal pores; limbs long, the adpressed hind limb reaching the shoulder; 10–12 scansors or lamellae under the first toe, 24–26 under the fourth; tail covered above with small smooth scales and 6 longitudinal rows of long, pointed, keeled tubercles, below at base with irregular imbricate scales distally with transversely dilated shields; on either side of

base of tail in both sexes are a few enlarged scales continguous with the subcaudals; length of tail longer than the length of head and body.

Color. Above, pale sandy buff to gray conspicuously spotted with brown; tail with brown crossbars. Below, whitish, uniform.

Size. Total length of ♀ (M.C.Z. 47847), 112 (51 + 61) mm. from Port Sudan; Malcolm Smith (1935, p. 43) gives that of an unsexed gecko (presumably Asiatic) as 117 (50 + 67) mm.

Breeding. On August 2, at Port Sudan, two pairs of embryo—containing eggs, latter measuring from 10 x 8.5 to 11 x 8 mm., are presumably referable to this species as I found them in loose, wind-blown sand and debris against boulders beneath which I captured the two female geckos that constitute the first record of this species in the Sudan.

Localities. **Egypt:** Near Cairo (*fide* Gasco); Kosseir on Red Sea Coast (Klunzinger); Tor, Sinai Peninsula (Heyden). **Anglo-Egyptian Sudan:** *Port Sudan (Loveridge). ? **Eritrea:** as "Abyssinian Coast" (Heyden).

Range. Asia (northwest India to Arabia) west to Egypt, south to ? Eritrea.

Gymnodactylus kotschyi Steindachner

1870a. *Gymnodactylus Kotschyi* Steindachner, Sitz. Akad. Wiss. Wien, **62, 1,** p. 329, pl. i, fig. 1: "Goree, Senegal." (? error).
1884a. Rochebrune, p. 80.
1885d. Boulenger, p. 29.
1919. Schmidt, p. 601.

Description. Snout long, rounded, longer than the distance between the eye and the ear-opening; latter large, roundish, or vertically or horizontally oval, its long diameter from a third to half that of the orbit; rostral broader than high, with median cleft above; granules on snout convex, smooth, larger than those between the tubercles on occiput and back; nostril between rostral, first labial and 3, rarely 2, nasals, the anterior separated from its fellow by 1–2 granules; upper labials 7–10; lower labials 6–8; mental as long as, or longer or shorter than, broad; a pair of large postmentals in contact or separated on the median line; followed by 2 or more pairs of chin shields; throat covered with unequal juxtaposed granules.

Back and limbs covered above with small, unequal, smooth, juxtaposed granules intermixed with large, strongly keeled tubercles forming 8–12 regular longitudinal rows separated from one another by 3–4 rows of granules; ventral scales larger, imbricate, in about 24–28

longitudinal rows; males with 2–4 (5) preanal pores; limbs long, the adpressed hind limb reaching the axilla or shoulder; 6–9 scansors or lamellae under the first toe, 15–19 under the fourth; tail covered above with small, smooth, imbricate scales and 6 longitudinal rows of long, pointed, keeled tubercles, below at base with irregular imbricate scales distally with transversely dilated shields; on either side of base of tail in both sexes are a few enlarged scales continuous with the subcaudals; length of tail longer than the length of head and body.

Color. Above, gray, flecked with darker; back with a series of dark brown, posteriorly light-edged, angular crossbands; digits and tail crossbanded. Below, whitish, uniform.

Size. Total length of ♂ (M.C.Z. 38453), 103 (47 + 56) mm., from Paros Island; ♀ (M.C.Z. 38449), 108 (51 + 57) mm. from Ios Island.

Remarks. Steindachner probably erred in thinking that he got the type on Goree Island off Dakar; at least that is the view of Wettstein according to Mertens and Müller (1928, p. 24). Boulenger (1885d) and others listed it from Egypt, but Anderson (1898) rejected it. Though probably not an African species I have included this common eastern Mediterranean gecko as likely to be introduced from Cyprus or Palestine.

Stepanek (1936, 1937) and Wettstein (1937) have described nine races, often on characters which do not inspire much confidence in the validity of the alleged races. To avoid ambiguity, however, the above description is based entirely on 24 geckos from 9 islands in the Cyclades, Aegean Sea.

Breeding. Between June 30 and July 7, on Amorgas Island, Cyclades, 2 eggs, measuring 8.5 x 10.5 and 9 x 11 mm. respectively, were collected by Werner (M.C.Z. 37011).

Range. Europe and Asia (countries bordering eastern Mediterranean from southern Italy to Palestine, also Persia). Reported from Africa (Senegal and Egypt) either in error or introduced.

Genus Quedenfeldtia

1883a. *Quedenfeldtia* Boettger, Abh. Senckenberg. Ges., **13**, p. 125 (type *Gymnodactylus trachyblepharus* Boettger).

1914b. *Narudasia* Methuen & Hewitt, Ann. Transvaal Mus., **4**, p. 126, pl. ix, fig. 1 (type *festiva*).

Diagnosis. Agrees with *Gymnodactylus* as defined here except that *Quedenfeldtia* has no enlarged tubercles on back and tail; males are without preanal pores; neither sex has postanal sacs.

The describers of *Narudasia* compared it with *Stenodactylus*. Parker (1936c) was the first to point out its close relationship with *Gymnodactylus*, from which it differs in the less well-developed postmentals in addition to the characters mentioned above.

Range. French Morocco and South West Africa.

Synopsis of the Species

Upper eyelid posteriorly edged with 3–5 prominent spine-like scales; 3 postmentals in contact with mental which is much broader than long; range: French Morocco ..... *trachyblepharus* (p. 67)

Upper eyelid posteriorly edged with 1–2 inconspicuous, sometimes absent, spine-like scales; 1–2, rarely 3, scarcely enlarged postmentals in contact with mental which is much longer than broad; range: South West Africa *festiva* (p. 69)

Quedenfeldtia trachyblepharus (Boettger)

1874. *Gymnodactylus trachyblepharus* Boettger, Abhand. Senckenberg. Ges., **9**, p. 138, pl. i, fig. 3: Djebel Hadid, near Mogador, French Morocco.
1885d. Boulenger, p. 34.
1891c. Boulenger, pp. 96, 110.
1893a. Boettger, p. 23.
1898. Doumergue, p. 524, pl. v, figs. 3–3b.
1925b. Pellegrin, p. 880.
1926a. Pellegrin, 1925, p. 316.
1926e. Pellegrin, p. 121.
1927a. Pellegrin, p. 261.
1929b. Werner, pp. 13, 21.
1931c. Werner, p. 277, pl. i, fig. 3.
1933. Wettstein, p. 63.
1934. Brongersma, p. 166.
1936h. Loveridge, p. 48.
1883a. *Saurodactylus* (*Quedenfeldtia*) *trachyblepharus* Boettger, p. 126.
1916e. *Gymnodactylus moerens* Chabanaud, Bull. Mus. Hist. Nat. Paris, **22**, p. 228, figs. 1–2: Imi n'Tanout (Tahout) and Telouet, French Morocco.
1927a. Pellegrin, p. 261.
1929b. Werner, p. 21.
1933. Wettstein, p. 62.

Description. Snout short, rounded, slightly longer than the distance between the eye and the ear-opening; latter moderate, horizontally oval, its diameter half that of the orbit; upper eyelid edged by pro-

jecting, triangular, spine-like scales; rostral twice as broad as high, with median cleft above; granules on snout, convex, smooth, larger than those on occiput and back; nostril between rostral, first labial and 3–5 nasals, the anterior separated from its fellow by 1–2 granules; upper labials 7–9; lower labials 5–7; mental shorter than broad; bordered by 3 large postmentals followed by some irregularly enlarged chin shields which posteriorly merge into the gular granules.

Back and limbs covered above with small, subequal, smooth, juxtaposed granules; ventral scales larger, imbricate, in about 20–26 longitudinal rows; males without pores but with preanal and femoral patches of callose brown scales; limbs moderate, the adpressed hind limb reaching axilla or shoulder; 7–8 scansors or lamellae under first toe, 15–18 under the fourth; tail covered above with small, uniform, smooth, juxtaposed scales, below at base with irregular imbricate scales, distally with transversely dilated shields; on either side of base of tail in both sexes is a single, large, smooth, rounded tubercle; tail longer than head and body.

Color. Above, grayish olive, spotted and vermiculated with reddish brown or black, with or without four prominent black spots in scapula region; sides of neck with some light yellow spots; tail with narrow, indistinct, yellow crossbars. Below, whitish; throat of males with two or three black chevron-shaped markings sometimes coalescing to form a network, in females obsolescent chevrons or scattered spots; on preanal and femoral region of males patches of reddish brown.

Size. Total length of type (Senckenberg Mus.), 97 (40 + 57) mm., of a ♂ (M.C.Z. 7431), 97 (45 + 52) mm.

Remarks. The grounds on which Chabanaud separated *moerens* from *trachyblepharus* appear to be inadequate. Its most striking difference, the presence of four large spots in the scapula region, is inconstant as they were both present and absent in the series of nine cotypes. Apparently they were present in both sexes of the four geckos from Goundafa reported on by Wettstein.

The other differences cited by Chabanaud, who had but a single ♂ *trachyblepharus* for comparison, may be summarized as follows, my comments following in parentheses. In *moerens:* Snout longer, somewhat more broadly rounded at the tip (a poor character); eye larger, its longitudinal diameter included about 1.5 times in its distance from the end of the snout (this is contradicted by the figure which shows it 2 times, in Chabanaud's *trachyblepharus* said to be rather more than twice, in our series of six *trachyblepharus* it ranges from 2.25 to 2.5); rostral not so high, so seemingly broader (subject to variation); nostril

between rostral, a crescentic rim which excludes first labial, and 2 nasals not dissimilar to those covering the rest of the snout (the development of this rim varies considerably, in M.C.Z. 19640 it excludes the first labial, in others two or more nasals; the latter show much variation in size though admittedly in *trachyblepharus* the upper anterior is markedly larger than the other granules on snout. It seems obvious that Chabanaud records the condition in the type alone and did not study his entire series); number, position and relative height of labials (answering exactly to some of our *trachyblepharus*, not to others, the variational range being such as is common to most geckos); dorsal granules convex and juxtaposed (alleging that they are flatter and subimbricate in his one *trachyblepharus*); transverse scales beneath tail beginning close to anus instead of a third of the way along the tail (here Wettstein's specimens differed in beginning at 12–17 scale-rows behind anus, i.e. 8–10 mm.; much depends as to whether all tails were original for in most of our specimens they are reproduced, though this is often far from obvious).

Nor do there appear to be geographical grounds for anticipating a local race, but to avoid confusion I have omitted any data which might be added from the description of *moerens* except under the heading *Color*. Those interested should consult Chabanaud's full description.

Breeding. On May 21, at Asni, a ♀ held one large ovum.

Diet. A sizeable mantis (*Ameles* sp.) in jaws of M.C.Z. 29932, flying ants and greenbottle fly in stomach of another.

Habits. This active diurnal gecko is found on rocks and stone walls (Werner).

Localities. **French Morocco:** *Arround; *Asni; Djebel Hadid; *Fenzon (? Fenzar); Goundafa (*moerens*); Haut Reraia (Reraya); Imintanout (Imi n Tahout); Targa Imoulay; Telouet (*moerens*); *Tizi Tachdirt.

Range. French Morocco (Grand Atlas from 797 to 2500 metres).

Quedenfeldtia festiva (Methuen & Hewitt)

1914b. *Narudasia festiva* Methuen & Hewitt, Ann. Transvaal Mus., **4**, p. 127, pl. xiv, figs. 1–1a: Narudas Süd, foot of Great Karas Mountains, South West Africa.
1936. Lawrence, p. 38.
1936c. Parker, p. 131.
1938. FitzSimons, p. 161.

Description. Snout acutely rounded, as long as[1], or longer than, the distance between the eye and the ear-opening; latter small, roundish or vertically oval, its diameter about a third that of the orbit; rostral twice as broad as high, with median cleft above; granules on snout unequal, the largest twice as large as those on occiput and back; nostril between rostral, first labial and 3 nasals, the anterior largest and in contact with or separated from its fellow, upper labials 7–9; lower labials 5–7; mental once and a half to twice as long as broad; 1–3 slightly enlarged postmentals surrounded by equally large chin shields which posteriorly merge into the gular scales.

Back and limbs covered with small, subuniform, smooth, juxtaposed granules or scales, ventral scales twice as large as the dorsal, hexagonal, smooth, imbricate; limbs slender, the adpressed hind limb reaches the axilla; about 6 lamellae under first toe, 16–19 under the fourth; tail covered above with imbricate scales, below with larger imbricate scales in transverse rows, tail longer than head and body.

Color. Above, olive brown (in young) to chestnut, dark brown, grayish or purplish (in adults); back, limbs and tail with narrow, zigzag, black crossbars edged with lighter or with cream or whitish spots in the angles; tail sometimes olive yellow, particularly in its distal half which may lack crossbars; reproduced tails are uniformly gray above and below. Below, whitish to grayish, anal region and beneath thighs creamy yellow; transverse bars from upper side of tail sometimes forming complete annuli beneath. Eye dark brown with chestnut and golden brown tints (largely FitzSimons).

Size. Total length of a ♂ (T.M. 17588), 69 (31 + 38) mm., no measurements were furnished for the type (T.M. 3038), two paratype ♂♂ in the M.C.Z. are slightly smaller.

Breeding. Between July 24–27, at Barby Farm, 2 oval eggs measuring 6.0 x 7.6 mm. were found in a rock crevice (FitzSimons).

Parasites. No mites on six geckos examined by Lawrence.

Habits. Exceedingly swift in its movements, when basking on the rocks it waves its yellow tail to and fro (Methuen), a habit not observed by FitzSimons, who collected thirty-one.

Habitat. Beneath loose flakes or in rock crevices of river beds and valley slopes to 4000 feet (at Satansplatz).

Localities. **South West Africa:** *Barby Farm; Brukkaros Mountains; *Narudas Süd Farm; Neudamm Farm; Satansplatz.

Range. South West Africa.

[1] *fide* Methuen & Hewitt, but probably an error as very distinctly longer in all our four specimens.

Genus Pristurus

1835. *Pristurus* Rüppell, Neue Wirbelthiere Fauna Abyss., Amph., p. 16, pl. vi, fig. 3: (type *flavipunctatus*).

1863c. *Spatalura* Gray, Proc. Zool. Soc. London, p. 236, pl. xx, fig. 2 (type *carteri*).

Diagnosis. Digits free, long, slender, the distal phalanges more or less compressed and more or less forming an angle with the basal portion, not dilated, tips pointed, covered above with scales, not denticulate laterally, below with a series of transversely dilated lamellae, of which some are swollen, clawed, the claw between two enlarged scales of which the lower is more or less deeply notched under the claw.

Pupil round or vertically subelliptic; eyelid more or less distinct as a circumorbital ring; dorsal lepidosis of small, subequal, smooth, juxtaposed granules, uniform or intermixed with tubercles; tail more or less strongly compressed in male, compressed or subcylindrical in female. Males without preanal or femoral pores.

Range. Asia (northwestern India; Persia; Arabia) and Africa (Anglo-Egyptian Sudan; Eritrea; Ethiopia; British Somaliland and Somalia).

Remarks. In addition to the *Diagnosis* given above, the following characters are common to all the species which I have examined. I have not seen *P. insignis* or *rupestris*.

Head short and high; snout much longer than the distance between the eye and ear-opening; length of ear-opening about a third to half that of the eye (not orbit); rostral about twice as broad as high, with median cleft above; granules on snout convex (flat in *sokotranus*), smooth, much larger than those on occiput and back; gular granules small.

Both back and flanks (African species) covered with small, subequal, smooth, juxtaposed granules; no row of enlarged tubercles on either side of base of tail in either sex.

The genus *Pristurus*, unlike most African genera, was recently the subject of a revision by Scortecci (1935f, pp. 284–295). However, Parker (1942), who has also given considerable attention to the genus, disagrees with several of Scortecci's dispositions and, as my material is scanty while long series were available to both these herpetologists, I have accepted Parker's findings regarding synonymy. Rather than further confuse a situation involving so many closely related species, I have neglected to incorporate the variations, etc. to be found in

Scortecci's paper as it appears a reëxamination of all material is necessary for a settlement of outstanding questions.

Key to the Species

1. Nostril bordered by 2–4 nasals and rostral.....2
   Nostril bordered by 1–3 nasals; rostral excluded.....5
2. Adpressed hind limb reaches to between ear and eye; lamellae beneath fourth toe 25–28; maximum length from snout to anus 58 mm.; range: Sokotra Island.....*insignis* (p. 73)

   Adpressed hind limb reaches axilla or ear; lamellae beneath fourth toe 18–26; maximum length from snout to anus 40 mm.....3
3. Snout narrower, consequently longer; no dorsal crest on body; lamellae beneath fourth toe 20–26; maximum length from snout to anus 39 mm.; range: Sokotra Island.....*sokotranus*. (p. 74)

   Snout broader, consequently shorter; lamellae beneath fourth toe 18–24...4
4. Tail scarcely compressed, with a feeble crest or row of enlarged scales in males only, never extending on to body; maximum length from snout to anus 32 mm.; range: India; Persia; Arabia; Somalia.....*rupestris* (p. 76)

   Tail strongly compressed, with a crest of lanceolate scales, longer in males than in females, usually carried forward on to body in males, or represented by a vertebral row of enlarged scales in females whose tails are slightly less compressed; maximum length from snout to anus 40 mm.; range: Arabia west to Anglo-Egyptian Sudan, south to Somalia..... *flavipunctatus* (p. 77)
5. Snout not beak-like; forehead slightly concave; lower labials 4–5.....6
   Snout definitely beak-like; forehead not concave; lower labials 6–7.....7
6. Snout obtuse or subacuminate; ventral scales larger than dorsal granules; lamellae beneath fourth toe 18–20; claws much longer than their ungual scales; tail 1.6 to 1.75 times as long as head and body; range: Arabia; Eritrea; Ethiopia; Somalia (and Sokotra, *fide* Steindachner)....*crucifer* (p. 80)

   Snout acuminate; ventral granules subequal to dorsal granules; lamellae beneath fourth toe 16–19; claws equal to or shorter than their ungual scales; tail not more than 1.5 times as long as head and body; range: British Somaliland and Somalia.....*phillipsii* (p. 82)
7. A black collar beneath throat; tail longer than head and body; flanks without enlarged tubercles; range: Aden to Wadi Hadramaut..... *carteri collaris* (Arabia)

   No black collar beneath throat; tail much shorter than head and body...8

8. Flanks without enlarged tubercles; range: Masirah Island; Muscat to Dhufar hinterland.....*carteri carteri* (Arabia)
Flanks with 2–4 rows of enlarged tubercles; range: Dhufar littoral.....
carteri tuberculatus (Arabia)

STATISTICAL DATA FOR THE SPECIES OF THE GENUS PRISTURUS

Species	Internasal Granules	Nasals, etc. surrounding Nostril	Upper Labials	Lower Labials	Tubercle Rows on Flank	Lamellae under First Toe	Lamellae under Fourth Toe	Length of Head and Body	Length of Tail
insignis	?	2–4+R	6–9	5–6	0	?	25–28	58	102
sokotranus	1	2–3+R	6–7	4–6	0	9	20–26	39	57
rupestris	?	2–3+R	7–8	5–6	0	?	18–24	32	53
flavipunctatus	1–2	2–3	6–8[1]	4–6	0	8	18–22	40	52
crucifer	5–6	3	5–6	4–5	0	9	18–20	40	50
phillipsii	2–5	1–2	4–6	4–5	0	8–9	16–19	30	33
c. collaris	5	1–3	6–8	6–7	0	8	18	52	48
c. carteri	?	3	8	7	0	?	?	65	29
c. tuberculatus	3–5	1–2	6–7	6	2–4	9	14–18	57	39

Pristurus insignis Blanford

1881. *Pristurus insignis* Blanford, Proc. Zool. Soc. London, p. 466, pl. xlii, fig. 1: Sokotra Island.
1882b. Peters, p. 44.
1883. Taschenberg, p. 166.
1885d. Boulenger, p. 54.
1903a. Boulenger, p. 75.

Description. Snout subacuminate, not compressed and beak-like, ear-opening large, vertically oval; forehead slightly concave; nostril between rostral and 2–4 nasals; mental very large; 3–5 slightly enlarged scales which might be called postmentals.

Ventral scales slightly larger than dorsal granules; limbs with granules like those on the back, slender, the adpressed hind limb reaching between the ear and eye; tail more or less strongly compressed

[1] 9, *fide* Anderson.

with a dorsal keel, but not even the rudiment of a crest, and a subcaudal keel of enlarged, smooth, imbricate scales; tail much longer than head and body.

For characters common to all species, see definition on p. 71; for scale counts and statistical data, see table on p. 73.

Color. Above, gray or brown; back with lighter and darker spots and more or less distinct dark crossbars; flank spotted or vermicularly lined with brick red; tail barred with darker. Below, whitish, the throat bluish, mottled or marbled with gray or brown, such markings sometimes continued on to the chest; belly bright yellow.

Size. Total length of a ♂ (Brit. Mus.), 160 (58 + 102) mm., and ♀ (Brit. Mus.), 124+ (52 + 72+) mm.

Remarks. Above description incomplete as no material available.

Localities. **Sokotra Island**: Adho Dimellus; Homhil; Jena agahan.

Range. Sokotra Island off Somali Coast.

Pristurus sokotranus Parker

1881. *Pristurus rupestris* Blanford (not Blanford, 1874), p. 465.
1882b. Peters, p. 44.
1882b. Müller, p. 173.
1883. Taschenberg, p. 166.
1885d. Boulenger (part), p. 53.
1887. Strauch, p. 45.
1896. Anderson (part), p. 23.
1903a. Boulenger, pp. 76, 94.
1903. Steindachner, p. 12.
1934c. Mertens, p. 50.
1938a. *Pristurus sokotranus* Parker, Ann. Mag. Nat. Hist. (11), **1**, p. 306: Dahamis, Sokotra Island.

Description. Snout subacuminate, not compressed and beak-like, though narrow; ear-opening small, subcircular or obliquely oval; forehead slightly concave; nostril between rostral and 2–3 nasals; mental very large; 3 slightly enlarged scales which might be called postmentals.

Ventral scales slightly larger than dorsal granules; limbs with granules like those on the back as well as imbricate scales, slender, the adpressed hind limb reaching the ear; tail of ♂ strongly compressed with a dorsal crest of lanceolate scales, *not* continued on to the lumbar region, and a subcaudal keel of enlarged, pointed, imbricate scales, tail of ♀ less compressed and with a much lower crest; tail much longer than head and body.

For characters common to all species, see definition on p. 71; for scale counts and statistical data, see table on p. 73.

Color. Above, pale brown; back with or without a light vertebral stripe flanked by a row of white spots; flank, from below eye to groin, usually with a light lateral line edged above with dark brown spots and below by darker vermiculations and light spots. Below, whitish, chin and throat mottled with gray or brown.

Blanford (1881) states that the coloring of Sokotra geckos does not differ in any important respect from that of *rupestris* from the Persian Gulf.

Parker (1938a) remarks that geckos from Abd el Kuri, while morphologically resembling the Sokotra specimens, lack the stripes usually present in the latter, but considers the available material inadequate for the separation of a race.

Size. Total length of type ♂ (Brit. Mus.), 93 (36 + 57) mm.

Remarks. Anderson (1896) first suggested that these Sokotran geckos should be regarded as a race of *rupestris*, to which Boulenger (1903a) objected on the grounds that the single character of a more pointed snout, cited by Anderson, was inconstant. Parker (1938a), however, regards it as a full species which he thinks is more closely related to *flavipunctatus* than to *rupestris*.

Habits. "Extremely swift in their movements and constantly on the alert for danger, they were much the most difficult lizards to catch without injury. If pounced on with the hand, one was almost invariably too late, and only a struggling tail remained, the rest of the gecko disappearing like a flash into some neighbouring crack. Far the best method of capture is to shoot them with a saloon pistol and a few pellets of dust shot, or, at close quarters, sand may be used with excellent results. By this means eight perfect specimens were collected one morning at Adho Dimellus in a very short time, three being killed at one shot." (W. R. O. Grant in Boulenger).

Habitat. "Generally found among the larger rocks on the hill sides or on the large boulders in the dry beds of water-courses, and seemed especially fond of the cracks and fissures in the perpendicular faces of the cliffs where they might frequently be seen sunning themselves." (Grant). At altitudes from sea level to 4500 feet.

Localities. **Abd el Kuri Island.** ***Sokotra Island:** Adho Dimellus; Dahamis; Hadibu Plain; Homhil; Jena agahan; Wadi Felink, Kallansiye.

Range. Sokotra and Abd el Kuri Islands off Somali Coast.

Pristurus rupestris Blanford

1874. *Pristurus rupestris* Blanford, Ann. Mag. Nat. Hist. (4), **13**, p. 454: Muscat, Arabia, and Kharag Island, Persian Gulf.
1885d. Boulenger (part), p. 54 (omit Sokotran material).
1935c. Scortecci, p. 119.
1938a. Parker, p. 305 (separates Sokotran geckos).
1942. Parker, p. 42.
1932b. *Pristurus flavipunctatus* Parker (not Rüppell), p. 347.
1933e. ?*Pristurus migiurtinicus* Scortecci, Atti Soc. Ital. Sci. Nat., **72**, p. 242: Inland from Bender Casim, Migiurtinia, Somalia.
1935c. Scortecci, p. 121.

Further references to "*rupestris*" will be found under *sokotranus*, while the more extensive Asiatic bibliography is omitted.

Description. Snout subacuminate, not compressed or beak-like, broad; ear-opening small, subcircular or obliquely oval; forehead slightly concave; nostril between rostral and 2–3 nasals; mental very large.

Ventral scales slightly larger than dorsal granules; limbs slender, the adpressed hind limb reaching between shoulder and ear; tail strongly compressed, though less so than in *sokotranus*, with a denticulate dorsal crest which is *not* continued on to the lumbar region, and a subcaudal keel of enlarged scales; length of tail much longer than the length of head and body.

For characters common to all species, see definition on p. 71; for scale counts and statistical data, see table on p. 73.

Color. Above, grayish olive or brown; through eye a dark streak; back with or without a pale (reddish in life) vertebral stripe flanked by a series of pale (reddish) spots. Below, whitish, throat spotted with brown. (after Malcolm Smith).

Size. Total length 85 (32 + 53) mm., *fide* Boulenger, but possibly based on a *sokotranus* as Parker (1938a) gives 30 mm. as maximum length from snout to anus, and Scortecci 27 mm. for a ♂ (Milan Mus.).

Remarks. Above description incomplete as no material available.

Habits. Found on rocks between 10 and 11 a.m., disappearing into cracks and fissures of the limestone when approached (Blanford). Terrestrial, found beneath a stone at 4200 feet (Taylor in Parker).

Localities. **British Somaliland:** Al Mado Mtns.; Borama District; Guban; Ogo. **Somalia:** Bio Culel (Culul), Bender Casim; inland from Bender Casim.

Range: Asia (Karachi through southern Iran and islands of Persian Gulf to southern Arabia) to British Somaliland and Somalia (where it is apparently confined to coastal plain and mountain zone).

Pristurus flavipunctatus Rüppell

1835. *Pristurus flavipunctatus* Rüppell, Neue Wirbelthiere Fauna Abyss., Amph., p. 17, pl. vi, fig. 3: Massaua, Eritrea.
1845. Gray, p. 171.
1882a. Vaillant, p. 16 (? Yafia Plateau near Aden, not Somalia).
1885d. Boulenger, p. 52.
1887. Strauch, p. 45.
1893a. Boettger, p. 24.
1895. Anderson, pp. 636, 638 (Arabia, but notes on habits).
1895b. Boulenger, p. 531.
1895. Prato, p. 24.
1896a. Boulenger, p. 546.
1896. Anderson, pp. 24, 71, 75, 77, 84, 88, 98.
1897g. Boulenger, p. 277.
1898. Anderson, p. 56, pl. iv, fig. 10.
1900. Peel, p. 334.
1904. Peracca, p. 2.
1908. Werner, 1907, pp. 1828, 1924.
1909a. Boulenger, p. 193.
1919. Schmidt, p. 601.
1919. Werner, p. 470.
1922a. Mertens, p. 169.
1927. Calabresi, pp. 21, 38.
1928b. Scortecci, p. 311.
1930a. Scortecci, p. 205.
1930c. Scortecci, p. 1.
1931a. Vinciguerra, p. 97.
1934. Brongersma, p. 166.
1942. Parker, p. 41.
1836. *Gymnodactylus flavipunctatus* Duméril & Bibron, p. 417.
1851a. Duméril & Duméril, p. 43.
1876. Gasco, p. 110.
1843. *Saurodactylus* (*Pristiurus*) *flavipunctatus*, p. 91.
1896a. *Pristurus percristatus* Boulenger, Ann. Mus. Civ. Stor. Nat. Genova (2), **16**, p. 547: Emberemi; Ghinda; and Neberet Valley, Ethiopia.
1898c. Boulenger, p. 913.
1912b. Boulenger, p. 329.
1927. Calabresi, p. 38.
1928b. Scortecci, p. 312.
1930a. Scortecci, p. 205.
1932b. Parker, p. 347.
1933e. *Pristurus percristatus pseudoflavipunctatus* Scortecci, Atti. Soc. Ital. Sci. Nat., **72**, p. 243: Rocca Littorio; Garoe; Gardo; Carim; Bender Casim, Somalia.
1935c. Scortecci, p. 123.

Further reference to "*flavipunctatus*" will be found under *rupestris*, Rochebrune's (1884a, p. 80) erroneous record from Senegambia is ignored; Arabian bibliography is also omitted.

Description. Snout subacuminate, not compressed or beak-like, broad; ear-opening small, subcircular or obliquely oval; forehead slightly concave; nostril between rostral and 2–3 nasals; mental only two-thirds as long as broad; usually 2–4 slightly enlarged scales which might be called postmentals, similarly the labials bordered inferiorly by irregularly enlarged scales.

Ventral scales larger than dorsal granules; limbs with granules like those on the back as well as imbricate scales, moderate, the adpressed hind limb reaching the axilla, shoulder, or ear (in young); tail of ♂ strongly compressed with a dorsal crest of lanceolate scales, which may be continued on to the lumbar region or as far as the nape (depending on age), and a subcaudal keel of enlarged, pointed, imbricate scales, or crest of lanceolate scales; tail of ♀ less compressed and with a much lower and less regular crest which, if continued on to body, only as a series of enlarged granules; on primary regenerated tails, whether single or bifid, the crest is well developed, on secondary regenerated tails it is absent; tail much longer than head and body.

For characters common to all species, see definition on p. 71; for scale counts and statistical data, see table on p. 73.

Color. Above, pale or dark grayish brown; from nostril through eye to temporal region a more or less distinct dark streak; shoulder of males with a light-edged black spot and occasionally other ocelli-like variegations; back with or without a light (orange or yellow in life) vertebral stripe (at least in females and young), flanked by more or less distinct dark spots or crossbars; flank spotted or lineolated with bright red or orange; tail barred with darker. Below, whitish, uniform, or throat and sides of belly spotted with dark brown; belly sometimes dotted with red.

For variations in coloring (of *percristatus*) see Scortecci (1928b).

Size. Total length of a cotype ♂ of *percristatus* (Brit. Mus.), 87 (35 + 52) mm., and cotype ♀ of same (Brit. Mus.), 86 (35 + 51) mm., surpassed in length from snout to anus by a cotype of *flavipunctatus* (Brit. Mus.) of 39 mm.

Remarks. Parker (1942), after examining cotypes of *percristatus*, which was based on 294 specimens, synonymized both it and *p. pseudoflavipunctatus* with *flavipunctatus*, saying that the height and extent of the dorsal and subcaudal crests was subject to variation, apparently increasing in height and extent with age. His paper should be con-

sulted for the carefully argued case with conclusions based on a score or more of geckos.

Anderson (1898) remarks that the length of the limbs is also subject to considerable variation irrespective of sex or locality.

Breeding. On April 10, on Gebel Araschkol, eggs, measuring 6 x 7 mm., were found in crevices of acacia bark. Within the eggs were completely developed and pigmented young indicating that they would emerge very shortly.

Parasites. A red mite (*Geckobia ? loricata*) found on flanks, simulates the minute red spots which usually do not cover more than two granules (Anderson).

Temperament. Males are irascible and much given to biting each other's tails, in consequence a high percentage of the latter are reproduced.

Habits. Diurnal and very active, so difficult to capture on the rocks which were unpleasantly hot to touch and from which the geckos disappear during the hours of greatest heat (Yerbury in Anderson).

Habitat. At Suakin one was taken in a hole (on a sandy plain) occupied by a monitor (*Varanus griseus*) and a toad (*Bufo pentoni*). They are, however, principally arboreal, being found on acacia, babool, and rubber trees; though in the absence of trees on rocks. Only one of thirteen captured by Taylor was on the ground and that in close proximity to a bush. In British Somaliland from 150–5000 feet.

Localities. **Anglo-Egyptian Sudan:** Bara; Durur; Gebel Araschkol; Nubbaka to Umm; *Port Sudan (A.L.); Senaar; Suakin; Talodi. **Eritrea:** Afreda (Afrera); Ain near Cheren; Asmara; Assab; Beilul, Danakil; Cheren (Keren); Dari Anseba[1]; Emberemi; Garre, Danakil; Ghinda; Mandafena; *Massaua; Monte Dongollo above Ghinda; Monte Ghedeni; Neberet Valley; Sabarguma; Saati (Sahati). **Ethiopia:** Amhara; Milmil. **British Somaliland:** Ado; Bohodle; Borama District; Buran District; Haud; Nogal Valley; Sol Haud; Zeilah (Zaila; Zeila). **Somalia:** Afghedud; Bender Casim; Carim; Dolo; Gardo, Miguirtinia; Garoe; Rahanuin country; Rocca Littorio.

Range. Arabia west to Anglo-Egyptian Sudan (west of Nile), southeast to Somalia.

[1] ? Dari River to Anseba River.

Pristurus crucifer (Valenciennes)

1861. *Gymnocephalus*[1] *crucifer* Valenciennes, Comptes Rendus Acad. Sci. (Paris), **52**, p. 433: Ethiopia.
1871a. *Pristurus longipes* Peters, Monatsb. Akad. Wiss. Berlin, p. 566: Kursi, near Aden, Arabia.
1882a. *Gymnodactylus crucifer* Vaillant, p. 17, pl. iii, figs. 1–1b.
1885d. *Pristurus crucifer* Boulenger, p. 55.
1892. Boulenger (part), p. 6.
1893b. Boettger, p. 122.
1895b. Boulenger, p. 531.
1895g. Boulenger, p. 165.
1896. Anderson, pp. 71, 75, 78, 84, 88.
1896b. Boulenger, p. 6.
1896c. Boulenger, p. 16.
1896e. Boulenger, p. 213.
1897g. Boulenger, p. 277.
1898a. Boulenger, p. 716.
1900. Peel, p. 334.
1901. Anderson, p. 138.
1903. ? Steindachner, pp. 8, 11.
1905. Neumann, p. 390.
1905c. Tornier, p. 367.
1912b. Boulenger, p. 329.
1932b. Parker, p. 348, fig. 2a.
1933e. Scortecci, p. 244.
1935c. Scortecci, p. 133.
1942. Parker, p. 43.
1927. *Pristurus stefaninii* Calabresi, Atti Soc. Ital. Sci. Nat., **66**, pp. 21, 39: Garass Hebla Aden to Jeromma, Somalia.
1931b. Scortecci (part), p. 132.
1933e. *Pristurus crucifer laticephalus* Scortecci, Atti Soc. Ital. Sci. Nat., **72**, p. 244: Garoe, etc., Somalia.
1935c. Scortecci, p. 139.

Further references to "*crucifer*" will be found under *phillipsii*, to which some of the above may belong.

Rochebrune's (1884a, p. 80) records from Senegambia are ignored as erroneous; possibly Steindachner's (1903) Sokotra specimen should be referred to *sokotranus*.

Description. Snout subacuminate, not compressed and beak-like, broad; ear-opening small, subcircular or obliquely oval; forehead not concave; nostril in a single or divided nasal or between 3 slightly

[1] Judging from the context *Gymnocephalus* is obviously a *lapsus*.

swollen nasals; mental about as long as, or slightly shorter than, broad; no definite postmental or chin shields.

Ventral scales larger than dorsal granules; limbs with large imbricate scales and some scale-like granules, slender, the adpressed hind limb reaching the ear or eye; claws long, longer than the ungual scales; tail of ♂ compressed with a low, scarcely serrate, dorsal crest, and a subcaudal keel of enlarged, slightly pointed, imbricate scales, tail of ♀ scarcely compressed and without crest or keel; tail much longer than head and body.

Color. Above, pale gray or grayish brown; neck with or without one or more deep black spots; back with or without a light (yellow in life) vertebral stripe, flanked by white spots which may be almost confluent, and seven or eight more or less distinct pairs of quadrangular brownish blotches, or crossbars; tail faintly barred. Below, whitish, chin light yellow; chin and throat usually mottled with gray.

Size. Total length of cotype of *longipes* (Berlin Mus.), 90 (40 + 50) mm., cotype of *stefaninii* (Milan Mus.), 89 (32 + 57) mm.

Remarks. Boulenger (1885d) synonymized *longipes* with *crucifer*, Scortecci did the same for *stefaninii*, which was said to be characterized by more slender habitus, longer digits, and longer tail. Scortecci's race *laticephalus*, said to differ in more robust habitus, smaller size and slightly shorter tail, does not appear to me, after examination of a cotype (M.C.Z. 38695), to be recognizable, for Scortecci records both *c. crucifer* and *c. laticephalus* from Gardo, Garoe, and Luglio.

Though claw length is a good key character for separating *crucifer* and *phillipsii*, as pointed out by Parker (1942, p. 43) there is some variation correlated with habitat, long, pointed, and scarcely curved claws being found on geckos taken in sandy situations; shorter and blunter claws on those inhabiting stony ground; and shortest of all on specimens from rocky localities.

Sexual dimorphism. Is shown by tails of most *Pristurus*. In *crucifer* that of the ♂ is compressed above and keeled below, while that of the ♀ is roundish with only a low crest above and no keel below (Tornier).

Diet. Beetles (Neumann).

Habitat. Sandy ground from 2100 to 5300 feet (Taylor in Parker).

Localities. **Eritrea:** Assab; Ferfer River to Mareb River (Dusa Mareb to Fer Fer); Massaua. **Ethiopia:** Milmil. **British Somaliland:** Ado to Burao in Haud; Artu; Berbera; Bohol Garshin; Borama District; *Dadubassa; Golis Mountains; Gumboworen; Hargeisa to Milmil; Las Kore (Las Gore); Warabod (Warabot). **Somalia:** Afghedud; Bender Casim; Candala; El

Donfar; Ganana and Web confluence; Garass Hebla Aden to Isomina (Jesomma); Gardo, Migiurtinia; *Garoe—inland from; Hafun; Lugh; Lugh to Matagoi; Obbia to Sissib; Rahanuin country; *Rocca Littorio—inland from; Uarandi (? Uorandi near Obbia). **Sokotra Island:** Ras Shoab (*fide* Steindachner, 1903).

Range. Arabia west to Eritrea and south through extreme eastern Ethiopia to Somalia.

Pristurus phillipsii Boulenger

1892. *Pristurus crucifer* Boulenger (part, not Valenciennes), p. 6.
1927. Calabresi, pp. 21, 38.
1895g. *Pristurus phillipsii* Boulenger, Ann. Mag. Nat. Hist. (6), **16**, p. 165, pl. vii, figs. 1–1a: Inland from Berbera, British Somaliland.
1897g. Boulenger, p. 277.
1898c. Boulenger, p. 913.
1901a. Boulenger, p. 48.
1915. Calabresi, p. 235.
1927. Calabresi, pp. 21, 38.
1942. Parker, p. 43.
1932b. *Pristurus somalicus* Parker, Proc. Zool. Soc. London, p. 349, fig. 2b: Sol Haud, British Somaliland.
1933e. Scortecci, p. 244.

Possibly other citations of *crucifer* should be transferred to this species.

Name. Silainyu (Somali: Taylor).

Description. Snout acuminate, triangular, almost beak-like; ear-opening small, obliquely oval or an oblique slit; forehead not concave; nostril in a single or semidivided nasal or between 2–4 slightly swollen nasals; mental about as long as broad; no definite postmental or chin shields.

Ventral granules subequal to dorsal; limbs with granules like those on back and imbricate scales, slender, the adpressed hind limb reaching the ear or eye; claws short, as long as, or shorter than, the ungual scales; tail of ♂ compressed with a low, scarcely serrate, dorsal crest, and a subcaudal keel of enlarged, slightly pointed, imbricate scales, tail of ♀ not or but slightly compressed and without crest or keel; tail longer than head and body.

For characters common to all species, see definition on p. 71; for scale counts and statistical data, see table on p. 73.

Color. Above, pale gray or grayish brown; neck with one or more deep black spots; from eye to eye across occiput a semicircular dark

band, interrupted mesially; back with or without a light vertebral stripe, flanked by seven or eight more or less distinct pairs of quadrangular brownish blotches, or crossbars; limbs with dusky crossbars and, on the hinder side, light spots; tail faintly barred. Below, whitish, throat and sides of belly usually mottled with gray.

Size. Total length of type ♂ (Brit. Mus.), 60 (28 + 32) mm., and type ♂ of *somalicus* (Brit. Mus.), 79 (39 + 40) mm., of paratype ♀ *somalicus* (M.C.Z. 35561), 63 (30 + 33) mm.

Remarks. *P. somalicus*, based on 31 specimens from Sol Haud, was thought to differ from *phillipsii* by a more depressed snout, pointed rostral, almost vertical nostril, more numerous subdigital lamellae (16–19 versus 14–17), less developed caudal crest, and coloring. However, Parker (1942) subsequently synonymized it, saying that the two types occurred together and though they might represent ecological forms, they were not geographical races.

Habitat. From 200 to 2500 feet in British Somaliland (Taylor in Parker).

Localities. **British Somaliland:** Berbera to Obbia; Berbera-inland; Gan Lebar (Libah); Golis Mountains; Hais; Nogal Valley; *Sol Haud; Taleh. **Somalia:** Andurgab to Caaio; Bender Casim; Candala; Dagah Shabell; Daror; Dorianle; El Donfar; Gardo, Migiurtinia; Hafun; Nogal region; Obbia; Obbia to Sissib.

Range. British Somaliland and Somalia (from Golis Mountains to Berbera, B. S., south to Dorianle, S.).

Genus Ancylodactylus

1907. *Ancylodactylus* L. Müller, Zool. Anz., **31**, p. 825, figs. 1–2 (type *spinicollis*).

Diagnosis. Digits free, long, slender, the distal phalanges forming two angles with the basal portion of the digit, not dilated, tips pointed, covered above with scales, not denticulate laterally, below, on basal portion, by scales except for a single large plate near the distal joint, by scansors beneath the distal phalanges, clawed.

Pupil (apparently) round; eyelid more or less distinct as a circumorbital ring; dorsal lepidosis of small granules intermixed with large tubercles; tail subcylindrical. (Male unknown).

Range. French and British Cameroons.

Remarks. This genus, known only from the female, appears to be more primitive than *Cnemaspis*, from which it apparently differs only

by the basal portion of the digits being covered by small scales. This is well illustrated by Müller's (1907) fig. 1; see also his 1910 figure of the gecko.

Ancylodactylus spinicollis Müller

1907. *Ancylodactylus spinicollis* L. Müller, Zool. Anz., **31**, p. 825, figs. 1–2: Mukonje Farm, Mundame, French Cameroons.
1910. L. Müller, p. 548, pl. i, fig. 1.
1910. Sternfeld, p. 15, fig. 24.
1919. Schmidt, p. 598.

Description. Snout moderately blunt, as long as the distance between the eye and the ear-opening; granular scales on the snout larger than those on the back of the head; rostral much broader than high, with median cleft above; nostril bordered by the rostral, first labial, several small posterior and a large superior nasal; upper labials 8; lower labials 8; mental large, subtriangular, truncate posteriorly, bordered by postmentals. On either side of neck a conspicuous, sharply pointed tubercle. Back and flanks covered with small granules, among which are scattered keeled, often posteriorly directed, conical tubercles forming about 10 longitudinal rows; ventral scales enlarged; digits elongate; median toe with small scales, *not* plates beneath its basal phalange; tail subcylindrical, covered above with small, smooth, subimbricate scales, numerous posteriorly directed, keeled tubercles arranged on the posterior edge of each caudal segment; scales below somewhat enlarged.

The above description is based on the figures and translation of the much lengthier original description, which see for further details.

Coloration. Above, dusky light brown; on the crown an indistinct dark interorbital band and a U-shaped marking connecting the posterior borders of the orbits; a horizontal streak in loreal region; labials flecked with darker; on nape and back a series of six ill-defined horseshoe-shaped markings whose openings are towards the tail and whose lateral prolongations extend on to the flanks, all these markings are indistinct and accompanied by numerous larger and smaller flecks, appear like irregular marblings; limbs transversely barred; tail ringed with alternating light and dark segments of which there are two of the former to one of the latter. Below, throat dusky white streaked with posteriorly-convergent, dark brown stripes (fig. 2); abdomen, limbs, and tail light yellowish brown.

Measurements. Total length of type ♀, 89^{+} ($53 + 36^{+}$) mm., but the tail is regenerated.

Localities. **French Cameroons:** Efulen; Mukonje Farm, Mundame. **British Cameroons:** Bibundi.

Range. French and British Cameroons.

Genus Cnemaspis

1842. *Goniodactylus* Gray (not Kuhl, 1826), Zool. Misc., p. 58 (type *boiei*).
1885d. *Gonatodes* Boulenger (part), Cat. Lizards Brit. Mus., **1**, p. 56.
1887. *Cnemaspis* Strauch, Mem. Acad. Imp. Sci. St.-Pétersbourg (7), **35**, No. 2, p. 4 (type *boulengeri*).
1921a. *Paragonatodes* Noble, Amer. Mus. Nov., No. 4, p. 14 (type *dickersoni* Schmidt = *Gonatodes quattuorseriatus* Sternfeld).

Diagnosis. Digits free, long, slender, the distal phalanges compressed and forming one or two angles with the basal portion of the digits, not dilated[1], tips pointed, covered above with scales, not denticulate laterally, below on basal portion by a row of plates, by transverse lamellae beneath the distal phalanges, clawed, the claw between three enlarged scales.

Pupil round; eyelid more or less distinct as a circumorbital ring; dorsal lepidosis of small, subequal, smooth, juxtaposed granules intermixed with large tubercles; tail subcylindrical, tapering. Males with preanal pores[2].

Range. Asia (East Indian Archipelago; Indo China; India) and Equatorial Africa.

Remarks. It was as recently as 1895 that the first African member of this genus was discovered, but incorrectly assigned to *Gymnodactylus* by its author. In 1921 Noble, discerning the differences between the New World *Gonatodes* and the Congo "*dickersoni*," made the latter genotype of *Paragonatodes*. More recently Malcolm Smith (1933, Rec. Indian Mus., **35**, p. 10) pointed out that *all* Old World geckos, both Asiatic as well as African, hitherto referred to *Gonatodes* formed a homogeneous group distinct from their American allies to which the name of *Gonatodes* must be restricted. For the Old World species the name *Cnemaspis* Strauch was available.

Ancylodactylus Müller, 1907, of the Cameroons, is closely related, indeed apparently distinguished only by the presence of small scales instead of large plates, beneath the proximal portion of the digits.

As pointed out by Malcolm Smith (1935, Fauna of British India, Rept. & Amphib., **2**, p. 65), the assumption, based upon the shape of

[1] Except in *littoralis* of India.
[2] Or without in Asiatic species, which also may be with or without femoral pores.

the pupil, that these geckos are diurnal, is unsubstantiated. The three African forms with which I am acquainted are crepuscular if not nocturnal, though emerging to bask in the rays of the rising and setting sun.

Key to the Species

1. Enlarged dorso-lateral tubercles in 4 rows or less; range: Belgian Congo east through Uganda to Kenya Colony, south to central Tanganyika Territory ..... *quattuorseriatus* (p. 86)

   Enlarged dorso-lateral tubercles in 8 rows or more 2

2. On *distal half* of digits a single series of shields; on *proximal half* of digits a few shields distally followed by scales on the basal portion; base of tail without tubercles; about 30 longitudinal scale-rows across belly; range: French Guinea ..... *a. occidentalis* (p. 89)

   On *distal half* of digits a single series of shields distally followed by scales basally; on *proximal half* of digits a single series of very large shields only; base of tail with 4 rows of tubercles; about 17–25 longitudinal scale-rows across belly 3

3. Dorso-lateral tubercles in 8 longitudinal rows; nostril bordered by the rostral and 3 nasals; range: British Cameroons ..... *a. köhleri* (p. 90)

   Dorso-lateral tubercles in 9–14 longitudinal rows; nostril bordered by the rostral and 3–6, normally 4, nasals 4

4. Males with 6–8 preanal pores[1]; usually 6 plates beneath basal portion of median toe; size larger and eggs measuring 10 x 10 or 11 x 9 mm.; range: Belgian Congo through Uganda to western Kenya ..... *a. elgonensis* (p. 91)

   Males with 9–14 preanal pores[1]; usually 4 plates beneath basal portion of median toe; size smaller and eggs measuring 9.5 x 7.5 or 9 x 8 mm.; range: central Kenya Colony south to eastern Tanganyika Territory *a. africanus* (p. 93)

Cnemaspis quattuorseriatus (Sternfeld)

1912c. *Gonatodes quattuorseriatus* Sternfeld, Wiss. Ergeb. Deut. Zentral-Afrika-Exped., 1907–1908, **4**, p. 202, pl. vi, fig. 1: Rugege Forest and Kisenyi, Lake Kivu, Belgian Ruanda-Urundi; Uvira, Lake Tanganyika, Belgian Congo.

1913c. Nieden, p. 65.

[1] The number of pores for these two races were transposed in key and table, though not in text, of Loveridge, 1936a, Proc. Zoöl. Soc. London, 1935, pp. 818 and 820.

1923d. Loveridge, p. 843.
1924b. Loveridge, p. 8.
1919. *Gonatodes dickersoni* Schmidt, Bull. Amer. Mus. Nat. Hist., **39**, p. 436, fig. 6: Medje, Ituri District, Belgian Congo.
1933j. Witte, p. 114.
1921a. *Paragonatodes dickersoni* Noble, pp. 11, 14.
1933. *Gonatopus quatuorseriatus* (sic) Schouteden, p. 234.
1933. *Gonatopus africanus* (sic) Schouteden (not Werner), p. 234.
1933m. *Gonatodes africanus* Witte (not Werner), p. 69.
1933h. *Paragonatodes quattuorseriatus* Loveridge, p. 282.
1936a. *Cnemaspis quattuorseriatus* Loveridge, p. 821.
1936j. Loveridge, p. 283.
1937f. Loveridge, p. 502.
1941. Witte, p. 111.
1942c. Loveridge, p. 317.
1936a. *Cnemaspis dickersoni* Loveridge, p. 822.
1936h. Loveridge, p. 49.
1941. Witte, p. 112.

Description. Snout elongate, obtusely pointed, slightly longer than the distance between eye and ear-opening; granular scales on snout larger than those on back of head; rostral much broader than high, with median cleft above; nostril bordered by the rostral, 2 small posterior and a large superior nasal, the latter usually separated from, rarely in contact with[1], its fellow by a single, rarely 2, granules; upper labials 5–7; lower labials 4–7; mental large, subtriangular, truncate posteriorly, bordered by 3, rarely 4, postmentals.

Back and flanks covered with small granules, a lateral and sometimes a dorso-lateral row of conical tubercles of variable size, about 5 to 10 between axilla and groin; ventral scales moderately enlarged, twice to thrice the size of the dorsal granules, 20 to 30 in a transverse series; males with 6 to 8 preanal pores; digits elongate, median toe with 3–5, normally 4, enlarged plates beneath its basal phalange. Tail subcylindrical, covered above with small smooth scales, conical and flat or nail-like tubercles on the dorsal aspect of the swollen basal portion present or almost absent, while ventrally on either side is a large conical tubercle; lateral scales slightly larger than the dorsal, occasionally a few widely-scattered, low tubercles present; below with a median series of irregularly enlarged scales.

Color. In alcohol. Above, faintly pinkish brown, a sepia-brown streak from nostril to eye, several transverse lines across the snout

[1] In contact in three geckos from Goma; Mount Elgon; and Mpwapwa respectively; two granules in a cotype from Rugege Forest.

and top of head, a dark patch in the parietal region; a broad, or narrow, light vertebral line usually present, frequently crossed by wavy, sepia-brown lines which tend to form a chain of ocelli-like markings on the dorsum; a series of well-separated, transverse, wavy lines on tail. In some individuals there is a tendency for the dark markings to coalesce to the exclusion of the lighter ground color. Below, white, sometimes sparsely flecked with pale brown, particularly on the throat.

Size. Total length of cotype ♂, 92 (42 + 50) mm.; length from snout to anus of cotype ♀, 45 mm., tail injured. Length of ♂ holotype of *dickersoni*, 78 (34 + 44) mm. Length from snout to anus of the largest males and females in a series of 31 from Mounts Debasien and Elgon, did not exceed 41 mm.

Remarks. Mr. C. M. Bogert, after studying the type series of *dickersoni*, and I, find it no longer possible to recognize that species as distinct. Its allegedly more slender habitus, narrow and more elongate neck do differ from those of a cotype (M.C.Z. 21923) of *quattuorseriatus* from the Rugege Forest, but fail to separate five geckos (det. *dickersoni* by Schmidt) from Beni from numerous *quattuorseriatus* from many localities. Neither is there any appreciable difference in size between the ventral scales of the two forms, and as tubercles are not always present on the tail of *quattuorseriatus* that character cannot be used to separate two races.

At the most some average difference may be found along the following lines, but so far as can be seen from present material this is not correlated with definite geographical areas. Witte (1941, pp. 112, 113) records both "species" as occurring at Goma.

A dorso-lateral as well as a lateral row of enlarged tubercles; base of tail studded with tubercles ..... *quattuorseriatus*

Only a lateral row of enlarged tubercles; base of tail with at most an odd tubercle or two ..... *dickersoni*.

Schmidt (1919) has given a very full description of the latter, which, after incorporation of data derived from the five Beni geckos, I (1936a) republished.

Sexual dimorphism. Only males possess preanal pores.

Breeding. On November 18, two eggs, measuring 7 x 6 mm., were taken together with a pair (♂ ♀) of geckos in a rotting log in the dry virgin forest on the western slopes of Mount Debasien at 8000 feet. Three days later another pair of eggs was found among drifted leaves between the buttress roots of an *mvuli* tree at 4000 feet on the same mountain. On March 3, a dozen eggs, each measuring about 7 x 6 mm.,

were taken from crevices in the bark, and from debris at the foot, of two large trees near the Upper Mulinga River on Idjwi Island at about 6500 feet. These eggs held embryos, one of which, on hatching, measured 27 (14 + 13) mm.

Diet. Remains of very small spiders, beetles, and ants were recovered from four stomachs examined.

Habitat. On Mount Debasien these geckos occur in the gallery forest of the ravines from 4000 feet to the rain forest at 8000 feet. Several were taken in drifts of leaves lying between the buttress roots of the giant *mvuli*, more frequently in rotting logs, and in one case beneath a stone in the dry river bed where it passed through thick forest. Several were taken high up on trees in camp, and after sunset one was caught running across a clearing in gallery forest. At Kibale Forest a male was taken just before sunset as it was ascending a tree trunk.

Localities. **Uganda:** *Kibale Forest; *Mount Debasien; *Mount Elgon. **Kenya Colony:** Mount Kenya. **Tanganyika Territory:** *Mpwapwa. **Belgian Ruanda:** Kiniha; Kisenyi; Lac Kivu; *Rugege Forest. **Belgian Congo:** *Beni; Bitshumbi, Lac Edward; *Goma (N'Goma); Kamanda, Lac Edward; Kamatembe; Mountains west of Nyamakuli; N'Zulu, Lac Kivu; *Upper Mulinga River, Ile Idjwi; Medje; Uvira.

Range. Kenya Colony south to central Tanganyika Territory, east through Uganda and Belgian Ruanda to Belgian Congo.

Cnemaspis africanus occidentalis Angel

1943a. *Cnemaspis occidentalis* Angel, Bull. Mus. Hist. Nat. (Paris), (2), **15**, p. 164: Mont Nimba at 650 metres, upper French Guinea.

Description. While possibly specifically distinct, this gecko, as stated by Angel, is closely related to typical *africanus*. In some respects it is closer to *africanus* than to *köhleri* of the Cameroons, this strange west-east affinity is paralleled by certain sylvicoline snakes of the genera *Rhamnophis* and *Thrasops*.

Mons. Angel has kindly sent me drawings that clearly show the distinctly different arrangement of the subdigital plates and scales which in *occidentalis* are the reversal of what one finds in *a. africanus* and *a. elgonensis* (*vide* key). Additional differences according to Angel, who had comparative material from Mombasa and Kibonoto, are (1) in *occidentalis* the more sharply angular arrangement of the preanal pores (though our series of *africanus* show marked variation, certainly

none approach the angle sketched by M. Angel as representing the condition in *occidentalis*).

Angel (1943a) furnishes a detailed description that should be consulted. From it the following statistics are taken: upper labials 6; lower labials 6; postmentals 3; ventrals 30 in a transverse series; median toe with 5 enlarged plates beneath its basal phalange; femoral pores 9.

Color. ♂. Above, brown, spotted and variegated with light gray; along the middle of the back from between the forelimbs to the sacral region are four lanceolate or lozenge-shaped, light marks separated by darker shades and not coalescing on the vertebral line. Below, immaculate, except for the throat on which are three dusky, chevron-shaped markings, diminishing in size posteriorly but none reaching the neck.

Size. Total length of type ♂ (Paris Mus.), 57^{+} ($45 + 12^{+}$) mm.

Remarks. Known only from two males, of which the paratype comes from Nzo, in the Paris Museum (*non vidi*).

Localities. **French Guinea:** Mont Nimbo; Nzo.

Range. French Guinea.

Cnemaspis africanus köhleri Mertens

1937f. *Cnemaspis köhleri* Mertens, Senckenbergiana, **19**, p. 382, fig. 1: Buea, Great Cameroon Mountain, British Cameroons.

1938b. Mertens, p. 34.

Description. Differs from the typical form in (1) having only 8 rows of tubercles, and these are strongly carinate and pointed, the lateral series said to be thorn-like, (2) in the nostril being bordered only by 3 small nasals in addition to the rostral.

The alleged difference of the fourth toe being angularly bent twice, does not appear to hold, for many typical *africanus* exhibit two sharply angular bends in this and other toes.

Mertens (1937) furnishes a very full description, which may be consulted. From it the following further statistics are taken: upper labials 7; lower labials 6–7; postmentals 3; ventrals 22–25 in a transverse series; median toe with 6 enlarged plates beneath its basal phalange.

Color. In life. ♀ type. Above, dark reddish brown; from occiput to base of tail a red vertebral stripe on either side of which are black, paired, transverse bands, each edged posteriorly with a light brown spot; the thorn-like lateral tubercles are light yellowish white; crown

and limbs brown indistinctly flecked with darker. Below, light yellow, throat flecked with dusky gray; underside of neck with very distinct longitudinal gray stripes.

Size. Total length of type ♀, 93 (48 + 45) mm. Further measurements will be found in the original description.

Breeding. On October 31, the type laid two eggs, measuring 9 x 7 and 9 x 6.9 mm. respectively. W. Senfft incubated these eggs for five months at the end of which time one embryo was found to be dead, the other too weak to rupture its shell. On its rostral was a simple embryonic egg-tooth, while its length was 30 (14.5 + 15.5) mm. A faded light spot was present on the parietal region and the light (brick-red in life in the mother) vertebral stripe was already developed.

Diet. In captivity. Small green grasshoppers.

Habitat. First seen resting beside Buea waterfall on the damp and vertical rock face which supported a sparse growth of ferns. Though Mertens first observed this gecko at dusk on October 18, he only succeeded in capturing it on the 22, and further visits failed to discover more of these geckos. A fortnight after capture the gecko succumbed to the high temperature in its traveling vivarium.

Localities. **British Cameroons:** Buea.

Range. British Cameroons.

Cnemaspis africanus elgonensis Loveridge

1936a. *Cnemaspis africanus elgonensis* Loveridge, 1935, Proc. Zool. Soc. London, p. 820: Above Sipi, Mount Elgon, Uganda.
1936j. Loveridge, p. 282, pl. vi, fig. 1.
1937f. Loveridge, p. 502.
1942e. Loveridge, p. 318.
1943a. Angel, p. 165.

Native names. Kibaragwesi (Sabei and Gishu, but not specific). Called *lisiamogoma* by the Maragoli of Kaimosi who believe this gecko to be the young of *Agama atricollis* (*cyanogaster*, if a syn.) to which lizard this name more properly applies.

Description. Differs from the typical form in (1) males having 6 to 8 preanal pores; (2) normally 6 subdigital plates on basal portion of median toe, range 4 to 8, average 6 for eighteen counts (only the Ruwenzori, Nyenye, and Kaimosi specimens have less than 6); (3) larger size, the ♂ attaining 53 mm., the ♀ 61 mm. in length from snout to anus; (4) larger eggs, measuring 10 x 10, 9.5 x 11, or 9 x 11mm.

Upper labials 5–8; lower labials 5–7; postmentals 3; back and base (only) of tail with 10–14 irregular rows of enlarged tubercles; nostril surrounded by 3–5 granules in addition to the rostral.

Color. In life. ♀ type. Above, gray- or brown-olive, lighter on crown and with a pale, interrupted vertebral line. Below, soiled white flecked with brown; regenerated portion of tail plumbeous.

♂ from Nyenye. Above, pale olive, harmonizing closely with the olivaceous bark of the wild fig tree on which it was taken, and demonstrating the variability of the coloration in life.

Newly hatched young at Sipi were faintly yellowish from nape to anus, tail pink below. Halfgrown young are bright mustard-yellow below from chin to anus and even on base of tail, the remainder of which is gray.

Size. Total length of paratype ♂, 109 (52 + 57) mm.; total length of a ♀, 120 (56 + 64) mm., from Ruwenzori Mountains.

Remarks. I agree with Angel (1943a) that the number of granules separating the supranasals are too variable to be useful in recognizing this race, but his belief that the race is untenable was partly based on an error in my key (1936a, p. 818) where the preanal-pore counts of *elgonensis* and *africanus* were transposed.

Breeding. On November 22, two fresh eggs were found beneath a log on the western slopes of Mount Debasien at 4500 feet. On December 12, a gravid ♀ with fully developed eggs was taken at Sipi, on the 14th many eggs, measuring 10 x 10 and 11 x 9 mm., mostly holding embryos, were found; some of the young hatched out during the following week. Between January 1 and 7, more than a dozen eggs, measuring about 11 x 9.5 mm., were unearthed about the base of, or in holes in, rotting trees on the eastern slopes of the Ruwenzori Mountains.

Diet. Crickets in three geckos examined.

Enemies. One male was recovered from the stomach of a green snake (*Chlorophis hoplogaster*).

Habitat. Chiefly in virgin forest on mountain slopes between 5000 and 7000 feet, but this sylvicoline species shows a certain amount of adaptability in recently deforested areas, for at Kaimosi one was seen on a garage door, another was captured in a bucket into which it had fallen, but from which it was unable to escape. A lengthy account of the difficulties attending the securing of a specimen on Ruwenzori, has been published (1942e) elsewhere.

Localities. **Uganda:** Mount Debasien—*Amaler River; Mount Elgon—*Nyenye—*Sipi; Ruwenzori Mountains—*Mubuku Val-

ley. **Kenya Colony:** *Kaimosi. (Belgian Congo record of *africanus* is referable to *quattuorseriatus*.

Range. Western Uganda to western Kenya Colony.

Cnemaspis africanus africanus (Werner)

1895b. *Gymnodactylus africanus* Werner, Verh. Zool.-Bot. Ges. Wien, **45**, p. 190, pl. v, fig. 5: Usambara Mountains, Tanganyika Territory.
1895h. *Gonatodes africanus* Boulenger, p. 173.
1896. Tornier, p. 10.
1897. Tornier, p. 63.
1898c. Boulenger, p. 913.
1900b. Tornier, p. 584.
1902b. Mocquard, p. 405.
1907. Lönnberg, p. 3.
1911. Lönnberg, p. 9.
1911b. Nieden, 1910, p. 442.
1912c. Sternfeld, p. 201.
1913c. Nieden, p. 64.
1913a. Werner, p. 13.
1923d. Loveridge, p. 843.
1924b. Loveridge, p. 8.
1928c. *Paragonatodes africanus* Barbour & Loveridge, p. 138.
1934. *Cnemaspis africanus* Brongersma, p. 166.
1943a. Angel, p. 165.
1936a. *Cnemaspis africanus africanus* Loveridge, p. 818.
1936j. Loveridge, p. 281.
1937f. Loveridge, p. 502.
1942e. Loveridge, p. 319.

Description. Snout elongate, obtusely pointed, considerably or slightly longer than the distance between the eye and the ear-opening; granular scales on the snout larger than those on the vertex; rostral much broader than high, with median cleft above; nostril bordered by the rostral, 2–5 small posterior and a large superior nasal, the latter usually separated from, rarely in contact with, its fellow by a single, rarely 2 or 3, granule; upper labials 6–9; lower labials 6–8; mental large, subtriangular, truncate posteriorly, bordered by 3 postmentals.

Back and flanks covered with small granules, among which are scattered keeled, conical tubercles of variable size but forming from 10–14 irregular longitudinal rows; ventral scales moderately enlarged, twice to thrice the size of the dorsal granules, 20–30 in a transverse series; males with 10–14 preanal pores; digits elongate; median toe with from 3–5, normally 4, enlarged plates beneath its basal phalange.

Tail subcylindrical, covered above with small smooth scales, numerous flat, or conical, tubercles more or less arranged in convergent lines upon the base of the tail, a large conical tubercle on either side; lateral scales slightly larger than the dorsal; below with an irregular median series of enlarged scales.

Color. In life. Magrotto ♂. Above, olive green mottled with brown and black. Below, throat white; belly, base of tail, thighs, groin, and anterior aspect of tibia, chrome.

In life. Topotype ♀. Above, blackish with grayish-green markings, a chain of these down the back are rather like a series of ornamental A's, in some individuals these coalesce to form a pale fawn vertebral line with paired stripes at right angles to it, formed from the feet of the A's; labials dusky with pale yellow spots, many inconspicuous yellow specks on sides of head, neck and limbs. Below, throat white with three dusky ∩-shaped markings, diminishing in size towards the centre; breast, belly, and underside of limbs yellowish green or yellowish-white, under surface of tail bright reddish orange.

In males the gular ∩-shaped markings appear to be a more constant feature; a series of them, one within the other, follows the outline of the lower jaw. In specimens taken on green tree trunks the green increases and brightens to olive.

In alcohol. Type ♀. Above dark gray with blackish brown markings; upper and lower labials dark brown with elongate white streaks. Below, whitish, throat with black markings. (Adapted from Werner's original description).

Size. Total length of a topotype ♂, 101 (47 + 54) mm.; total length of a ♀ from Kwai, 119 (54 + 65) mm.

Breeding. On April 22, on Mount Mbololo, a gravid ♀ held ova which were only half the diameter of the egg when laid. On July 5, on Magrotto Mountain, a ♀, together with one egg, measuring 9.5 x 7.5 mm., and evidently just laid, were found beneath a log; on the same day two fresh eggs, measuring 9 x 7.5 mm., were dug from a hole at the base of a tree. On November 22, at Amani, three pairs of eggs, each egg measuring 9 x 8 mm., were found in the rotting wood of fallen trees. On December 21, at Phillipshof, thirty-one whole eggs besides numerous hatched shells, were taken from a hole in a bank in the forest.

Diet. Cockroaches, small beetles and an ant.

Habitat. In gallery forest of coastal plain to virgin forests at 5000 feet. Living principally in hollow trees in the forest, they emerge to bask where a shaft of sunlight is to be found close to the hole or fissure,

into which they quietly slip when anyone approaches. Nieden (1911b) quotes Krefft as stating that they are terrestrial. This is hardly correct, though they may be taken crossing the ground from one tree to another or on their way to lay their eggs in some old log or suitable hole.

One was seen on the brink of a large pool in the forest between Misalae and Kizerui. On being approached it took to the water without the slightest hesitation and swam out to a piece of floating bark. As I quietly took another step in its direction it jumped off its raft and struck out boldly across the six feet of water to the opposite bank, which it gained before I did. Had it not paused to rest on landing, I should not have caught it. In the Magrotto forest I twice disturbed one of these geckos basking on a moss-grown boulder in a small stream flowing between fern-covered banks. On the first occasion the gecko gained the next boulder and freedom by a leap; the second time it plunged boldly into the water. The species squeaks when captured.

Many other notes on habitat will be found in the literature.

Localities. **Kenya Colony:** Athi Plains; Mombasa; Mount Kenya—Meru[1]; *Mount Mbololo. **Tanganyika Territory:** *Magrotto Mountain; *Siga Caves, Mkulumuzi River; Mount Kilimanjaro—Kibonoto; *Tanga; Uluguru Mountains—*Vituri; Usambara Mountains—*Amani—*Bumbuli—*Derema—*Kizeiru—*Kwai—*Mount Lutindi—*Phillipshof.

Range. Central Kenya Colony south to eastern Tanganyika Territory.

Genus Hemidactylus

1817. *"Hemidact"* (assumed abbreviation for *Hemidactylus*) Oken, Isis, p. 1183: based on Hemidactyles of Cuvier, 1817, Régne Animal., **2**, p. 47 (type "G. Tuberculeux de Daud.," i.e. *tuberculosus* Daudin = *mabouia* Moreau de Jonnés).
1842. *Boltalia* Gray, Zool. Misc., p. 58 (type *sublaevis*).
1843. *Hoplopodion* Fitzinger, Syst. Rept., pp. 19, 103 (type *coctaei*).
1843. *Microdactylus* Fitzinger, Syst. Rept., pp. 19, 104 (type *peruvianus*).
1843. *Onychopus* Fitzinger, Syst. Rept., pp. 19, 104 (type *garnoti*).
1843. *Tachybates* Fitzinger, Syst. Rept., pp. 19, 105 (type *mabouia*).
1843. *Pnoëpus* Fitzinger, Syst. Rept., pp. 19, 106 (type *javanicus*).
1845. *Valernesia* Gray, Cat. Lizards Brit. Mus., p. 156 (type *richardsonii*).
1845. *Doryura* Gray, Cat. Lizards Brit. Mus., p. 156 (type *bouringii*).

[1] *Fide* Lönnberg, not Tornier's misidentified *quattuorseriatus*.

1845. *Leiurus* Gray (not Hemprich & Ehrenberg, 1829), Cat. Lizards Brit. Mus., p. 157 (type *ornatus*).
1845. *Nubilia* Gray, Cat. Lizards Brit. Mus., p. 273 (type *argentii*).
1862b. *Liurus* Cope (not Ehrenberg, 1828), in Slack, Handbook Mus. Acad. Nat. Sci. Philadelphia, p. 32 (*n.n.* for *Leiurus* Gray).
1869. *Teratolepis* Günther, Proc. Zool. Soc. London, p. 504 (type *Homonota fasciata* Blyth).
1894c. *Bunocnemis* Günther, Proc. Zool. Soc. London, p. 85 (type *modestus* Günther).
1934. *Lophopholis* Smith & Deraniyagala, Ceylon Journ. Sci., B, **18**, p. 235 (type *Teratolepsis scabriceps* Annandale).
1940. *Aliurus* Dunn & Dunn, Copeia, p. 71 (*n.n.* for *Liurus* Cope).

Diagnosis. Digits free or partly webbed, the distal phlanges short or long, rising angularly from within a dilated basal portion, covered above with scales, not denticulate laterally, below on undilated basal portion by scales or lamellae, on dilated basal portion by scansors which are usually divided[1], clawed[2].

Pupil vertical; upper eyelid distinct, lower vestigial; dorsal lepidosis of small or large, uniform or heterogeneous, scales, granules, or tubercles. Tail swollen, cylindrical or subcylindrical and tapering, or depressed and root-shaped. Males with, rarely without[3], preanal and/or femoral pores.

The following characteristics are apparently shared by all the African species that I have examined, and consequently have been omitted from the descriptions.

Head oviform; snout obtusely pointed; rostral quadrangular, nearly twice as broad as high, with median cleft above; forehead usually slightly concave; ear-opening round to suboval or oval (there is often considerable variation within a species) and without lobules anteriorly; mental subtriangular, about twice as long as an adjacent labial; gular region covered with minute, or small flat, granules.

Remarks. Though Günther was fully justified at the time he described *Bunocnemis* as generically distinct, subsequent discoveries have shown it impossible to retain the genus on the character of undivided subdigital scansors. As pointed out by Parker (1942, p. 32) some species provide intergrading links between those with divided and those with undivided scansors, the character which caused Smith and Deraniyagala to separate *Lophopholis* (divided) from *Teratolepis* (undivided).

[1] Mostly undivided in *modestus*, variable in *matschiei*.
[2] Inner digit clawless in *greeffi* only.
[3] Absent in *somalicus*, *forbesii*, *aporus*, and *newtoni*.

Though Parker (1942, p. 32) decided to refer both *Bunocnemis* and *Lophopholis* to the synonymy of *Teratolepis*, he thought that genus should be recognized on the basis of the strongly imbricating scales. Any arrangement which would break up so unwieldy a genus as *Hemidactylus* is worthy of careful attention, but I find it impossible to recognize *Teratolepis* even on this single character owing to the closely related species of *Hemidactylus* like *homoeolepis* with subimbricate scales and the intermediate type *somalicus* which is said to have juxtaposed granules on the anterior part of the back "but imbricate behind and on the flanks."

The reasons for synonymizing *Aliurus* with *Liurus* and *Leiurus* have been given elsewhere (Loveridge, 1941e, p. 116).

That the tail in members of this genus should be so fragile is unfortunate for it proves to be an important guide to affinities. In arranging the numerous African species I have assumed that those with uniform scales or uniform granules are more primitive than species in which tubercles have been developed; that few and smooth tubercles should precede those which are more numerous or strongly keeled, that species in which males are poreless (now mostly to be found only on islands) or have but few pores (frequently desert dwellers), gave rise to those with many preanal or preano-femoral pores.

I have also proceeded on the assumption that the genus entered the continent from southwestern Arabia, for the greatest number of species are to be found in the Somali region, and thence spread north and west across the continent to its furthest limits. Certain species (*brookii, turcicus, mabouia*) apparently being carried to the New World (West Indies, Brazil, etc.) by human agency, *brookii* so long ago that it has developed a recognizable race in Haiti, the other two more recently.

Range. Polynesia; southern Asia; southern Europe; Africa; America.

Key to the Species

1. Dorsal scales strongly imbricating; original tail cylindrical or slightly swollen 2
   Dorsal scales, granules, or tubercles[1] subimbricate[2] or juxtaposed; original tail subcylindrical or depressed 9

2. Back covered with smooth uniform scales 3
   Back covered with scales intermixed with more or less strongly keeled scales or tubercles 7

[1] Dorsum is exclusively covered with tubercles only in *oxyrhinus*.
[2] Imbricate on posterior portion of dorsum only in *somalicus*.

3. No enlarged tubercles on occiput; subdigital scansors mostly divided; (except in *albopunctatus*) hind limb covered posteriorly with subequal scales 4

   A few enlarged tubercles scattered over occiput; subdigital scansors mostly undivided; hind limb covered posteriorly with scales and greatly enlarged tubercles 6

4. Midbody scale-rows 50–58; scansors under first toe 4; preanal pores in males 8–22; range: Ethiopia and British Somaliland . . . . . *ophiolepis* (p. 105)

   Midbody scale-rows 59–102; scansors under first toe 5–7 5

5. Midbody scale-rows 59–81; preanal pores in males 4–8; hind limb covered posteriorly with subequal scales; range: Ethiopia and British Somaliland south to Kenya Colony . . . . . *isolepis* (p. 105)

   Midbody scale-rows 70–102; preanal pores in males 12–19; hind limbs covered posteriorly with scales and irregularly scattered tubercles; range: Ethiopia and British Somaliland . . . . . *albopunctatus* (p. 107)

6. Upper labials 7–8; lower labials 5–7; preanal pores in males 10–18; range Kenya Colony . . . . . *modestus* (p. 108)

   Upper labials 6–7; lower labials 5; male unknown; range: Nigeria and Togo . . . . . *matschiei* (p. 109)

7. Both large and small dorsals keeled, the enlarged scales larger than the interspaces between them; preanal pores in males 6–10; median subcaudal scales only moderately enlarged transversely; range: British Somaliland south to Kenya Colony . . . . . *t. tropidolepis* (p. 110)

   Only the enlarged dorsals keeled, these enlarged scales usually smaller than the interspaces between them; preanal pores in males 10–23 8

8. Median subcaudal scales enlarged transversely; upper labials 10 (sole character separating it from *t. squamulatus*); preanal pores in male 14 (distinguishes it from *H. brookii angulatus*); range: Blue Nile, Anglo-Egyptian Sudan (known only from type, which I have not seen) . . . . *t. floweri* (p. 112)

   Great disparity in size between smooth and keeled dorsals, the latter strongly keeled; median subcaudal scales only moderately enlarged transversely; preanal pores in males 10–20: Somalia inland through dry uplands to west central Tanganyika Territory . . . . . *t. squamulatus* (p. 112)

   Slight disparity in size between smooth and keeled dorsals, the latter feebly keeled; median subcaudal scales strongly enlarged transversely;

males with 16–23 preanal pores; range: East African coast from Malindi, Kenya Colony, south to Tanga, Tanganyika Territory....*t. barbouri* (p. 116)

9. Back without enlarged tubercles; original tail subcylindrical, without enlarged tubercles (except on base in *fasciatus*).....10
Back with or without scattered tubercles; original tail depressed, usually with 6 (rarely 0, 4, 8, or 10) transverse rows of enlarged tubercles..19

10. Back covered with smooth, subequal, subimbricate scales or juxtaposed granules; preanal pores in males 2–4 or absent.....11
Back covered with obtusely keeled, subequal, juxtaposed tubercles, or smooth granules among which are scattered smooth or feebly striate tubercles.....17

11. Upper labials 8–11; range: Sokotra Island and Somaliland.....12
Upper labials 7–8; range: Cape Verde Islands.....15

12. Back covered with flat subimbricate scales; tail without a basal constriction; range: Sokotra Island, Gulf of Aden.....*homoeolepis* (p. 117)
Back covered with juxtaposed granules (imbricate posteriorly in *somalicus*).....13

13. Distance from tip of snout to anterior border of orbit (not eye) as long as the distance between eye and ear; eye equal to its distance from nostril; eye about equal to 16–22 ventrals in longitudinal series at midbody; claw extending only just beyond scansor portion of the digits; range: British Somaliland.....*megalops* (p. 118)
Distance from tip of snout to anterior border of orbit (not eye) slightly longer than the distance between eye and ear; eye distinctly shorter than its distance from nostril; claw extending well beyond scansor portion of the digits.....14

14. Length of eye about equal to 7 ventrals in longitudinal series at midbody; subdigital scansors abruptly differentiated from granules of soles, 4 under first toe, 7–8 under fourth toe; range: British Somaliland..*laevis* (p. 119)
Length of eye about equal to 12–16 ventrals in longitudinal series at midbody; subdigital scansors proximally scarcely larger than granules of soles, 5–6 under first toe, 9–11 under fourth toe; range: British Somaliland.....*somalicus* (p. 120)

15. Scansors under first toe 6; range: Sal Island.....*b. chevalieri* (p. 121)
Scansors under first toe less than 6.....16

16. Scansors under first toe 4–5; range: Boa-vista Island.....*b. boavistensis* (p. 121)

Scansors under first toe 3; range: Brava; Fogo; Sao Antao; Sao Tiago; Sao Vicente.....*b. bouvieri* (p. 122)

17. Back covered with obtusely keeled, subequal, juxtaposed tubercles; scansors under first toe 6–7, under fourth toe 11–12; preanal pores in males 2; range: Abd el Kuri Island, Gulf of Aden.....*oxyrhinus* (p. 123)

Back covered with smooth granules among which are scattered smooth or feebly striate tubercles.....18

18. Scansors under first toe 9–11, under fourth toe 11–13; preano-femoral pores in males 16; dorsal tubercles in 16–18 rows; range: Eastern Belgian Congo.....*f. ituriensis* (p. 124)

Scansors under first toe 6–8, under fourth toe 8–11; preano-femoral pores in males 32–40; dorsal tubercles in 18–24 rows; range: Belgian Congo west to Liberia.....*f. fasciatus* (p. 124)

19. Distance from end of snout to anterior border of eye equal to, or but slightly longer than, the distance from posterior border of eye to posterior border of ear-opening.....20

Distance from end of snout to anterior border of eye *much* longer than the distance from posterior border of eye to posterior border of ear-opening.....30

20. Tail without basal constriction, tapering gradually.....21

Tail with basal constriction, swollen or root shaped.....26

21. Back covered with granules among which are scattered smooth or feebly keeled tubercles.....22

Back covered with granules among which are scattered more or less strongly keeled tubercles.....24

22. Inner toe with sessile claw; dorsal tubercles smooth, not extending forward on to nape; scansors under first toe 3–5, under fourth toe 7–10; preano-femoral pores in males 24–36; range: Somaliland; Lamu Island; St. Helena; etc.....*frenatus* (p. 127)

Inner toe with well-developed clawed phalange; dorsal tubercles feebly keeled, extending forward on to nape.....23

23. Scansors under first toe 4, under fourth toe 7–8; preanal pores in males 5–6; tail with 4 rows of enlarged tubercles; range: Sokotra Island, Gulf of Aden.....*pumilio* (p. 130)

Scansors under first toe 5, under fourth toe 8–9; preanal pores in males 4–6; tail with 6 rows of enlarged tubercles; range: Somalia and Zanzibar (introduced) ..... *puccionii* (p. 131)

24. Free distal joints of digits very short, the claw extending only slightly beyond the basal dilation; scansors under first toe 4–5, under fourth toe 6–8; preanal pores in males 4–7; range: British Somaliland to Kenya Colony ..... *citernii* (p. 132)

Free distal joints of digits moderately long, the claw extending well beyond the basal dilation 25

25. Scansors under first toe 4–6, under fourth toe 5–9; preano-femoral pores in males 20–46; maximum length from snout to anus 69 mm.; range: Eritrea to Cape Verde, south to Angola and Tanganyika ... *b. angulatus* (p. 134)

Scansors under first toe 5–8, under fourth toe 8–11; preanal pores in males 3–10; maximum length from snout to anus 60 mm.; range: Sokotra Island and Somalia northwest to French Morocco ..... *t. turcicus* (p. 142)

Scansors under first toe 6–9, under fourth toe 9–12; preanal pores in males 6–12; maximum length from snout to anus 80 mm.; range: Somalia south to Kenya Colony ..... *t. macropholis* (p. 148)

Scansors under first toe 6–8, under fourth toe 9–11; preanal pores in males 6–11; maximum length 78 mm.; range: Ethiopia and British Somaliland ..... *barodanus* (p. 150)

26. Back covered with granules among which are scattered smooth or feebly keeled tubercles 27

Back covered with granules among which are scattered strongly keeled, trihedral tubercles 28

27. Dorsal tubercles unequal, perfectly flat, the lateral slightly obtusely conical, irregularly disposed; tail 5 mm. shorter than length from snout to anus; range: Eritrea ..... *l. fossatii* (p. 151)

Dorsal tubercles subequal, obtusely conical, the lateral with slight traces of keels, more regularly disposed; tail 5 mm. longer than length from snout to anus; range: Eritrea ..... *l. laticaudatus* (p. 152)

28. Scansors under first toe 7–9, under fourth toe 10–12; preanal pores in males 8–9; range: British Somaliland ..... *taylori* (p. 153)

Scansors under first toe 4–5, under fourth toe 6–8; preano-femoral pores in males 28–36 (in *ruspolii*, male of *tanganicus* unknown).....29

29. Upper surface of snout and crown covered with large, keeled, juxtaposed tubercles; maximum length from snout to anus 50 mm.; range: British Somaliland to Kenya Colony.....*ruspolii* (p. 154)

Upper surface of snout and crown covered with keeled and conical tubercles, juxtaposed on tip of snout, elsewhere scattered among fine granules; maximum length from snout to anus 76 mm.; range: east central Tanganyika Territory.....*tanganicus* (p. 156)

30. Tail depressed but not cyclotetragonal.....31
Tail cyclotetragonal, strongly spinose.....37

31. Toes without interdigital webbing.....32
Toes with interdigital webbing.....36

32. Back covered with uniform granules, neither dorsal nor lateral tubercles present.....33
Back covered with granules among which are scattered smooth or feebly keeled, conical tubercles.....34

33. Scansors under first toe 7–10, under fourth toe 11–14; preanal pores in males 0, femoral pores 5–14; range: Egypt to Eritrea and Asia..... *flaviviridis* (p. 157)

Scansors under first toe 5, under fourth toe 8–9; preanal pores in males 4, femoral pores 0; range: British Somaliland.....*curlei* (p. 162)

34. Scansors under first toe 10–11, under fourth toe 14–15; preano-femoral pores absent in males; range: Abd el Kuri Island, Gulf of Aden..*forbesii* (p. 163)

Scansors under first toe less than 10, under fourth toe less than 12....35

35. Scansors under first toe 6–7, under fourth toe 9–11; upper labials 8–10; lower labials 7–9; preanal pores in males 8–12; length from snout to anus 78 mm.; range: Sokotra Island, Gulf of Aden.....*granti* (p. 164)

Scansors under first toe 6–9, under fourth toe 9–11; upper labials 10–11; lower labials 8–9; preanal pores in males 6–10; length from snout to anus 70 mm.; range: Ethiopia and British Somaliland.....*jubensis* (p. 164)

Scansors under first toe 6–7, under fourth toe 9–11, these scansors extending on to sole of foot; upper labials 13–14; lower labials 10; preano-femoral pores in males 28–32; length from snout to anus 53 mm.; range: British Somaliland and Somalia.....*smithi* (p. 166)

Scansors under first toe 5–7, under fourth toe 7–9 (6–8 *fide* Parker), these scansors *not* extending on to sole of foot; upper labials 9–14; lower labials 7–11; preano-femoral pores in males 24–60; length from snout to anus 50–86 mm.; range: Tropical Africa; Madagascar; Mauritius; South America, etc. ..... *mabouia* (p. 167)

Apparently differs from *mabouia* only in alleged absence of pores in males; range: Annobon Island, Gulf of Guinea ..... *aporus* (p. 180)

Scansors under first toe 4, rarely 5, under fourth toe 6–7; upper labials 8–12; lower labials 7–11; preano-femoral pores in males 24–34; length from snout to anus of adults 41–53 mm.; range: East Coast from Kenya to Mozambique; Madagascar; Aldabra Islands; Seychelles ... *gardineri* (p. 181)

Scansors under first toe 4–6, under fourth toe 9–11; upper labials 11–12; lower labials 9–12; preanal pores in males 9–10; length from snout to anus of adult 55 mm.; range: Nigeria to Liberia ..... *ansorgii* (p. 183)

36. Scansors under first toe 6–7, under fourth toe 9–10; back covered with granules with at most 2–4 more or less irregular, lateral, or dorso-lateral rows of tubercles; range: Belgian Congo to British Cameroon ..... *richardsonii* (p. 184)

37. Toes without interdigital webbing 38
Toes with interdigital webbing 40

38. Thumb rudimentary, clawless; back with 20 rows of feebly-keeled tubercles; preano-femoral pores in males 34–36; range: Sao Thomé and Principe Islands, Gulf of Guinea ..... *greeffi* (p. 186)

Thumb normal, clawed 39

39. Back with 14–18 rows of low, moderately-keeled tubercles; preanal pores in males 4–8; range: Angola to French Congo ..... *longicephalus* (p. 187)

Back with 10–14 rows of high, feebly-keeled tubercles; preanal pores in males 8–11; range: Belgian Congo to Liberia ..... *muriceus* (p. 189)

40. Preanal pores in males 8–11; small nasals 4–5; upper labials 12–13; lower labials 10; scansors beneath first toe 9; range: Belgian Congo to British Cameroons ..... *echinus* (p. 191)

Preanal pores in males absent; small nasals 2–3; upper labials 9–11; lower labials 8–9; scansors beneath first toe 7–8; range: Annobon Island, Gulf of Guinea ..... *newtoni* (p. 193)

STATISTICAL DATA FOR THE AFRICAN SPECIES OF THE GENUS HEMIDACTYLUS

so far as known up to the present time.

Where blanks are left it is because the precise number was not stated in the original description, and no specimens have been seen.

Species	Internasal Granules	Nasals surrounding Nostril	Upper Labials	Lower Labials	Tubercle rows on Dorsum	Scansors under First Toe	Scansors under Fourth Toe	Tubercle rows on Tail	Length of Head and Body	Male Pores
ophiolepis		3	7	6	0	4	9	0	45	8–22
isolepis	0	3–4	7–8	5–7	0	5–7	6–10	0	40	4–8
albopunctatus	0	3	7–8	6–7	0	5–6	6–8	0	46	12–19
modestus	0–1	3	7–8	5–7	0	3–6	6–10	0	45	10–18
matschiei		3–4	6–7	5	0	5	7	0	?	–
t. tropidolepis	0	3–4	7–8	5–6	0	4	7–9	0	37	6–10
t. floweri	1	3	10	5	0	5	7	0	41	14
t. squamulatus	0–1	3–4	6–8	5–7	0	3–5	6–8	0	48	10–20
t. barbouri	0–1	3–4	6–8	5–7	0	4–6	6–8	0	44	16–23
homoeolepis		3	8–9	7–8	0	4–5	8–10	0	40	4
megalops	0	3	9–11	7–9	0	5	8–9	0	36	2
laevis		3	9	7	0	4	7–8	0	39	–
somalicus	0	3	8–11	7–9	0	5–6	9–11	0	43	0
b. chevalieri		3	7–8	6–7	0	6	7–8	0	43	2
b. boavistensis		3–4	7–8	6–7	0	4–5	8	0	44	–
b. bouvieri		3–4	7–8	6–7	0	3	4–5	0	36	2
oxyrhinus		3	8–10	7–8	all	6–7	11–12	0	50	2
f. ituriensis	3	4–5	9–11	8–10	16–18	9–11	11–13	0	89	16
f. fasciatus	0–1–2	3–4	9–13	8–11	18–24	6–8	8–11	base	95	32–40
frenatus	0–1	3	8–12	7–10	2–8	3–5	7–10	6	55	24–36
pumilio		4	8–9	6–8		4	7–8	4	26	5–6
puccionii	1	3	9	7–9	10–16	5	8–9	6	39	4–6
citernii		4–5	7–10	5–7	14–16	4–5	6–8		36	4–7
b. angulatus	0–1–2	3–4	6–11	6–8	14–25	4–6	5–9	6–8	69	20–46
t. turcicus	0–1	3	7–11	6–9	14–16	5–8	8–10	6–8	59	3–10
t. macropholis	1	3–4	9–10	6–8	12–16	6–9	10–12	4–6	80	6–11
barodanus	1	3	9–11	8	14–16	6–8	9–11	6	78	6–11
l. fossatii		3	9	8		5	6–7	6	47	–
l. laticaudatus		3–4	7–8	6–7		4	6–7	6	60	12–18
taylori	1	4	10	7–8	13–15	8–9	10–12	4	71	8–9
ruspolii	0	3–5	8–10	7–8	14–18	4–5	6–8	10	50	28–34
tanganicus	0	4	8–9	8	18–20	5	8	6–10	76	–
flaviviridis	1	3	12–16	9–12	0	7–10	11–14	4–6	74	8–14
curlei	1	3	8–10	6–8	0	5	8–9	0	43	4
forbesii		3	10–11	8–9		10–11	14–15		83	0
granti		3	8–10	7–9		6–7	9–11		78	8–12
jubensis		4–5	10–11	8–9		6–9	9–11		70	6–10
smithi		3	13–14	10		6–7	9–11		53	28–32
mabouia	0–1–2	2–4	9–14	7–11	9–18	5–6	7–9	4–6	86	24–54
aporus		3	10	9–10	16–20	5	7	6	54	0
gardineri	0–1–2–3	2–4	8–12	7–11	10–16	4–5	6–7	6	53	24–34
ansorgii	1	3	11–12	9–12	8–10	4–6	9–11	6	55	9–10
richardsonii	1	3–4	9–14	8–11	2–4	6–7	9–10	6	80	40–48
greeffi		3–4	10–11	9	20	7	9–10	6	60	12–14
longicephalus	1	2–4	9–12	7–10	14–18	5–7	8–11	6	64	4–8
muriceus	1	4	9–12	8–11	10–14	5–7	9–11	6	54	8–11
echinus	2	4–5	12–13	10–12	18	9	11–13	6	58	8–11
newtoni		2–3	9–11	8–9		7–8	11–12	6		0

Hemidactylus ophiolepis Boulenger

1903d. *Hemidactylus ophiolepis* Boulenger, Ann. Mag. Nat. Hist. (7), **11**, p. 54: "Amibarra, Hawash" ? Hawash River, Amhara, Ethiopia.
1932b. Parker, p. 347 (key).
1942. *Teratolepis ophiolepis* Parker, p. 35.

Description. Snout slightly longer than the distance between the eye and the ear-opening; granular scales on the snout flat, larger than those on the vertex; nostril bordered by the rostral, first labial, and 3 small nasals, the uppermost in contact with its fellow; upper labials 7; lower labials 6; a pair of large postmentals in contact on the median line, an outer, but smaller, pair of chin shields.

Back and belly covered with uniform, smooth, rounded, imbricate scales, largest on the back, about 50 encircling midbody; limbs without any strikingly large tubercles posteriorly; males with 8–22 preanal pores forming an uninterrupted series; digits free, slightly dilated, with rather short distal joints, inferiorly with oblique scansors, 4 under the first toe, 9 under the fourth toe; tail, when unregenerate, cylindrical tapering, covered above with small, smooth, imbricate scales which are larger than those on the body; below with smooth, imbricate scales of which the median series are transversely enlarged; length of tail slightly longer than that of head and body.

Color. Above, pale gray-brown; a dark brown streak from nostril passes through the eye; back with small dark brown spots and interrupted transverse whitish lines. Below, whitish.

Size. Total length of type ♂, 95 (45 + 50) mm.

Localities. **Ethiopia**: "Amibarra, Hawash". **British Somaliland**: Borama District; Haud.

Range. Ethiopia to British Somaliland.

Hemidactylus isolepis Boulenger

1893b. *Hemidactylus homoeolepis* Boettger (not Boulenger), pp. 114, 122.
1895b. *Hemidactylus isolepis* Boulenger, Proc. Zool. Soc. London, p. 531, pl. xxix, fig. 1: Turfa Tug, S. of Harrar, Ethiopia.
1896c. Boulenger, p. 16.
1896e. Boulenger, p. 213.
1897g. Boulenger, p. 277.
1898a. Boulenger, p. 716.
1898c. Boulenger, p. 913.
1901a. Boulenger, p. 48.
1910b. Andersson, p. 202.
1911. Lampe, p. 153.

1923b. Calabresi, p. 151.
1923d. Loveridge, p. 844.
1924b. Loveridge, p. 9.
1927. Calabresi, p. 39.
1932a. Parker, p. 222.
1932b. Parker, p. 347 (key).
1936e. Parker, p. 601.
1936. Roux, p. 160.
1937f. Loveridge, p. 491.
1942. *Teratolepis isolepis* Parker, p. 35.

Description. Snout equal to, or slightly longer than, the distance between the eye and the ear-opening; granular scales on the snout convex, larger than those on the vertex; nostril bordered by the rostral and 3–4 small nasals, the uppermost in contact with its fellow; upper labials 7–8; lower labials 5–7; a pair of large postmentals in contact on the median line, an outer, but smaller, pair of chin shields present or absent.

Back and belly covered with uniform, smooth, rounded, imbricate scales, subequal on back and belly, about 59–81 encircling midbody; males with 4–8 preanal pores forming an uninterrupted series; digits free, slightly dilated, with rather short distal joints, inferiorly with oblique scansors, 5–7 under the first toe, 6–10 under the fourth toe; tail, when unregenerate, cylindrical, tapering, covered above with small, smooth, imbricate scales which are larger than those on the body; below with smooth, imbricate scales of which the median series are slightly enlarged; length of tail slightly longer than that of head and body.

Color. Above gray or pale brown; a dark brown streak from nostril passes through the eye to the neck; back with irregular dark brown spots and scattered white dots which sometimes coalesce to form transverse lines. Below, whitish.

Size. Total length of type ♂, 78 (40 + 38) mm., from Turfa, of largest ♀, 72 (35 + 37) mm., from Lokitaung.

Sexual dimorphism. ♂♂ with 62–65 and ♀♀ with 67–77 scales encircling midbody.

Remarks. Calabresi (1923b) states that some of the dorsal scales in her Archer Post geckos are not perfectly smooth, but carry a faintly raised median keel. In this respect, she says, they agree with the specimens from Lugh identified by Boulenger. One might suppose that she was dealing with another species but for the fact that she discusses *tropidolepis* and *squamulatus* on succeeding pages.

Breeding. An embryo-containing egg, measuring 7 x 5 mm., was taken near the mouth of the Kaliokwell River (Parker, 1932a).

Localities. **Ethiopia:** Harar; Lake Rudolf; Turfa Tug; Webi Shebeli. **British Somaliland:** Borama District; Gan Lebar (Libah). **Somalia:** Lugh. **Kenya Colony:** Archer's Post; Kaliokwell River mouth; Komogin River; Lake Rudolf; *Lokitaung; Todoniang; *Turkana Province.

Range. Ethiopia and British Somaliland south through Somalia to northern Kenya Colony.

Hemidactylus albopunctatus nom. nov.

1942. *Teratolepis taylori* Parker (not *Hemidactylus taylori* Parker, 1932a), Bull. Mus. Comp. Zoöl., **91**, p. 33: Haud at 46°20′ E. x 8°15′ N., 2,100 feet, British Somaliland.

Description. Snout longer than the distance between the eye and the ear-opening; scales on the snout juxtaposed, large, polygonal; nostril bordered by the rostral, first labial, and 3 small nasals, the uppermost in contact with its fellow; upper labials 7–8; lower labials 6–7; a pair of large postmentals in contact on the median line, lower labials bordered by some enlarged scales.

Back and belly covered with imbricate scales, largest on the back, about 70–80 encircling the body in males, 96–102 in females; males with 12–19 preanal pores forming an angular series; limbs short, overlapping when adpressed, hind surface of femur and tibia with some enlarged, irregularly disposed tubercles; digits free, slightly dilated, the distal joints of fingers short, of toes much longer, inferiorly with divided scansors, 5–6 under the first toe, 6–8 under the fourth toe, merging into the granular scales of the sole; tail, when unregenerate, cylindrical, tapering, covered above with smooth scales like those on the body; length of tail *probably* slightly shorter than that of head and body.

Color. Above, brownish gray; a black streak from nostril passes through the eye and above the ear and is bordered below by a white line extending along upper labials to the region of the forearm, below this again on the lower labials is an interrupted black line continued as a series of widely separated spots to forearm; from eye along temple a short whitish stripe may be present or absent; on the occiput a V-shaped marking followed by a series of from five to seven distinct, roundish white spots along the vertebral line; hind limbs spotted with

white posteriorly; tail with a median series of transversely oval spots anteriorly, and with two alternating dorso-lateral series posteriorly.

Size. Total length of type ♂, 88+ (46 + 42+) mm.

Remarks. Parker considers *T. modestus* to be the nearest known relative of *albopunctatus* (*taylori*) whose divided scansors and smaller postfemoral tubercles distinguish it, quite apart from the distinctive color pattern of labial stripe and light spots in contrast to the uniform brown of *modestus*.

Habitat. Beneath stones or among grass in sandy regions interspersed by patches of grass and scrub, at altitudes between 2700 and 3800 feet.

Localities. **British Somaliland:** Haud (for various latitudes and longitudes *cf.* Parker).

Range. British Somaliland.

Hemidactylus modestus (Günther)

1894c. *Bunocnemis modestus* Günther, Proc. Zool. Soc. London, p. 95, pl. viii: Ngatana, Tana River, Kenya Colony.
1894e. Boulenger, p. 722.
1923d. Loveridge, p. 845.
1924b. Loveridge, p. 9.
1936j. Loveridge, p. 287.
1937f. Loveridge, p. 492.
1942. *Teratolepis modesta* Parker, pp. 33, 35.

Native name. *Goria* (Pokomo, but generic in its application).

Description. Snout equal to, or slightly longer than, the distance between the eye and the ear-opening; scales on the snout flat or but slightly convex, smooth or indistinctly keeled, larger than the granules on the vertex, among which are scattered larger, rounded, flat or slightly convex, smooth tubercles; nostril bordered by the rostral, first labial, and 3 small nasals, the uppermost in contact with its fellow or rarely separated by a single granule; upper labials 7–8; lower labials 5–7; a pair of large postmentals in contact on the median line, an outer, but smaller, pair of chin shields.

Back and belly covered with uniform, smooth, rounded, imbricate scales, subequal on back and belly, about 80–100 encircling midbody; scaling of limbs anteriorly as on back but posteriorly with minute scales among which are numerous large, smooth, subconical tubercles; males with 10–18 preanal pores forming an uninterrupted series; digits free, slightly dilated, with rather long distal joints, inferiorly with

oblique scansors of which only 1 or 2 on each toe are divided, 3–6 under the first toe, 6–10 under the fourth toe; tail, when unregenerate, cylindrical, tapering, covered above with small, smooth, imbricate scales which are larger than those on the body; below with smooth, imbricate scales of which the median series are enlarged (regenerate tail substantially similar but scaling more heterogeneous above, while below appears a tendency to transversely enlarged scales); length of tail slightly shorter than that of head and body.

Color. Above, uniformly brown. Below, whitish.

Size. Total length of type ♂, 78 (45 + 33) mm., but tail reproduced in part; length of topotype ♀, 56 (29 + 27) mm.

Diet. An isopod in stomach of one, a number of eggs, apparently those of a small species of grasshopper, in another.

Habitat. Under piles of rubbish and rotting vegetation bordering native gardens beneath the mangoes which mark the site of the vanished village of Ngatana.

Localities. **Kenya Colony:** *Ngatana (known only from the type in the British Museum, and topotypes in the Museum of Comparative Zoölogy).

Range. Kenya Colony.

Hemidactylus matschiei (Tornier)

1901c. *Bunocnemis matschiei* Tornier, Arch. Naturg., **67**, p. 71: Adele (as Bismarckburg), Togo.
1919. Schmidt, p. 601.
1942. *Teratolepis matschiei* Parker, p. 33.

Description. A rough translation of the original description—"Snout not quite twice as long as the eye; nostril bordered posteriorly by 3–4 granules; upper labials 6–7; lower labials 5; subdigital lamellae beneath first to fifth fingers respectively 5, 6–7, 7, 6, 7, and beneath first to fifth toes 5 (second and third divided), 7 (second and fourth divided), 7 (second, third, and fourth divided), 7 (second, third, and fourth divided), 5 (second divided). Otherwise like *B. modestus.*"

Remarks. I have not seen the two cotypes in Berlin which are stated by Tornier to agree with *Bunocnemis* in having imbricating scales on the dorsum, and in the subdigital scansors being mostly undivided.

His further statement that it differs from *modestus* in length of snout and certain labial and subdigital counts is questionable. In none of these does it differ from the range exhibited by our topotypic

series except that there are 5–6 scansors beneath the fifth toe in *modestus*, and 7 in *matschiei*, a difference of minor importance when so much depends at what point one ceases to count scansors in the tapering series of enlarged subdigital plates.

Parker states that the occipital and nuchal scales are homogeneous in *modestus* type, but this is not the case with our four topotypes among which are scattered very much enlarged tubercles, a condition that he attributes to the Nigerian specimen of *matschiei* in the British Museum. Nevertheless could direct comparison be made between the types of *modestus* and *matschiei* it seems probable that they would prove to be distinct.

Size. Total length of larger cotype ♀, 57 mm.

Habitat. Taken while clearing a path, according to Conradt.

Locality. **Nigeria**: Zaria Province. **Togo**: Adele (Bismarckburg).

Range. Nigeria and Togo.

Hemidactylus tropidolepis tropidolepis Mocquard

1888. *Hemidactylus tropidolepis* Mocquard, Mém. Cent. Soc. Philom. Paris, p. 113: Somaliland.
1893b. Boettger, p. 122.
1897g. Boulenger, p. 277.
1909d. Boulenger, p. 310.
1912b. Boulenger, p. 329.
1923b. Calabresi, p. 152, pl. v, fig. 1.
1923d. Loveridge (part), p. 844.
1924b. Loveridge (part), p. 9.
1927. Calabresi, p. 39.
1932b. Parker, p. 342.
1936j. *Hemidactylus werneri werneri* Loveridge (part), p. 286.
1942. *Teratolepis tropidolepis* Parker, pp. 33, 36.

Further citations of "*tropidolepis*" will be found under *H. t. squamulatus* and *H. t. barbouri*.

Native name. Goria (Pokomo, but not specific).

Description. Snout slightly longer than the distance between the eye and the ear-opening; granular scales on the snout convex and keeled, larger than those on the vertex, among which are scattered larger, rounded, keeled tubercles; nostril bordered by the rostral, first labial (sometimes excluded), and 3–4 small nasals, the uppermost in contact with its fellow; upper labials 7–8; lower labials 5–6; a pair of

large postmentals in contact on the median line, an outer, but smaller, pair of chin shields.

Back covered with small, strongly keeled scales among which are scattered large, strongly keeled scales; ventral scales smooth, rounded, imbricate; males with 6–10 preanal pores forming an uninterrupted series; digits free, moderately dilated, with rather short distal joints, inferiorly with oblique scansors, 4 under the first toe, 7–9 under the fourth toe; tail, when unregenerate, cylindrical, tapering, covered above with large imbricate scales, of which some at least of those on the base of the tail are keeled, the keeling becoming less pronounced distally; below with imbricate scales of which the median series are more or less transversely enlarged; length of tail equal to, or slightly shorter than, that of head and body.

Color. Above, grayish fawn or olive brown; a dark streak from nostril passing through the eye to the ear is sometimes present; lips and edge of eyelid sometimes white; back marbled with brown and each scale spotted with black. Below, whitish, most of the scales being minutely punctate with black.

In life. Based on ♀ from Ngatana. Above, olive variegated with flecks of black and white, the white chiefly on the enlarged keeled scales and uniformly arranged in four longitudinal series; edges of digits flecked with chinese white. Below, uniformly white. Pupil black, flanked by gold.

Size. Total length of type ♂, 66+ (37 + 29+) mm., of Ngatana ♀, 57+ (32 + 25+) mm.

Remarks. Andersson's (1912) reference is to a lumping of all four forms and is more properly placed under *H. t. barbouri*, Nieden's (1913c) "*tropidolepis*" is essentially *H. t. squamulatus*. Parker (1942) states that the grounds for considering *squamulatus* as specifically distinct from *tropidolepis*, are less than he at first supposed, he further remarks that the differences in pholidosis, thought to be sexual (1932), are actually not so.

Habitat. Found at altitudes from 1500 to 2500 feet in sandy regions of thorn scrub and tufts of grass, where they remain concealed beneath stones or logs by day, probably emerging at night.

Localities. **British Somaliland:** Ado; Haud; Nogal Valley. **Somalia:** Balli, lower Webi Shebeli; Bardera; Dolo. **Kenya Colony:** *Ngatana.

Range. British Somaliland south through Somalia to Kenya Colony (Tana River).

Hemidactylus tropidolepis floweri Werner

1908. *Hemidactylus floweri* Werner, 1907, Sitzb. Akad. Wiss. Wien, **116, 1,** p. 1830: Blue Nile, Anglo-Egyptian Sudan.
1919. Schmidt, p. 601.
1919. Werner, p. 470.

Description. Upper nasal separated from its fellow by a single granule; upper labials 10; lower labials 5; lamellae under first toe 5; lamellae under fourth toe 7; male with 14 preanal pores.

Remarks. The more numerous pores and the allegedly more numerous upper labials alone separate *floweri* from the typical form with which it is compared by Werner. So few *tropidolepis* males are known that it seems likely that the number of pores may be increased to embrace those of *floweri*; it is so unusual for the upper labials to be twice as numerous as the lower that one cannot help wondering if minor granules near the gape were not included. As the type locality is a thousand miles from the nearest record of either *tropidolepis* or *squamulatus*, however, it may well be that the form is distinct.

Except for the more numerous upper labials, there is nothing in Werner's lengthy description of this gecko, known only from the male holotype which I have not seen, to differentiate it from *H. t. squamulatus* of which I have examined thirty specimens. These had 6–7, rarely 8, upper labials with the fifth or sixth below the eye instead of the seventh as in *floweri*.

Color. Does not appear to differ from that of *squamulatus* in any noteworthy detail.

Size. Total length of type ♂, 80 (41 + 39) mm.

Hemidactylus tropidolepis squamulatus Tornier

1896. *Hemidactylus squamulatus* Tornier, Die Kriechthiere Deutsch-Ost-Afrikas, p. 10: Kakoma, Ugunda, Tanganyika Territory.
1897. Tornier, p. 63.
1898c. Boulenger, p. 913.
1902b. Tornier, p. 590.
1911. Lönnberg, p. 9.
1920a. Loveridge, p. 134.
1923d. Loveridge, p. 844.
1923h. Loveridge, p. 939.
1924b. Loveridge, p. 9.
1928d. Loveridge, p. 63.

1896. *Hemidactylus bocagei* Tornier (not Boulenger), Die Kriechthiere Deutsch-Ost-Afrikas, p. 12: Dalalani, Lake Natron, Tanganyika Territory.
1897d. Werner, p. 377.
1897. *Hemidactylus werneri* Tornier, n.n. for *bocagei* Tornier, preoc., p. 63.
1900b. Tornier, p. 587.
1902b. Tornier, p. 590.
1907. Lönnberg, p. 3.
1912c. Sternfeld, p. 204.
1913c. Nieden, p. 66.
1923d. Loveridge, p. 845.
1924b. Loveridge, p. 9.
1902b. *Hemidactylus Tornieri* Mocquard, n.n. for *bocagei* Tornier, preoc., p. 405.
1913c. *Hemidactylus tropidolepis* Nieden (not Mocquard), p. 66.
1923c. *Hemidactylus Alluaudi* Angel, Bull. Mus. Hist. Nat. Paris, **29**, p. 490: Bura, near Teita, Kenya Colony.
1925a. Angel, p. 8, fig. 1.
1923b. *Hemidactylus tropidolepis* var. *squamulatus* Calabresi, p. 153, pl. v, fig. 2.
1937f. Loveridge (part), p. 495 (not 492).
1937d. Mertens, p. 3.
1923h. *Hemidactylus citernii* Loveridge (not Boulenger), p. 939.
1929h. *Hemidactylus werneri werneri* Loveridge, p. 44.
1933h. Loveridge, p. 285.
1936j. Loveridge (part), p. 286 (Voi only).
1937f. Loveridge, pp. 492, 495.
1933h. *Hemidactylus werneri alluaudi* Loveridge, p. 285.
1937f. Loveridge, p. 495.
1942. *Teratolepis squamulatus* Parker, p. 33.

Further citations of "*squamulatus*" will be found under *H. t. barbouri* and of "*werneri werneri*" (part) under *t. tropidolepis*.

Description. Snout equal to, or slightly longer than, the distance between the eye and the ear-opening; granular scales on the snout convex, some keeled, larger than those on the vertex, among which are scattered larger, rounded or oval, conical or keeled, tubercles; nostril bordered by the rostral, first labial (sometimes excluded), and 3–4 small nasals, the uppermost in contact with its fellow, or separated by a single granule; upper labials 6–8; lower labials 5–7; a pair of large postmentals in contact on the median line or rarely separated (in type of *alluaudi* only), an outer, but smaller, pair of chin shields.

Back covered with heterogeneous, smooth, imbricate scales among which are scattered strongly keeled scales forming 10–16 more or less

regular longitudinal rows; ventral scales smooth, rounded, imbricate; males with 10–20[1] preanal or preano-femoral pores forming a scarcely interrupted series; digits free, moderately dilated, with rather short distal joints, inferiorly with oblique scansors, 3–5 under the first toe, 6–8[2] under the fourth toe; tail, when unregenerate, cylindrical, tapering, covered above with large, smooth, imbricate scales, below with imbricate scales of which the median series are moderately transversely enlarged (regenerate tail carrot-shaped, covered above and below with large, smooth, heterogeneous scales); length of tail equal to, or slightly shorter than, that of head and body.

Color. Above, pale or dark brown, a darker streak (sometimes represented only by a spot) from nostril passing through the eye is continued on to the occiput where it unites with its fellow, thus forming a characteristic semi-circular marking; lips with centre of each labial flecked with brown; back with brown crossbars or reticulations (scarcely distinguishable in one pallid specimen), the enlarged keeled scales black or brown tipped posteriorly with cream or white, such coloring being particularly noticeable on the flanks. Below, whitish.

The young are usually more brightly colored, exhibiting a good deal of yellow on the labials, eyelids, and keeled scales.

Size. Total length of a Morogoro ♂, 84 (42 + 42) mm., of Kibwezi and Mangasini ♀ ♀, 48 mm. from snout to anus, tails reproduced.

Remarks. To fully understand the involved synonymy of this form, it is necessary to give a synopsis of the position.

In 1868 Cope described *H. longiceps* from Manila, Philippine Islands. The type (M.C.Z. 5730) was later found to be a synonym of *H. frenatus* Duméril & Bibron.

In 1873 Bocage described *H. longicephalus* from Capangombe, Angola. In 1873 O'Shaughnessy placed *longiceps* in parenthesis after *longicephalus*, apparently as an emendation.

In 1885 Boulenger, presumably on account of O'Shaughnessy's action, renamed the Angolan gecko *bocagii*. As, however, *longicephalus* is not preoccupied it remains valid.

In 1896 Tornier (p. 10) described *H. squamulatus* from Kakoma, just south of Tabora in central Tanganyika Territory.

In 1896 Tornier (p. 12) also described *H. bocagei* from Lake Natron on the northern frontier, i.e. 300 miles northeast of Tabora.

In 1897 Tornier proposed the name *H. werneri* in appreciation of

[1] 6, 7, and 8 in young, presumably immature males (Lönnberg and Loveridge).

[2] 9 to 10 according to Calabresi, who evidently includes the small plates or shields following; the decision must often be arbitrary.

Werner having pointed out that *bocagei* Tornier was preoccupied by *bocagii* Boulenger.

In 1902 Mocquard proposed *H. tornieri* for Tornier's *H. bocagei*, overlooking the fact that Tornier himself had already renamed it.

In 1913 Nieden, misled by Andersson's (1912) remarks on *tropidolepis* synonymized *squamulatus* with *tropidolepis* though the two are distinguishable. Neither Andersson nor Nieden apparently had material of typical *tropidolepis*.

In 1923 Angel proposed *H. alluaudi* for a gecko from Bura, near Voi, which had the postmentals separated on the median line, and assuming that *squamulatus* agreed with *tropidolepis* in having *all* the dorsals keeled.

In 1923 Calabresi, with material of both *tropidolepis* and *squamulatus*, offered a solution by making the latter a variety of the former. This action is somewhat questionable as the former is smaller and with fewer pores, but it does seem likely to avoid confusion.

In 1923 I erroneously identified some young *squamulatus* as *citernii* to which species they bear a more than superficial resemblance, while adults were correctly referred to *squamulatus*.

In 1925, on receiving a Kibwezi gecko from the Berlin Museum as typical of *werneri*, I realized that the gecko of the dry uplands which I had been calling *squamulatus* was identical, so started (1929h) calling them *w. werneri* (which of course they were, as it is only a synonym) and applied the name *squamulatus* to the coastal gecko which Andersson referred to *tropidolepis*, since named *barbouri*.

In 1933, after examining the type of *alluaudi*, I doubted its distinctness from *werneri* but decided to tentatively treat it as a race. Since working over all the African members of the genus I have come to the conclusion that the character of separated postmentals alone is insufficient to justify the recognition of *alluaudi*; particularly as typical *squamulatus* (*werneri*) are abundant at nearby Voi.

Breeding. At Kilosa, on July 13, a ♀ held two ovules measuring 2 mm. in diameter. At Voi, on April 9, four pairs of detached gecko eggs measuring 8 x 8.5 to 9 x 9.5 mm. were found in association with numerous young *squamulatus* beneath the debris of a collapsed hut where no other species of gecko were encountered.

Habits. This terrestrial gecko is nocturnal for a female was taken at 8 p.m. as it was running across a road in Dodoma township, and a pair were seen by the light of a lantern on open grass-free ground at Kilosa. A fourth was within nine inches of a giant field cricket (*Brachytrypetes membranaceus*) which was shrilling in a most deafening

manner. I wondered if the gecko was dazed by the noise for it made no attempt to escape when approached.

Habitat. Not only do they live in holes made by other creatures, but during the day are to be found beneath stones, occasionally under logs or their bark on rock-strewn hillsides or plains in arid acacia country between 1500 and 5000 feet. At Voi a dozen juveniles were taken in the crumbling walls and collapsed thatching of some mud huts on the Msinga Estate. The absence of adults, which are known to live in the burrows of insects, or termitaria, suggests that adults had only resorted to this spot to lay their eggs.

Localities. **Kenya Colony:** Athi Plains; Bura; *Kibwezi; Kitui; Njoro; Samburu; Tsavo; Vajir, north of Lorian Swamp; *Voi. **Tanganyika Territory:** Dalalani, Lake Natron; *Dodoma; *Itende (Hende is misprint); Kakoma, Ugunda; Kibonoto; *Kilosa; Lukole; *Maji Malulu, Turu; *Mangasini, Turu; Masai Steppe; *Masiliwa, Turu; Matete Bach; *Mbala; Morogoro; *Mpwapwa; Ngare na Nyuki at foot of Mount Meru.

Range. Northeast Kenya Colony south to south central Tanganyika Territory.

Hemidactylus tropidolepis barbouri Loveridge

1912. *Hemidactylus tropidolepis* Andersson (not Mocquard), p. 227, figs. 1–4.
1928c. Barbour & Loveridge, p. 142.
1933h. *Hemidactylus tropidolepis squamulatus* Loveridge (not Tornier), p. 284.
1936j. Loveridge, p. 287.
1937f. Loveridge (part), p. 492 (not 495).
1942. *Hemidactylus tropidolepis barbouri* Loveridge, Bull. Mus. Comp. Zoöl., **91,** p. 320, figs. – : Changamwe, Kenya Colony.

Description. Differs from *squamulatus* only in the less heterogeneous nature of the dorsal lepidosis of which only the largest are keeled and that rather more feebly; also in the greater transverse development of the median series of subcaudal scales which resemble the ventrals of serpentes (*vide* Andersson, 1912, fig. 3). The following scale counts, based on seventeen specimens, do not distinguish the race from its allies—*tropidolepis* and *squamulatus.*

Nostril bordered by the rostral, first labial, and 3–4 small nasals, the uppermost in contact with its fellow or separated by a single granule; upper labials 6–8; lower labials 5–7; digits moderately dilated, inferiorly with oblique scansors, 4–6 under the first toe, 6–8 under the fourth toe, but owing to the gradual diminution in size of enlarged

lamellae-like shields, counting becomes somewhat arbitrary and on some individuals might be reckoned up to 10 or 11; males with 16–23 preanal or preano-femoral pores.

Color. Essentially similar to that of *H. t. squamulatus*, the young exhibiting a similar dichromatism as compared with the adult.

Size. Total length of type ♀, 84 (44 + 40) mm., largest paratype ♂, 70+ (38 + 32+) mm., the tail being regenerated.

Remarks. For the history of this form consult the description (1942).

Diet. Six termites and a grasshopper's leg.

Habitat. Beneath garden rubbish, and piles of palm fronds in the coconut plantations of the coast, a terrestrial species which may at times ascend stumps.

Localities. **Kenya Colony**: *Changamwe; *Kilindini-mainland opposite; Sokoki Forest. **Tanganyika Territory**: *Siga Caves; Tanga.

Range. Coast of Kenya Colony south to Tanga, Tanganyika Territory.

Hemidactylus homoeolepis Blanford

1881. *Hemidactylus* (*Liurus*) *homoeolepis* Blanford, Proc. Zool. Soc. London, p. 464, fig. 1, pl. xlii, fig. 2: Sokotra Island.
1882b. Peters (part), p. 43.
1883. Taschenberg, p. 165.
1885d. Boulenger, p. 117.
1903a. Boulenger, p. 80.
1903. Steindachner, p. 12.

Further citations of "*homoeolepis*" will be found under *H. isolepis* and *flaviviridis*.

Description. Snout slightly longer than the distance between the eye and the ear-opening; granular scales on the snout convex, larger than those on the vertex; nostril bordered by the rostral, first labial, and 3 small nasals, the uppermost separated from its fellow; upper labials 8–9; lower labials 7–8; a pair of large postmentals in contact on the median line, an outer, but smaller, pair of chin shields.

Back and belly covered with uniform, smooth, rounded, imbricate scales, largest on the sides, about 40 across the belly; males with 4 preanal pores forming an uninterrupted series; limbs without any strikingly large tubercles posteriorly; digits free, slightly dilated, with rather short distal joints, inferiorly with oblique scansors, 4–5 under the first toe, 8–10 under the fourth toe; tail, when unregenerate, cylindrical, tapering, covered above with small, smooth, imbricate

scales which are larger than those on the body; below with smooth, imbricate scales of which the median series are transversely enlarged; length of tail slightly longer than that of head and body.

Color. Above, gray or fawn; a dark streak from nostril passes through the eye; back spotted with darker; tail with black annuli. Below, whitish, except for five black annuli beneath tail.

Size. Total length of cotype ♂, 40^{+} (40 + ?) mm., of cotype ♀, 77 (37 + 40) mm.

Remarks. Boulenger (1903a) points out that Peters, (1882b) larger specimen was a misidentified *flaviviridis*, while Boettger's (1893b) record of *homoeolepis* from the Webi Shebeli is referable to *isolepis*.

Habitat. Fairly common under rocks and stones in dry ravines (Grant); in a rock fissure (Steindachner).

Localities. **Sokotra Island:** Adho Dimellus; Dahamis; Hadibu Plain; Homhil; Jena agahan; Kallansiye; also on Abd el Kuri Island, about 340 metres west of Sokotra.

Range. Sokotra and Abd el Kuri Islands.

Hemidactylus megalops Parker

1932b. *Hemidactylus megalops* Parker, Proc. Zool. Soc. London, p. 345: Sol Haud, British Somaliland.
1942. Parker, p. 31.

Description. Snout slightly longer than the distance between the eye and the ear-opening; granules on the snout larger than those on the vertex; nostril bordered by the rostral, first labial, and 3 small nasals, the uppermost in contact with its fellow; upper labials 9–11; lower labials 7–9; a pair of large postmentals in contact or separated on the median line, an outer, but smaller, pair of chin shields.

Back covered with small, uniform granules; ventral scales smooth, rounded, imbricate, about 16–22 longitudinal series at midbody corresponding to a distance equal to the diameter of the eye; males with 2 preanal pores forming an uninterrupted series; digits free, moderately dilated, the claws scarcely extending beyond the digital expansion, inferiorly with oblique scansors, 5 under the first toe, 8–9 under the fourth toe; tail, when unregenerate, cylindrical, tapering, covered above with small, smooth, imbricate scales; below with larger imbricate scales; length of tail shorter than that of head and body.

Color. Above, pale brown; anterior border of eye white, a black spot below, and a dark streak behind, eye; back closely and uniformly dappled with small, circular, white dots, 4 broad, indefinite, dusky

crossbars on body, another across base of tail; 6 narrow, white, cross bars on tail. Below, whitish.

Size. Total length of type ♂, 64 (36 + 28) mm.

Remarks. For further details see original description. *H. laevis* was described from a single female, *megalops* from four males. If it were not that Parker has seen both, I should be inclined to suppose that they represent the sexes of a single species; perhaps this may yet prove to be the case when more material is available. There is no difference in scale counts as may be seen by reference to the table (p. 104), Boulenger's figure of the foot of *laevis* shows 8 scansors beneath the fourth toe, not 7 as given in Parker's key (p. 347). The essential differences which I have given (p. 99) are taken from Parker as I have seen no material of either species.

Habitat. 1900–3100 feet.

Localities. **British Somaliland:** Nogal Valley; Sol Haud.

Range. British Somaliland.

Hemidactylus laevis Boulenger

1901a. *Hemidactylus laevis* Boulenger, Proc. Zool. Soc. London, **1**, p. 48, pl. vii, fig. 1: Gan Lebar (or Libah), Golis Mountains, British Somaliland.
1912b. Boulenger, p. 329.
1932b. Parker, p. 347.
1942. Parker, p. 31.

Description. Snout as long as the distance between the eye and the ear-opening; granules on the snout larger than those on the vertex; nostril bordered by the rostral, first labial, and 3 small nasals; upper labials 9; lower labials 7; a pair of large postmentals separated on the median line, an outer, but smaller, pair of chin shields.

Back covered with small, uniform granules; ventral scales smooth, rounded, imbricate; male unknown; digits free, moderately dilated, with rather short distal joints, inferiorly with oblique scansors, 4 under the first toe, 7–8[1] under the fourth toe; tail, when unregenerate, unknown.

Color. Above, brownish, a dark streak from nostril passes through the eye; back marbled with darker brown; a light-edged, dark brown crossbar on base of tail. Below, whitish.

Size. Total length of type ♀, 62+ (39 + 23+) mm., tail regenerated.

Habitat. At 5900 feet.

[1] 7 *fide* Parker, 8 *fide* Boulenger.

Localities. **British Somaliland:** Gan Lebar (Gaan Libah). **Somalia:** Dolo; Rahanuin country[1].

Range. British Somaliland and (?) Somalia.

Hemidactylus somalicus Parker

1932b. *Hemidactylus somalicus* Parker, Proc. Zool. Soc. London, pp. 344, 347: Sol Haud, British Somaliland.

1942. Parker, p. 31.

Description. Snout slightly longer than the distance between the eye and the ear-opening; granules on the snout larger than those on the vertex; nostril bordered by the rostral and 3 small nasals, the uppermost in contact with its fellow; upper labials 8–11; lower labials 7–9; a pair of large postmentals in contact or separated on the median line, an outer, but smaller, pair of chin shields.

Back covered with small granules, juxtaposed anteriorly but imbricate posteriorly and on the flanks, uniform anteriorly but with a few slightly enlarged scales irregularly scattered posteriorly; ventral scales smooth, rounded, imbricate, larger posteriorly, about 12–16 in longitudinal series at midbody corresponding to a distance equal to the diameter of the eye; males with neither preanal nor femoral pores; digits free, slightly dilated, the claws extending well beyond the digital expansion; inferiorly with oblique scansors, 5–6 under the first toe, 9–10 under the fourth toe; tail, when unregenerate, subcylindrical, tapering, covered above with small, smooth, imbricate scales which are larger than the dorsals; length of tail equal to that of head and body.

Color. Above, pinkish white dusted with dark brown; head sometimes dotted with brown particularly in front of eye, the anterior border of which is white; from eye to eye a dark brown semicircular band; back with, or without, small circular white dots, and with four dark brown crossbars which tend to broaden and break up upon the flanks; tail with about eleven dark brown crossbars. Below, whitish.

Size. Total length of type ♂, 86 (43 + 43) mm.

Remarks. For further details see original description. Parker states that *somalicus* is distinguished from *homoeolepis* by its smaller dorsal granules, narrower subdigital scansors, and slimmer habitus; from *laevis* by its much smaller ventral scales and more numerous subdigital scansors.

[1] Parker (1942) suspects Boulenger's (1912b) Somalia records may be based on misdetermined *fragilis* (here regarded as a synonym of *frenatus*.)

Habitat. Under stones and in a dead branch on the ground between 2000–3000 feet.

Localities. **British Somaliland:** Buran District; Haud; Nogal Valley; Sol Haud.

Range. British Somaliland.

Hemidactylus bouvieri chevalieri Angel

1935c. *Hemidactylus chevalieri* Angel, Bull. Mus. Hist. Nat. Paris (2), **7**, p. 166: Ile Sal, Cape Verde Islands.

1937b. Angel, p. 1695.

Description. Said to differ from its nearest neighbour *b. boavistensis* in possessing 6 scansors under the first *digit* in all thirteen cotypes, instead of 4–5 scansors as given by Boulenger for a series of *b. boavistensis*. Should it be found that Boulenger omitted the enlarged basal scale from his scansor count, *chevalieri* would have to be united with *boavistensis* for the difference in coloration—5 instead of 6 transverse bands—in so variable a species can scarcely be expected to form a stable basis for separation as, according to Bocourt himself, both 5 and 6 cross bands were to be found in the type series of *b. bouvieri*.

For a full and detailed description of this form consult the original description by Angel, for statistical data see list following generic diagnosis.

Color. Substantially as in *b. boavistensis*, but lacking a semitransverse interocular band on the occiput. One of the type series is entirely uniform.

Size. Total length of a cotype, 84 (43 + 41) mm.

Locality and Range. Eastern Cape Verde Islands, *viz.* Ile Sal.

Hemidactylus bouvieri boavistensis Boulenger

1902. *Hemidactylus bouvieri* Bocage (part, not of Bocourt), p. 209 (Boa Vista only).

1906i. *Hemidactylus boavistensis* Boulenger, Ann. Mus. Civ. Stor. Nat. Genova (3), **2**, p. 198: Boa Vista Island, Cape Verde Islands.

1937b. Angel, p. 1695.

Description. Said to differ from *b. bouvieri*, which occurs on islands lying to the west and south, only in its slightly more elongate digits and consequently more numerous scansors, *viz.* 4–5 under the first toe, and 6–8 under the third and fourth; the pair of postmentals are said to average larger. See also remarks on color.

Color. Above, pale grayish, yellowish, or reddish brown; a dark brown streak from nostril is bordered above by yellow and reaches eye; from eye to eye across the occiput is a wavy, dark-edged, brown band, a second on the nape, three more on the back, which otherwise may be speckled with dark or uniform, the bands may be interrupted mesially by a series of dark brown spots or be almost indistinguishable. Below, whitish.

The light yellow canthal streak of this form is lacking in *bouvieri*, and the dark canthal streak is never prolonged to the nuchal band or flanks as in *bouvieri*.

Size. Total length of cotype ♂, 81 (42 + 39) mm., of cotype ♀, 83 (44 + 39) mm.

Habitat. From sea level to 2000 feet.

Locality and Range. Eastern Cape Verde Islands, *viz.* Boa Vista.

Hemidactylus bouvieri bouvieri (Bocourt)

1870. *Emydactylus bouvieri* Bocourt, Arch. Mus. Hist. Nat. Paris (2), **6**, Bull., p. 17: Saint Vincent, Cape Verde Islands.
1884a. *Hemidactylus bouvieri* Rochebrune, p. 76, pl. ix, figs. 3–4.
1885d. Boulenger, p. 118.
1896a. Bocage, p. 66, pl. i, fig. 2.
1897a. Bocage, p. 193.
1902. Bocage (part), p. 209.
1906i. Boulenger, p. 197.
1935c. Angel, p. 167.
1937b. Angel, p. 1695.
1873b. *Hemidactylus Cessacii* Bocage, Jorn. Sci. Lisboa, **4**, p. 210: Saint Iago, Cape Verde Islands.

Description. Snout slightly longer than the distance between the eye and the ear-opening; granules on the snout larger than those on the vertex; nostril bordered by the rostral, first labial, and 3–4 small nasals; upper labials 7–8; lower labials 6–7; a pair of large postmentals in contact on the median line, an outer, but smaller, pair of chin shields.

Back covered with rather large, uniform granules; ventral scales smooth, rounded, imbricate; males with 2 preanal pores; digits free, moderately dilated, with rather short distal joints, inferiorly with oblique scansors, 3 under the first toe, 4–5 under the *median* toe; tail, when unregenerate, cylindrical, tapering, covered above with small, smooth, uniform scales; below with smooth, imbricate scales of which

the median series are transversely enlarged; length of tail slightly shorter than that of head and body.

Color. Above, light brown, a dark streak from nostril passes through eye and may be continued on flank as far as base of tail; upper lip white; back with five or six dark brown crossbands. Below, whitish.

Size. Total length (*fide* Boulenger) 67 (36 + 31) mm.

Habitat. 2000–2300 feet on Brava.

Localities. **Cape Verde Islands:** Brava; Fogo; Sao Antao; Sao Tiago (Iago, Jago; Thiago; Santiago); Sao Vicente.

Range. West and southern Cape Verde Islands.

Hemidactylus oxyrhinus Boulenger

1899d. *Hemidactylus oxyrhinus* Boulenger, Bull. Liverpool Mus., **2**, p. 5: Abd el Kuri Island, west of Sokotra Island.
1903a. Boulenger, p. 94, pl. x, fig. 2.
1903. Steindachner, p. 12.

Description. Snout slightly longer than the distance between the eye and the ear-opening; granules on the head, convex, "increasing in size posteriorly;" nostril bordered by the rostral, first labial, and 3 small nasals; upper labials 8–10; lower labials 7–8; a pair of large postmentals in contact on the median line, an outer, but smaller, pair of chin shields.

Back covered with rather large, subequal, obtusely keeled, juxtaposed tubercles; ventral scales much smaller, smooth, rounded, imbricate; males with 2 preanal pores; digits free, moderately dilated, inferiorly with oblique scansors, 6–7 under the first toe, 11–12 under the fourth toe; tail, when unregenerate, cylindrical, tapering, covered above with uniform, small, smooth scales; below with smooth, imbricate scales of which the median series is transversely enlarged; length of tail longer than that of head and body.

Color. Above, pale buff or grayish brown, a dark streak from nostril passes through the eye; nape and back with four, more or less distinct, dark, wavy crossbars, others forming annuli on the tail which, in the young, are separated by white interspaces. Below, whitish.

Size. Total length of type, 95 (43 + 52) mm., but is surpassed in length from snout to anus by one of 50 mm. with a regenerated tail.

Locality and Range. Abd el Kuri Island, west of Sokotra Island.

Hemidactylus fasciatus ituriensis Schmidt

1919. *Hemidactylus ituriensis* Schmidt, Bull. Amer. Mus. Nat. Hist., **39,** pp. 455, 599, fig. 7, pl. xv, fig. 2, pl. xvi: Avakubi, Belgian Congo.
1934. Brongersma, p. 165.
1936h. Loveridge, p. 50.
1941. Witte, p. 113.

Description. For a full description see original citation. This gecko differs from the typical form principally in the following characters:

Character	*f. fasciatus*	*f. ituriensis*
Subdigital scansors under 1st toe . . .	6–8	9–11
Subdigital scansors under 4th toe . . .	8–11	11–13
Preano-femoral pores in the male . . .	16+16 to 20+20	8+8
Subcaudals in relation to tail width . .	½ to ⅔	about ⅓

Color. The coloration of the type in general closely resembles that of *f. fasciatus* though differing in details. These have been described at length by Schmidt. The paratype that I have seen in no way differs from the typical form as regards coloration.

Size. Total length of type ♂, 134⁺ (79 + 55⁺) mm., tail regenerating; total length of paratype ♀, 167 (89 + 78) mm.

Localities. **Belgian Congo:** Akenge; Avakubi; Batama; Costermansville; Lubongola; *Medje; Panga; Walikale.

Range. Eastern Belgian Congo.

Hemidactylus fasciatus fasciatus Gray

1842. *Hemidactylus fasciatus* Gray, Zool. Misc., p. 58: No locality.
1845. Gray, p. 154.
1875a. Peters, p. 197.
1884a. Vaillant, p. 168.
1884b. Vaillant, p. 344.
1885d. Boulenger, p. 124, pl. xi, fig. 4.
1887. Strauch, p. 2.
1890. Büttikofer, p. 478.
1893a. Boettger, p. 28.
1893c. Matschie, p. 210.
1897b. Mocquard, p. 6.
1897. Sjöstedt, p. 13.
1898a. Werner, p. 206.
1899a. Werner, p. 133.
1900b. Boulenger, p. 448.
1901b. Tornier, p. 61.
1901c. Tornier, p. 69.

1902c. Tornier, p. 669.
1902a. Werner, p. 342.
1903a. Bocage, p. 41.
1905f. Boulenger, p. 184.
1906i. Boulenger, p. 198.
1906. Johnston, p. 833.
1910. Müller, p. 555.
1910. Nieden, p. 14.
1911. Despax, p. 236.
1911. Lampe, p. 153.
1917c. Chabanaud, p. 84.
1919g. Boulenger, p. 12.
1919. Schmidt, pp. 452, 599, 601.
1930a. Barbour & Loveridge, p. 775.
1933m. Witte, p. 69.
1934. Brongersma, p. 165.
1936h. Loveridge, p. 49.
1937c. Loveridge, p. 281.
1938b. Mertens, p. 36.
1940a. Mertens, p. 239.
1941e. Loveridge, p. 116.
1845. *Leiurus ornatus* Gray (not *Leiurus* Hemprich & Ehrenberg, 1829, in Arachnida), 1845, Cat. Lizards Brit. Mus., p. 157: West Africa.
1882b. Müller, p. 173.
1884a. Rochebrune, p. 77.
1885. Müller, p. 709.
1856. *Hemidactylus formosus* Hallowell, Proc. Acad. Nat. Sci. Philadelphia, p. 148: Liberia.
1862b. *Liurus ornatus* Cope (not *Liurus* Ehrenberg, 1828, in Arachnida), in Slack, p. 32.
1896. *Gymnodactylus* (sic) *fasciatus* Günther, p. 264 (*lapsus*).
1940. *Aliurus ornatus* Dunn & Dunn, Copeia, p. 71 (substitute name for *Liurus* Cope, preoccupied by *Liurus* Ehrenberg, 1828, in Arachnida)

Description. Snout slightly longer than the distance between the eye and the ear-opening; granules on the snout, convex, smooth, larger than those on the vertex, among which are sparsely scattered larger, rounded, convex tubercles; nostril bordered by the rostral, first labial, and 3–4 small nasals, the uppermost in contact with its fellow or separated by 1 or 2 granules; upper labials 9–13; lower labials 8–11; a pair of large postmentals in contact on the median line, and flanked by numerous smaller chin shields.

Back covered with small granules among which are scattered smooth or feebly striated, convex tubercles forming 18–25 more or less regular longitudinal rows; ventral scales smooth, rounded, imbricate; males

with [1]32–40 preano-femoral pores forming a widely interrupted series; digits slightly webbed at the base, moderately dilated, inferiorly with oblique scansors, 6–8 under the first toe, 8–11 under the fourth toe; tail, when unregenerate, subcylindrical being slightly flattened above and below, covered above with small smooth scales devoid of tubercles except for a few on the basal portion; below with imbricate scales of which the median series are transversely enlarged to half to two-thirds the width of the tail (regenerate tail, subcylindrical, covered above with small scales devoid of tubercles, below by very irregular, narrow, lamellae-like, transverse scales); length of tail longer or shorter than that of head and body.

Color. Above, pale chestnut brown, from eye to eye across the nape a large, white-edged, **U**-shaped band three light-edged[2] blotches or crossbars; a perfect tail with from five to seven. Below, whitish, sometimes the caudal bars extending beneath to form annuli, or entire subcaudal region plumbeous.

A more detailed description is given by Schmidt (1919, p. 453). I assume that Hallowell's (1856) description of a two-inch young one was based on a faded example as even smaller specimens in the Museum of Comparative Zoölogy are substantially similar to the adults.

Size. Total length of ♂, 182 (85 + 97) mm., from Harbel, but surpassed by type ♂ of *formosus* in length from snout to anus of 95 mm. with a regenerated tail. Total length of ♀ (M.C.Z. 43220), 161 (84 + 77) mm., from Ganta.

Remarks. Boulenger has already pointed out that Günther's record of *Gymnodactylus fasciatus*, a Martinique gecko, from Lambarené, was a *lapsus*; both Mocquard and Chabanaud have recorded *H. fasciatus* from Lambarené.

Habitat. By day it hides in dark and damp localities, at night it may be seen on the forest trees. Only once seen in a hut by Mertens (1938b), who states that the species does not occur on Cameroon Mountain above 400 or 500 metres.

Localities. **West Africa:** Aburi (Peters; not located). **Liberia:** *Ganta; *Gbanga; Harbel. **Ivory Coast:** Oulougoulou (not located), Assinie Riviere region. **Gold Coast:** Accra; Ashanti. **Togo:** Misahöhe; Mroso (not located) on Volta (Wolta) River. **Nigeria:** Old Calabar. **British Cameroons:** Bibundi; Debundscha Farm; Ekundu; Elephant Lake near Kumba; Johann Al-

[1] 13 + 16 in an immature ♂ (M.C.Z. 7957) of 58 mm., snout to anus.

[2] According to Tornier (1901c) the light edges of the purplish brown blotches are golden yellow in life.

brechtshöhe; Mubenge (seen); Mujuka (seen); Victoria; Wowange near Isongo. **French Cameroons:** Bipindi; Dibango (Dibongo) Farm near Edea; *Ebolova (Ebolowa); Efoulen; *Kribi; Lamourde near Garoua; *Mete (Metet); Moukonje Farm, Moundame; *Sakbayeme; Yaounde (Jaunde). **Fernando Poo. Rio Muni. French Congo:** Fan Topat, Ogoue (Ogowe) Riviere; Fernan Vaz; Lambarene. **Belgian Congo:** Kole; Lingunda; Makala; Medje; Niangara; Panga; Tondu.

Range. Eastern Belgian Congo (where it meets with *H. f. ituriensis* at Medje) west to Liberia.

Hemidactylus frenatus Duméril & Bibron[1]

1836. *Hemidactylus frenatus* (Schlegel) Duméril & Bibron, Erpét. Gén., **3**, p. 366: Java (restricted); South Africa, etc.
1849. Smith, A., p. 5.
1885d. Boulenger, p. 121.
1888. Mocquard, p. 113.
1893b. Boettger, p. 122.
1896c. Boulenger, p. 16.
1897g. Boulenger, p. 277.
1913. Boettger, p. 356.
1927. Calabresi, p. 39.
1929c. Scortecci, p. 253.
1930c. Scortecci, p. 2.
1931b. Scortecci, p. 128.
1934. Brongersma, p. 165.
1936j. Loveridge, p. 286.
1937f. Loveridge, p. 492.
1942. Parker, p. 31.
1843. *Hemidactylus (Phoëpus) javanicus* (Cuvier) Fitzinger, Syst. Rept., p. 106: Java (restricted).
1843. *Hemidactylus (Phoëpus) Bojeri* Fitzinger, Syst. Rept., p. 106: Cape of Good Hope; Madagascar; Mauritius.
1845. *Hemidactylus vittatus* Gray, Cat. Lizards Brit. Mus., p. 153: Borneo.
1854. ?*Hemidactylus punctatus* Jerdon, Journ. Asiatic Soc. Bengal, **22**, p. 467: Tellicherry, Malabar (Type lost).
1860. *Hemidactylus inornatus* Hallowell, Proc. Acad. Nat. Sci. Philadelphia, p. 492: Riu Kiu Islands.
1860. *Hemidactylus pumilus* Hallowell[2], Proc. Acad. Nat. Sci. Philadelphia, p. 502: Hongkong, China.

[1] *Hemidactylus navarri* Dugès, 1883, placed with a query by Boulenger in the synonymy of *H. frenatus*, is in reality a synonym of *Peropus mutilatus* (Wiegmann) *fide* Smith & Necker (1943, Copeia, p. 197).

[2] Type apparently lost. Not in Philadelphia *fide* Dunn (10.xi.41), nor Washington, *fide* Stejneger (15.xi.41).

1864. *Gecko chaus* Tytler, Journ. Asiatic Soc. Bengal (2), **33**, p. 547: Rangoon, Burma (restricted).

1864. *Gecko caracal* Tytler, Journ. Asiatic Soc. Bengal (2), **33**, p. 547: Rangoon, Burma.

1868b. *Hemidactylus longiceps* Cope, Proc. Acad. Nat. Sci. Philadelphia, p. 320: Manila, Philippine Islands.

1868b. *Hemidactylus hexaspis* Cope, Proc. Acad. Nat. Sci. Philadelphia, p. 320: Madagascar.

1915. *Hemidactylus fragilis* Calabresi, Mon. Zool. Ital. Firenza, **26**, p. 236, fig. 1: Bur Meldac, Somalia.

Further citations of "*frenatus*" will be found under *H. mabouia*, of "*pumilus*" under *pumilio* Boulenger.

Apart from synonyms, the foregoing citations are restricted to those containing records from the African mainland and closely adjacent islands.

Description. Snout slightly longer than the distance between the eye and the ear-opening; granules on the snout convex, larger than those on the vertex, which are subuniform; nostril bordered by the rostral, first labial (sometimes excluded), and 3 small nasals, the uppermost in contact with its fellow or separated by a single granule; upper labials 8–12; lower labials 7–10; a pair of large postmentals in contact on the median line, one or two outer, but smaller, pairs of chin shields.

Back covered with small granules among which are usually scattered flat, smooth, tubercles forming 2–8 more or less irregular longitudinal rows; ventral scales smooth, rounded, imbricate; males with 24–36 preano-femoral pores forming an uninterrupted series; digits free, moderately dilated, the innermost very short with sessile claw, inferiorly with oblique scansors, 3–5 under the first toe, [1]8–10 under the fourth toe; tail, when unregenerate, depressed, verticillate, covered above with small, smooth scales and 6 rows of rounded, smooth, flat tubercles; below with imbricate scales of which the median are transversely enlarged (regenerate tail covered above and below with heterogeneous scales devoid of tubercles though with, or without, a median transversely enlarged series below); length of tail longer or shorter than that of head and body.

Color. Above, gray or pinkish brown; head sometimes variegated with brown; labials mottled light and dark; a dark streak from nostril passes through eye to the flank; back uniform or variegated with brown. Below, whitish.

[1] Said to be 7 in type of *fragilis*.

Size. Total length of *hexaspis* cotype ♂ (M.C.Z. 5732), 102 (55 + 47) mm., surpassed by Boulenger's record of 113 (55 + 58) mm. and that of Malcolm Smith for an Asiatic gecko of 125 (60 + 65) mm.

Remarks. The above description is based on Calabresi's description of *fragilis*, which I refer to the synonymy, together with material in the Museum of Comparative Zoölogy from Lamu Island, Kenya Colony; St. Helena (received from Berlin Museum as *bocagii*); Madagascar (received from Senckenberg Museum as *mabouia*) and the types (M.C.Z. 5732) of *hexaspis*, referred to the synonymy of *mabouia* by Boulenger but which, on examination, I find are undoubtedly *frenatus*. The description is, therefore, independent of Asiatic complications, though Asiatic synonyms are given above.

Duméril's record of a specimen sent from the Cape of Good Hope by De Laland, must be regarded with suspicion, perhaps it came from St. Helena where its introduction, as in other African localities, must be attributed to human agency.

Boettger's alleged race *H. f. calabaricus* has been shown by Mertens (1922a, p. 169) to be a synonym of *mabouia*. The records of *frenatus* from Senegambia (Rochebrune, 1884a, p. 76) and Kidada, Belgian Congo (Witte, 1933m, p. 69) may also be assumed to have been based on misidentified *mabouia*.

They are readily distinguished by the absence of tubercles from the nape and occiput of *frenatus*, a character which distinguishes it from all other members of the genus to be found on Lamu Island.

Breeding. Numerous spherical eggs, supposedly of this species as found with a dozen young *frenatus* on Lamu Island, May 10–14, 1934, measure from 9 to 10 mm. in diameter.

Habitat. These young were found among the spathes of small palms in a coconut plantation a mile northeast of the McDougall Estate on Lamu Island. On Madagascar, as elsewhere in the East, this species is said to inhabit houses, as do *mabouia* and *brookii angulatus* on the East African mainland.

Localities. **Somalia:** Balad (Beled), Webi Shebeli; Bur Meldac; Villaggio Duca degli Abruzzi inland from Mogadish. **Kenya Colony:** *Lamu Island **Seychelle Islands.** ***Mauritius.** ***Madagascar.** **Union of South Africa** (? see remarks above). ***St. Helena.**

Range. Asia (Korea; China; Indo China; Malay Peninsula; Ceylon; southern India; islands of the Pacific and Indian Ocean including) Mauritius; Madagascar; Seychelles; Lamu Island; Somaliland; St. Helena; Mexico.

Much of this wide dispersal must be attributed to human agency. For rejected records see *Remarks* above. All African records known to me are given under *Localities*.

Hemidactylus pumilio Boulenger

1899d. *Hemidactylus pumilus* Boulenger (not of Hallowell), Bull. Liverpool Mus., **2**, p. 6: Dahamis, Sokotra Island.

1903a. *Hemidactylus pumilio* Boulenger, in Forbes, The Natural History of Sokotra and Abd-el-kuri, p. 81, pl. x, fig. 1: *nom. nov.* for *pumilus* Boulenger, preoccupied.

Description. Snout slightly longer than the distance between the eye and the ear opening; granules on the snout larger than those on the vertex, among which are scattered small rounded tubercles; nostril bordered by the rostral and 4 small nasals, the uppermost separated from its fellow by a single granule; upper labials 8–9; lower labials 6–8; a pair of large postmentals in contact on the median line, an outer, but smaller, pair of chin shields.

Back covered with small granules among which are scattered feebly keeled tubercles forming more or less irregular longitudinal rows; ventral scales smooth, rounded, imbricate; males with 5–6 preanal pores forming an uninterrupted series; digits free, moderately dilated, with very short distal joints, inner with sessile claw, inferiorly with oblique scansors, 4 under the first toe, 7–8 under the fourth toe; tail, when unregenerate, cylindrical, covered above with small, smooth scales and 4 (!) rows of pointed tubercles; below with imbricate scales of which the median series is *not* transversely enlarged; length of tail slightly longer than that of head and body.

Color. Above, pale brown or buff; a dark brown streak from nostril through eye; back uniform or spotted with brown. Below, whitish.

Size. Total length of type ♂, 53 (26 + 27) mm.

Remarks. See under *H. puccionii*.

Habitat. Under boulders and stones in, or near, dry ravines on Haghier range from 350 to 2500 feet.

Localities. **Sokotra Island:** Dahamis; Jena agahan.

Range. Sokotra Island.

Hemidactylus puccionii Calabresi

1927. *Hemidactylus puccionii* Calabresi, Atti. Soc. Ital. Sci. Nat., **66**, pp. 23, 39, pl. i, figs. 3–3b: Obbia to Durgale, Somalia.
1931b. Scortecci, p. 128.
1936e. *Hemidactylus parkeri* Loveridge, Proc. Biol. Soc. Washington, **49**, p. 59: Zanzibar Island.
1937f. Loveridge, p. 492.
1941. Moreau & Pakenham, p. 107.

Description. Snout slightly longer than the distance between the eye and the ear-opening; granules on the snout larger than those on the vertex, among which are scattered small rounded tubercles; nostril bordered by the rostral, first labial (excluded in *puccionii*), and 3 small nasals, the uppermost separated from its fellow by a single granule; upper labials 9; lower labials 7–9 (8–9 in *puccionii*); a pair of large postmentals in contact (*parkeri*) or separated (*puccionii*) on the median line, an outer, but smaller, pair of chin shields.

Back covered with small granules among which are scattered feebly keeled tubercles forming 10–16 (10 in *puccionii*) more or less regular longitudinal rows; ventral scales smooth, rounded, imbricate; males with 4–6 (4 in *puccionii*) preanal pores forming an uninterrupted series; digits free, moderately dilated, inferiorly with oblique scansors 5 under the first toe, 8–9 under the fourth toe; tail, when unregenerate, subcylindrical, covered above with small, smooth scales and 6 rows of flat, scarcely keeled, nail-like tubercles; below with imbricate scales of which the median series is transversly enlarged; length of tail subequal to that of head and body.

Color. Type of *puccionii*. Above, rosy maroon; head and flanks irregularly sprinkled with little black spots; well-defined, black cross-bars on back and tail. Below, yellowish white.

Type of *parkeri* (faded). Above, drab; a brown streak from nostril through eye to above ear-opening; nape and back with a series of dark brown spots and dashes arranged in longitudinal lines on the former and tending to form cross bars on base of tail. Below, whitish.

Size. Total length of *puccionii* type ♂, 72^{+} ($40 + 32^{+}$) mm., tail regenerated; total length of *parkeri* type ♂, 72 ($36 + 36$) mm., tip of tail injured.

Remarks. The differences between *puccionii* and *parkeri* are scarcely sufficient to warrant the recognition of the latter, which we must assume reached Zanzibar as an introduction by the extensive dhow trade from the Somali coast. It was collected in 1862 by Caleb Cooke, United States consul to Zanzibar. The differences are:

puccionii	*parkeri*
First labial excluded from nostril.	First labial bordering nostril.
Lower labials 8–9.	Lower labials 7.
Postmentals separated on median line.	Postmentals in contact on median line.
Dorsal tubercles in 10 rows.	Dorsal tubercles in 14–16 rows.
Males with 4 preanal pores.	Males with 6 preanal pores.
Scansors under fourth toe are 8.	Scansors under fourth toe are 9.

Recently Parker (1942, p. 27) has suggested that *puccionii* was based on a juvenile *turcicus* with smooth tubercles, for he finds much variation between feebly and strongly keeled tubercles in a single series of *turcicus* from British Somaliland. He may well be right in this allocation.

At one time I thought that both *puccionii* and *parkeri* would have to be united with *citernii*, for there is no difference in scale counts between *citernii* and *parkeri*. However, Mr. H. W. Parker, after comparing the two types, wrote: "it (*parkeri*) seems to agree fairly well except for the size of the enlarged dorsal tubercles which are much smaller in your (*parkeri*) gecko. They seem to stand to one another in much the same relation as *H. brookii* to *H. mabouia*."

Another close relative is *H. pumilio* of Sokotra which appears to differ only in one important character, the inner digit being said to have a sessile claw as against the short, but well-developed, free-rising distal joint in *parkeri* (and presumably in *puccionii*). Should this condition in *pumilio* turn out to be exaggerated, then it may prove possible to unite all three species under that name (*pumilio*) for the only remaining points of difference are: 4 small nasals; 8–9 upper labials; 6–8 lower labials; median subcaudals *not* enlarged transversely. The number of tubercle rows is not stated.

Localities. **Somalia**: Obbia to Durgale. ***Zanzibar Island.**

Range. Somalia and Zanzibar (introduced).

Hemidactylus citernii Boulenger

1912b. *Hemidactylus citernii* Boulenger, Ann. Mus. Civ. Stor. Nat. Genova (3), **5**, p. 329: Rahanuin country, Somalia.
1920a. Loveridge, p. 132.
1923d. Loveridge, p. 844.
1924b. Loveridge (part), p. 9.
1927. Calabresi (part), p. 40.
1932b. Parker, p. 341.
1937f. Loveridge, p. 491.
1942. Parker, p. 30.

A further citation of "*citernii*" will be found under *H. t. squamulatus*.

Description. Snout slightly longer than the distance between the eye and the ear-opening; granular scales on the snout larger than those on the vertex, which are minute, and among which are scattered small, rounded tubercles; nostril bordered by the rostral, and 4–5 small nasals, the uppermost separated from its fellow by a single granule; upper labials 7–10; lower labials 5–7; a pair of large postmentals in contact on the median line, an outer, but smaller, pair of chin shields.

Back covered with small granules among which are scattered strongly keeled or subtrihedral tubercles forming 14–16 more or less regular longitudinal rows; ventral scales smooth, rounded, subimbricate or juxtaposed; males with 4–7 preanal pores forming an uninterrupted series; digits free, moderately dilated, with short distal joints, inferiorly with oblique scansors, 4–5 under the first toe, 6–7 under the fourth toe; tail, when unregenerate, subcylindrical, covered above with small, imbricate, keeled scales and rows of long, pointed, keeled tubercles; below with imbricate scales of which the median series are transversely enlarged.

Color. Above, pale reddish brown; a brown streak from nostril through eye; back with chocolate brown spots in transverse series; limbs and tail with dark brown crossbars. Below, whitish.

Size. Length of head and body of ♂, 36 mm., of ♀, 34 mm.

Remarks. My (1923h, p. 939) record of this species from Tanganyika was based on misidentified young of *H. s. squamulatus*.

Habitat. Most of the twenty-one specimens collected by Taylor (see Parker, 1932b and 1942) were beneath stones and rocks, but others were in holes in, or beneath the bark of, trees at altitudes from 150–3200 feet.

Localities. **British Somaliland:** Buran District; Nogal Valley; Sol Haud. **Somalia:** Rahanuin country. **Kenya Colony:** Nairobi.

This last record is based on a specimen which I captured on a rubbish tip on the hillside close to the lines of the King's African Rifles shortly after that regiment had returned from a campaign in Somaliland. The identification of this specimen, which was donated to the British Museum in 1923, has been confirmed by both Boulenger and Parker. The latter's reference (1932b, p. 342) to a Zanzibar gecko, was based on the individual subsequently described by me as *parkeri* and now referred to the synonymy of *puccionii* Calabresi.

Range. Northwest British Somaliland and Somalia south to Kenya Colony (? introduced. Erroneously reported from Tanganyika and Zanzibar).

Hemidactylus brookii angulatus Hallowell

1852a. *Hemidactylus angulatus* Hallowell, Proc. Acad. Nat. Sci. Philadelphia, p. 63, fig.: West Coast of Africa.[1]
1885d. Boulenger, p. 113, footnote.
1885. Müller, p. 709.
1919. Schmidt, pp. 447, 449, 450.
1858. *Hemidactylus cyanodactylus* Girard (not Rafinesque), p. 284, pl. xxv, figs. 17–24.
1862b. *Hemidactylus verruculatus* Peters (not Cuvier), p. 271.
1867a. Bocage, p. 219.
1878a. Peters, p. 202.
1884a. Rochebrune, p. 74.
1884b. Sauvage, p. 200.
1868b. *Hemidactylus guineensis* Peters, Monatsb. Akad. Wiss. Berlin, p. 640: Ada Foah, Guinea, *i.e.* ? Adafer, Mauretania, F.W.A.
1873b. Bocage, p. 209.
1874. Reichenow, p. 296.
1875a. Peters, p. 197.
1884a. Rochebrune, p. 74.
1885d. Boulenger, p. 131.
1887. Müller, p. 288.
1897. Sjöstedt, p. 33.
1902c. Tornier, p. 669.
1870a. *Hemidactylus affinis* Steindachner, Sitzb. Akad. Wiss. Wien, **62**, **1**, p. 328: Dagana and Goree, Senegal.
1881b. Boettger, p. 406.
1884a. Rochebrune, p. 76.
1885d. *Hemidactylus stellatus* Boulenger, Cat. Lizards Brit. Mus., **1**, p. 130, pl. xii, fig. 1: Gambia and West Africa.
1896a. Bocage, p. 82.
1902a. Werner, p. 336.
1910a. Nieden, p. 234.
1910. Sternfeld, p. 14.
1917c. Chabanaud, p. 84.
1919. Schmidt, p. 601.
1930e. Angel, p. 253.
1885d. *Hemidactylus brookii* Boulenger (part, not Gray), p. 128.
1887a. Bocage, p. 193.
1887. Müller, p. 288.
1887. Strauch, p. 32.
1888a. Günther, p. 50.
1893a. Boettger, p. 29.
1893c. Matschie, p. 210.

[1] Donated by "Mr. Henry Ford of Liberia," later changed to Gaboon.

1894c. Günther, p. 85.
1895b. Boulenger, p. 532.
1896b. Boulenger, p. 6.
1896a. Bocage, pp. 68, 74, 81.
1896. Tornier, p. 12.
1897g. Boulenger, p. 277.
1897. Tornier, p. 63.
1897b. Werner, p. 396.
1898a. Boulenger, p. 716.
1898. Tornier, p. 284.
1900. Flower, p. 967.
1900b. Tornier, p. 586.
1901c. Tornier, p. 70.
1902. Bocage, p. 209 (as *Brockii*).
1902d. Boulenger, p. 445.
1902. Ferreira, p. 232.
1902c. Tornier, p. 669.
1903a. Bocage, p. 41.
1904. Peracca, p. 2.
1905. Neumann, p. 390.
1905c. Tornier, p. 368.
1906i. Boulenger, p. 199.
1908c. Boulenger, p. 5.
1908. Werner, 1907, pp. 1831, 1924.
1909. Gendre, p. cv.
1909b. Pellegrin, p. 413.
1910. Sternfeld, p. 14.
1911c. Boulenger, p. 162.
1911. Lampe, p. 154.
1911. Lönnberg, p. 10.
1912c. Sternfeld, p. 204.
1913. Boettger, p. 356.
1913. Klaptocz, p. 280.
1913c. Nieden, p. 66.
1913a. Werner, p. 19.
1917c. Chabanaud, p. 84.
1917. Sternfeld, p. 419.
1918b. Chabanaud, p. 160.
1919g. Boulenger, p. 12.
1919. Schmidt, pp. 446, 599, 600.
1919. Werner, p. 470.
1920a. Loveridge (part), p. 134.
1921a. Chabanaud, p. 461.
1921b. Chabanaud, p. 522.
1922. Mello & Suctancar, p. 795, fig. 1.

1923d. Loveridge, p. 845.
1923h. Loveridge, p. 940.
1924b. Loveridge, p. 9.
1925a. Angel, p. 8.
1925b. Flower, p. 940.
1928. Angel, p. 246.
1929h. Loveridge, p. 41.
1930e. Angel, p. 253.
1930a. Scortecci, p. 205.
1930c. Scortecci, p. 2.
1932a. Parker, p. 223.
1932b. Parker, p. 346.
1933h. Loveridge, p. 286.
1933a. Noble & Bradley, p. 289.
1933m. Witte, p. 69.
1936h. Loveridge, p. 50.
1936j. Loveridge, p. 284.
1936. Noble & Clausen, p. 209.
1936e. Parker, p. 602.
1936. Roux, p. 160.
1937. Andersson, p. 3.
1937b. Angel, p. 1695.
1937c. Loveridge, p. 281.
1937f. Loveridge, pp. 492, 495.
1937d. Mertens, p. 3.
1938. Angel & Lhote, p. 354.
1938b. Mertens, p. 34, pl. viii, fig. 34.
1940b. Monard, p. 151.
1941. Moreau & Pakenham, p. 107.
1942. Parker, p. 26.
1886a. *Hemidactylus* sp. Bocage, p. 67, footnote.
1893c. *Hemidactylus Bayonii* Bocage, Jorn. Sci. Lisboa (2), **3**, p. 116: Dondo, Cuanza (Quanza) River, Angola.
1895a. Bocage, p. 13, pl. ii, figs. 2a–d.
1897a. Bocage, p. 193.
1937b. Monard, p. 51.
1897b. *Hemidactylus brookii* var. *Togoensis* Werner, Verh. Zool.-Bot. Ges. Wien, **47**, p. 397: Atakpame, Togo.
1902a. Werner, p. 336.
1911. *Hemidactylus mabouia* Lampe (part, not Moreau de Jonnés), p. 153.
1920a. *Hemidactylus ruspolii* Loveridge (part, not Boulenger), p. 134 (omit Dutumi record based on subsequent type of *tanganicus*).
1941f. *Hemidactylus brookii angulatus* Loveridge, p. 246.
1942. Gekko, Hull, p. 125.

Further citations of "*brookii*" will be found under *H. mabouia* and *gardineri*; of "*guineensis*" under *longicephalus*.

Names. Western House-gecko (English); *bwirebwangu* (Samia); *chemnayat* (Suk); *ekigo* (Kisii); *lihumbachira* (Bunyore); *lihumbichila* (*Hanga*); *lihumbagila* (Maragoli); *lihumbagira* (Kakamega); *lihumbajira* (Teriki); *olele* (Luo). Nyanza Province, Kenya, tribes, taken from Hull (1942).

Description. (Based on African material only). Snout slightly longer than the distance between the eye and the ear-opening; granular scales on the snout convex or flat, smooth or keeled, larger than those on the vertex, among which are scattered larger conical or keeled tubercles; nostril bordered by the rostral, first labial (rarely excluded), and 3–4 small nasals, the uppermost usually separated from (rarely in contact with) its fellow by a single (rarely 2) granule; upper labials 6–11, usually 7–8; lower labials 6–8 (5 *fide* Werner); a pair of large postmentals in contact on the median line or separated[1] by a single granule, an outer, but smaller, pair of chin shields.

Back covered with small granules among which are scattered strongly keeled or subtrihedral tubercles forming 14–25 more or less regular longitudinal rows; ventral scales smooth, rounded, imbricate; males with [2]20–46 preano-femoral pores forming an uninterrupted series (or interrupted by a single scale); digits free, moderately dilated, inferiorly with oblique scansors, 4–6 under the first toe, 5–9 (usually 7–8) under the fourth toe; tail, when unregenerate, depressed, verticillate, covered above with small, smooth scales and 6–8 rows of long, pointed, keeled tubercles; below with imbricate scales of which the median series are transversely enlarged (regenerate tail swollen, carrot-shaped, covered above and below with granules with or without pointed tubercles); length of tail usually longer than that of head and body.

For factors influencing form and color of scales on regenerated tails in the West Indian race, see Noble and Clausen (1936, p. 209). For further detailed description, see Schmidt (1919, p. 449).

Color. In life, from a Morogoro gecko. Above, dull orange, a black streak from the nostril passes through the eye; on each side three pairs of rather indefinite ocelli which unite on the back with black saddle-

[1] Separated at Bukoba; Karungu Bay; and in 4 of 8 geckos from Ukerewe Island (Loveridge); in 12 of 79 Congo geckos and in all 6 from Gaboon (Schmidt), but *not* separated in others from further west (Loveridge). Separated in only 2 (M.C.Z. 20256–7) Indian out of 50 (M.C.Z.) Asiatic geckos, *i.e. H. b. brookii*, and in only 1 (M.C.Z. 34689) of 50 (M.C.Z.) West Indian *H. b. haetianus*.

[2] Immature males, as for example the type of *bayonii* (37+37 mm.) with only 6, or occasional (diseased ?) males may have less.

like markings edged by white granules; tail bright orange ringed with black. Below, throat, belly and limbs transparent white; tail pale orange, the annuli less distinct. (Loveridge, 1920a).

In life. At Voi and Tsavo where the soil is laterite, both young and an adult were a very beautiful red. Elsewhere geckos taken from a termitarium and from beneath boulders were black, but changed rapidly when exposed to daylight.

The dorsal markings may form an irregular dark network, better defined in males than in females (Fort Archambault: Sternfeld, 1917).

Young with a series of reddish brown, transverse flecks surrounded by white tubercles; in adults these flecks tend to form dark transverse bands (Butiaba: Sternfeld, 1912c).

The juvenile pattern may persist in the adult and the longitudinal rows of spots appear to be derivable from the disintegration of crossbars (Belgian Congo: Schmidt, 1919).

The literature is full of similar discussions of coloration. For a very detailed account of that of Sudanese geckos, see Werner (1908 (1907), p. 1831).

Size. Total length of ♂, 143 (67 + 76) mm., of ♀, 128 (61 + 67) mm. Both from Belgian Congo where Schmidt (1919, p. 449) found that the tail length of 79 specimens ranged from .49 to .55 of the total.

It is, however, difficult to find adult geckos whose original tails are intact. The largest males in Uganda, Kenya and Tanganyika measure 69, 67, and 68 mm. respectively in length from snout to anus, while females from Kenya and Tanganyika measure 65 and 63 mm. respectively.

Remarks. Schmidt (1919, p. 449), after examining the somewhat dried type of *angulatus*, pronounced it a *brookii* and suggested that the name might become available for a West African race. His conclusion that possibly it might have come from Liberia after all, despite Hallowell's correction, is not substantiated by the two other lizards (*Monopeltis galeata* and *Feylinia elegans*) described from the same collection and which are unknown in Liberia.

Tornier (1902c, p. 669), after examining the type of *guineensis*, found that Peters had counted the divided scansors only and referred the species to *brookii*, but remarks that the geckos from Cameroon referred to "*guineensis*" by Werner, in reality represent another species which he, Tornier, renamed *steindachneri*.

Boettger (1881b, p. 406), with fresh topotypic material of *affinis* pronounced that species to be synonymous with *brookii*.

Boulenger (1885d, p. 130) decided that *angulatus* was unrecognizable

from the description, published a translation of that of *guineensis* claiming that he had no material, synonymized *affinis* with the Asiatic *brookii*, and described *stellatus* from Gambia, where it was collected by Dalton together with other specimens referred to *brookii*.

H. stellatus was soon recorded from Togo (Werner), Dahomey (Bocage; Chabanaud), and Cameroon (Nieden; Angel), usually from the same locality as *"brookii."* Its sole claim to distinction appears to be in that the two male cotypes had only 8 + 8 femoral pores which were widely separated, a condition which I suggest is an aberration resulting from the non-development of the preanal section of the row of pores. The Museum of Comparative Zoölogy has a ♂ (M.C.Z. 34941) from Irumu, Belgian Congo, with only 3 + 3, and another (M.C.Z. 40920) from Kitau, Kenya Colony, with only 8 + 9, though the latter are separated by a single scale. I therefore refer *stellatus* to the synonymy of *H. b. angulatus*.

Bocage (1893c, p. 116) described *H. bayonii* from a single, very young, *i.e.* 74 (37 + 37) mm., Angolan gecko, which had only 6 preanal pores. This condition is one of immaturity, and as the description differs in no other respect, except for the freakish supernumerary sixth toe, from that of *angulatus*, I refer it to that species though it should be noted that it constitutes the only Angolan record of occurrence there.

Werner (1897b, p. 397) characterizes *togoensis* as having tubercles which exceed in size the interspaces between them, and by the females having broader tails than the males. Tornier (1901c, p. 70), with 22 Togo geckos, found them impossible to distinguish from East African *"brookii."* Schmidt (1919, p. 449), dealing with Congo geckos, found it was the males that had the broader tails.

After studying the extensive material in the Museum of Comparative Zoölogy, it appears to me that the following races of *brookii* are recognizable.

Key to the Geographical Forms of Hemidactylus brookii

1. Preano-femoral pores of *adult*[1] males normally *less* than 26 (13 + 13); range—Asia 2
   Preano-femoral pores of *adult*[1] males normally *more* than 26 (13 + 13), though ranging from 20 (10 + 10) to 46 (23 + 23); range-Africa; West Indies; South America 3

[1] Adult because in juveniles they are incompletely developed and the numbers consequently lower, very occasional (diseased?) adults have the number far below the normal, e.g. 3+3 in an adult ♂ (M.C.Z. 34941) from Irumu, Belgian Congo.

2. Size smaller (40 largest adults in M.C.Z. range from 40–55 mm. from snout to anus, average 45.7 mm.); pores of adult males 10 (5 + 5) to 26 (13 + 13); tubercles on tail less spinose; range—India, southern Burma; East Indies, etc. ..... *b. brookii*

   Size larger (3 known specimens from Tsagain and Fort Ava range from 62–63 mm. from snout to anus); pores of adult males 12 (6 + 6) to 16 (8 + 8); tubercles on tail very long and spinose; range—northern Burma. *b. subtriedroides*

3. Size larger (40 largest adults in M.C.Z. range from 51–69 mm. from snout to anus[1], average 59.6 mm.); usually 8 (4 + 4) tubercles on fourth[2] caudal verticil; tubercles along dorsolateral line trihedral; upper labials fewer, average 8; range—trans-Africa and adjacent islands . . . *b. angulatus*

   Size larger (40 largest adults in M.C.Z. range from 51–69 mm. from snout to anus[1], average 59.6 mm.); usually 6 (3 + 3) tubercles on fourth[2] caudal verticil; tubercles along dorsolateral line somewhat flattened; upper labials more numerous, average 10; range—West Indies and South America. ..... *b. haitianus*

Breeding. In November, at Niangara, each of four females held 2 eggs, measuring from 4 x 5 mm. to 6.2 x 7.6 mm. On December 2, at Fort Archambault, a ♀ held 2 eggs. On December 16, at Karungu Bay, a pair of eggs, from beneath a boulder, measuring 11 x 10 mm., held well advanced embryos. On February 14, at Morogoro, a ♀ held 2 eggs.

Moulting. Noble and Bradley (1933, p. 289) discuss the lengthened periodicity of moulting resulting from thyroidectomy perpetrated on the West Indian race—*H. b. haitianus* Meerwath.

Longevity. 1 year, 1 month, 10 days, at Giza Zoo (Flower).

Diet. Of eight Congo geckos, five held cockroaches, two termites, and one a Lycosid spider (Schmidt).

Parasites. Trypanosomes were present in geckos from Agougon (Chabanaud). Mello and Suetancar (1922) discuss the life cycle of *Herpetomonas* in intestine.

Enemies. Recovered from stomachs of snakes (*Boaedon l. lineatus* and *Philothamnus s. semivariegatus*) at Njiana Farm, Belgian Congo.

Folklore. Natives of French Guinea allege that the gecko is poisonous,

[1] Length is given from snout to anus as tails are so often regenerated or damaged, it should be remembered, however, that the tail is usually equal to, or longer than, the head and body, so that the difference in size is actually double that which appears above, or more than a quarter the length of the gecko. Nor is 67–69 mm. unusually large for African geckos, such being recorded from Uganda, Kenya, and Tanganyika, etc. By a curious coincidence the ranges of African and New World geckos were identical as were the resultant averages.

[2] Fourth caudal verticils because the three anterior verticils usually have at least one supernumerary row. To find 6 posteriorly on an African gecko is as unusual as to find 8 posteriorly on an Indian specimen.

that if it runs over a sleeping person, the latter, on awakening, will discover red lines upon his skin often followed by swelling and the formation of pus (This is probably due to a centipede. A.L.), in consequence the Moslems kill these geckos at every opportunity.

Habits. Emerging from their retreats at dusk, these geckos may be seen hunting insects in lighted rooms. This is a common spectacle in West Africa where the species appears more addicted to haunting houses than in the East.

Habitat. From coastal plain to upland savanna, *i.e.* from sea level to about 7000 feet (Butandiga, Mt. Elgon). I have taken these geckos from holes in an earth-bank and an abandoned termitarium; from beneath stones and boulders on the lake shore; in fissures of rock; under heaps of garden rubbish; from beneath bark of fallen trees; in crevices of thorn trees and native grass huts; on veranda posts and walls of buildings, and among Portuguese ruins.

Dug from termitarium of *Termes bellicosus* (Lönnberg). In termite hills (Tornier). Fissure in rock (Klaptocz). On a tree (Tornier). In open country, native gardens, and mission buildings in Sudan (Werner). In houses of Dahomey, French Guinea, and Gambia (Various). It is only accidental in rain forest, though Schmidt (1919, p. 449) speaks of it as having invaded the forest area in Sierra Leone. The Sierra Leone and Cameroons records are most probably from extra-sylvicoline localities.

Localities. **Anglo-Egyptian Sudan:** El Duem (Dueim); El Obeid; Gabt el Meghahid; Gebel Debri; Gondokoro; Gulfan to Keiga Tummero; Kadugli to Keiga Tummero; Khor Attar; Khor el Affin; Mongalla; *Port Sudan (A.L., but apparently typical *brookii*); Sennaar; Talodi; Tonga. **Eritrea:** Asmara; Cheren; (Keren); Massaua; Monte Ghedini. **Ethiopia:** Coromma s.e. Lake Abaya; Harar Mtns.; Jaldessa (Djildessa—Sheikh Serbej); Sheikh Mahomed s.w. Sheikh Hussein. **Somalia:** Lugh. **Kenya Colony:** Guaso Nyiro; Kalodeke; Kaliokwell River mouth; *Karungu Bay; Kibibi Basin; Kibwezi; *Kisumu; *Kitau, Manda Island; Lamu; Lodwar; Lokitaung; Lorogumu; Mbuyuni (Mbunyi); *Mombasa; Naramum; Noyangiran (or Na'aragan); Sokoki Forest; Tana region; Teita; *Tsavo; Turkana Province; *Voi; West Suk. **Tanganyika Territory:** *Bukoba; Dalalani (Ndalalani); Lake Natron; *Dutumi (Duthumi); Lake Eyasi; Longido West; Masai Nyika; Matete Bach; Mbugwe; Mkata River; *Morogoro; *Saranda; Shirati; Tanga; *Ukerewe Island; Usambara Mountains—Derema—Majombo. ? **Zanzibar Island:**

(coll. Neumann, det. Tornier, 1896, requires confirmation). **Uganda:** Bussu; Butiaba (Rutiala); *Kampala; Lado; Mbale; *Mount Elgon—Butandiga; Sesse Islands—Bugala Id.; Wadelai. **Belgian Congo:** Adra; Dramba; Faradje; Garamba; *Irumu; Kasenyi; Mahagi Port; Mangbetu (Monbuttu); Niangara; Njiana Farm; Yakuluku. **Angola:** Dondo. **French Congo:** Gabon (Type). **French Equatorial Africa:** Fort Archambault. **French Cameroons:** Batanga; Garoua region: Lamourde; *Sadsche or Satsche. **British Cameroons:** Bamenda; Bibundi; Likomba; Victoria. **Nigeria:** Old Calabar. **Dahomey:** Agougon; Ajuda; Godomey; Grand Popo; Porto Novo; Zomai. **Togo:** Adele (Bismarckburg); Atakpame; Kete to Kratje; Mangu to Thierry. **Gold Coast:** Accra. **French West Africa:** Adafer (as Ada Foah, Guinea); Bourem; Douentza; Mantankari; Tahoua. **French Guinea:** Beyla; Conakry (Konakry); Kerouane; Labe, Fouta Djalon; Mamou. **Portuguese Guinea:** Bissau; Bolama; Catio; Geba; Madina Boé; Mansoa; Pitche; Ponte Robalo; Rio Cassine; Same. **Gambia:** *Maccarthy Island. **Senegal:** Dagana; Goree; Kolda or Sedhiou; Niani (Nianing); Rufisque. **Cape Verde Islands:** Fogo; Porto Praya (Praia); Sao Tiago.

Range. Anglo-Egyptian Sudan south to Tanganyika Territory west through Uganda, Belgian Congo, and Angola, to French Congo, northwest to Senegal and the Cape Verde Islands.

Distribution largely due to human agency. Tornier's Zanzibar record is regarded as questionable. Reported in error (for *mabouia* juv.) from Mozambique.

Hemidactylus turcicus turcicus (Linnaeus)

For a good bibliography of this species see Anderson (1898, p. 80). The following citations are confined to original citations of synonyms, and to the more recent references to African material, and of these a few from the Eritrea-Somaliland region may be referable to the larger southern race—*H. t. macropholis* Boulenger

1758. *Lacerta turcica* Linné, Syst. Nat., ed. 10, **1**, p. 202: Orient.
1810. *Gecus Cyanodactylus* Rafinesque, Caratt. Nuovi Gen. Spec. An. Sicilia, p. 9: Sicily.
1826. *Hemidactylus triedrus* Fitzinger (not Daudin), p. 46.
1826. *Gecko meridionalis* Risso, Hist. Nat. Europ. Merid., **3**, p. 87: Southern Europe.

1827. *Hemidactylus granosus* Heyden, in Rüppell, Atlas Reise Afrika, **1**, Rept., p. 17, pl. v, fig. 1: Egypt; Abyssinia; Arabia.
1922a. Mertens, p. 169.
1827. *Hemidactylus robustns* (*sic*) Heyden, in Rüppell, Atlas, Reise Afrika, **1**, Rept., p. 19: Abyssinia (*fide* Mertens, 1922a).
1922a. Mertens, p. 169 (as *robustus*).
1829. *Gecko verruculatus* Cuvier, Règne Animal., ed. 2, **2**, p. 54: Provence, France; Italy; Sicily.
1831b. *Gecko Verrucosus* "Cuv." Gray, in Griffith, Animal Kingdom, **9**, Syn. Rept., p. 50: (amended spelling).
1841. *Hemidactylus verruculatus* Schlegel, p. 138.
1850. Guichenot, p. 4.
1882a. Vaillant, p. 16.
1883. Martens, p. 149.
1888. Giglioli, p. 65.
1897. Bateman, p. 75.
1900. Peel, p. 334.
1862b. *Hemidactylus cyanodactylus* Strauch, p. 23.
1884. *Hemidactylus karachiensis* Murray, Vert. Zool. Sind., p. 361, pl. ix, fig. 2: Sind, India.
1885d. *Hemidactylus sinaitus* Boulenger, Cat. Lizards Brit. Mus., **1**, p. 126: Mt. Sinai, Egypt.
1895b. Boulenger, p. 532.
1896. Anderson, pp. 72, 75, 78, 84, 88, 98.
1897g. Boulenger, p. 277.
1936h. Loveridge, p. 50.
1942. Parker, p. 28, fig. 5.
1885b. *Hemidactylus Turcicus* Boettger, p. 464.
1885d. Boulenger, p. 127.
1887. Strauch, p. 32.
1890. Müller, p. 696.
1891c. Boulenger, pp. 96, 115.
1892. Anderson, p. 11.
1892. König, p. 15.
1892a. Werner, p. 351.
1893a. Boettger, p. 28.
1893b. Werner, p. 359.
1894. Oliver, p. 107.
1894. Werner, p. 77.
1896. Anderson, pp. 26, 70, 78, 78, 84, 90, 98.
1896a. Boulenger, p. 550.
1896. Francaviglia, p. 42.
1896b. Oliver, p. 119.
1897b. Werner, p. 405.
1898. Anderson, p. 80, pl. v, fig. 3.

1899. Doumergue, p. 519, pl. iv, figs. 6–6a.
1901. Gadow, p. 508, fig. 120.
1901. Steindachner, p. 327.
1903a. Boulenger, p. 82.
1903. Mayet, p. 12.
1903. Steindachner, p. 8.
1903b. Andersson, p. 6.
1904. Chaignon, p. 17.
1904. Peracca, p. 2.
1908. Werner, 1907, p. 1829.
1909a. Werner, pp. 599, 628.
1913. Ghigi, p. 284.
1913a. Werner, p. 19, fig. —.
1914b. Barbour, p. 82.
1920. Mourgue, p. 233.
1921. Andres, p. 17.
1922a. Mertens, p. 169.
1922. Stejneger, p. 56.
1922. Zavattari, p. 15.
1923a. Calabresi, p. 9.
1925b. Flower, p. 940.
1927a. Pellegrin, p. 261.
1927. Vinciguerra, p. 333.
1928b. Scortecci, p. 313.
1929. Dollfus, p. 112.
1929c. Scortecci, p. 253.
1929b. Werner, p. 8.
1929. Zavattari, p. 87.
1930a. Scortecci, p. 205.
1930c. Scortecci, p. 2.
1930a. Zavattari, p. 266.
1931. Gestro & Vinciguerra, p. 538.
1931b. Scortecci, p. 128.
1931a. Vinciguerra, p. 98.
1932. Kuntze, p. 330.
1933. Flower, p. 756.
1933. Leavitt, p. 96.
1934. Brongersma, p. 165.
1935e. Scortecci, p. 186.
1937. Hediger, p. 187.
1937. Zavattari, p. 530.
1942. Parker, p. 27, fig. 6.
1895g. *Hemidactylus jubensis* Boulenger (not Boulenger, 1895i), p. 166.
1898. *Hemidactylus turcicus sinaita* Anderson, p. 83, pl v, fig. 4.
1905. Neumann, pp. 390, 403.

1905c. Tornier, pp. 368, 384.
1927. Calabresi, p. 40.
1929c. Scortecci, p. 253.
1930c. Scortecci, p. 1.
1906. *Hemidactylus exsul* Barbour & Cole, Bull. Mus. Comp. Zoöl., **50**, p. 148: Progreso, Yucatan.
1941f. *Hemidactylus turcicus turcicus* Loveridge, p. 247.

Further citations of *"turcicus"* will be found under *H. t. macropholis*, of *"cyanodactylus"* and *"verruculatus"* under *b. angulatus* and *longicephalus*.

Native names. Warty Gecko (English); *bors* (Sudan: Andersson).

Description. Snout slightly longer than the distance between the eye and the ear-opening; granular scales on the snout slightly convex or flat, much larger than those on the vertex, among which are scattered larger rounded tubercles; nostril bordered by the rostral[1], first labial (rarely excluded), and 3 small nasals, the uppermost usually separated from (rarely in contact with) its fellow by a single granule; upper labials 7–11; lower labials 6–9; a pair of large postmentals in contact (rarely separated)[2] on the median line, an outer, but smaller, pair of chin shields.

Back covered with small granular scales among which are scattered strongly keeled[3] or subtrihedral tubercles forming (12–14 *fide* Heyden) 14–16 more or less regular longitudinal rows; ventral scales smooth, rounded, imbricate; males with (3–10 *fide* Boulenger) 4–8 preanal pores forming an uninterrupted series; digits free, moderately dilated; inferiorly with oblique scansors, 6–8 (5 in type of *sinaitus*) under the first toe, 9–10 (8 in type of *sinaitus*) under the fourth toe; tail, when unregenerate, slightly depressed, verticillate, covered above with small smooth scales and 6–8 rows of large, pointed, keeled tubercles; below with imbricate scales of which the median series are transversely enlarged (regenerate tail covered above with small smooth or granular scales devoid of large keeled tubercles, below as in original tail but more irregular); length of tail usually longer than that of head and body.

Color. Above, pinkish brown, light brown, sandy gray or sandy yellow; an indistinct dark streak from nostril passes through eye to

[1] Anderson (1898, p. 83) has pointed out that it is the first labial, *not* the rostral, which is excluded from the nostril in the type of *sinaitus* and that this character is constant in five-sixths of Suakin geckos. See discussion under *Remarks*.

[2] In type of *exsul* from Yucatan, but not in Cuban, Florida, or West Indian specimens in the Museum of Comparative Zoölogy. British Museum material (Boulenger, 1885d) presents both conditions.

[3] Sometimes feebly, according to Parker (1942, p. 28) whose discussion should be read.

above the ear; back mottled with darker but many of the tubercles white. Below, whitish.

Size. Total length of ♂, 122 (53 + 69) mm., from Petra, Arabia (M.C.Z. 9660); total length of ♀, 123 (59 + 64) mm. (*fide* Anderson, 1898). Both, however, are exceptionally large, about 20 mm. above the average for adults.

Remarks. The status of *sinaitus* presents a difficult problem. Anderson (1898, p. 83), who was the first person to investigate it with any degree of thoroughness, would recognize it as a variety, but any attempt to define it as a geographical race seems impossible, possibly on account of introductions and reintroductions by the extensive dhow trade in the Red Sea region. Parker (1942) would regard it as a full species as it is found with typical *turcicus* in so many places. He separates his material on the basis of six characters and figures the left foot of both forms. His paper should be consulted.

To me it seems probable that *sinaitus* represents the parent stock from which *turcicus* sprang for it averages fewer scansors beneath the digits (5–8 beneath the first toe, 8–11 beneath the fourth) though the overlap is far too great to be of diagnostic value. The first labial is excluded from the nostril in five-sixths of geckos from Durur and Suakin. The subcaudals are not transversely enlarged in *sinaitus* as they progressively tend to be as one proceeds westwards with *turcicus*. Few individuals possess all these characters, however, and one or other of them crops up in geckos from Upper Egypt, Sinai Peninsula, Sudan, Somaliland, Ethiopia and Aden, Arabia.

As Malcolm Smith (1935, p. 86) does not recognize *karachiensis* as distinct, I follow him, but should like to remark that our single topotype (M.C.Z. 7140) of this gecko, differs from all our Arabian, African, European, and New World material in the scarcity of tubercles on the crown and occiput, and their feebler development on the dorsum. Doubtless the species owes its presence in Baluchistan and Sind to introduction by the palm-thatched dhows.

I had already transferred Lönnberg and Andersson's (1913) and Calabresi's (1927) records of *turcicus* to the race *macropholis* before reading Vinciguerra's (1931a) suggestion that they represent that form. It seems possible that a few other records of *turcicus* from Somalia, when reexamined, should be transferred also.

Parker (1942, p. 27) suggests that *puccionii* Calabresi (1927) was based on a small, smoothly tuberculate example of *turcicus*. I wonde if it may not be a synonym of *pumilio* Boulenger.

Breeding. The eggs may be seen shimmering through the semi-

transparent abdominal skin of the gravid female. In Algeria, 2 or 3 (!) eggs, measuring 9 or 10 mm. in diameter, are deposited in June and hatch in mid-July (Doumergue, 1899).

Longevity. 7 years, 5 months, 9 days, and still alive in Giza zoological gardens on March 31, 1924 (Flower, 1925b).

Parasites. Mites (*Pterygonoma similis*) on Egyptian geckos (*fide* Hediger, 1935).

Diet. Flies and spiders (Werner).

Habits. According to Werner (1913a) it has a loud cry, but Kuntze (1932) says that he never heard them make a sound at Giza where they were associated with *Ptyodactylus* in or near the houses, but never in the country

Habitat. In houses, ruins, rocky ravines, under stones, dead logs, or in the burrows of other creatures (Anderson, 1898).

Localities. **French Morocco:** Casablanca; Ouezzane. **Algeria:** Aidour; Alger (Algiers); Arlal; Aumale; Betterie espagnol; Beni Mansour; Biskra; Bone; *Djebel Mourdjadjo; Djelfa; Gambetta; Hammam Rira (Rirha); Misserghin—near; Mount Edough; Oran; Polygone, Oran; Sainte Anne (? St. Aime) Ravin; Santa Cruz Mountain. **Tunisia:** Bir Mcherga; Bled Thala; Bordj Ibrim; Djebel Rezaz; Ile Galite; Ile Kerkenna; Sfax; Thala; Zarzio. **Libya:** Barca; Bardia; Bengasi; Cyrenaica; Gan Chenabi; Giarabub; Marsa Susa (Apollonia); Sidi el Garbaa; Tolmeta; Tripoli. **Egypt:** Abukir; Alexandria; *Cairo; Daba; Edfu; Edku; Gebel Ain (Gebelein); Gebel Mokattam; Gemein near Suez; Giza; Heliopolis; Mariut; Mersa Matruh; Mex; Ras Gharib; Romani, northern Sinai; Shadwan Island; Shaluf, Suez; Sidi Abd el Rasik, between Edku and Rosetta; Tor, Sinai Peninsula. **Anglo-Egyptian Sudan:** Akik Seghir; *Durur; Mersa Halaib; *Port Sudan (A.L.); Suakin; Wadi Halfa. **Eritrea:** Arkiko; Assab; Cheren (Keren); Isola Sheikh Said, Massaua; Monte Ghedeni, Ghinda; Nakra, Isola Daalac; Sabarguma. **Ethiopia:** Artu; Biskaboba—south of; Boholgarskan; Bussa; *Dabas; Djeldabal. **British Somaliland:** Berbera; Golis Mountains (as *jubensis*); Island opposite Zeilah; Las Koreh (Gore); Warsingali. **Somalia:** Gardo, Migiurtinia; Mogadish; Obbia. **Sokotra Island:** Hadibu Plain; Homhil.

Range. In Africa from Morocco east to Egypt and south to Sokotra Island and Somalia (where it meets with *H. t. macropholis*). Elsewhere, from Yucatan, Florida, and Cuba, east to the Canary Islands and Mediterranean Basin and borders of Red Sea, east to Persia and Sind (a distribution largely attributable to human agency).

Hemidactylus turcicus macropholis Boulenger

1913. *Hemidactylus turcicus* Lönnberg & Andersson (not Linnaeus), p. 1.
1927. Calabresi, pp. 25, 40.
1896b. *Hemidactylus macropholis* Boulenger, Ann. Mus. Civ. Stor. Nat. Genova (2), **17**, p. 7, pl. i, figs. 2–2c: Dolo, Somalia.
1896c. Boulenger, p. 17.
1897g. Boulenger, p. 277.
1898a. Boulenger, p. 716.
1898c. Boulenger, p. 913.
1909d. Boulenger, p. 310.
1911. Lönnberg, p. 11.
1912b. Boulenger, p. 329.
1923d. Loveridge, p. 845.
1924b. Loveridge, p. 9.
1927. Calabresi, p. 41.
1929h. Loveridge, p. 44.
1930c. Scortecci, p. 1.
1931b. Scortecci, p. 128, pl. iii, fig. 1.
1931a. Vinciguerra, p. 98.
1932b. Parker, p. 341.
1937f. Loveridge, p. 491.
1942. Parker, p. 27.

Native name. *Godadu* (British Somaliland: Parker).

Description. Snout slightly longer than the distance between the eye and the ear-opening; granular scales on the snout convex, much larger than those on the vertex, among which are scattered larger rounded tubercles; nostril bordered by the rostral, (rarely by the first labial), and 3–4 small nasals, the uppermost separated from its fellow by a single granule; upper labials 9–10; lower labials 6–8; a pair of large postmentals in contact on the median line, an outer, but smaller, pair of chin shields.

Back covered with granules among which are scattered strongly keeled subtrihedral tubercles forming 12–16 more or less regular longitudinal rows; ventral scales smooth, rounded, imbricate; males with 6–11 preanal pores forming an uninterrupted series; digits free, moderately dilated, inferiorly with oblique scansors, 6–9 under the first toe, 10–12 under the fourth toe[1]; tail, when unregenerate, slightly depressed, verticillate, covered above with small, smooth scales and 4–6 rows of rather flat, pointed, keeled tubercles; below with imbricate scales of which the median series are transversely enlarged (regenerate

[1] My (1929h) statement about "median digit" referred to the finger, whereas Boulenger's "median digit" evidently meant the toe.

tail covered above and below with small irregular scales or plates, but devoid of tubercles); length of tail longer than that of head and body.

Color. Above, uniform sandy gray. Below, whitish.

Size. Total length of ♂ (M.C.Z. 18254), 140 (62 + 78) mm., from Lugh, but surpassed in length from snout to anus by one of 80 mm. recorded by Parker (1932b) in his key, also ♀ of 67 mm.

Remarks. Scortecci (1931b) figures and discusses the tubercles. *H. t. yerburii* Andersson (1895), described from Lahej, near Aden, carries development a step further, both in its 12–15 preanal pores and in the greater development of the digital expansion. The Museum of Comparative Zoölogy possesses three males which I collected at Shaikh Othman, near Aden, in 1919.

Habitat. Found in termitaria and upon, beneath, or in fissures of, rocks, stones, and dead trees, from 1500 to 3400 feet.

Localities. **Eritrea:** Gaarre, Danakil. **British Somaliland:** Ado: Buran District; Coastal plain; Nogal Valley; Sol Haud. **Somalia:** Bacbac; Bardera; Bulo Burti; Bugda Acable; Dolo; Gardo, Migiurtinia; Kismayu; *Lugh; Mofi; Uegit. **Kenya Colony:** Guaso Nyiro; ? Merelle River; Njoro.

Range. Eritrea and British Somaliland south through Somalia to northern Kenya Colony.

Hemidactylus sp.

1900. ?*Hemidactylus turcicus* Peel (not Linné), p. 334: Guban.
1942. *Hemidactylus* sp. Parker, Bull. Mus. Comp. Zoöl., **91**, p. 27: Guban, British Somaliland.

Whether Peel's description refers to his four-inch gecko or, as seems probable, is adapted from some book, is not clear. Nor is it certain whether it represents the same race as Parker's specimens.

Parker invites attention to two geckos, a female and juvenile, closely related to *macropholis*, but having more numerous dorsal tubercles; smaller ventrals; more numerous subdigital scansors—10 (instead of 6–9) under the first toe, 14 (instead of 10–12) under the fourth toe; and a distinctive color pattern of broad, dark, transverse bars. Parker states that in color as well as in certain other characters they resemble the Indian *H. triedrus* and *H. subtriedrus*, but apparently are not referable to any known species. It might be well to see if these variations are within the range of *H. t. yerburii*, for there is a considerable dhow traffic between Lahej and the British Somaliland coast, i.e. Guban.

Hemidactylus barodanus Boulenger

1901a. *Hemidactylus barodanus* Boulenger, Proc. Zool. Soc. London, **1**, p. 48, pl. vii, fig. 2: Gan Lebar (Libah), Ethiopia.
1927. Calabresi, p. 41.
1932b. Parker, p. 346.
1942. Parker, p. 26.

Description. Snout slightly longer than the distance between the eye and the ear-opening; granular scales on the snout convex, striated, larger than those on the vertex, among which are scattered larger conical tubercles; nostril bordered by the rostral, first labial and 3 small nasals, the uppermost separated from its fellow by a single granule; upper labials 9–11; lower labials 8; a pair of large postmentals in contact on the median line, an outer, but smaller, pair of chin shields.

Back covered with small granules among which are scattered small or large obtusely keeled or subtrihedral tubercles forming 14–16 very irregular longitudinal rows; ventral scales smooth, rounded, imbricate; male with 6–11 femoral pores; digits free, moderately dilated, inferiorly with slightly oblique scansors, 6–8 under the first toe, 9–11 under the fourth toe; tail, when unregenerate, depressed, carrot-shaped, verticillate, the swollen basal portion marked off by a faint constriction, covered above with juxtaposed granules and 6 rows of long, nail-like, striated tubercles; below with imbricate scales of which the median series are transversely enlarged; length of tail shorter than that of head and body.

Color. Above, brownish gray; head mottled with brown, sometimes an indistinct dark streak from nostril to eye; back more or less uniform or with three dark-edged, brown, crossbars which bifurcate on the flanks; tail mottled with brown. Below, whitish.

Size. Total length of ♀, 138 (72 + 66) mm., surpassed in length from snout to anus by that of the type ♀, 78 mm.

Remarks. The above description is based on the original, together with data derived from two females from "Ethiopia" in the American Museum of Natural History, which I have examined, and Parker's (1942) remarks which should be consulted for comments on tubercles and tail.

Habitat. 5900 feet on Gan Lebar (or Gaan Libah), which is due south of Berbera, but across the border, and from 4000 to 6000 in the mountains of the Ogo, Borama District, where they are to be found under rocks and stones.

Localities. **Ethiopia. British Somaliland:** Gan Lebar.

Range. Ethiopia and British Somaliland.

Hemidactylus laticaudatus fossatii Scortecci

1928a. *Hemidactylus fossatii* Scortecci, Atti. Soc. Ital. Sci. Nat., **67**, p. 33, pl. i, figs. 1–5: Saganeiti, Eritrea.
1928b. Scortecci, p. 314.
1930a. Scortecci, p. 206.
1932b. Parker, p. 346.

Description. Snout slightly longer than the distance between the eye and the ear-opening; granular scales on the snout larger than those on the vertex, among which are scattered small, smooth tubercles; nostril bordered by the rostral, first labial, and 3 small nasals; upper labials 9; lower labials 8; a pair of large postmentals in contact on the median line, an outer, but smaller, pair of chin shields.

Back covered with small granules among which are scattered numerous, small, ovoid, perfectly smooth, subconical tubercles forming more or less irregular longitudinal rows; ventral scales smooth, rounded, imbricate; male unknown; digits free, moderately dilated, inferiorly with oblique scansors, 5 under the first toe, 6–7 under the fourth toe (*fide* fig.); tail, when unregenerate, depressed, carrot-shaped, verticillate, the swollen basal portion marked off by a faint constriction, covered above with small, smooth scales and 6 rows of long, smooth, pointed, nail-like tubercles; below with imbricate scales of which the median series are irregular and but slightly enlarged in a double or single series; length of tail shorter than that of head and body.

Color. Above, clear grayish yellow; a dark streak from nostril passes through eye to shoulder; back indistinctly barred with darker; tail with a longitudinal stripe at base but distally with crossbars. Below, whitish or yellowish gray.

Size. Total length of type ♀, 89 (47 + 42) mm.

Remarks. Scortecci, whose original description can be consulted for further details, states that *fossatii* is generally less robust, with smaller head, more slender legs, narrower digits, and shorter tail than *laticaudatus*. He figures the subcaudal region of the latter (fig. 6) to show the median series of transversely enlarged scales (though Andersson states of his two cotypes "no transversely enlarged median plates on the under surface of the tail") in contrast with the condition (fig. 4) in the female cotype of *fossatii*. The only differences of any consequences are those given in the key (p. 101) to the species of *Hemidactylus*. Parker (1932b), in his key, has transposed Andersson's "obtusely pointed" into "obtusely keeled" which I think is a mistake, I have rendered it "subconical." Perhaps Parker has seen specimens of the two forms, I have not.

Localities: **Eritrea:** Saganeita.
Range. Eritrea.

Hemidactylus laticaudatus laticaudatus Andersson

1910b. *Hemidactylus laticaudatus* Andersson, Jahrb. Nassau. Ver. Naturk (Wiesbaden), **63**, p. 200, pl. i: Harrar, Ethiopia.
1911. Lampe, p. 153.
1925a. Calabresi, p. 101.
1928a. Scortecci, p. 34, pl. i, fig. 6.
1942. Parker, p. 24.

Description. Snout slightly longer than the distance between the eye and the ear-opening; granular scales on the snout larger than those on the vertex, among which are scattered small, smooth tubercles; nostril bordered by the rostral and 3–4 small nasals; upper labials 7–8; lower labials 6–7; a pair of large postmentals in contact on the median line, an outer, but smaller, pair of chin shields.

Back covered with small granules among which are scattered numerous, small, round, smooth, subconical tubercles forming more or less regular longitudinal rows (*fide* fig.); ventral scales smooth, rounded imbricate; males with 12–18 preano-femoral pores forming an interrupted series; digits free, moderately dilated, inferiorly with oblique scansors, 4 under the first toe, 6–7 under the fourth toe; tail, when unregenerate, depressed, carrot-shaped, verticillate, the swollen basal portion marked off by a faint constriction, covered above with small, smooth scales and 6 rows of long, smooth, pointed, nail-like tubercles; below with imbricate scales of which the median series may (Gondar; Scortecci), or may not (Harrar; Andersson), be transversely enlarged; length of tail longer than that of head and body.

Color. Above, pale grayish brown; a dark streak from nostril passes through eye to shoulder; head marbled with black and with two dark, wavy, crossbars on the occiput; back with five dark, wavy, crossbars; tail with seven to tendark cross bars. Below, whitish, the tail marbled with black.

Size. Total length of cotype ♂, 115 (55 + 60) mm., of a still larger ♂, 126 (60 + 66) mm. from Gondar.

Remarks. Andersson, whose original description can be consulted for further details, considered *laticaudatus* most nearly related to *granti* of Sokotra Island. The former is still known only from the two cotypes and an additional six examples recorded by Calabresi, none of which have been seen by me. Subsequently Scortecci described *fossatii* from Eritrea, which is but doubtfully distinct.

Localities. **Ethiopia:** Caha River below Gondar; Gondar; Harrar; Lake Tana.

Range. Ethiopia.

Hemidactylus taylori Parker

1932b. *Hemidactylus taylori* Parker, Proc. Zool. Soc. London, p. 342: Sol Haud, British Somaliland.

1942. Parker, p. 23.

Description. Snout slightly longer than the distance between the eye and the ear-opening; granular scales on the head small, juxtaposed, intermixed with larger conical tubercles; nostril bordered by the rostral and 4 small nasals, the uppermost separated from its fellow by a single granule; upper labials 10; lower labials 7–8; a pair of large postmentals in contact on the median line, an outer, but smaller, pair of chin shields.

Back covered with small granular scales among which are scattered strongly keeled trihedral tubercles forming 13–15 more or less regular longitudinal rows; ventral scales smooth, rounded, imbricate; males with 8–9 preanal pores forming an uninterrupted series; digits free, moderately dilated, inferiorly with oblique scansors, 8–9 under the first toe, 10–12 under the fourth toe; tail, when unregenerate, depressed, carrot-shaped, verticillate, the swollen basal portion marked off by a faint constriction, covered above with juxtaposed granules and 4 rows of long, pointed, keeled tubercles; below with imbricate scales (regenerate tail depressed, leaf-shaped, swollen, covered above with small, uniform, pointed, subimbricate scales) length of tail shorter than that of head and body.

Color. Above, pinkish white, an indistinct dark stripe from the eye to above the ear; nape and back with four or five indistinct dark crossbars, another across root of tail, which is dotted with black (but regenerated). Below, whitish.

Size. Total length of type ♂, 109+ (71 + 38+) mm., tail regenerating.

Remarks. Known only from the type series of five specimens, one (M.C.Z. 33595) of which I have examined. Much additional data will be found in the original description. Parker is correct in stating that the species differs from the type of *barodanus* Boulenger in its much more strongly keeled tubercles, it is closely related to *H. turcicus macropholis* from which it differs in the more numerous tubercles on the hind limbs, in addition to the tail.

Habitat. Beneath stones at 2700 feet.
Localities. **British Somaliland:** *Sol Haud.
Range. British Somaliland.

Hemidactylus ruspolii Boulenger

1896b. *Hemidactylus ruspolii* Boulenger, Ann. Mus. Civ. Stor. Nat. Genova (2), **17**, p. 6, pl. i, figs. 1–1c: Bardera; Dolo; Lugh; Magala and Umberto Island, Somalia.
1896c. Boulenger, p. 17.
1897g. Boulenger, p. 277.
1898a. Boulenger, p. 716.
1898c. Boulenger, p. 914.
1911. Lönnberg, p. 10.
1912b. Boulenger, p. 329.
1913. Lönnberg & Andersson, p. 1.
1923b. Calabresi, p. 155.
1923d. Loveridge, p. 844.
1924b. Loveridge, p. 9.
1927. Calabresi, p. 40.
1929h. Loveridge, p. 41.
1929c. Scortecci, p. 252.
1931b. Scortecci, p. 128, pl. iii, fig. 2.
1932b. Parker, p. 341.
1936e. Parker, p. 601.
1937f. Loveridge, p. 491.
1942. Parker, p. 23.
1907b. *Hemidactylus erlangeri* Steindachner, Anz. Akad. Wiss. Wien, **44**, p. 355: Ethiopia.
1907c. Steindachner, p. 1535, pl. –, figs. 1–1d (as *ruspolii*).
1940a.? *Hemidactylus* sp. Scortecci, p. 21[1].

Further citations of "*ruspolii*" will be found under *H. b. angulatus* and *tanganicus*.

Description. Snout slightly longer than the distance between the eye and the ear-opening; no granular scales on the snout which, like the vertex, is entirely covered with large conical or keeled tubercles of variable size, the largest on the occiput; nostril bordered by the rostral, first labial, and 3–5 small nasals, the uppermost of which is in contact with its fellow; upper labials 8–10; lower labials 7–8; a pair of large postmentals in contact on the median line, an outer, but smaller, pair of chin shields.

Back covered with small granular scales among which are scattered

[1] See discussion on p. 156 of this paper.

strongly keeled or trihedral tubercles forming 14–18 more or less regular longitudinal rows; ventral scales smooth, rounded, imbricate, lateral edge of belly bordered by a series of small, round tubercles; males with 28–34 preano-femoral pores forming an uninterrupted series; digits free, moderately dilated, inferiorly with oblique scansors, 4–5 under the first toe; 6–8 under the fourth toe; tail, when unregenerate, depressed, carrot-shaped, verticillate, the swollen basal portion marked off by a faint constriction, covered above with small smooth scales and 10 (at least at base) rows of long, pointed, keeled tubercles; below with imbricate scales (regenerate tail, leaf-like, depressed, covered above and below with granules devoid of tubercles); length of tail usually shorter than that of head and body.

Color. Above, gray brown; a dark streak from nostril passes through the eye; back spotted or marbled with dark brown or black, or wavy, black, crossbars, or series of longitudinal blotches, some of the dorsal tubercles white; tail ringed with darker and lighter. Below, whitish.

Color in life of males, predominantly black and yellow (white in alcohol) according to Taylor, in Parker, who also says of the young. Above, and below, dark brown or nearly black, some of the larger tubercles pure white.

Size. Total length of ♂, 93 (48 + 45) mm. from ? Merelle River; total length of cotype 88 (50 + 38) mm., tail presumably regenerating (A.L.).

Remarks. My (1920a, p. 134) record of the occurrence of this species in Tanganyika (repeated in 1923d, 1924b lists) was due to misidentification of *brookii angulatus* + *tanganicus*, then undescribed.

Habitat. Lönnberg records that in the latter half of February several of these geckos were found by tearing away the dry frondstalk bases of the doom palms at Njoro. Adroitly slipping away, the lizards often discarded their brightly colored tails which may, by distracting the attention of the enemy, possess survival value for the gecko.

Taylor captured specimens in a hole and from beneath the bark of dead trees in the Haud at altitudes from 2000–3100 feet (Parker). Boschis took one on an old building at Galadi (Scortecci).

Localities. **Ethiopia** (Type of *erlangeri*). **British Somaliland:** Ado; Haud. **Somalia:** Bardera; Dolo; Galadi; Goscia; *Kismayu; Lugh; Lugh to Matagoi; Magala, Umberto Island; Mofi; **Kenya Colony:** Bulessa; Loiyangallani; Lorian Swamp; Marsabit Road; ? Merelle River; Njoro; Yajir.

Range. Ethiopia and British Somaliland south to northern Kenya Colony.

Hemidactylus sp.

Scortecci (1940a, p. 21) has recently described, as *Hemidactylus* sp., five geckos from Moyale and Negelli which agree with the foregoing description of *ruspolii* in every respect except (1) the preano-femoral pores are interrupted in the middle by one or two poreless scales; (2) 19, instead of 18, rows of dorsal tubercles; (3) larger size max. of 60 mm. for head and body, as against max. of 50 mm. Scortecci himself differentiates it from *ruspolii* on the grounds that the tubercles are smaller in his Moyale-Negelli material. It would seem possible that he is dealing with the unknown male of *tanganicus*, his males had 28–34 pores, exactly the range of *ruspolii*.

Hemidactylus tanganicus Loveridge

1920a. *Hemidactylus ruspolii* Loveridge (part, not Boulenger), p. 134.
1929h. *Hemidactylus tanganicus* Loveridge, U. S. Nat. Mus. Bull. 151, p. 42, pl. i: Dutumi, near Kisaki, Tanganyika Territory.
1937f. Loveridge, p. 495.

Description. Snout slightly longer than the distance between the eye and the ear-opening; granular scales on centre of snout (flanked by large, conical or keeled, tubercles) larger than those on the vertex, among which are scattered larger rounded tubercles; nostril bordered by the rostral, first labial (or excluded), and 4 small nasals, the uppermost of which is in contact with its fellow; upper labials 8–9; lower labials 8; a pair of large postmentals in contact on the median line, an outer, but smaller, pair of chin-shields.

Back covered with small granular scales among which are scattered strongly keeled or subtrihedral tubercles forming 18–20 more or less regular longitudinal rows; ventral scales smooth, rounded, imbricate; male unknown; digits free, moderately dilated, inferiorly with oblique scansors, 5 under the first toe, 8 under the fourth toe; tail, when unregenerate, depressed, carrot-shaped, verticillate, the swollen basal portion marked off by a faint constriction, covered above with small smooth scales and 6 (10 at base) rows of long, pointed, keeled tubercles; below with irregular imbricate scales of which the median series are transversely enlarged; length of tail (but with tip regenerated) longer than that of head and body.

Color. Above, buff with a pinkish tinge; six dark blotches along the vertebral line between occiput and base of tail, similar blotches on back and flanks. Below, grayish tinged with pink.

Size. Total length of type ♀ (M.C.Z. 18253), 157 (76 + 81) mm., but tip of tail regenerated.

Remarks. For a lengthier description and distinguishing characters, see original.

Localities. **Tanganyika Territory:** *Dutumi.

Range. Tanganyika Territory.

Hemidactylus flaviviridis Rüppell

1835. *Hemidactylus flaviviridis* Rüppell, Neuer Wirbelth. Fauna Abyss. Amphib., p. 18, pl. vi, fig. 2: Massaua Island, Eritrea.
1836. Duméril & Bibron, p. 347.
1898. Anderson, p. 77, pl. v, fig. 5.
1901. Steindacher, p. 327.
1903a. Boulenger, p. 82.
1908. Werner, 1907, p. 1830.
1920. Woodland, p 63, figs. 1–6.
1922a. Mertens, p. 169.
1930a. Scortecci, p. 206.
1932. Das, p. 657.
1932b. Parker, p. 345.
1933. Flower, p. 766.
1935a. Mahendra, p. 34.
1935b. Mahendra, p. 37.
1935c. Mahendra, p. 178.
1936b. Mahendra, pp. 250–281, pls. xiv–xviii.
1939. Sood, pp. 316–322, figs. 1–3.
1941. Mahendra, pp. 288–306, figs. 1–8.
1942. Mahendra, pp. 231–252, figs. 1–10.
1942. Parker, p. 24.
1836. *Hemidactylus coctaei* Duméril & Bibron, Erpét. Gén., **3**, p. 365: Bengal and Bombay, India.
1896a. Boulenger, p. 550.
1842. *Boltalia sublaevis* Gray, Zool. Misc., p. 58: India.
1871. *Hemidactylus bengalensis* Anderson, Journ. Asiatic Soc. Bengal (2), **40**, p. 14: Bengal, India.
1882b. *Hemidactylus homocolepis* Peters (part, not Blanford), p. 43.
1929a. *Hemidactylus Zolii* Scortecci, Atti. Soc. Ital. Sci. Nat., **68**, p. 116, figs. –: Massaua Island, Eritrea.
1930a. Scortecci, p. 206.

Description. Snout slightly longer than the distance between the eye and the ear-opening; granules on the snout convex, larger than those on the vertex; nostril bordered by the rostral (rarely excluded), first labial, and 3 small nasals, the uppermost separated from its

fellow by a single granule; upper labials 12–16; lower labials 9–12; a pair of large postmentals in contact on the median line, an outer, but smaller, pair of chin shields.

Back covered with small, uniform[1] granules; ventral scales smooth, rounded, imbricate; males with 4–7 femoral pores *on each side*, widely interrupted mesially; digits free, strongly dilated, inferiorly with oblique scansors, 7–10 under the first toe, 11–14 under the fourth toe; tail, when unregenerate, depressed, carrot-shaped, verticillate, the swollen basal portion marked off by a faint constriction, covered above with small, smooth scales and 4–6 rows of large, smooth, flat, nail-like tubercles; below with imbricate scales of which the median series are transversely enlarged; length of tail longer than that of head and body.

Color. Above, gray, uniform or with indistinct darker markings. Below, whitish.

In life. Above, yellowish green; circumorbital ring yellow; iris yellowish brown, pupil black; digits more yellowish. Below, bright orange yellow except for the pair of post-anal tubercles which are bright sulphur yellow, and the digital scansors which are bluish (*fide* Rüppell).

In life. Above, pale lemon yellow faintly tinged with greenish gray; back with dark, undulating, transverse bands sometimes faintly indicated. Below, richer lemon, the distal scansors silvery white.

Size. Total length of ♂, 159 (74 + 85) mm., from Suakin (Anderson); total length of cotype ♀ (M.C.Z. 21927), 148 (71 + 77) mm., but both are surpassed by Asiatic specimens of 180 (90 + 90) mm., and even larger.

Remarks. H. zolii, which was based on two females from Massawa (which is also the type locality of *flaviviridis*), differs only in the slightly broader tail and in the absence upon it of 6 rows of enlarged tubercles. I assume that these characters are due to the two tails being reproduced, this is merely an assumption, but it finds some support in the fact that the tails of both Scortecci's cotypes are *shorter* (75 + 73 and 75 + 70 mm.) than the head-and-body length, whereas in our cotype of *flaviviridis* it is longer. Parker (1942, p. 25) remarks that his new species, *curlei*, approaches most nearly to *zolii*; in scale counts *curlei* approximates to *homoeolepis*.

Osteology. Mahendra (1935b) states that the vertebral column is

[1] Anderson (1898, p. 78) says "sometimes a large tubercle before the shoulder, and a few rounded tubercles on the sacral region."

composed of 8 cervical, 5 thoracic, 13 lumbar, and 2 sacral elements, 28 in all.

Anatomy. The heart and venous system are described by Mahendra (1942).

Woodland (1920) has published a detailed account of his extensive observations on the mechanism of caudal autotomy and regeneration. Less than half of his 200 specimens had their original tails when captured, and 5 out of a dozen perfect-tailed geckos that were put in a box together, shed their tails within an hour. In this species the tail is shed only when restrained, and the autotomy occurs usually within a vertebra not more than two segments removed from the point of seizure. If the fracture occurs near the base, Woodland believes that the regeneration of a full length tail takes at least 4 or 5 months. When a regenerated tail is seized the tendency is for the break to occur at the point of origin of the regenerated portion, wherever that may be.

Professor Woodland describes how cleavage planes in the skin, fat layer, muscular layer, and submuscular fat bands, correspond to a cleavage plane in the centre of each caudal vertebra. Still more interesting is the mechanism for stopping hemorrhage at the point of autotomy. For this purpose the walls of the caudal artery are thickened immediately anterior to each cleavage point, and these thick-walled areas act as sphincters for closing the artery. Woodland believes this constitutes the only recorded instance of a sphincter muscle being developed on a blood vessel. As the flow of blood in the caudal vein is toward the body, no sphincter is present though some constriction takes place and the vein is temporarily closed by a blood clot. Woodland's paper should be consulted for further details. Das (1932) remarks on two trifid tails, and Sood (1939) describes an abnormal reproduced tail.

Mahendra (1941) discusses this gecko's ability to run over walls, and even across ceilings though this is limited to geckos of moderate weight. He deals successively with the pneumatic, electric, friction, and adhesive theories. Deciding that all are untenable, he concludes that geckos are able to move along the underside of horizontal surfaces because their claws take hold of every irregularity, and this action is duplicated by the microscopic cuticular processes of their scansors interlocking with microscopic depressions of the locomotor surface as they are pressed in. During sloughing, or when the hair-like cuticular processes are matted by moisture, the gecko fails to hold on.

Parshad (1916) records ecdysis as occupying 52 hours in a healthy

female. The epithelium became loose over the entire body so that the gecko appeared to be wrapped in white tissue paper. She became restless, rubbing herself against the sides of the glass jar in which she was confined. The first fissure to appear in the epithelium was above the vertebral region of body and tail, it was followed by transverse rents which separated the sloughs on head, limbs, and tail. Finally the tissue was shed in flakes.

Sexual dimorphism. Mahendra (1935c) corrects Prashad's (1916) statement as to males being smaller, contending that specimens of the same age are subequal in size regardless of sex. Males are recognizable by the presence of femoral pores; absent in females. Post-anal sacs are present in both sexes though more conspicuous in males, in which their rims are raised by the post-anal bone that is lacking in females. Mahendra also comments on the post-anal areas of females being concave or flat, though prominently swollen in males. This, he says, is most noticeable in March and April (in India), and becomes less so at the close of the breeding season.

Breeding. According to Prashad (1916) pairing begins in northern India at the end of the hibernation period and commencement of the hot season, i.e. in March, to continue for several months, occasionally as late as October (Mahendra). Prashad states that fights between males are of common occurrence, and that a female is sometimes pursued by several suitors. He observed one male circling about a female as she rested on a wall. At times the male, nodding his head, approached and touched the female, then recommenced his encircling perambulations. After ten minutes of this performance he came to rest beside the female, but continued to nod and touch her with his head or extruded tongue. The female became responsive and turned her head towards the wooer.

Mahendra (1936), who watched two courtships take place, states that both commenced with a chase in which the female paused from time to time to permit the male's approach, then darted off again. Both uttered a low call like "tak-tak-tak." When within a yard or so of each other both geckos lashed their tails vigorously. Then approaching still closer they bit at each other on body or limbs. In neither instance was there much resemblance to the procedure observed by Prashad.

Copulation, says Mahendra, usually takes place on a wall, either at dusk, or early in the morning if in some dark corner. With his jaws the male takes firm hold of the female's neck, then mounts her back, reinforcing his hold with the fore and hind foot of one side.

The female arches her tail from the base and the male slides his beneath it (1936, pl. xvii) till the anal openings are in juxtaposition; whether one or both hemipenes were employed was not observed.

Mahendra discusses the fertilization and intra-uterine development of the ova, which, within 24 days of copulation, were deposited in earth in contrast to Prashad's statement of "about two months." Normally a pair of eggs are deposited in a hole or crevice of a wall, without benefit of any adhesive cement. No evidence of collective laying was found. Eggs varied in size from 10–11 x 12–13 mm., and had an average weight of 900 mg. Mahendra observed that eggs placed in water or on level ground invariably rotated to the same position. By marking the part that always came uppermost, and then opening the egg, Mahendra found that it coincided with the underlying air space.

Mahendra figures and describes the embryological development. He found that 33–34 days elapsed between the laying and hatching of eggs, in contrast to Prashad's "about 37 days." Neither Prashad nor Mahendra found hatchlings showing any trace of an egg-tooth, and Mahendra states that the fragile shell ruptures as a result of pressure exerted by the struggling gecko within, then a roundish piece of shell breaks away to allow of the emergence of the little lizard. Upon hatching, young geckos measure 53 or 55 (25 + 28; 26 + 29) mm., and for the first two or three days were unable to climb the sides of an open glass trough.

Diet. House-flies, mosquitoes, and spiders have been found in dissected specimens, but Prashad (1916) found his captives refused all food, though offered house-flies, mosquitoes, caterpillars, earthworms, and meat. One male lived for 117 days without eating, before it died of starvation.

Parasites. The reddish "ticks" (presumably acarine mites) which Prashad found on these geckos, remained attached to the host even when the lizard sloughed.

Habitat. Among the rafters, walls, and cellars of old Arab houses.

Localities. **Egypt**: Kosseir on coast; Suez. **Anglo-Egyptian Sudan**: *Port Sudan (A.L.); Suakin. **Eritrea**: Ghinda; *Massaua. **French Somaliland. British Somaliland**: Berbera. **Sokotra Island**: Hadibu Plain. (also **Ethiopia**, fide Werner, 1908).

Range. Red Sea coast from Egypt and Sudan south to Sokotra Island, eastwards through Arabia and Persia to India north of 20° and not east of Bengal (according to Malcolm Smith, 1935, who evidently discounts the inclusion of Burma and Malaya). Its distri-

bution along the Red Sea coasts is generally attributed to human agency.

Hemidactylus curlei Parker

1942. *Hemidactylus curlei* Parker, Bull. Mus. Comp. Zool., **91**, p. 24: Borama District (43°10′E. x 9°55′N.) at 5000 feet, British Somaliland.

Description. Snout slightly longer than the distance between the eye and the ear-opening; granules on the snout much larger than those on the vertex; nostril bordered by the rostral, first labial, and 3 small nasals, the uppermost separated from its fellow by a single granule; upper labials 8–10; lower labials 6–8; a pair of large postmentals in contact on the median line, an outer, but smaller, pair of chin shields.

Back covered with somewhat irregular, flat, subcircular, subimbricate scales; ventral scales smooth, rounded, imbricate; males with 4 preanal pores forming an uninterrupted series; digits free, dilated basally, inferiorly with scansors, 5 under the first toe, 8–9 under the fourth toe; tail, when unregenerate, strongly depressed, root-shaped, verticillate, the swollen basal portion marked off by a distinct constriction, covered above with transverse rows of smooth, imbricate scales of which 5 rows constitute an annulus; below with imbricate scales of which the median series is transversely enlarged, 2 of them to an annulus; tip of tail regenerated, not annulate, but covered above with quincuncially arranged imbricate scales, below by transversely enlarged subcaudals.

Color. Above, yellowish; a dark streak from nostril passes through eye and above ear to sides of the neck, thereafter it is represented by a row of spots extending to base of tail; back heavily spotted and blotched with purplish black, those of the mid-dorsal area irregularly transverse; limbs with scattered, circular, white spots; tail with dark crossbars. Below, white.

Size. Total length of cotype ♀ (Brit. Mus. 1937.12.5.295), 85^{+} ($43 + 42^{+}$) mm., posterior third regenerated.

Remarks. Further details will be found in the lengthy description based on a male and four females, whose midbody scale-rows ranged from 81–95. While the shape of a fully regenerated tail is similar to the original appendage, it lacks transverse scale-rows and is not verticillate. Parker adds that no *Hemidactylus* with this type of tail has such uniform flat scales or so few scansors. He regards it as most nearly related to *H. zolii* Scortecci, a species which I synonymize with

flaviviridis. He further says that in its flat, subimbricate scales *curlei* resembles *homocolepis* and approaches the imbricate group which he calls *Teratolepis*, but differs from both *homocolepis* and *laevis* in its more depressed habitus and root-shaped tail.

Localities. **British Somaliland:** Borama District; Hargeisa.

Range. British Somaliland.

Hemidactylus forbesii Boulenger

1899d. *Hemidactylus forbesii* Boulenger, Bull. Liverpool Mus., **2**, p. 5: Abd el Kuri Island, west of Sokotra Island.

1903a. Boulenger, p. 95, pl. ix, fig. 2.

Description. Snout slightly longer than the distance between the eye and the ear-opening; granules on the snout convex, larger than those on the vertex; nostril bordered by the rostral, first labial (sometimes excluded), and 3 small nasals, the uppermost separated from its fellow by a single granule; upper labials 10–11; lower labials 8–9; a pair of large postmentals in contact on the median line, usually an outer, but smaller, pair of chin shields.

Back covered with small granules among which may be scattered irregularly slightly enlarged round tubercles; ventral scales smooth, rounded, imbricate or juxtaposed; males with neither preanal nor femoral pores; digits free, moderately dilated, inferiorly with oblique scansors, 10–11 under the first toe, 14–15 under the fourth toe; tail, when unregenerate, depressed, tapering, verticillate, the basal portion not swollen nor marked off by a faint constriction, covered above with small, smooth scales and a few scattered, pointed tubercles on its basal portion; below with imbricate scales of which the median series is *not* transversely enlarged; length of tail longer than that of head and body.

Color. Above, pale grayish; head and body rather indistinctly marbled and spotted with brown; tail barred. Below, whitish.

Size. Total length of type ♂, 198 (83 + 115) mm.

Remarks. Allied to *H. flaviviridis* from which it differs in its much smaller ventral scales, more moderately dilated digits, and in its tapering tail.

Habitat. Common beneath stones!

Locality. **Abd el Kuri Island.**

Range. Abd el Kuri Island, west of Sokotra Island.

Hemidactylus granti Boulenger

1899d. *Hemidactylus granti* Boulenger, Bull. Liverpool Mus., **2**, p. 4: Adho Dimellus, Sokotra Island, 3500–4500 feet.
1903a. Boulenger, p. 81, pl. x, fig. 3.
1903. Steindachner, p. 12.

Description. Snout slightly longer than the distance between the eye and the ear-opening; granules on the snout larger than those on the vertex, among which are scattered small rounded tubercles; nostril bordered by the rostral, first labial, and 3 small nasals, the uppermost separated from its fellow by a single granule; upper labials 8–10; lower labials 7–9; a pair of large postmentals in contact on the median line, an outer, but smaller, pair of chin shields.

Back covered with small granules among which are scattered small, round, feebly keeled or subconical tubercles forming more or less irregular longitudinal rows; ventral scales smooth, rounded, imbricate; males with 8–12 preanal pores forming an uninterrupted series; digits free, moderately dilated, inferiorly with oblique lamellae, 6–7 under the first toe; 9–11 under the fourth toe; tail, when unregenerate, depressed, tapering, covered above with granular scales and rows of pointed, tubercles; below with imbricate scales of which the median series are transversely enlarged; length of tail longer than that of head and body.

Color. Above, grayish or brownish, a dark streak from nostril passes through the eye; nape and back irregularly marbled or with four more or less distinct wavy crossbars which are edged with black; tail similarly barred. Below, whitish.

Size. Total length of type ♂, 172 (78 + 94) mm.

Remarks. H. granti might appear to be synonymous with *jubensis* but for its being said to agree with *mabouia* in that its subdigital scansors do not extend on to the sole of the foot.

Habitat. Found beneath stones and in rock crevices on hillsides in the highest pass in the central Haghier range, 3000–4500 feet.

Locality. **Sokotra Island:** Adho Dimellus.

Range. Sokotra Island.

Hemidactylus jubensis Boulenger

1895i. *Hemidactylus jubensis* Boulenger, Ann. Mus. Civ. Stor. Nat. Genova (2), **15**, p. 10, pl. iii, fig. 1: Upper Ganale River, Ethiopia.
1896b. Boulenger, p. 6.
1897g. Boulenger, p. 277.

1898c. Boulenger, p. 913.
1927. Calabresi, pp. 25, 40.
1932b. Parker, p. 346.
1942. Parker, p. 30.

A further citation of "*jubensis*" will be found under *t. turcicus*.

Description. Snout slightly longer than the distance between the eye and the ear-opening; granules on the snout larger than those on the vertex, among which are scattered small rounded tubercles; nostril bordered by the rostral, and 4–5 small nasals, the uppermost separated from its fellow by a single granule; upper labials 10–11; lower labials 8–9; a pair of large postmentals in contact on the median line, an outer, but smaller, pair of chin shields.

Back covered with small granules among which are scattered flat, feebly keeled tubercles forming more or less irregular longitudinal rows; ventral scales smooth, rounded, imbricate; males with 6–10 preanal pores forming an uninterrupted series; digits free, moderately dilated, inferiorly with oblique scansors which extend on to the sole of the foot, 6–7 (8–9 *fide* Parker) under the first toe, 9–11 under the fourth toe; tail, when unregenerate, depressed, covered above with small, smooth scales and rows of large, smooth, flat tubercles; below with imbricate scales of which the median series are transversely enlarged; length of tail usually shorter than that of head and body.

Color. Above, pale brown; a dark streak from nostril passes through eye; a lateral series of more or less confluent dark spots; back with five or six dark crossbars; tail similarly barred. Below, whitish.

Size. Total length of cotype ♂, 132 (67 + 65) mm., but tail regenerated; total length of cotype ♀, 104 (54 + 50) mm.

Remarks. Rather larger than the closely related *H. smithi*, from which it differs in having flattened, feebly keeled tubercles (instead of conical and smooth as in *smithi*) and in the adult male having only 6–10 preanal pores (instead of 28–32 as in *smithi*).

Sexual dimorphism. Calabresi (1927) found 10 preanal pores present in a female whose uterus held two eggs measuring 8 mm. in diameter.

Localities.[1] **Ethiopia:** Milmil; Upper Ganale River. **Somalia:** Biomal (Biornal) in Obbia.

Range. Ethiopia east to Somalia.

[1] The record from Golis Mountains, British Somaliland was based on a small-tubercled *H. t. turcicus* (Parker, 1942, p. 30).

Hemidactylus smithi Boulenger

1895b. *Hemidactylus smithi* Boulenger, Proc. Zool. Soc. London, p. 532, pl. xxix, fig. 2: Webi Shebeli, Ethiopia.
1897g. Boulenger, p. 277.
1898c. Boulenger, p. 913.
1927. Calabresi, p. 40.
1932b. Parker, p. 341.
1942. Parker, p. 30.
1898e. *Hemidactylus mabouia* Boulenger (not Moreau de Jonnés), p. 130. Probably other records of *mabouia* should be added.

Description. Snout slightly longer than the distance between the eye and the ear-opening; granules on the snout larger than those on the vertex, among which are scattered small, rounded tubercles; nostril bordered by the rostral, first labial, and 3 small nasals, the uppermost separated from its fellow by two granules; upper labials 13–14; lower labials 10; a pair of large postmentals in contact on the median line, followed by three small chin shields which are separated from the labials in the type.

Back covered with small granules among which are scattered flat or conical, smooth tubercles irregularly disposed; ventral scales smooth, rounded, imbricate; males[1] with [2]28–32 preano-femoral pores forming an uninterrupted series; digits free, moderately dilated, inferiorly with oblique scansors which extend on to the sole of the foot, 6–7 (8-9 *fide* Parker) under the first toe, 9–11 under the fourth toe; tail, when unregenerate, depressed slightly, covered above with small, smooth scales and rows of large, smooth, flat tubercles; below with imbricate scales of which the median series are transversely enlarged.

Color. Above, gray; back with more or less distinct wavy crossbars which are finely edged with black behind; tail similarly barred. Below, whitish.

Size. Total length of type ♂, 86 (47 + 39) mm., but surpassed in length from snout to anus by one of 53 mm., and a ♀ of 57 mm.

Remarks. Parker (1932b), who has examined the type and a series of *smithi*, says that it is not readily distinguished from *mabouia* or *jubensis*. From *mabouia* it may be distinguished by the subdigital lamellae extending on to the sole of the foot, from *jubensis* by its smaller size, more numerous pores, and conical[3], smooth, tubercles.

[1] Parker (1932b) records a ♀ from Nogal Valley which has pores, the central 8–10 well-developed and with a waxy secretion, the distal small.

[2] Not 12, but 15 on each side, according to Parker after reëxamination of the type.

[3] Boulenger says "flat" in type.

Habitat. Arboreal, at altitudes from 1900–3300 feet.

Localities. **British Somaliland:** Buran District; Golis Mountains; Haud; Nogal Valley. **Ethiopia:** Webi Shebeli.

Range. British Somaliland south into Ethiopia.

Hemidactylus mabouia (Jonnés)[1]

1818. *Gecko Mabouia* Moreau de Jonnés, Bull. Soc. Philom. Paris, p. 138: Antilles and adjacent mainland.
1823. *Gecko tuberculosus* Raddi, Soc. Ital. Sci., **19**, p. 63: Warmer climates throughout the world, even on remote oceanic islands.
1825. *Gecko aculeatus* Spix, Animalia Nova Novae Lacerta., p. 16; pl. xviii, fig. 3: Rio de Janeiro, Brazil.
1825. *Gecko cruciger* Spix, Animalia Nova Novae Lacerta., p. 16: Bahia, Brazil.
1825.[1] *Gecko incanescens* Wied, Beitr. Naturg. Brasilien, **1**, p. 101: Brazil.
1825. *Gecko armatus* Wied, Beitr. Naturg. Brasilien, **1**, p. 104: Brazil.
1842. *Hemidactylus mercatorius* Gray, Zool. Misc., p. 58: Madagascar.
1854. *Hemidactylus platycephalus* Peters, Monatsb. Akad. Wiss. Berlin, p. 615: Coast N. of Mozambique; Johanna (Anjoana) Island.
1855. Peters, p. 44.
1866a. Bocage, p. 42.
1866b. Bocage, p. 60.
1869a. Peters, p. 13.
1873b. Bocage, p. 209.
1884a. Rochebrune, p. 75.
1893c. Matschie, p. 210.
1859. *Hemidactylus mabouia* (also *mabuia*, *mabuya*, *mabuja*) Bianconi, p. 499; also Spec. Zool. Mosamb., pp. 22, 62, pl. i, figs. 1a–c.
1877c. Peters, p. 612.
1878a. Peters, p. 202.
1882. Pechuël-Loesche, p. 276 (as *Hemidaktylus mabouia*).
1882a. Peters, p. 27, pl. v, fig. 3.
1882a. Vaillant, p. 15.
1884a. Rochebrune, p. 75.
1885a. Boettger, p. 176.
1885d. Boulenger, p. 122.
1886. Vieíra, p. 237.
1887a. Boulenger, p. 484.
1887. Strauch, p. 31.
1888a. Boettger, p. 21.

[1] *Thecadactylus pollicaris* Spix, 1825, long considered a synonym of *H. mabouia*, has been shown by Müller & Brongersma, 1933, after an examination of the four cotypes, to be a valid species of *Phyllospezus*.

1888. Mocquard, p. 112.
1889. Hesse, p. 263.
1889. Pfeffer, p. 5.
1890. Büttikofer, p. 478.
1891a. Boulenger, p. 306.
1892. Boulenger, p. 6.
1893a. Boettger, p. 28.
1893b. Boettger, p. 122.
1893. Pfeffer, p. 72.
1894a. Günther, 1893, p. 618.
1894c. Günther, p. 85.
1895a. Bocage, p. 10.
1895. Jeude, p. 227.
1895b. Werner, p. 191.
1896a. Bocage, p. 86.
1896a. Boulenger, p. 550.
1896c. Boulenger, p. 17.
1896. Tornier, p. 11.
1897b. Boulenger, p. 277.
1897e. Boulenger, p. 800.
1897g. Boulenger, p. 277.
1897c. Mocquard, p. 123.
1897. Tornier, p. 63.
1898a. Boulenger, p. 716.
1898. Johnston, p. 361.
1898. Sclater, p. 102.
1898. Tornier, p. 284.
1899b. Mocquard, p. 282.
1900b. Boulenger, p. 448.
1900. Peel, p. 334 (*mabonia*).
1900b. Tornier, p. 586.
1901c. Tornier, p. 69.
1902b. Mocquard, p. 405.
1902b. Tornier, p. 581.
1902a. Werner, p. 342.
1904. Ferreira, p. 117.
1905. Bocage, p. 91.
1905c. Boulenger, p. 110.
1905. Ferreira, p. 170.
1906i. Boulenger, p. 198.
1906. Johnston, p. 833.
1906a. Mocquard, p. 562.
1907j. Boulenger, p. 483.
1907b. Roux, p. 405.
1908b. Boulenger, p. 223.

1908. Sordelli, p. 17.
1909d. Boulenger, p. 310.
1910b. Boulenger, p. 458.
1910a. Hewitt, pp. 58, 70.
1910c. Hewitt, pp. 78, 86.
1910. Meek, p. 406.
1910a. Nieden, p. 235.
1910. Nieden, p. 14.
1911. Grote, p. 349.
1911b. Hewitt, p. 46.
1911. Lampe (part), p. 153.
1911. Lönnberg, p. 10.
1911b. Nieden, p. 442.
1911a. Sternfeld, p. 245.
1911c. Sternfeld, p. 415.
1912. Peracca, p. 1.
1912c. Sternfeld, p. 203.
1913. Boettger (part), pp. 347, 349, 353, 354, 356, 358, 362, 364–5.
1913. Hewitt & Power, p. 149.
1913. Lönnberg & Andersson, p. 1.
1913c. Nieden, p. 65.
1913a. Werner, p. 19.
1913d. Werner, p. 40.
1915. Calabresi, p. 237.
1917. Sternfeld, p. 419.
1918. Calabresi, p. 122.
1919. Schmidt, pp. 440, 598, 601.
1920a. Loveridge, p. 133.
1922. Lönnberg, p. 1.
1923b. Calabresi, p. 155.
1923d. Loveridge, p. 844.
1923h. Loveridge, p. 936.
1924b. Loveridge, p. 213.
1925. Carpenter, p. 92 (unnamed).
1925a. Loveridge, p. 72.
1927. Calabresi, p. 25.
1927d. Witte, p. 327.
1928. Angel, p. 246.
1928c. Barbour & Loveridge, p. 140, pl. iv, figs. 2, 4.
1928. Cott, p. 952.
1928d. Loveridge, p. 63.
1929h. Loveridge, p. 40.
1929c. Scortecci, p. 252, fig.
1930a. Barbour & Loveridge, p. 775.
1930b. Barbour & Loveridge, p. 788.

1930c. Scortecci, p. 2.
1931b. Scortecci, p. 128.
1931a. Vinciguerra, p. 97.
1933h. Loveridge, p. 283.
1933m. Witte, p. 69.
1934. Brongersma, p. 165.
1934a. Cott, p. 147.
1934. Pitman, p. 302.
1935. Hewitt, p. 297.
1936. Lawrence, p. 37.
1936h. Loveridge, p. 49.
1936j. Loveridge, p. 285.
1936c. Parker, p. 128.
1936e. Parker, p. 602.
1937f. Loveridge, pp. 492, 495.
1937b. Monard, p. 52.
1937a. Parker, p. 630.
1939b. FitzSimons, p. 25.
1940a. Angel, p. 391.
1941f. Loveridge, p. 248.
1941. Moreau & Pakenham, p. 107.
1941. Angel & Rochon-Duvigneaud, p. 518, fig. 9.
1941. Themido, p. 5.
1941. Witte, p. 113.
1942e. Loveridge, p. 322.
1942. Parker, p. 30.

1867. *Hemidactylus Sakalava* Grandidier, Revue Mag. Zool. (2), **19**, p. 233: Tulear, Madagascar.

1879a. *Hemidactylus frenatus* var. *calabaricus* Boettger, Ber. Offenb. Ver. Naturk., **17–18**, p. 1: Old Calabar, Nigeria.
1922a. Mertens, p. 169.

1884a. *Hemidactylus frenatus* Rochebrune (not Duméril & Bibron), p. 76.
1933m. Witte, p. 69.

1893c. *Hemidactylus benguellensis* Bocage, Jorn. Sci. Lisboa (2), **3**, p. 115: Cahata, Benguela, Angola.
1895a. Bocage, p. 12, pl. i, fig. 1a–b.
1897a. Bocage, p. 193.
1937b. Monard, p. 52.

1910. *Hemidactylus brookii* Meek (not Gray), p. 406.

1932. *Hemidactylus tasmani* Hewitt, Ann. Natal. Mus., **7**, p. 120: Driefontein, near Gwelo, Southern Rhodesia.
1936. Lawrence, p. 37.
1937b. Mertens, p. 6.

1933h. *Hemidactylus persimilis* Loveridge (part), p. 284 (Miritini).

Further citations of "*mabouia*" will be found under *H. b. angulatus, smithi, greeffi, longicephalus, muriceus*, and *newtoni*, of "*platycephalus*" under *muriceus*.

Native names. *Ndia kafiri* (Amu); *mjusi kafiri* (Swahili; Makonde; Yao); *goria* (Pokomo); *kolololumhusi* (Giriama: Koch); *molukandua* (Teita); *chungula* (Shambaa); *kimbulubulu* (Kami); *zirambi* (Sandawi); *ikaka* (Gogo); *kanakipili* (Nyakusa); *nangwagwa* (Mahiwa); *panapanda* (Sena: Cott); *kamantungi* (Comoro: Peters).

Description. Snout much longer than the distance between the eye and the ear-opening; granules on the snout convex, larger than those on the vertex, among which are scattered larger rounded tubercles; nostril bordered by the rostral, first labial (sometimes excluded), and 2–4, usually 3, small nasals, the uppermost separated from (rarely in contact with) its fellow by a single (rarely 2) granule; upper labials 9–14; lower labials 7–11; a pair of large postmentals in contact (or very rarely separated by a single granule[1] or plate[2]) on the median line, an outer, but smaller, pair (rarely subdivided) of chin shields.

Back covered with small granules among which are scattered convex, striated, keeled or subtrihedral tubercles forming 9–18 more or less irregular longitudinal rows; ventral scales smooth, rounded, imbricate; males with 24–54 (60 *fide* Boulenger) preano-femoral pores forming an uninterrupted series; digits free, moderately dilated, inferiorly with oblique scansors, 5–6[3] under the first toe, 7–9 under the fourth toe; tail, when unregenerate, depressed, covered above with small, smooth scales and 6 rows of long or high, conical or pointed, smooth or obtusely keeled tubercles; below with imbricate scales of which the median series are transversely enlarged (regenerate tail covered above and below with heterogenous scales which may, or may not, be transversely enlarged below, and which may, or may not, have tubercles above); length of tail longer than that of head and body in adults, subequal in young.

Color. Above, gray, light brown, or brown, uniform, or spotted with darker; back with five wavy crossbars; tail with ten, usually more distinct, black crossbars. Below, whitish, or more or less *minutely* punctate with black; subdigital scansors dark. Nieden writes of a Cameroons specimen in which black speckling beneath the tail had coalesced to form more or less interrupted longitudinal lines.

[1] In a Birchenough Bridge gecko (M.C.Z. 44483) of scores examined.

[2] In a Mombasa specimen (M.C.Z. 8189) only, of all our material. Scortecci (1931b) mentions a Gardo specimen in which the postmentals are separated.

[3] Sternfeld's (1912c) record of 7 scansors requires confirmation.

Being rapidly changeable in life, the coloration is very variable. Those taken on white-washed walls were light flesh-color or almost transparent, others from the interior of burnt-out trees were practically black. Geckos found hiding in crevices of paupau trees were pale straw-color, some from bushes were olive green, others from trees had darkly barred and mottled skins which so accentuated the tubercles as to lead me to suppose they were a different species.

Apparently color change may be influenced also by the lizard's feelings for on one occasion I witnessed two of these geckos fighting—the victor was pale gray and the pursued brown-black.

Size. Total length of ♂ and ♀, 188 (86 + 102) mm., both from Morogoro, but surpassed by Sternfeld's record of an Nguru ♀ measuring 190 (84 + 106) mm. It was a curious coincidence that my two largest specimens of opposite sex should measure precisely the same for the tail of the male was regenerated.

Remarks. Bocage's (1873b, p. 209) record of *platycephalus* was based on *bocagii* = *longicephalus*. Greeff's (1885 (1884), p. 48) record of *mabouia* from Sao Thomé was based on *greeffi*, subsequently described by Bocage. Bocage's (1893a, p. 45) record from Annobon Island was based on the geckos which later became the types of *newtoni* Ferreira. Sjostedt's (1897, p. 9) record from Ekundu, Cameroons, has been shown by Mertens to be a *muriceus*. Boulenger's (1898e, p. 130) record from Golis Mountains, British Somaliland, should be referred to *smithi* according to Parker.

H. benguellensis Bocage, known only from the ♂ ♀ cotypes until Monard recorded a third specimen from Cahata, 150 km. S. of Ebanga, differs in no counts of scales or pores from those of *mabouia*. Bocage says that it differs from *longicephalus* by its much larger dorsal tubercles which are also more strongly keeled and more distinctly prismatic. It is in its dorsal tubercles, however, that *mabouia* varies above all else. Schmidt (1919, p. 442) dealing with 75 Congo geckos, states of the tubercles that they "may be rounded, conical (often striate), or weakly keeled, with considerable variation in the same individual." An opinion coinciding with my own after examination of extensive series from various parts of the continent.

H. tasmani Hewitt, based on a ♂ and ♀ cotype from Gwelo (5600 feet), Southern Rhodesia, were differentiated from *mabouia* on the grounds that their tubercles were distinctly keeled. A series (M.C.Z. 44480–5), comprising both sexes, from Birchenough Bridge, Sabi River, Southern Rhodesia agree with Transvaal material in exhibiting keeled tubercles yet are indistinguishable in this respect from topotypic

Antillean geckos (M.C.Z. 6070) from Fort de France, Martinique. In view of the large size of the ♀ cotype of *tasmani*, viz. 142 (69 + 73) mm., I have no hesitation in referring it to the synonymy of the very variable *mabouia*. It is to be noted, however, that gravid females in our Birchenough Bridge series measure only 52–56 mm. from snout to anus, thus being nearer in size to *mabouia* of the Antilles (50–65 mm.) and Madagascar, rather than to those of the equatorial belt to the north (65–80 mm.), the passage from one to the other, however, is so gradual that I am at a loss to separate them. In the event of separation the name *platycephalus* would have priority over *tasmani*.

Anatomy. The eyelids are discussed and figured by Angel and Rochon-Duvigneaud (1941).

Mating. On June 1, 1921, at 7.10 p.m., I was working by lamplight at Kilosa when I heard a sound like 'tchk, tchk.' Looking up, I saw two large geckos on the mosquito screening which enclosed the veranda. Apparently one lizard had seized the other by the right side of her neck just at that moment, a second later there was a rapid movement as the posterior portions of their bodies met and pairing took place. A minute later, possibly scared by the moving of a lamp, they separated and ran off in different directions.

Breeding. A pair of eggs are laid which, at the moment of deposition, are soft, sticky, and almost spherical. "Almost," because of a certain flattening at the point of attachment, for they adhere fast to some crevice in wall or rocks, or fissure of bark. The shell soon hardens, becoming so brittle that it is no easy task to detach them unbroken from a hard surface. The surface of the shell is finely granulate, and in color opaque or bluish white. In diameter these eggs range from 10 to 12 mm., even 13 mm. at Amani, in the tropics, but further south, like the geckos themselves, they average slightly smaller, being in Southern Rhodesia, according to FitzSimons, from 8.5 to 9.5 mm. in height, by 10.3 to 10.8 mm. in diameter.

The following is a complete list of the dates on which I happen to have encountered eggs in East Africa.

February 26, at Mbala, beneath logs.
March 3, at Kitaya, in ruins of a hut.
March 9, at Morogoro, in a hollow tree.
May 13, at Kilosa, beneath an earthen pot.
May 15, at Kitau, upon trunk of a baobab.
May 25, at Nzinga, adhering to rock, held well-advanced embryos.
July 29, at Makindu.
August 2, at Frere Town, in a key hole.

October 4, at Dar es Salaam, on trunk of palm, held advanced embryos.

October 16, at Lumbo, hatching the same day.

November 17, at Mombasa, on some books, hatched a day or two later.

November 26, at Amani, on a cliff face.

December 4, at Dar es Salaam, beneath a pile of palm fronds.

December 20, at Morogoro.

While from Mt. Selinda, Southern Rhodesia, FitzSimons records finding in December, attached to a rock, between 50 and 60 eggs in all stages of incubation.

On emerging, young geckos measure about 62 (31 + 31) mm., the tail thereafter growing faster than the head and body.

Diet. The menu is a varied one, principally comprised of moths, crickets, cockroaches and spiders, however a gecko which I shot on the stem of a coconut palm held a large polydesmid in its mouth. Other unusual items were a tsetse fly (*Glossina morsitans*) and a soldier *siafu* or driver ant (*Dorylus n. burmeisteri*) so that it appears that the diet may consist of almost anything that the gecko is capable of overpowering, as may be seen from the following notes.

While seated at breakfast on the veranda of the rest house, my attention was attracted by a slight commotion among the rafters that supported the grass thatch. A house gecko had seized an adult male of a smaller species (*Lygodactylus p. mombasicus*) and the latter was twirling its body round and round in a vain attempt to free itself. As I stood up to get a better view, however, the *Hemidactylus* opened its jaws, released its prey, then bolted. For a time the *Lygodactylus* remained behind, gaping and moving its jaws as if to ease them, then it also fled but in an opposite direction to that taken by the larger lizard (Golbanti, 24.vi.34).

One evening I was sitting on the veranda when, from the further end, there came a sharp rapping, a sound precisely like the hammering of the tail of a trapped rat, and quite as large in volume. On reaching the spot, however, I found it to be caused by a large gecko which had swallowed the greater part of a centipede, of which three-quarters of an inch, together with the caudal appendages, still remained in view. Disturbed by the light I was carrying, the gecko paused for a minute then recommenced hammering the side of its jaw on the wooden panelling. Presently it disgorged two inches of the centipede, which I judged from its width to be about three inches long. For a while the gecko rested with this object hanging limp and motionless from

its mouth, except for administering an occasional spasmodic knock. Presently the lizard ran up a post and along the spouting of the gutter where, with a few gulps, it swallowed all that remained. From the time that I became a spectator until the last of the centipede disappeared was about ten minutes (Kilosa, 14.vi.21).

Another night my attention was drawn to a gecko which seemed to be struggling with something on the ground. I fetched a lamp and by its light found that the gecko was flinging itself about and squirming over and over in an attempt to rid itself of one of those fearsome-looking, hairy, swift-running, spider-like arachnids (*Solpuga* sp.). The large jaws of the solpugid had seized the gecko between eye and ear, from this area the skin had been torn, and there were signs of other bites on the right side and near the base of the tail. I surmise that the gecko had first attacked the solpugid, but the latter would probably have killed the gecko, which had already swallowed a large black field cricket (Kilosa, 12.iv.22).

The noise so small a creature can make is quite surprising. Hearing an object being thumped against the wall outside, I measured the distance from where I had been sitting to the scene of combat and found that it was 23 feet. A large cricket was the victim (Kilosa, 9.vii.21).

The rapacity of these geckos is not always confined to nocturnal feeding. At 3 p.m. one afternoon a large mantis was resting in bright sunshine upon the veranda screening when a gecko darted upon it, the mantis, eluding the rush, succeeded in escaping (Kilosa, 5.v.21).

Neither the eye-spots nor large size of a moth (*Cylegramma latona*) proved deterrents to an Mkonumbi gecko, though hunger is often tempered by discretion and Carpenter (1925) speaks of one, though not by name, examining and rejecting a carabid beetle. In this connection Cott's (1934a) detailed account should be consulted, and the following incidents are not without interest.

I observed a gecko on the screening facing upwards towards a large hornet. The latter adopted a menacing attitude, flew a few inches up the gauze, then settled again. The gecko ran after it but halted an inch away and did not attack (Kilosa, 29.i.22).

A harmless fly (*Negritomyia maculipennis*) which, however, is an excellent mimic of a local wasp, was crawling on a white and lighted ceiling at 8 p.m. when I observed a gecko stalking it. Just as the gecko was at the right distance for a spring, the fly emitted a buzz, the lizard paused, studied the insect for a moment, and then withdrew (Kilosa, 1.i.22).

Parasites. The house gecko appears particularly liable to infection by small red mites (*Geckobia hemidactyli* and *G. tasmani*) which, when present, are usually scattered over the under surface. Sternfeld (1911a) reports a tick on a Mikindani gecko. Nematodes (*Physaloptera* sp.) were present in a Bagamoyo gecko, while Cott (1934a) records two species (*Thelandros ?micipsae* and *Thunbunaca ?asymmetrica*) from Mozambique material.

Enemies. In view of the excellent scavenging accomplished by house geckos, as recorded above, it is doubly deplorable to have to list among its enemies certain misguided individuals of the human race. In particular I recollect the wife of a district commissioner who, on the ground that she could not abide their beady black eyes, sought to destroy these useful creatures on every possible occasion—even expressing regret that she found a Flit-gun ineffective except for the very young!

On one occasion Salimu reported having seen a mountain kestrel (*Falco t. carlo*) drop from the sky to pick a lizard off a rock. I dispatched him to fetch the bird, from whose crop we recovered a house gecko. Another was found in the stomach of a monitor lizard (*Varanus n. niloticus*).

Twice I have recovered these geckos, one with tail intact, from house snakes (*Boaedon l. lineatus*), once from a white-lipped snake (*Crotaphopeltis h. hotamboeia*) and five times from spotted wood snakes (*Philothamnus s. semivariegatus*). In addition I caught one of the latter in the act of swallowing a house gecko, which, incidentally, had not dropped its tail; yet another of these snakes disgorged a bolus of gecko with tail intact.

Defence. At Morogoro, however, no fewer than 20 out of 31 of these geckos had regenerated tails. This high percentage, more noticeable among males than among females, may be attributed in part to the combats which take place between them, in part to tail-dropping as a decoy when escaping from enemies. When one of these geckos was placed in a vivarium with a stripe-bellied sand snake (*Psammophis s. sudanensis*) the latter darted and doubled about the case in pursuit of its prey with almost incredible agility—the weather being hot. The gecko discarded its tail, but the snake, undistracted by the wriggling of this lure, seized and held the gecko until the latter became limp from the effects of the venom, then swallowed it.

Bifid regenerated tails are by no means uncommon, perhaps the finest example was that of a Frere Town gecko which measured 52 mm. in length from snout to anus while its tails measured 56 and 59

mm. respectively. At Kilosa a three-legged gecko was seen on several occasions, doubtless it had escaped from some predator at the cost of a limb.

Habits. Daily, at sunset, one of these geckos used to lie along a certain bar across the screening of my house at Kilosa, enabling me to note the curious phenomenon of being able to see daylight through its head when the ear-openings happened to be directly in line with the light!

Essentially a house-dweller, this species emerges at dusk from behind pictures or from dark crannies to run about on walls and ceilings. Where a great many occupy a house, it is a remarkable sight to see them leaving it at sunset to go foraging; they descend the walls from the eaves, and should there be shrubs or tree trunks within a foot or so, they reach them by a leap. The natives put their own interpretation on these nocturnal expeditions, informing me that it was evidence of the little creatures' shrewdness, as they feared to remain in the house after dark lest a careless person should set it on fire!

Lang, in Schmidt (1919, p. 443) says: "Nearly all of the sixty-five specimens from Zambi were collected in a small wooden latrine where hundreds of flies swarmed. Here, in relative darkness, they fed at all hours of the day, but in other buildings remained in hiding until nightfall. Probably the hours of their activity are dependent on the facility with which they can procure prey. After we had taken the first specimen, a thorough search resulted in the gathering of seven others, and within a fortnight more than forty were taken from the same shed. At the sound of footsteps they ran as fast as lizards to their habitual retreat, a dark space between boards above the door, from which most of the others had been removed, passing by equally dark cracks closer to the food supply, which ordinarily consists chiefly of spiders."

I have found it perfectly easy to secure a good series with undamaged tails, by the simple process of shining their beady black eyes with an electric torch as the geckos rested on a wall at night; then dabbing a handkerchief, or other soft material, upon their forepart, being careful to approach them from the side opposite to the beam of light.

Habitat. In addition to houses, as recorded above, and the thatch of native huts (Cott), these geckos favour caves, crevices in cliffs, or rocky hills. One of their most favoured refuges, however, are the huge and often hollow baobab trees. At Mwaya the trunks of the acacias provided a home, but trees with loose bark beneath which they can conceal themselves, are usually preferred. In the flooded gallery forest

along the Tana River they attain to large dimensions living on the wild fig trees. It is, however, unusual to find them in forest, so I was not a little surprised to encounter a few in forest clearings on the Rondo Plateau. These clearings, long since abandoned, had been made by native refugees during the World War I, so the geckos undoubtedly owe their introduction to man. Cott reports them as present in the crown of a Borassus palm at a height of sixty feet from the ground.

While most abundant in the coastal towns at low altitude, the house gecko has been stated to occur on the Nyika Plateau between 6000 and 7000 feet.

Localities. The first three certainly require confirmation. **Eritrea:** Assab (Vinciguerra, 1931a). **Ethiopia:** Harar (Boulenger, 1896a, says det. dubious as damaged, but ♂ with 13+14 pores). **British Somaliland:** Las Koreh, Warsingali (Lasgoré, Ouarsanguelis. Vaillant, 1882a, says det. dubious but size is 99 (54+45) mm.). **Somalia:** Balli; Bardera; Bidi to Gelib; Brava; Egherta; El Donfar; Gardo, Migiurtinia; Kismayu; Lugh; Lugh to Matagoi; Mofi; Mogadish; Margherita; Obbia; Uddur; Villaggio Duca degli Abruzzi. **Kenya Colony:** Archer's Post; *Belazoni; Changamwe; *Frere Town; *Golbanti; Jombeni Range; *Kibwezi; Kigoma; Kililana; Kisumu; *Kitau, Manda Island; *Lamu, Lamu Island; Lorian; Makandua, Teita; *Malindi; Marikani; *Miritini; *Mombasa; *Mount Mbololo; Mtito Andei; *Ngatana; Njiri; Njoro; Patta Island; Sirima, Lake Rudolf; Takaungu; Tana River; Teita; *Tiwa River; *Tsavo; Ungama Bay; Vajir; *Voi; Wange (Wanga); *Witu. **Tanganyika Territory:** *Bagamoyo; *Dar es Salaam; Dodoma; *Dutumi (Duthumi); Ilonga; Ipiana; Iringa; Itende; Kakoma; Korogwe (Kerogwe); Kihengo; Kilimatinde; *Kilosa; *Kitaya; Kongwa; Kwa Mtoro Mission; *Lindi; Lukigura; Madimula, Usaramo; Makindu or Mkindo; Majomba near Mua (Majamboni); Makonde (country); *Mangasini; Manyoni; Mavene; Mbala; *Mikindani; Mkalama; Mkomasi; Mnazi; *Morogoro; *Mount Hundugula; Mount Kilimanjaro; Muheza; *Mwaya; *Nchingidi; Nguru; Nzinga; Pongwe; Usegua; Rufigi; Saranda; *Sigi Caves; Singi; *Tanga; Tendaguru; Tsame; Tukuyu (Langenburg); Ujiji; Uluguru Mountains—*Bagilo—Mkangazi — *Nyange — Nyingwa — Vituri; Usambara Mountains—*Amani—Kizerui—Mount Lutindi—*Soni near Lushoto. **Pemba Island:** Chakechake; *Verani. **Zanzibar Island:** Mkokotoni; *Zanzibar City. **Mafia Island. Mozambique:**

Amatongas; Beira; Caia; Charre; Coguna; Delagoa Bay; Fambani; Inhambane; *Lumbo; *Mazambo, Limpopo River; Mount Gaza; *Mocambique Island; Quilimane; Tete. **Nyasaland:** Karonga to Kondowe; Nyika Plateau; Shire Valley; Zomba. **Northern Rhodesia:** Chinsali; Luangwa Valley in Mpika and Serenje Districts. **Southern Rhodesia:** *Birchenough Bridge; Changadzi River; Chilimanzi; Circuti; Driefontein near Gwelo; Mount Silinda; *Vumba Mountain. **Bechuanaland Protectorate:** Bushman Mine. **Transvaal:** Comati-Crocodile Rivers junction; *Griffin Mine near Leydsdorp; Hectorspruit; *Louw's Creek; Lower Sabi Camp; Malelane Camp, Kruger Park; Pretoria; Satara Camp between Olifant and Sabi Rivers; Zoutpansberg. **Zululand:** Mseleni. **Cape Province:** Mortimer[1]. **South West Africa:** Swakopmund[2]. **Angola:** Cabira, Sierra de Stombe; Cahata; Cambondo; Carangigo; Catete; Dondo; Duque de Braganca; Ebanga; Loanda; Lobito; Pungo Andongo; **Cabinda:** Cabinda; Chinchoxo; Kolonga. **Belgian Congo:** Banana; Boma; *Bumba; *Buta; Djamba; Kidada near Kitobola[3]; Landana; Lokandu; *Lulonga River; Moanda; Moba; Nyangwe; Stanleyville; Temvo, Mayumbe; *Uvira; Vista; Zambi. **Belgian Ruanda:** Ruhengeri (Rubengera). **French Congo: Ilha de Sao Tomé:** Ilheu das Rolas. **French Cameroons:** Douala (*fide* Angel.) **British Cameroons:** Ossindinge (*fide* Nieden & Sternfeld). **Nigeria:** Lagos; Old Calabar. **Togo:** Adele (Bismarckburg). **Gold Coast. Liberia:** *Monrovia. **French Guinea:** Ile de Tumbo, Iles de Los. (**Senegal,** *fide* Rochebrune, 1884a, so very doubtful).

Range. In Africa from Somalia (possibly Eritrea and Ethiopia also) south to Zululand, northwest through the Transvaal and Bechuanaland to Angola, thence north and northwest to Liberia (in West Africa, however, the distribution is spotty, presumably due to introduction at ports). West Indies. Mexico. South America. Madagascar. *Reunion Island.

Folklore. According to Koch, East African natives say that this lizard prays to God to destroy man, whom it dislikes, in order that the gecko may eat sand undisturbed. It would seem that some other species is intended.

[1] This record of Cott's is rejected by Hewitt (1935a, p. 297), though he mistakenly attributes it to Halesowen, the next station to Mortimer.

[2] A juvenile (A.M.N.H. 47789) of 60 (28 + 32) mm. which I have examined.

[3] This arbitrary assignment of a gecko identified as *frenatus* by de Witte, has recently been confirmed by Dr. de Witte as correct.

The Wakami say that should these geckos' feces fall upon one's clothes the stains will not come out. Vieira (1886), writing from Sao Thomé, refers to this gecko as poisonous!

Hemidactylus aporus Boulenger

1906i. *Hemidactylus aporus* Boulenger, Ann. Mus. Civ. Stor. Nat. Genova (3), **2**, p. 199: Annobon Island.
1917. Sternfeld, p. 420.

Description. Snout much longer than the distance between the eye and the ear-opening; granules on the snout convex, larger than those on the vertex, among which are scattered larger rounded tubercles; nostril bordered by the rostral and 3 small nasals; upper labials 10; lower labials 9–10; a pair of large postmentals in contact on the median line, an outer, but smaller, pair of chin shields.

Back covered with small granules among which are scattered fairly strongly keeled tubercles forming 16–20 more or less regular longitudinal rows, the outermost arranged on a longitudinal dermal fold; ventral scales smooth, rounded, imbricate; males with neither preanal nor femoral pores; digits free, moderately dilated, inferiorly with oblique scansors, 5 under the first toe, 7 under the fourth toe; tail, when unregenerate, covered above with small smooth scales and 6 rows of long, pointed, keeled tubercles; length of tail usually longer than that of head and body.

Color. Above, pale brown, an ill-defined streak from nostril through eye to back of head; crown with a small V-shaped mark between the eyes; nape and back with 6 or 7 indistinct wavy brown crossbands; tail with 9 similar crossbands which posteriorly darken until almost black and tend to form complete annuli separated by lighter areas. Below, whitish; throat darker; tail with dark annuli towards its tip.

Size. Total length of cotype ♂, 114 (54 + 60) mm., of cotype ♀, 107 (50 + 57) mm.

Remarks. The absence of pores in the male distinguishes *aporus* from all other West African species with the exception of *newtoni*, which inhabits the same island. From *newtoni* it differs in possessing fewer subdigital scansors, 7 (instead of 11–12) under the fourth toe, and 16–20 (instead of irregularly disposed) dorsal tubercles.

Habitat. Sea level to 500 metres.

Range. Annobon Island opposite the French Congo.

Hemidactylus gardineri Boulenger

1869a. *Hemidactylus maculatus* Peters (not Duméril & Bibron), p. 14.
1877b. Peters, p. 456.
1909h. ?*Hemidactylus brookii* Boulenger (not Gray), p. 297.
1909h. *Hemidactylus gardineri* Boulenger, Trans. Linn. Soc. London (2), **12**, p. 296, pl. xl, fig. 4: Farquhar Island, Seychelles.
1911d. Boulenger, p. 378.
1942. Moreau & Pakenham, p. 61.
1928c. *Hemidactylus persimilis* Barbour & Loveridge, Mem. Mus. Comp. Zoöl., **50**, p. 140, pl. iv, figs. 1 & 3: Dar es Salaam, Tanganyika Territory.
1929h. Loveridge, p. 41.
1933h. Loveridge (part), p. 284 (omit Miritini record).
1936j. Loveridge, p. 286.
1937f. Loveridge, p. 492.
1936e. *Hemidactylus mandanus* Loveridge, Proc. Biol. Soc. Washington, **49**, p. 60: Kitau, Manda Island, Kenya Colony.
1936j. Loveridge, p. 285.
1937f. Loveridge, p. 492.

The part of a "*persimilis*" (1933h) citation will be found under *H. mabouia*.

Native names. Those applied to *H. mabouia*, which it so closely resembles.

Description. Snout much longer than the distance between the eye and the ear-opening; granules on the snout larger than those on the vertex, among which are scattered small, rounded tubercles; nostril bordered by the rostral, first labial (sometimes excluded), and 2–4 small nasals, the uppermost separated from (rarely in contact with) its fellow by a single (rarely 2 or 3) granule; upper labials 8–12; lower labials 7–11; a pair of large postmentals in contact (or separated by a single granule or by a backward prolongation of the mental which, posteriorly, may be in contact with two rounded shields and flanked by any number of subdivided chin shields)[1] on the median line, an outer, but smaller, pair (rarely subdivided, see above) of chin shields.

Back covered with small granules among which are scattered oval, keeled or subtrihedral tubercles forming 10–16 more or less regular longitudinal rows; ventral scales smooth, rounded, imbricate; males with 24–34 preano-femoral pores forming an uninterrupted series; digits free, moderately dilated, inferiorly with oblique scansors, 4–5 under the first toe, 6–7 under the fourth toe; tail, when unregenerate,

[1] Variations in individuals from Seychelles, Dar es Salaam, Bagilo, and Kilosa.

depressed, covered above with small, smooth scales and 6 rows of long or high, conical or pointed, striated tubercles; below with imbricate scales of which the median series are transversely enlarged; length of tail longer than that of head and body.

Color. H. gardineri. Above, grayish or reddish brown; back spotted with dark brown and with dark, angular or wavy, crossbars. Below, whitish.

H. mandanus. Above, pinkish buff; a dark streak from the nostril passes through the eye and is continued on the flank; back with three dark brown longitudinal lines from occiput to base of tail. Below, whitish.

Size. Total length of ♂, 92 (41 + 51) mm., from Frere Town, but surpassed in length from snout to anus by a Bagilo ♂ of 52 mm.; total length of ♀, 108 (51 + 57) mm., but surpassed in length from snout to anus by a Bagamoyo ♀ of 53 mm., and a Madagascar ♀ of 58 mm.

All these measurements, however, are about 10 mm. above the average for this dwarf offshoot of *mabouia.* A six-weeks-old specimen measured 45 mm. overall.

Remarks. The reasons for referring *persimilis* and *mandanus* to the synonymy of *gardineri* have been given elsewhere (1942e, p. 323).

This species has been confused with *mabouia* for the best part of a century, and doubtless many of the citations under that species should be referred to *gardineri.* I was first led to discriminate between the two species by finding the eggs—so dissimilar in size, those of *gardineri* separate, those of *mabouia* usually cemented together. The geckos, however, except for gravid females, are exceedingly difficult to differentiate, though *mabouia* males may have more numerous pores. Apart from size, and habits, and the more pronounced striations or keeling of the tubercles in *gardineri* (smoothly conical, feebly striated or keeled in *mabouia*), the sole character distinguishing the two species is the presence of only 6–7 scansors beneath the fourth toe which are normally 8 in *mabouia,* though rarely 7 or 9.

Breeding. On November 9, at Dar es Salaam, and on November 11, at Bagamoyo, females were captured through whose translucent abdominal walls could be seen a pair of eggs. These eggs, ranging from 8 to 9 mm. in diameter, agreed in size with those found among and beneath piles of palm fronds in the coconut plantations, or beneath the palm thatch of collapsed huts, in which situations these geckos were captured. Such eggs are separate, not cemented in pairs as is usually the case with those of *mabouia.*

Diet. Tineid moth in one (Bagilo), the serrated leg of a sizeable cricket was disgorged by another (Tanga).

Enemies. These small geckos are preyed upon by snakes (*Chlorophis hoplogaster; Philothamnus s. semivariegatus; Meizodon semiornata*) from whose stomachs they were recovered at Bagamoyo, Mbanja and Amboni respectively.

Defence. That these geckos seem to find life hazardous, is suggested by the relative rarity with which one encounters examples with their original tails. In the young particularly, the pinkish tail is conspicuously barred with black and white, and probably serves a useful purpose in distracting attention from the inconspicuously mottled body of its owner.

Habitat. Their distribution seems to be conditioned by that of the coconut palm, beneath whose piled-up fronds they are most frequently found. If disturbed, they make a dash for the nearest palm, slip around its trunk to the further side, then swiftly mount the stem to seek safety in the crown. From 50 to 5000 feet, but only a single record is so high.

Localities. **Kenya Colony:** *Frere Town; *Kilindini—mainland opposite; *Kitau, Manda Island; *Lamu Island; *Mombasa Island. **Tanganyika Territory:** *Amboni Estate near Tanga; *Bagamoyo; *Bagilo, Uluguru Mountains; *Dar es Salaam; *Kilosa; *Mbala; *Mbanja; *Morogoro; *Nchingidi; *Siga Caves; *Tanga. **Pemba Island:** *Mkoani; *Weta. **Mozambique:** *Lumbo. ***Seychelle Islands:** Almirante Island (as *brookii*); Cerf Island in Farquhar group; Des Roches Atoll; *Farquhar Island. **Aldabra Islands:** Aldabra Island[1]—Malaba—Picard—Takamaka; Cosmoledo Island—Astove—Menai. **Madagascar:** *Majunga; *Tamatave to Tananarive. **Mauritius:** *Roches Noir.

Range. Coast of Kenya Colony south to Mozambique; islands of Pemba; Seychelles; Aldabra; Madagascar; and Mauritius in the Indian Ocean.

Hemidactylus ansorgii Boulenger

1901d. *Hemidactylus Ansorgii* Boulenger, Ann. Mag. Nat. Hist. (7), **7**, p. 204: Sapele Station, Niger Delta, Nigeria.
1919. Schmidt, p. 598.
1930a. *Hemidactylus muriceus* Barbour & Loveridge (not Peters), p. 775.

[1] Boulenger (1911d) suggests that Stejneger's (1893b) record of *mabouia* from Aldabra may be based on an example of *gardineri* which is common there.

Description. Snout much longer than the distance between the eye and the ear-opening; granules on the snout convex, smooth, larger than those on the vertex, among which are scattered *a very few* larger rounded tubercles; nostril bordered by the rostral, first labial, and 3 small nasals, the uppermost separated from its fellow by a single granule; upper labials 11–12; lower labials 9–12; a pair of large postmentals in contact on the median line, an outer, but smaller, pair of chin shields.

Back covered with small granules among which are scattered small keeled tubercles forming 8–10 more or less regular longitudinal rows; ventral scales smooth, rounded, imbricate; males with 9–10 preanal pores forming an uninterrupted series; digits free, moderately dilated, inferiorly with oblique scansors, 4–6 under the first toe, 9–11 under the fourth toe; tail, when unregenerate, depressed (slender, cylindrical, *fide* Boulenger), covered above with small smooth scales and 6 rows of long, pointed, keeled tubercles; below with imbricate scales (of variable size, *fide* Boulenger) of which the median series are hexagonally enlarged; length of tail usually longer than that of head and body.

Color. Above, dark brown, blotched or spotted with lighter. Below, whitish flecked with brown (♂), or brownish (♀).

Size. Total length of type ♂, 115 (55 + 60) mm., from Nigeria; total length of gravid ♀, ? (46 + ?) mm., tail missing, from Liberia.

Remarks. The above description is based on the original, together with data derived from a pair of Liberian geckos (M.C.Z. 22576–7) which agree so closely with the description of the unique type that they are tentatively assigned to *ansorgii*, of which I have not seen the type.

Breeding. In October, at Paiata, Liberia, a ♀ held two large eggs.

Localities. **Nigeria**: Sapele Station. **Liberia**: *Firestone Plantation No. 3, Du River; *Pieta (Paiata), St. Paul's River.

Range. Nigeria west to Liberia.

Hemidactylus richardsonii (Gray)

1845. *Velernesia Richardsonii* Gray, Cat. Lizards Brit. Mus., p. 156: No locality.
1885d. *Hemidactylus richardsonii* Boulenger, p. 143, pl. xii, fig. 3.
1888c. Fischer, p. 49, pl. iv, fig. 10.
1900b. Boulenger, p. 448.
1902b. Mocquard, p. 410.
1902c. Tornier, p. 670.
1910. Müller, p. 556.

1910. Nieden, p. 14.
1911. Lampe, p. 154.
1919g. Boulenger, p. 13.
1919. Schmidt, pp. 459, 599, map 8, pl. xvii, fig. 1.
1938b. Mertens, p. 36.

Description. Snout slightly longer than the distance between the eye and the ear-opening; granules on the snout convex, larger than those on the vertex, which are subuniform; nostril bordered by the rostral, first labial (sometimes excluded), and 3–4 small nasals, the uppermost separated from its fellow by a single granule; upper labials 9–14; lower labials 8–11; a pair of large postmentals in contact on the median line, an outer, but much smaller, pair of chin shields.

Back covered with small granules among which are scattered a few smooth tubercles, forming on either flank a more or less regular lateral row; a fold of skin from axilla to groin and another bordering the hind limb posteriorly; ventral scales smooth, rounded, imbricate; males with 40–48 preano-femoral pores forming an uninterrupted series; digits distinctly webbed at the base, strongly dilated, inferiorly with oblique scansors, 6–7 under the first toe, 9–10 under the fourth toe; tail, when unregenerate, depressed, flat below, covered above with small, smooth, imbricate scales and 6 rows of long, pointed, smooth tubercles, the outermost very pronounced and forming a lateral fringe; below with imbricate scales of which the median series are transversely enlarged (regenerate tail covered above with granules and almost devoid of tubercles, below by heterogeneouss cales) ;length of tail slightly shorter than that of head and body.

Color. Above, gray, a brown streak from nostril passes through the eye to the flanks where it breaks up into a series of blotches; back and limbs variegated with more or less distinct brown crossbands and sometimes a vertebral line; tail with six or seven crossbands. Below, whitish.

Color in life. Schmidt quotes Lang as saying that this is changeable and gives it as: Above, silvery gray; labials creamy white; tubercles white; postocular stripe, dorsal markings, and caudal crossbands light and dark brown. Below, gray tinged with yellow.

For further detailed accounts see Müller (1910, p. 556) and Sjöstedt (1897, p. 12).

Size. Total length of ♂, 150 (63 + 70) mm., from Avakubi; total length of type ♀, 159 (80 + 79) mm.

Defence. Damage to the delicate skin, so readily injured, does not appear to seriously affect the well-being of these geckos, for Mertens

records that a badly damaged specimen recovered and reached Frankfurt safely.

Habitat. One evening Mertens captured a single gecko on a big stump in the Botanical Gardens at Victoria.

Localities. **Belgian Congo:** Avakubi; Bafwaboli; Medje. **French Congo:** Gabon; Lambarene. **Rio Muni. French Cameroons:** Dibango (Dibongo); *Ebolova (Ebalowa); *Mete (Metet); Yaounde (Jaunde). **British Cameroons:** Isongo; Victoria.

Range. Belgian Congo west to French Congo and British Cameroons

Hemidactylus greeffi Bocage

1885. *Hemidactylus mabouia* Greeff (not Jonnés), 1884, p. 48.
1886a. *Hemidactylus greeffii* Bocage, Jorn. Sci. Lisboa, **11**, p. 66: Sao Tomé.
1886b. Bocage, p. 71.
1886c. Bocage, p. 103.
1896. Vieira, p. 237.
1887a. Boulenger, p. 484.
1892. Bedriaga, p. 736.
1892b. Bocage, p. 221.
1892c. Bocage, p. 230.
1893d. Bocage, p. 143.
1894e. Boulenger, p. 722.
1897a. Bocage, p. 193.
1903a. Bocage, p. 53.
1905. Bocage, p. 91.
1906i. Boulenger, p. 198.

Description. Snout much longer than the distance between the eye and the ear-opening; granules on the snout convex, larger than those on the vertex, among which are scattered larger rounded tubercles; nostril bordered by the rostral, first labial, and 3–4 small nasals, the uppermost separated from its fellow by a single granule; upper labials 10–11; lower labials 9; a pair of large postmentals in contact on the median line, an outer, but smaller, pair of chin shields.

Back covered with small granules among which are scattered more or less distinctly keeled tubercles forming 20 more or less irregular longitudinal rows, the outermost composed of larger tubercles arranged on a longitudinal dermal fold; ventral scales smooth, rounded, imbricate; males with 34–36 preanal and femoral pores, the former separated from the latter by a few poreless scales[1]; thumb rudimentary, clawless;

[1] Possibly an abnormality, the earlier statement that males were without femoral pores was withdrawn by Bocage (1892b).

digits free or those of hind foot slightly webbed, moderately dilated, inferiorly with oblique scansors, 7 under the first toe, 9–10 under the fourth toe; tail, when unregenerate, cyclotetragonal, covered above with small smooth scales and 6 rows of long, pointed, keeled tubercles; below with imbricate scales of which the median series are hexagonally enlarged; length of tail usually longer than that of head and body.

Color. Above, brownish gray; a brown streak from the nostril passes through the eye to the temple, above, and parallel to it, a second line extends only to above the orbit; back and tail with indistinct wavy brown crossbands. Below, whitish slightly tinted with rose.

Size. Total length of type (?♂), 126 (60 + 66) mm.

Remarks. Distinguished from all other African members of the genus by its vestigial, clawless, first finger (thumb). Many of the characters tabulated by Bocage as distinguishing this species from *mabouia*, break down in practice as the latter had a greater range of variation than was realized by Bocage.

Localities. **Ilha de Sao Tomé:** Lagoa Amelia; Roca Sandade; Zona Alta. **Ilha de Principe:** Sao Matheus.

Range. Ilha de Sao Tomé and Ilha de Principe in the Gulf of Guinea.

Folklore. Vieira (1886) states, doubtless from native hearsay, that this gecko is venomous, which of course it is not.

Hemidactylus longicephalus Bocage

1866a. *Hemidactylus verruculatus* Bocage (not Cuvier), p. 42.
1873b. *Hemidactylus longicephalus* Bocage, Jorn. Sci. Lisboa, **4**, p. 210: Capangombe and Catumbella, Angola.
1887a. Bocage, p. 178.
1919. Schmidt, p. 445, map 6.
1933. Schmidt, p. 4.
1934. Brongersma, p. 165.
1936c. Parker, p. 128.
1873. *Hemidactylus longiceps* O'Shaughnessy (not Cope), Zool. Rec., **10**, p. 89: emendation for *longicephalus* Bocage.
1885d. *Hemidactylus bocagii* Boulenger, Cat. Lizards Brit. Mus., **1**, p. 125: *nom. nov.* for *longiceps* O'Shaughnessy, preoccupied.
1887. Strauch, p. 2.
1895a. Bocage, p. 11.
1897a. Bocage, p. 193.
1900b. Boulenger, p. 448.
1903a. Bocage, p. 53.
1904. Ferreira, p. 117.
1905. Ferreira, p. 170.

1912c. Sternfeld, p. 203.
1937b. Monard, p. 52.
1892. ?*Hemidactylus mabouia* var. *Molleri* Bedriaga, Inst. Rev. Sci. Litt. (Coimbra), **39**, p. 739: Sao Thomé.
1892b. Bocage, p. 221.
1898a. *Hemidactylus guineensis* Werner (not Peters), p. 206.
1901g. *Hemidactylus Hecqui* Boulenger, Ann. Mus. Congo, Zool. (1), **2**, p. 7, pl. iii, fig. 1: Albertville, Belgian Congo.
1903b. Bocage, p. 63 (as *Heequi*).
1931c. Witte, p. 42.
1933m. Witte, p. 69.
1902c. *Hemidactylus steindachneri* Tornier, Zool. Jahrb. Syst., **15**, p. 668, pl. xxxv, fig. 2: Bipindi, French Cameroons, and Victoria, British Cameroons.
1910. Müller, p. 555.
1910. Nieden, p. 14.
1919. Schmidt, p. 598.

A further citation of "*bocagii*" will be found under *H. t. squamulatus*.

Native name. *Lofilonuindo* (Angola: Bocage).

Description. Snout much longer than the distance between the eye and the ear-opening; granules on the snout convex, keeled, much larger than those on the vertex, among which are scattered larger rounded tubercles; nostril bordered by the rostral, first labial (sometimes excluded), and 2–4 small nasals, the uppermost separated from its fellow by a single granule; upper labials 9–12; lower labials 7–10; a pair of large postmentals in contact on the median line, an outer, but smaller, pair of chin shields.

Back covered with small granules among which are scattered fairly strongly keeled or subtrihedral tubercles forming 14–18 more or less irregular longitudinal rows; ventral scales smooth, rounded, imbricate; males with 4–8 preanal pores forming an uninterrupted series; digits free, moderately dilated, inferiorly with oblique scansors, 5–7 under the first toe, 8–11 under the fourth toe; tail, when unregenerate, cyclotetragonal, covered above with small smooth scales and 6 rows of long, pointed, striated tubercles; below with imbricate scales slightly increasing in size towards the median line (regenerate tail covered above and below with imbricate scales and devoid of tubercles); length of tail usually longer than that of head and body.

Color. Above, grayish, uniform or with indistinct darker and lighter markings, occasionally a light dorsolateral line; tail sometimes transversely barred. Below, whitish.

Size. Total length of ♀, 124 (59 + 65) mm., but surpassed in

length from snout to anus by a ♂ (64 + reg.), both from Congulu (M.C.Z. 42688–9).

Remarks. H. mabuia var. *molleri* is tentatively referred to the synonymy as having only 6 preanal pores, but on account of the small size of the male cotype, about 46 mm. from snout to anus, the possibility of its being only an immature male *mabouia* (a species which occurs on Sao Thomé) should not be overlooked when an opportunity is presented to examine the type.

H. hecqui was thought to differ in having a flatter head, position of nostril bordered by first labial, and fewer, hence larger, ventral scales which numbered 26, instead of 29–45, in a transverse row. Schmidt (1919, p. 445) has presented a reasoned argument, with which I agree, for relegating *hecqui* to the synonymy.

H. steindachneri was considered by Tornier to differ on account of the lowest tubercle-row on the flank being situated on a longitudinal fold. Such folds appear commonly on the flanks of this species, but their coinciding with the lowest tubercle-row in the types appears to be fortuitous. The Museum of Comparative Zoölogy possesses a specimen (M.C.Z. 13264) from Mete, not far distant from the type locality of Bipindi (here restricted in case the Victoria cotype is possibly referable to *muriceus*), and Müller has recorded one from Lolodorf.

Habitat. One was found hiding beneath banana leaves lying on a termitarium at Thysville.

Localities. **Angola:** Ambriz; Capangombe; Carangigo; Catumbela; *Congulu; Cunga, Cuanza River; Duque de Bragança; Gauca; Gumba; Pungo (Andongo); Quirimbo; Rio Coroca; Sao Salvador du Congo. **Cabinda:** Landana. **Belgian Congo:** Albertville; Djamba; Thysville; Zambi. **French Conglo:** Gabon. **Ilha de Principe. French Cameroons:** Bipindi; Lolodorf; *Mete (Metet). ? **Saõ Thome: British Cameroons:** Johann Albrechtshöhe; Victoria.

Range. Angola north to British Cameroons east to Lake Tanganyika.

Hemidactylus muriceus Peters

1870c. *Hemidactylus muriceus* Peters, Monatsb. Akad. Wiss. Berlin, p. 641: Keta, Guinea, *i.e.* Quittah, Gold Coast.
1881d. Peters, p. 147.
1885d. Boulenger, p. 123.
1885. Müller, p. 709.
1895a. Bocage, p. 13.

1901c. Tornier, p. 70.
1902c. Tornier, p. 666.
1910. Müller, p. 554.
1910. Sternfeld, p. 13.
1911. Lampe, p. 153.
1919. Schmidt, pp. 444, 598.
1933m. Witte, p. 69.
1937b. Monard, p. 52.
1938d. Loveridge, p. 51.
1938b. Mertens, p. 35.
1885d. *Hemidactylus platycephalus* Müller (not Peters), p. 708: Tumbo Island.
1887. Müller, p. 288.
1897. *Hemidactylus mabouia* Sjöstedt (not Jonnés), p. 9.
1897c. *Hemidactylus intestinalis* Werner, Zool. Anz., **20**, p. 263: In stomach of viper from Togo.
1901c. Tornier, p. 70.

A further citation of "*muriceus*" will be found under *ansorgii*.

Description. Snout much longer than the distance between the eye and the ear-opening; granules on the snout convex, smooth, larger than those on the vertex, among which are scattered larger rounded tubercles; nostril bordered by the rostral, first labial, and 4 small nasals, the uppermost separated from its fellow by a single granule; upper labials 9–12; lower labials 8–11; a pair of large postmentals in contact on the median line, an outer, but smaller, pair of chin shields.

Back covered with small granules among which are scattered striated, subtrihedral or conical tubercles forming 10–14 more or less irregular longitudinal rows; ventral scales smooth, rounded, imbricate; males with 8–11 preanal pores forming an uninterrupted series; thumb well-developed, clawed; digits free, moderately dilated, inferiorly with oblique scansors, 5–7 under the first toe, 9–11 under the fourth toe; tail, when unregenerate, cyclotetragonal, covered above with small smooth scales and 6 rows of long, pointed, obtusely-keeled tubercles; below with imbricate scales of which the median series is *not* enlarged; length of tail usually slightly longer than that of head and body.

Color. Above, grayish brown to black, uniform, or back and tail with indistinct wavy brown crossbands. Below, whitish but almost obscured by brown infuscations.

Size. Total length of ♂, 112 (54 + 58) mm., from Medje (Schmidt); total length of ♀, 105 (51 + 54) mm., from Ganta (Loveridge).

Remarks. H. intestinalis was synonymized with *muriceus* by Tornier (1902c) after direct comparison of the two types. Contrary to Werner's statement, he found that preanal pores were present in the partly digested, fragmentary type of *intestinalis*.

The record of *muriceus* from Paiata, Liberia (Barbour & Loveridge, 1930a, p. 775) was based on a gecko which I now refer to *ansorgii*. In 1930 the Museum of Comparative Zoölogy had no example of *muriceus*, the one so labeled being actually a *longicephalus*.

Sexual dimorphism. Müller (1910) states that pores may develop in old females. Mertens (1938b) points out that males have the base of the tail very strongly swollen.

Parasites. Nematode present (Werner, 1897c).

Enemies. In stomach of a tree viper (*Atheris s. squamigera*) in Togo.

Habitat. Living upon stumps and trunks of trees in which situations their coloration is admirably adapted to concealment. In such places, however, Mertens (1938b) captured five in half-an-hour.

Localities. **Belgian Congo:** Avakubi; Kisala; Medje. **French Equatorial Africa:** Kouango (Cuango). **French Cameroons:** Dibango (Dibongo). **British Cameroons:** Bibundi; Ekundu; Isongo; Johann Albrechtshohe; Mubenge; Mundame (Mundave). **Togo:** Misahohe. **Gold Coast:** Quittah (Keta). **Liberia:** *Ganta.

Range. Belgian Congo west to Liberia, or [1]French Guinea (Tumbo Island).

Hemidactylus echinus O'Shaughnessy

1875. *Hemidactylus echinus* O'Shaughnessy, Ann. Mag. Nat. Hist. (4), **16**, p. 264: Gabon, French Congo.
1885d. Boulenger, p. 123, pl. xi, fig. 3.
1897. Sjöstedt, p. 10.
1898a. Werner, p. 206.
1900b. Boulenger, p. 448.
1902c. Tornier, p. 670.
1906i. Boulenger, p. 198.
1910. Müller, p. 555.
1910. Nieden, p. 14.
1911. Despax, p. 233.
1911. Lampe, p. 153.
1917c. Chabanaud, p. 84.
1919g. Boulenger, p. 12.
1919. Schmidt, p. 599.
1934. Brongersma, p. 165.
1938b. Mertens, p. 35, pl. viii, fig. 35.

Description. Snout slightly longer than the distance between the eye and the ear-opening; granules on the snout convex, smooth, larger

[1] Depending on whether Muller's record of *platycephalus* is really *muriceus*.

than those on the vertex, among which are scattered larger conical tubercles; nostril bordered by the rostral, first labial, and 4-5 small nasals, the uppermost separated from its fellow by 2 granules; upper labials 12–13; lower labials 10–12; a pair of large postmentals in contact on the median line or subdivided to form several smaller chin shields.

Back covered with small granules among which are scattered smooth, conical tubercles, forming 18 more or less irregular longitudinal rows; ventral scales smooth, rounded, scarcely imbricate; males with 8–11 preanal pores forming an uninterrupted series; digits very slightly webbed at base, moderately dilated, inferiorly with oblique lamellae, 9 under the first toe, 11–13 under the fourth toe; tail, when unregenerate, cyclotetragonal, covered above with small, smooth granules and 6 rows of long, pointed, smooth tubercles of variable size forming an almost continuous series on the angles; below with small, imbricate scales, of which the median series is *not* enlarged, and 2 longitudinal series of long pointed tubercles; length of tail usually shorter than that of head and body.

Color. Above, light brown, a light streak on the side of the head passing through the eye, present or absent; a vertebral series of dark brown blotches of which the first is in the interorbital region, second on nape and fifth on rump, also lighter markings sometimes present on the back; a round yellow spot on hinder side of thigh close to root of tail; tail with dark and light annuli. Below, whitish.

Size. Total length of type ♂, 114 (58 + 56) mm., while Despax records one of 118 mm. from Upper Ivindo.

Remarks. The two rows of *subcaudal* tubercles, which are additional to the six upper ones, appear to distinguish this gecko from all other known members of the genus.

Habits. In life the tail is carried with the distal portion coiled (*vide* Mertens, 1938b, pl. viii, fig. 35), but when disturbed it is moved more or less vigorously.

Habitat. Mertens captured ten of these geckos in the banana-cooling room at Palime.

Localities. **Belgian Congo:** Medje. **French Equatorial Africa:** Fernan Vaz; Gabon; Lambarene; Upper Ivindo River; Oubangui-Chari (Ubangi-Shari) region. **French Cameroons:** Dibango (Dibongo). **British Cameroons:** Bibundi; Ekundu; *Idenau near Victoria; Johann Albrechtshohe; Mundame (Mundave); Palime; Victoria.

Range. Belgian Congo west to French Congo and British Cameroons.

Hemidactylus newtoni Ferreira

1893a. *Hemidactylus mabouia* ? Bocage (not Jonnés), p. 45.
1897a. *Hemidactylus Newtoni* Ferreira, Jorn. Sci. Lisboa (2), **4**, p. 251: Annobon Island.
1903a. Bocage, p. 58.

Description. Snout [1] longer than the distance between the eye and the ear-opening; granules on the snout; nostril bordered by the rostral, first labial, and 2–3 small nasals; upper labials 9–11; lower labials 8–9; a pair of large postmentals in contact on the median line, an outer, but smaller, pair of chin shields.

Back covered with small granules among which are scattered rounded "tetrahedral" tubercles irregularly disposed; ventral scales imbricate males without preanal or femoral pores; digits free, moderately dilated, inferiorly with oblique scansors, 7–8 under the first toe, 11–12 under the fourth toe; tail, when unregenerate, cyclotetragonal and with 6 rows of long, pointed tubercles above.

Color. Above, more or less distinctly brown, back with numerous, angular, black crossbands; tail banded brown and white. Below, whitish. Both color and markings more distinct in the young.

Size. ?

Remarks. Known only from the seven cotypes (1 ♂, 5 ♀♀, 1 young), which I have been unable to see. The original description in Portuguese (1897) was rendered into French (1903) by Bocage, and the scanty description furnished above is based on a translation from the latter.

The absence of pores characterizes also *aporus*, more recently described from the same island, but, if correctly counted, the greater number of subdigital scansors of *newtoni*, approaching those of *echinus*, afford good grounds for separation.

Range. Annobon Island opposite the French Congo.

Genus Lygodactylus

1864e. *Lygodactylus* Gray, Proc. Zool. Soc. London, p. 59 (type *strigatus* = *capensis* A. Smith).
1880c. *Scalabotes* Peters, Monatsb. Akad. Wiss. Berlin, p. 795 (type *thomensis*).
1883c. *Microscalabotes* Boulenger, Ann. Mag. Nat. Hist. (5), **11**, p. 174 (type *cowani*).

Diagnosis. Digits free, very unequal in length, thumb vestigial and not dilated, remaining digits subcylindrical at base with free distal

[1] Whether "slightly" or "much" is not stated.

phalanges rising from end of strongly dilated discoid portion, covered above with scales, not denticulate laterally, below on undilated basal portion by scales or transverse lamellae, on dilated portion by pairs of transversely oblique scansors separated by a median groove in which the claw is more or less retractile.

Pupil round; upper eyelid distinct, lower vestigial; dorsal lepidosis of small, uniform, smooth, juxtaposed granules; tail slightly depressed and tapering, covered above with small juxtaposed or subimbricate scales, below with larger imbricate scales (which, on regenerate tails, are replaced by irregular, ribbon-like transversely dilated scales), the tip of an uninjured tail is furnished with paired scansors (reproduced tails sometimes show a feeble attempt to reproduce this apparatus). Males with preanal pores forming an uninterrupted series and, at least when breeding, several rows of roughened, slightly raised, brownish scales on inner aspect of thighs and tibia.

Range. Africa (from about 15° N. to 30° S.); Madagascar.

Remarks. Under the name of *Microscalabotes cowani* Boulenger separated two Malagasy geckos on the grounds that they were "Distinguished by the distal clawed phalanges, which are free, as in *Lepidodactylus* Fitz., and not curved and retractile between the anterior infradigital lamellae; the claw of the inner digits is very strong and always exposed, and not sheathed and frequently hidden as in *Lygodactylus*." One wonders whether it was a coincidence that the claws happened to be fully extended in Boulenger's two specimens, for the claws are retractile in our material of *cowani*, if the latter is correctly identified.

The visual cells of members of this diurnal genus have been discussed by Walls (1942, p. 237, pl. i) at various times.

Considerable attention has been devoted to the arrangement of the species in an effort to reflect the lines of development from the more primitive to those in which there is an increase in preanal pores, accompanied by the development of sexual dichromatism. It will serve no useful purpose to attempt a synopsis of Tornier's (1896, pp. 15–26) very lengthy dissertation on pattern, with his conclusions that *picturatus*, *gutturalis*, *angularis*, etc. are all one species, and his proposal of three varietal names without designating types or giving any clear indication from where the varieties came.

My definition of a "broad" or "elongate" snout calls for explanation. The length of a snout from its end to the anterior border of the eye equals (broad), or is slightly greater than (moderately elongate), or is much greater than (elongate) the interorbital distance anteriorly; it

also is slightly longer than (broad or moderately elongate), and much longer than (elongate) the distance from the posterior border of the eye to the ear-opening.

The ear-opening, apart from the sunken slit in the primitive (?) desert-dwelling *somalicus*, or its shape, appear to have little diagnostic value, being to some extent subject to muscular control, thus in the form *L. p. gutturalis* I have found specimens in which the ear-opening was round, vertically oval, or horizontally oval. There is some size difference between species, but one's mental impression of its relative proportion is difficult to express and itself subject to variation.

The mental shield is invaluable in reflecting group relationship. *L. s. somalicus* alone appears to represent the primitive condition where this shield is followed by a large postmental. In *L. s. annectens* the latter fuses with the former yet leaves the lateral lines of fusion sharply distinct in a whole group of species. The final stage is found in *L. p. picturatus* and its allies which possess a very large and entire mental.

One would have suspected that undifferentiated subcaudals represented the most primitive condition within this genus, if that be so, then *capensis* and a few other species would have to be regarded as ancestral. Geographically, however, *somalicus* and a trans-equatorial group of species with the two median rows of subcaudals slightly enlarged, appear to have given rise on the one hand, possibly by reversion to an earlier type, to *capensis* and its allies, and on the other, through *grotei*, to those species in which the median row of subcaudals is transversely enlarged, presumably by fusion of the two median rows. Because regenerated tails in all members of the genus usually have irregular, ribbon-like, transversely-enlarged subcaudals, one must not conclude that the transversely dilated scales of *grotei*, etc. are primitive. Their form is very different from the ribbon-like type of a regenerated tail.

Tornier (1899c) has discussed and figured the structure of the scansorial pad on the tip of the tail. Schmidt (1919) comments on the "hairs" which characterize both caudal and digital scansors. If one of these geckos be killed by a sudden blow upon the spine, it will fall over backwards but remain attached to the tree by the adhesive caudal apparatus. Once, having fired a rifle at a tree from 200 yards away, on reaching the spot I found hanging by its tail, a dead, but uninjured gecko, which had evidently been killed by the concussion of the bullet striking the tree.

Key to the Species

1. Mental entire 2
   Mental with deep lateral fissures resulting from fusion with a former large postmental 4

2. Mental deeply concave posteriorly to accommodate a large, yet entirely separated, postmental 3
   Mental entire, without trace of lateral fissures 9

3. Snout moderately elongate; upper nasals separated by 2-3 granules; lower labials 5–6; range: British Somaliland . . . . . *s. somalicus* (p. 201)

4. Subcaudals with the two median rows enlarged 5
   Subcaudals subequal or with one median row enlarged 6

5. Snout moderately elongate; upper nasals separated by 1–4 granules; lower labials 6–9; 4 pairs of scansors under fourth toe; range: British Somaliland and Somalia . . . . . *s. annectens* (p. 201)

   Snout broad; upper nasals separated by 1 granule; lower labials 5–6; 5 pairs of scansors under fourth toe; range: eastern Kenya Colony . . . . *scheffleri* (p. 202)

   Snout broad; upper nasals separated by 0–1–2 granules; lower labials 5–8; 5 pairs of scansors under fourth toe; range: southeastern Kenya Colony and mountains of eastern Tanganyika Territory . . . . . *conradti*. (p. 204)

   Snout elongate; upper nasals separated by 2–3 granules; lower labials 6–9; 4–5 pairs of scansors under fourth toe; range: Gaboon and Cameroons, also Sierra Leone . . . . . *fischeri* (p. 206)

6. Subcaudals subequal, the median row not, or but irregularly and occasionally enlarged 7

   Subcaudals with median row strongly enlarged transversely; snout elongate; preanal pores in males 4–8 8

7. Snout elongate; preanal pores in males 7–10; range: Africa south of 5° South (i.e. about Central Railway of Tanganyika Territory) . . *angolensis* (p. 207)

Snout broad; preanal pores in males 4–7; range: Africa south of equator (i.e. about central Kenya Colony in the east) ..... *capensis* (p. 208)

8. Head, back, and limbs not conspicuously flecked with black; a broad dark streak from nostril through eye usually extends to flank; light vertebral and lateral lines present; size slightly larger and stouter; range: Tanganyika Territory south to Mozambique ..... *g. grotei* (p. 212)

Head, back, and limbs conspicuously flecked with black; a narrow dark streak from nostril through eye to above ear-opening but not extending to flank; light vertebral and lateral lines absent or only faintly indicated; size slightly smaller and less robust; range: Pemba Island .... *g. pakenhami* (p. 216)

9. Subcaudals subequal, the median row, or rows, not enlarged[1] 10
Subcaudals with median row strongly enlarged transversely; snout broad 11

10. Snout broad; preanal pores in males 6–8; 4 pairs of scansors under fourth toe; back with numerous conspicuous ocelli; range: Transvaal .. *ocellatus* (p. 217)

Snout elongate; preanal pores in males 9–11; 5 pairs of scansors under fourth toe; back with four lines of reddish-brown angular marks; range: Transvaal ..... *methueni* (p. 218)

11. Rostral entering nostril; latter situated above the suture between rostral and first labial 12

Rostral almost invariably separated from nostril; latter situated above first labial, so posterior to (rarely above) the suture between rostral and first labial 15

12. Fourth finger and toe about twice as long as the third and fifth 13
Fourth finger and toe only slightly longer than the third and fifth 14

13. Throat of ♂ and ♀ immaculate or with dusky median streak; postmentals 2; preanal pores in males 4; range: oceanic islands in the Gulf of Guinea *thomensis* (p. 218)

14. Throat of ♂ and ♀ immaculate or with faint median streak; postmentals 3; preanal pores in males 4; range: Fernando Po; Cameroons; Liberia *conraui* (p. 220)

[1] Perhaps the tailless type of *p. lawrencei* belongs here, see footnote to p. 223.

Throat of ♂ and ♀ with a series of dark lines converging from labials to base of throat, the anterior forming two V-shaped marks, the apex of the second prolonged posteriorly as a single line; postmentals 1–2; preanal pores in males 5–8; range: southern Tanganyika Territory and Nyasaland west to (?) Northern Rhodesia..... *a. angularis*
(p. 221)

Throat of ♂ as in *angularis*, but markings faint or obsolescent on throat of ♀; postmentals 3; preanal pores in males 9–10; range: southeastern Belgian Congo..... *a. heeneni*
(p. 221)

15. *L. picturatus*, whose races are best treated as follows:

a. Throat of ♂ and ♀ white, with two[1] dark chevrons but without a third or basal mark.

Preanal pores in male 10; a russet-brown band from axilla to groin; range: Bechuanaland..... *p. chobiensis*
(p. 224)

b. Throat of ♂ and ♀ white, with three dark chevrons or else a solid arrow-head or spot as a third basal mark.

Preanal pores in male 2, but from its size (26.5 mm. from snout to anus) the type was possibly a juvenile; tail lacking; range: South West Africa..... *p. lawrencei*
(p. 223)

Preanal pores in males 6–9; arms of second gular chevron parallel or divergent; subcaudals with a median series of dusky spots; range: Uganda and extreme western Tanganyika west to French Congo; Portuguese Guinea..... *p. gutturalis*
(p. 224)

Preanal pores in males 7–8; arms of second gular chevron convergent; subcaudal region immaculate; range: Ituri Forest, Belgian Congo..... *p. depressus*
(p. 227)

Preanal pores in males 7–8; the apices of both anterior gular chevrons uniting to form an o-shaped postmental spot; range: northern Kenya Colony and adjacent arid areas in southern Ethiopia and Somalia..... *p. keniensis*
(p. 228)

[1] FitzSimons says one, but the dark streak along the edge of the labials, that he mentions, corresponds to an obsolescent outer chevron.

c. Throat of ♂ white, a dark median streak uniting the outer and inner chevrons and usually also a third basal spot which retains but little resemblance to a third chevron. Throat of ♀ white, immaculate.

The apices of both anterior gular chevrons of males unite to form an o-shaped postmental spot; range: Eritrea west to the Anglo-Egyptian Sudan.....*p. sudanensis* (p. 228)

d. Throat of ♂ uniformly black, only rarely showing traces of chevrons. Throat of ♀ normally white, only rarely showing faint obsolescent markings.

Head and shoulders pure white in life, with darker markings superimposed.

Habit robust; labials white, usually heavily blotched with black; a dorso-lateral series of large ocelli; range: islands and shores of Lake Victoria in western Kenya and Tanganyika.....*p. ukerewensis* (p. 230)

Habit slender; labials white, or at most their buccal borders edged with brown; no dorso-lateral series of ocelli; range: coastal belt of Kenya Colony south to Tanga, Tanganyika Territory (occurring with the typical form at Mombasa and Tanga, with intermediates up the railway as far as Kibwezi).....*p. mombasicus* (p. 231)

Head and shoulders bright mustard-yellow in life (often fading to white on preservation) with darker markings superimposed.

Habit slender; labials yellow, or at most their buccal borders edged with brown; back of male blue gray, uniform, or with dusky markings that may take the form of ill-defined dorso-lateral lines; back of female brown with markings similar to those of male; range: (reported from coastal belt of Somalia) coastal belt of Kenya Colony (from Mombasa south) and Tanganyika Territory and inland following railways and rivers (through human agency); Zanzibar; Northern Rhodesia (Victoria Falls); Belgian Congo (Elizabethville, *fide* de Witte).....*p. picturatus*. (p. 233)

STATISTICAL DATA FOR THE AFRICAN SPECIES OF THE GENUS LYGODACTYLUS

so far as known up to the present time.

Where the range is very restricted it may usually be assumed that it will be increased when more material is available for study. Despite the small amount of variation as between species and races, those recognized are, for the most part, perfectly distinct.

Species	Internasal Granules	Nasals surrounding Nostril	Rostral enters Nostril	Upper Labials	Lower Labials	Postmentals	Scansors under Fourth Toe	Male Pores	Maximum Length Head and Body
s. somalicus	2–3	2	Yes	6–7	5–6	1+3	4	6	30 mm.
s. annectens	1–4	2	"	6–9	6–9	3	4	6	30 mm.
scheffleri	1	2	"	5–7	5–6	3	5	6	24 mm.
conradti	0–1–2	2–3	"	5–8	5–8	2	5	6–8	39 mm.
fischeri	2–3	2–3	"	6–9	6–8	3	4–5	7–10	35 mm.
angolensis	1–2	2–3	"[1]	6–9	6–8	2–3	4–5	7–10	36 mm.
capensis	1–3	2–3	"[1]	6–8	5–8	3	4–5	4–8	34 mm.
g. grotei	0–1–2	1–2–3	"[1]	6–9	5–8	2–4	4–5	4–8	33 mm.
g. pakenhami	1–2	2–3	"[1]	8–9	7–8	2–4	4	4	28 mm.
ocellatus	0–1–2	2–3	"	6–8	5–7	2–3	4	6–8	38 mm.
methueni	1	3	"	6	6	2	5	9–11	41 mm.
thomensis	2	2	"	6–7	6–7	2	4	4	31 mm.
conraui	2	2–3	"	7–9	6–7	3	4–5	4	30 mm.
a. angularis	1–2	2–3	"	5–8	5–7	1–2	5–6	5–8	46 mm.
a. heeneni	2	3	"	7–8	7	3	5	9–10	37 mm.
p. lawrencei	2–3	2–3	No	7–9	6–7	2	4	2!	26 mm.
p. chobiensis	1	2	"	7–8	6–7	3	5	10	39 mm.
p. gutturalis	1–2	2–3	"	6–8	5–7	1–3	5–6	6–9	42 mm.
p. depressus	1–4	2–3	"	7–8	7–7	2–3	4–5	7–9	38 mm.
p. keniensis	1–2	2	"	6–7	5–6	2–3	5	7–8	42 mm.
p. sudanensis	1–3	2–3	"	6–9	6–8	2–4	5	7–9	37 mm.
p. ukerewensis	1–3	2–3	"	6–9	5–7	2–4	5–6	6–9	42 mm.
p. mombasicus	1–2	2–3	"	6–9	5–8	3	5–6	6–10	39 mm.
p. picturatus	1–2	2–3	"	6–9	5–8	3	5–6	6–12	43 mm.

[1] Sometimes excluded.

Lygodactylus somalicus somalicus Loveridge

1932b. *Lygodactylus capensis scheffleri* Parker (part, not Sternfeld), p. 350.
1935g. *Lygodactylus somalicus somalicus* Loveridge, Proc. Biol. Soc. Washington, **48**, p. 196: Bar Madobe, Nogal Valley, British Somaliland.
1942. *Lygodactylus somalicus* Parker, p. 39.

Description. Snout moderately elongate, the distance from its end to the anterior border of the eye slightly greater than the interorbital width anteriorly, slightly longer than the distance between the eye and the ear-opening, which is a very small sunken slit; nostril pierced above the suture between rostral and first labial, being between these shields and 2 nasals; mental entire but deeply concave posteriorly to accommodate a large and entirely separate postmental which is followed by 3 small postmentals; original tail below with imbricate scales of which the two median series are slightly enlarged.

For other scale and pore counts, see statistical table on p. 200.

Color. Above, ashy brown; a dark streak from nostril passes through eye to shoulder and may be continued on flank; back with a slightly darker area forming a broad, though indistinct, vertebral band which narrows and deepens to form a distinct line upon the tail. Below, white, immaculate.

Size. Total length of type ♂, 50 (25 + 25) mm., of paratype ♀, 52 (30 + 22) mm., but tail regenerating.

Remarks. This, the most northeasterly member of the genus, appears to be also the most primitive for the large postmental shows no trace of fusion with the mental. Parker (1942) questions the validity of the race considering that in three of the paratypes complete suture is only simulated by a fold "probably due to the manner of preservation." Yet this beautifully preserved series were all taken by the same collector—Captain R. H. R. Taylor.

Habitat. The seven known specimens were all found on trees.

Localities. **British Somaliland:** *Bar Madobe.

Range. British Somaliland southeast to Bera (Beira), Somalia, where it meets with the fissured-mental form.

Lygodactylus somalicus annectens Loveridge

1892. *Lygodactylus picturatus* Boulenger (not Peters), p. 6.
1896c. *Lygodactylus capensis* Boulenger (not Smith), p. 17.
1897g. Boulenger, p. 277.
1898a. Boulenger, p. 716.
1912b. Boulenger, p. 330.

1920a. Loveridge (part), p. 135 (Lugh specimen).
1923b. Calabresi, p. 155.
1927. Calabresi, pp. 25, 41.
1929c. Scortecci, p. 253.
1905c. *Lygodactylus conradti* Tornier (not Matschie), p. 368.
1905. Neumann, p. 390.
1931b. *Lygodactylus fisheri* (sic) Scortecci (not Boulenger), p. 129.
1932b. *Lygodactylus capensis scheffleri* Parker (part, not Sternfeld), p. 350.
1935g. *Lygodactylus somalicus annectens* Loveridge, Proc. Biol. Soc. Washington, **48**, p. 197: Buran District, British Somaliland.

Description. Nostril pierced above the suture between rostral and first labial, being between these shields and 2 nasals; mental deeply fissured but the fissures *not* uniting to excise a large postmental, followed by 3 small postmentals; original tail below with imbricate scales of which the two median series are slightly enlarged.

For other scale and pore counts, see statistical table on p. 200.

Color. Substantially that of the typical form.

Size. Total length of paratype ♂, 61 (29 + 32) mm., of ♀, 56 (30 + 26) mm., both from Villaggio Duca degli Abruzzi.

Remarks. Differs from the typical form in that the lateral fissures of the mental do not unite to excise a large postmental. The validity of this form is very doubtful as both conditions of the mental occur at Bera (Beira) and at Villaggio Duca degli Abruzzi, a locality well within the range of the southern form. Calabresi (1927) also mentions both conditions but without specifying localities. In the many other species with a fissured mental, however, no such uniting of fissures is known except in the typical form if one considers the complete sutures only simulated in certain cases.

Parasites. Red Mites.

Habitat. Trees at 3100 feet.

Localities. **British Somaliland:** Buran District. **Somalia:** Aroe (? Arro) near Obbia; Badditu to Dime; Bar Madeghe; Bera (Beira); Bidi to Gelib; Bugda Acable; Lugh; Obbia to Berbera; Obbia to Sissib; Odamuda, Djida, Webi region; Rahanuin country; Rocca Littorio; Uarandi (Uorandi near Obbia); Villaggio Duca degli Abruzzi.

Range. British Somaliland and Somalia.

Lygodactylus scheffleri Sternfeld

1912c. *Lygodactylus fischeri scheffleri* Sternfeld, Wiss. Ergeb. Deut. Zentral-Afrika-Exped. 1907–1908, **4**, p. 206: Kibwezi, Kenya Colony.

1913c. Nieden, p. 68.
1923d. Loveridge (part), p. 845 (omit T.T.).
1924b. Loveridge (part), p. 9 (omit T.T.).
1936j. Loveridge, p. 288.
1937f. *Lygodactylus scheffleri* Loveridge, p. 495.

Further citations of *"scheffleri"* will be found under *L. s. somalicus*, *s. annectens*, and *conradti*, with which species it has been confused.

Description. Snout broad, the distance from its end to the anterior border of the eye about equal to the interorbital distance anteriorly, slightly longer than the distance between the eye and the ear-opening, which is small, roundish; nostril pierced above the suture between rostral and first labial, being between these shields and 2 nasals, the uppermost separated[1] from its fellow by a single granule; mental deeply fissured, followed by 3 small postmentals; original tail below with imbricate scales of which the two median series are slightly enlarged.

For scale and pore counts, see statistical table on p. 200.

Color. Above, olivaceous mottled with darker and lighter; labials faintly flecked with reddish brown; a dark brown streak from nostril passes through eye to above ear-opening; on neck between ear-opening and fore limb is a reddish brown or jet black blotch; from neck to base of tail a faint reddish brown lateral band or series of six, large, sepia-brown spots on a light ground; tail with coalescing yellow spots. Below, white, immaculate, or with a few brown flecks on the chin shields.

Size. Total length of cotype ♂, 51 (24 + 27) mm.

Remarks. This dwarf form is known only from the two male cotypes (Berlin Museum) and a third male, from Voi, with the same head and body length as the type, but tail regenerating. Voi is about 80 miles southeast of Kibwezi on the Kenya-Uganda Railway. Despite its frequent confusion with other species, this little gecko is perfectly distinct, especially in coloration.

Habitat. I first caught sight of the only specimen I have ever seen as it ran up the trunk of a mango-like tree, with laurel-like leaves, in fairly dense gallery forest beside the (then dry) Voi River, near Msinga Estate. The gecko disappeared beneath a sliver of bark at a height of twenty feet. By throwing up a stick I dislodged the sliver, which, together with the gecko, fell to the ground. The reptile dashed up the trunk again and sought refuge beneath another piece of bark where I was able to catch it.

[1] I (1936j) was in error in saying "in contact."

Localities. **Kenya Colony:** Kibwezi; *Voi.
Range. Kenya Colony.

Lygodactylus conradti Matschie

1892. *Lygodactylus conradti* Matschie, Sitz. Ges. Naturf. Freunde Berlin, p. 109: Derema, Usambara Mountains, Tanganyika Territory.
1896. Tornier, p. 14.
1897. Tornier, p. 63.
1900b. Tornier, p. 587.
1907. Lönnberg, p. 4.
1937f. Loveridge, p. 502.
1895b. *Lygodactylus thomensis* Werner (not Peters), p. 191.
1896. Tornier, p. 14.
1897. Tornier, p. 63.
1913c. *Lygodactylus fischeri* Nieden (not Boulenger), p. 67.
1923d. Loveridge, p. 845.
1924b. Loveridge, p. 9.
1928c. Barbour & Loveridge, p. 143.
1920a. *Lygodactylus fischeri scheffleri* Loveridge (not Sternfeld), p. 136.
1923h. Loveridge, p. 940.

Further citations of "*conradti*" will be found under *somalicus annectens* and *fischeri*, with which species it has been confused.

Description. Snout broad, the distance from its end to the anterior border of the eye about equal to the interorbital distance anteriorly, slightly longer than the distance between the eye and the ear-opening, which is large, roundish; nostril pierced above the suture between rostral and first labial, being between these shields and 2–3 nasals, the uppermost separated from (rarely in contact with) its fellow by 1–2 granules; mental deeply fissured, followed by 2 small postmentals; original tail below with imbricate scales of which the two median series are slightly enlarged.

For scale and pore counts, see statistical table on p. 200.

Color. Above, yellowish gray, olive gray, or blackish gray; usually a dark streak from nostril through eye to above ear-opening; back uniform or streaked and mottled with darker; occasionally a broad, dark-edged, fawn stripe from posterior border of eye to base of tail where it merges with its fellow from the opposite side; sides uniform or with a series of dark blotches. Below, white, immaculate, or sparsely spotted.

In life some (? breeding) males were yellow or orange beneath, thus agreeing with a young gecko whose belly and hind limbs were bright yellow, but whose tail was orange below. Newly-hatched young are plumbeous above, but spotted on flanks and throat.

Size. Total length of ♂, 90 (39 + 51) mm., and of ♀, 87 (39 + 48) mm., both from Western Usambaras. This species surpasses all other members of the genus in size.

Remarks. Werner's (1895) misidentification of one of these geckos with *thomensis*, uncritically repeated by Tornier (1896; 1897), was later (1900b) corrected by Tornier after reëxamination of Werner's specimen in the Vienna Museum. However Tornier (1902c) then confused the situation by synonymizing *conradti* with *fischeri*, an error which went uncorrected until 1935 when I was able to obtain Cameroon examples of *fischeri* from Munich for direct comparison with our extensive topotypic series of *conradti*.

Lönnberg's (1907) material from Kibonoto and Ngare na Nyuki should be checked, for the habitat, together with his comments regarding the black spots on the flanks, raises doubts as to whether his geckos might not possibly be *scheffleri*.

Breeding. On November 20, at Bomoli, an egg, measuring 7 x 5 mm., was found. On December 21, at Phillipshof, 102 eggs, fresh and recently laid, were discovered through my seeing a dozen of them lying on the bare soil of a crumbling bank at the side of the terraced roadway where it passes through heavy forest. Speculating as to how they came to be there, I examined the roots of a large tuft of grass on the edge of the bank, then found the other 90 eggs among the roots! Why did 51 geckos all come to this one spot to lay when abundant sites of equal suitability were to be found in close proximity? Diligent search in the vicinity failed to reveal a single gecko. Doubtless they were up in the forest canopy or hidden in some hollow tree, for the nearest point at which I found any of these lizards was in some wild bananas two miles away.

Diet. Ants, beetles and a cockroach were found in stomachs.

Parasites. Red mites are frequently present in the preanal region.

Habitat. At Phillipshof eight geckos were captured among the basal stalks of wild bananas growing on a deforested hillside; but at nearby Kwai my native collector obtained nine beneath logs and rocks at the forest edge. One that I found at Vituri was on a tree stump at the forest edge. In Tanganyika it occurs from 2000 to 6000 feet.

Localities. **Kenya Colony:** *Mbuyuni. **Tanganyika Territory:** Mount Kilimanjaro—Kibonoto, at foot of; Mount Meru—Ngare na Nyuki, at foot of; Uluguru Mountains—*Vituri; Usambara Mountains—Buloa—Derema—*Kwai—*Mount Bomoli—*Phillipshof; also reported from Tanga.

Range. Eastern Kenya Colony south to eastern Tanganyika Territory.

Lygodactylus fischeri Boulenger

1884a. *Hemidactylus capensis* Rochebrune (not A. Smith), p. 76.
1890d. *Lygodactylus fischeri* Boulenger, Proc. Zool. Soc. London, p. 80, pl. viii, fig. 1: Sierra Leone.
1902b. Mocquard, p. 410.
1910. Müller, p. 558.
1910. Sternfeld, p. 15.
1911. Lampe, p. 155.
1917c. Chabanaud, p. 85.
1919. Schmidt, p. 599.
1902c. *Lygodactylus conradti* Tornier (not Matschie), p. 670.
1919. *Lygodactylus capensis* Schmidt (not A. Smith), p. 599.
1920a. Loveridge (part), p. 135 (French Congo record only).

Further citations of "*fischeri*" will be found under *somalicus annectens*, *conradti*, *angolensis*, and *capensis*, with which species it has been confused.

Description. Snout elongate, the distance from its end to the anterior border of the eye much greater than the interorbital distance anteriorly, much longer than the distance between the eye and the ear-opening, which is large, roundish; nostril pierced above the suture between rostral and first labial, being between these shields and 2–3 nasals; mental deeply fissured, followed by 3 small postmentals; original tail below with imbricate scales of which the two median series are slightly enlarged.

For scale and pore counts, see statistical table on p. 200.

Color. Above, pale olive or reddish brown; a brown streak from nostril passes through eye to above ear-opening; back with an indistinct vertebral, and distinct dorsolateral, series of elongate brown spots; usually a very large black spot above the forearm (Cameroons) or "behind the axilla, followed by a series of smaller ones" (Sierra Leone) which may be present or absent. Below, white, immaculate, or with a few brown flecks in the sublabial region.

Size. Total length of ♂, 65 (31 + 34) mm., and of ♀, 60 (31 + 29) mm., both from Dibango (M.C.Z. 38689–90), but surpassed by the type male which had a head and body length of 35 mm.

Remarks. The above is a combination of data derived from the literature and from the two specimens in the Museum of Comparative Zöology. So far as I am aware, no direct comparison has ever been made between the unique Sierra Leone type and any of the dozen specimens recorded from the Cameroons-Gaboon region; under these circumstances some doubts must rest on the assumption that they are subspecifically identical.

Localities. **French Congo:** Lambarene; Ogoue (Ogowe) Riviere. **Rio Muni:** Rio Benito. **French Cameroons:** *Dibango (Dibongo). **British Cameroons:** Bibundi; Johann Albrechtshohe. **Sierra Leone.**

Range. French Congo and Cameroons, also Sierra Leone.

Lygodactylus angolensis Bocage

1895a *Lygodactylus capensis* Bocage (part, not A. Smith), p. 15.
1920b. Angel, p. 614.
1895b. *Lygodactylus angolensis* Bocage, Jorn. Sci. Lisboa (2), **4**, p. 110: Hanha, Benguela, Angola.
1897a. Bocage, p. 193.
1937b. Monard, p. 52.
1911c. *Lygodactylus Fischeri* Sternfeld (not Boulenger), p. 415.
1926c. *Lygodactylus stevensoni* Hewitt, Ann. Natal. Mus., **5**, p. 445, pl. xxv, figs. 3–4: Khami Ruins, Southern Rhodesia.
1933h. Loveridge, p. 287.
1934. Pitman, p. 302.
1936. Lawrence, p. 38.
1933. *Lygodactylus laurae* Schmidt, Ann. Carnegie Mus., **22**, p. 4: Chitau, Bihe District, Angola.
1937b. Mertens, p. 6.
1935b. *Lygodactylus capensis capensis* V. FitzSimons (not A. Smith), p. 332.

Undoubtedly some of the citations of *capensis*, listed under that species, eventually will have to be transferred to the synonymy of *angolensis*.

Description. Snout elongate, the distance from its end to the anterior border of the eye much greater than the interorbital distance anteriorly, longer or much longer than the distance between the eye and the ear-opening, which is large, roundish; nostril pierced above the first labial, so posterior to the suture between rostral and first labial, being between the latter shield (rostral sometimes included) and 2–3 nasals; mental deeply fissured, followed by 2–3, normally 3, small postmentals; original tail below with subequal imbricate scales.

For scale and pore counts, see statistical table on p. 200.

Color. Above, gray, olive, or brown; sometimes a transverse streak between the orbits anteriorly; a dark streak from nostril through eye to shoulder; head and back finely vermiculate or a dorsolateral series of pale spots enclosed within the angle of Λ-shaped sepia-brown marks which may break up into scattered flecks; tail uniform, or flecked with brown, or with light crossbands. Below, white, immaculate, or throat faintly and sparsely flecked or streaked with gray.

Size. Total length of ♂, 65 (30 + 35) mm., from Nyamkolo, and of a ♀ cotype of *stevensoni*, 78 (36 + 42) mm. (*fide* Hewitt).

Remarks. Hewitt (1926c), writing of *stevensoni*, states that its nostril is bordered by the rostral (it is almost so in several of our specimens, but never quite), and thinks that the 2 small nasals, "generally 3" in *capensis*, is a distinguishing characteristic, but if it holds at all the average would appear to be so slight (five of our series have 2, two have 3) as to be of doubtful value.

Undoubtedly this gecko is difficult to distinguish from *capensis*, several authors have suggested that the relationship is a subspecific one, but this is hardly borne out by the distribution. On the other hand it is closely related to *grotei*.

Enemies. One had been swallowed by a snake (*Hemirhagerrhis n. nototaenia*) at Kitungulu.

Parasites. Mites (*Geckobia australis, natalensis,* and *transvaalensis*) have been recorded from this species by Lawrence (1936).

Habitat. Largely arboreal, usually living under the bark of dead or living trees, though also obtained in rotting logs or among leaves lying beneath the trees (FitzSimons).

Localities. **Tanganyika Territory:** *Dodoma; *Kitungulu (sight). **Mozambique:** *(Sternfeld's "*Fischeri*" specimen, now in M.C.Z.). **Northern Rhodesia:** *Ikomba (sight); Lealui; *Nyamkolo. **Southern Rhodesia:** Figtree; Khami Ruins near Bulawayo; Zimbabwe. **Bechuanaland Protectorate:** Gaberones; Kaotwe Pan; Maun; Motlhatlogo; Shaleshonto; *Tsotsoroga Pan. **Angola:** Benguela; Cahata; *Chitau; Ebanga; Galanga; Gauca; Goedeche Farm, 25 km. N. of General Machado; Hanha.

Range. Central Tanganyika Territory south to Southern Rhodesia west through Bechuanaland to Angola.

Lygodactylus capensis (Smith)

1849. *Hemidactylus capensis* A. Smith, Illus. Zool. S. Africa, Rept., pl. lxxv, fig. 3: Kaffirland and districts N. of Cape Colony.
1854. Peters, p. 615.
1855. Peters, p. 44.
1867a. Bocage, p. 219.
1867b. Peters, p. 235.
1869b. Peters, p. 657.
1882a. Peters, p. 28.
1864e. *Lygodactylus strigatus* Gray, Proc. Zool. Soc. London, p. 59: Southeast Africa.

1937f. Loveridge, p. 495.
1885d. *Lygodactylus capensis* Boulenger, p. 160.
1886. Boettger, p. 21.
1887. Strauch, p. 28.
1893a. Boettger, p. 30.
1893. Günther, 1892, p. 555.
1893. Pfeffer, p. 72.
1895a. Bocage (part), p. 15.
1896a. Bocage, p. 98.
1896. Tornier, p. 13.
1897. Tornier, p. 63.
1898. Johnston, p. 361.
1898. Sclater, p. 102.
1900b. Boulenger, p. 448.
1902b. Boulenger, p. 16.
1902b. Tornier, p. 581.
1905h. Boulenger, p. 252.
1907a. Boulenger, p. 7.
1907j. Boulenger, p. 484.
1907b. Roux, p. 405.
1908b. Boulenger, p. 223.
1908. Odhner, p. 2.
1909a. Chubb, p. 592.
1909b. Chubb, p. 34.
1910b. Boulenger, p. 458.
1910a. Hewitt, pp. 56, 58, 70.
1910c. Hewitt, pp. 79, 82, 86.
1910a. Werner, p. 307.
1911b. Hewitt, p. 43.
1911d. Sternfeld, p. 12, fig. 8.
1912b. Sternfeld, p. 385.
1913. Hewitt & Power, p. 149.
1914a. Hewitt, pp. 241, 246.
1914b. Methuen & Hewitt, p. 127.
1915c. Werner, p. 336.
1920a. Loveridge (part), p. 135.
1922c. Angel, p. 354.
1922. Lönnberg, p. 1.
1923d. Loveridge, p. 845.
1924b. Loveridge, p. 9.
1925a. Angel, p. 11.
1926c. Hewitt, p. 444, pl. xxv, fig. 5.
1928a. Essex, 1927, p. 930.
1931. Power, pp. 40, 46, 48.
1932b. Brock, p. 509, figs. 2, 6B, 8, 10, 12.

1933j. Witte, p. 114.
1933m. Witte, p. 70.
1934. Brongersma, p. 166.
1934. Power, p. 105.
1936. Cowles, p. 6.
1937a. FitzSimons, p. 264.
1937f. Loveridge, p. 495.
1937b. Monard, pp. 52, 53.
1929h. *Lygodactylus fischeri* Loveridge (not Boulenger), p. 46. (a damaged juvenile).
1932. *Lygodactylus bradfieldi* Hewitt, Feb., Ann. Natal Mus., **7**, p. 126, pl. vi, fig. 10: Quickborn Farm, Near Okahandja, South West Africa.
1936. Lawrence, p. 38.
1932. *Lygodactylus capensis ngamiensis* FitzSimons, Oct., Ann. Transvaal Mus., **15**, p. 35, Mabeleapudi, Ngamiland, Bechuanaland Protectorate.
1935b. FitzSimons, p. 334, figs. 8–9.
1936. Lawrence, p. 38.
1933h. *Lygodactylus capensis capensis* Loveridge, p. 286.
1933. Schmidt, p. 4.
1934a. Cott, p. 147.
1934. Pitman, p. 302.
1936. Lawrence, p. 37.
1937b. Mertens, p. 6.
1939b. FitzSimons, p. 26.

Further citations of "*capensis*" will be found under *L. somalicus annectens, fischeri, grotei* and *angolensis*, with which species it has been confused. Doubtless a few of the citations given above should also be removed to the synonymy of *angolensis*. It has not been deemed necessary to add "(part)" to citations which give the range erroneously, as this would involve duplicating so many citations.

Native name. Isibankwa (Zulu: Cowles).

Description. Snout broad, the distance from its end to the anterior border of the eye about equal to the interorbital distance anteriorly, slightly longer than the distance between the eye and the ear-opening, which is small, roundish; nostril pierced above the first labial so posterior to, rarely above, the suture between rostral and first labial, being between these shields (or the rostral excluded) and 2–3 nasals; mental deeply fissured, followed by 3 small postmentals; original tail below with imbricate scales, subequal, or a few of the median series irregularly enlarged. Males with 4–6, rarely 7[1] or 8[2], preanal pores.

[1] Only in males from Masiliwa and Naivasha.
[2] Only in a male from Kasorongai River (seen).

For scale and pore counts, see statistical table on p. 200.

Color. Above, gray, olive, or brown, no transverse streak between the orbits anteriorly, a dark streak from nostril through eye to shoulder, sometimes extending along flank; head and back finely vermiculate or flecked with black, the flecks sometimes coalescing to form broken lines; usually a light, yellowish, or fawn (pale reddish orange in life) dorsolateral line from eye to tail where it may break up into a series of light spots or ocelli. Below, white, immaculate, or throat flecked and vermiculated with brown.

Pupil round, iris golden yellow. At Masiliwa the gray color and markings of these geckos rendered their detection difficult on the lichen-grown trees which they frequented.

Size. Total length of ♂, 75 (34 + 41) mm. (*fide* FitzSimons), and of ♀, 69 (33 + 36) mm. from Mt. Silinda (FitzSimons).

Anatomy. Skull development has been dealt with by Brock (1932b).

Remarks. The cotypes are apparently lost (FitzSimons, 1937a).

Breeding. On February 8–9, at Caia, and May 27, at Fambani, gravid females held ova measuring 3.5 x 4.5 mm. (Cott). In December 10–16, at Vumba, eggs, invariably cemented together in pairs, measured 7.5 x 5.6 mm., were found beneath rocks (FitzSimons). In Zululand, eggs, though usually laid singly, sometimes cemented in pairs, were found beneath stones and logs, in fissures of bark or in any warm, well-protected cranny (Cowles).

Diet. Twenty-four geckos were found to have eaten 43 beetles, 23 ants, 16 homopterous bugs, 2 hymenoptera, 2 cockroaches, 2 lepidoptera, 1 caterpillar, 11 spiders, and 1 woodlouse (*vide* Cott, 1934a, for further details).

Parasites. Lawrence (1936) records mites (*Geckobia rhoptropi*) off *bradfieldi*, and others (*G. transvaalensis*) off *ngamiensis*.

Defence. Apart from cryptic coloration as described above, Cott (1934a) remarks that on several occasions he has known these geckos to "feign death" on being caught. They submitted to handling without showing the least signs of life. He also comments on the readiness with which they will discard their tails, the latter remaining active up to seven minutes after autotomy.

Habitat. Tree trunks in orchard savanna at Masiliwa (Loveridge). On trees such as baobab and mopani at Birchenough Bridge; on rocky outcrops at Vumba (FitzSimons). Abundant on acacia trees, fences, and native huts at Linokana (Power). Common on wood piles and verandas at Beira (Cott).

Localities. **Kenya Colony:** Kasorongai River, west of Mount

Kenya; **Tanganyika Territory:** Ipiana; Kakoma; *Masiliwa; Usagara; *Ukerewe Island. **Mozambique:** Amatongas; Beira; Caia; Coguna; Delagoa Bay; Fambani; Jiku; Kurumadzu River; Lorenco Marques; Mocimboa; Quilimane; Tete. **Nyasaland:** Fort Johnston; Shire Highlands; Zomba. **Northern Rhodesia:** Broken Hill; Muchingas near Serenje; Petauke. **Southern Rhodesia:** *Birchenough Bridge; *Bulawayo; Eldorado; Melsetter District; *Mount Silinda (Chirinda); Salisbury District; Vumba Mountain. **Bechuanaland Protectorate:** Lobatsi; Mabeleapudi; Okavange (Okawango);. . **Transvaal:** Barberton; De Kaap Goldfields; *Hectorspruit; Klaserie River valley; Linokana; Newington Farm; *Olifants River District; Pongola River; Potchefstroom; *Pretoria; Rustenberg; Waterval Onder; Zeekoegat Farm; Zoutpansberg. **Zululand:** *Hluhluwe; Indukuduku; Lake Sibayi; Ngoye Hills; Ntambanana. **Natal:** Pietermaritzburg; Umzumbe Valley; *Umvoti River; Umkomaas River; Verulam. **Cape Province:** Ghousis (Ghous) near Upington; Kimberly; Madibi; Mafeking; Taungs. **South West Africa:** Keetmanshoop; Kuibis; Narudas Süd Farm; Otjimbingue; *Quickborn Farm near Okahandja; Wasserfall; *Waterberg. **Angola:** Benguela; Caconda; Campulu (Kampulu) near Casinga; Casinga (Kasinga); Chiyaka District; Cuvelai (Kuvelai); Dombe; Mucungu. **Belgian Congo:** Lukafu; Nyanza, Lake Tanganyika.

Range. Africa south of the equator (central Kenya to northern Cape Province)[1].

Lygodactylus grotei grotei Sternfeld

1865b. *Hemidactylus capensis* Peters (not Smith), p. 455.
1868b. *Liurus capensis* Cope (not Smith), p. 320.
1900b. *Lygodactylus capensis* Tornier (not Smith), p. 587.
1911b. Nieden, p. 442.
1913c. Nieden, p. 66.
1937a. Parker, p. 630.
1940. Parker, Moreau, Pakenham, p. 310.
1911a. *Lygodactylus Grotei* Sternfeld, Sitz. Ges. Naturf. Freunde Berlin, p. 245: Mikindani, etc., Tanganyika Territory.
1911. Grote, p. 349.
1911c. Sternfeld, p. 415.
1913. Boettger, p. 358.

[1] FitzSimons (1943) regards the geckos from South West Africa as a subspecies *L.c. bradfieldi*, but the key characters allegedly distinguishing them fail to do so in series.

1913c. Nieden, p. 67.
1920a. Loveridge, p. 136.
1923d. Loveridge, p. 846.
1923h. Loveridge, p. 940.
1924b. Loveridge, p. 9.
1928c. Barbour & Loveridge, p. 145.
1928d. Loveridge, p. 63.
1929h. Loveridge, p. 46.
1933h. Loveridge, p. 287.
1934. Brongersma, p. 166.
1937f. Loveridge, pp. 492, 495.
1941. Moreau & Pakenham, p. 107.
1920a. *Lygodactylus capensis mossambica* Loveridge, Proc. Zool. Soc. London, p. 135: Lumbo, Mozambique.
1942e. *Lygodactylus grotei grotei* Loveridge, p. 324.

For citations of "*grotei*" from the Belgian Congo, see *Remarks* below.

Native names. *Kihetupetu* (Konde); *nangwagiwa* (Mahiwa); *nankwakwa* (Yao).

Description. Differs only from *capensis* in the possession of a median series of transversely dilated subcaudals, intermediates occur in Mozambique and at Ujiji. My sole reason for not treating *grotei* as a subspecies of *capensis* is on account of the obscure distribution of the two in Tanganyika Territory. Undoubtedly this has been complicated by transportation for in the Territory *grotei* is in the main a gecko of the coastal belt, but follows the railways into the interior where *capensis* occurs chiefly in the uplands but also in the Great Lakes region.

Snout elongate, the distance from its end to the anterior border of the eye much greater than (except in hatchlings) the interorbital distance anteriorly, much longer than (except in hatchlings) the distance between the eye and the ear-opening, which is small, roundish or oval; nostril pierced above the first labial so posterior to the suture between rostral and first labial, being between these shields (or the rostral excluded) and 1–3 nasals, the uppermost separated from (rarely in contact with) its fellow by 1–2 granules; mental deeply fissured, followed by 2–4, normally 3, small postmentals; original tail below with imbricate scales of which the median series is transversely enlarged. Males with 4–6, rarely 8[1], preanal pores.

For scale and pore counts, see statistical table on p. 200.

Color. Above, gray, olive, or brown; a dark streak from nostril

[1] Only in one (M.C.Z. 47331) male from Mbanja of scores examined.

through eye to shoulder and usually extending along flank (where it may carry light spots or break up into a series of dark dashes) to groin or base of tail; head and back finely vermiculate or flecked with black, the flecks coalescing to form broken lines, sometimes a light, scarcely distinguishable, vertebral line; a broad, pale band from end of snout passes over upper part of eye to become a pinkish brown dorsolateral line extending to lumbar region or base of tail; tail reddish, faintly mottled with gray. Below, white, immaculate, or throat flecked with darker (in some Lumbo males even dark with a light Λ-shaped or ∩-shaped central marking); chest and belly sometimes yellowish white (cream color in life); tail pinkish, or, in young geckos, distinctly reddish.

Size. Total length of ♂, 71 (31 + 40) mm., from Ujiji, of ♀, 70 (33 + 37) mm., from Morogoro, while the average of thirty-one females from Lumbo was 57 (29 + 28) mm., many having regenerated tails. The measurements given by Barbour & Loveridge (1928c) for a male were due to a misprint.

Remarks. In addition to the brief original description, Boettger (1913) has entirely redescribed *grotei* on the basis of the 19 cotypes. In drafting the above redescription I have utilized 22 topotypes as well as the extensive material in the Museum of Comparative Zoölogy. *L. c. mossambica* is unquestionably a synonym and my reason for not treating *grotei* as a race is stated above.

Witte (1931c, 1933m) referred a single gecko from Tembwe, B. C. to *grotei*, a locality from which he had many *p. gutturalis;* he (1933m) also identified two geckos from Basongo, B. C., as *grotei.* One of these, now M.C.Z. 42858, has been carefully examined and is a ♀ *picturatus* with dusky obsolescent gular markings. I should call it a *picturatus* > < *gutturalis*, surprisingly enough with *picturatus* dominant. The ♀ gecko from Fort Archambault, French Congo, referred to *picturatus* by Sternfeld (1917) appears to be closely similar.

The occurrence of geckos embedded in Zanzibar copal, referred to in detail by Peters, Cope, and others, under the name of *capensis*, is here, on geographical grounds, assumed to be *grotei*; the specimens should be reëxamined.

Breeding. On February 4, at Morogoro, a pair of geckos were seen in coitu about 8 a.m. when dew drops, sparkling in the early sunshine, bespangled the spray of green mimosa to which they were clinging.

The two eggs, rather more oval than those of many geckos, are cemented in pairs and deposited in a wide variety of situations, such as inside the dried outer leaves on the stem of a banana plant, one

pair at a height of five feet from the ground; under weeds or the piled fronds of a coconut palm; in bundles of dry grass assembled for thatching; beneath the fallen thatch of a collapsed hut; even beneath a stone.

Over a series of years, eggs were found on the following dates:

March 23, at Mikindani, measuring 6.5 x 5 mm.
March 25, at Kitaya, measuring 5.5 x 5 mm.
July 10, at Lumbo, a gravid ♀ held almost matured eggs.
July 27, at Lumbo, eggs measuring 7 x 6 mm. hatched on October 16, the resultant young measuring 24 (13 + 11) mm.
October 22, at Mkarazi, eggs were found to hold embryos.
November 9, at Dar es Salaam, eggs measuring 7 x 6 mm.
November 11, at Bagamoyo, eggs measuring 6 x 5 mm.
November 15, at Tanga, eggs measuring 7 x 5.5 mm., hatched on the same day, the emergent young measuring 25.5 (13.5 + 12) mm.

Diet. One gecko was observed to stalk and spring upon a cockroach that was resting on the main stem of a shrub. On another occasion I observed a young gecko seize a small staphylinid bettle, then, dropping it quickly, shake its head as might a person who had taken a nauseous draught. Termites, small beetles, a large beetle larva, and a bluebottle were among the identifiable contents of their stomachs.

Parasites. Red mites are frequently present on the ventral surface. At Bahi and elsewhere, these geckos often suffer from a glandular infection of the throat and sublabial region which results in goitre-like swellings of the affected areas.

Enemies. The spotted wood snake (*Philothamnus s. semivariegatus*), from whose stomachs I have recovered eleven of these little geckos, would certainly appear to constitute their principal foe.

Habits. These diurnal geckos are extremely active, descending from the crowns of coconut palms in the early morning so as to bask in the rays of the rising sun. After warming up they devote much of the morning to the pursuit of prey; towards evening they select some spot still reached by the sinking sun and on trees devoid of crannies or loose bark, apparently spend the night among rubbish at its base. Though unusual, one may at times see a *grotei* on the same tree as one of its larger relatives, *L. p. picturatus*. Occasionally one of these geckos will squeak when captured.

Habitat. Pawpaw, banana, or smooth barked trees, less frequently found on shrubs, stumps, or fallen logs, while at Bangwe, on the shores

of Lake Tanganyika, they may be seen running over rocks almost at the water's edge.

Localities. **Tanganyika Territory:** *Bagamoyo; *Bahi; *Bumbuli; *Dar es Salaam; *Dodoma; *Dutumi; *Igulwe (Gulwe); *Itende; Kilimanjaro—west of (as *capensis*); *Kilosa; *Kitaya; *Lake Tanganyika; Mafia Island; Makonde Highlands; *Manyoni; *Mbanja; *Mikindani; *Mkarazi; *Morogoro; *Msiha; *Mukwese; *Saranda; *Shinyanga; *Tanga; *Ujiji (intermediates with *capensis* also occur here); *Vituri. **Mozambique:** Beira (or intermediates); Cabayra; Cogano (or intermediates); *Lumbo; *Mosuril Bay. (Reported in error from **Belgian Congo**).

Range. Chiefly lowlands of Tanganyika Territory south to Mozambique.

Lygodactylus grotei pakenhami Loveridge

1941e. *Lygodactylus grotei pakenhami* Loveridge, Proc. Biol. Soc. Washington, **54**, p. 176: Wete, Pemba Island.
1942. Moreau & Pakenham, p. 61.

Description. Snout elongate, the distance from its end to the anterior border of the eye much greater than the distance between the orbits anteriorly, much longer than the distance between the eye and the ear-opening, which is small, roundish; nostril pierced above the first labial, so posterior to the suture between rostral and first labial, being between these shields, or the rostral just excluded, and 2–3 nasals; mental deeply fissured, followed by 2–4 small postmentals; original tail below with imbricate scales of which the median series is transversely enlarged.

For scale and pore counts, see statistical table on p. 200.

Color. Above, gray; a *narrow* dark streak from nostril through eye to above ear-opening, *not* extending to flanks; head and back conspicuously flecked with black, no light vertebral or lateral bands, or latter slightly indicated; tail somewhat paler, with darker and lighter mottlings. Below, white, uniform.

Size. Total length of paratype ♂ (M.C.Z. 46084), 62 (28 + 34) mm., of type ♀ (M.C.Z. 46082), 60 (28 + 32) mm.

Remarks. The five geckos on which this form is based, the first examples of the genus ever to be recorded from the island, were compared with sixty typical *g. grotei* from widely scattered localities in Tanganyika Territory and Mozambique, and found to differ in those characters stated in the key.

Breeding. On December 22, at Wete, the type held two ova, each measuring about 4.5 x 4 mm.

Habitat. The Wete series was taken on trees (*Pterocarpus* sp. and *Cassia javanica*) in a garden, also on veranda and walls of house.

Localities. **Pemba Island:** Kinazini; Wete.

Range. Pemba Island.

Lygodactylus ocellatus Roux

1907b. *Lygodactylus ocellatus* Roux, Zool. Jahrb. Syst., **25**, p. 406, pl. xiv, figs. 1–3: Pretoria district, Transvaal.
1910b. Boulenger, p. 459.
1910a. Hewitt, p. 58.
1910c. Hewitt, pp. 79, 82, 86.
1911b. Hewitt, p. 43.
1914a. Hewitt, p. 246.
1934. Brongersma, p. 166.
1936. Lawrence, p. 38.

Description. Snout moderately elongate, the distance from its end to the anterior border of the eye occasionally almost equal to, though usually greater than, the interorbital distance anteriorly, slightly longer than the distance between the eye and the ear-opening, which is large, roundish; nostril pierced directly above, or slightly before or behind, the suture between rostral and first labial, being between these shields and 2–3 nasals, the uppermost separated from (rarely in contact with) its fellow by 1–2 granules; mental entire, followed by 2–3 small mentals; original tail below with subequal imbricate scales.

For scale and pore counts, see statistical table on p. 200.

Color. Above, olive or brown; a dark streak from nostril through eye sometimes reaches the shoulder; head, back and limbs with numerous ocelli, whose light centres are occasionally lacking leaving the back with brown vermiculations; tail usually a pale buff, flecked or spotted with brown. Below, white, immaculate.

Size. Total length of ♂, 61 (31 + 30) mm., from Carolina (M.C.Z. 41829), and ♀, 55 (27 + 28) mm., from Doornkop (M.C.Z. 21362), the former apparently surpassed in head and body length by a cotype of 38 mm.

Remarks. This distinctive species was described from three males and three females, one (M.C.Z. 20976) of which, together with eight other specimens in the Museum of Comparative Zoölogy, have been studied.

Roux stated that there were 3 pairs of scansors ("lamellae") under

the toe. He probably overlooked the diminutive fourth for both Hewitt and I have failed to find specimens with 3.

Localities. **Transvaal:** Athol; *Carolina; *Doornkop; *Pretoria; *Waterval Boven; Waterval Onder; Witpoort.

Range. Transvaal.

Lygodactylus methueni FitzSimons

1937b. *Lygodactylus methueni* V. FitzSimons, Ann. Transvaal Mus., **17**, p. 275, figs. 1–2: Woodbush, Pietersburg District, Transvaal.

Description. Snout moderately elongate, the distance from its end to the anterior border of the eye greater than the interorbital distance anteriorly, longer than the distance between the eye and the ear-opening, which is small, roundish; nostril pierced above the suture between rostral and first labial, being between these shields and 3 nasals; mental entire, followed by 2 small postmentals; original tail below with subequal imbricate scales.

For scale and pore counts, see statistical table on p. 200.

Color. Above, olive; crown of head with a few indistinct brownish markings alternating with large whitish spots; a dorso-lateral as well as a lateral series of pale spots enclosed within the angle of Λ-shaped reddish-brown marks; hind limbs spotted with lighter; tail with large whitish spots alternating with angular reddish-brown markings. Below, yellowish, throat faintly vermiculate with gray, a bluish gray streak along sublabial region.

Size. Total length of type ♂, 91.4 (41.4 + 50) mm.

Remarks. Known only from the unique type, which appears to have affinities with *a. angularis* of Nyasaland. For data not in the original description I am indebted to Mr. V. FitzSimon's letter of 18.vii.41.

Localities. **Transvaal:** Woodbush, Pietersburgh District.

Range. Pietersburgh District, northern Transvaal.

Lygodactylus thomensis (Peters)

1880c. *Scalabotes thomensis* Peters, Monatsb. Akad. Wiss. Berlin, p. 795, pl. –, fig. 1: Rolas Islet, Sao Tomé Island.
1885. Greeff, p. 48 (corrects type locality to Rolas).
1886a. Bocage, p. 68.
1892c. Bocage, p. 230.
1885. *Scalabotes Rolasi* Greeff, 1884, Sitzb. Ges. Beförd. Naturw. Marburg, p. 48: (alternative name for *thomensis* from Rolas).
1885d. *Lygodactylus thomensis* Boulenger, p. 161.

1893a. Bocage, p. 46.
1902c. Tornier, p. 671.
1903a. Bocage, pp. 53, 59.
1905. Bocage, p. 92.
1906i. Boulenger, p. 199.
1917. Sternfeld, p. 421.

Further citations of *"thomensis"* will be found under *conradti* and *conraui*, with which species it has been confused.

Description. Snout broad, the distance from its end to the anterior border of the eye about equal to the interorbital distance anteriorly, slightly longer than the distance between the eye and the ear-opening, which is moderate, roundish; nostril pierced above the suture between rostral and first labial, being between these shields and 2 nasals, the uppermost separated from its fellow by 2 granules; upper labials 6–7[1]; lower labials 6–7[1]; mental entire, followed by 2 small postmentals; original tail below with imbricate scales of which the median series is transversely enlarged.

For scale and pore counts, see statistical table on p. 200.

Color. Above, olive or olive brown; sometimes a dark transverse streak between the anterior angles of the eyes; a dark streak from nostril through eye to above ear-opening; back spotted with darker; tail banded with black. Below, white or greenish yellow, throat citron yellow with a dusky median streak and other irregular markings; belly uniform or variegated with brown.

In his description, Peters reverses the usual method and treats the markings as the ground color, viz.: "submental region black-brown, with two irregularly V-form yellow markings" (translation). In our now faded cotype (M.C.Z. 21940) the throat is white with dusky markings as I have described above.

Size. Total length of cotype ♂, 69 (31 + 38) mm., and ♀, 64 (31 + 33) mm.

Remarks. Overlooking the elongate fourth toe of *thomensis*, I (1938d) stupidly synonymized *conraui* with this species.

Habitat. Especially abundant on cocoa trees (Greef), up to 500 metres.

Localities. **Ilas Annobon:** Laguna Apata; Pueblo. **Ilha de Sao Tomé:** Ilheu das Rolas; Sao Tomé township. **Ilha de Principe:** In township.

Range. Islands in Gulf of Guinea opposite the French Congo.

[1] Peters gives 9 upper, but says that last 2 are very small, similarly he gives 8 lower, last very small.

Lygodactylus conraui Tornier

1890. *Lygodactylus sp.* Büttikofer, pp. 438, 478.
1899a. *Lygodactylus thomensis* Werner, p. 133.
1938d. Loveridge, p. 51.
1902c. *Lygodactylus conraui* Tornier, Zool. Jahrb. Syst., **15**, p. 670, pl. xxxv, fig. 3: Bipindi, French Cameroons, and Fernando Po.
1906i. Boulenger, p. 199.
1910. Müller, p. 558.
1910. Sternfeld, p. 15.
1911. Lampe, p. 155.
1919. Schmidt, p. 599.
1927. *Lygodacutylus* (*sic*) *strongi* Barbour & Loveridge, Proc. New England Zoöl. Club, **10**, p. 18: Firestone Plantation, Du River, Liberia.
1930a. Barbour & Loveridge, p. 775.

Description. Snout broad, the distance from its end to the anterior border of the eye about equal to the interorbital distance anteriorly, slightly longer than the distance between the eye and the ear-opening, which is small, roundish; nostril pierced above the suture between rostral and first labial, being between these shields and 2–3 nasals; upper labials 7–9; lower labials 6–7[1]; mental entire, followed by 3 small postmentals; original tail below with imbricate scales of which the median series is transversely enlarged.

For scale and pore counts, see statistical table on p. 200.

Color. Above, pale brown, more or less uniform or speckled with darker, or a dusky, broad, vertebral line; flanks sometimes darker brown; tail uniform, or speckled with darker and lighter. Below, white, immaculate, or throat with a very faint median line. For a detailed description of fresh coloration see Tornier (1902c).

Size. Total length of ♂, 56 (27 + 29) mm., from Sakbayeme (M.C.Z. 22426), and of ♀, 55 (26 + 29) mm., from Ganta (M.C.Z. 43224), but surpassed by one with a head and body length of 30 mm. from Ganta.

Remarks. It should be pointed out that Cameroons geckos have 2 nasals entering nostril, but the three known Liberian specimens (*strongi*) have 3, the latter also agree in having 5 paired lamellae under the fourth toe, whereas 4 may be normal and 5 rare in Cameroons geckos. More material is needed before it can be decided whether *strongi* merits recognition as a race, the strange discontinuous distribution appears to be paralleled by that of *fischeri*, which is known from

[1] 9, *fide* Tornier.

Sierra Leone and the Cameroons-Gaboon region two thousand miles apart. Are we to invoke artificial introduction as the explanation?

Localities. **French Cameroons:** Bipindi; Dibango (Dibongo); Sakbayeme. **British Cameroons:** Isongo. **Fernando Poo. Liberia:** Firestone Plantation No. 3, Du River; Ganta.

Range. Cameroons and Fernando Poo, also Liberia.

Lygodactylus angularis angularis Günther

1893. *Lygodactylus angularis* Günther, 1892, Proc. Zool. Soc. London, p. 555, pl. xxxiii, figs. 1–3: Shire Highlands, Nyasaland.
1894e. Boulenger, p. 722.
1896a. Bocage, p. 103.
1897e. Boulenger, p. 800.
1898. Johnston, p. 361.
1933h. Loveridge, p. 292.
1934. Pitman, p. 302.
1937f. Loveridge, p. 502.

Native names. Linyarupanga (Hehe); *kambiri* (Kinga); *komakipiki* (Nyakusa). The Banyakusa consider it to be the young of *Agama atricollis.*

Description. Snout broad, the distance from its end to the anterior border of the eye about equal to, or slightly greater than, the interorbital distance anteriorly, slightly longer than the distance between the eye and the ear-opening, which is small, roundish; nostril pierced above the suture between rostral and first labial, being between these shields and 2–3 nasals; mental entire, followed by 1–2 small postmentals; original tail below with imbricate scales of which the median series is transversely enlarged.

For scale and pore counts, see statistical table on p. 200.

Color. Above, olive or brown; a dark brown streak from nostril through eye to above ear-opening; a series of alternating dark and light spots, or sometimes a light fawn band, commences behind ear and continues to base of tail; back marbled with darker and lighter flecks, sometimes a light vertebral line. Below, white, the throats of both sexes with a series of convergent dark lines from the labials to the base of throat, the anterior forming two V-shaped marks whose apices tend to fuse and form a single line posteriorly.

In life the throats of males are lemon yellow, the remaining lower surface rose pink, somewhat brighter in the anal region; females on the other hand are entirely lemon-yellow below.

Size. Total length of ♂, 84 (42 + 42) mm., and of ♀, 81 (46 + 35) mm., both from Madehani.

Breeding. During February 14–19, at Madehani, pairs of ova in various stages of development were present in all fifteen females; some ova, measured on the 14th, were 6 and 7 mm. in diameter, those of 8 mm., found a few days later, were about ready for laying.

Diet. Beetles, including a Curculionid and Lampyrid; beetle larvae; caterpillars, including a hairy one and another of 35 mm. in length; ants; bugs; spiders; and in addition the stomachs of two geckos held remnants of shell which I have little hesitation in saying were from the eggs of a *Lygodactylus*, and not from snails.

Parasites. Red mites present in the anal region.

Habitat. Except for Pitman's Abercorn record, which perhaps should be referred to the subspecies found in the Katanga, *L. a. angularis* might be considered a montane rain-forest form occurring between 5500 and 7500 feet. Those I captured were on tree trunks and a telegraph pole. Despite the fact that 22 were obtained at Madehani, the species appeared to me to be uncommon there for I was constantly on the lookout for these geckos. Sixteen of those secured were taken by a lad who did little else but search for them during the fortnight that I was camped at Madehani.

Localities. **Tanganyika Territory:** *Madehani; *Nkuka Forest; *Tandala. **Nyasaland:** Masuku Mountains; Nyika Plateau; Shire Highlands. **Northern Rhodesia:** Abercorn; Muchingas near Serenje.

Range. Southwestern Tanganyika Territory and Nyasaland west to Northern Rhodesia.

Lygodactylus angularis heeneni Witte

1933f. *Lygodactylus heeneni* Witte, Revue Zool. Bot. Africaine, **23**, p. 185: Kapiri, Katanga, Belgian Congo.
1933m. Witte, p. 70, pl. iii, figs. 1–1c.

Description. Differs from the typical form only in the obsolescent gular markings of the female which, in the typical form, are equally well developed in both sexes; and in the more numerous pores of the male.

Snout broad, the distance from its end to the anterior border of the eye slightly greater than the interorbital distance anteriorly, slightly longer than the distance between the eye and the ear-opening, which is small, roundish; nostril pierced above the suture between rostral and first labial, being between these shields and 3 nasals, mental entire, followed by 3 small postmentals; original tail below with imbricate scales of which the median series is transversely enlarged.

For scale and pore counts, see statistical table on p. 200.

Color. Above, olive or brown, snout lighter; a dark brown streak from nostril through eye to above ear-opening; a series of black-edged, fawn-colored spots on a light fawn band commences behind eye and continues to base of tail; back marbled with darker and lighter flecks, a vertebral series of elongate light spots. Below, white, throat of male with a series of convergent dark lines from the labials to the base of throat, such markings being only faintly visible in the female.

Size. Total length of type ♂, 77 (34 + 43) mm., and of paratype ♀, 76 (37 + 39) mm.

Remarks. Comparison of a paratype female (M.C.Z. 42859) with our series of typical *angularis*, convinces me that the two differ only in the characters indicated in the key.

Localities. **Belgian Congo:** *Kapiri in Katanga.

Range. Southeastern Belgian Congo.

Lygodactylus picturatus lawrencei Hewitt

1926b. *Lygodactylus lawrencei* Hewitt, Ann. S. African Mus., **20**, p. 478: Otjitambi, Kakoveld, South West Africa.

1936. Lawrence, p. 38.

Description. Differs from the typical form in gular markings and number of preanal pores.

Nostril between first labial and 2–3 nasals; mental entire, followed by 2 small postmentals.

For scale and pore counts, see statistical table on p. 200.

Color. Above, ashy gray, spotted or streaked with darker; a dark streak from nostril passes through eye to shoulder, another extends from eye along the dorsolateral region, another from gape to base of fore limb, etc. etc. Below, white, chin shields edged by a narrow dark streak extending to a point below and behind the ear-opening; throat with two chevron-shaped markings and a central gular spot.

Size. Total length of type ♂, from snout to anus, 26.5 mm.

Remarks. Known from two specimens[1] of which the type only is in the South African Museum and lacks a tail. As the stump bore no enlarged scales Hewitt assumed that its relationships lay with *ocellatus* with which species he contrasts it in considerable detail. He lays some

[1] Since the above was written, FitzSimons (1943, pp. 49, 55) has recorded a third example (from Kowares, S.W.A.) with a "partly reproduced" tail whose subcaudals he characterizes as "more or less equal in size." This is surprising and if it applies to the original part of the tail, would justify his regarding *lawrencii* as a full species more nearly related to *ocellatus* and *methueni* than to the *picturatus* group.

stress on the differentiation of the scales on the under side of the thighs, this, however, is a sexual character common to the males of most members of the genus.

Localities. **South West Africa:** Otjitambi.

Range. South West Africa.

Lygodactylus picturatus chobiensis FitzSimons

1932. *Lygodactylus picturatus chobiensis* V. FitzSimons, Ann. Transvaal Mus., **15**, p. 35: Kabulabula, Chobe River, Bechuanaland Protectorate.

1935b. V. FitzSimons, p. 335, fig. 10.

Description. Differs from the typical form in gular markings, from *L. p. gutturalis* by its single, ill-defined, gular chevron, and general color pattern.

Nostril between first labial and 2 nasals; mental entire, followed by 3 small postmentals.

For scale and pore counts, see statistical table on p. 200.

Color. Above, dull gray to grayish brown, irregularly mottled with black-edged, light, bluish-gray spots or patches; a dark streak from nostril through eye to shoulder; on lower flanks from axilla to hind limb a russet-brown band. Below, white, lower labials tinged with reddish brown; chin shields edged by a narrow dark streak extending to a point below the ear-opening; throat with an ill-defined, grayish-brown, chevron-shaped marking; chest to anus ochre yellow; tail slate gray, with a darker, ill-defined, median line.

Size. Total length of type ♂, 80 (39.6 + 40.4) mm., and of paratype ♀, 67 (36 + 31) mm.

Localities. **Bechuanaland Protectorate:** Chobe River, Kabulabula; Kasane.

Range. Bechuanaland Protectorate.

Lygodactylus picturatus gutturalis (Bocage)

1873b. *Hemidactylus gutturalis* Bocage, Jorn. Sci. Lisboa, **4**, p. 211: Bissao, Portuguese Guinea.

1885d. *Lygodactylus gutturalis* Boulenger, p. 161.

1888a. Günther, p. 50.

1896a. Bocage, p. 75, pl. i, fig. 3.

1897a. Bocage, p. 194.

1902. Ferreira, p. 232.

1906i. Boulenger, p. 199.

1906. Johnston, p. 833.

1908c. Boulenger, p. 5.
1911c. Boulenger, p. 162.
1913a. Werner, p. 21.
1933j. Witte, p. 114.
1933m. Witte, p. 69.
1940b. Monard, p. 152.
1902d. *Lygodactylus picturatus* Boulenger (not Peters), p. 445.
1912b. Sternfeld, p. 385.
1912c. Sternfeld (part), p. 205 (Lake Kivu and Usumbura geckos).
1917. Sternfeld, p. 421.
1919. *Lygodactylus picturatus gutturalis* Schmidt, pp. 462, 601, map 9, pl. xiv, figs. 2–3.
1923d. Loveridge, p. 846.
1924b. Loveridge, p. 9.
1928. Angel, p. 246.
1929h. Loveridge, p. 47.
1930b. Barbour & Loveridge, p. 788.
1933h. Loveridge, p. 291.
1934. Brongersma, p. 166.
1936h. Loveridge, p. 51.
1936j. Loveridge, p. 290.
1937f. Loveridge, p. 495.
1941. Witte, p. 114.
1942e. Loveridge, p. 325.
1931c. *Elasmodactylus Grotei* Witte (not Sternfeld), p. 42.
1933m. *Lygodactylus Grotei* Witte (not Sternfeld), p. 70.

Native names. *Ageragera* (Karamojong); *kibaragwesi* (Sabei); *abagwakulu* (Amba).

Description. Differs from the typical form only in gular markings and coloration.

Nostril between first labial and 2–3 nasals; mental entire, followed by 1–3, usually 2, small postmentals.

For scale and pore counts, see statistical table on p. 200.

Color. Above, grayish or brownish, spotted and streaked with darker and lighter, these mottlings often taking the form of ocelli. Below, white, throat in both sexes with three or two chevron-shaped markings, where the latter then the third is represented by an arrowhead mark or spot between the posteriorly directed arms of the second chevron, occasionally these markings may coalesce to form a network; belly (yellow in life) immaculate; tail with a median series of dusky spots.

Size. Total length of ♂, 84 (42 + 42) mm., and of a ♀, 74 (38 + 36) mm., both from Ujiji.

Breadth of head is included in length from 1.1–1.2 times (only three geckos with 1.2) average 1.1 (based on 25 geckos from Ujiji).

Breeding. On May 28, at Ujiji, several females were gravid, but ova still small. In May and June, at Garamba, three females held ova measuring 5 or 6 mm. in diameter, while an egg, measuring 8 x 6 mm., containing an embryo, together with a newly hatched young, were also taken in May (Schmidt). On December 7, at Nabagut, and December 8, at Nyenye, eggs were found in the decayed interiors of hollow trees.

Diet. At Garamba, Lang records termites, flies, tiny wasps, beetles, larvae, and bugs, to which Schmidt adds that five geckos had eaten membracids, a sixth held an ant and a small spider.

Enemies. One recovered from the stomach of a spotted wood snake (*Philothamnus s. semivariegatus*) at Budongo Forest, Katwe, and on Mt. Debasien.

Habitat. Invariably I have found these geckos on trees, but Lang, who collected fifty-five at Garamba, writes: "It was no small surprise to see so typical an arboreal form living on the ground; nearly all of the fifty-five specimens were found hiding near the earth, sometimes clinging upside down to pieces of wood; but the reason for this change of habitat is easily explained. In May and June, the beginning of the rainy season, the Mondo and Baka plant their fields. Some time before, they clear large patches of brush and former plantations, piling heaps of the cumbersome rubbish, which is burned when dry. The many tiny creatures living in this scrub are thus thrown together and others are attracted by such accumulations, true also of the few reptiles which prey upon them. In these regions dead vegetable matter is otherwise scarce and it seems natural that so alert and agile a gecko, accustomed to daylight, should come in numbers to profit by an increase in food . . . " (Schmidt).

Does not occur above 2000 metres in the Parc National Albert (Witte).

Localities. **Anglo-Egyptian Sudan:** *Nimule. **Uganda:** *Bisu; Budongo Forest; *Bundibugyo; Kananyait[1]; Loborokojo[1]; Mbale[1]; *Mount Debasien; *Nabagut; *Nyenye; Sesse Islands. **Tanganyika Territory:** *Ujiji. **Belgian Ruanda:** Keshero; Lake Kivu; Rugari; Usumbura. **Belgian Congo:** Basongo (intermediate[1]); Bena Makima; *Beni; Bitshumbi, Lake Edward; Bunia[1]; Djamba[1]; *Garamba; *Irumu; Kalinga; Kamanda, Lake

[1] These specimens have been seen also. A.L.

Edward; Katanda; Katobwe[1]; Lubongola, s.w. Lake Kivu; Luvungi; Mangbetu (Monbuttu); Mauda; Mutwanga; *Rutshuru; Rwindi River; Tembwe (+ intermediate); Tshambi. **French Equatorial Africa:** Fort Archambault (recorded as *picturatus*). **Portuguese Guinea:** Bissau; Bolama; Contubo-el; Geba; Madina Boé; Pitche.

Range. Southern Anglo-Egyptian Sudan and Uganda south to extreme western Tanganyika Territory, west to French Equatorial Africa; also Portuguese Guinea.

Lygodactylus picturatus depressus Schmidt

1919. *Lygodactylus depressus* Schmidt, Bull. Am. Mus. Nat. Hist., **39**, p. 466, pl. xvii, fig. 2: Medje, Ituri Forest, Belgian Congo.
1934. Brongersma, p. 166.

Description. A somewhat doubtful race, differing from *gutturalis* only in gular and subcaudal markings as indicated in the key. After examination of three paratypes one of which is now M.C.Z. 45987, I do not think that the habitus is more depressed than in *gutturalis*.

Nostril between first labial and 2–3 nasals; mental entire, followed by 2–3 small postmentals. For scale and pore counts, see statistical table on p. 200.

Color. Above, dark bluish gray, spotted and streaked with darker, more heavily anteriorly; tip of snout black followed by a dark transverse bar and a second bar connecting the orbits anteriorly; an indistinct stripe through eye to shoulder. Below, white, throat in both sexes with two black chevron-shaped markings, the posterior usually converging to enclose a dark spot (which may be absent); belly and tail immaculate (yellow in life).

A female from Lukolela, received as representing this form, shows distinct traces of a median series of dusky markings beneath the tail. Lang comments on changeability and cites the case of an entirely black gecko which became bluish gray after injection.

Size. Total length of type ♂, 78 (38 + 40) mm., and of a paratype ♀, 72 (35 + 37) mm.

Remarks. The above description is based on the original and on a further examination of the Medje series only. Additional characters cited by Schmidt are: "habitus stout, depressed; head flat; orbits little raised;" and he thinks that the legs are shorter and the dorsal granules somewhat smaller than in *gutturalis*.

Localities. **Belgian Congo:** *Lukolela (?, *vide supra*); *Medje.

Range. Eastern Belgian Congo.

Lygodactylus picturatus keniensis Parker

1895i. *Lygodactylus picturatus* Boulenger (not Peters), p. 11.
1927. *Lygodactylus picturatus gutturalis* Calabresi (not Bocage), pp. 26, 41.
1930c. Scortecci, p. 3.
1932a. Parker, p. 223.
1940a. Scortecci p., 142 (reprint, p. 22).
1936. *Lygodactylus picturatus picturatus* Roux (not Peters), p. 161.
1936e. *Lygodactylus picturatus keniensis* Parker, Ann. Mag. Nat. Hist. (10), **18**, p. 602: Lodwar, Lake Rudolf, Kenya Colony.
1937f. Loveridge, p. 491.

Description. Differs from the typical form and all its allies in the presence of a white spot near the apex of the chin.

Nostril between first labial and 2 nasals; mental entire, followed by 2–3 small postmentals. For scale and pore counts, see statistical table on p. 200.

Color. Above, head and shoulders bright mustard yellow, spotted and streaked with darker; a dark streak from nostrils through eye to shoulder, sometimes continued to hind limb as a series of feebly-marked ocelli; rest of body, limbs, and tail brownish, spotted and streaked with darker. Below, white, throat of both sexes with an o-shaped spot on the postmental region united with the apices of two black, chevron-shaped markings followed by indications of a third; tail immaculate. For further details, see Parker (1936e), and Roux (1936).

Size. Total length of ♂, 77 (42 + 35) mm., from Negelli, and of cotype ♀, 65 (35 + 30) mm. from Kerio River (M.C.Z. 42697).

Parasites. Mites have been recorded by Calabresi (1927).

Localities. **Ethiopia:** Bourille, Omo River; Upper Ganale River[1]. **Somalia:** Caitoi; Moyale; Negelli; Uddur; Uegit. **Kenya Colony:** Elmenteita[2]; *Guaso Nyiro; *Kerio River; Lake Baringo[2]; *Lodwar; Lokitaung[2]; near Nepal Pass, Turkana[2].

Lygodactylus picturatus sudanensis Loveridge

1908. *Lygodactylus picturatus* var. *gutturalis* Werner (not Bocage), 1907, p. 1833.
1913. Barbour, p. 145.
1919. Werner, p. 475.
1928b. *Lygodactylus gutturalis* Scortecci (not Bocage), p. 314.
1930a. Scortecci, p. 206.
1935g. *Lygodactylus picturatus sudanensis* Loveridge, Proc. Biol. Soc. Washington, **48**, p. 197: Abu Zor, Senaar, Anglo-Egyptian Sudan.

[1] The halfgrown young one recorded by Boulenger (1895i) as *picturatus;* not seen by me.
[2] Seen by Parker and referred to *keniensis.*

Description. Differs from the typical form in gular markings and general coloration.

Nostril between first labial and 2–3 nasals; the uppermost separated from its fellow by 1–3 granules, or by an upward and backward prolongation of the rostral (in a Singa gecko only); mental entire, followed by 2–4 small postmentals.

For scale and pore counts, see statistical table on p. 200.

Color. Above, uniformly pale olive; a black spot on the middle of the snout; an undulating transverse bar connecting the orbits anteriorly; a dark streak from nostril through eye to flank where it terminates by giving off one or two spots; a second, but shorter, line from the commissure of the mouth; two or three more or less parallel series of short, longitudinal, brown streaks on the occiput, nape and anterior portion of back. Below, white, throat of male with a black median streak which is fused with an inner ⋂-shaped marking, uniting, or just failing to unite it with the outer ⋂-shaped marking, and usually fused with a posterior basal patch or blotch which rarely retains any resemblance to the third chevron of *L. p. gutturalis:* throat of female immaculate.

For a very detailed description, see Werner, 1908 (1907), p. 1833, who states that one never sees Sudanese geckos with yellow head or black throat such as is normal for East African *picturatus.*

Size. Total length of type ♂, 66 (34 + 32) mm., but surpassed in body length by 3 mm., in tail length by 4 mm., by two others. The ♀ paratypes measure 36, 34 and 33 mm. in head and body, their tails being regenerated or missing.

Werner (1908) remarks that one encounters both broad and long-headed forms in the Sudan and that it has no sexual significance; the observation requires confirmation.

Habitat. Dwells on acacia and other trees, hiding in fissures; occasionally found on houses. Werner caught one on board a Nile steamer, showing how the transportation of this species is likely to confuse racial characters.

Localities. **Eritrea:** *Cunama. **Anglo-Egyptian Sudan:** *Abu Zor; *Chakchak to Wau; Drum; *El Mesherat; Gondokoro; Goz Abu Guma; Khor Attar; Melut; Mongalla; *Roseires; *Senaar; *Singa. (Werner states that it has not been found in Kordofan or west of the Nile).

Range. Eritrea east and south through thè Anglo-Egyptian Sudan.

Lygodactylus picturatus ukerewensis Loveridge

1896. *Lygodactylus picturatus* Tornier (part, not Peters), p. 15.
1929h. *Lygodactylus picturatus picturatus* Loveridge (part, not Peters), p. 46 (Kisumu specimen).
1933h. Loveridge, p. 290.
1935g. *Lygodactylus picturatus ukerewensis* Loveridge, Proc. Biol. Soc. Washington, **48**, p. 199: Ukerewe Id., Lake Victoria, Tanganyika Territory.
1937f. Loveridge, p. 495.
1937d. Mertens, p. 4.

Native name. *Kihangalla* (Kerewe).

Description. Differs from the typical form in gular markings as described below, and in absence of yellow on head and shoulders.

Nostril between first labial and 2–3 nasals; lower labials[1] 4–7; mental entire, followed by 2–4, normally 3, small postmentals.

For scale and pore counts, see statistical table on p. 200.

Color. Above, gray or olive; snout black; upper labials china-white with jet black markings, principally along the buccal borders; crown of head white, heavily mottled or marbled with black; sides of head and neck with three very conspicuous, though often discontinuous, black stripes; back mottled with black and a pair of dorso-lateral rows of light, usually black-edged, ocelli. Below, white, throat of male deep velvety black, the latter prolonged posteriorly to the level of the fore arms as lines or vermiculations, sometimes a light ∩-shaped patch separating the black of the chin from the black of the posterior area; throat of female with faint or obsolescent dusky chevrons as in *gutturalis;* tail with a median series of dusky streaks.

In life the lower side of the neck may be either rich orange or china white in fully adult males; the underside of the limbs as well as a broad band along the entire length of breast and belly is pale yellow, the flanks on either side of this area being grayish white; females showed only pale yellow in the breast and pelvic region.

Size. Total length of type ♂, 90 (42 + 48) mm., and of a paratype ♀, 74 (37 + 37) mm.

Breadth of head is included in length from 1.1–1.4 times, average 1.17 (based on 25 geckos from Ukerewe Island).

Breeding. On June 12, on Ukerewe Island, four pairs of eggs, of which one pair was separated, measured 6 x 7 mm.

Enemies. Two were recovered from the stomach of a spotted wood snake (*Philothamnus s. semivariegatus*).

[1] Mertens (1937d) records 4 in an ill-preserved ♀ from Lake Eyasi, which, however, he states has 9 indistinct preanal pores.

Habitat. Some were taken on mango trees, but they were more plentiful on the trunks of the imported Javan silk-cotton trees, a few were actually taken on buildings. At altitudes between 3000 and 5000 feet.

Localities. **Kenya Colony:** Kadem (or Radem or Radana: Neumann coll.); *Kisumu; *Loita Plains. **Tanganyika Territory:** Isansu to Lake Eyasi; Kagehi; *Ukerewe Island.

Range. Kenya Colony in the vicinity of Lake Victoria south to Tanganyika Territory.

Lygodactylus picturatus mombasicus Loveridge

1887a. *Lygodactylus picturatus* Boulenger (part, not Peters), p. 486 (Witu).
1887. Müller, p. 289.
1887. Strauch, p. 28.
1893a. Boettger, p. 31.
1894c. Günther (part), p. 86 (Ngatana).
1912c. Sternfeld (part), p. 205 (Kibwezi).
1920a. Loveridge (part), p. 138 (Jilore; Frere Town; Mombasa).
1923h. Loveridge (part), p. 941 (Frere Town; Kilindini).
1940. Walls, p. 172.
1896. *Lygodactylus picturatus* var. *quinquelineatus* Tornier, pp. 15, 20, pl. i, fig. 19.
1913. *Lygodactylus picturatus* var. *quinquelineata* Boettger (part), pp. 355, 356, 365 (Patta Id., Lamu Id., Mombasa Id.).
1933h. *Lygodactylus picturatus* var. Loveridge, p. 289, pl. i, fig. 2.
1935g. *Lygodactylus picturatus mombasicus* Loveridge, Proc. Biol. Soc. Washington, **48**, p. 198: Kilindini, Mombasa Id., Kenya Colony.
1936j. Loveridge, p. 289.
1937f. Loveridge, pp. 492, 495.
1942e. Loveridge, p. 326.

Native name. Mvuvi (Pokomo, but not specific). This name is applied to caecilians in Kikami.

Description. Differs from the typical form in its head and shoulders being white, instead of yellow, typically (i.e. along the coast northwards from Mombasa and not in the area of intergrades westwards from Mombasa to Kibwezi) the black markings on head and shoulders are strikingly different.

Nostril between first labial and 2–3 nasals; mental entire, followed by 3 small postmentals.

For scale and pore counts, see statistical table on p. 200.

Color. Above, faintly bluish white on head; a black streak from nostril through eye to shoulder; a finer line on edge of lips continues

from angle of mouth to, and along, forearm; an M-like mark between eyes, another resembling two fused blotches on occiput forms a gridiron-like pattern, a third mark on nape with down-pointing prolongations which unite with the lateral band first mentioned; back gray with another pair of slightly fused blotches, a pair of dorso-lateral rows of dusky blotches (which fuse to form stripes in intermediates); tail bluish gray. Below, white, throat of male deep velvety black, occasionally with a black chevron-shaped marking following the outline of the jaws and extending backwards, as a pair of lines, almost to the axilla, this outer chevron-shaped marking fused anteriorly with an inner one; in females these chevrons are wholly absent or but feebly indicated; tail immaculate.

Size. Total length of paratype ♂, 81 (39 + 42) mm., and of a ♀, 74 (37 + 37) mm., the latter from Kibwezi.

Breadth of head is included in its length from 1.3–1.5 times, average 1.3 (based on 18 geckos from two localities).

Breeding. On April 16–17, on Mt. Mbololo, 14 pairs of eggs, each measuring about 8 x 9 mm., were found. On May 8, on Lamu Id., 4 pairs of eggs, each measuring about 8 x 9.5 mm. On May 31, at Witu, many eggs seen attached to veranda posts. On June 8, at Ngatana, a pair of eggs, each measuring about 9.5 x 9.5 mm. found.

On May 8, on Lamu Id., a newly hatched young measured 23 (12 + 11) mm. On June 8, another young one was captured measuring 29 (15 + 14) mm.

Enemies. Recovered from a house snake (*Boaedon l. lineatus*) at Voi, and from spotted wood snakes (*Philothamnus s. semivariegatus*) at Kibwezi and on Mt. Mbololo. How one was attacked by a larger gecko (*Hemidactylus mabouia*) will be found described under that species.

Habitat. On acacia, boababs, wild figs and she oaks; at Witu, a series were taken on the walls of a hut, an unusual location for members of this arboriphile genus.

Localities. **Kenya Colony:** *Frere Town; *Golbanti; *Jilore; *Kibwezi; *Kilindini; *Kitau, Manda Island; *Lamu Island; *Mombasa Island; *Mtito Andei; *Mt. Mbololo; *Ngatana; Patta Island; *Sokoki Forest; *Voi; *Witu. **Tanganyika Territory:** *Tanga.

Range. Coastlands of Kenya south to Tanga, Tanganyika Territory; overlapping with the typical form at both Tanga and Mombasa; an area of intermediates along railway (? human introduction) from Mombasa inland to Kibwezi.

Lygodactylus picturatus picturatus (Peters)

1868a. *Hemidactylus variegatus* Peters (not Duméril & Bibron, 1836), Monatsb. Akad. Wiss. Berlin, p. 449: Zanzibar coast.
1869a. Peters, p. 13, pl. ii.
1870b. *Hemidactylus picturatus* Peters, Monatsb. Akad. Wiss. Berlin, p. 115: *nom. nov.* for *variegatus* Peters, preoccupied.
1878a. Peters, p. 202.
1885d. *Lygodactylus picturatus* Boulenger, p. 161.
1887a. Boulenger (part), p. 486 (Zanzibar).
*1888. Mocquard (? part), p. 114.
1889. Pfeffer, p. 5.
*1893b. Boettger, p. 132.
1893. Pfeffer, p. 72.
1894c. Günther (part), p. 86 (Tsavo).
*1896b. Boulenger, p. 8.
1896. Tornier (part), p. 15, pl. i (part), vars. *griseus, septemlineatus, quinquelineatus.*
*1897g. Boulenger, p. 277.
1897. Tornier, p. 63.
1898. Tornier, p. 284.
1899c. Tornier, p. 549, figs. 1–3.
1900b. Tornier, p. 587.
1901. Nickel, p. 68.
1902a. Scherer, p. 255.
1902b. Tornier, p. 581.
1907. Lönnberg, p. 4.
1910. Meek, p. 406.
1911a. Sternfeld, p. 245.
1912c. Sternfeld (part), p. 205 (? Kibwezi).
*1913. Lönnberg & Andersson, p. 2.
1913c. Nieden, p. 67.
1913a. Werner, p. 21, fig.
*1915. Calabresi, p. 237.
*1918. Calabresi, p. 122.
1920a. Loveridge (part), p. 136 (omit Frere Town and Jilore).
1922. Lönnberg, p. 2.
1923d. Loveridge, p. 846.
1923h. Loveridge (part), p. 941 (omit Frere Town and Kilindini).
1924b. Loveridge (part), p. 9 (omit Uganda).
1925a. Angel, p. 11.
*1927. Calabresi, pp. 26, 41.
*1931b. Scortecci, p. 132.
1933m. Witte, p. 70.

* These Somaliland references require subspecific verification.

1942. Parker, p. 39.
1913. *Lygodactylus picturatus* var. *quinquelineata* Boettger, p. 346.
1925a. *Lygodactylus picturatus picturatus* Loveridge, p. 72.
1928c. Barbour & Loveridge, p. 146.
1929h. Loveridge (part), p. 46.
1933h. Loveridge, p. 288, pl. i, fig. 1.
1934. Brongersma, p. 166.
1934. Pitman, p. 302.
1936h. Loveridge, p. 50.
1936j. Loveridge, p. 289.
1937f. Loveridge, pp. 492, 495.
1937a. Parker, p. 630.
1941. Moreau & Pakenham, p. 107.
1942e. Loveridge, p. 326.
1928c. *Lygodactylus manni* Loveridge, Proc. U. S. Nat. Mus., **72**, Art. 24, p. 1, pl. i: Saranda, Ugogo, Tanganyika Territory.

Further citations of "*picturatus*" will be found under its races, also *s. annectens, gutturalis, keniensis, ukerewensis,* and *mombasicus.*

Native name. Garomwe was the name applied to a male by children at Changamwe, when shown a female they said that it was *kibibi,* literally 'little wife' in Swahili.

Description. Snout broad, the distance from its end to the anterior border of the eye about equal to, or slightly greater than, the interorbital distance anteriorly, slightly longer than the distance between the eye and the ear-opening, which is small, roundish; nostril pierced above the first labial, so posterior to (rarely above) the suture between rostral and first labial, being between the first labial and 2–3, normally 2, nasals, the uppermost separated from (very rarely in contact with) its fellow by 1–2 granules; upper labials 6–9; lower labials 5–8; mental entire, followed by 3 small postmentals.

Males with 6–12, normally 6–8, preanal pores; fourth toe with 5–6 pairs of scansors beneath dilated portion; original tail below with imbricate scales of which the median series is transversely enlarged.

Color. Above, head and shoulders bright mustard yellow, spotted and streaked with darker, body, limbs, and tail of male blue-gray, of female brown, uniform, or spotted and streaked with darker so as to form longitudinal lines. Below, throat of adult male deep velvety black, of female with obsolescent marblings or uniformly white; or occasionally showing traces of ∩-shaped markings; breast and belly of male orange, limbs showing patches of yellow, tail gray; breast, belly, limbs and tail of female uniformly white.

A male, taken from a dark cavity, was entirely black; females at least, have the power of changing from brown to dull gray very rapidly. Nieden (1913c) discusses such changes in relation to the color varieties named by Tornier (1896) in his lengthy discourse on pattern.

Generally speaking the yellow heads of the males render them conspicuous, but on one tree, whose bark was overgrown with tufts of gray and yellow lichen, it had the opposite effect.

Mocquard (1888) speaks of the somewhat different coloration of Somaliland specimens, while Boulenger (1892) remarks that a male with six pores has no trace of black on its throat. Probably he was dealing with the gecko now called *somalicus*, to whose race *annectens* this record has been transferred, but all Somali records must be regarded as questionable, possibly *mombasicus*, until reëxamined.

Size. Total length of ♂, 86 (43 + 43) mm., and of ♀, 79 (38 + 41) mm., both from Morogoro, slightly exceeded by specimens from Victoria Falls.

Breadth of head is included in length from 1.3–1.7 times, average 1.4 (based on 25 geckos from 5 localities).

Sexual dimorphism. Occasionally old males are to be found in which the head has developed massive proportions, as is sometimes the case with old agamas. Sexual dichromatism attains its greatest development in this form.

Breeding. On January 1, at Morogoro, with the sun shining brightly after recent rains, almost every tree in the avenue had its pair of yellow-headed geckos, in brilliant color, on its sunny side. One male was arching his throat—presumably to exhibit its velvety blackness—in a peculiar manner, but each time that he approached the female for whose benefit he was performing, she drove him off.

Eggs were found beneath bark; in a hole in the stem of a coconut palm; beneath palm fronds; and in a sunbird's abandoned nest. On

February 1, at Morogoro,

April 11, at Dar es Salaam,

June 10, at Siga Caves, an egg containing an embryo,

July 5, at Korogwe,

October 29, at Likoni, six pairs of eggs, measuring 6.5 x 5.5 mm., of which two had hatched, and another hatched on

October 30. On

December 4, at Dar es Salaam, two eggs, measuring 6 x 5 mm.

Parasites. To judge by the clumping, eruptive and disorganized appearance of the preanal pores in a series of geckos from Kisumu (now in United States National Museum), they would appear to have been attacked by some parasite.

Enemies. Three recovered from the stomach of a hawk (*Accipter b. polyzonoides*) and one in another (*A. m. tropicalis*) shot in coconut palms at Mikindani at sunset and noon respectively. Also from an owl (*Glaucidium c. scheffleri*) at Wami River, a green snake (*Chlorophis neglectus*) at Dar es Salaam, and a spot-striped snake (*Hemirhagerrhis n. nototaenia*) at Mkata River.

Habits. These diurnal geckos frequent large trees on which they descend to within a couple of feet of the ground, if anyone should approach them, however, they adroitly slip around to the opposite side of the trunk and then hasten to the top.

On a small tree they may be captured by throwing one's arms about the tree to prevent such an ascent, after which a handkerchief can be tied around it to accomplish the same purpose. Then one can pounce upon the gecko with another handkerchief or soft cloth; when this has been done the edge of the cloth should be turned back cautiously until the head only is exposed. The little creature can then be picked off the tree by head or shoulders; if the hunt is properly conducted there is little fear of the tail being discarded.

Habitat. Acacia, paupau, and palm trunks, also palings, and occasionally huts, chiefly from sea level to 3000 feet, though sometimes even higher.

The most unusual place in which I ever found one of these geckos was deep down in a termites' nest on the Mkata plains, the creature was wholly black, and one can only conclude that it was aestivating.

Localities. **Somalia:** Balad (Beled), Webi Shebeli; Bardera to Lugh; Gelib; ? Goscia to Juba River; Kismayu; Margherita; Mofi; Mogadish—inland from. (All these require confirmation as to race). **Kenya Colony:** *Changamwe; *Likoni opp. Kilindini; *Kilindini; Maji Chumvi; Mombasa; Mtito Andei; Teita; Tsavo; *Voi (intermediates). **Tanganyika Territory:** *Amboni Estate near Tanga; *Bagamoyo; *Dar es Salaam; *Handeni; Kakoma; *Kidete; *Kilosa; *Kipera; *Kitaya; *Korogwe (Kerogwe; Kikogwe); *Lake Manka; Lewa, Usambara; *Madazini; Magila (Magiba); Majombo (Majomboni); Masai Steppe; *Mikindani; *Mkarazi; *Mkata Station, *Mkindo River; *Mombo; *Morogoro; *Ngerengere; *Nyange; *Palms, Pangani River; *Saranda; *Siga Caves; *Tanga; **Zanzibar Island:** *Zanzibar City. **Mafia Island:** Mafia Id.; Songosongo Id.; Tchole Id. **Northern Rhodesia** *Victoria Falls. **Belgian Congo:** Elisabethville (a ♂ without distinct gular markings, *fide* Dr. R. Laurent).

Range. (Somalia?) or Kenya Colony (coastal belt from Mombasa)

south to Tanganyika Territory (chiefly coast, rivers, and railway) and adjacent islands. Northern Rhodesia and adjacent Belgian Congo (its transportation in egg-form or adult by human agency now complicating its distribution).

Genus Phyllodactylus

1828. *Phyllodactylus* Gray, Spicil. Zool., p. 3 (type *pulcher*).
1843. *Euleptes* Fitzinger, Syst. Rept., pp. 18, 95 (type *Phyllodactylus europaeus* Gené).
1843. *Discodactylus* Fitzinger, Syst. Rept., pp. 18, 95 (type *Phyllodactylus tuberculosus* Wiegmann).
1879. *Paroedura* Günther, Ann. Mag. Nat. Hist. (5), **3**, p. 218 (type *sanctijohannis*).

Diagnosis. Digits free, moderate, not dilated at base but dilated at apex, covered above with scales, those on the distal expansion strongly differentiated from those on the basal portion, not denticulate laterally, below the basal portion by tubercles or transversely dilated smooth shields, below the distal expansion by two subtriangular plates between which is a retractile claw.

Pupil vertical; eyelid more or less distinct as a circumorbital ring; dorsal lepidosis of small, subequal, smooth, juxtaposed granules or subimbricate scales, uniform or intermixed with large tubercles; tail subcylindrical, tapering. Males with or without preanal, but no femoral, pores.

Range. Australia; Asia; Africa; islands of the western Mediterranean; tropical America.

Remarks. In addition to the *Diagnosis* given above, the following characters are common to all four African forms which I have examined, and probably to all African species. They *do not* apply to *peringueyi* which is not considered an African species.

Head oviform, longer than broad, flattened above; snout rounded or obtusely pointed; ear-opening small, roundish or obliquely oval, its diameter about a third that of the orbit; rostral (except in *trachyrhinus* where it is divided) about twice as broad as high; granules on snout slightly convex, smooth, larger than those on occiput; (probably the mental will be found to be as broad as, or broader than, adjacent labials, in all species).

Digits slightly depressed on the basal portion, beneath which are a more or less enlarged median series of transversely dilated shields, usually preceded and followed by small scales; tail scarcely verticillate, covered above with small, uniform, smooth, granular scales which are

larger than the dorsals, below by somewhat irregular, subimbricate scales which are slightly larger than the ventrals.

Phyllodactylus palmatus Mocquard was transferred to *Diplodactylus* by Müller (1910); for remarks on the similarity of these two genera see under *Diplodactylus*.

Key to the Species

1. Back covered with coarse granules intermixed with numerous oval, keeled tubercles: range: known only from types allegedly from Chelsea Point, near Port Elizabeth and Little Namaqualand, but in all probability non-African in origin ..... *peringueyi* (p. 240)

   Back covered with subuniform granules or scales 2

2. Back covered with subuniform granules; rostral without median cleft above; digital dilation large; males (of *ansorgii* unknown) without preanal pores 3

   Back covered with subuniform scales; rostral with median cleft above; digital dilation small; males with preanal pores 9

3. Granules on snout subequal to, or smaller than, those on back 4
   Granules on snout larger than those on back 5

4. Mental and lower labials bordered posteriorly by a row of scales which are not distinctly larger than those of the row following; ventral scales larger than dorsal granules; adpressed hind limb reaches elbow; length of head and body 40 mm.; range: islands of western Mediterranean .. *europaeus* (p. 241)

   Mental and lower labials bordered posteriorly by a row of scales which are distinctly larger than those of the row following; ventral scales smaller than dorsal granules; adpressed hind limb reaches shoulder; length of head and body 140 mm.; range: Sokotra Island, Indian Ocean *riebecki* (p. 242)

5. Mental and lower labials bordered posteriorly by a row of scales which are distinctly larger than those of the row following; dorsal granules in middle of back larger than those on sides; range: Sokotra Island, Indian Ocean ..... *trachyrhinus* (p. 243)

   Mental and lower labials bordered posteriorly by a row of scales which are not, or but slightly, larger than those of the row following; dorsal granules in middle of back smaller than those on sides 6

6. First upper labial excluded from nostril by a narrow rim; no enlarged scales in preanal region 7

   First upper labial allegedly bordering nostril; a series of 8–9 enlarged scales in preanal region of female (male unknown) 8

7. Beneath longest *toe* is a median series of scansors separated by a few small scales from the adhesive plates of the digital expansion; upper border of rostral straight; range: southcentral and western Cape Province ....
   p. porphyreus (p. 243)

   Beneath longest *toe* are at most 1–2 scansors, the remaining basal portion of toe being covered with small scales up to the adhesive plates of the digital expension; upper border of rostral with backward prolongation (a character of doubtful value); range: Little Namaqualand (possibly north to Warmbad and Damaraland, South West Africa) .....
   p. namaquensis (p. 246)

8. Known only from the female cotypes taken at Maconjo, Benguela, Angola
   ansorgii (p. 246)

9. Mental and lower labials bordered posteriorly by scales which are not larger than those of the row following; scales generally smaller; known only from the female holotype taken at Pahuis Pass, Cape Province
   microlepidotus (p. 247)

   Mental and lower labials bordered posteriorly by enlarged scales which are slightly or distinctly larger than those of the row following; scales generally larger 10

10. Dorsal scales juxtaposed; ventrals subimbricate; adpressed hind limb reaches elbow; color pattern different; range: Little Namaqualand ....
    l. rupicolus (p. 248)

    Dorsal scales subimbricate; ventrals imbricate; adpressed hind limb reaches wrist; color pattern different 11

11. Posteriorly 2–3 pointed, projecting, supraciliary scales; postmental and chin shields 2–4; range: western Cape Province including Little Namaqualand ..... *l. lineatus*
    (p. 249)

    Posteriorly 1 pointed, projecting supraciliary scale; postmental and chin shields 4–6; range: eastern Cape Province ..... *l. essexi*
    (p. 250)

STATISTICAL DATA FOR THE AFRICAN SPECIES OF THE GENUS PHYLLODACTYLUS

Species or Race	Internasal Granules	Nostril between Rostral, First Labial (except those with *) and nasals	Upper Labials	Lower Labials	Postmentals	Preanal Pores in Males	Maximum Length Recorded for H.	Maximum Length Recorded for B. Tail
peringueyi	?	4	6–7	6–7	?	0	25	20+
europaeus	1–2	3	9–11	9–11	2–3	0	40	30
riebeckii	1–2	3	10–12	9–11	2	0	140	150
trachyrhinus	?	2	8–10	9	2	0	55	40
p. porphyreus	1–2	2–3*	7–9	7–9	0	0	50	58
p. namaquensis	1	?	?	?	0	0	46	35+
ansorgii	?	?	10	10	0	?	45	30
microlepidotus	1	3	9–10	7	0	?	28	39
l. rupicolus	1–3	3–4	7–9	6–8	2–3	3–4	29	31
l. lineatus	1–2	3	6–7	5–7	2	4–6	30	29
l. essexi	0–1–3	3	6–7	5–7	2	4	27	29

Phyllodactylus peringueyi Boulenger

1910b. *Phyllodactylus peringueyi* Boulenger, Ann. S. African Mus., **5**, pp. 457, 493: Chelsea Point, Port Elizabeth and Little Namaqualand, Cape Province.

1937d. Hewitt, p. 206.

Description. Snout markedly elongate, nearly twice as long as orbit, obtusely pointed, slightly longer than the distance between eye and ear-opening; rostral without median cleft above; granules on snout keeled; mental and lower labials bordered posteriorly by large, flat granules only. Back covered with coarse granules intermixed with numerous oval, keeled tubercles; ventral scales subimbricate; limbs short; digits moderately dilated distally; a median series of transversely dilated shields.

For characters, common to other species, see definition on p. 237; for scale counts, see statistical table above.

Color. Above, pale brownish; a more or less distinct dark brown streak from nostril through eye and along flank. Below, whitish.

Size. Total length of cotype (S. Afr. Mus.), 45^{+} ($25 + 20^{+}$) mm., tail reproduced.

Remarks. Based on a ♂ (S.A.M. 777) allegedly from Little Namaqualand (Peringuey coll.) and ♀ (S.A.M. 8628) from Port Elizabeth (Moorhouse coll.), but showing no close affinity with any South African form. Hewitt (1937d), after reëxamination of the cotypes, remarks that their state of preservation is so similar that he thinks they were taken at the same time and from the same locality, which he rejects as being South African for the species is closely related to New World members of the genus.

Phyllodactylus europaeus Gené

1839. *Phyllodactylus europaeus* Gene, Mem. Accad. Torino (2), **1**, p. 263, pl. i, fig. 1: Sardinia.
1876. Wiedersheim, p. 495, pls. xvii–xix.
1885d. Boulenger, p. 90.
1887a. Boulenger, p. 482.
1891c. Boulenger, pp. 96, 110.
1897. Bateman, p. 75.
1899. Doumergue, p. 524, pl. v, figs. 4–4a.
1901. Doumergue, p. 88, etc. (reprint of 1899).
1903. Mayet, p. 12.
1927a. Pellegrin, p. 261.
1934. Brongersma, p. 165.
1843. *Phyllodactylus* (*Euleptes*) *Wagleri* Fitzinger, Syst. Rept., p. 95: subst. name for *europaeus*.
1877. *Phyllodactylus doriae* Lataste, Bull. Soc. Zool. France, **2**, p. 467: Tinetto Island, Gulf of Spezzia, Italy.

The extensive bibliography of European records has not been consulted, the first record from an African island being in 1891c.

Name. European Phyllodactyle (Bateman).

Description. Snout as long as, or slightly longer than, the distance between eye and ear-opening; rostral without median cleft above; granules on snout subequal to those on back; no regular chin shields but small polygonal scales slightly larger than the row following which merges gradually into the minute gular granules.

Back covered with small, subuniform, rounded, smooth, flattened, juxtaposed granules, those in middle of back sometimes smaller than on sides; ventral scales roundish, larger than dorsals, subimbricate; limbs moderate, the adpressed hind limb reaching the elbow; digits strongly dilated distally; tail covered above with subgranular, sub-

imbricate scales; on either side of base of tail in both sexes, though larger in males, is a single, white, tooth-like tubercle; tail shorter than head and body.

For characters common to all species, see definition on p. 237; for scale counts, see statistical table on p. 240.

Color. Above, grayish brown; a more or less distinct dark streak from nostril through eye and above ear to neck; back with a network of brown markings or irregular crossbars, sometimes dotted with lighter; tail like back. Below, whitish or grayish.

Size. Total length of a topotype ♂ (M.C.Z. 25993), 67 (34 + 33) mm., surpassed by an unsexed specimen (Brit. Mus.) of 70 (40 + 30) mm.

Remarks. The above description is based only on the literature cited above and four specimens, two of which are topotypic, from islands in the Mediterranean. Doubtless much information may be added by a search of the extensive European bibliography.

Anatomy. Has been dealt with by Wiedersheim (1876).

Localities. **Tunisia:** Ile Galaite.

Range. *Islands of the western Mediterranean.

Phyllodactylus riebeckii (Peters)

1882b. *Diplodactylus Riebeckii* Peters, Sitz. Ges. Naturf. Freunde Berlin, p. 43: Sokotra Island.
1883. Taschenberg, p. 164.
1885d. *Phyllodactylus riebeckii* Boulenger, p. 94.
1903a. Boulenger, p. 78.

Description. Snout as long as distance between eye and ear-opening; rostral without median cleft above; granules on snout subequal to or smaller (larger in Boulenger's 1885d translation of Peter's description) than those on back; the small polygonal shields flanking the postmentals are distinctly larger than the row following.

Back covered with uniform, smooth, flattened, juxtaposed granules; ventral scales slightly smaller than dorsals; limbs long, the adpressed hind limb reaching the shoulder; digits strongly dilated distally; tail covered above with granules; tail longèr than head and body.

For characters common to all species, see definition on p. 237; for scale counts, see statistical table on p. 240.

Color. Above, grayish brown; back with small dark brown markings usually disposed in pairs or forming narrow crossbars, sometimes also semicircular pale spots, which in the young form regular crossbars,

persist in the adults as pale crossbars; reproduced tail streaked with brown. Below, white, the throat sometimes spotted or marbled with brown.

Size. Total length of type (Berlin Mus.), 290 (140 + 150) mm.

Temperament. Extremely tenacious of life, continuing to struggle in spirits for fully a quarter of an hour (Grant in Boulenger).

Habitat. Usually found in holes in the partially decayed stems of large trees such as *Boswellia*, one was taken beneath a large stone in the dry bed of a river, all were between 2000 and 4000 feet (Grant).

Localities. **Sokotra Island:** Adho Dimellus; Homhil.

Range. Sokotra Island.

Phyllodactylus trachyrhinus Boulenger

1899d. *Phyllodactylus trachyrhinus* Boulenger, Bull. Liverpool Mus., **2**, p. 4: Adho Dimellus and Jena agahan, Sokotra Island.
1903a. Boulenger, p. 79, pl. ix, fig. 1.

Description. Snout as long as the distance between eye and ear-opening; rostral completely divided into two shields no larger than adjacent labials; granules on snout adherent to skull, larger than those on back; a row of small polygonal shields flanking the postmentals.

Back covered with uniform, smooth, flattened, juxtaposed granules, those in middle of back larger than on sides; belly covered with granules uniform with dorsals, juxtaposed; limbs rather short; digits well-developed distally; tail covered above and below with uniform, flattened granules; tail shorter than head and body.

For characters common to all species, see definition on p. 237; for scale counts, see statistical table on p. 240.

Color. Above, pale brownish; a black streak from nostril through eye; back with black marblings. Below, white.

Size. Total length of cotype (Brit. Mus.), 95 (55 + 40) mm.

Remarks. Known to me only from the description of the two cotypes.

Habitat. At altitudes of from 1200 to 4500 feet.

Localities. **Sokotra Island:** Adho Dimellus; Jena agahan.

Range. Sokotra Island.

Phyllodactylus porphyreus porphyreus (Daudin)

1802d. *Gecko porphyreus* Daudin, Hist. Nat. Rept., **4**, p. 130: "L'ile Sainte Domingue, l'Amerique méridionale." (error).
1820. Merrem, p. 43 bis.

1830. *Sphaerodactylus porphyreus* Wagler, p. 143.
1836. *Phyllodactylus porphyreus* Duméril & Bibron (part), p. 393.
1849. Smith, A., p. 6.
1867a. Steindachner, p. 14.
1885d. Boulenger (part), p. 87, pl. vii, fig. 5 (omit Madagascar and ? Damaraland).
1887a. Boulenger, p. 482.
1887. Strauch, p. 39.
1893a. Boettger, p. 26.
1898. Sclater, p. 102.
1898. Werner, 1896–7, p. 140.
1901. Lampe & Lindholm, p. 199.
1907b. Roux, p. 405.
1910b. Boulenger (part), p. 457 (? omit Little Namaqualand and S.W.A.)
1910a. Hewitt, p. 58.
1910c. Hewitt (part), pp. 78, 85 (? omit Little Namaqualand, etc.).
1910a. Werner (part), p. 307 (? omit Warmbad).
1913. Hewitt & Power, p. 149.
1922c. Angel, p. 354.
1925. Essex, p. 336.
1926b. Rose, p. 491.
1928a. Essex, 1927, p. 930.
1929. Rose, p. 114, figs. 73, 75.
1936. Lawrence, p. 37.
1934. Brongersma, p. 166.
1937d. Hewitt, p. 205.
1937d. *Phyllodactylus porphyreus cronwrighti* Hewitt, Ann. Natal Mus., **8**, p. 205: Cape St. Francis, Cape Province.

Further citations of "*porphyreus*" will be found under the subspecies *namaquensis* and *Diplodactylus palmatus*.

Description. Snout slightly or considerably longer than the distance between eye and ear-opening; rostral without median cleft above; granules on snout larger than those on back; enlarged oval scales bordering mental and lower labials not or but slightly larger than the row following which merges gradually into the minute gular granules.

Back covered with small, subuniform, smooth, more or less flattened, juxtaposed granules, those in middle of back smaller than on sides; ventral scales subhexagonal, larger than dorsals, imbricate; limbs short, the adpressed hind limb reaching the wrist; digits strongly dilated distally; tail covered above with subimbricate scales; on either side of base of tail in both sexes, though larger in males, is a single, white, tooth-like tubercle; tail longer than the head and body.

For characters common to all species, see definition on p. 237; for scale counts, see statistical table on p. 240.

Color. Above, grayish or pinkish; a dark streak from nostril through eye and above ear to neck; back heavily variegated with dark brown, a light vertebral stripe sometimes present; tail variegated like back. Below, whitish. Young are dark brown; tails reddish.

Size. Total length of ♂ (M.C.Z. 45474), 108 (50 + 58) mm., and of ♀ (M.C.Z. 45472), 106 (51 + 55) mm. Young, on hatching, measure 30 mm.

Remarks. Hewitt described the four cotypes of *cronwrighti* on the grounds that their anterior nasals were separated by 2 granules instead of 1 as was the case with his Cape Town specimens. However, one of our Cape Town geckos (M.C.Z. 11931) has the nasals separated by 2 granules, and eight out of nine geckos from Die Mond (M.C.Z. 11930) have 2; on the other hand an East London gecko (M.C.Z. 11930), that is to say from a point much further east than even Cape St. Francis, has but 1 granule. The character has proved highly variable throughout many gekkonid genera which I have examined so I see no reason for recognizing *cronwrighti* on the basis of this character.

Sjöstedt's (1897) record of *porphyreus* occurring at Ekundu in the Cameroons, was based on a misidentified *Diplodactylus palmatus*, it was repeated by Werner (1898) and Tornier (1902c) and was presumably the reason for Schmidt (1919) listing *porphyreus* as an accidental member of the rain-forest fauna of West Africa.

Breeding. Eggs, measuring 8 x 10.5 mm., are deposited beneath stones, as many as 19–20 being found together. As the embryo develops the egg darkens until ruptured by the emergent young, often covered by a thin white membrane which gradually sloughs away piecemeal (Rose). Thirteen eggs, covered by sand and moss, were found in a small cavity in the side of a rock at Kalk Bay (Hewitt & Power).

Parasites. Mites (*Geckobia phyllodactyli*) have been described by Lawrence.

Temperament. Much more active than *Pachydactylus maculatus* (*fide* Essex).

Habitat. In rock fissures or beneath stones on mountain slopes; in crevices of bark or under logs (Smith; Rose), an old wall (types of *cronwrighti*)

Localities. **Cape Province:** Calvinia; Cape Flats; *Cape Town; Cape St. Francis (types of *cronwrighti*); Ceres: Clanwilliam; Constantia, Cape Peninsula; *Die Mond, Cape Peninsula; *East London; Kalk Bay; Karatara near Knysna; Knysna; Kirstenbosch, Cape Peninsula; Mossel Bay; *Range Cottage near Cape

Town; Robben Island; Sir Lowrys Pass; St. James; Table Mountain; Tokai; Wynberg.

Range. Cape Province (except Little Namaqualand).

Phyllodactylus porphyreus namaquensis Hewitt

1885d. ? *Phyllodactylus porphyreus* Boulenger (part), p. 87 (Damaraland).
1910b. ? Boulenger (part), p. 457 (Namaqualand).
1910c. ? Hewitt (part), p. 85 (L. Namaqualand).
1910a. ? Werner (part), p. 307 (Warmbad, S.W.A.).
1911d. ? Sternfeld, p. 12 (Damaraland & Warmbad).
1935. *Phyllodactylus porphyreus namaquensis* Hewitt, Rec. Albany Mus., **4**, p. 320, pl. xxix, fig. 4: Bitterfontein, Little Namaqualand, Cape Province.

Description. "Snout slightly narrower and more pointed than in *porphyreus*;" rostral with a short mesial backward prolongation of its upper border; beneath basal portion of *toes* except first, at most only 1–2 scansors, the rest being covered with small scales up to the adhesive plates of the digital expansion.

For characters common to all species, see definition on p. 237; for scale counts, see statistical table on p. 240.

Color. Above, pale ashy; head and back heavily variegated with darker; tail with a white patch at base.

Size. Total length of type (Albany Mus.), 85^{+} ($46 + 35^{+}$) mm., tail reproduced.

Remarks. Known to me only from the very brief description of a single unsexed specimen. If the race should prove valid, one might expect that the three specimens listed in the citations given above (with queries) will prove referable to this form.

Habitat. Living among granite boulders in company with *Cordylus peersi* (*fide* Peers).

Locality. Known only from the type, see citations above also.

Range. Little Namaqualand (possibly north to Damaraland, South West Africa).

Phyllodactylus ansorgii Boulenger

1907b. *Phyllodactylus ansorgii* Boulenger, Ann. Mag. Nat. Hist. (7), **19**, p. 212: Maconjo, Benguela, Angola.
1937b. Monard, p. 51 (lists only).

Description. Snout as long as the distance between eye and ear-opening; rostral without median cleft; granules on snout larger than those on back; scales bordering mental and lower labials not forming

definite chin shields. Females with 8–9 enlarged preanal scales (possibly indicating presence of pores in males) forming a slightly curved series; limbs "moderate"; tail covered above with quadrangular scales.

For characters common to all species, see definition on p. 237; for scale counts, see statistical table on p. 240.

Color. Above, pale grayish brown, a dark streak from nostril through eye and above ear to neck; upper lip white spotted with brown; back with a series of large whitish spots along each side. Below, white, with small brown spots.

Size. Total length of cotype ♀ (Brit. Mus.), 75 (45 + 30) mm.

Remarks. Known to me only from the description of the two female cotypes which are said to differ from *porphyreus* by their more slender form and the presence of enlarged preanal scales.

Locality. Known only from the type.

Range. Benguela Province, Angola.

Phyllodactylus microlepidotus FitzSimons

1939a. *Phyllodactylus microlepidotus* FitzSimons, Ann. Transvaal Mus., **20**, p. 5: Pakhuis Pass, Clanwilliam District, Cape Province.

Description. Snout slightly longer than the distance between eye and ear-opening; rostral with median cleft above; granules on snout subequal to those on back; no postmental or chin shields; gular granules minute.

Back covered with flattened, juxtaposed or subimbricate, subgranular scales; ventral scales larger than dorsals, imbricate; digits slightly dilated distally; tail covered above with "flattened, juxtaposed scales"; tail longer than head and body.

For characters common to all species, see definition on p. 237; for scale and pore counts, see statistical table on p. 240.

Color. Above, gray to slate; back with reticulate black markings forming irregular crossbars edged posteriorly with small white spots; tail marked like back with black crossbars. Below, white, chin and throat densely infused with gray.

Size. Total length of type ♀ (S.A.M. 19259), 67.5 (28 + 39.5) mm.

Remarks. Known to me only from the description of the holotype, which was collected together with two typical *lineatus* in 1936 by R. Smithers. FitzSimons remarks: "no information is available as to whether the two species have the same habitat." He distinguishes it from *lineatus* by the shape of the head, absence of chin shields,

distinctly enlarged median row of subdigital scales, and smallness of the scales generally.

Habitat. Presumably rupicolous as taken beneath a loose slab on a granite boulder (FitzSimons, 1943, p. 26).

Locality. Known only from the type.

Range. Cape Province (Clanwilliam District).

Phyllodactylus lineatus rupicolus FitzSimons

1938. *Phyllodactylus lineatus rupicolus* FitzSimons, Ann. Transvaal Mus., **19**, p. 162: Between O'okiep and Springbok, Little Namaqualand, Cape Province.

Description. Snout very slightly longer than the distance between eye and ear-opening; rostral with median cleft above; granules on snout subequal to, or smaller than, those on back; postmentals flanked by scales which are slightly or distinctly larger than the row following which merges gradually into the gular granules.

Back covered with small, subuniform, rounded, smooth, flattened, juxtaposed, subgranular scales, those in middle of back not appreciably smaller ("smaller" in type) than on sides; ventral scales subhexagonal, larger than dorsals, subimbricate; limbs moderate, the adpressed hind limb reaching the elbow; digits slightly dilated distally; tail covered above with subimbricate scales; on either side of base of tail in males is a single row of 3 enlarged flattened scales; tail slightly longer than the head and body.

For characters common to all species, see definition on p. 237; for scale and pore counts, see statistical table on p. 240.

Color. Above, dark grayish brown, a dark streak from nostril through eye to above ear; back with scattered semicircular, pale grayish to slate spots, each bearing a small yellowish to salmon-coloured spot within the black-edged anterior curve; tail tinged with olive yellow but otherwise marked like back. Below, whitish.

Size. Total length of type ♂ (T.M. 18161), 57.3 (28 + 29.3) mm., of paratype ♀ (T.M. 18165), 60 (29 + 31) mm.

Remarks. Based on nine specimens of which one is now M.C.Z. 46818.

Breeding. Three eggs, measuring 6 x 7.8 mm., were collected on August 23.

Habitat. Taken in fissures of rocks forming small outcrops along valley bottom (FitzSimons).

Localities. **Cape Province:** Kamaggas to Springbok; *O'okiep to Springbok.

Range. Little Namaqualand, Cape Province.

Phyllodactylus lineatus lineatus (Gray)

1845. *Diplodactylus lineatus* Gray, Cat. Lizards Brit. Mus., p. 150: Cape of Good Hope.
1849. *Phyllodactylus lineatus* A. Smith, p. 6.
1867a. Steindachner, p. 14.
1885d. Boulenger, p. 92.
1898. Sclater, p. 102.
1907b. Roux, p. 405.
1910b. Boulenger, p. 457.
1910a. Hewitt, p. 58.
1910c. Hewitt, pp. 78, 86.
1932. Hewitt, p. 119.
1936. Lawrence, p. 37.
1937d. Hewitt, p. 203.
1938. FitzSimons, p. 161.

Description. Snout longer[1] than the distance between eye and ear opening; rostral with median cleft above; granules on snout subequal to or smaller or larger than those on back; postmentals flanked by scales which are slightly or distinctly larger than the row following which merges gradually into the gular granules.

Back covered with small, subuniform, rounded, smooth flattened, subimbricate scales, those in middle of back slightly smaller than on sides; ventral scales subhexagonal, larger than dorsals, imbricate; limbs moderate, the adpressed hind limb reaching the elbow; digits slightly dilated distally; tail covered above with imbricate scales; on either side of base of tail in males is a single row of slightly enlarged, flattened scales; tail slightly longer than the head and body.

For characters common to all species, see definition on p. 237; for scale and pore counts, see statistical table on p. 240.

Color. Above, dark grayish to purplish brown; a dark streak from nostril through eye; crown of head usually variegated with darker; back usually with from four to six longitudinal dark lines, the lateral arising from nostril and the median pair from occipital region, or with small, scattered, paler, black-edged spots and irregular crossbars. Below, grayish to brownish white.

[1] "Shorter" *fide* Boulenger (1885d).

Size. Total length of cotype (Brit. Mus.), 59 (30 + 29) mm., ? tail reproduced.

Remarks. The debatable question as to whether *lineatus* should be returned to *Diplodactylus*, is ably discussed by Hewitt (1937d) who, deciding against such action, agrees with Malcolm Smith that the two genera — *Phyllodactylus*, 1828, and *Diplodactylus*, 1832, "are only doubtfully distinct."

Breeding. Eggs measuring about 7.8 x 6.8 mm., were taken between August 18–24 in the habitat described below (FitzSimons).

Habitat. Rock crevices and under the bark of decayed trees (A. Smith). In nest of *Otomys* or *Gerbillus* (Roux). Taken among vegetable debris beneath *Mesembryanthemum* bushes on rocky slopes (FitzSimons).

Localities. **Cape Province:** Buffels River, Lainsburg; Bushmanland; Cape of Good Hope; Clanwilliam; Garies; Kamaggas Road 32 miles from Springbok; Kamieskroon; Kleinzee; Klipfontein; *Little Namaqualand; O'okiep; Pakhuis Pass, Clanwilliam District; Tulbagh.

Range. Western Cape Province (including Little Namaqualand).

Phyllodactylus lineatus essexi Hewitt

1925b. *Phyllodactylus essexi* Hewitt, Rec. Albany Mus., **3**, p. 343, figs. 3–4, pl. xv, fig. 2: Hounslow, near Grahamstown, Cape Province.
1925. Essex, p. 337.
1928a. Essex, 1927, p. 931.
1937e. *Phyllodactylus lineatus essexi* Hewitt, p. 21, pl. vii.

Name. Essex's Gecko (Hewitt).

Description. Snout as long as the distance between eye and ear-opening; rostral with median cleft above; granules on snout subequal to those on back; postmentals flanked by scales which are distinctly larger than the row following which merges gradually into the gular granules.

Back covered with small, subuniform, rounded, smooth, flattened, subimbricate scales, those in middle of back not smaller than on sides; ventral scales subhexagonal, larger than dorsals, imbricate; limbs short, the adpressed hind limb reaching the wrist; digits slightly dilated distally; tail covered above with imbricate scales; on either side of base of tail in males (none in M.C.Z. females) is a single row of 3 enlarged projecting scales; tail slightly longer than the head and body.

For characters common to all species, see definition on p. 237; for scale and pore counts, see statistical table on p. 240.

Color. Above, grayish brown, a dark streak from nostril through eye and above ear to shoulder; back with irregular wavy crossbars; tail paler, with brown crossbars. Below, whitish.

Size. Total length of type ♂ (Albany Mus.), 51+ (25 + 26+) mm., tail reproduced; of ♀ (M.C.Z. 21494), 56 (27 + 29) mm.

Habitat. The adult male and juvenile types were taken beneath large stones on a kopje.

Locality. *Known only from the type.

Range. Eastern Cape Province.

Genus Diplodactylus

1832a. *Diplodactylus* Gray, Proc. Zool. Soc. London, p. 40 (type *vittatus*).
1843. *Strophurus* Fitzinger, Syst. Rept., pp. 18, 96 (type *strophurus*).
1870b. *Stenodactylopsis* Steindachner, Sitz. Akad. Wiss. Wien, **62**, **1**, p. 343 (type *pulcher*).

Diagnosis. Characters as described for *Phyllodactylus* (see p. 237) except that the digital expansion is covered above distally by scales that are strongly differentiated from those on the dorsal basal portion.

While these distinctions hold good for the genotypes, there are other species occupying so intermediate a position as to render their allocation to one genus or the other somewhat arbitrary. It is by no means certain, therefore, that *Diplodactylus* can be maintained as generically distinct from *Phyllodactylus* Gray, 1828.

Range. Australia; Madagascar; Seychelles; Equatorial Africa.

Remarks. Coming as they do from such widely scattered points as the Seychelles, Tanganyika Territory, and the Cameroons, makes it appear unnecessary to provide a key to the four species listed here. This is especially so seeing that none of the four are available to me and the relationships of three of them are sufficiently close as to suggest that they may be subspecific. The Sokotran *riebeckii* was transferred to *Phyllodactylus* by Boulenger.

Diplodactylus inexpectatus Stejneger

1893b. *Diplodactylus inexpectatus* Stejneger, Proc. U. S. Nat. Mus., **16**, p. 715: Mahe Island, Seychelles.
1909h. Boulenger, p. 295.
1936b. Parker, p. 445.
1939a. Rendahl, p. 257.

Description. Snout considerably longer than the distance between the eye and the ear-opening; which latter is one-third the orbital diameter; granular scales on the snout larger than those on the back; rostral quadrilateral, twice as broad as high, without median cleft above; nostril pierced just above the suture between rostral and first labial, bordered by the rostral, first labial, and 3 small scales, of which the superior is separated from its fellow on the opposite side by 3 small scales; upper labials 11; lower labials 10; mental trapezoid, not larger than the adjacent labials, bordered by small polygonal postmentals passing gradually into the minute granules of the gular region. Back and flanks, limbs and tail, covered with small, uniform granules; ventral scales, small, slightly larger than the dorsal granules, but smooth, roundish hexagonal, slightly imbricate; no preanal pores in holotype; digits rather slender, feebly depressed, covered above, including the upper surface of the expansion, with small granules like those on the back; and with large, transverse, undivided lamellae below, 12 under fourth toe breaking up into small tubercles some distance before the digital expansion, which is cordiform and considerably broader than the digit, and two-thirds the orbital diameter tail cylindrical, tapering, covered above with small, uniform granules, slightly larger than those on the back; two enlarged granules close together on either side beneath the base of the tail.

Color. Above, dark brownish gray, with indistinct darker marbling on head and sides; a pale stripe from nostril through upper part of eye to above ear-opening bordered below by a dark line; lower back with traces of dark crossbands; digits transversely barred with dusky. Below, white.

Size. Total length of type, 75 (40 + 35) mm.

Habitat. 800 to 1400 feet.

Localities. **Seychelle Islands:** Mahe Island—Cascade—Cascade Estate—Chateau Margot; Praslin Island.

Range. Seychelle Islands.

Diplodactylus wolterstorffi Tornier

1900b. *Diplodactylus wolterstorffi* Tornier, Zool. Jahrb. Syst., **13**, p. 584, fig. A: Tanga, Tanganyika Territory.
1902b. Tornier, p. 580.
1913c. Nieden, p. 65.
1923d. Loveridge, p. 843.
1924b. Loveridge, p. 8.
1937f. Loveridge, p. 492.

Description. Snout elongate, rounded, considerably longer than the distance between the eye and the ear-opening; granular scales on the snout larger than those on the back of the head; rostral septagonal, twice as broad as high, with median cleft above; nostril pierced just above the suture between rostral and first labial, bordered by the rostral, first labial, and 3 small scales, of which the superior is separated from its fellow on the opposite side by 3 or 4 small scales; upper labials 10–12; lower labials 8–11; mental pentagonal, not larger than the adjacent labials, bordered posteriorly by 2 enlarged scales which pass gradually into the minute granules of the gular region. Back, flanks, limbs, and tail, covered with small hexagonal granules; ventral scales rather larger than the dorsal, hexagonal, flat; digits rather small, feebly depressed, distally dilated, the expansion cordiform and much broader than the digits, covered above with granular scales, below with large, transverse, undivided lamellae of which there are 8 or 9 beneath the fourth toe followed by a few pairs of large scales; scales on tail rather larger than those on back; tip of tail furnished with adhesive lamellae as in *Lygodactylus*.

Color. Above, dark brownish gray indistinctly mottled with darker markings which tend to form transverse bands, tail with dark transverse bands which are bordered posteriorly with a fine white line between light transverse bands. Below, white.

Size. None given.

Remarks. The above description is based on the figure and translations of Tornier's two papers. Müller (1910), after making direct comparison between one of the four cotypes of *wolterstorffi* and examples of the Cameroons *palmatus* (Mocquard), states that the construction and degree of digital expansion and scalation of the two species is almost identical and that both species possess the adhesive tail-tip apparatus. He discusses these at great length, together with the tubercle formations at base of tail which he finds highly variable.

Localities. **Tanganyika Territory:** Tanga. (Known only from types).

Range. Tanganyika Territory.

Diplodactylus palmatus (Mocquard)

1897. *Phyllodactylus porphyreus* Sjöstedt (not Daudin), p. 9.
1898a. Werner, p. 206.
1902c. Tornier, p. 666.
1910. Sternfeld, p. 11.

1919. Schmidt, p. 598.
1902b. *Phyllodactylus palmatus* Mocquard, Bull. Mus. Hist. Nat. Paris, **8**, p. 410: 50 km. s.w. of Lambarene, French Congo.
1910. *Diplodactylus palmatus* Müller, p. 549, pl. i, fig. 4.
1910. Sternfeld, p. 12.
1919. Schmidt, p. 598.
1938b. Mertens, p. 37.

Description. Snout moderate, rounded, slightly longer than the distance between the eye and the ear-opening; granular scales on the snout larger than those on the back; eyelid *broad*, some small *conical tubercles* among the scales along its upper part; rostral twice as broad as high, with median cleft above; nostril pierced just above the suture between rostral and first upper labial, bordered by the rostral, first labial, and 3 small scales, of which the superior is separated from its fellow on the opposite side by **4** small scales; upper labials 10–12; lower labials 9–10; mental subtriangular, not larger than the adjacent labials, bordered posteriorly by 2 enlarged scales which pass gradually into the minute granules of the gular region. Back covered with small uniform granules; ventral scales small, *about* **7** *in an area of two millimetres in length*, subhexagonal, slightly imbricate; limbs robust, on the posterior side of the hind limb a *dermal fold*; digits strongly depressed, distally dilated, covered above, including the upper surface of the expansion, with granular scales, below with large, transverse, undivided lamellae, the 2 scansors on the digital expansion are noticeably longer than broad; the terminal scansors notched anteriorly and furrowed; interdigital skin *strongly developed web-like*; tail strongly depressed, flat beneath, covered below with subhexagonal, imbricating scales which are larger than the ventrals and arranged in transverse rows; lateral scales forming a sharp edge; 3–8 enlarged tubercles forming groups on either side of the base of the tail; tip of tail furnished with an adhesive disk.

Color. Above, brown or gray; head darker, some brown stripes on temporal region and sides of neck; vertebral region usually lighter than on the sides which occasionally bear two irregular lateral lines, between them four equally irregular, but continuous, vertical lines of the same shade which together form a ladder-like pattern or network; back with a series of dark brown angular or rhombic flecks; a grayish white angular area, enclosed by two brown spots and transverse lines, on base of tail; tail transversely banded or ringed with pale brown alternating with gray. Below, gray or brownish gray on throat and limbs, more or less white on the abdomen.

The coloration is very variable according to Müller, whose account is incorporated with that of Mocquard's description.

Size. Total length of ♂, 91 (45 + 46) mm., from Dibango; total length of ♀, 98 (58 + 40) mm., from Ekundu.

Remarks. The above description is based on translations of Mocquard's description of his two female cotypes, together with the variations noted by Müller for the ten specimens which he examined. Mocquard's statement that the fingers are half-webbed, the toes three-quarters, appears to be an exaggeration due to distention of the interdigital skin. The points italicized in the above description are those which, according to Müller, separate *palmatus* from *weileri*. Müller considered that the gecko referred to *porphyreus* by Sjöstedt was a *weileri*, Mertens (1938b), however, after making direct comparison between Sjöstedt's specimen and an example of *weileri*, unhesitatingly referred it to *palmatus*. My own view, without having seen any material, is that they will prove to be identical.

Habitat. Common on trees in dry forest of Dibango, but not found in the damp forest of Mundame (Müller).

Localities. **French Congo:** 50 km. s.w. of Lambarene. **French Cameroons:** Dibango (Dibongo) Farm, near Edea. **British Cameroons:** Ekundu.

Range. French Congo north to French and British Cameroons.

Diplodactylus weileri Müller

1909. *Diplodactylus weileri* Müller, Jahrb. Nassau. Ver. Naturk., **62**, p. 113. Bibundi, British Cameroons (later).
1910. Müller, p. 552, pl. i, fig. 2.
1910. Sternfeld, p. 12.
1911. Lampe, p. 152.
1919. Schmidt, p. 598.

Description. Snout moderate, rounded, slightly longer than the distance between the eye and the ear-opening; granular scales on the snout larger than those on the back of the head; eyelid *narrow*, small *uniform* scales along its upper part; rostral twice as broad as high, with median cleft above; nostril pierced just above the suture between rostral and first upper labial, bordered by the rostral, first labial, and 3 small scales, of which the superior is separated from its fellow on the opposite side by 3 small scales; upper labials 9–10; lower labials 9; mental pentagonal, not larger than the adjacent labials, bordered posteriorly by slightly enlarged scales which pass gradually

into the minute granules of the gular region. Back covered with small uniform granules; ventral scales small, *from* **10** *to* **11** *in an area of two millimetres in length*, linguiform, imbricate; limbs robust, on the posterior side of the hind limb a *slight fold*; digits moderately slender, strongly depressed, distally dilated, the expansion cordiform and much broader than the digit, covered above with granular scales, below with large, transverse, undivided lamellae of which there are 10 beneath the fourth toe, the terminal notched anteriorly and furrowed; interdigital skin *scarcely developed*; tail regenerated, covered above and below with irregular, mostly large, imbricating scales without acuminate lateral ones yet somewhat compressed; tip of regenerated tail recurved as if prehensile.

Color. Above, reddish brown-gray; a dark interorbital band; a stripe from the back of the eye to the ear-opening, another to the corner of the mouth; vertebral region lighter than the sides which bear two interrupted lateral lines on a dusky ground; back with five pairs of dark brown flecks; a light angular fleck, its point posteriorly directed, surrounded by darker patches, on base of tail; limbs vermiculated with dark brown. Below, yellowish with dusky infuscations, especially noticeable on throat and breast, less so on the abdomen.

Size. Total length of type, 78 (45 + 33) mm.

Remarks. The above description is based on the figure and translations of Müller's two papers. According to Müller, the two species *palmatus* and *weileri* are very closely related, but differ in the narrower head of *weileri* and in the six points italicised above. One might be tempted to suppose that these differences in part were the result of diverse methods of preservation, but a passing reference to a Mongonge specimen of *weileri* by Mertens (1938b, p. 37) leads one to assume that he considers the two species as distinct.

Localities. **British Cameroons**: Bibundi; Mongonge.

Range. British Cameroons.

Genus Afroedura

1895d. *Oedura* Boulenger (part, not Gray), Cat. Lizards Brit. Mus., **1**, p. 104.
1944f. *Afroedura* Loveridge, Amer. Mus. Novit., No. 1254, p. 1, fig. 1 (type: *karroica bogerti*).

Diagnosis. Digits free, moderate, dilated throughout, with slightly raised distal joints bearing a somewhat enlarged discoid dilation at apex, covered above with scales, not denticulate laterally, below on basal portion by scales or transversely dilated shields and one or

two pairs of scansors slightly separated from another pair on the distal dilation, clawed, the claw retractile between the distal scansors.

Pupil vertical, upper eyelid distinct, lower vestigial; dorsal lepidosis of small, subequal, smooth, juxtaposed granules; tail depressed, verticillate (scarcely noticeably so in *pondolia*), tapering posteriorly; males with preanal pores.

Range. Africa south of the Quanza (in west) and Zambesi (in east) Rivers, i.e. of 8° (west) and 15° (east) S. latitude.

Remarks. Formerly referred to the Australian genus *Oedura* Gray, 1842, the African species form a fairly homogeneous group which may be distinguished as follows:

4 or more pairs of scansors beneath the fourth toe; tail not verticillate ..... Australia

1–3 pairs of scansors beneath the fourth toe; tail verticillate (not noticeably so in *pondolia*) ..... South Africa

In its tail, *p. pondolia* of Natal most nearly approaches the swollen-tailed Australian forms (*lesueurii*, *marmorata*, *rhombifera*, and *robusta* examined) for the verticils are indistinct to the unaided eye.

In addition to the *Diagnosis* given above, the following characters are common to all six African forms which I have examined, and probably to all African species.

Snout moderate, subacuminate; ear-opening small, roundish or obtusely oval, its diameter about a third that of the orbit; rostral about twice as broad as high, without median cleft above; granules on snout slightly flattened (with possible exception of "*amatolica*," *nivaria* and *k. halli*, which Hewitt characterizes as convex; both slightly flattened and convex conditions occur in our series of *p. pondolia*), smooth, larger than those on occiput and back (possibly subequal to those on back in *africana* and *nivaria*, as stated by Boulenger); mental as broad as, or broader or narrower than, adjacent labials (as all three conditions occur in our Port St. John series of *p. pondolia*, and Devuli River series of *t. platyceps*, it seems reasonable to assume that the character is equally variable in all forms).

Back covered with small, subequal (often definitely unequal in *t. platyceps* and *k. karroica*), smooth, flattened (except *tembulica* in which they are convex), juxtaposed granules; ventral scales larger than dorsal; digits dilated, the basal portion nearly as broad as the digital expansion, beneath which are 2–3 pairs of large adhesive lamellae; on either side of base of tail in both sexes (though less developed and sometimes lacking in females) is a single row of white tubercles; length of tail somewhat longer than head and body.

Key to the Species

1. Original tail (that of *p. marleyi* unknown) not noticeably verticillate; males with 10–17 preanal pores 2
   Original tail verticillate 4

2. Male with 17 preanal pores; range: northern Transvaal .... *p. multiporus* (p. 260)
   Males with less than 17 preanal pores 3

3. Males with 13–16 preanal pores; range: eastern Transvaal south to Natal and Pondoland, Cape Province ..... *p. pondolia* (p. 260)
   Male with 10 preanal pores; range: Zululand ..... *p. marleyi* (p. 262)

4. Males with 12–15 preanal pores 5
   Males with 4–10 preanal pores 6

5. Pores of males form an angular series; granules on head flattened; nasals in contact behind rostral; range: Damaraland, South West Africa .... *africana* (p. 263)
   Pores of males form a slightly curved series; granules on head convex; nasals separated by a granule behind rostral; range: mountains of Natal and eastern Cape Province ..... *nivaria* (p. 264)

6. Rostral bordering the nostril (rarely excluded in *nivaria* and *tembulica*) .. 7
   Rostral not bordering the nostril (see also *nivaria* and *tembulica*) 11

7. Mental and lower labials bordered posteriorly by scales that are distinctly larger than those of the row following 8
   Mental and lower labials bordered posteriorly by scales that are but slightly larger than those of the row following 10

8. The adpressed hind limb reaches the elbow of the forelimb; 3 pairs of scansors beneath digits; range: Little Namaqualand, Cape Province *namaquensis* (p. 265)
   The adpressed hind limb reaches only to the wrist or fingers of the forelimb; 2, rarely 3, pairs of scansors beneath digits; range: Transvaal, etc. 9

9. Ventral scales roundish, juxtaposed; range: ? Inhambane, Mozambique to eastern Northern Rhodesia ..... *t. platyceps* (p. 266)
   Ventral scales subhexagonal, subimbricate; range: central and western Northern Rhodesia south to northern Transvaal ..... *t. transvaalica* (p. 267)

10. Dorsal granules flattened; the adpressed hind limb reaches only to the wrist of the forelimb; range: Zululand (repeated here as tail unknown) *p. marleyi* (p. 262)

Dorsal granules convex; the adpressed hind limb reaches the elbow of the forelimb; range: mountains of southeast Cape Province from Tembuland to Queenstown District..... *tembulica* (p. 268)

11. Nasals in contact behind rostral; male with 4 (? 6–7) preanal pores; tail strongly depressed, oval in section with angular lateral edges; range: mountains of south-central Cape Province, south of 32° S... *k. karroica* (p. 269)

Nasals separated by a granule; male with 8 preanal pores; tail depressed but thicker with broadly rounded edges; range: north of 32° S.....12

12. Dorsal granulations finer (granules and ventrals around midbody number about 90); greatest width of tail (6 mm.) 1.5 times width of body (9 mm.); range: mountains of eastern Cape Province, Basutoland and Orange Free State north of 32° S..... *k. halli* (p. 271)

Dorsal granulation coarser (granules and ventrals around midbody number about 75); greatest width of tail (10 mm.) 1.3 times width of body (13 mm.); range: east-central Angola..... *k. bogerti* (p. 272)

STATISTICAL DATA FOR THE SPECIES OF THE GENUS AFROEDURA

Species or Race	Internasal Granules	Nostril between three Nasals, first Labial	Upper Labials	Lower Labials	Number of Scales in a Caudal Verticil Above and Below	Preanal Pores in Males	Maximum Recorded Length for	
							H.B.	Tail
p. multiporus	1	and rostral	8–10	9–11	unsegmented	17	53	59
p. pondolia	0–1–3	"	8–10	7–10	"	13–16	50	55
p. marleyi	1	"	8–9	8	?	10	30	?
africana	0	"	10	10	7–8 + 5	13–15	64	65
nivaria	1	"[1]	8–9	8–9	6 + 5	15	56	62
namaquensis	0–1	"	9–11	8–10	7 + 5	8–10	56	59
t. platyceps	0–1	"	9–11	9–10	7–9 + 5–6	9	67	59
t. transvaalica	0–1	"	9–11	8–10	7–9 + 5–6	6–8	67	61
tembulica	0–1	only[1]	9–10	8–9	7 + 4–5	6–9	56	?
k. karroica	0	"	7–10	7–9	5–6 + 3–4	4	51	53
k. halli	1	"	9–10	8–9	5 + 3–4	7–8	64	74
k. bogerti	1	"	8	8	5 + 4	8	50	92+

[1] Rarely the contrary in *nivaria* and *tembulica* where the rostral may or may not border the nostril.

Afroedura pondolia multiporis (Hewitt)

1925b. *Oedura pondolia multiporis* Hewitt, Rec. Albany Mus., **3**, p. 348: Clearwaters, near Haenertsburg, Zoutpansberg District, Transvaal.
1936. Lawrence, p. 37.

Description. Anterior nasal separated from its fellow by a granule; mental pentagonal not narrowing so much from the base as in *p. pondolia*; dorsal scales rounded, scarcely flattened, not subimbricate; digits slender; male with 17 preanal pores.

Color. Above, dark markings form an indefinite coarse reticulation.

Size. Total length of type ♂ (T.M. 3420), 112 (53 + 59) mm.

Remarks. The above description is taken from the original which occupies only eight lines.[1] Apparently 17 pores is the sole distinguishing character, but the locality from which the only known specimen came, is so far removed from the range of typical *pondolia* that I am inclined to recognize *multiporis* for the time being.

Localities. Known only from the type.

Range. Northern Transvaal.

Afroedura pondolia pondolia (Hewitt)

1907b. *Oedura nivaria* Roux (not Boulenger), p. 405.
1910b. *Oedura africana* Boulenger (part, not Boulenger, 1888d), p. 458.
1925b. *Oedura pondolia* Hewitt, Rec. Albany Mus., **3**, p. 346, pl. xvi, fig. 2: Mbotyi River mouth, Lusikisiki, Cape Province.
1926. Godfrey, p. 82.
1936. Lawrence, p. 37.
1937e. Hewitt, p. 21.
1930. *Oedura langi* FitzSimons, Ann. Transvaal Mus., **14**, pp. 21, 24, figs. 1–3: Venice Farm, Brak River, eastern Transvaal.
1936. Lawrence, p. 37.
1935. *Oedura pondoensis* Power (*lapsus*), p. 334.

Name. Pondo Rock Gecko (Hewitt).

Description. Snout as long as, or slightly shorter or longer than, the distance between the eye and the ear-opening; mental and lower labials bordered by scales which are abruptly or but slightly larger than the row following.

Ventrals subimbricate; preanal pores of males forming an angular series; limbs moderate, the adpressed hind limb reaching the elbow of the backward pressed forelimb; proximal pair of scansors beneath

[1] FitzSimons (1943, p. 36) should be consulted, however, for further details. The key characters which he employs to separate *multiporus* and *marleyi* from *pondolia* are highly variable in *Afroedura*.

digital expansion followed by a series of more or less transversely dilated shields; tail slightly depressed, its width at base about a third that of body, verticillate, covered with smooth scales, those above subimbricate, those below imbricate.

For characters common to all species, see definition on p. 257; for scale and pore counts, see statistical table on p. 259.

Color. Above, grayish, a dark streak from nostril passes through eye and above ear to neck; crown of head with darker infuscations; back with irregular or disintegrating dark brown to blackish crossbars which tend to coalesce and form reticulations or lines, particularly on flanks; tail with dark crossbars of which the basal three may form annuli, but reproduced tails are only spotted or streaked longitudinally. Below, whitish, slightly grayish on chin and tail.

Size. Total length of ♂ (M.C.Z. 42611), 105 (50 + 55) mm., of ♀ (M.C.Z. 42610), 112 (49 + 63) mm., both from Port St. John; the unsexed type (Albany Mus.) was 100+ (47 + 53+) mm., its tail being reproduced like that of *langi* paratype ♂ (T.M. 13134), 85+ (45 + 40+) mm.; *langi* type ♀ (T.M. 12856), 96 (43 + 53) mm.

Remarks. FitzSimons described *langi* chiefly on the basis of the anterior nasals being in contact in his pair of adults and two young, his action may be justified as in all thirteen of our *p. pondolia* it is separated by from 1–3 granules. In view of the fact that FitzSimons himself finds these nasals in contact or separated in the type series of *namaquensis* and in the short series of *t. platyceps* from Devuli River Bridge, I am not convinced that this character is sufficiently stable to admit of the recognition of *langi* even as a race until larger series demonstrate its stability in the eastern Transvaal. As supplementary characters FitzSimons mentions the number of lower labials (7 instead of 8–9, actually 7–9 in our Port St. John series), the much narrower mental (even narrower still in M.C.Z. 42613 from Port St. John though most of the series have a mental equal to, or broader than, the adjacent labials), and nature of body scaling.

Hewitt's race *multiporus* is considered doubtful, its dorsals are said to be "not subimbricate" which is the case with all members of the genus, his statement that in *p. pondolia* they are subimbricate proves illusory on careful examination of our material. Sole grounds for separation appear to be the possession of 17 (13–16 in our Port St. John series) preanal pores in the male.

FitzSimons separates *marleyi* from *p. pondolia* principally by the possession of only 10 pores. As the only known example was but two-thirds grown is it possible that the pores were not all developed?

Geographically one would expect it to be most nearly related to, possibly synonymous with, *p. pondolia*, as FitzSimons suggests; tentatively I have placed it with those species having from 6–10 pores.

Breeding. Makes a squeaking noise when mating (Gould in Hewitt).

Diet. Nocturnal, feeding by lamplight on moths, fish-moths, and flies (Gould).

Temperament. Pugnacious, holding on with the tenacity of a bulldog when biting (Gould).

Habitat. Found in dead trees, also beneath fragments of slaty rock at the base of a cliff within a few feet of the sea; very numerous in an old hut (Gould, etc.). *A. langi* was found in typical low veld country with stone and rocky outcrops.

Localities. **Transvaal:** Brak River (types of *langi*). **Natal:** Durban; Kentani. **Cape Province:** Coffee Bay, Pondoland Coast; Mbotyi River mouth, Lusikisiki; Mquanduli District; *Port St. John.

Range. Eastern Transvaal south through Natal to adjacent areas of Cape Province.

Afroedura pondolia marleyi (FitzSimons)

1930. *Oedura marleyi* FitzSimons, Ann. Transvaal Mus., **14**, pp. 22, 24, figs. 4-5: False Bay, Zululand.

Description. Mental and lower labials bordered by scales which are but slightly larger than the row following. Ventrals subimbricate; proximal pair of plates beneath digital expansion followed by a series of transversely dilated shields; tail reproduced.

Color. Above, grayish white tinged with brown; a dark streak from nostril through eye and above ear to neck; crown of head with darker infuscations; back with six irregular, wavy, dark brown crossbars; reproduced portion of tail spotted with brown. Below, whitish or creamish.

Size. Total length of type, a two-thirds grown ♂ (T.M. 13184), 55^{+} ($30.5 + 25^{+}$) mm., tail reproduced.

Remarks. Known to me only from the description of the subadult holotype, thought by FitzSimons to be possibly a subspecies of *pondolia*[1] from which he distinguishes it principally by the 10 preanal pores. This may be due to immaturity.

Localities. Known only from the type.

Range. Zululand.

[1] Later FitzSimons (1943, pp. 30, 35) makes it a race of *pondolia*, and I have followed him in this while still thinking *marleyi*'s low number of pores may be due to immaturity.

Afroedura africana (Boulenger)

1888d. *Oedura africana* Boulenger, Ann. Mag. Nat. Hist. (6), **2**, p. 137: Walfish Bay, Damaraland, South West Africa (loc. supplied in 1910b).
1890d. Boulenger, p. 77.
1898. Sclater, p. 102.
1910b. Boulenger (part), p. 458 (type only).
1910c. Hewitt, pp. 78, 86.
1911b. Hewitt, p. 43.
1911d. Sternfeld, p. 12.
1925b. Hewitt, p. 348.
1936. Lawrence, p. 37.

Description. Snout as long as the distance between the eye and the ear-opening. Ventrals subimbricate; preanal pores of males forming an angular series; tail much depressed, its width at base nearly equal to that of body, verticillate, covered with smooth scales.

For characters common to all species, see definition on p. 257; for scale and pore counts, see statistical table on p. 259.

Color. Above, grayish, with small brown spots and crossbars, of which there are five on the body and three on the tail.

Size. Total length of cotype (S.Afr.Mus.), 129 (64 + 65) mm.

Remarks. Known to me only from the original description and Hewitt's (1925b) comments on one of the two cotypes recovered from the stomach of a snake (*Pythonodipsas carinata*) allegedly from Walfish Bay. That this snake does occur in Damaraland is vouched for by Hewitt (1925b) who says that specimens were taken between Omaruru and Otavi by the Durban Light Infantry during World War I.

Previously it had been suggested that as the type of *carinata* Günther came from the Zambezi, and was the only specimen known, there had been an error in labeling, for *africana* is more closely related to eastern species of the genus and has not been taken in South West Africa for more than half-a-century.

Enemies. Cotypes recovered from stomach of *Pythonodipsas carinata*.

Localities. Known only from the type.

Range. South West Africa.

Afroedura nivaria (Boulenger)

1894c. *Oedura nivaria* Boulenger, Proc. Zool. Soc. London, p. 608: Summit of Drakensberg Range, Natal.
1894e. Boulenger, pp. 722, 726, pl. xvii, fig. 1.

1898. Sclater, p. 102.
1910b. Boulenger, p. 458.
1910c. Hewitt, pp. 78, 86.
1911b. Hewitt, p. 43.
1927a. Hewitt (part), p. 401 (omit Cala; Herschel; Masete).
1925b. *Oedura amatolica* Hewitt, Rec. Albany Mus., **3**, p. 349, pl. xvi, fig. 3, pl. xvii, fig. 2: near Hogsback, 6000 feet, Amatola Range, Cape Province.
1925. Essex, p. 337.
1927a. Hewitt, p. 402.
1928a. Essex, 1927, p. 931.
1930. FitzSimons, p. 23.
1936. Lawrence, p. 37.
1937e. Hewitt, p. 21, pl. viiA.
1928a. *Oedura* sp. n. Essex, 1927, p. 930.

Name. Drakensberg Rock Gecko.

Description. Snout as long as the distance between the eye and the ear-opening. Ventrals subimbricate; preanal pores of males forming a slightly curved series; proximal pair of scansors beneath digital expansion followed by a series of transversely dilated shields; tail slightly depressed, verticillate, covered with smooth scales.

For characters common to all species, see definition on p. 257; for scale and pore counts, see statistical table on p. 259.

Color. Above, pale brown to brownish gray, the loreal region darker but without definite streak; back with irregular, undulating, dark brown mottling or crossbars, of which there are 7–8 on the body and 5 on the tail; tail with black transverse spots and whitish annuli on its distal half.

Size. Total length of type ♂ (Brit. Mus.), 118 (56 + 62) mm., and unsexed cotype of *amatolica* (Albany Mus.), 100+ (54 + 46+) mm., tail partly reproduced.

Remarks. Known to me only from the bibliography above, from which the description and statistical data is a composite. In the type of *nivaria* the rostral was excluded from the nostril, but this was not the case with a second specimen from the Drakensberg referred to *nivaria* by Hewitt and in this respect the latter agreed with *amatolica*. Another point of difference between the types of *amatolica* and *nivaria* were the number of preanal pores, 12 in the two male types of *amatolica*, 15 in the holotype of *nivaria*. However the two cotypes of *africana*, had 13 and 15 respectively, the Port St. John series of *p. pondolia* 13–16, and there seems no reason to suppose but that the range for all species in the group would be 12–16.

It was with *pondolia* that Hewitt contrasted *amatolica* at the time of the latter's description.

Habitat. The type of *nivaria* was very active when captured in July, 1894, in the snow of the highest point of the Drakensberg. The cotypes of *amatolica* were found beneath stones at about 6000 feet.

Localities. **Natal:** Mont aux Sources, Tugela River, and summit of Drakensberg. **Cape Province:** near Hogsback, Amatola Mountains; Pirie Forest, Kingwilliamstown; summit of Katberg; Lushington, Alice District; near Stutterheim about two miles west of Dohne Peak.

Range. Western Natal and eastern Cape Province.

Afroedura namaquensis (FitzSimons)

1938. *Oedura namaquensis* FitzSimons, Ann. Transvaal Mus., **19**, p. 163, figs. 1–2: 32 miles from Springbok on Kamaggas road, Little Namaqualand, Cape Province.

Description. Snout slightly longer than the distance between the eye and the ear-opening; mental and lower labials bordered by scales which are abruptly larger than the row following.

Ventrals subhexagonal, subimbricate[1]; preanal pores of male forming a slightly curved series; limbs moderate, the adpressed hind limb reaching the elbow of the forelimb; 3 pairs of scansors beneath the digital expansion, the proximal pair followed by a series of transversely dilated shields; tail much depressed, its width at base about a third that of body, verticillate, covered above with smooth, subgranular, juxtaposed scales, those below subimbricate.

For characters common to all species, see definition on p. 257; for scale and pore counts, see statistical table on p. 259.

Color. Above, back and tail light grayish brown with irregular or disintegrating, dark chocolate-brown crossbars bearing dull yellow spots; sides pale grayish yellow to dirty cream, usually with a line of yellow spots from axilla to groin. Below, creamy white, tail gray to slate with thin, closely-set, zigzag bars encircling reproduced portion (FitzSimons).

Size. Total length of type ♂ (T.M. 18094), 108+ (53 + 55+) mm., of paratype ♀ (T.M. 18096), 115+ (56 + 59+) mm., tails reproduced.

Remarks. Known only from six males and two females, of which one of the former is now M.C.Z. 46803.

1. Juxtaposed according to FitzSimons.

Habitat. Found in association with *Pachydactylus w. weberi* beneath flakes on granitic boulder outcrops on hillsides (FitzSimons).

Locality. Known only from the *type.

Range. Little Namaqualand, Cape Province.

Afroedura transvaalica platyceps (Hewitt)

1925b. *Oedura transvaalica platyceps* Hewitt (? part), Rec. Albany Mus., **3**, p. 352, pl. xvi, fig. 4: Umtali, Southern Rhodesia.
1936. Lawrence, p. 37.
1939b. FitzSimons, p. 25.
1925b. *Oedura* sp. Hewitt, p. 353: Inhambane.
1934. Pitman, p. 303: Southern Rhodesia.

Description. Snout slightly longer than the distance between the eye and the ear-opening; mental and lower labials bordered by scales which are abruptly or but slightly larger than the row following.

Ventrals roundish, juxtaposed; preanal pores of male forming a slightly curved series; limbs short, the adpressed hind limb reaching the fingers of the backward pressed forelimb; proximal pair of scansors beneath digital expansion followed by a series of transversely dilated shields; tail much depressed, its width at base about half that of body, verticillate, covered with smooth scales, those above subimbricate or juxtaposed, those below subimbricate.

For characters common to all species, see definition on p. 257; for scale and pore counts, see statistical table on p. 259.

Color. Above, very pale grayish, traces of a dark streak from nostril through eye; back with six irregular or disintegrating, dark brown crossbars; tail with dark brown crossbars, but reproduced tails have only zigzag streaks. Below, whitish, slightly grayish on chin and tail.

Coloring brighter, and markings much more distinct, in young; for description of which see FitzSimons (1939b).

Size. Total length of ♂ (T.M. 18773), 116^{+} ($67 + 49^{+}$) mm., tail being reproduced; of type ?♀ (S.Afr.Mus.), 119 mm. (proportions not given).

Remarks. Hewitt distinguished *platyceps* from the typical form on the even *more* depressed head; even *more* flattened granules; obsolete canthus rostralis; rostral *more* than twice as broad as high; mental pentagonal and decidedly smaller than first labial; absence of chin shields; and only 1 pair of plates below *basal* portion of digit.

None of these are of diagnostic value but on the strength of some

of them he included two geckos from Matopos, S. R. (S.R. Museum) which I think should be referred to *t. transvaalica*.

FitzSimons (1939b) collected a series of 13 (6 of which are now M.C.Z. 44572–7) geckos at Devuli River Bridge, which is not far from Umtali, type locality of *platyceps*, to which race he referred them. He furnishes an excellent full description of the race and cites characters which he finds more or less distinguish *platyceps* from the types of *transvaalica*. To me, only one of these appears valid, viz. the rounded and juxtaposed ventrals; for six geckos from Empandeni and Musami (M.C.Z. 27123–5, 33440–2) appear to me to agree with our cotype of *t. transvaalica* in having subhexagonal, subimbricate ventrals, while the two males have 6 (Empandeni) and 8 (Musami) pores respectively.

Parasites. Mites (*Geckobia oedurae*) have been described by Lawrence.

Habitat. Found in the fissures of rocky outcrops in bushveld country (FitzSimons).

Localities. For omission of Matopos specimens see *Remarks* above. ? **Mozambique**: ? Inhambane (specimen listed by Hewitt, 1925b, p. 353). **Southern Rhodesia**: *Devuli River Bridge; Umtali.

Range. Probably western Mozambique and adjacent eastern Southern Rhodesia.

Afroedura transvaalica transvaalica (Hewitt)

1925b. *Oedura transvaalica* Hewitt, Rec. Albany Mus., **3**, p. 350, pl. xvi, fig. 1, pl. xvii, fig. 1: Njelele River, Zoutpansberg District, Transvaal.
1936. Lawrence, p. 37.

Description. Snout slightly longer than the distance between the eye and the ear-opening; mental and lower labials bordered by scales which, at least anteriorly, are abruptly larger than the row following.

Ventrals subhexagonal, subimbricate; preanal pores of males forming a slightly curved series; limbs short, the adpressed hind limb reaching the wrist of the backward pressed forelimb; proximal pair of scansors beneath digital expansion followed by a series of more or less transversely dilated shields; tail much depressed, its width at base about half that of body, verticillate, covered with smooth scales, those above juxtaposed, those below subimbricate.

For characters common to all species, see definition on p. 257; for scale and pore counts, see statistical table on p. 259.

Color. Above, pale grayish, with irregular or disintegrating, dark brown crossbars of which there are five or six between occiput and base of tail; tail with from seven to ten dark brown crossbars. Below, whitish, tail of adults dusky purplish.

Size. Total length of a cotype (Transv. Mus.), 122 (58 + 64) mm., of a ♀ (M.C.Z. 33440), 116+ (67 + 49+) mm. from Musami.

Remarks. Both the Musami and Empandeni series were received from Hewitt as *t. transvaalica* though he questioned the subspecific determination of those from Empandeni. See *Remarks* under *t. platyceps.*

Localities. **Southern Rhodesia:** *Empandeni; (? Matopos cotypes of *platyceps*); *Musami near Salisbury. **Transvaal:** *Njelele River, Zoutpansberg District.

Range. Southern Rhodesia (except east) south to northern Transvaal.

Afroedura tembulica (Hewitt)

1926a. *Oedura tembulica* Hewitt, Ann. S. African Mus., **20**, p. 415: Cofimvaba, Tembuland, Cape Province.
1927a. Hewitt, p. 402.
1928a. Essex, 1927, p. 930.
1930. FitzSimons, p. 24.
1936. Lawrence, p. 37.
1937e. Hewitt, p. 22.

Name. Tembu Rock Gecko (Hewitt).

Description. Snout slightly longer than the distance between the eye and the ear-opening; mental and lower labials bordered by scales which are scarcely larger than the row following.

Ventrals subimbricate; preanal pores of male forming a slightly curved series; limbs moderate, the adpressed hind limb reaching the elbow of the backward pressed forelimb; proximal pair of scansors beneath digital expansion followed by a series of transversely dilated shields; tail much depressed, its width at base about half that of body, verticillate, covered with smooth scales, those above subimbricate, those below imbricate.

For characters common to all species, see definition on p. 257; for scale and pore counts, see statistical table on p. 259.

Color. Above, grayish; back with about ten indistinct, irregular, and usually disintegrating, brown crossbars; tail with dark crossbars and spots. Below, whitish.

Size. Length of unsexed cotype's (Albany Mus.) head and body, 56 mm., of cotype ♀ (M.C.Z. 22094), 50 mm., tails reproducing.

Remarks. Hewitt (1927a) states of *tembulica* that "the characters are not altogether constant, specimens from Braam Nek and one from Mackay's Nek having the large nasals in contact." In one of the cotypes he found that the rostral was excluded from the nostril by a small granule on one side of the head only.

Habitat. Fissures of sun-split rocks on a hillside.

Localities. **Cape Province:** Braam Nek near Imvani; *Cofimvaba, Tembuland; Imvani, Queenstown District; Mackay's Nek south of Cala; Nanusi's (or Nonesis ?) Nek, Queenstown District.

Range. Mountains of southeastern Cape Province from Tembuland to Queenstown District.

Afroedura karroica karroica (Hewitt)

1910b. *Oedura africana* Boulenger (part, not Boulenger, 1888d), p. 458.
1925b. *Oedura karroica* Hewitt, Rec. Albany Mus., **3**, p. 348, fig. 1: Albany District, Cape Province.
1927a. Hewitt, p. 402.
1928a. Essex, 1927, p. 930.
1936. Lawrence, p. 37.
1937e. Hewitt, p. 22.
1926c. *Oedura karroica wilmoti* Hewitt, Ann. Natal Mus., **5**, p. 446, pl. xxv, figs. 1–2: Tarkastad, Cape Province.
1927a. Hewitt, p. 402.
1928a. Essex, 1927, p. 930.
1930. FitzSimons, p. 23.
1936. Lawrence, p. 37.
1937e. Hewitt, p. 22, pl. vi.

Name. Karroo Rock Gecko (Hewitt).

Description. Snout slightly longer than the distance between the eye and the ear-opening; mental and lower labials bordered by scales which are subequal to those in the row following.

Ventrals subimbricate; preanal pores of male forming a transverse series; limbs moderate, the adpressed hind limb reaching the elbow of the backward pressed forelimb; proximal pair of scansors beneath digital expansion followed by a series of scales which may, or may not, be transversely dilated; tail much depressed, its width at base about two-thirds that of body, verticillate, covered with smooth scales, those above subimbricate, those below imbricate.

For characters common to all species, see definition on p. 257; for scale and pore counts, see statistical table on p. 259.

Color. Above, grayish; back with about six to eleven, irregular or disintegrating brown crossbars; tail with dark, transversely-arranged spots. Below, whitish, tail edged with grayish.

Size. Total length of unsexed type of *wilmoti* (Albany Mus.), 98 (44 + 54) mm., of *karroica* type ♀ (S.A.M. 11019) 43 mm. from snout to vent, tail lacking and condition poor.

Remarks. Hewitt separated *wilmoti* from *karroica* on the grounds that the two cotypes of the latter possessed a more elongated mental and first labial, the three scales being bordered posteriorly by 4 small scales. In *wilmoti*, on the other hand, "normally 5 or 6" scales bordered these three shields, but he goes on to say that one cotype of *wilmoti* has 4 scales and another 7. In our series of thirteen *p. pondolia* from Port St. John there are from 4–7 scales, while in our series of six *t. platyceps* from Devuli River Bridge there are 5–7. It would seem, therefore, that while 5–6 are normal for most species of the genus, 4 and 7 occur as unusual variations and the character is not one to justify separation of a race.

Of the closely related *halli*, which I regard as no more than a race of *karroica*, Hewitt himself says that the mental in the cotypes may be larger, smaller, or subequal to the first labial. Variation in this shield is quite common in the Gekkonidae and provides no grounds for the recognition of *wilmoti* even though none of the twenty-four cotypes had so narrow a shield as did the type of *karroica*.

Moreover Hewitt records both *karroica* and *wilmoti* from Graaf Reinet, the respective specimens being collected by John Whaits and Robert Essex. Later (1937e), he refers to the type of *karroica* as being "the only known specimen" and adds that the male *has* 6–7 pores. As the type was a ♀, he only *assumed* from her preanal scales that a male, if found, might have 6 or 7 pores.

Of *wilmoti*, Hewitt says: "male with 4 preanal pores." This raises the question as to whether there was only one male among the twenty-four cotypes and that subadult, 4 pores being lower than in any other known species of the genus. The four cotypes (M.C.Z. 22090–3) in the Museum of Comparative Zoölogy are all females.

Parasites. Mites (*Geckobia karroica*) described by Lawrence.

Habitat. Associated with *Pachydactylus maculatus* in narrow crevices of sun-split rocks on kopjes.

Localities. **Cape Province:** Abbotsbury Farm near Lettskraal; Albany District; Coetzeesberg near Pearston; Cradock District;

Graaf Reinet; Hopewell Farm, south of Tarkastad towards slopes of Winterberg; Lettskraal at 5400 feet; *Tarkastad; Winterberg.

Range. Mountains of south central Cape Province south of 32°.

Afroedura karroica halli (Hewitt)

1927a. *Oedura nivaria* Hewitt (part, not Boulenger), p. 401.
1928a. Essex, 1927, p. 930.
1935. *Oedura halli* Hewitt, Rec. Albany Mus., **4**, p. 321, pl. xxix, figs. 1–2: Telle Junction, near Palmiefontein, Herschel District, Cape Province.
1937e. Hewitt, p. 21, pl. vii.
1939a. Power, p. 374.

Name. Hall's Rock Gecko (Hewitt).

Description. Snout slightly longer than the distance between the eye and the ear-opening; mental and lower labials bordered by scales which are abruptly larger than the row following.

Ventrals subimbricate; preanal pores of male forming an angular series; limbs moderate, the adpressed hind limb reaching the elbow of the backward pressed forelimb; proximal pair of scansors beneath digital expansion followed by a series of transversely dilated shields; tail depressed, verticillate, covered with smooth scales, those above subimbricate, those below imbricate.

For characters common to all species, see definition on p. 257; for scale and pore counts, see statistical table on p. 259.

Color. Above, pale gray to brown, with dark mottlings and irregular crossbars which are often edged posteriorly with white; head, limbs, and tail also with blackish mottlings. Newly-hatched young are pale gray, with light brown crossbars and minutely speckled with white; the crossbars tend to disintegrate and form blotches as the gecko ages.

Size. Total length of paratype ♂ (Albany Mus.), 138 (64 + 74) mm., of paratype ♀ (Albany Mus.), 116+ (60 + 56+) mm., tail reproduced. Hatchlings averaged 22.5 + 19.5 mm., whereas the proportions were reversed to 62.5 + 65.5 mm. in adults measured by Power.

Breeding. The following notes are taken from a fairly extensive account of the habits at Roma as observed by Power (1939a).

A pair of oval, calcareous, and brittle-shelled eggs are laid beneath stones and adhere to the rock so tenaciously that in most cases they could be removed only by chipping off the flake with hammer and

chisel. The eggs of as many as five pairs of geckos might be found beneath a single stone, and Power suggests that the sight of previously-laid eggs may serve as a stimulus to a gravid gecko. Embryos in a fairly advanced condition were found in freshly deposited eggs. Eggs laid on the night of December 8, hatched January 16. Another pair laid on December 10, hatched January 19. Had they remained in their environment where the rocks were exposed to the sun's rays, it is reasonable to suppose that the period of incubation might have been even shorter.

The fully developed embryo lies coiled within the shell with its snout applied to the base of its tail, the latter is curved around until its tip reaches the axilla, the forefeet lie along the flanks near the base of the hind limbs while the hind feet are beneath the head. No calcareous egg-tooth was observed, the score of young which hatched, did so by rupturing a jagged hole in end or side of the shell.

Diet. Ants and small beetles (Power).

Habitat. These geckos reside in fissures of the great sandstone rocks found in the barren and waterless region near Telle Junction at about 4500 feet (Hall). In deep clefts of the precipitous sandstone rocks that form the sides of flat-topped hills near Roma (Power).

Localities. **Orange Free State:** *Thebapatchoa, Thaba'nchu. **Basutoland:** Masiti (Masite; Masete) near Morija; Roma Mission. **Cape Province:** Majuba Nek near Herschel; Stormberg Range near Cala, Xlanga District; Telle Junction near Palmietfontein, Herschel District.

Range. Mountains of eastern Orange Free State, Basutoland, and Cape Province north of 32°.

Afroedura karroica bogerti Loveridge

1944f. *Afroedura karroica bogerti* Loveridge, Amer. Mus. Novit., No. 1254, pl. i, fig. 1: Namba (Mombolo), Cuanza Sul Province, Angola.

Name. Bogert's Rock Gecko.

Description. Agrees with *A. k. halli* in most respects, including the thicker tail with lateral edges broadly rounded in contradistinction to *A. k. karroica* whose tail is much more strongly depressed and whose lateral edges are angular. From a ♀ (M.C.Z. 46143) *halli* it differs in the greater breadth of the strongly verticillate tail whose greatest width is 13% the length of head and body instead of 20% as in *halli*.

For characters common to all species, see definition on p. 257; for scale and pore counts, see statistical table on p. 259.

Color. Above, grayish; back with five or six obsolescent, irregularly W-shaped, brown crossbars; limbs and tail immaculate. Below, whitish, uniform. (Apparently a very old gecko).

Size. Total length of holotype ♂ (A.M.N.H. 47841), 92+ (50 + 42+) mm., tip of tail missing.

Localities. Known only from the type.

Range. East-central Angola.

Genus Ptyodactylus

1820. *Styodactylus* Goldfuss, Handbuch der Zool., **2**, p. 158 (type *Gecko lobatus* Geoffroy = *hasselquisti* Donndorff).

1825. *Ptyodactylus* Gray, Ann. Philos. (2), **10**, p. 198 (type *Gecko lobatus* Geoffroy = *hasselquisti* Donndorff).

Diagnosis. Digits free, moderate, slender, not dilated at base but strongly dilated at apex, covered above with scales, not denticulate laterally, below on basal portion by transverse shields and distally by narrow fan-like scansors, clawed, the claw retractile between scales in the anterior notch of the distal expansion.

Pupil vertical, eyelid more or less distinct as a circumorbital ring; nasals more or less swollen; dorsal lepidosis of small, smooth, juxtaposed granules, uniform (India) or intermixed with tubercles; tail slender, subcylindrical, tapering. Males without preanal or femoral pores.

Range. Asia (Sind; Syria south to Arabia) east through arid northern Africa north of 10° N.

Remarks. The genus *Ptyodactylus*, hitherto attributed to Gray, should more properly be accredited to Goldfuss, who, however, substituted an "S" for a "P" in its spelling. That this was a *lapsus* is plain for he gives it as "*Styodactylus* Cuv." The word used by Cuvier (1817, **2**, p. 49) for the fourth division of his family Geckotiens was actually Ptyodactyles, and as such inadmissable as a generic name.

I take this opportunity of designating *lobatus* Geoffroy as type, for Goldfuss includes "*P. aegyptiacus*" which is a synonym for the lizard now known as *Tarentola a. annularis* (Geoffroy).

The elucidation of the races and ranges of the fan-footed gecko must be left to someone prepared to assemble and study all the recorded material. I regard the following key as only tentative.

Tentative Key to the Species

1. Back covered with small uniform granular scales; range: Sokotra Island.. *ha. sokotranus* (p. 274)
   Back covered with small granules and larger tubercles forming longitudinal rows.....2

2. Form slender (? or robust); scaling below finer; color above usually paler (whitish to sandy gray); granules on snout small, flattish.....3
   Form robust; scaling below coarser; color above usually darker (dark gray to olive brown); granules on snout moderate or large.....4

3. Upper nasal separated from its fellow behind rostral by 1–2 granules; range: ? Syria south through Arabia to British Somaliland, north through Eritrea to Egypt, and west through Ethiopia and Sudan to French West Africa and the Algerian Sahara where it meets with *oudrii*..... *ha. hasselquistii* (p. 275)
   Upper nasal in contact with its fellow behind rostral; range: northern French Togo (status doubtful as known only from the two cotypes)... *ha. togoensis* (p. 283)

4. Granules on snout moderate; no tubercles on upper arm; color above without light spots; range: Algeria and Morocco.....*ha. oudrii* (p. 281)
   Granules on snout large, strongly developed; tubercles on upper arm numerous and prominent; above peppered with large light spots, at least in adults; range: northern Syria south to ?.....(*ha. puiseuxi*)

Ptyodactylus homolepis sokotranus Steindachner

1902. *Ptyodactylus socotranus* Steindachner, Anz. Akad. Wiss. Wien, **39**, p. 168: Gebel Hali near Kallansiye, Sokotra Island.
1903. *Ptyodactylus sokotranus* (sic) Steindachner, p. 12.

Description.[1] Snout rounded, longer than the distance between the eye and the ear-opening; latter vertically oval, its length more than half that of the orbit; rostral broader than high; granules on snout larger than those on occiput; *nostril between rostral, first labial and 3 nasals*; *upper labials 11–12*; *lower labials 9–12*; mental small, about as large as adjacent labials; bordered by a row of small postmentals.

Back and limbs covered above with small, uniform, smooth, scales without any larger tubercles, midbody scales about 111; ventral scales larger, subimbricate; limbs rather slender, the adpressed hind limb reaching the shoulder; tail slightly depressed, covered above with small scales, below with much larger ones.

Color. Above, back with broad, more or less indistinct, dark crossbars upon which are scattered darker spots, or only indistinct dark

[1] See *Remarks*.

mottling on the dorsum; tail, of one female, with white spots arranged in cross rows.

Remarks. Steindachner states that *sokotranus* differs only from *homolepis* Blanford, of Sind, in the rostral and first labial bordering the nasal, a character of which both types may be found in *h. hasselquistii* from a single locality in Arabia. I have, therefore, made *sokotranus* a subspecies and, having seen no specimens, drafted the description by taking *homolepis* characters from M. A. Smith (1935, p. 79) and adding, *in italics*, the scanty information furnished by Steindachner; the entire color description, however, is based on that of Steindachner.

Habitat. Under slabs of rock and in holes beneath the larger stones up to 460 metres above sea level.

Localities. **Sokotra Island:** Gebel Hali; Ras Shoab.

Range. Sokotra Island.

PTYODACTYLUS HASSELQUISTII HASSELQUISTII (Donndorff)

1757. *Lacerta gecko* Hasselquist & Linné (part, not Linné, 1754), Iter. Palaest., p. 306: Cairo, Egypt.
1758. Linné (part), p. 205.
1760. Linné (part), p. 365.
1896. Lönnberg (part), p. 15.
1798. *Lacerta hasselquistii* Donndorff, Zool. Betyr., **3**, p. 133: Cairo, Egypt.
1820. *Gekko Ascalabotes* Merrem (part), Vers. Syst. Amphib., p. 40 bis: Egypt (omit 'also Archipelago and the East').
1820. *Styodactylus* (sic) *lobatus* Goldfuss, p. 158.
?1823.[1] *Gecko lobatus* Is. Geoffroy Saint Hilaire, in Savigny, Descr. Égypte, Hist. nat. Rept., **1**, p. 132, pl. v, fig. 5: Egypt.
1823. Lichtenstein, Doubl. Berlin Mus., p. 103: Nubia.
1827. *Ptyodactylus guttatus* Heyden, in Rüppell, Atlas Reise Afrika, **1**, Rept., p. 13, pl. iv, fig. 1: "Gegend von Tor im petraeischen Arabien, Auch am Sinai" i.e. Tor, Sinai, Egypt.
1833. *Gecko maculatus* Schinz, Naturg. Abbild. Rept., p. 74, pl. xvi: n.n. for *P. guttatus* Heyden from Tor, Sinai.
1836. *Ptyodactylus hasselquistii* Duméril & Bibron, p. 378, pl. xxxiii, fig. 3.
1884a. Rochebrune, p. 77 (localities ignored).
1896. Anderson, pp. 56, 68, 69, 75, 78, 84, 89, 98.
1898. Anderson, p. 62, pls. vi–vii (omit fig. 9).
1900. Anderson, p. 422.
1901. Steindachner, p. 327.
1903b. Andersson, p. 6.

[1] Anderson (1898) gives Lichtenstein (1823) as author and dates Is. Geoffroy as "?1827"; however Lichtenstein (1823) gives Geoffroy as author and cites pl. v, fig. 5, so that the plate at least was published. Goldfuss (1820) cites Cuvier (1817) who also gives "Geoffr. Rept. Eg. III, 5 as author.

1908. Werner, 1907, p. 1829.
1913a. Werner, p. 16, fig.
1914. Fowler, p. 2.
1923. Cottam, p. 49.
1925b. Flower, p. 939.
1930e. Witte, p. 616.
1932. Kuntze, p. 329.
1933. Flower, p. 763.
1935. Andersson, p. 5.
1937. Werner, p. 32.
1937. Zavattari, p. 530.
1938. Angel & Lhote, p. 355.
1942. Parker, p. 44.
1874d. *Ptyodactylus gecko* Peters, p. 66.
1882a. Müller, p. 163.
1887. Strauch (part), p. 35 (omit Batna).
1897. Bateman, p. 75.
1885d. *Ptyodactylus lobatus* Boulenger (part), p. 110.
1889. Pfeffer, p. 5.
1893a. Boettger, p. 27.
1893. Pfeffer, p. 71.
1895. Prato, p. 24.
1896a. Boulenger, p. 549.
1899. Doumergue, p. 520, pl. v, figs. 2–2a.
1899c. Werner, p. 284.
1901. Doumergue, p. 84, etc. (reprint of 1899).
1905. Rosén, p. 129.
1911. Lampe, p. 152.
1913a. Werner, p. 16.
1914b. Barbour, p. 80.
1917c. Chabanaud, p. 84.
1928b. Scortecci, p. 312.
1930a. Scortecci, p. 205.
1931a. Vinciguerra, p. 97.
1934. Brongersma, p. 166.
1936a. Pellegrin, p. 51.
1944b. Angel, p. 418.
1892. *Ptyodactylus Lacazii* Boutan, Arch. Zool. Expér. (2), **10**, pp. 17, 18: Caves of "Hummoun ul Faroun" i.e. Hammam Far'un, Sinai Peninsula, 60 miles southeast of Suez.
1893. *Ptyodactylus Bischoffsheimi* Boutan, Revue Biol. N. France, **5**, p. 340, pl. iii, fig. 1: Ruins of Palmyra, Syria.
1893. *Ptyodactylus Montmahoui* Boutan, Revue Biol. N. France, **5**, p. 369, pl. iii, fig. 2: Ruins of Palmyra, Syria.
1893. *Ptyodactylus Barroisi* Boutan, Revue Biol. N. France, **5**, p. 375, pl. iii, fig. 3: Ruins of Palmyra, Syria.

1894. *Ptyodactylus lobatus syriacus* Peracca, Bull. Mus. Zool. Torino, **9**, No. 167, pp. 1, 3: "Dscherasch, Est-Giordano" i.e. Jerash, Transjordania.
1913a. Werner, p. 16.
1896. *Ptyodactylus hasselquistii* var. *siphonorhina* Anderson, Contr. Herp. Arabia, p. 98: Abu Roash, near Giza, Cairo, Egypt.
1898. *Ptyodactylus hasselquistii* var. *ragazzii*[1] Anderson, Zool. Egypt, Rept., p. 69, pl. vii, figs. 10–11: Ghinda, Eritrea.
1905. Neumann, p. 390.
1905c. Tornier, p. 368.
1919. Werner, p. 471.
1927. Calabresi, p. 39.

Further references to *"gecko"* and *"lobatus"* will be found under *h. oudrii*, while *h. puiseuxi* and its synonym *l. sancti-montis* are omitted as definitely applicable to the north Syrian form.

The synonymy given above is only provisional as explained in the *Remarks* below. Part of the extensive bibliography between 1757 and 1880 will be found in Anderson (1898).

Names. Fan-footed Gecko (English); *abu bors* (i.e. father of lepers; Arabic); *abu kaff* (in reference to dilated digits; Arabic); *timtaleg* (in Tibesti region: Werner).

Description. The following does not purport to embody all the variations given in the foregoing synonymy, it is based largely on the Egyptian and Sudanese material in the Museum of Comparative Zoölogy.

Proportions variable; form slender or stout; snout long, rounded, much longer than the distance between eye and ear-opening; latter moderate, vertically oval, its diameter about half that of the orbit; rostral nearly twice as broad as high, without median cleft above; granules on snout small, scarcely convex, smooth, larger than those on occiput and back; nostril between rostral, first labial (either of which occasionally may be excluded), and 3, rarely 4, nasals, which may be slightly or strongly swollen, the anterior separated from its fellow by 1–2 granules; upper labials 11–15; lower labials 9–15; mental twice as long as broad, usually in contact with the gular granules, rarely bordered by a pair of large postmentals in contact (Gebel Dilling) on the median line; flanked by a series of chin shields or sublabials which postero-laterally merge into the gular granules instead of the abrupt transition immediately behind the mental.

Back and limbs covered above with small, unequal, smooth, juxtaposed granules intermixed with 8–14 rows of slightly keeled or almost

[1] As amended in the Corrigenda slip.

smooth tubercles; ventral scales scarcely larger, subimbricate; limbs moderate, slender (? or stout), the adpressed hind limb reaching the shoulder or ear; subdigital shields actually under the first toe 2–5, 9–13 under the fourth toe; tail depressed, verticillate, with median sulcus, covered above with small, smooth, granular scales and 4–6 rows of small, smoothish or keeled tubercles, below with subequal imbricate scales; on either side of base of tail in both sexes are 2–3 white tooth-like tubercles; length of tail slightly longer than the length of head and body.

Color. Above, whitish to sandy gray or dark gray-brown; uniform, or usually a brown streak from nostril to eye which may continue on to meet its fellow on nape; crown reticulate or spotted with dark or reddish brown; back with a more or less distinct or broken series of chevron-shaped brown crossbars; limbs, digits and tail more or less barred. Below, white, uniform.

Coloration of course varies in accordance with the environment, Flower (1933) describes living specimens of "pale yellowish brown with numerous circular spots of pale lilac-blue."

Size. Total length of a perfect ♂ (Anderson), 137 (68 + 69) mm. from Aswan, of a ♀ (Anderson), 135 (67 + 68) mm., from Mokattam, surpassed in length from snout to vent by a ♂ (M.C.Z. 1054), of 77 mm. from Sakkara Temple, and another Eritrean ♂ (Anderson) of 96 mm.

Remarks. The question of the validity of the above synonymy must be left to some conservative taxonomist with the patience to assemble all available material as listed in the papers cited. After spending some time on the problem I find my conclusions coincide with those of Barbour (1914), viz. that there are *at least* three recognizable forms: in the northeasterly limits of its range a distinctively colored one from northern Syria (*P. h. puiseuxi* Boutan, 1893, from "Lac Houleh," i.e. Bahr el Chet, with *P. l. sancti-montis* Barbour, 1914, from Rasheya, foot of Mount Hermon, as a synonym): an Algerian and Moroccan (*P. h. oudrii* Lataste) in the northwesterly limits of the species, and the more slender typical form from Egypt (*P. h. hasselquistii* (Donndorff)) in the centre, but our two Cairo topotypes appear to represent both a slender and a robust type, and these apparently crop up throughout much of Arabia, Palestine and Syria.

Our robust little 142 (72 + 70) mm. example from Gebel Dilling, Anglo-Egyptian Sudan, was identified by Werner with *P. h. ragazzii* a southern form of which the largest (96 + 68 mm.) cotype is slightly larger (by 10 mm. in length from snout to vent) than the typical form from Egypt. Werner (1919) however, says that it does not

appear distinguishable from some Arabian specimens and goes on to synonymize *togoensis*, though that form has a character, minor to be sure, which distinguishes it from all other recorded material.

The only explanation that occurs to me is that formerly both a slender and robust form occurred in the near East but have again merged, aided, perhaps, in this long-inhabited region, by the peregrinations of man, whose houses they share and in whose possessions they doubtless deposit their eggs.

To anyone investigating this problem, Anderson's (1898, pp. 60–76) detailed and well-illustrated account will be invaluable, though his conception of a variety does not wholly coincide with current ideas of a geographical entity or race. Werner (1919) presents extensive tables showing variation in the material available to him, and furnishes a synopsis of the forms which he considers recognizable. Flower (1933) found it impossible to apply a trinomial system to the highly variable Egyptian material; his paper also should be consulted for much interesting matter pertaining to the Egyptian Fanfoot.

As an aid to such an investigation I append the data derived from the 42 specimens in the Museum of Comparative Zoölogy which I have examined. The three Syrian are from the type series of *sanctimontis*, the three Algerian are cotypes of *oudrii*. The number of tubercle rows on tail is not so clear cut as would appear at first glance for 2 + 2 does occur outside of Algeria and Morocco, though the converse does not appear to be the case. The greatest tail length does not necessarily belong to the gecko cited for greatest length of head and body.

Country	Number of Specimens	Internasal Granules	Nasals Surrounding Nostril	Upper Labials	Lower Labials	Tubercle Rows on Dorsum	Scansors under First Toe	Scansors under Fourth Toe	Tubercle Rows on Tail	Greatest Length Head and Body	Greatest Length of Tail
Syria	3	1–2	3	11–13	9–10	9–12	2	10–11	3 + 3	76	55
Palestine	12	1–2	3–4	11–14	11–13	10–13	2–4	9–13	"	85	77
Arabia	16	1	3	12–15	10–14	8–13	2–4	9–11	"	80	70
Sinai	4	1	3	11–13	11–14	10–13	3–5	10–11	"	83	60
Egypt	2	1	3	12–13	10–12	9–12	3	11	"	77	—
Sudan	1	1	3	11	10–11	13–14	3	9	"	72	70
Algeria	3	1	3	10–12	9–11	8–10	2	8–10	2 + 2	61	46
Morocco	1	2	3	11–12	10–11	10	2	8	"	50	48

Longevity. Three years, 5 months, 13 days at Giza Zoo (Flower).

Diet. Insects, also kernel of fruit of *Zizyphus lotus* in stomach of a Tamrit gecko (Angel & Lhote, 1938).

Parasites. Larval ticks on a Gebel Dilling specimen (M.C.Z.); hemogregarines recorded as present in one from Djenne (Chabanaud, 1917c).

Habits. Its cry resembles the sound made by a man urging on his horse (Anderson, 1898).

Flower (1933) states that it is active in the daytime within caves and buildings, even venturing out into the hot sunshine of summer, but seeking safety in some cranny if approached. In illustration of their sedentary ways he relates how on two occasions he transported one of these geckos from house to house, yet in each instance it remained in its new quarters without attempting, either by day or night, to escape through the open windows, or door.

According to Kuntze, if one discharges the contents of a glass of water at one of these geckos on a wall, it will fall to the ground (the scansors losing their adhesive ability) and may be seized with ease. It will promptly bite the restraining hand, but little attention need be paid to this for at the worst only a slight abrasion will result.

Habitat. In Egypt largely in houses, temples or tombs, elsewhere in caves or on cliffs and rocks. As pointed out by Anderson, the *species* has adapted itself to a wide range of conditions between the mountains of Palestine and Algeria, in both of which it is subject to snow, and the scorching stretches of the arid Sahara and Sudan to the fertile uplands of Shoa.

It is the more surprising then to read that three delicate and semi-transparent *hasselquistii*, captured by Werner in the cool rooms of the Luxor Hotel, succumbed to the high temperature of his railway carriage during the journey to Cairo. He refers to the robust forms of Lower Egypt and Syria as being veritable bulldogs in comparison with the delicate lizards at Luxor, where he hesitated to hunt them in deference to the threatening attitude of the guard at the tombs.

Folklore. From the time of Hasselquist, who stated that at Cairo "he saw the hand of a man, over which a gecko had run, become in an instant covered with red pustules and inflamed, accompanied by itching like that caused by the sting of a nettle". Arabs have attributed all manner of ills to these geckos, including leprosy if eaten.

The symbolism of a gecko and its occurrence as a hieroglyph on tombs or temples, is discussed at some length by Anderson (1898, p. 75).

Localities. **French West Africa:** Agades (Agadez); Djenne; Iferouane; Tidmit Pits near Air. **French Equatorial Africa:** Guelta D'Ehi Kori, Tibesti, Sahara. **Algeria:** Abelessa, Ahaggar (Hoggar) Mountains; Ain Tegert (Tigeurt); Djanet; In Azaoua, Tassili de Timissao; In Gall; Silet, Ahaggar; Tamanrasset, Ahaggar; Tamrit; Tin Zaouatene, Adrar Mountains. **Libya:** Gat, Fezzan; Esneh; Hofra, Fezzan. **Egypt:** Abu Roash; Ain Mellah to Khan Tubb Tusef; Ain Sudra; Assiut Province; Aswan (Assuan); Beni Hassan; Cairo; Dar Fadda; Edfu Temple; Emerald Mines; Gebel Mokattam; Giza; Helwan; Kosseir on coast; Luxor; Medinet Habu Temple; Mount Sinai; Nakhl; Nile Valley; Philae Temple; Quena; Ras Abu Zenima; *Sakkara Temple; Suez Plain; Thebes; *Wadi Feiran; Wadi Gulan. **Anglo-Egyptian Sudan:** Berber Province; Dongala Province; Gamilab and other mountains in Red Sea Province; Gebel Debri; *Gebel Dilling (Delleng); Wadi Halfa. **Eritrea:** Alali; Gaarre, Danakil; Ghinda; Saati (Sahati); Senafe. **Ethiopia:** Shoa. **British Somaliland:** Fulla Valley; Guban; Gumboworen.

Range. Asia (? Syria; Palestine; Transjordania; Arabia) west through Sinai to French West Africa and the Algerian Sahara (where it meets with the northwestern race *oudrii*).

Ptyodactylus hasselquistii oudrii Lataste

1880. *Ptyodactylus oudrii* Lataste, Le Naturaliste, p. 299: Bou Saada, Algeria.
1882b. Müller, p. 173.
1893. Boutan, p. 343, fig. 2.
1899. Doumergue, p. 521, pl. v, figs. 1–1c.
1901. Doumergue, p. 85, etc. (reprint of 1899).
1885d. *Ptyodactylus lobatus* Boulenger (part, not Geoffroy), p. 110.
1891c. Boulenger, pp. 96, 111, pl. xiii, fig. 2.
1894. Oliver, p. 107.
1901. Schenkel, p. 181.
1927a. Pellegrin, p. 261.
1887. *Ptyodactylus gecko* Strauch (part, not Linné), p. 35.
1893a. *Ptyodactylus lobatus* var. *oudrii* Boettger, p. 27.
1894. Werner, p. 76.
1895. Koenig, p. 405.
1913. Hartert, p. 77.
1913a. Werner, p. 16.
1931. Pellegrin, p. 216.
1934. Pellegrin, p. 50.

1898. *Ptyodactylus hasselquistii* var. *oudrii* Anderson, p. 68, pl. vii, fig. 9.
1914b. Werner, p. 335.
1929b. Werner, pp. 13, 21.

Description. Snout short, rounded, longer than the distance between the eye and the ear-opening; latter moderate, vertically oval, its diameter about half that of the orbit; rostral twice as broad as high, without median cleft above; granules on snout convex, smooth, slightly larger than those on occiput and back; nostril between rostral, first labial and 3 slightly swollen nasals, the anterior separated from its fellow by 1–2 granules; upper labials 10–12; lower labials 9–11 (7–8 in original description considered erroneous); mental twice as long as broad, usually in contact with the gular granules, rarely bordered by a single small postmental; flanked by a series of chin shields or sublabials which postero-laterally merge into the gular granules instead of the abrupt transition immediately behind the mental.

Back and limbs covered above with small, unequal, smooth, juxtaposed granules intermixed with 9–11 rows of slightly keeled, more rarely smoothly convex, tubercles; ventral scales larger, subimbricate; limbs moderate, stout, the adpressed hind limb reaching the shoulder or neck; subdigital shields actually under the first toe 2, 8–10 under the fourth toe; tail depressed, verticillate, with median sulcus, covered above with small, smooth, granular scales and 2–4 rows of small keeled tubercles, below with imbricate scales showing a tendency for one or two of the median series to be slightly enlarged; on either side of base of tail in both sexes are 2 pale tooth-like tubercles; length of tail slightly longer than the length of head and body.

Color. Above, dark gray to olive brown, uniform or indistinctly spotted with darker brown; limbs, digits and tail barred with brown. Below, white, uniform.

By its brighter coloring and markings this race differs strikingly from the typical form (Boettger in Koenig).

Size. Total length of cotype (Lataste), 102 (55 + 57) mm., of a cotype ♂ (M.C.Z. 4639), 103+ (61 + 42+) mm., tail regenerated.

Habits. Owing to the readiness with which they slip into the deep fissures of the rocks, from which they emerge to bask in the late afternoon, this nocturnal species is difficult to catch. Even towards dusk when the vertical rock-faces of the Djebel Sfa fairly swarm with their silently scurrying forms, their very numbers contribute to the difficulty of effecting a capture. So wary were they that the passing of a pedestrian would cause droves of them to ascend to a height of

about a dozen feet where they apparently felt secure, shifting but slightly when stones were thrown at them (Werner). This timidity was apparently not so evident among those encountered on the rocks and house walls at El Golea where Hartert (1913) did not have much difficulty in catching them though he complains of the ease with which they part with their tails.

Localities. **French Morocco:** *Djebel opp. Beni Ounif de Figuig; Zenaga (Zenagh, also across border from Beni Ounif). **Algeria:** Ain Sefra; Atakor n Ahaggar, Imarera (Imegha or Imerera; ? Irerrer) Plateau, Ahaggar Montagne; Batna; Batna to Biskra; Beni Ounif; *Bou Saada; Chaiba Rocks, Biskra; Col de Sfa (Sfah); Djebel Aures near Batna; Djebel bou Derga; Djenen bou Rezg (Resq) near Oran; El Golea; Geryville; Ghardaïa; Laghouat; Mecheria; Oran; Stiten (Stitten)

Range. Eastern French Morocco and Algeria (Possibly some of the records of the typical form from the central and southern Algerian Sahara should be referred to *oudrii*, but this is doubtful. Apparently absent from Tunisia, though listed from there by Boutan (1893) in error).

Ptyodactylus hasselquistii togoensis Tornier

1901c. *Ptyodactylus hasselquisti* var. *togoensis* Tornier, Arch Naturg., **67**, Festschrift vol. p. 68: Mangu, Togo.
1919. Schmidt, p. 601.

Remarks. Differs only from "*P. h. ragazzi*" of Eritrea in having the anterior nasals in contact, according to Tornier, whose lengthy description, based on two specimens, should be consulted for further details. No other Togo specimens have been recorded in forty years. However, from nearby French West Africa are many records of the typical form and it remains to be seen in what relationship these stand to *togoensis*, which at one time Werner synonymized with *ragazzii*, the Eritrean race which, tentatively, I have failed to separate from *P. h. hasselquistii*.

Localities. **Togo:** Mangu.

Range. Northern Togo.

Genus Rhoptropus

1869c. *Rhoptropus* Peters, Monatsb. Akad. Wiss. Berlin, p. 58 (type *afer*).
1878. *Dactychilikion* Thominot, Bull. Soc. Philom. Paris (7), **2**, p. 254 (type *braconnieri*).

Diagnosis. Digits free, slender, subcylindrical at base, strongly dilated distally but without free terminal phalange, covered above with scales, and toes with a series of flat, nail-like scutes distally, below on basal portion by transversely dilated shields merging into the undivided (except the most apical) scansors of the discoid apex, clawless[1].

Pupil vertical, eyelid distinct as a circumorbital ring or at least in its upper half; dorsal lepidosis of small, subequal, smooth, juxtaposed granules; tail depressed, tapering, covered above with small, juxtaposed, granular scales, below with larger, subimbricate scales or transversely dilated shields. Males with or without preanal (but no femoral) pores.

Range. South West Africa and Angola.

Remarks. In addition to the *Diagnosis* above, I have omitted from the specific descriptions the undermentioned characteristics which are common to all the four species which I have examined.

Snout more than twice the diameter of the orbit, about 1.5 to 1.75 times as long as its distance from the ear-opening; latter rather large, sometimes concealed by a narrow dermal fold; rostral about twice as broad as deep with a median prolongation above separating the pronounced nasal swellings anteriorly; nostril pierced in a swelling formed by 3[2] nasals, the uppermost separated from its fellow anteriorly by granules; granules on snout larger than the dorsals; a slight depression behind the nostrils; mental and contiguous labials much elongate.

Body more or less depressed; dorsal lepidosis of subequal, juxtaposed granules; below with smooth, subhexagonal, scarcely imbricating scales; limbs elongate.

Roux (1907b, p. 412), without material of *afer*, but with examples of *Rhoptropus ocellatus* Boulenger (1885b, p. 474) suggests that *Rhoptropus* is a synonym of *Phelsuma*. Actually *Rhoptropus* is quite distinct while *ocellatus*, for which Hewitt (1937d, p. 199) proposed the genus *Rhoptropella*, occupies an intermediate position very close to *Phelsuma* as will be seen from the comparative characters given on p. 293.

Key to the Species

1. Range: Lake Ngami, Bechuanaland Protectorate.....*braconnieri* (p. 286)
   Range: South West Africa and Angola.....2

[1] Peters states that very indistinct retractile claws are present, but both Boettger and I have failed to find them.

[2] Three or 4 according to Peters, but 3 only in our extensive series.

2. No chin shields differentiated; males without preanal pores.....3
   A row of enlarged chin shields; males with preanal pores; adpressed hind limb does not reach beyond shoulder; rupicolous.....4

3. Anterior gulars larger than, rarely subequal to, scales on belly; adpressed hind limb reaches eye; scales beneath tail granular; tail pale yellow banded with brown; deserticolous; range: southern and central Damaraland, South West Africa.....*afer* (p. 286)
   Anterior gulars subequal to scales on belly; adpressed hind limb does not reach beyond shoulder; scales beneath distal part of tail transversely enlarged; tail dark gray narrowly banded with black; rupicolous; range: central Damaraland, South West Africa.....*bradfieldi* (p. 288)

4. Scansors and shields beneath fourth toe 14–17; scales beneath tail enlarged in pairs (only on reproduced tails transversely enlarged); range: central Damaraland, South West Africa to Mossamedes, Angola.....*barnardi* (p. 289)
   Scansors and shields beneath fourth toe 17–24; scales beneath distal part of tail transversely enlarged.....5

5. Chin shields rectangularly elongate; range: northern Damaraland, South West Africa to Mossamedes, Angola.....*b. boultoni* (p. 291)
   Chin shields roundish; range: Benguela, central east Angola..... *b. benguellensis* (p. 292)

STATISTICAL DATA FOR THE SPECIES OF THE GENUS RHOPTROPUS

Species	Snout ? rounded	Internasal Granules	Granules between Nasals	Upper Labials	Lower Labials	Chin Shields well developed	Scansors and Shields under Fourth Toe	Preanal Pores in Males	Length of Head and Body	Length of Tail
braconnieri	?	?	?	7	8	3!	5+?	0?	56	56
afer	blunt	3	1–3	9–12	7–9	No	21–24	0	53	53
bradfieldi	acute	3	1–3	9–13	8–10	No	20–21	0	60	61
barnardi	acute	3	1–2	8–12	6–8	Yes	14–17	4–7	48	40
boultoni	acute	3	1–2	8–13	7–10	Yes	17–24	5–8	66	67
benguelensis	acute	3	1	9–11	7–8	Yes	19–20	6–7	56	49

Rhoptropus braconnieri (Thominot)

1878. *Dactychilikion braconnieri* Thominot, Bull. Soc. Philom. Paris (7), **2**, p. 254: Lake Ngami, Bechuanaland Protectorate.
1885d. Boulenger, p. 209.
1910c. *Rhoptropus braconnieri* Hewitt, pp. 81, 85, 88.
1934. Brongersma, p. 166.

Recorded and (?) figured by Rochebrune (1884a, p. 72, pl. ix, figs. 1–2) as occurring in Sengambia; an obvious error.

Description. Known only from the description of the type, the characters given being mostly those common to all members of the genus. Length of the head said to be included in that of the body 6.75 times, its width to rather more than half the distance between end of snout and shoulder; upper jaw furnished with about 50 teeth, lower with 55–60, relatively strong, conical, and almost pointed; no preanal pores in type whose sex is not stated.

For characters common to all species see *Remarks* on p. 284, for scale counts see statistical table on p. 285.

Color. Above, greenish olive marbled with darker, a transverse row of three black spots near thighs; limbs with reddish-brown, chevron-shaped bands; tail banded with black. Below, yellowish white, uniform.

Size. Total length of type (Paris Mus.) 112 (56 + 56) mm. The total length is actually given as 612 mm., obviously a misprint as the author states that the head and body equal the tail, which is 56 mm.

Remarks. Obviously most closely related to *afer*, with which it was synonymized by Boulenger (1910b). Thominot states that it formed part of a collection received from M. de Castelnau, French Consul at the Cape, and that he named it for M. Braconnier, preparator at the Museum.

Locality. **Bechuanaland Protectorate:** near Lake Ngami. (Known only from the type).

Range. Bechuanaland Protectorate.

Rhoptropus afer Peters

1869c. *Rhoptropus afer* Peters, Monatsb. Akad. Wiss. Berlin, p. 59, pl. –, fig. 2: Damaraland, South West Africa.
1869b. Peters, p. 658.
1885d. Boulenger, p. 217 (omit Mossamedes).

1890d. Boulenger, p. 78.
1893a. Boettger, p. 39.
1894a. Boettger, p. 88.
1894. Fleck, p. 83.
1898. Sclater, p. 103.
1910b. Boulenger (part), p. 463 (omit Angola and Bechuanaland).
1910a. Hewitt, p. 58.
1910c. Hewitt, pp. 81, 88.
1910a. Werner, p. 315.
1911b. Sternfeld, p. 398.
1911d. Sternfeld, p. 17, figs. 13–14.
1915c. Werner, p. 336.
1935. Hewitt, p. 306.
1936. Lawrence, p. 38.
1937b. Mertens, p. 7.
1938. FitzSimons, p. 183.

Recorded by Rochebrune (1884a, p. 78) from Senegambia in error. Further citations of "*afer*" will be found under *bradfieldi* and *boultoni benguellensis*.

Description. Snout depressed, more bluntly rounded than in other species; no, or at most only an occasional, enlarged chin shield; anterior gular scales usually slightly larger than, sometimes subequal to, those on belly; tail rounded above, flattened below, somewhat depressed, tapering, covered above and below with small, flat, smooth, granular scales faintly arranged in verticils, below no transversely dilated scales even in regenerated tails.

For characters common to all species see *Remarks* on p. 284; for scale counts see statistical table on p. 285.

Color. Above, pale gray to grayish brown, uniform or with scattered whitish or yellowish and brown spots, the latter sometimes forming transverse series; limbs pale yellowish brown spotted or barred with darker; tail yellow with dark brown crossbands. Below, chin, throat, underside of limbs, anal region and tail bright yellow; chest and belly bluish white to dark blue. Eye light brown.

Size. Total length of a cotype (Berlin Mus.) 105[1] (52 + ?53) mm., of a sexed ♂ (M.C.Z. 43163), 98 (53 + 45) mm., with original tail intact.

Remarks. The dark-banded yellowish, or yellowish white, limbs of Boettger's (1894a) and Sternfeld's (1911b) geckos provide sufficient

[1] "135" in original, an obvious misprint as the snout to anus is 52 mm., the tail is based on subtraction.

reason for concluding that their material was correctly referred to *afer*. The entirely black head, back, and belly of Sternfeld's two specimens, though agreeing better with *bradfieldi*, more or less describes certain examples of *afer*. Fleck (1894), who was the collector of the gecko identified by Boettger, states that the species was found on granite cliffs near Dubas Mountains, Namib Desert; the sort of habitat preferred by *bradfieldi* rather than the allegedly deserticolous *afer*. One suspects that Fleck confused them.

Diet. Small moths, among them the allegedly inedible *Utetheisa pulchella* Linné, for whose identification I am indebted to Mr. V. Nabokov.

Parasites. Nematode worms in Namib Desert specimen (M.C.Z.).

Habits. "With the aid of its long well-developed hind legs, it can run with great rapidity over considerable distances, and to capture a series proves thus an exhausting business. I have known specimens to run for a distance of a hundred yards or more when pursued, before disappearing into a hole or under a stone." (FitzSimons, who collected 29 *afer*).

Habitat. "This species, although found in the same locality as *R. bradfieldi*, has a totally different habitat. It is confined to the dry open flats of gravelly sand and stones in the Namib Desert and does not apparently occur in the finer dune-sand areas." (FitzSimons).

Localities. **South West Africa:** Ausschieb to Cape Cross; Damaraland; Goanikontes (Gonekontes); Kuisip River near Rooibank; Luderitz Bay; *Namib Desert; Namib Station to Nonidas, 12–20 miles east of Swakopmund; Omaruru River 10 miles north of Swakopmund; *Rooibank near Walvis Bay; Scheppmansdorff; Swakopmund; Walvis (Walfish) Bay; Windhoek (Windhuk).

Range. Damaraland, South West Africa.

Rhoptropus bradfieldi Hewitt

1935. *Rhoptropus bradfieldi* Hewitt, Rec. Albany Mus., **4**, p. 307: Messum River, South West Africa.
1936. Lawrence, p. 38.
1938. FitzSimons, p. 186.

Description. Snout depressed, acuminately rounded; no well differentiated row of enlarged chin shields; anterior gular scales subequal to those on belly; tail rounded above, flattened below, somewhat depressed, tapering, covered above with granular scales,

below with flat, smooth scales arranged in verticils and, except on basal segment, forming a median series of transversely dilated scales.

For characters common to all species see *Remarks* on p. 284; for scale counts see statistical table on p. 285.

Color. Above, sooty brown, dark gray, or blackish, with indistinct, narrow, wavy, darker crossbars; limbs and tail like back, or each caudal segment narrowly edged with black. Below, whitish faintly tinged with blue, ranging to bluish slate or black in adults.

FitzSimons states that their dark coloring matched the black rocks so closely that their presence was revealed only by their movements.

Size. Total length of an unsexed adult (T.M. 17399), 121 (60 + 61) mm., the cotype ♀ (Albany Mus.) measured 54 mm. from snout to anus.

Remarks. Hewitt considers *bradfieldi* distinguished from *afer* by the former's stouter digits and more flattened tail. He records *barnardi* also from Messum River.

Diet. An ant, a bug (Coreidae: Hemiptera), an aquatic bug (Corixidae: Hemiptera), 4 Braconidae (Hymenoptera), and 7 small moths were among the identifiable contents of two stomachs, determined for me by my colleague F. G. Werner.

Parasites. None on 8 geckos examined by Lawrence.

Habitat. Black rocky outcrops in the Namib Desert.

Localities. **South West Africa:** Gorob; Omaruru River 55 miles north of Swakopmund; Haigamchab (Heichamchab); Messum River; *Namib Desert; Nonidas to Rossing, 15–20 miles east of Swakopmund; Ugab (River).

Range. Damaraland, South West Africa.

Rhoptropus barnardi Hewitt

1873b. *Rhoptropus afer* Bocage (not Peters), p. 212.
1887a. Bocage, p. 203.
1895a. Bocage, p. 16.
1937b. Monard (part), p. 52 (omit Hanha).
1926a. *Rhoptropus barnardi* Hewitt, Ann. S. African Mus., **20**, p. 413, pl. xxxv, figs. 1–3: Eriksson's Drift, Kunene River, South West Africa.
1933. Schmidt, p. 6, fig. 2, pl. i.
1935. Hewitt, p. 307.
1936. Lawrence, p. 38.
1936c. Parker, p. 127.
1938. FitzSimons, p. 183, pl. iii, fig. 3.

Description. Snout depressed, acuminately rounded; a row of slightly enlarged, slightly elongate though mostly rounded, chin shields; anterior gular scales smaller than those on belly; tail rounded above, flattened below, somewhat depressed, tapering, covered above with granular scales, below with small, flat, smooth scales, arranged in verticils, with a tendency to be enlarged in pairs along the median line (regenerated tails are unsegmented and present a median row of transversely dilated scales).

For characters common to all species see *Remarks* on p. 284; for scale and pore counts see statistical table on p. 285.

Color. Above, pale gray, blue gray, slaty gray, grayish- or pinkish brown, or dark brown, with scattered paler or darker spots and dark reddish brown spots sometimes forming transverse series; limbs lighter in young, tail like back. Below, chin to chest whitish; belly pale bluish; hind limbs creamy white; tail bluish white to pale gray.

For further detailed descriptions of variations see FitzSimons (1938), who states that their coloring renders these geckos amazingly difficult to detect when at rest upon the rocks.

Size. Total length of type ♂ (S.A.M. 16639), 84 (41 + 43) mm., of another ♂ (M.C.Z. 43433), 88 (48 + 40) mm., and of a ♀ (M.C.Z. 43431), 80 (44 + 36) mm., both the latter from Namib Desert.

Breeding. In May and June, in South West Africa, FitzSimons found several batches of slightly oblong eggs, measuring 9–10 x 11–12 mm. with a height of from 5–6 mm., cemented to the rock face in fissures or beneath loose flakes. At Usakos Bradfield found three sets of eggs and says that the species lays 3 (!) eggs (Hewitt, 1935).

Parasites. Mites (*Geckobia ovambica*) have been described from this species by Lawrence.

Localities. **South West Africa**: Ausschieb to Cape Cross; Erikssons Drift, Kunene River; *Erongo Mountain Plateau; Huab Farm; Kalkveld (Kalkfeld); Kamanyab; Kamanyab to Otjikondo (Oshikondo); 4 miles east of Lake Guinas; *Lake Otjikoto; Messum River; *Namib Desert; *Otjimbombe, Kunene River; Paderburn Farm; Sissekab; Usakos. **Angola**[1]: Bibala; Huxe Sierra; Maconge (Maconjo); Mossamedes; Mucungu.

Range. Damaraland, South West Africa north to Mossamedes, Angola.

[1] All these localities are in Mossamedes on my latest map, Schmidt states that three of them are in Benguella.

Rhoptropus boultoni boultoni Schmidt

1933. *Rhoptropus boultoni* Schmidt, Ann. Carnegie Mus., **22**, p. 7, fig. 2, pl. i: Pico Azevedo, Mossamedes, Angola.
1938. FitzSimons, p. 184.

A further citation will be found under *b. benguellensis*.

Description. Snout depressed, acuminately rounded; a row of enlarged, elongate chin shields; anterior gular scales smaller than those on belly; tail rounded above, flattened below, somewhat depressed, tapering, covered above with granular scales, below with flat, smooth scales indistinctly arranged in verticils and with a strong tendency to be transversely dilated on the distal half.

For characters common to all species see *Remarks* on p. 284; for scale and pore counts see statistical table on p. 285.

Color. Above, dark gray, sooty olive brown, or blackish, obscurely clouded with darker, or with large, scattered, irregularly shaped, dark-edged spots and dull brick-red spots sometimes forming transverse series; limbs and tail lighter in young, like back in adults. Below, white in young to brownish in adult; belly dark bluish gray to slate in adults, forelimbs and posterior surface of tibia often paler. Eye reddish brown flecked with golden tints.

FitzSimons, from whom much of the above description is taken, says that the dark coloring of these diurnal geckos is apparently not protective, for they stand out conspicuously on the light colored rocks among which they live.

Size. Total length of type ♂ (Carn. Mus. 5634), 133 (66 + 67) mm., exceeded by a ♂ (T.M. 17182) with a head and body length of 73 mm., tail reproduced; paratype ♀ (M.C.Z. 35551) has a head and body length of 65 mm.

Remarks. The labial characters which Schmidt considered distinguished *boultoni* from *afer* and *barnardi* are inconstant. FitzSimons (1938) furnishes an excellent detailed account embodying numerous minor variations (omitted here) which he noted during the examination of thirty specimens.

Temperament. "If approached quietly while basking in the sun, they are reluctant to move and will permit a very close approach before finally dashing off rapidly to cover. Males appear to be somewhat aggressive and pugnacious, and were often observed chasing and fighting one another, while disabled specimens were pounced on immediately and mercilessly attacked." (FitzSimons).

Habitat. Granitic boulder-strewn kopje outcrops, whereas *barnardi*, occurring in the same localities, apparently confines itself to the smaller outcrops in the neighbouring flats (FitzSimons).

Localities. **South West Africa:** Huab Farm; Kamanyab; Kamanyab to Otjikondo (Oshikondo); *Namib Desert; Padaerburn Farm. **Angola:** *Pico Azevedo, Mossamedes.

Range. Damaraland, South West Africa north to Mossamedes, Angola.

Rhoptropus boultoni benguellensis Mertens

1897b. *Rhoptropus afer* Bocage (not Peters), p. 210.
1937b. Monard (part), p. 52 (omit Capangombe and Coroca).
1936c. *Rhoptropus ? boultoni* Parker, p. 127.
1938e. *Rhoptropus boultoni benguellensis* Mertens, Senckenbergiana, **20**, p. 431, figs. 4–5: Cubal, Benguela Province, Angola.

Description. Snout depressed, acuminately rounded; a row of enlarged, rounded chin shields; anterior gular scales much smaller than those on belly; tail characters apparently those of the typical form though basal verticils said to be composed of 13 (presumably a misprint for the usual 3) rows of scales.

For characters common to all species see *Remarks* on p. 284; for scale and pore counts see statistical table on p. 285.

Color. Above, dark slate gray with irregular reddish brown spots. Below, light gray, uniform.

Size. Total length of type ♂ (Senck. Mus. 25299), 105 (56 + 49) mm.

Remarks. Known to me only from the original description of type and four paratypes. From Bocage's (1895) remarks that his specimens had pores, it is obvious that they were not *afer*, which is known only from South West Africa, his Hanha, Benguela, record, repeated by Monard (1937b), is tentatively referred here pending reëxamination.

Localities. **Angola:** Benguela Province—Bocoio; Cubal; Hanha.

Range. Benguela Province, Angola.

Genus Rhoptropella

1937d. *Rhoptropella* Hewitt, Ann. Natal Mus., **8**, p. 119, pl. xii (type *Rhoptropus ocellatus* Boulenger).

Diagnosis. Characters those of *Phelsuma*, from which it differs in the following:

Character	*Phelsuma*	*Rhoptropella*
snout	long, narrow, pointed, except in *mutablis* and *breviceps* which are scarcely or not distinguishable on this character.	moderately long, but rather broad at end.
rostral	relatively smaller, its hind margin not extending backward as far as an imaginary line connecting the posterior margins of the nostrils.	relatively larger, its hind margin extending backwards beyond an imaginary line connecting the posterior margins of the nostrils.
nostril	lies between first upper labial and 3 nasals (2 only in *mutabilis* and *breviceps*; rostral also in others).	pierced in first upper labial (with which the foremost nasal is normally fused) and 1 nasal (2 when foremost not fused).
eyelid	continuous as a narrow circular fold more or less around the eye, its upper portion not projecting nor its margin scaled inferiorly.	continuous as a narrow circular fold more or less around the eye, its upper portion projecting with the margin bearing 7–8 somewhat enlarged scales and internally, near the eye, a second row of 5–8 small, broad, flattened scales.
upper surface of digital expansion	with many small scales basally in a double series and distally extending in 1–2 rows almost to the end between the mesial row of more or less enlarged scales and the marginal ones which correspond in breadth with the height of the subdigital scansors.	with only a few small scales, about 3–5 in a single series, which distally extends only to the greatly enlarged mesial scale that terminates the mesial row of more or less enlarged scales; marginal scales broader than the height of the adjacent subdigital scansors.
scansors beneath digital expansion	numbering more than 8 except in *mutabilis* and *breviceps* which have 8 if one excludes the transversely dilated shields into which they merge.	numbering only 7–8, including the very small distal one but excluding the 8–9 transversely dilated shields into which the scansors merge proximally.

Range. Little Namaqualand, Cape Province.

Remarks. Roux (1907b) was the first to suggest that *ocellata* was referable to *Phelsuma*. Later Schmidt (1933), after examining the type in the British Museum, stated that it "must unquestionably be transferred to *Phelsuma*." With such a view most herpetologists would have concurred but for the perspicacity of Hewitt (1937d) whose intensive study revealed differences which, together with certain qualifications resulting from an examination of our material, I have reformulated as above.

Some may be inclined to question whether such slight differences should be regarded as of generic importance. However, in view of the eastern *Phelsuma* being largely, if not entirely, arboreal, and the widely separated western *ocellata* rupicolous, the recognition of *Rhoptropella* as a distinct genus seems warranted.

Rhoptropella appears to be immediately descended from *Rhoptropus* from which it differs in its nostril being *in contact with* the first labial, *not* in a swelling; the pupil roundish, *not* vertical; the lower labials *not* unduly elongate; only four, *not five*, digits well developed, the fourth, not the third, the longest; and in the males possessing femoral pores which are entirely absent in *Rhoptropus*.

Rhoptropella ocellata (Boulenger)

1885b. *Rhoptropus ocellatus* Boulenger, Ann. Mag. Nat. Hist. (5), **16**, p. 474: "Cape Town" (? error), Cape Province, South Africa.
1887a. Boulenger, p. 490.
1898. Sclater, p. 103.
1907b. Roux, p. 412.
1910b. Boulenger, p. 463.
1910a. Hewitt, p. 58.
1910c. Hewitt, pp. 81, 88.
1911d. Sternfeld, p. 17.
1936. Lawrence, p. 38.
1937d. *Rhoptropella ocellata* Hewitt, p. 200, pl. xii, figs. 1–7.
1938. FitzSimons, p. 182.

Description. Snout 1.3 to 1.6 times[1] as long as the distance between the eye and the ear-opening; vertical diameter of the latter about three-quarters that of the former; rostral *without* median cleft above; nostril pierced in first upper labial (with which the anterior nasal is usually fused) and bordered by a small nasal, rarely between first labial and two nasals, the uppermost separated from its fellow by

[1] Not "as long as" as stated by Boulenger.

3–4 granules; upper labials 7–8; lower labials 5–7; chin region covered with large scales of which the outer are much larger than inner, the latter posteriorly merging into the gulars.

Back covered with smooth granules; ventral scales smooth, subhexagonal; males with 24–32 preano-femoral pores forming an uninterrupted series; transverse scansors beneath fourth toe 7–8 + 8–9 shields; tail, when unregenerate, covered above and below with small smooth scales, none of which are transversely dilated.

For further details see also FitzSimons (1938).

Color. Above, light to grayish brown or gray to grayish black; an inconspicuous dark streak from nostril through eye to ear present or absent; back, limbs, and tail with round dark-edged whitish and dark spots; adults may be tinged with orangy brown over lumbar region, groin, and base of tail at sides. Below, chin often suffused with gray, otherwise creamy to bluish or pinkish white, uniform.

The general coloring tones in well with the particular rocks on which a given gecko may be found, according to FitzSimons (1938) from whom much of this description is taken.

Size. Total length of ♂ (T.M. 17891), 80 (37 + 43) mm., the type ♂ (Brit. Mus.) measured only 35 mm. from snout to anus, a ♀ (M.C.Z. 21060) only 33 mm., both having lost their original tails.

Parasites. Mites (*Geckobia rhoptropi*) have been described from this gecko by Lawrence.

Temperament. "A very active diurnal gecko, living among rocks and boulders over which it runs rapidly in short lightning quick spurts, jumping across spaces as much as six to ten inches with the utmost ease," and seeking shelter beneath close-fitting flakes (FitzSimons).

Localities. **Cape Province:** [1]Little Namaqualand: Leliefontein near Kamieskroon; Klipfontein; hills 15 miles east of Port Nolloth; Steinkopf.

Range. Little Namaqualand, Cape Province.

Genus Phelsuma[2]

1825. *Phelsuma* Gray, Ann. Philos. (2), **10**, p. 199 (type *Gecko cepedianus* Merrem).

1830. *Anoplopus* Wagler, Natur. Syst. Amphib., p. 142 (type *Gecko cepedianus* Merrem).

[1] The alleged type locality "Cape Town" considered erroneous.

[2] Boettger (1913) emended the spelling to *Phelsumia*, but this seems undesirable. Though named for van Phelsum, the noun has a feminine ending which makes it advisable to have all the adjectival specific names in agreement.

Diagnosis. Thumb and inner toe vestigial and not dilated, remaining digits free, subcylindrical at base with a strongly dilated discoid apex, covered above with scales, not denticulate laterally, below on basal portion by scales and distally by transversely dilated shields merging into the undivided scansors of the dilated apex, clawless or with vestigial claws.

Pupil round; upper eyelid distinct as a circumorbital ring, its upper portion not projecting nor its margin scaled inferiorly; dorsal lepidosis of small, subequal, smooth or keeled, juxtaposed granules; tail depressed, tapering, covered above with granules, below with larger imbricate scales. Males with preano-femoral pores forming an uninterrupted series.

Range. Islands of the Indian Ocean (Andaman; Mauritius; Madagascar; Comoro; Aldabra; Amirante; Seychelle; Pemba; Zanzibar) and adjacent coast of Tanganyika Territory[1].

Remarks. Much additional information concerning this genus will be found in a recent revision (Loveridge, 1942c, Bull. Mus. Comp. Zoöl., **89**, pp. 437–482) which contains a key to the twenty-three species regarded as recognizable. Members of this genus have returned to diurnal habits according to Walls (1942, p. 237, pl. i) in a discussion on visual cells.

Key to the Species

Subcaudals subequal, the median series not strongly transversely enlarged; preano-femoral pores in males 22–29; range: Zanzibar Island and opposite littoral ..... *d. dubia* (p. 296)

Subcaudals with median series strongly transversely enlarged; preano-femoral pores in males 32–38; range: Pemba Island, north of Zanzibar .. *m. parkeri* (p. 299)

Phelsuma dubia dubia (Boettger)

1881a. *Pachydactylus dubius* Boettger, Zool. Anz., **4**, p. 46: Madagascar.
1885d. *Phelsuma madagascariense* Boulenger (part), p. 214 (Zungomero record).
1885d. *Phelsuma dubium*[2] Boulenger, p. 215 (no material).
1940. Parker, Moreau & Pakenham, p. 309.
1941. Moreau & Pakenham, p. 107.
1900b. *Phelsuma laticauda* Tornier (not Boettger), p. 588.

[1] Boulenger (1885d, p. 214) records two young geckos from Quilimane, Mozambique as "probably introduced." They were received from Sir John Kirk, British Consul at Zanzibar.
[2] Actually listed as *Pachydactylus dubius*, though referred to *Phelsuma*.

1920a. Loveridge, p. 139.
1923d. Loveridge, p. 846.
1924b. Loveridge, p. 9.
1925a. Loveridge, p. 72.
1928c. Barbour & Loveridge, p. 146.
1933h. Loveridge, p. 295.
1937f. Loveridge, p. 492.
1942c. *Phelsuma dubia dubia* Loveridge, pp. 460–462.

The above citations are for Tanganyika Territory and Zanzibar references; a complete bibliography will be found in Loveridge (1942c).

Description. Snout 1.3 to 1.6 times as long as the distance between the eye and the ear-opening; vertical diameter of the latter about three-quarters that of the former; rostral with [1] median cleft above; center of nostril above first labial; nostril between first labial and 3 nasals, the uppermost separated from its fellow by 2–3, *very rarely* 1, granules; upper labials 9–12; lower labials 8–10; chin region covered with enlarged scales of which the outer are much larger than the inner, the latter posteriorly merging into the gulars.

Back covered with obtusely keeled[2] granules; ventral scales smooth; males with 22–29 preano-femoral pores forming an uninterrupted series; about 15–17 scansors beneath fourth toe distally; tail, when unregenerate, covered above with obtusely keeled scales, below, with smooth, imbricate, subuniform scales.

Color. Above, bluish gray to purplish brown, variegated and spotted with orange brown; a dusky streak may be present or absent on the flank; limbs vermiculated or spotted with black, gray, or bluish; tail sometimes bluish. Below, whitish, immaculate, or a dusky ∩-shaped mark may follow the contour of the lower jaw to the shoulder.

In life (Dar es Salaam). Above, dark green, finely flecked with red on back and tail.

Judging by a hatchling (Madagascar), 21 mm. in length from snout to anus, the young are minutely speckled with brown-edged white spots that disappear by the time the gecko attains 23 or 24 mm. in length.

From time to time Boettger has cited color differences allegedly distinguishing *dubia* from other species; these do not appear to hold good in series and should be accepted with reserve.

[1] Dar es Salaam specimens allegedly without, are not available for reëxamination.
[2] "Smooth" in the original description was subsequently corrected by Boettger.

Size. Total length of ♂, 150 (65 + 85) mm., from Zanzibar (M.C.Z. 19123); and of ♀, 133 (58 + 75) mm., from Madagascar (Boettger, 1913).

Remarks. At some time Boettger appears to have confused *dubia* with *laticauda*, even saying that the type of the former (previously said to be in Hamburg Museum) was No. 4192.2a in the Senckenberg Museum, a statement that Mertens (1922a) denies. Specimens of *laticauda* labeled *dubia* were exchanged by Senckenberg Museum.

However, in 1913 (p. 337) Boettger gave a very fair summary of the characters distinguishing *dubia* from *laticauda*, though in stating that the two species agree in not having the median series of subcaudals enlarged, he errs, for those of *laticauda* are enlarged.

Unfortunately, in referring Zanzibar geckos to *laticauda*, I (1920a, *et seq.*) followed Tornier (1900b) and overlooked his subsequent (1902b) retraction for several years. Even then, in the hope that they might prove to be subspecifically related, I continued to use the name *laticauda* until the opportunity (1942) occurred to revise the entire genus. Parker (1940) pointed out my error and I entirely agree that Zanzibar, Bagamoyo, and Dar es Salaam specimens do not differ from Malagasy material of *dubia*, except perhaps an average difference in size.

Breeding. Presumably the pair of eggs are deposited in the crowns of coconut palms, for the lowest eggshells which I have found were at a height of six feet from the ground.

Diet. Ants and beetles.

Parasites. Red acarine parasites are sometimes present about the anus.

Enemies. One was recovered from the stomach of a tiger snake (*Tarbophis s. semiannulatus*).

Habitat. In East Africa, owing to their keeping to the crowns of coconut palms, these geckos are exceedingly difficult to obtain. I happened to be passing through a street in the native quarter of Dar es Salaam when I secured the first specimens. Overhead some thatchers were cutting fronds and dropping them into the road. Even then, one of the geckos made a dash for the nearby trunk of a palm which it ascended to safety. Occasionally one of these geckos may be found on the ground when it is presumably *en route* from one palm to another.

Localities (in East Africa only). **Zanzibar Island:** *Zanzibar. **Tanganyika Territory:** *Bagamoyo; *Dar es Salaam; Singino; Zungomero.

Range. Northwest Madagascar; Comoro Islands; Zanzibar Island; and adjacent coast of Tanganyika Territory.

Phelsuma madagascariensis parkeri Loveridge

1913. *Phelsumia madagascariensis* Boettger (not Gray), p. 350.
1941. *Phelsuma madagascariense* ? subsp. Moreau & Pakenham, 1940, p. 107.
1941g. *Phelsuma madagascariensis parkeri* Loveridge, Proc. Biol. Soc. Washington, **54**, p. 175: Kinowe, Pemba Island.
1942c. Loveridge, p. 468.
1942. Moreau & Pakenham, p. 61.

Description. Snout 1.6 to 2 times as long as the distance between the eye and the ear-opening, vertical diameter of the latter three-quarters of, or equal to, that of the former; rostral without, rarely with, median cleft above; centre of nostril above the first labial; nostril between first labial and 3 nasals, the uppermost separated from its fellow by 1–2 granules; upper labials 8–10; lower labials 7–9; chin region covered with enlarged scales of which the outer are much larger than the inner, the latter posteriorly merging into the gulars.

Back covered with smooth granules; ventral scales smooth; males with 32–38 preano-femoral pores forming an uninterrupted series; about 16–17 transverse lamellae beneath fourth toe anteriorly; tail, when unregenerate, covered above with smooth scales, below with smooth imbricate scales of which the median series are strongly transversely enlarged.

Color. Above, bluish gray (green in life) finely vermiculate with black on back and limbs; tail paler, uniform. Below, whitish, immaculate, even on throat.

Size. Total length of a paratype ♂, 148+ (65 + 83+) mm., the tail in process of regeneration; total length of type ♀, 148 (65 + 83) mm.

Remarks. The foregoing description is based almost exclusively on the type series of seven specimens in the Museum of Comparative Zoölogy, collected by Mr. R. H. W. Pakenham.

Breeding. On December 3, the type ♀ held two ova, each measuring about 13 x 8 mm.

Habitat. Coconut palms.

Localities. **Pemba Island:** Kinasini; Wete.

Range. Pemba Island.

Genus Homopholis

1885d. *Homopholis* Boulenger, Cat. Lizards Brit. Mus., **1**, p. 191 (type *Geko walbergii* (sic) A. Smith).

1890d. *Platypholis* Boulenger, Proc. Zool. Soc. London, p. 80, pl. viii, fig. 2 (type *fasciatus* Boulenger).

Diagnosis. Digits free, strongly dilated, covered above with scales, not denticulate laterally, below with chevron-shaped scansors which are undivided except for the terminal scansor, inconspicuously clawed, claws on pollux and hallux minute, retractile.

Pupil vertical; upper eyelid distinct, lower vestigial; dorsal lepidosis of moderate, unequal or subequal, flat, juxtaposed or imbricate scales, uniform (Africa) or with irregularly disposed tubercles (Madagascar); tail, thick, subcylindrical, tapering, covered above with moderate, smooth, juxtaposed or imbricate scales. Males with preanal pores.

Range. Ethiopia and British Somaliland south to Zululand[1]; Madagascar.

Remarks. The original descriptions of both *Homopholis* and *Platypholis* were faulty; retractile claws, said to be lacking on thumb and first toe, are, in fact, present, though often concealed. Males *do* possess preanal, though no femoral, pores. Detailed reasons for considering *Platypholis* synonymous with *Homopholis* have been furnished by me (1944, Proc. Biol. Soc. Washington, **57**, p. 1) elsewhere. The presence or absence of dorsal tubercles alone cannot be considered adequate grounds for separating the Malagasy gecko, for attempts to do so in *Hemidactylus*, *Pachydactylus*, etc. have broken down.

Key to the Species

1. Scales on back juxtaposed and intermixed with irregularly disposed rows of enlarged tubercles ..... *heterolepis* (Madagascar)

   Scales on back without any enlarged tubercles 2

2. Scales on back subequal, juxtaposed 3

   Scales on back subequal, imbricate 4

3. Dorsal pattern of crossbars united with a pair of dorso-lateral stripes; range: Ethiopia and Somaliland ..... *f. erlangeri* (p. 301)

   Dorsal pattern consisting of a series of wavy crossbars; range: Kenya Colony south to Tanganyika Territory ..... *f. fasciata* (p. 302)

[1] Natal in error.

4. Lower surface white peppered with sharply defined black spots; range: Southern Rhodesia and Bechuanaland.....*w. arnoldi* (p. 305)

Lower surface white, uniform, or faintly infuscated with brown; range: Transvaal and Mozambique south to Zululand.....*w. wahlbergii* (p. 303)

Homopholis fasciata erlangeri Steindachner

1895i. *Platypholis fasciatus* Boulenger (not Boulenger, 1890d), p. 11.
1897g. Boulenger, p. 277.
1907c. Steindachner, p. 1539.
1912b. Boulenger, p. 330.
1929c. Scortecci, p. 253, fig.
1930c. Scortecci, p. 3.
1907a. *Homopholis erlangeri* Steindachner, 1906, Ann. Naturhist. Hofmus. Wien, p. 149, pl. vii: Jubba (i.e. Juba River) and near Umfudu (? = Afmado, near the Juba), Ethiopia.
1932b. *Platypholis fasciata erlangeri* Parker, p. 350.
1942. Parker, p. 40.

Description. Agrees with that of the typical form, but the following unusual variations have been recorded. Exceptionally the rostral and as many as 4 nasals may border the nostril, the uppermost nasal may be in contact with its fellow on the opposite side; lower labials 10–11. Midbody scale-rows 53 (Scortecci).

Color. Above, light gray, from nostril, or at least from eye, a dark dorso-lateral streak extends to tail and is united with its fellow by a series of crossbars so as to form a ladder-like pattern; tail with 8–11 transverse bands. Below, whitish.

Size. Total length of ♂ (Milan Mus. 1218), 99 (58 + 41) mm., exceeded by an unsexed cotype (Vienna Mus.) of 130 mm.

Remarks. Steindachner (1907b) corrected his own misstatements regarding the absence of claws on thumb and first toe, and the absence of preanal pores which he later found on three cotypes. He then referred *erlangeri* to the synonymy of *fasciatus*, from which status it was raised to subspecific rank by Parker (1932b) solely on the basis of dorsal pattern. This action would seem rather questionable in view of the three color variations figured by Steindachner from among the seven cotypes, however Parker has seen half-a-dozen of these northern geckos and I have not.

Habitat. On trees, usually in holes, from 2900–3300 feet in British Somaliland (Taylor in Parker).

Localities. **Ethiopia:** Upper Ganale River. **British Somali-**

land: Buran; Sol Haud. **Somalia**: Balad (Beled), Webi Shebeli; Goscia; Rahanuin country; Umfudu[1].

Range. Ethiopia and British Somaliland south to ? northern Kenya Colony.

Homopholis fasciata fasciata (Boulenger)

1890d. *Platypholis fasciata* Boulenger, Proc. Zool. Soc. London, pp. 77, 81, pl. viii, fig. 2: Mombasa, Kenya Colony.
1896. Tornier, p. 27.
1897. Tornier, p. 63.
1900b. Tornier, p. 588.
1902b. Mocquard, p. 405.
1902b. Tornier, p. 581.
1913c. Nieden, p. 68.
1920a. Loveridge, p. 139.
1923d. Loveridge, p. 846.
1924b. Loveridge, p. 9.
1934. Brongersma, p. 166.
1937f. Loveridge, p. 492.
1937d. Mertens, p. 4.

Further citations of '*fasciata*' will be found under *f. erlangeri.*

Description. Snout once and a half to once and three quarters as long as the orbital diameter[2], as long as the distance between the eye and the ear-opening, latter small, roundish; granules on head somewhat unequal but mostly smaller than the dorsals; rostral without median cleft; nostril bordered by first labial and 3 nasals, the uppermost separated from its fellow by a single granule; upper labials 9–11; lower labials 9–10; mental small; a pair of slightly enlarged postmentals flanked by smaller diminishing chin shields.

Back and limbs covered above with small, unequal, irregular or roundish, smooth, juxtaposed scales; males with 2 preanal pores; digits free, strongly dilated, inferiorly with slightly oblique, undivided scansors merging into transversely dilated shields, 7–8 (+ 3) under the first toe, 8–9 (+ 4) under the fourth toe; tail cylindrical, tapering, covered above and below with small, smooth scales, those below imbricate; length of tail rather more than half the length of head and body.

Color. Above, grayish olive to purplish brown, a broad dark band

[1] Umfudu (Steindachner), Umfundu (Scortecci), Umudu ? Afmadu (Parker). Umfudu is about twenty miles north of Gelib, 0° 30′ N., 42° 40′ E., and has nothing to do with Afmadu, I am informed by Major M. North of the Somalia administration.

[2] Not "as long as", as stated by Boulenger, in either our ♂ or ♀.

from eye to nape where it unites with its fellow to form a chevron; back with 4–5 wavy crossbars which are broader than the interspaces between them. Below, whitish, vermiculated or marbled with brown.

Size. Total length of ♂ (M.C.Z. 18262), 101 (64 + 37) mm., and of ♀ (M.C.Z. 18263), 125 (82 + 43) mm., both from Mbuyuni. I originally reported their tails as being regenerated, but this is doubtful.

Breeding. On May 15, at Mbuyuni, a ♀ held two ovules, each measuring 10 mm. in diameter.

Habitat. Hollow acacia trees in dry savanna from sea level to 6000 feet, if the Nyeri record of Mocquard is referable to this race.

Localities. **Kenya Colony:** Maziwi, between Kagiado and Mombasa; *Mbuyuni; Mombasa; Njiri. **Tanganyika Territory:** Bukoba; Kakoma; Kavende; Uhehe.

Range. Northern Kenya Colony south to Tanganyika Territory (depending on whether the Njiri record is referable to this race).

Homopholis wahlbergii wahlbergii (Smith)

1849. *Geko walbergii* (sic) A. Smith, Illus. Zool. S. Africa, Rept., pl. lxxv, figs. 1–1a: Kafferland eastward of Cape Colony.
1885d. *Homopholis wahlbergii* Boulenger, p. 191.
1898. Sclater, p. 102.
1898. Werner, 1896–7, p. 140.
1907j. Boulenger, p. 484.
1907b. Roux, p. 407.
1908b. Boulenger, p. 223.
1910b. Boulenger (part), p. 459.
1910c. Hewitt, pp. 79, 82, 86.
1914a. Hewitt, p. 241.
1915. Breijer, p. 114.
1920. Hewitt, p. 91, fig. 1.
1928. Cott, p. 952.
1934. Brongersma, p. 165.
1934a. Cott, p. 148.
1934. Pitman, p. 302 (but does not occur).
1936. Lawrence, p. 38.
1937a. FitzSimons, p. 264.
1944e. Loveridge, p. 1.
1885b. *Homopholis macrolepis* Boulenger, Ann. Mag. Nat. Hist. (5), **16**, p. 474: Delagoa Bay, Mozambique.
1887a. Boulenger, p. 489.
1898. Sclater, p. 102.
1910c. Hewitt, pp. 79, 82, 86.

Description. Snout about twice[1] as long as the orbital diameter, slightly longer than the distance between the eye and the ear-opening, latter small, roundish, oval, or subtriangular; granules on head minute, subequal or slightly larger on the snout; nostral without median cleft; nostril bordered by first labial and 4–7 small nasals, the uppermost separated from its fellow by 1, rarely 2 (4 *fide* Hewitt) granules; upper labials 10–13; lower labials 8–12; mental small; a pair of slightly enlarged postmentals flanked by smaller diminishing chin shields.

Body and limbs covered above and below with small, subequal, subhexagonal, smooth, imbricate scales; males with[2] preanal pores; digits strongly dilated, inferiorly with slightly oblique, undivided scansors merging into transversely dilated shields, 10–12[3] under the first toe, 11–15[3] under the fourth toe; tail cylindrical, tapering, covered above and below with small, smooth, imbricate scales; length of tail shorter than that of head and body.

Color. Above grayish, uniform or variegated with darker, sometimes with a pair of broad, black, longitudinal dorso-lateral lines, offshoots from which may form wavy crossbars on the dorsum and so forming a vertebral series of light spots. Below, whitish, usually uniform, occasionally with faint brown infuscations, or scattered grayish brown spots.

Smith (1849) gives a very detailed description. Cott (1934a) describes the color in life as being: Pale purplish brown with a series of light mid-dorsal spots; flanks and limbs being spotted with darker. Iris bronze with dark purple venations.

Size. Total length of type, 115 (68 + 47) mm., of alleged type from "Natal" in the British Museum, 177 (102 + 75) mm., but when remeasured by FitzSimons, 171 (96 + 75) mm., surpassed by an unsexed Transvaal gecko (Roux) of 190 mm. The ♀ type of *macrolepis* (Brit. Mus.), measured 170 (95 + 75) mm.

Remarks. FitzSimons (1937a, p. 265) suggests that as Wahlberg was never in the region now known as Kaffirland, the gecko may have come from Natal where he did travel. However, when I pointed out that no authentic specimen has been taken south of Zululand, FitzSimons agreed (letter of 24. ix. 43) that the type may well have come from Zululand.

[1] Not once and a quarter (*wahlbergii*) or scarcely longer than (*macrolepis*) as stated by Boulenger.

[2] Not absent as stated by Boulenger, 2–4 present in each of six males in M.C.Z.

[3] The last 3–5 in each case being only transversely dilated shields.

Boulenger (1910b) referred his *macrolepis* to the synonymy of *wahlbergii* in the same year that Hewitt (1910c) questioned its validity in detail. The M. C. Z. possesses a topotype of *macrolepis* which certainly does not differ from Transvaal specimens.

Anatomy. The so-called branchial arch is figured and discussed by Hewitt (1920).

Diet. Large long-horned grasshopper (Cott). Grasshoppers, caterpillars, beetles (one a large cockchafer), spiders, and finely crushed smaller insects in M. C. Z. material (Loveridge).

Parasites. Mites (*Geckobia homopholis*) have been described by Lawrence.

Temperament. A male, when captured by Cott, bit furiously and emitted a "feeble but prolonged squealing sound."

Habitat. Taken from holes in trees, one of which was a baobab, by Chubb and FitzSimons.

Localities. **Mozambique:** Coguna; *Delagoa Bay; Maputa District. **Transvaal:** *Barberton; *Dientje Farm near Vaalhoek; Komatipoort; *Louw's Creek; *Malta Farm near Leydsdorp; Venice Farm on Brak River; *Waterval Boven; Zoutpansberg District. **Swaziland:** *Bremersdorp. **Zululand:** Mseleni. (**Natal** [1]?)

Range. Southern Mozambique and Transvaal south through Zululand.

Homopholis wahlbergii arnoldi Loveridge

1909a. *Homopholis wahlbergii* Chubb (? not of Smith), p. 592.
1909b. Chubb, p. 34.
1910b. Boulenger (part), p. 459 (Salisbury only).
1913. Hewitt & Power, p. 150.
1939b. FitzSimons, p. 27.
1944e. *Homopholis wahlbergii arnoldi* Loveridge, Proc. Biol. Soc. Washington, **57**, p. 2: Mahalapsi River, Bechuanaland Protectorate.

Description. Internasal granules 2; nostril surrounded by 4–5 nasals and the first labial; upper labials 11; lower labials 11; scansors and lamellae beneath first toe 2 + 4, beneath fourth toe 11 or 12 + 5; preanal pores 2. Differs from the typical form only in its spotted belly.

Color. Above, pale gray flecked with black, an irregularly broad, black, longitudinal dorso-lateral line from behind eye towards base of tail where it breaks up and forms transverse bars; limbs spotted

[1] See *Remarks* above.

or finely barred with black. Below, pure white, peppered with sharply distinct black spots, each covering a scale.

Size. Total length of ♂ type (M.C.Z. 12581), 156 (97 + 59) mm., but tail regenerated.

Remarks. See Loveridge (1944e, p. 3). It is possible that this race should be restricted to Bechuanaland Protectorate and geckos from Southern Rhodesia regarded as intermediates. FitzSimons (in letter of 24.ix.43) informs me that "the majority of specimens from Transvaal and Zululand (of the typical form) are immaculate below, but odd ones from different localities have a few dusky ill-defined specks or spots below."

Localities. **Southern Rhodesia:** Birchenough Bridge, Bulawayo; Mazeppa Mine, Gwanda; Salisbury; World's View; Matopos. **Bechuanaland Protectorate:** Gaberones; *Mahalapsi (or Mahalapye?) River.

Range. Bechuanaland and Southern Rhodesia.

Genus Geckonia

1895c. *Geckonia* Mocquard, Bull. Mus. Hist. Nat. Paris, **1**, p. 311 (type *chazaliae*).

Diagnosis. Digits free, strongly dilated, covered above with scales, denticulate laterally, below on basal portion with scales merging into lamellae then chevron-shaped scansors except the terminal one which is straight; third and fourth fingers and all the toes clawed.

Pupil vertical; upper eyelid distinct, lower vestigial; dorsal lepidosis of moderate, unequal, flat scales intermixed with larger, conical tubercles; tail short, subcylindrical, tapering, covered above with unequal, smooth scales and, corresponding with the verticils, regular transverse series of spinose tubercles extending to the sides, below with small, irregular, smooth scales. Males without pores.

Range. French West Africa north through Rio de Oro to French Morocco.

Remarks. In describing *Geckonia*, Mocquard distinguished it from *Tarentola* on the following grounds:

1. Nostril not in contact with either rostral or first labial.
2. Mental not separating the post mentals.
3. Eyelid only distinct anteriorly and posteriorly.
4. Digits are not enlarged distally.
5. Digits are denticulate laterally.
6. Fifth toe is not more widely separated than are the others.

Gekkonia chazaliae Mocquard

1895c. *Geckonia Chazaliae* Mocquard, Bull. Mus. Hist. Nat. Paris, **1**, p. 311: Cap Blanc, French West Africa.
1903. Günther, p. 298.
1909b. Zulueta, p. 355.
1924a. Chabanaud, p. 55.
1934. Brongersma, p. 165.
1939. Roux, p. 12.

Description. Head large, subtriangular, not concave anteriorly but slightly flattened in occipital region and terminating posteriorly in an upraised semicircular border, studded with conical tubercles, which continues over the ear-opening almost to the commissure of the mouth; the neck immediately behind it is covered with minute granules; snout obtusely pointed, its length equal to the distance between eye and ear-opening, latter a small oblique slit; rostral 3–4 times as broad as high with a faint median groove above; granules on head unequal, many greatly enlarged, those on the projecting supraorbital region largest, polygonal, elevated, even conical, adhering to the skull; nostril above, but separated from, first labial, bordered by 2–4 nasals, the uppermost separated from its fellow by 2 granules; upper labials 9–10; lower labials 7–9; mental longer than broad or slightly broader than long, pentagonal, its posterior angle wedged anteriorly between a pair of slightly enlarged post mentals which are surrounded by irregularly disposed chin shields which merge into the gulars.

Back and limbs covered above with unequal, flattened, juxtaposed scales and rounded or sharply conical tubercles; ventral scales small, smooth, polygonal, juxtaposed; limbs well developed, the adpressed hind limb reaching the shoulder; digits free, dilated throughout, inferiorly with chevron-shaped scansors 3–4 under the first and fourth toes passing into the 6–7 transverse lamellae; tail as described for genus, its length much shorter than that of head and body.

Color. Above, sandy or brownish gray, uniform in adults but with elongate spots irregularly arranged on either side of the vertebral region and scattered over limbs and tail in young. Below, whitish, uniform.

Size. Total length of ? ♂ (Chabanaud), 94 (57 + 37) mm., the type thought by Mocquard to be a ♂, by Chabanaud to be a ♀, also measured 57 mm. from snout to anus; a sexed ♀ (M.C.Z. 32081), 84 (56 + 28) mm.; largest in Günther's series, 82 (52 + 30) mm.

Remarks. Named for the yacht Chazalie, of the collector Count Dalmas. Günther invites attention to its somewhat *Phrynosoma*-like appearance, more especially the row of enlarged tubercles bordering the head posteriorly.

Diet. Finely chewed insects and an entire mealworm, the latter possibly fed to it in captivity, in the M.C.Z. female.

Parasites. A nematode.

Localities. **French West Africa:** Cap Blanc[1]; Port Etienne. **Rio de Oro:** Cabo Blanco[1]; *Rio de Oro; Tarfaya, Cabo Juby. **French Morocco:** Tiznit.

Range. French West African coast north through Rio de Oro to French Morocco.

Genus Tarentola

1820. *Platydactylus* Goldfuss (part), Handbook Zool., **2**, p. 157 (type *Lacerta gecko* Linné, but includes *Gecko fascicularis* Daudin = *Lacerta mauritanica* Linné).

1825. *Tarentola* Gray, Ann. Philos. (2), **10**, p. 199 (type *Lacerta mauritanica* Linné and its synonym *Gecko stellio* Merrem).

Diagnosis. Digits free, strongly dilated at least at apex, covered above with scales, while first, second, and fifth fingers and toes have a flat, nail-like scute distally, not denticulate laterally, below on basal portion occasionally by small scales, more usually by transverse lamellae and scansors throughout; third and fourth fingers and toes clawed, remaining digits clawless or toes with a minute, scarcely distinguishable, vestigial claw.

Pupil vertical, though almost round when dilated; eyelid more or less distinct as a circumorbital ring; dorsal lepidosis of small, unequal, flat scales intermixed with tubercles; tail subcylindrical or depressed, tapering. Males without pores.

Range. Europe (Mediterranean region); Asia (? Syria; Arabia); Africa (North of 5° N., including Madeira, Canary, and Cape Verde Islands); America (Bahamas; Cuba).

Remarks. In addition to the *Diagnosis* given above, the following characters are common to all the species which I have examined. I have not seen *T. d. gigas* and *T. d. hoggarensis* whose affinities may lie with *T. a. ephippiata* rather than with *T. delalandii.*

[1] Half the peninsula being French, and half Spanish, territory.

Snout rounded, slightly or much[1] longer than the distance between eye and ear-opening; latter moderate, vertically oval; rostral nearly or just twice as broad as high, with median cleft above; granules on snout flat or convex, smooth, slightly rugose or keeled, subequal to those on occiput, much larger than those on back; mental flanked on either side by 1–4 (2–3 in most species) chin shields which are much larger than the minute gular scales.

Dorsal scales smooth (at least in young, faintly striate, rugose or an occasional one keeled in adults of some species), juxtaposed; dorsal tubercles much larger, oval, forming longitudinal rows; fore and hind limbs with similar tubercles; ventral scales much larger than dorsal, imbricate; limbs moderate or stout; tail verticillate, below with irregular, imbricate scales, on either side of base of tail in both sexes is a single row of 2–4 white, tooth-like tubercles, preceded by two small post-anal slits in which are postanal bones in males. Externally the sexes appear indistinguishable.

Osteoderms. Tornier (1905) objects to Boulenger's (1885d) references to a supraorbital bone, pointing out that actually each epidermal scale in this region is reinforced by an angular bony disk, the aggregate of these closely-applied ossicles forming a mosaic-like bony covering. Parker (1942) reveals that it is only in the supraorbital region that such correspondence between scales and scutes occurs, elsewhere the osteoderms are minute and bear no relation to the overlying scales. In *T. a. annularis* they form a complete protection for body and limbs, those on the dorsum being subhexagonal or rounded, while the ventral osteoderms are substantially squares with rounded corners which, in a ♀ measuring 78 mm. from snout to anus, measure along the sides from 0.1 to 0.13 mm. Thus, according to Parker, in no other members of the Gekkonidae have osteoderms reached such a degree of development as is to be found in *Tarentola*.

Key to the Species[2]

1. Dilation of digits moderate, their sides subparallel; 10–12 scales across interorbital region; range: Sahara of southern Algeria, Tunisia and Libya *neglecta* (p. 311)

   Dilation of digits strong, their sides sloping widely outwards; 12–20 (23) scales across interorbital region.....2

[1] By "much" I mean to end of skull. It is true that Boulenger and others have said "as long as" for *neglecta*, *ephippiata*, *annularis*, and *gigas*, but in the numerous examples of the first three which I have examined, this is not the case, so doubtful for *gigas* also.

[2] *Tarentola clypeata* Gray, 1842, Zoöl. Misc., p. 57, without locality, formerly in Mus. Andersonian Inst., Glasgow, is unidentifiable. Gray's full description is reprinted by Boulenger (1885d), p. 195, footnote.

2. Ear-opening without projecting tubercles forming a denticulation on its posterior border; range: Old World 3

   Ear-opening surrounded by projecting tubercles forming a denticulation (except in very young) on both anterior and posterior border; range: New World 8

3. Dorsal tubercles strongly keeled 4

   Dorsal tubercles weakly keeled or smooth 5

4. Scales along the vertebral line not noticeably different from the dorso-lateral; ground color usually brown or dark gray; length of head and body not exceeding 80 mm.; range: Canary and Madeira Islands and Mediterranean region—in North Africa from Morocco to Egypt ..... *m. mauritanica* (p. 313)

   Scales along the vertebral line strikingly larger than the dorso-lateral; ground color pale gray to sandy white; length of head and body allegedly attaining 103 mm.; range: Sahara of southern Algeria (and possibly of Tunisia and Libya also) ..... *m. deserti* (p. 319)

5. Anterior border of ear-opening *usually* denticulate; supraorbital region, *at least in adults*, stiffened by presence of ossicles 6

   Anterior border of ear-opening without denticulation; supraorbital region soft, being devoid of ossification 7

6. Scansors and transversely dilated lamellae beneath fourth toe 14–18, beneath first toe 12–13 (with 1–5 more at base on palm); range: French West Africa east through arid regions to French Cameroons. *a. ephippiata* (p. 320)

   Scansors and transversely dilated lamellae beneath fourth toe 18–22, beneath first toe 16–18 (with 1–4 more at base on palm); range: Libya east through Egypt to Arabia, south through Sudan to Ethiopia and British Somaliland ..... *a. annularis* (p. 323)

7. Snout less acuminate; temporal region narrower; head shields larger than in typical *delalandii*; range: Hoggar Mountains of Algerian Sahara .... *d. hoggarensis* (p. 330)

   "Snout as long as the distance between eye and ear-opening; mental three times as long as it is broad in the middle"; range: Branco and Raso Islets of Cape Verde Archipelago ..... *d. gigas* (p. 330)

   Snout slightly or much longer than the distance between eye and ear-opening; mental twice to two and a half times as long as it is broad in the middle; range: Cape Verde and Canary Islands (also reported from many places on continent, some perhaps in error) ..... *d. delalandii* (p. 331)

8. Dorsal tubercles strongly keeled; range: Cuba and Bahamas (described from "New York").....(*americana*[1])

STATISTICAL DATA FOR THE SPECIES OF THE GENUS TARENTOLA

Species	Interorbital Scales	Internasal Granules	Nasals, etc surrounding Nostril	Upper Labials	Lower Labials	Mental Breadth into Length	Tubercle Rows on Dorsum	Scansors under First Toe	Scansors under Fourth Toe
neglecta	10–12	1	3+L	8–9	7–10	1.5	12–16	10–	13–
m. mauritanica	12–17	0–1	3+L+R*	8–11	6–10	1–1.5	12–16	10–13	13–17
m. deserti	13–16	0–1	3+L	8–10	7–9	1.3–1.5	10–14	12–14	14–18
(*americana*)	13–17	0–1–2	3+L+R	7–10	6–9	1.2–1.5	16–20	9–15	14–18
a. ephippiata	16–17	0–1	3+L+R*	8–12	7–9	1.5–1.6	10–14	12–13	14–18
a. annularis	14–20	0–1–2	2–3+L+R*	9–12	8–10	1.5–2.2	12–16	16–18	18–22
d. hoggarensis	?	0–	?	?	?	?	?	?	?
d. gigas	?	?	3+L+R	9–10	8–	?	–16	?	?
d. delalandii	14–18	1–2	4–3+L*+R*	8–11	7–10	1.2–1.5	12–20	11–12	11–15

TARENTOLA NEGLECTA Strauch

1887. *Tarentola neglecta* Strauch, Mem. Acad. Imp. Sci. St.-Pétersbourg (7), **35**, No. 2, p. 21, pl. i, figs. 3–4: "Batna, Algeria." (probably southern Algeria).
1890d. Boulenger, p. 77.
1891c. Boulenger, pp. 96, 116.
1893. Boulenger, p. 204.
1894. Oliver, p. 108.
1894. Werner, p. 77.
1895. Koenig, p. 406.
1897b. Werner, p. 405.
1899. Doumergue, p. 517, pl. iv, figs. 3–4.
1901. Doumergue, p. 81, etc. (reprint of 1899).
1913. Hartert, p. 78.
1923a. Angel, p. 205.
1927a. Pellegrin, p. 261.

[1] Reasons for considering *cubana* Gundlach and Peters a synonym, will be found in Copeia, 1944, pp. 18–20.

* An asterisk against R signifies that the rostral may sometimes be excluded, similarly one against L implies that the first labial may not always border the nostril.

1937. Zavattari, p. 530.

1887. *Tarentola angusticeps* Strauch, Mem. Acad. Imp. Sci. St.-Pétersbourg (7), **35**, No. 2, p. 22, pl. i, figs. 1–2: "Batna, Algeria." (probably southern Algeria).

Description. Anterior border of ear without, or with slight, denticulation formed by small conical tubercles, its vertical diameter about half that of the orbit; supraorbital ossicles present, weak; sides of neck with smooth, flattened or conical tubercles. Dorsal tubercles smooth and flat or weakly or strongly keeled; adpressed hind limb reaches the elbow; tail covered above with small, smooth scales and anteriorly with 6 (3 + 3) posteriorly with 4 (2 + 2) rows of more (lateral) or less (dorsal) keeled tubercles; length of tail longer than the length of head and body.

For characters common to all species, see definition on p. 309; for scale counts and statistical data, see table on p. 311.

Color. Above, yellowish white to pale brown, uniform or streaked and spotted with brown; from nostril through eye to body a reddish brown streak; on snout and occiput other longitudinal lines; back and tail with more or less distinct brown crossbars. Below, white, uniform.

Size. Total length of type of *neglecta*, 95 (43 + 52) mm., and of type of *angusticeps*, 80 (39 + 41) mm., exceeded in length from snout to vent by one of 53 mm. (tail regenerated) examined by Lataste.

Remarks. T. angusticeps allegedly differed from *neglecta* chiefly on account of the less swollen temporal region of the former; one suspects that Strauch's two "Batna" geckos, purchased from a Parisian dealer, represented a ♀ and ♂ respectively. Though Boulenger synonymized *angusticeps* with *neglecta*, he later used the less swollen temporal region as a character distinguishing this species from *m. mauritanica*. If specimens of the same size and sex be compared no such difference will be found to exist.

Habitat. In the sandy Sahara where it occurs, this not very active gecko is usually found beneath piled palm fronds or on old palms in oasis gardens, sometimes on walls or in an abandoned fort (Werner; Hartert).

Localities. **Algeria:** Arifidji (Arefidji) to El Morra (El Mala); "Batna[1]"; Dra el Kastir; El Golea—Ghardaia Ouargla triangle; Fort Miribel; Kef el Dhor between Biskra and Touggourt; Meraïeur (Mraier); Ouargla (Wargla); Touggourt (Tuggurt). **Tunisia:**

[1] Though the types, purchased in Paris, allegedly came from Batna, this is most improbable as the species is not known from the plateau but occurs in the Sahara.

"*Erlanger leg. Received from Berlin Mus." **Libya**: Serdeles, Fezzan (*fide* Zavattari).

Range. Algerian Sahara east to Libya.

Tarentola mauritanica mauritanica (Linné)

1758. *Lacerta mauritanica* Linné, Syst. Nat. ed. 10, **1**, p. 202: Mauritanica.
1760. Linné, p. 361.
1768. *Gecko muricatus* Laurenti, Spec. Med. Syn. Rept., p. 44: Mauritania.
1795. *Stellio mauritanicus* Meyer, p. 31.
1802d. *Gecko fascicularis* Daudin, Hist. Nat. Rept., **4**, p. 144: Tripoli.
1823. Lichtenstein, p. 103.
1820. *Gecko Stellio* Merrem, Vers. Syst. Amphib., p. 43 bis: Europe merid.; Africa.
1825. *Tarentola stellio* Gray, p. 199.
1826. *Ascalabotes fascicularis* Fitzinger, p. 47.
1848. Fitzinger, p. 102.
1900. Sewertzoff, p. 33.
1826. *Gekko mauritanicus* Risso, p. 87.
1830. *Platydactylus fascicularis* Wagler, p. 142.
1831b. Gray, p. 48.
1841. Schlegel, p. 109.
1832–41. *Ascalabotes mauritanicus* Bonaparte, p. "15", pl. –, fig. 1.
1836. *Gecko (platydactylus) fascicularis* Gervais, p. 309.
1836. *Platydactylus muralis* Duméril & Bibron, Erpét. Gén., **3**, p. 319: Barbary; Egypt; etc.
1850. Guichenot, p. 4.
1876. Gasco, p. 110.
1884a. Rochebrune, p. 68 (omit as based on misidentification).
1897. Bateman, p. 73.
1845. *Tarentola mauritanica* Gray, p. 164.
1880d. Peters, p. 306.
1881a. Peters, p. 365.
1883a. Boettger, p. 126.
1885b. Boettger, p. 464.
1885d. Boulenger, pp. 196, 413.
1887a. Boulenger, p. 489.
1889b. Boulenger, p. 303.
1890. Müller, p. 697.
1891c. Boulenger, p. 96.
1892. Anderson, p. 11.
1892. König, p. 16.
1892a. Werner, p. 351.
1892b. Werner, p. 265.
1893a. Boettger, p. 36.

1893. Boulenger, p. 204.
1894. Milani, p. 560.
1894. Oliver, p. 108.
1894. Werner, p. 77.
1896. Anderson, pp. 72, 75, 78, 84, 90, 99.
1896. Escherich, pp. 277, 278.
1896. Francaviglia, p. 43.
1896b. Oliver, p. 119.
1897b. Werner, p. 405.
1898. Anderson, p. 86, pl. viii, figs. 1–2.
1899. Doumergue, p. 508.
1899. Grijs, p. 242.
1901. Doumergue, p. 72 (reprint of 1899).
1901. Gadow, p. 508, fig. 120.
1901. [1]Steindachner, p. 328.
1903. Mayet, p. 13.
1904. Chaignon, p. 17.
1906. Barbier, p. 52.
1907. Johnson, pp. 18–19, 69, photos.
1907. Le Cerf, p. 22.
1908. Zulueta, p. 452.
1909a. Werner, pp. 599, 628.
1911. Lampe, p. 156.
1912a. Pellegrin, p. 256.
1912b. Pellegrin, p. 263.
1913. Ghigi, p. 284.
1913a. Werner, p. 25, fig., pl. –
1914b. Werner, p. 336.
1915e. Boulenger, p. 79.
1916d. Chabanaud, p. 226.
1916e. Chabanaud, p. 231.
1917. Maluquer, p. 429.
1920. Ghigi, p. 202.
1922. Zavattari, p. 16.
1923a. Calabresi, p. 10.
1925b. Flower, p. 940.
1925b. Pellegrin, p. 880.
1926a. Pellegrin, 1925, p. 316.
1926f. Pellegrin, p. 160.
1927a. Pellegrin, p. 261.
1927. Vinciguerra, p. 333.
1928. Hediger, p. 407.
1928. Pellegrin, p. 243.
1929b. Werner, pp. 8, 13, 22.

[1] I believe this to be a misidentification of *a. annularis*, which see.

1929. Zavattari, p. 87.
1930a. Zavattari, p. 266.
1931. Gestro & Vinciguerra, p. 538.
1931. Mann, pp. 387, 398, 401.
1931b. Vinciguerra, p. 251.
1931c. Werner, p. 277, pl. iii, fig. 15.
1932. Kuntze, p. 331.
1933b. Cyrén, p. 6.
1933. Flower, p. 766.
1933. Wettstein, p. 62.
1934. Brongersma, p. 166.
1934. Mosauer, p. 52.
1935. Hediger, p. 4.
1935. Laurent, p. 345.
1935e. Scortecci, p. 186.
1936h. Loveridge, p. 51.
1936. Noble & Clausen, p. 209.
1936a. Pellegrin, p. 51.
1937. Hediger, p. 187.
1937. Zavattari, p. 530.
1945. Conant, p. 233.
1862b. *Platydactylus facetanus* Strauch, p. 22.
1881c. Lataste, p. 398.
1874. *Platydactylus mauritanicus* Boettger, p. 136.
1920. Mourgue, p. 233.
1887. *Tarentola facetana* Strauch, p. 21.
1891a. *Tarentola mauritanica* var. *angustimentalis* Steindachner, Anz. Akad. Wiss. Wien, **28**, p. 144: Allegranza; Graciosa; and Fuerteventura, eastern Group of Canary Islands.
1891b. Steindachner, p. 307.
1891c. Steindachner, pp. 302, 306.
1913d. Werner, p. 3.
1893a. ?*Tarentola senegalensis* Boettger (not Boulenger), p. 37 (from Casablanca. ? imported or loc. or det. wrong; other material same loc. and collector are identified as *mauritanica*).
1899. *Tarentola mauritanica* var. *facetana* Doumergue, p. 511.
1901. Doumergue, p. 75 (reprint of 1899).
1899. *Tarentola mauritanica* var. *mauritanica* Doumergue, p. 513.
1901. Doumergue, p. 77 (reprint of 1899).
1899. *Tarentola mauritanica* subvar. *gracilis* Doumergue, Bull. Soc. Geog. Arch. Oran., **19**, p. 513: Oran, Algeria, etc.
1901. Doumergue, p. 77 (reprint of 1899).
1899. *Tarentola mauritanica* subvar. *atlantica* Doumergue, Bull. Soc. Geog. Arch. Oran., **19**, p. 514, pl. iii, fig. 2: Saida, Algeria, etc.
1901. Doumergue, p. 78, etc. (reprint of 1899).

1899. *Tarentola mauritanica* var. *lissoide* Doumergue, Bull. Soc. Geog. Arch. Oran, **19**, p. 515, pl. iv, fig. 1: Stitten, Algeria.
1901. Doumergue, p. 79, etc. (reprint of 1899).
1905. *Tarentola tuberculata* Rosén, Ann. Mag. Nat. Hist. (7), **16**, p. 130, fig. 1, pl. vii, fig. 1: Algiers, Algeria.

Further citations of "*mauritanica*" will be found under *m. deserti.*

Names. Moorish Wall Gecko (English); *wussra* (Arabic in Tunisia: Mosauer).

Description. Anterior border of ear without denticulation, its vertical diameter about a third to half that of the orbit; supraorbital ossicles present; sides of neck with smooth and keeled conical tubercles. Dorsal tubercles strongly keeled; adpressed hind limb reaches the elbow or axilla; tail covered above with small, smooth or keeled scales and with 6 (3 + 3) rows of long, pointed, keeled tubercles; length of tail equal to, or slightly longer than, the length of head and body.

For characters common to all species, see definition on p. 309; for scale counts and statistical data, see table on p. 311.

Color. Above, gray, gray-brown or yellow-brown; from nostril through eye to beyond ear a more or less distinct dark streak; back and tail more or less distinctly barred or marbled with darker and lighter. Below, white, uniform.

The effect of light and temperature in inducing color changes is discussed by Hediger (1935). Geckos found among the olives of Tunisia are intensely black, those on the whitewashed houses much paler (König, 1892).

Size. Total length of ♂ (M.C.Z. 29942), 155 (75 + 80) mm., from Oudjda, Morocco, but surpassed in head and body length by another ♂ (M.C.Z. 19650) of 122+ (80 + 42+) mm., from Bone, Algeria, and another (Werner, 1909a) of 146+ (80 + 66+) mm. from Ain Sarah, Tripoli. I reject Steindachner's (1901) statement that he had several up to 200 mm. from Mersa Halaib on Red Sea coast of Anglo-Egyptian Sudan as being more probably *T. a. annularis* within whose range they would be while being out of range of *T. m. mauritanica.*

Remarks. Our single *mauritanica* from the eastern Canaries, does not bear out Steindachner's claims for *T. m. angustimentalis.* Moreover mental breadth, in relation to its length, shows wide variation as will be seen from the statistical table on p. 311.

The numerous varieties named by Doumergue (1899) appear to be nothing but individual variations. However, their status might well be made the subject of intensive study by someone with more

abundant Algerian material and a knowledge of the topography of the terrain.

T. tuberculata Rosén allegedly differed in three characters, viz. in the nostril being bordered by 3 (instead of 2) nasals, actually it is bordered by 3 in all of our African and European material; the median cleft of rostral more distinct — a highly variable character; and the tubercles on body and tail larger and more numerous — again subject to much variation. I refer it to the synonymy.

Anatomy. Early development has been dealt with by Sewerstoff (1900), the lung by Milani (1894) the iris and pupil are described by Mann; function and adhesive mechanisms of the subdigital scansors are discussed by Hediger who believes that his experiments dispose of the electrical theory of Schmidt; factors influencing form and color of scales on regenerated tails are dealt with by Noble and Clausen.

Breeding. An Algerian gecko, after arrival in England, laid 2 eggs towards the end of April, 2 more towards end of following June, these measuring about 10 x 13 mm.; another captive gecko laid in June of two successive years (Gadow).

Longevity. Seven years, five months, nine days, and still alive at Giza Zoo (Flower, 1925b).

Diet. Moths, even an adult migratory locust (*Schistocera gregoria*) was attacked, though not overcome, by one of the many geckos hunting on the brightly illuminated walls of the hotel at Asni (Werner). Insects were stalked, then rushed, chiefly at night, while drops of water were taken by a lapping motion of the tongue (Gadow).

Parasites. Mites (*Geckobia loricata*) described from Italian geckos by Berlese. Ticks present on Mogador geckos (Hediger).

Hibernation. In Tunisia not in evidence during the winter months but emerging to sun themselves on the first spring day (König).

Habits. Even during the heat of the day these geckos may be seen sunning themselves on ruined buildings or running about. As evening falls their shadowy forms noiselessly appear on the walls of hotel rooms and similar places (Werner). König claims that if intercepted from their usual retreat they can be headed towards a cupped hand into which they will run and can thus be readily captured. Conant (1945) records the arrival of three in shipments of cork bark from North Africa to Philadelphia.

Habitat. Elsewhere they may be found in caves, wells, or waterpipes, on cliffs, old walls, and date palms, or beneath Opuntia leaves, bark of fallen trees, clods of earth or boulders — in such situations they invariably rest back downwards (Escherich & others). Found

at 1509 metres at Midelt (Pellegrin, 1926f), possibly some of the other localities recorded are even higher.

Localities. **Canary Islands:** Allegranza; Fuerteventura; Graciosa; *Lanzarote; Zaute. **Madeira Islands:** Buenos Aires. **Spanish Morocco:** Cabo Spartel; Mauern; Tanger to Tetuan; Tifazor near Melilla. **French Morocco:** Agadir to Mogador; *Asni; Azilal; Azemmour (Azymour); *Azrou; Beni Mellal; Berguent; Cap Sim; Casablanca; *Chellah near Rabat; *Debdou; Djebel Bouhelel (? Bou Djellal); *Djebel Gueliz (Guelis); *Djebel Zalagh; Dradeh near Rabat; El Aioun, Fedhala; Fes; Fort Gurgens; Goundafa; Guercif; Imintahout; Kasba Tadla; Mahiridja; Marrakech; Midelt; Mogador Island; Mogador to Morocco; Moulay Idriss; *Oudjda; Ouezzane; Rabat; Sale; Sidi Ali; Sidi Slimane; *Tadlest; Taourirt; Taroudant; *Taza; Tazouta; Tintazart; *Tiznit; Zegzelsch near Berkane; Zeuatta (Stuatta). **Algeria:** Ain el Turck; Arlal; Bedeau; *Bone; Djebel Aïat; Isle Habibas; Lambeze (Lambesa); Maison Carrée; Mecheria; Michalet; Mont Edough; Oran; Ouargla; Philippville; Saïda; Stiten (Stitten); *Tlemcen. **Tunisia:** Bab Alewa; Douirat; Gafsa—mtns. near; Kebili; Kriz; Oudna (Oudena); Sidi bou Ali; Sousse (Susa); Tozeur; Tunis. **Libya**[1]: Agedabia to Gialo; Ain Zara (Sarah); Barca (Barce; El Merg); Bardia; Bengasi; Birmilrha; Cyrene; Derna; El Agheila; El Faidia (Feteja or Ftaiah) near Derna; El Gubba; El Mechili; Es Sahabi; Garian (Gharian; Gherran) Mountains; Gebel Tarhuni (Tarrhoni; Tarrhona); Ghemines; Gialo; Giarabub; Giofra; Marada; Maraua; Marmarica; Marsa Luch; Marsa Susa (Apollonia); Meshia; Misurata; Sidi el Garbaa; Sirtica; Soluch; Tecnis; Tocra; Tolmeta; Tripoli; Uadi el Cuf (Wadi Kuf); Uadi el Faregh, Sirtica; Umm er Rzem (Um Erzan); Zella. **Egypt:** Abukir; Alexandria; Cairo; Daba; Edku; El Khreit west of Lake Maruit (Mareotis); Mandara; Mariut; Mersa Matruh; Mex; Ramleh; Romani, northern Sinai; Sidi Abd el Rasik. **French Equatorial Africa:** Enneri Tofode, Tibesti, Sahara (*fide* Pellegrin, 1936a, ? *T. m. deserti*).

Range. Islands and countries bordering the Mediterranean (European, Asiatic — Syria only, African); Canary and Madeira Islands; Spanish and French Morocco east to Egypt (inc. Sinai).

Rochebrune's (1884a) records from Cap Blanc etc. are considered erroneous; Steindachner's (1901) from coasts of Sudan and Eritrea

[1] It is probable that many south Libyan records should be referred to *T. m. deserti*.

are also omitted as possibly based on *T. a. annularis* with whose size and range they agree rather than with those of *T. m. mauritanica*.

Tarentola mauritanica deserti Boulenger

1859. *Tarentola mauritanica* Tristam (not Linné), p. 476.
1923a. Angel, p. 205.
1937. Werner, p. 32 (half-grown so det. doubtful).
1891c. *Tarentola mauritanica* var. *deserti* Boulenger, Trans. Zool. Soc. London **13**, p. 115, pl. xiii, fig. 3: Ouargla, Algerian Sahara.
1892. Anderson, p. 11.
1895. Koenig, p. 406.
1899. Doumergue, p. 512.
1920c. Chabanaud, p. 461.
1913. Hartert, p. 78.
1922. Foley, p. 74.
1929b. Werner, p. 8.
1899. *Tarentola mauritanica* var. *saharae* Doumergue, Bull. Soc. Geog. Arch. Oran, **19**, p. 513, pl. iii, fig. 1: Ain Sefra, Algeria.
1901. Doumergue, pp. 77, 80, etc. (reprint of 1899).

Name. *Bonk ĕ schésch* (Arabic: Koenig); *Boulam* (Arabic: Foley).

Description. Anterior border of ear without, or with slight, denticulation, its vertical diameter about a third to half that of the orbit; supraorbital ossicles present; sides of neck with smooth and keeled conical tubercles. Dorsal tubercles strongly keeled; adpressed hind limb reaches axilla; tail covered above with small, smooth or keeled scales and with 6 (3 + 3) rows of long, pointed, keeled tubercles; length of tail slightly longer than the length of head and body.

For characters common to all species, see definition on p. 309; for scale counts and statistical data, see table on p. 311.

Color. Above, very pale gray or sandy white; from nostril through eye to above ear a more or less distinct dark streak; back almost uniform or with paired black spots or crossbars; tail distinctly barred with black. Below, white, uniform.

Size. Total length of topotype *saharae* ♂ (M.C.Z. 27360), 150 (74 + 76) mm., surpassed by an unsexed *deserti* (Doumergue) of 173 (80 + 93) mm. or in head and body length of 88 mm. by a Biskra gecko (M.C.Z. 4641) received from Lataste, who, according to Boulenger (1891c) had one with a snout to vent measurement of 103 mm.

Remarks. Boulenger (1891c) credits Lataste with being the author *in litt.* of the name *deserti*, apparently he never published it so Boulenger is author. The latter considers this form to have a "some-

what longer and more pointed head," and "finer granulations between the tubercles and on the throat" than in the typical race.

Parasites. Acarines (*Geckobia insignis*) present in skin folds of hibernating geckos. Of eighteen geckos examined by Foley, four carried a blood filarian (probably *Thamugadia hyalina*).

Habitat. Lives on sun-baked mud walls of houses (Koenig), but found hibernating in rock fissures of the wadis (Foley).

Localities. **Algeria:** Abelessa, Hoggar Mtns.; *Ain Sefra; Arba Tachtani; *Beni Ounif; *Biskra; Bordj Hobra; El Abiod Sidi Cheikr; El Golea; El Golea to Ghardaia; Ghardaia to Ouargla; Mzab; Touggourt.

Undoubtedly some of the southern Tunisia and southern Libya records attributed to *T. m. mauritanica* should more properly be referred to this form, the difficulty being to know where to draw the line.

Range. Algerian Sahara (see preceding paragraph also).

Tarentola annularis ephippiata O'Shaughnessy

1870a. *Platydactylus aegyptiacus* Steindachner (not Cuvier), p. 327.
1884a. Rochebrune, p. 69.
1875. *Tarentola ephippiata* O'Shaughnessy, Ann. Mag. Nat. Hist. (4), **16**, p. 264: West Africa.
1885d. Boulenger, pp. 198, 414, pl. xvi, fig. 1.
1906i. Boulenger, p. 199.
1907b. Scherer, p. 43.
1910. Pellegrin, p. 23.
1911. Lampe, p. 156.
1913a. Werner, p. 27.
1919. Schmidt, p. 601.
1930e. Witte, p. 616.
1932. Angel, p. 385.
1938. Angel & Lhote, p. 356.
1940b. Monard, p. 153.
1881b. *Tarentola Delalandei* (sic) Boettger (not Duméril & Bibron), p. 406.
1901c. Tornier, p. 71.
1885d. *Tarentola senegalensis* Boulenger, Cat. Lizards Brit. Mus., **1**, p. 414: Gorée, Senegal (type one of Boettger's 1881b geckos).
1893. Boulenger, p. 204.
1910. Pellegrin, p. 22.
1919. Schmidt, p. 601.
1930e. Angel, p. 253.
1933b. Angel, p. 68.
1917c. *Tarentola annularis* Chabanaud (not Geoffroy), p. 85.
1917f. Chabanaud, p. 226.

Further citations of "*ephippiata*" will be found under *a. annularis.*

Description. Anterior border of ear with, rarely without, denticulation formed by small conical tubercles, its vertical diameter about a third to half that of the orbit; supraorbital ossicles present (at least in specimens measuring 57 mm. or more from snout to anus); sides of neck with conical tubercles. Dorsal tubercles smooth or weakly keeled; adpressed hind limb reaches the axilla; tail covered above with small striated scales and 6 (3 + 3) rows of smooth or obtusely keeled tubercles; length of tail about equal to the length of head and body.

For characters common to all species, see definition on p. 309; for scale counts and statistical data, see table on p. 311.

Color. Above, grayish or pale reddish brown, sometimes more or less uniform, though usually from nostril through eye a reddish brown streak which broadens posteriorly and may unite with its fellow on the anterior part of the back or else continue along back as an interrupted dorso-lateral band; scapula region of back with or without four equidistant white spots followed by four more or less distinct broad brown crossbars; limbs indistinctly barred; tail with seven brown crossbars which are broader than the light interspaces that separate them. Below, whitish, uniform.

For a detailed color description see also Angel, (1930e).

Size. Total length of *ephippiata* type (Brit. Mus.), 122 (63 + 59) mm., of a ♀ (Carn. Mus. 23741), 184+ (100 + 84+) mm. from Dakar, both surpassed by Monard's specimen of 205 (102 + 103) mm. from Portuguese Guinea.

Remarks. Owing to the variability of the differential characters employed by Boulenger (1885d, p. 196) in his Synopsis of the Species, considerable confusion as between *annularis* and *ephippiata* (of which Boulenger had only the two cotypes) on the one hand, and *senegalensis* on the other, has persisted until the present day. The entire description of the latter reads:

> "Very closely allied to *T. annularis*, from which it differs in the absence of a denticulation in front of the ear. Even in coloration the two forms are perfectly similar."

Later (1893) he separated *ephippiata* and *senegalensis* as follows:

Tail rounded on the sides elliptical in section.....*ephippiata*
Tail flat inferiorly, with sharpish lateral edge.....*senegalensis*

These differences as between rounded (young) and flat (adult) are to be noted in a series of *americana* (or *cubana*) from La Patana. I

may be wrong in synonymizing *senegalensis* as I have only four specimens — from Bakel and Dakar, Senegal and Yola, Cameroons respectively, but if two species are present throughout this region the records are confusing.

There does appear to be at least an average difference in that eastern geckos (*a. annularis*) *usually* show a denticulation, whereas western ones (*a. ephippiata*) frequently do not. Thus Pellegrin (1910) records one Tintan gecko as *ephippiata* because its ear is anteriorly denticulate, another from nearby as *senegalensis* because it lacks denticulation. Chabanaud (1917f), claiming that all gradations between denticulate and non-denticulate are to be found in a series of six geckos from Gorée and Gourao, Senegal, synonymizes *senegalensis* with *annularis*, saying that this is the only distinguishing character — for he overlooks that of the digital lamellae.

I am inclined to think that *T. d. hoggarensis* may also be a synonym for reasons given in *Remarks* regarding that species.

Parasites. Hemogregarines and *Hemoproteus* found in Senegal geckos by Bouet (Chabanaud).

Habitat. Among rocks and stones at Goundam (Angel) and Gorée (Chabanaud).

Localities. **French Cameroons:** North of Cameroons (Angel, 1930); *Yola. **Togo:** Jendi; Mangu. **Portuguese Guinea:** Bafata; Contubo-el; Enxale; Farim; Mansoa. **Gambia:** MacCarthy Island. **Senegal:** *Bakel; Dagana; Dakar; Fundium; Ile Gorée. **French West Africa:** El Aioudj to Tintan; Goundam; In Ouri, Tilemsi; Segou; Tassenat, Mount Baguezane, near Aïr; Tintan (Tintane).

Boettger (1893a) recorded both *mauritanicus* and *senegalensis* from Casablanca, French Morocco; possibly on the basis of the latter species having smoother tubercles. As considerable collecting has been done at Casablanca during the past fifty years without the taking again of *senegalensis*, I conclude that Boettger's record was based on an introduction, misidentification, or wrong locality data.

Range. French Cameroons west in arid regions to French West Africa.

Folklore. Held in awe by natives of Portuguese Guinea who believe it to be poisonous (Monard).

Tarentola annularis annularis (Geoffroy)

1823.[1] *Gecko annularis* Is. Geoffroy Saint Hilaire, in Savigny, Descr. Égypte, Hist. nat. Rept., **1**, p. 130, pl. v, figs. 6–7[2]: Egypt.
1827.? *Gecko Savignyi* Audouin, in Savigny, Descr. Égypte, Hist. nat. Rept., **1**, p. 164, and Suppl. Rept., pl. ii, fig. 1: Egypt.
1829. *Platydactyles* (not *Platydactylus*) *G.* (*ecko*) *aegyptiacus* Cuvier, Règne Animal, ed. 2, **2**, p. 53: Egypt.
1831. *Gecko Egyptiacus* (sic) Griffith, p. 144.
1831b. *Platydactylus Aegyptiacus* Gray, in Griffith, Synopsis, p. 48.
1836. Duméril & Bibron, p. 322, pl. xxviii, fig. 3.
1845. Rüppell, p. 300.
1851. Guichenot, p. 195, pl. i, fig. 1.
1862b. Peters, p. 271.
1876. Gasco, p. 110.
1843. *Ascalabotes aegyptiacus* Fitzinger, p. 102.
1845. *Tarentola Aegyptiaca* Gray, p. 165.
1882a. Müller, p. 164.
1887. Strauch, p. 24.
1940. Farris, p. 1, pls. i–xxiv.
1882a. *Tarentola delalandii* Vaillant (not Duméril & Bibron), p. 14.
1885d. *Tarentola annularis* Boulenger, pp. 197, 414.
1887. Müller, p. 289.
1889. Pfeffer, p. 5.
1893a. Boettger, p. 36.
1893. Pfeffer, p. 72.
1896. Anderson, pp. 72, 75, 78, 84, 88, 99.
1896a. Boulenger, p. 550.
1898. Anderson, p. 89, pl. viii, fig. 3.
1898. Jeude, p. 17.
1899. Grijs, p. 239.
1901. Schenkel, p. 181.
1903b. Andersson, p. 7.
1904. Peracca, p. 2.
1905. Rosén, p. 131.
1906. Kammerer, pp. 51, 119, 157–8.
1908. Werner, 1907, p. 1832.
1909a. Pellegrin, p. 203.
1910b. Andersson, p. 202.
1910. Ditmars, p. 113.
1911. Lampe, p. 156.
1913. Barbour, p. 145.

[1] 1827 according to Sherborn (1923, Index Animal., **2**, p. 341) however this is for the letterpress for the plate was available to Lichtenstein in 1823. See footnote to *Ptyodactylus h. hasselquistii*.
[2] Too many claws.

1913a. Werner, p. 26.
1914. Fowler, p. 2.
1919. Schmidt, p. 601.
1919. Werner, p. 475.
1923. Cottam, p. 41, fig.
1925b. Flower, p. 941.
1927. Werner, p. 77.
1928b. Scortecci, p. 314.
1930a. Scortecci, pp. 197, 206.
1930c. Scortecci, p. 3.
1931a. Vinciguerra, p. 99.
1932. Kuntze, p. 330.
1933. Flower, p. 767.
1934. Brongersma, p. 166.
1935d. Scortecci, p. 191.
1936h. Loveridge, p. 51.
1937. El Toubi, p. 30.
1937a. Flower, p. 25.
1937. Zavattari, p. 530.
1942. Parker, p. 44.
1895g. *Tarentola ephippiata* Boulenger (not O'Shaughnessy), p. 166.
1896. Anderson, p. 99.
1896e. Boulenger, p. 213.
1897g. Boulenger, p. 277.
1898. Anderson, p. 88, fig. 5.
1901a. Boulenger, p. 49.
1908. Werner, 1907, p. 1832.
1929h. Loveridge, p. 47.
1900. *Platydactylus delalandii* Peel (not Duméril & Bibron), p. 334.
1901. ? *Tarentola mauritanica* Steindachner (? not Linné), p. 328.
1905c. *Tarentola annularis quadraticauda* Tornier, Zool. Jahrb. Syst., **22**, p. 368: "Warabot," i.e. Warabod, British Somaliland.
1905. Neumann, p. 391.
1927. Calabresi, p. 41.
1921. *Platydactilis* (sic) *annularis* Hafferl, p. 433, figs. 1–22.

Further citations of "*annularis*" and "*aegyptiacus*" will be found under *a. ephippiata*.

Names. White-spotted Gecko (Cottam); Egyptian Gecko (Flower); *abu bors aswad* (Arabic in Egypt, meaning father of black *bors*: Anderson); *dab, dhaba, dub* (Arabic in Sudan: Cottam); *orotto* (Somali: Neumann).

Description. Anterior border of ear with, rarely without, denticulation formed by small conical tubercles, its vertical diameter about

half to two-thirds that of orbit; supraorbital ossicles present (at least in specimens measuring 65 mm. or more from snout to anus); sides of neck with smooth conical tubercles. Dorsal tubercles smooth and flat or slightly convex and weakly keeled; adpressed hind limb reaches the axilla; tail covered above with small striated scales and 6 (3 + 3) rows of smooth or obtusely keeled tubercles; length of tail shorter than the length of head and body.

For characters common to all species, see definition on p. 309; for scale counts and statistical data, see table on p. 311.

Color. Above, grayish or pale reddish brown, sometimes more or less uniform; usually from nostril through eye a more or less distinct narrow dark streak uniting with a crossbar on the anterior part of the back; scapula region of back with or without four equidistant dark-edged white spots followed by two to five more or less distinct broad brown crossbars. Below, whitish, uniform.

Very variable. Almost black on the black rocks above the First Nile Cataract; almost white on whitewashed buildings (Anderson, 1898). Specimens taken during the day were almost black, those caught at night nearly white (Werner, 1919).

Size. Total lengths are given as 216 (120 + 96) mm., from Kharga (El Toubi); 210 (113 + 97) mm., from Cairo (Werner); 208 (130 + 78) mm., tail presumably regenerated (Boulenger), all surpassed in length from snout to anus by one of 196 (133 + 63) mm. from Magangani, Sudan (M.C.Z. 8306).

Remarks. While Cuvier has generally been cited as author of *Platydactylus*, actually in the second edition he used it only in the vernacular form Platydactyles in a group sense under which he describes "*G(ecko) Aegyptiacus* nob."

Judging by his remarks, Vaillant's geckos from British Somaliland were actually *annularis* misidentified as *delalandii*, an error copied by Peel in his list.

Similarly, from their great size and locality, I suggest that Steindachner's (1901) specimens from the Sudan and Eritrea are *annularis* and not *mauritanica* as identified.

The Somaliland specimens determined as *ephippiata* by Boulenger (1895g etc.) have been reëxamined by Parker (1942) and found to be *annularis*; undoubtedly his other records from Somaliland and Ethiopia will be the same.

In the East therefore we are left with the single record of Anderson (1896, 1898) of a gecko taken at Durur, near Port Sudan, on the Red Sea coast. This seems to have been determined in part by the

irregular chin-shields of which those on one side are said to agree with West African *ephippiata*, actually this character is not dependable. Possibly the denticulation on the anterior border of the ear-opening is blurred or indistinct, as is occasionally the case with Egyptian examples of *annularis* which I have examined. The Durur gecko should have its subdigital scansors recounted, for Werner obtained typical *annularis* near Port Sudan.

The trivial characters on which Tornier based his race *quadraticauda*, are not worth discussing. As no type locality was designated I select Warabod, British Somaliland, as being the most easterly.

Anatomy. Hafferl (1921) describes the neurocranial cartilage in a contribution to our knowledge of the development of the skull. Farris (1940) has treated the morphology of telencephalon in a 106 page contribution.

De Grijs (1899) remarks that in daylight the vertical pupil is a more or less fine slit that invariably displays four horizontal, very short, point-like cross lines. These are indications of the angles that appear when the pupil is exposed to artificial light and assumes a decagon form. In a weak light the pupil becomes circular, covering most of the eyeball.

Breeding. De Grijs observes that a captive male made a quite unusual purring sound as he approached his mate and playfully bit her on the flank. At Khartoum breeding takes place after the rains, the eggs being laid in any suitable crevice or hole. Young lizards were seen in January (Cottam).

Longevity. Eight years, 16 days at Giza Zoo; 5 years and 10 months in London Zoo (Flower).

Diet. Unlike some geckos *T. a. annularis* adapts itself to a diet of mealworms on which, without other food, it will subsist for a considerable period (de Grijs). In captivity they can be fed on pieces of raw meat, but one gecko killed, and partly ate, a newly hatched chicken. Another was observed to pick up particles of food dropped from a parrot's cage, another to climb a small stool and partake of sweet cake (Cottam). Though cockroaches apparently constituted the chief article of diet for some of these geckos kept in a cage with anoles, the latter also disappeared rapidly (Ditmars). While insects are undoubtedly their principal food, one was observed eating a formidable arachnid (*Galeodes arabs*) by Flower, who, commenting on their cannibalistic propensities (see *Temperament*), advises against keeping them in captivity with smaller lizards.

These geckos drink by frequent immersion of the tongue, but

healthy specimens rarely drink except at night (de Grijs). Though apparently able to live for long periods without water, these lizards drink eagerly when given the opportunity. In this connection, not only were they seen drinking from water vessels (*zeers*), but geckos in process of sloughing have fallen in and drowned, their digital scansors apparently being unable to function when sloughing or damp (Cottam).

Habits. *T. a. annularis* assists the moulting of its extremities by seizing a flake of scarf skin in its jaws and, while holding its claws curled, slowly draws off the slough as if it were a glove. So slowly and carefully is this done that it would seem that the reptile was sensitive about its removal. When removed, these portions of the slough are usually eaten so that one rarely finds them lying about the cage with the sloughed epidermis of head, body, and tail, which flake off unaided.

When curled strips of cork bark are placed in a terrarium occupied by these geckos, instead of seeking shelter beneath them by resting on the ground, the reptiles prefer to rest belly uppermost on the underside of the bark. Large, heavy-bodied, geckos will remain in this way clinging to the underside of a horizontal sheet of plate glass without indication of fatigue for an entire day. If, however, the glass should become clouded with moisture the geckos' power of attachment is impaired. This is also the case if a gecko is repeatedly pulled from its support, the scansors are more or less useless until after the next moult.

When Ditmars attempted to photograph some of these geckos, he found them so active that he resorted to chilling them at a temperature of 35° for fifteen minutes. This resulted in their being too sluggish to run, but it also rendered their scansors inoperative, the geckos sliding down the pane of glass instead of adhering to it as before (Ditmars).

Their ordinary cry of "kek kek" is varied at times till it "resembles the squeak of a bat" (Cottam) or in courtship like purring (de Grijs).

Temperament. De Grijs comments on the impossibility of keeping two males in the same cage on account of their mutual intolerance and resultant fights. These are so dogged that both combatants not only injure their jaws, but the edges of bitten places swell with blood and become septic. Such wounds do not completely recover until after several sloughings. Though his captive *annularis* lay immobile by day, if approached at night with a light they darted away and never showed signs of becoming tame. Whenever a gecko

was picked up it cried repeatedly and gaped widely. Only by holding the creature by the neck could one hope to escape being bitten.

Their bellicose temperament is also referred to by Kuntze, who, on putting his hand into a hole in a wall to remove a small snake that he had seen enter, promptly withdrew his hand with a gecko fastened on to it by its jaws; the bite was quite painful. The Cottams, however, who have been bitten frequently, declare that the teeth never break the skin.

On returning home, Kuntze placed his gecko in a cage already accommodating several *Ptyodactylus* and *Agama* lizards. As evening fell, a commotion in the vivarium attracted Kuntze's attention, on going to the cage he found the disturbance was caused by the *Tarentola* eating one of the *Ptyodactylus*. When the *Tarentola* was removed to another cage in which only agamas were confined, it tyrannized them, even emerging from its retreat in daylight to molest them when feeding. Mr. R. Wintle observed some of these geckos attacking and driving away toads that were hunting insects (Cottam).

Folklore. If a gecko is seen near a vessel containing milk or water the liquid will be thrown away for not only its breath but a look at the fluid is sufficient to render it unfit for human consumption. It is believed that after drinking from such a vessel the gecko habitually spits into it and the spittle is believed very poisonous. A person drinking from such a contaminated vessel will at least suffer stomach pains if they do not actually die. A water jar, if left uncovered overnight, is liable to be visited by a *dab*, as this gecko is called at Khartoum. After taking its first drink the gecko is said to vomit into the bowl before drinking again. To frighten a gecko from such a vessel it is only necessary to lay a knife across the top!

Similarly if a water melon is cut into and a portion set aside for the morrow, it is usual to leave a knife sticking into it to prevent a gecko from partaking of, then spitting on, the fruit. Incidentally the gecko is accredited with being the guardian of melon seeds according to a Berber native whose lengthy story is given by the Cottams.

Salt also should be protected or the gecko will urinate upon it, thereafter anyone eating such contaminated salt will break out in a rash of brown and black spots like those on the gecko's back. When blister beetles caused an outbreak of blisters on the necks of soldiers in the Khartoum garrison, the men averred that the blisters were caused by the lizards on the ceiling urinating upon them.

If the feet of a gecko running over a person should touch the eyes,

the latter will become inflamed; on the other hand if it is the skin that is involved the latter will blister and burn — alternatively leprosy will result. Should a pregnant woman so much as set eyes on a *dab*, her baby, when born, will be disfigured with spots like those to be seen on the gecko.

Naturally with so fearsome a creature the bite also is regarded as very dangerous. When a gecko was accidentally caught in a mouse-trap, the Cottams' servant wished to kill it lest it should bite his employers; on another occasion the servant, on being questioned regarding a gecko found dead in the bathroom, admitted to having killed the creature, alleging that had he not done so it might have bitten him and he would have died. There is ample evidence that the natives lose no opportunity of killing these useful and harmless creatures as a result of their firm belief in its poisonous attributes.

The foregoing notes are all taken from an article on Sudanese superstitions by the Cottams (1932) and should be consulted for many more.

Flower (1933) relates how temporarily he placed some of these geckos in an empty bird cage; when, at a later date, some fire-finches were placed in the cage, they all died. The natives averred that the fatalities were caused by poison left behind by the geckos.

Habitat. Found in hollow baobabs as well as on other trees, rocks and ruins, also, though less commonly, in houses. Taken at 3840 feet (1170 metres) at Erkowit.

Localities. **Libya:** Ain Zueja; El Auenat, Kufra. **Egypt:** Aburoash; Abusir; Aswan (Assuan)[1]; Birket el Kurun; Cairo; Dashur Pyramid, El Ayat district; Ein el Shams; Elephantine Island; Embaba; *Giza; Heliopolis; Helwan; Kharga Oasis; Luxor; Maadi; Maruit; Medinet Habu; Mena House; Minia; Mount Sinai; Philae Island (now submerged); *Sakkara; Salhia, Fakus district, Sharquia Province; Tel el Amarna; Thebes. **Anglo-Egyptian Sudan:** Bara; Berber Province; Dehilba rocks, Suakin Plain; Dongola Province; Durur (as *ephippiata*); El Duem (Dueim) El Obeid; Erkowit, Suakin; Gebel Araschkol; Khartoum; Kitchener Island; *Magangani; Mersa Halaib[1]; Mutmir, Nimule; Omdurman; Port Sudan; Roseires; Sennar; Singa; Suakin; Wadi Halfa; Wadi Medani. **Eritrea:** "Adde-rhorhode, Mareube River"; Agordat; Cunama; Daalac (Dahlac; Dhalec) Island[1]; Filfil; Gaarre, Danakil; Ghinda; Massaua; Monte Ghedeni;

[1] Based on Steindachner's 1901 identification as *mauritanica*, which is presumed to be erroneus, though material not seen. Their size was said to be about 200 mm., whereas maximum for *mauritanica* is about 150 mm.

Nocra Island; "Ouodgerate"; Ras Corali; Sabarguma; Sabderat; Zahl, near Saati (Sahiti)[1]. **Ethiopia:** Bussa; Harar; Sheikh Hussein. **British Somaliland:** Berbera to Goolis Mtns., Biji; Borama to Zeilah; Dadab; Dadubassa; Djeldabae; Gumboworen; Las Koreh (Lasgoré), Warsingali; Lasman; Warabod (Warabot).

Range. Arabia west through Sinai to Egypt and Libya, south through Sudan to Eritrea, Ethiopia and British Somaliland.

Tarentola delalandii hoggarensis Werner

1937. *Tarentola delalandii hoggarensis* Werner, Zool. Anz., **118**, p. 33: Hoggar Mountains, western Sahara, Algeria.

Remarks. Werner states that his single specimen differs from *T. d. delalandii* in having a less pointed snout, supranasals in contact, larger head shields, and narrower temporal region. These are all characters to be found in *T. a. ephippiata* of this general arid region, but in the face of his concluding statement that the new species had nothing whatever to do with *ephippiata* or *gigas*, I hesitate to synonymize *hoggarensis* with *ephippiata* where I expect it belongs. From its size I imagine that ossicles might not yet have developed in the supraorbital region, in which case it would fall into the *delalandii* section of Boulenger's key which it may be assumed that Werner used.

Color. Above, gray-brown; from eye a dark streak continues along side to a point above the elbow.

Size. Total length of holotype, 118^{+} ($68 + 50^{+}$) mm., tail regenerating.

Localities. Known only from the type.

Range. Southern Algeria.

Tarentola delalandii gigas (Bocage)

1875. *Ascalabotes gigas* Bocage, Jorn. Sci. Lisboa, **5**, p. 108: Ilheo Raso, Cabo Verde Islands.
1884a. Rochebrune, p. 72, pl. viii, figs. 1–2.
1884a. *Platydactylus gigas* Rochebrune, p. 208.
1885d. *Tarentola gigas* Boulenger, pp. 200, 414.
1890. Müller, p. 697.
1896a. Bocage, p. 68, pl. i, fig. 1.
1897a. Bocage, p. 194.
1902. Bocage, p. 209.
1906i. Boulenger, p. 200.
1913a. Werner, p. 27.
1937b. Angel, p. 1695.
1907b. *Tarentola gigantea* Scherer (lapsus for *gigas*), p. 43.

Description. Anterior border of ear without denticulation; supraorbital ossicles absent. Dorsal tubercles weakly keeled; tail with 6 (3 + 3) rows of tubercles which are slightly stronger and more conical than those on the back; length of tail shorter than the length of head and body.

For characters common to all species, see definition on p. 309; for scale counts and statistical data, see table on p. 311.

Color. Above, brownish gray; from nostril through eye a dark streak, bordered above with lighter; back and tail with more or less distinct crossbars.

Size. Total length of type (Lisboa Mus.), 236 (125 + 111) mm.

Habitat. A small arid islet near Ilheo Branco, Cape Verde Islands.

Localities. Cape Verde Islands: Ilheo Branco; Ilheo Raso (Razo).

Range. Cape Verde Islands.

Tarentola delalandii delalandii (Duméril & Bibron)

1836. *Platydactylus Delalandii* Duméril & Bibron, Erpét. Gén., **3**, p. 324: Teneriffe, Canary Islands; Madeira; Senegal.
1862b. ? Strauch, p. 23.
1866a. Bocage, p. 42.
1874. Boettger, p. 180, pl. –, fig. 2.
1884a. Rochebrune, p. 70.
1839. *Gecko Delalandii* Gervais, p. 4.
1839. Webb & Berthelot, pl. –, figs. 8–10.
1844. Gervais in Webb & Berthelot, p. 5.
1843. *Ascalabotes Delalandii* Fitzinger, p. 102.
1858. Giraud, p. 289, pl. xxi, figs. 1–8.
1845. *Tarentola borneensis* Gray, Cat. Lizards Brit. Mus., p. 165: "Borneo" (4 ex. don. Capt. Sir Edward Belcher).
1845. *Tarentola Delalandii* Gray, p. 165.
1876a. Peters, p. 118.
1882b. Müller, p. 173.
1885d. Boulenger, pp. 199, 414.
1885. Müller, p. 709.
1887. Müller, p. 289.
1887. Strauch, p. 23.
1890. Müller, p. 697.
1891c. Steindachner, pp. 300, 306.
1896a. Bocage, p. 68.
1899. Doumergue, p. 518, pl. iv, fig. 5.
1901. Schenkel, p. 181.
1902. Bocage, p. 209.

1906i. Boulenger, p. 199.
1911. Lampe, p. 156.
1913a. Werner, p. 27.
1914. Boettger & Müller, p. 77.
1917c. Chabanaud, p. 85.
1919. Schmidt, p. 601.
1924a. Chabanaud, p. 55.
1925b. Flower, p. 941.
1934. Brongersma, p. 166.
1935c. Angel, p. 167.
1937. Andersson, p. 3.
1937b. Angel, p. 1695.
1937a. Flower, p. 25.
1937. Morison, p. 315.
1938b. Angel, p. 485.
1869b. *Gecko (Tarentola) Delalandii* Peters, p. 657.
1875a. *Hemidactylus Delalandii* Peters, p. 197.
1891c. *Tarentola Delalandii* var. *Boettgeri* Steindachner, Ann. Naturhist. Hofmus. Wien, **6**, pp. 300, 306: Grand Canary Island.
1906i. *Tarentola delalandii* var. *rudis* Boulenger, Ann. Mus. Civ. Stor. Nat. Genova (3), 2, p. 200: S. Filippe, Fogo Island, and near Praja, S. Jago = Tiago, Cape Verde Islands.

Further citations of "*delalandii*" will be found under *a. ephippiata* and *a. annularis*.

Description. Anterior border of ear without denticulation, its vertical diameter about half that of the orbit; supraorbital ossicles absent; sides of neck with conical tubercles. Dorsal tubercles smooth or weakly keeled; adpressed hind limb reaches the axilla; tail covered above with small, smooth scales and 6 (3 + 3) rows of long, pointed, keeled tubercles; length of tail shorter than the length of head and body.

For characters common to all species, see definition on p. 309; for scale counts and statistical data, see table on p. 311.

Color. Above, grayish or pale reddish brown, uniform, or occasionally from nostril through eye a more or less distinct dark streak; back with more or less distinct lighter and darker marblings or wavy brown crossbars which may be followed by a row of white tubercles; limbs spotted with brown; tail barred. Below, whitish, uniform.

Size. Total length of topotype *boettgeri* ♂ (U.M.M.Z. 61440), 101 (52 + 49) mm., of a topotype *delalandii* ♂ (M.C.Z. 4827), 98 (50 + 48) mm. with original tail. Boulenger's (1885d) measurement of 137 (81 + 56) is omitted as possibly being that of the Senegambia

gecko which he withdrew and later (p. 414) described as *senegalensis*.

Remarks. Steindachner (1891c), in describing his var. *boettgeri*, states that Gomera, Palma, and Teneriffe geckos have 12, rarely 14, longitudinal rows of dorsal tubercles. Teneriffe (which is type locality for *delalandii*) material in the M.C.Z. alone shows 12–16 rows. Steindachner says that they are *usually* sharply keeled; in some M.C.Z. specimens the tubercles are almost smooth, so he names those from Gran Canaria, of which he had 23 examples, as new, having 16–18 rows of allegedly smaller and entirely smooth or occasionally keeled tubercles on the body with similar ones on the tail. Boettger and Müller (1914) remark that *boettgeri*, though approached by geckos from Hierro, and despite "a good deal of local variation" must be recognized. It is not quite clear to what extent they are repeating Steindachner's remarks. Topotypic *boettgeri* in M.C.Z. and U.M.M.Z. when contrasted with topotypic *delalandii* reverses Steindachner's findings regarding keeling. Boulenger (1906i), in describing *rudis* states that it occurs together with *boettgeri* on S. Filippe and with typical *delalandii* on S. Tiago, adding that: "The contrast between examples of the two extreme forms from the same locality is very striking," and although both extreme forms "pass into the typical form by every possible gradation," he thinks that they require naming. These therefore are not geographical races as usually understood.

Breeding. After two years in captivity a ♀ in Scotland laid, during March and April, 4 eggs, each measuring about 7 mm. in diameter (Morison).

Longevity. Maximum of 7 years; average of 4 years and 4 months for ten geckos in the London Zoo (Flower).

Diet. One kept in a room in Scotland ate adults and over 200 eggs of a Psocid moth (*Lepinotus inquilinus*), adults and larvae of a beetle (*Ptinus tectus*), also fragments of cockroaches (*Blatta orientalis*) and honey bees (*Apis mellifera*) placed in its habitat, were recovered from its faeces. (Morison).

Defence. When provoked it would squeak loudly and bite, but the teeth were too weak to break the human skin. (Morison).

Migration. A gecko measuring 52 mm. from snout to anus, imported with bananas to Aberdeen, lived at Marischal College for 2 years and 9 months, in a room whose temperature of 30°C. sometimes fell to 17°C. Sloughing took place about twice per annum. Its color changed under the stimulus of lighting (Morison).

Localities. Undoubtedly this hardy species is subject to transporta-

tion by human agency, as instanced by its arrival in Scotland as stated above, but it is permissible to suppose that faulty labeling is responsible for the Borneo (Gray, 1845) record. Vaillant's (1882a) Somaliland specimens, later listed by Peel (1900), were presumably misidentified *a. annularis*. I have also rejected the Boghar, Algeria, record of Strauch (1862b) for he states that he never examined the specimen, which was presumably an example of *m. mauritanica*. It may be permissible to question Peter's (1869b) listing from South West Africa as possibly being a *Pachydactylus serval*, while it is distinctly strange that between 1874 and 1885 it was recorded from so many places from which it has not been collected since. I suspect that some at least are due to confusion with *a. ephippiata*; Tornier (1905) corrected his Togo identifications claiming that he was misled by Boulenger's key.

Nigeria: Niger (Boulenger, 1885d); Old Calabar (Müller, 1882b). **Gold Coast**: Accra (Peters, 1875a, 1876a). **Gambia**: MacCarthy Island. (Boulenger and Andersson). **Senegal**: (Based on specimen in Paris Mus. coll. Gallot, who, however, is known to have collected on Madeira also. Rochebrune, 1884a). **French West Africa**: Akjoujt to sea; Beziah, Zemmour; Bir Moghrin (Moghrein), Mauritanie; Port Etienne; **Cape Verde Islands**: Boa Vista; Brava; Fogo; Rombos; Sal; Sao Antao; Sao Nicolao; Sao Tiago (Iago, Jago, Thiago)—Pedra Badejo—Pico de Antonio—Porto Praya; Sao Vicente. **Canary Islands**: Gomera; Gran Canaria—nr. Castillo del Rey—Tafira; Hierro; La Palma; Teneriffa (Teneriffe)—Orotava—Sta. Cruz. **Madeira Islands**: Madeira. **Spanish Morocco**: Tanger (Boettger, 1874).

Range. Canary and Cape Verde Islands. (Rest uncertain pending examination of material on which continental records are based).

Genus Colopus

1869c. *Colopus* Peters, Monatsb. Akad. Wiss. Berlin, p. 57, pl. –, figs. 1–1[f] (type *wahlbergii*).

Diagnosis. Digits free, moderate, fingers slightly dilated at apex' toes tapering, covered above with scales and a flat, nail-like scute distally, denticulate laterally, below on basal portion by granular scales and with two scansors distally; fingers clawless, toes minutely clawed[1].

[1] Clawless according to Peters, who was apparently mistaken.

Pupil vertical; upper eyelid distinct, lower vestigial; dorsal lepidosis of small, uniform, smooth, juxtaposed granules; tail thick, subcylindrical, tapering. Males without pores.

Range. Bechuanaland Protectorate possibly west to South West Africa.

Colopus wahlbergii Peters

1869c. *Colopus Wahlbergii* Peters, Monatsb. Akad. Wiss. Berlin, p. 57, pl. –, figs. 1–1f: "Damaraland" probably error for Bechuanaland.
1869b. Peters, p. 658.
1885d. Boulenger, p. 208.
1898. Sclater, p. 103.
1910b. Boulenger, p. 463.
1910c. Hewitt, pp. 81, 88.
1910a. Werner, p. 315.
1911d. Sternfeld, p. 16.
1932. *Colopus kalaharicus* FitzSimons, Ann. Transvaal Mus., **15**, p. 36: Kaotwe Pan, central Kalahari, Bechuanaland Protectorate.
1935b. FitzSimons, p. 340, figs. 11–14.
1936. Lawrence, p. 38.

Description. Head short, convex, longer than broad[1]; snout obtusely pointed, slightly longer than the distance between eye and ear-opening; latter small, roundish or vertically oval; rostral twice as broad as high, without median cleft above; granules on snout larger than those on occiput or back; nostril bordered by 2–3 nasals, the uppermost in contact with, or separated from its fellow by 1 granule; upper labials 8–9; lower labials 7–9; mental broader than long or longer than broad; no enlarged post mentals, all chin shields being scarcely larger than the gulars.

Back and limbs covered with small, uniform, smooth, juxtaposed granules; ventral scales small, subhexagonal, smooth, imbricate; limbs moderate, the adpressed hind limb not reaching the axilla; fingers free, slightly dilated at their tips which are furnished inferiorly with 2 undivided transverse scansors, and covered above with a median series of imbricating scales of which the distal one is nail-like; toes tapering to tips, the scaling similar to, though smaller than, that of the fingers; tail covered above with scales larger than those on back, subquadrangular, subimbricate, below with slightly larger, smooth, irregular, imbricate scales; on either side of base of tail in males is a series of 4–5 enlarged, elongate scales arranged

[1] Breadth equals the distance from end of snout to a point midway between eye and ear-opening in all three Kalahari specimens in the M.C.Z.

fanwise, their apices directed upwards; length of tail equal to, or slightly longer or shorter than, the length of head and body.

Color. Above, pale olive brown; a dark streak from hind edge of eye passes over shoulder to back; a yellow streak from angle of jaw to flank, where it breaks up into a series of yellow spots; crown and back irregularly spotted or mottled with chalky yellow, such spots sometimes coalescing to form irregular crossbands and sometimes edged by chocolate-brown scales, such darker edging to the yellow markings being more distinct on tail. Below, pale creamy yellow, uniform.

For further color notes see FitzSimons (1935b), who states that the pallid color of these geckos renders them difficult to distinguish at night in their sandy habitat.

Size. Total length of type ♂ (Stockholm Mus.), 84.5 (44 + 40.5) mm., surpassed by *kalaharicus* type ♂ (T. M. 14552), 99 (52 + 47) mm., and a ♀ (T.M.), 96 (53 + 43) mm.

It will be noted that the measurements of the Stockholm type are totally at variance with those furnished by Boulenger (1885d) who had no specimen. It would appear that the measurements of some other species were substituted in error for he gives total length as 135 mm., etc., etc.

Remarks. FitzSimons (1935b), when describing *kalaharicus* in detail, tells us that at first he "presumed that, owing to the smallness of" the claws in *kalaharicus*, they "had perhaps been overlooked in descriptions of *C. wahlbergii*. Reference to literature, however, revealed detailed descriptions by such eminent and careful workers as Peters, Boulenger, Sternfeld and Werner, and it may thus be taken for granted that the specimens examined by them had no claws, as all have definitely stated."

Unfortunately we are all prone to make mistakes, and the possibility that Peters (1869c) overlooked these very minute claws, which at times can be detected only under ideal lighting conditions, is the more probable because the same plate which figures the clawless toes of *wahlbergii*, attributes claws to *Rhoptropus afer*, whose presence in Damaraland material of *afer* neither Boettger nor I have been able to detect. Is it possible that the statement regarding their presence was attributed to the wrong gecko and carried out by the artist?

Boulenger (1885d) had no material and merely made a synoptic translation of Peters' original description while accidentally substituting some erroneous measurements as stated above. Even as late as 1910b he makes no mention of fresh material so that all cita-

tions down to, and including Hewitt (1910c) are merely repetitions based on Peter's description.

Werner (1910a) is the first to list fresh data, he examined six geckos collected by Schultze from Kalahari; Vlei (as Vleij) Topan; Kokong (as Kgokong) and Kong (Kang), and though Werner states that these are clawless, one of them (now M.C.Z. 21018) at least has claws which are quite as distinct, or rather as indistinct, as in FitzSimon's Kaotwe geckos (now M.C.Z. 33471–2).

In the Fauna der Deutschen Kolonien articles written at the beginning of his brief career, Sternfeld (1911d) only made synoptic translations from Boulenger's catalogues, in this instance including the erroneous measurements, then added any localities which he might cull from the literature or from material in the Berlin Museum. For *wahlbergii*, to Peters' Damaraland he only added Werner's localities given above, and, though the specimens may have been in the Berlin Museum by then, we have no evidence that he examined them.

These Werner localities are in the Kalahari approximately a hundred miles south or southwest of FitzSimons' localities. Thus we find that in ninety years no one, other than Peters, has obtained this gecko from Damaraland, despite considerable collecting there by such an able herpetologist as FitzSimons himself.

This raises doubts as to whether Wahlberg's gecko actually came from Damaraland through which he passed on his way to the Kalahari. One of his letters from Lake Ngami, dated November 21, 1855, says that he is leaving his ivory in the care of the Bechuana chief Letcholatebe as he expects to spend several months hunting (1856, Ofvers. K. Vet.-Akad. Förh., **13**, pp. 173–174), thus it is clear that he was in the Kalahari about a hundred miles to the north of FitzSimons' type locality.

However, for the benefit of those who think that there may be two races in this region, the following key, based on a translation of Peters' description and utilizing the allegedly distinguishing characters employed by FitzSimons (1932)[1], is given.

Head short, convex; rostral about once and a half times as broad as the mental; granules on snout scarcely larger than those on back; toes (allegedly) clawless; range: (allegedly) Damaraland..... *wahlbergii*

Head longer than broad; rostral almost twice as broad as the mental; granules on snout distinctly larger than those on back; toes minutely clawed; range: Kalahari Desert, Bechuanaland Protectorate. . *kalaharicus*

[1] FitzSimons (1943, p. 111) has himself relegated *kalaharicus* to the synonymy of *wahlbergi* since the above was written.

Enemies. One in stomach of gecko (*Chondrodactylus angulifer*).

Parasites. No mites found on four geckos examined by Lawrence.

Temperament. Sluggish and easy to capture when once detected (FitzSimons).

Habits. Strictly nocturnal, emerging, especially after rain, from their retreats (FitzSimons).

Habitat. By day remaining in their holes beneath small bushes of the sand veld (FitzSimons).

Localities. **Bechuanaland Protectorate:** Kalahari: Gomodimo Pan; Gomodimo to Kuke; Kaotwe Pan; Kokong (Kgokong) and Kong (Kang); Matapha Pan; Topan Vlei (Vleij). **South West Africa:** ? Damaraland.

Range. Bechuanaland Protectorate, possibly west to South West Africa.

Genus Pachydactylus

1834. *Pachydactylus* Wiegmann, Herp. Mexicana, p. 19 (type *bergii* = *inunguis* Guerin, not Cuvier, = *geitje* Sparrman).

1864e. *Homodactylus* Gray, Proc. Zool. Soc. London, p. 59 (type *turneri*).

1894e. *Elasmodactylus* Boulenger, Proc. Zool. Soc. London, p. 724 (type *tuberculosus*).

Diagnosis. Digits free, more or less dilated at least at apex, covered above with scales, and toes with a flat, nail-like scute distally, more or less serrate laterally, below on basal portion by granules, scales or lamellae, and by undivided[1] angular distally, clawed or clawless[2].

Pupil vertical; upper eyelid distinct, lower vestigial; dorsal lepidosis of small, subequal or unequal, granules or scales, uniform or intermixed with larger tubercles; tail swollen, cylindrical, subcylindrical or depressed, tapering. Males without preanal (except in *tuberculosus*) or femoral pores.

Range. Africa south of equator.

Remarks. In so large a genus few characters are constant for all species. The rostral is without median cleft above except in *tuberculosus*, but this and presence of preanal pores in male appear to be the only characters on which *Elasmodactylus* could be separated. Length of snout in relation to eye diameter is an age character influenced by the larger orbit of younger geckos; snout length in relation to distance from eye to ear-opening is found to be of little value in distinguishing

[1] The first and last sometimes divided.

[2] A character that requires careful examination for all species.

species when reduced to actual measurement instead of the looser phraseology of "about equal," "slightly longer," or "much longer" as have been used in the past.

The ear-opening appears capable of dilation from the normal oval to a subcircular condition, so that its horizontal diameter to that of the eye is of questionable value in many cases, it is termed small when its diameter is a third that of the eye, moderate when equal to half. Scales on the edge of the eyelid form more or less of a denticulation, varying in degree according to species. The number of labials will be seen to have small diagnostic significance. The shape of the mental, so stressed by some authors, is subject to so much individual variation that I attach small importance to it in its relation to the adjacent labials. Chin shields are absent, though occasionally a few irregularly enlarged scales may border the labials in *P. c. capensis* and *mentalis* Hewitt, which I regard as a synonym. The gulars in one male (M.C.Z. 44495) are flat, intricate scales, in another male (M.C.Z. 44498) they are small granules; both geckos (*P. b. turneri*) are from Birchenough Bridge.

Posterior to the vent are a pair of postanal slits (not checked for all species), while on either side of base of tail in both sexes (though often greatly reduced in females) is a short series of from 1–6 enlarged, compressed or flattened, rounded or pointed, usually white, often tooth-like tubercles.

Key to the Species[1]

1. Lepidosis of back and flanks consists of uniform or subuniform granules or scales 2
   Lepidosis of back and/or flanks consists of granules or granular scales intermixed with larger granules or tubercles (see *kobosensis* also) . . . 16

2. Basal portion of digits covered below by undifferentiated granules 3
   Basal portion of digits below with a median series of granules or scales at least somewhat enlarged 8

3. Nasorostrals separated by 2–3 granules 4
   Nasorostrals in contact or separated by 1 granule 5

4. First labial borders nostril; 5–6 scansors under fourth toe; range: Little Namaqualand, Cape Province . . . . . *amoenus* (p. 348)

[1] In a few instances it has been found advisable to sacrifice strict taxonomic sequence for the sake of brevity. *Pachydactylus tristis* Hallowell, 1854a, Proc. Acad. Nat. Sci. Philadelphia, p. 98, and 1857, p. 66, was said to come from Liberia, but the brief description fails to conform to that of any African gecko known to me. Boulenger (1885d, p. 200) eventually (1887a, p. 484) placed *tristis* in the synonymy of the tropical American *Thecadactylus rapicauda*. The type of *tristis* is believed to be lost according to Dr. E. R. Dunn (postcard of 19.v.43).

First labial excluded from nostril; 3 scansors under fourth toe; range: southern Bechuanaland and north central Cape Province west to South West Africa ..... *m. latirostris* (p. 345)

5. Nostril bordered by 3 nasals with or without first labial 6
Nostril bordered by 2 nasals only 7

6. No exceptionally large flattened granule mesially behind nasorostrals; granules on snout subequal to those on back; range: southern Orange Free State due south through eastern to southern Cape Province .... *m. mariquensis* (p. 346)

A moderately large (as large or larger than any other scale on snout) flattened granule mesially behind nasorostrals; flattened granules on snout much larger than those on back; range: Little Namaqualand, Cape Province ..... *m. macrolepis* (p. 347)

7. Ventral scales subgranular, juxtaposed; range: Little Namaqualand, Cape Province ..... *austeni* (p. 349)

8. Granules on snout subconical, subequal to, or slightly larger than those on occiput; ear-opening horizontally oval, its horizontal diameter ½ that of the eye; range: western Cape Province (? introduced on Ascension Island) ..... *geitje* (p. 350)

Granules on snout flattened, much larger than those on occiput; ear-opening obliquely oval, its horizontal diameter ¼–⅓ that of the eye .. 9

9. Snout slightly convex; back covered with imbricate or juxtaposed scales (sometimes not on vertebral line) 10
Snout acuminate, depressed; back covered with juxtaposed granules ... 14

10. Snout obtuse; dorsal scales smooth 11
Snout acuminate; dorsal scales strongly keeled (with possible exception of those on vertebral line) 12

11. Form robust; range: Mozambique west through Bechuanaland to South West Africa and Angola ..... *p. punctatus* (p. 352)

Form allegedly more slender; range: South West Africa in immediate vicinity of Luderitz Bay only ..... *p. amenoides* (p. 356)

12. Nostril bordered by 3 scales only; range: Angola ..... *s. angolensis* .. (p. 357)

Nostril bordered by 3 scales and at least a labial 13

13. Nostril bordered by 3 scales and first labial; range: Great Namaqualand, South West Africa.....*s. robertsi* (p. 358)

Nostril bordered by 3 scales, first labial, and rostral; range: Damaraland, South West Africa.....*s. scutatus* (p. 359)

14. Dorsal granules unequal, some being slightly enlarged on posterior part of back; tail strongly verticillate; range: South West Africa..*kobosensis* (p. 363)

Dorsal granules subequal; tail indistinctly or moderately verticillate..15

15. Nostril bordered by 3 nasals only; scattered white scales on tail suggest enlarged tubercles; range: South West Africa.....*bicolor* (p. 360)

Nostril bordered by 3 nasals and rostral with first labial, or latter excluded; range: Cape Province to South West Africa.....*purcelli* (p. 362)

16. Scansors under fourth toe 3–7; cheeks not or but slightly swollen; length of adult head and body less than 70 (40–68) mm.....17

Scansors under fourth toe 8–13; cheeks swollen; length of adult head and body (except *fasciatus*) over 70 (71–95) mm.....34

17. Snout obtuse, slightly convex; tail cylindrical or subcylindrical; first labial and rostral excluded from nostril.....18

Snout and tail very depressed; first labial and/or rostral *usually* bordering nostril.....29

18. Tail covered above and below by subuniform imbricate scales without rows of enlarged tubercles; range: Zululand, Natal, and Cape Province (Bulawayo!).....*maculatus* (p. 364)

Tail covered above with granules or scales and 6 (8 to 2 from base to tip) longitudinal rows of enlarged granules or tubercles.....19

19. Tail covered above with granules and rows of enlarged, conical, stellate, anteriorly keeled tubercles; below with granules.....20

Tail covered above with scales and rows of subconical or flat, keeled tubercles; below with scales.....21

20. Dorsal tubercles trihedral, strongly keeled, in more or less regular longitudinal rows; range: Bechuanaland and adjacent Cape Province to South West Africa.....*r. rugosus* (p. 369)

Dorsal tubercles conical, stellate and keeled, in more or less irregular longitudinal rows; range: northern South West Africa.....*r. frater* (p. 371)

21. Enlarged dorsal tubercles form more or less regular longitudinal rows..22
Enlarged dorsal tubercles irregularly disposed.....24

22. Digits terminating beyond the flattened nail-like scute, in a single distal scale; dorsal pattern of dark blotches arranged in longitudinal or transverse series; range: Little Namaqualand, Cape Province.....*c. labialis* (p. 374)

Digits terminating beyond the flattened nail-like scute, in a pair of distal scales.....23

23. Dorsal pattern of small brown spots which sometimes coalesce to form blotches or crossbars among which may be scattered pure white dots; range: Cape Province north to Bechuanaland and Transvaal.....
c. capensis (p. 375)

Dorsal pattern of irregular white crossbars which are much narrower than the darker interspaces; range: Little Namaqualand, Cape Province...
c. barnardi (p. 372)

24. Dorsal pattern of dark spots with, or without, white lines.....25
Dorsal pattern of transverse white lines or transverse white spots without dark spots.....26

25. Brown spots or blotches with, or without, faint traces of irregular white lines on nape; range: Rustenberg District, Transvaal.....*c. affinis* (p. 381)

Brown or black spots with distinct white crossbars formed of juxtaposed white dots; range: south and eastern Southern Rhodesia.....
c. rhodesianus subsp. nov. (p. 384)

26. Dorsal pattern of narrow white crossbars.....27
Dorsal pattern of broad white crossbars or large transversely-expanded blotches.....28

27. Six or more irregular white crossbars on back between fore and hind limbs; tail spotted; range: Pretoria District, Transvaal.....*c. formosus*[1] (p. 379)

Four or five sharply distinct irregular white crossbars on back between fore and hind limbs; tail unspotted; range: Zoutpansberg District, Transvaal.....*c. tigrinus* (p. 383)

28. Two broad white crossbars on back between fore and hind limbs, four on tail, the last two forming complete annuli; range: western Southern Rhodesia.....*c. levyi* (p. 386)

[1] *P. c. vansoni* of Zoutpansberg (p. 382), inadvertently omitted from this key, apparently differs in having a white vertebral line in addition to the crossbars, though nothing was said of such a line in the original description. See FitzSimons, 1943, p. 96.

Two broad, black-edged, cream-colored, transversely dilated spots on back, seven on tail; range: Northern Rhodesia and Nyasaland..... *c. oshaughnessyi* (p. 387)

29. Dorsal tubercles well separated by granular interspaces.....30
Dorsal tubercles or scales more or less contiguous, covering entire back except for a narrow strip in vertebral or lumbar region.....see 13

30. Dorsal tubercles flat or subconical, smooth or obtusely keeled, differing little from the dorsal granules among which they are widely scattered; tail slightly verticillate; range: Little Namaqualand and adjacent areas of Cape Province north to South West Africa.....*serval* (p. 388)

Dorsal tubercles keeled, forming 16–25 more or less irregular or regular longitudinal rows; tail distinctly verticillate.....31

31. Dorsal tubercles moderately keeled.....32
Dorsal tubercles strongly keeled.....33

32. Dorsal tubercles more or less irregularly disposed; occipital and temporal regions without or with but few tubercles; range: central Little Namaqualand, Cape Province.....*w. gariesensis* (p. 390)

Dorsal tubercles in more or less regular longitudinal rows; occipital and temporal regions with numerous tubercles; range: northern Little Namaqualand, Cape Province.....*w. weberi* (p. 391)

33. Range: Great Namaqualand, southern South West Africa...*w. acuminatus* (p. 393)
Range: Damaraland, northern South West Africa.....*w. werneri* (p. 394)

34. Snout depressed; rostral "as broad as high"; range: Cape Province (base of Hantam Mountain to Little Namaqualand).....*fasciatus* (p. 396)

Snout convex; rostral broader than high; length of adult head and body over 70 mm.....35

35. Nostril bordered by 3 (rarely 4) nasals only.....36
Nostril bordered by 3 (rarely 4) nasals and rostral with, or without, first labial.....41

36. Tubercles or scales of middorsal zone flattened, smooth or obtusely keeled; stellate tubercles, if present, restricted to sides of neck and flank....37
Tubercles of middorsal zone strongly keeled.....38

37. Back covered with juxtaposed or imbricate scales intermixed with longitudinal rows of large, roundish, flat or subconical, smooth or obtusely keeled tubercles, those on flanks slightly more conical, stellate; range: Little Namaqualand north through South West Africa to southern Angola ..... *l. laevigatus* (p. 398)

Back entirely covered with unequal, smooth, flat, juxtaposed scales presenting a pavement-like appearance; the few smooth subconical tubercles being confined to the flanks; range: Damaraland, South West Africa ..... *l. fitzsimonsi* nom. nov. (p. 400)

38. Keeled tubercles of middorsal zone (in both adults and young) usually free of striae, rarely with traces of secondary radiating keels, such stellate tubercles as are present being confined to occiput and flanks . . 39

Keeled tubercles of middorsal zone (in adults only) stellate, or at least radiating keels present on the lateral and posterior facets of many of them 40

39. Tubercles on crown juxtaposed; dorsal tubercles very strongly keeled; median ventrals smaller than those towards sides; range: Cape Province including Little Namaqualand ..... *b. bibronii* (p. 401)

Tubercles on crown few and widely separated; dorsal tubercles less strongly keeled; median ventrals subequal to those towards sides; range: northern South West Africa and southern Angola ..... *b. pulitzerae* (p. 403)

Tubercles on crown juxtaposed; dorsal tubercles very strongly keeled; median ventrals smaller than those towards sides; range: Belgian Ruanda and Tanganyika Territory south to Mozambique, west through Nyasaland, the Rhodesias, Bechuanaland, Transvaal, and Orange Free State to Little Namaqualand and adjacent Cape Province, South West Africa and Angola ..... *b. turneri* (p. 405)

40. Rostral without median groove but with an upward projection entering the greatly swollen nasal ring; lower labials 6–9; scansors under first toe 8–11; range: Little Namaqualand, Cape Province north to Great Namaqualand, South West Africa ..... *namaquensis* (p. 396)

Rostral with median groove but without upward projections; nasal swelling moderate; lower labials 9–11; scansors under first toe 5–9; range: Northern Rhodesia north to Belgian Congo and Tanganyika Territory ..... *tuberculosus* (p. 409)

Species or race	Diameter of eye into length of snout	Distance between eye and ear-opening into length of snout	Horizontal diameter of ear-opening in relation to that of eye	Height of rostral into rostral breadth	Nasals and scales (L=first labial; R=rostral) surrounding the nostril	Granules separating nasorostrals (i.e. anterior nasals)	Upper labials	Lower labials	Scansors under apex of first toe	Scansors under apex of fourth toe	Tubercles in a row across back and flanks	Tubercle rows across tail (6 often = 8-6-4-2)	Tubercles on either side of base of tail	Maximum length of H. & B.	Maximum length of tail
*m. latirostris**	1⅓–1½	1–1⅓	⅓	2	3	2	7–8	9	3	3	0	0	3	58	45
" *mariquensis**	1½	1–1⅓	⅓	1⅓–2	3; 3+L	0–1	6–8	6–8	3	3	0	0	4–5	50	40
" *macrolepis*					3; 3+L	0	8–9	6–7	3	3	0	0	3	52	39
amoenus	1½	1		2	3+L		9	7–8		5–6	0	0	5	36	30
*austeni**	1⅓–1¾	1⅓	¼	1⅓–1½	2	0	9	7–9	3	3	0	0	4–6	45	32
*gcitje**	1½	1⅓	½	1–1½	1–2 0– 2		7–9	6–9	3–4	4	0	0	3–4	43	31
*p. punctatus**	1⅓–1⅔	1⅓–1⅔	¼–⅓	¼–"2"	3; 3+L	0–1	6–9	5–7	2–3–4	3–4	0	0	3	40	41
" *amoenoides**	1⅓–1½	1¼	⅓	1⅓–1⅗	3+L	0–1	6–8	5–6	3–4	3–4	0	0	3–5	37	39
s. robertsi	1⅓	1⅓		2	3+L	0	8–9	6–7	4	6	contiguous	6		42	48
" *scutatus*	1⅔–1⅗	"1½"		2	3+L+R	0	9–10	7–8	5–6	7	"	6	2	42	38
" *angolensis*	1⅓–1⅗	1¼–1⅓	½	2	3	0	7–8	6–7	3–4	5	17	6	3	42	33
*bicolor**	1⅓–1¾	1¼–1⅓	⅓	1½–1¾	3	0	7–9	6–8	4	4–5	0	scales	2–5	43	53
*purcelli**	1½–1⅞	1⅓	⅓	1¼–1¾	3+L+R; 3+R	0	7–11	7–10	5	5–6	0	6	2	43	50
*kobosensis**	1¾	1⅓–"1½"	⅓	1½–1⅗	3	0	8–10	7–10	5–6	6–7	0 or few	6	2–3	50	57
*maculatus**	1½–1¾	1–1⅓	⅓	1–1½	1–2–3–4	1–2–3–4	7–10	7–10	3–4–5	4–5	irregular	0	2–4	45	—
monticolus	1½	1	⅓	1¼	3	2–3	8–9	7	5	5	"	0	3	36	—
*r. rugosus**	1⅓–1½	1¼	⅓	1¼	3	1–2	8–10	7–10	4–5	4–5	18	6	2	56	39
" *frater**	1⅔	1¼	⅓	1½–1⅔	3	2–3–4	12	10	4	5	irregular	6	3	56	33
*c. barnardi**	1½	1¼–1⅓	⅓	1⅓–1½	3	1–2	7–10	5–8	4	4	16	6	2–3	53	38
" *labialis**	1½	"1⅗"			3	1	5–7	5–6	5	5		6	2	44	—
" *capensis**	1½–1⅞	1¼–1⅓	⅓–½	1¼–1½	3	1	6–9	5–8	4–5	4–5	16–24	6	2–4	64	59
" *formosus**	1⅔	1⅓	⅓	1¼	3	0–1	7–9	6–9	4–5	5	20	6	2–3	43	50
" *affinis**	1⅔	1¼–1⅓	⅓	1¼–1½	3	0–1	8–9	6–8	4–5	4	irregular	6	2–3	68	42
" *vansoni*						0	7–8	7–8	4	4		6		48	36
" *tigrinus**	1½–1⅔	1¼–1⅓	⅓	1¼–1½	3	0	8–9	6–8	3–4	3–4–5	irregular	6	1–4	52	48
" *rhodesianus**	1½–1⅞	1¼–1⅓	⅓	1¼–1½	3	0	8–10	6–8	3–4	4–5	"	6	2–4	50	45
" *levyi*						0	8–9	7–8		4–5	"			27	20
" *oshaughnessyi*						0	8	7		4–5	"			41	38
*serval**	1½–1¾	1¼–1⅓	½–½	1¼–1¾	3+L+R; 3+R	0–1	9–10	7–9	4–5	5–6	"	6	1–3	45	43
*w. guriensis**	1½–1¾	1¼–1⅓	⅓	1¼–1½	3; 3+L	0	7–10	7–8	4–5	6–7	20–22	6	2–3	49	58
" *weberi**	1½–1⅔	1¼	⅓	1¼–1½	3; 3+L	0–1	7–10	7–9	4–5	5–6	16–22	6	2–3	45	47
" *acuminatus**	1⅓–1½	1¼–1⅓	⅓	1¼–1¾	3+L; 3+L+R	0	8–9	7–8	4	5	16–18	6	2	42	43
" *werneri*	1⅓				3+L	0	10	8		6	16–"25"	6	3	39	—
fasciatus	1½		⅓	"1"	3	0	8–9	7–8	6	10	16–18	6		49	58
*namaquensis**	1¾–2	1⅕–1⅓	⅓	1½–1¾	3+L+R; 3+R	0–1–2	10–12	9–11	8–11	11–13	irregular	6	3	82	82
*l. laevigatus**	1¾–2	1¼	¼–⅓	1¾–1½	3	0	8–11	7–10	6——10	8——12	19–22	6	4	91	72
" *fitzsimonsi*							10	8–10	9	11				80	70
*b. bibronii**	1¾–2	1¼–1⅓	⅓	1¼–1½	3	0	8–10	7–9	8–10	10——12	16–17	6	4–6	95	87
" *pulitzerae**	1½–1¾	1¼–1⅓	⅓	1¼–1½	3	0	11–12	9–10	7–8	9–10	16–18	6	4–5	71	62
" *turneri**	1½–2	1⅓–1⅔	⅓	1¼–1½	3–4	0–1	8–11	7–11	7——10	8——12	16–19	6	3–6	95	74
*tuberculosus**	1⅓–2	1⅓–1⅔	¼–⅓	1¼–1½	3+L; 3 4+L+R	0–1	8–11	6–9	5——9	8——12	16–20	6	0–2	79	85

*Represented in the collections of the Museum and so available.

Pachydactylus mariquensis latirostris Hewitt

1910b. *Pachydactylus mariquensis* Boulenger (part, not Smith), p. 462 (? Bechuanaland and Kenhardt records).
1914b. Methuen & Hewitt, p. 130.
1923b. *Pachydactylus latirostris* Hewitt, Ann. Natal Mus., **5**, p. 69, pl. iv, fig. 3: Victoria West, Cape Province.
1933a. Power, p. 215.
1935a. FitzSimons, p. 529.
1936. Lawrence, p. 38.
1937e. Hewitt, p. 20.

Description. Snout obtuse, slightly convex; ear-opening small, subcircular; granules on snout subconical, smooth, slightly larger than those on occiput, which are homogeneous; cheeks not swollen; mental as broad as, or narrower than, adjacent labials; gulars minute, granular, juxtaposed.

Body and flanks covered with small, unequal, flat or subconical, smooth, juxtaposed granules; ventral scales subequal to dorsal, those in middle subequal to those towards sides, subimbricate; limbs short or moderate, slender, the adpressed hind limb reaching the wrist or elbow; digits long, not (fingers) or but scarcely more (toes) dilated at apex than at base; tail cylindrical, not verticillate, tapering, covered above and below with unequal, smooth, imbricate scales, tail shorter than head and body.

For characters common to all species, see *Remarks* on p. 338; for scale counts, etc., see statistical table opposite p. 344.

Color. Above, grayish or light purplish to cinnamon drab; a buffy pink spot near anterior superior corner of eye, a bar of same from just behind eye to labial margin; sometimes the trace of a crescentic marking on occiput; back with 5–6 irregular, dark-edged, light reddish brown crossbars, 8–9 more on tail; flanks with a series of pale yellowish spots. Below, whitish tinged with pink.

So well does their coloring merge with their environment that these lizards are extremely difficult to detect (FitzSimons).

Size. Total length of a ♂ (M.C.Z. 41849), 78 (43 + 35) mm., and ♀ (M.C.Z. 41850), 91 (55 + 36) mm., exceeded by an unsexed gecko (T.M. 15903), of 103 (58 + 45) mm., the length from snout to anus of type (Albany Mus.) was 44 mm.

Temperament. Somewhat sluggish (FitzSimons).

Habitat. Under stones on veld (Power); among broken quartz pebbles lying on reddish sand south of Orange River (FitzSimons).

Localities. **Cape Province:** De Aar; *Kakamas; Kenhardt;

Pofadder; Rietfontein to Zwart Modder River; Victoria West. **South West Africa**: Narudas Süd Farm, Great Karas Mountains (I have transferred Methuen & Hewitt's record here on account of their statement regarding the nasorostrals, and on grounds of geographical probability).

Range. Northcentral Cape Province west to Great Karas Mountains, South West Africa.

Pachydactylus mariquensis mariquensis Smith

1849. *Pachydactylus mariquensis* A. Smith, Illus. Zool. S. Africa, Rept., App., p. 3: Interior of Southern Africa towards the Tropic of Capricorn.
1870b. Peters, p. 110.
1885d. Boulenger, p. 207, pl. xvi; fig. 6.
1898. Sclater, p. 102.
1910b. Boulenger (part), p. 462 (omit Springbokfontein, etc.).
1910c. Hewitt (part), pp. 81, 85, 87 (omit Namaqualand).
1911b. Hewitt, p. 45.
1913. Hewitt & Power, p. 150.
1923b. Hewitt, pp. 68, 70.
1934a. Cott, p. 149.
1936. Lawrence, p. 38.
1936h. Loveridge, p. 51.
1937a. FitzSimons, p. 265.
1937e. Hewitt, p. 20, pl. viii.

Further citations of "*mariquensis*" will be found under *m. latirostris* and *m. macrolepis*.

Name. Mariqua Gecko (Hewitt).

Description. Snout obtuse, slightly convex; ear-opening small, subcircular or obliquely oval; granules on snout subconical, smooth, larger than those on occiput, which are homogeneous; cheeks not swollen; mental as broad as, or narrower than, adjacent labials; gulars minute, granular, juxtaposed.

Body and flanks covered with small, unequal, flat or subconical, smooth, juxtaposed granules; ventral scales subequal to, or slightly smaller than, dorsals, those in middle subequal to those towards sides, imbricate; limbs moderate, slender, the adpressed hind limb reaching the elbow; digits long, not (fingers) or but scarcely more (toes) dilated at apex than at base; tail cylindrical, not verticillate, tapering, covered above and below with subequal, smooth, imbricate scales; tail shorter than head and body.

For characters common to all species, see *Remarks* on p. 338; for scale counts, etc., see statistical table opposite p. 344.

Color. Above, pale gray; a broad dark brown streak from second labial passes through eye to form a crescentic (sometimes incomplete) marking on occiput; crown of head variegated with dark brown; limbs uniform or indistinctly flecked with brown; nape and back with five pairs of black-edged, reddish brown blotches which may coalesce to form irregular crossbars, or longitudinally also making a ladder-like pattern; tail with ten to twelve black-edged, brown crossbars mostly broader than the pale interspaces. Below, whitish, uniform.

Size. Total length of type (Brit. Mus.), 87 (48 + 39) mm., and ♀ (M.C.Z. 16173), 90 (50 + 40) mm., latter from Worcester, C.P.

Remarks. FitzSimons (1937a) examined the four alleged cotypes in the British Museum and found that the largest agreed well, though much faded, with Smith's description.

Perhaps Boulenger's (1885d) statement that the snout is "hardly as long as the diameter of the orbit," led Hewitt (1910c, 1911b) to comment on an example from Blue Cliff, Uitenhage, whose head was abnormally flattened and snout "relatively long and not obtuse."

Habitat. Holes in the ground such as deserted nests of trapdoor spiders, away from stones and rocks (Hewitt).

Localities. **Orange Free State:** *Smithfield. **Cape Province:** Albany District; Alexandersfontein; Bluecliff; Clanwilliam; Fort Brown, Albany District; Graaf Reinet; Grahamstown; Hanover; Hantam; Kimberly; Lady Frere; Malmesbury; Mortimer; *Worcester.

Range. Southern Orange Free State due south through eastern to southern Cape Province.

Pachydactylus mariquensis macrolepis FitzSimons

1905h. *Pachydactylus mariquensis* Boulenger (not Smith), p. 252.
1907b. Roux, p. 412.
1910b. Boulenger (part), p. 462.
1911d. Sternfeld, p. 16.
1939a. *Pachydactylus mariequensis* (sic) *macrolepis* FitzSimons, Ann. Transvaal Mus., **20**, p. 6, fig. 1: Springbokfontein and Namaqualand.

Description. Granules on snout subconical ("flattened"), much larger than those on occiput, which are homogeneous.

Body and flanks covered with flat or subconical, juxtaposed granules; ventral scales much smaller than dorsals; tail shorter than head and body.

For characters common to all species, see *Remarks* on p. 338; for scale counts, etc., see statistical table opposite p. 344.

Color. Above, tawny to yellowish brown; crown of head uniform or finely speckled with black; from eye to eye a dark crescentic marking on occiput; limbs light brown indistinctly spotted with white; nape and back with four to five pairs of dark-edged, chestnut brown blotches which may coalesce to form irregular broad crossbars; tail with similar crossbars which are broader than the pale interspaces. Below, creamy white, uniform.

Size. Total length of cotype ♂ (S.A.M. 1159), 89.5 (50.5 + 39) mm., and cotype ♀ (S.A.M. 2417) from snout to vent, 52 mm., tail missing

Remarks. Known to me only from the brief description.

Localities. **Cape Province**—Little Namaqualand: Klipfontein; O'okiep; Springbok (Springbokfontein).

Range. Little Namaqualand, Cape Province.

Pachydactylus amoenus Werner

1910a. *Pachydactylus amoenus* Werner, Denks. Med.-Nat. Ges. Jena, **16**, p. 314, fig. 11: Kamaggas, Little Namaqualand, Cape Province.
1910b. Boulenger, p. 462.
1911b. Hewitt, p. 46.
1911d. Sternfeld, p. 16.

Description. Snout "somewhat pointed;" ear-opening small, obliquely oval; granules on occiput homogeneous; gulars minute, granular.

Body and flanks covered with small, subequal granules; ventral scales "small;" digits "not" dilated at apex; tail "very slightly swollen in the middle," tapering, covered above and below with homogenous, smooth, imbricate scales; tail shorter than head and body.

For characters common to all species, see *Remarks* on p. 338; for scale counts, etc., see statistical table opposite p. 344.

Color. Above, pale brownish gray; a dark streak over upper and lower labials, another on lower labials beneath the eye; back with five angular reddish-brown crossbars, tail with five straight ones.

Size. Total length of type (Berlin Mus.), 66 (36 + 30) mm.

Remarks. Known only from the type which Werner considered most nearly related to *mariquensis* from which it allegedly differed in longer snout, more widely separated nasorostrals, and more numerous (5–6 instead of 3) scansors. If an error was made regarding the

scansorial count then it will probably be found that *amoenus* should be regarded as a race of *mariquensis* with *macrolepis*, whose type locality is not far distant from that of *amoenus*, as a possible synonym.

Localities. Known only from the type.

Range. Little Namaqualand, Cape Province.

Pachydactylus austeni Hewitt

1923b. *Pachydactylus austeni* Hewitt, Ann. Natal Mus., **5**, p. 67, figs. 1 and 3, pl. iv, figs. 1–2: Port Nolloth, Little Namaqualand, Cape Province.
1936. Lawrence, p. 38.
1936h. Loveridge, p. 51.

Description. Snout obtuse, slightly convex; ear-opening small, obliquely oval; granules on snout, flattened, smooth, subequal to or slightly larger than those on occiput, which are homogeneous; cheeks not swollen; mental as broad as adjacent labials; gulars minute, granular, juxtaposed.

Body and flanks covered with small, subequal, subconical, smooth juxtaposed granules; ventral scales subgranular, subequal to, or slightly smaller than, dorsals, those in middle subequal to those towards sides, juxtaposed; limbs moderate, slender, the adpressed hind limb reaching the elbow; digits long, slender, scarcely more dilated at apex than at base; tail cylindrical, not verticillate, tapering, covered above and below with subequal or irregular, smooth, imbricate scales; tail slightly longer than head and body in young, shorter in adult.

For characters common to all species, see *Remarks* on p. 338; for scale counts, etc., see statistical table opposite p. 344.

Color. Above, gray or pinkish brown; hind limbs indistinctly spotted with white; back with six pairs of indistinct dark spots which may coalesce to form longitudinal lines; sometimes back and tail indistinctly spotted with white, such spots being arranged in ill-defined longitudinal lines. Below, whitish, uniform.

Size. Length from snout to vent of both cotype (Albany or Natal Mus.) and a gravid ♀ (M.C.Z. 34945), 45 mm., while a young ♂ (F.M.N.H. 16013), is 61 (29 + 32) mm.

Localities. **Cape Province**—Little Namaqualand: *Kleinzee; Port Nolloth.

Range. Little Namaqualand, Cape Province.

PACHYDACTYLUS GEITJE (Sparrman)

1778. *Lacerta Geitje* Sparrman, Göteborgs Kong. Vetensk. Vitter.-Samh. Handl., **1**, p. 75: South Africa.
1900. Andersson, p. 28.
1817. *Gecko inunguis* Cuvier, Régne Animal, ed. 1, **2**, p. 46, pl. v, fig. 3: "Isle de France," i.e. Mauritius (error for Cape of Good Hope, i.e. Union of South Africa).
1829–44. *Platydactylus inunguis* Guerin, p. 10, pl. xiv, fig. 2.
1831b. *Phelsuma inunguis* Gray, p. 47: "Isle de France."
1834. *Pachydactylus Bergii* Wiegmann, Herp. Mexicana, p. 19: "Africa merid."
1849. Smith, A., p. 5 (but omit bibliography).
1836. *Platydactylus ocellatus* Duméril & Bibron, Erpét. Gén., **3**, p. 298: "l'Afrique australe." i.e. South Africa.
1845. *Pachydactylus ocellatus* Gray, p. 167 (omit bibliography).
1867a. Steindachner, p. 10.
1885d. Boulenger (part), p. 205.
1887b. Boettger, p. 141.
1887. Strauch, p. 19.
1897. Bateman, p. 75.
1898. Sclater, p. 102.
1898. Werner (part), 1896–7, p. 140 (omit Transvaal).
1907b. Roux, p. 411.
1910b. Boulenger (part), p. 462 (omit Transvaal, Natal, Angola).
1910a. Hewitt, p. 58.
1910c. Hewitt, pp. 81, 85, 88.
1911b. Hewitt, p. 45.
1911b. Sternfeld (part), p. 397 (omit Windhoek).
1911d. Sternfeld (part), p. 15 (Kobis Mountain only).
1916. Andersson, p. 39.
1926b. Rose, p. 491.
1927b. Hewitt, p. 452.
1929. Rose, p. 117, figs. 75–77.
1936. Lawrence, p. 38.
1900. *Pachydactylus geitje* Andersson, p. 28.

Many other references to "*ocellatus*" will be found under *p. punctatus* and *p. amenoides* with both of which it has been confused.

Description. Snout obtuse, slightly convex; ear-opening moderate, subcircular or horizontally oval; granules on snout subconical, smooth, subequal to, or slightly larger than, those on occiput, which are homogeneous; cheeks not swollen; mental as broad as adjacent labials; gulars minute, granular, juxtaposed.

Body and flanks covered with small, subequal, flattened, smooth, juxtaposed granules; ventral scales slightly larger than dorsals, those in middle subequal to those towards sides, imbricate; limbs moderate, slender, the adpressed hind limb reaching the elbow; digits short, scarcely more dilated at apex than at base; tail cylindrical, swollen, not verticillate, tapering, covered above and below with unequal, homogenous, smooth, pointed, imbricate scales; tail shorter than head and body.

For characters common to all species, see Remarks on p. 338; for scale counts, etc., see statistical table opposite p. 344.

Color. Above, gray, olive, or brown; a broad dark brown (pale-edged above as far as eye) streak from second labial through eye to shoulder; eyelid white; labials spotted with brown; limbs uniform or spotted; back with small, white, dark-edged ocelli and sometimes dark blotches or elongate streaks; tail spotted with brown. Below, whitish, throat, tail, and sometimes belly, spotted with brown.

Size. Total length of *geitje* type (Stockholm Mus.), 64 (38 + 26) mm., surpassed by a ♂ (M.C.Z. 5738), 74 (43 + 31) mm. from the Cape.

Remarks. The type, still bearing a label "*Lacerta Geitje* nov. spec." in Quensel's handwriting, and agreeing perfectly with Sparrman's description, has been identified by Andersson (1900) with *P. ocellatus* of Boulenger.

At the time my (1942c) "Revision of the Afro-Oriental Geckos of the Genus *Phelsuma*" was published, I indicated (p. 439) that settlement of certain unanswered queries regarding types in European Museums would have to await more propitious times. Meanwhile I suggested (p. 440) with question mark, that *Gecko cepedianus* Merrem was probably a synonym of *Phelsuma inunguis* (Cuvier) as both were allegedly from Ile de France = Mauritius.

However Mons. Angel, with customary kindness, now (23.x.45) informs me that Cuvier's two cotypes (Paris Mus. 6663) of *Gecko inunguis* never came from Ile de France but were sent from the Cape of Good Hope (= Union of South Africa) by Delalande, and subsequently were designated *Platydactylus ocellatus* by Duméril and Bibron. Furthermore, he adds, these cotypes correspond to the description of the gecko called *Pachydactylus ocellatus* by Gray, Steindachner, and Boulenger (1885d).

Gecko ocellatus was a manuscript name of Oppel, first published by Cuvier (1870) as being (translation) "gray, all covered with eye-like, brown and white in the middle, spots," and described as one

of the "platydactylous geckos without claws and with very small thumbs which come from Isle de France. But according to Mons. Angel, Cuvier's examples of *ocellatus* came from South Africa, are not referable to *Phelsuma*, but correspond to *Pachydactylus ocellatus* of Boulenger (1885d).

Phelsuma cepediana (Merrem) should therefore be substituted for *Phelsuma inunguis* (Cuvier) in my revision (1942c, Bull. Mus. Comp. Zoöl., **89**, pp. 447, 448) and on the latter page the 1817 and 1831b citations of *inunguis* be removed from the synonymy.

Duméril and Bibron's suggestion (1836, p. 300) that *ocellatus* probably occurs on Mauritius is erroneous. Outside of South Africa it is apparently present on Ascension Island where it was presumably introduced through human agency.

Breeding. Eggs measure 9.5 x 7 mm.

Habits. Less active and inclined to climb than most geckos. Apt to stand with upraised head, almost vertical neck, and stiffened forelimbs. When lying this gecko curls up like a cat. The tail probably serves as a food reservoir for lean times. There is little ability to change color, if any. The eye is large and limpid, and the species apparently mute (Rose).

Habitat. Found in decaying vegetable matter, roof thatching, old walls, and among loose stones (Smith); numerous among heaps of fist-sized stones lying near the shore on Robben Island (Rose); in nest of *Gerbillus* or *Otomys* (Roux).

Localities. **Cape Province:** Beaufort West; Bredasdorp; Caledon; Calvinia; *Cape of Good Hope; *Cape Town; Franskraal, Gansbaai (Fransch Kraal, Gan's Bay); Kobis Mountain; Malmesbury; Matjesfontein; Mossel Bay; Prince Albert Poort; Robben Island; Robertson; Steynsburg; Swellendam; Table Mountain; Touwsriver; Tulbagh; Worcester. **Ascension Island** (1845. 3 ex. Admiralty. See *Remarks* above).

Range. Cape Province; Ascension Island (? introduced).

Pachydactylus punctatus punctatus Peters

1854. *Pachydactylus punctatus* Peters, Monatsb. Akad. Wiss. Berlin, p. 615: Sena and Tete, Mozambique.
1855. Peters, p. 44.
1882a. Peters, p. 26, pl. v, fig. 2.
1885d. Boulenger, p. 206.
1896a. Bocage, p. 98.
1910b. Boulenger, p. 462.

1910c. Hewitt, pp. 81, 85, 88.
1913e. Hewitt, p. 483.
1914b. Methuen & Hewitt (part), p. 130.
1934. Pitman, p. 303.
1936c. Parker, p. 130.
1867a. *Pachydactylus ocellatus* Bocage (not Cuvier), p. 220.
1869b. Peters, p. 657.
1885d. Boulenger (part), p. 205 (Benguela record at least).
1895a. Bocage, p. 16.
1905c. Boulenger, p. 110.
1910a. Werner (part), p. 313 (omit Luderitz Bay).
1911b. Sternfeld (part), p. 397 (Windhoek only).
1911d. Sternfeld (part), p. 15 (omit Kobis Mtn. and Luderitz Bay).
1937b. Monard, p. 52.
1913b. *Pachydactylus Brunnthaleri* Werner, Denks., Akad. Wiss. Wien, **88**, p. 718: Bulawayo, Southern Rhodesia.
1915c. Werner, p. 334.
1923b. Hewitt, p. 69, fig. 4.
1926b. *Pachydactylus punctatus brunnthaleri* Hewitt, p. 478.
1933. Schmidt, p. 5.
1935. Hewitt, p. 315.
1931. *Pachydactylus serval* Monard (not Werner), p. 90.
1937b. Monard, pp. 52, 54.
1932. *Pachydactylus punctatus langi* FitzSimons, Ann. Transvaal Mus., **15**, p. 35: Gemsbok Pan, Ghanzi District, Bechuanaland Protectorate.
1935b. FitzSimons, p. 339.
1936. Lawrence, p. 38.
1935b. *Pachydactylus punctatus punctatus* FitzSimons, p. 339.
1936. Lawrence, p. 38.
1937b. Mertens, p. 6.
1938. FitzSimons, p. 175.
1939b. FitzSimons, p. 28.

Further citations of "*p. brunnthaleri*" will be found under *p. amenoides*.

Name. *Canomba* (Benguela: Anchieta in Bocage).

Description. Snout obtuse, slightly convex; ear-opening small or moderate, subcircular or obliquely oval; granules on snout flattened, smooth, much larger than those on occiput, which are homogeneous; cheeks not swollen; mental as broad as, or slightly narrower or broader than, adjacent labials; gulars minute, granular and juxtaposed or flat and imbricate.

Body and flanks covered with small, subequal, smooth, imbricate scales; ventral scales subequal to, or slightly or distinctly larger than,

dorsals, those in middle subequal to those towards sides, imbricate; limbs short or moderate, slender, the adpressed hind limb reaching the wrist or elbow; digits long, slender, scarcely more dilated at apex than at base; tail cylindrical, not verticillate, tapering, covered above with large, smooth, imbricate scales, below with larger, smooth, rounded or slightly pointed, imbricate scales of which the median series are somewhat enlarged; tail equal to, or shorter or longer than, head and body.

For characters common to all species, see *Remarks* on p. 338; for scale counts, etc., see statistical table opposite p. 344.

Color. Above, pale gray to grayish or purplish brown; crown of head uniform or variegated with darker; usually a dark brown streak from nostril passes through eye to vanish near ear; eyelid largely white; each upper and lower labial with a brown spot; limbs uniform or indistinctly flecked with brown; back and tail uniform or with irregular longitudinal series of brown spots or vermiculations which sometimes form indistinct crossbars, some scattered whitish scales. Below, whitish, uniform.

Parker (1936c), remarking that a pair collected on the same farm at Hoffnung are very different in color, questions the validity of any of the races.

Size. Total length of *punctatus* type (Berlin Mus.), 71 (34 + 37) mm.; of *langi* type ♂ (Transvaal Mus.), 73 (34 + 39) mm., both surpassed by a ♀ (M.C.Z. 21267), 81 (40 + 41) mm. from Zondagfontein.

Remarks. Boulenger (1885d), thinking he had no material of *punctatus*, followed Bocage in referring his Angolan *punctatus* to "*ocellatus.*" Monard (1931), to judge by his remarks, also thinking that he had no *punctatus*, referred his specimens to "*serval* Werner."

Werner (1915c) admits that all the so-called "*ocellatus*" from South West Africa identified or seen by him, were in reality referable to *brunnthaleri*, a conclusion that I arrived at independently. Methuen and Hewitt (1914b) were the first to suggest that *brunnthaleri* was synonymous with *punctatus*, but unfortunately Hewitt later (1926b; 1935) recognized it "as a long-snouted subspecies of *punctatus.*" Its status was finally settled by Mertens, (1937b) reëxamination of Werner's type which he considered inseparable from *p. punctatus.* The Museum of Comparative Zoölogy has a topotype of *brunnthaleri* that appears to me to be subspecifically identical with the Angolan gecko (C.M. 5618) recorded by Schmidt (1933) which I have also examined. Nobody since Peters appears to have had topotypic

p. punctatus for study, but it is reasonable to assume that a gecko with a transcontinental distribution from Angola to Southern Rhodesia is not likely to be differentiated in Mozambique. Like FitzSimons (1938) I have made careful comparison between Rhodesia, Bechuanaland, Transvaal and South West African specimens and regard all as of one race.

When describing *p. langi* FitzSimons believed it differed from typical *punctatus* in more slender form, shorter and narrower head, scales on occiput larger, dorsals less flattened, ventrals but slightly larger than dorsals, caudal scales proportionately larger, and its well-defined color pattern.

To me the last character appears to be the only one of consequence, after comparing our four paratypes (at least taken with the type) of *langi* with an extensive series of the highly variable *punctatus*. In *langi* the naso-aural streak tends to be continued on to the flank. I see nothing in the alleged more slender form, or shorter and narrower head.[1]

Breeding. Eggs collected in Southern Rhodesia in January, measured 8-8.5 x 6.4-6.8 mm., others taken in South West Africa between May and July, were 8-8.6 x 6.2-7.0 mm. (FitzSimons).

Parasites. Mites (*Geckobia transvaalensis*) recorded with some misgivings by Lawrence.

Temperament. Sluggish and easy to capture (FitzSimons).

Habitat. Under stones on veld (Peters). Invariably beneath stones in open grasslands, thick bush, mopane forest, or in the loosely built stone walls of kraals, etc. One night during a shower of rain large numbers were seen abroad (FitzSimons). Bocage's (1895a) statement "common on house walls" may be due to confusion of species by Anchieta's native informant, therefore the name *canomba* may also be doubtful.

Localities. **Mozambique:** Sena; Tete. **Southern Rhodesia:** *Bulawayo; *Birchenough Bridge; Matopos. **Bechuanaland Protectorate:** Gemsbok Pan; Kalakamati; Lake Ngami to Mabeleapudi; Mabeleapudi; Motlhatlago; Serowe; *Titumi **Transvaal:** Letaba Camp, Great Letaba River; *Njelele River; Selati, Letaba District; *Zondagfontein, Magalakwin River. **South West Africa:** Arandis, Damaraland; Grootfontein; Hereroland; Hoffnung Farm near Windhoek; Kalkveld; Karibib; *Keetmanshoop; Kraikluft Farm, Great Karas Mountains;

[1] Since the foregoing was written, I notice that FitzSimons (1943) himself has synonymized *langi* with *p. punctatus*.

Kubub; Lake Guinas; Nakeis Mine, Little Karas Mountains; Narubis; Neitsas Farm near Grootfontein; Neudamm Farm; Okaukuejo to Outjo; Osona Farm near Okahandja; 20 miles south of Outjo; Paderburn Farm; Teufelsbach, 25 km. s.s.e. Okahandja; Usakos; Windhoek. **Angola**: Benguela; Catumbela; Cuanza (Quanza); Pico Azevedo.

Range. Mozambique west through Transvaal and Bechuanaland to South West Africa and Angola.

Pachydactylus punctatus amoenoides Hewitt

1910a. *Pachydactylus ocellatus* Werner (part, not Cuvier), p. 313 (omit Hereroland and Kubub).
1914b. *Pachydactylus punctatus* Methuen & Hewitt (part), p. 130 (omit Karas Mountain material).
1935a. *Pachydactylus punctatus brunnthaleri* FitzSimons (not Werner), p. 530.
1935. *Pachydactylus punctatus amoenoides* Hewitt, Rec. Albany Mus., **4**, p. 314: Luderitz Bay, South West Africa.
1937e. Mertens, p. 10.
1938. FitzSimons, p. 175.

Description. Snout obtuse, slightly convex; ear-opening small, obliquely oval; granules on snout flattened, smooth, much larger than those on occiput, which are homogeneous; cheeks not swollen; mental as broad as, or slightly narrower than, adjacent labials; gulars minute, granular, juxtaposed.

Body and flanks covered with small, subequal, smooth imbricate scales; ventral scales subequal to, or larger than, dorsals, those in middle subequal to those towards sides, imbricate; limbs moderate, slender, the adpressed hind limb reaching the elbow; digits long, slender, scarcely more dilated at apex than at base; tail cylindrical, not verticillate, tapering, covered above with large, smooth, imbricate scales, below with larger, smooth, rounded, imbricate scales of which the median series are somewhat enlarged; tail as long as, or longer than, head and body.

For characters common to all species, see *Remarks* on p. 338; for scale counts, etc., see statistical table opposite p. 344.

Color. Above, pale grayish or pinkish brown; crown of head variegated with darker; a dark brown streak from nostril passes through eye and over ear to forelimb; each eyelid white; upper and lower labial with a brown spot; limbs indistinctly speckled; back and tail with longitudinal rows of pale spots without trace of crossbars. Below, whitish, uniform. Young substantially like adult.

Size. Length from snout to vent of type ♂ (Albany Mus.), 31.5 mm., total length of another unsexed specimen (Transvaal Mus.), 76.5 (37 + 39.5) mm.

Remarks. Hewitt, basing this race on an adult and young, alleges that it differs in "the flattened head, the small number of labials, and the more flattened nongranular dorsal scales." I see nothing granular about the lepidosis of the imbricate-scaled *p. punctatus* though *geitje*, so often confused with *punctatus*, is granular. Certainly our topotype of *amoenoides* does not differ from typical *punctatus* in either of the other characters mentioned.

FitzSimons (1938) alleges, however, that *amoenoides* may be "readily distinguished" from the typical form by its more slender habit, depressed head, and narrower mental — all contradicted by our topotype, so that I am inclined to agree with Parker (1936c) that it is doubtful if the race can be recognized.

Temperament. Very active (FitzSimons).

Habitat. Stony situations in valley between rocky hills (FitzSimons).

Localities. **South West Africa:** Great Namaqualand: Aus; Barby Farm; Kuibis (Quibis); *Luderitz Bay.

Range. South West Africa (in immediate vicinity of Luderitz Bay only.)

Pachydactylus scutatus angolensis Loveridge

1944f. *Pachydactylus scutatus angolensis* Loveridge, American Mus. Novit., No. 1254, p. 3, fig. 1: Hanha, Benguela Province, Angola.

Description. Snout acuminate, slightly convex; ear-opening moderate, subcircular or vertically or horizontally oval; granules on snout flattened, smooth, much larger than those on occiput, which are intermixed with a few enlarged tubercles; mental as broad as, or slightly narrower than, adjacent labials; gulars minute, granular juxtaposed.

Back, except for a narrow vertebral strip where the scales are small, almost entirely covered with large, strongly keeled, juxtaposed or imbricate scales (tubercles) among which occasional smaller ones may be scattered; flanks with smaller keeled scales; ventral scales smaller than dorsal, those in middle subequal to those towards sides, imbricate; limbs short, the adpressed hind limb reaching the wrist; digits long, slender, scarcely more strongly dilated at apex than at base, inferiorly with subdigital scansors, 3–4 under the first toe, 5

under the fourth, followed by transversely enlarged lamellae, 5 under the first, 8–10 under the fourth; tail subcylindrical, tapering, covered above with small, smooth or obtusely keeled scales and rows of large, keeled, tubercle-like scales, below with irregular, smooth, imbricate scales of which the median series is distinctly enlarged; on either side of base of tail in both sexes is a row of 3 white, flattened, pointed tubercles, with a smaller one below; tail at least as long as head and body.

Color. Above, grayish to reddish brown; a dark brown streak from nostril passes through eye to above ear-opening; crown of head almost uniformly pale; limbs more or less uniform; back with scattered white spots (which in one paratype tend to form narrow transverse lines); tail uniformly pale gray. Below, whitish, uniform.

Size. Total length of type ♂ (A.M.N.H. 47874), 68^{+} ($35 + 33^{+}$) mm., head and body length of paratype gravid ♀ (A.M.N.H. 47872), 42 mm., tail missing.

Remarks. Nostril surrounded by 3 nasals only. Apparently the only character distinguishing it from *P. s. scutatus* Hewitt, of Damaraland (in which the nostril is surrounded by rostral, first labial, and 3 nasals), and *P. s. robertsi* FitzSimons, of Great Namaqualand (in which the nostril is surrounded by first labial and 3 nasals). This character, unstable in many members of the genus, does separate the three known Angolan geckos from their more southerly allies and supplies tentative justification of a northern race.

Localities. **Angola:** Hanha; Lobito Bay.

Range. Benguela Province, Angola.

Pachydactylus scutatus robertsi FitzSimons

1938. *Pachydactylus robertsi* FitzSimons, Ann. Transvaal Mus., **19**, p. 177: Kraikluft Farm, Great Karas Mountains, South West Africa.

Description. Snout acuminate; ear-opening horizontally oval; granules on snout larger than those on occiput, which are intermixed with a few subconical, smooth tubercles; mental much narrower than adjacent labials; gulars minute.

Back, except for a narrow vertebral strip where scales are granular, almost entirely covered with large keeled, juxtaposed scales (tubercles) among which occasional small granules may be scattered, only one at most separating two of the larger scales; flanks with smaller keeled scales; ventral scales imbricate; tubercles on hind limbs large, conical, keeled, but not juxtaposed; limbs moderately long; digits moderately

long, slightly more dilated at apex than at base; tail subcylindrical, verticillate, covered above with small, smooth, subimbricate scales and rows of large, keeled, tubercle-like scales, below with larger imbricate scales of which the median series is enlarged; tail longer than head and body.

For characters common to all species, see *Remarks* on p. 338; for scale counts, etc., see statistical table opposite p. 344.

Color. Above, pale olive brown; a dark streak, in canthal region bordered above by a pale one, from nostril passes through eye to form a crescentic marking on occiput; from angle of jaw, bordered below and behind by a pale olive yellow band which in turn is edged behind by a discontinuous dark streak arising on last lower labial, a dark streak passes through ear; labials wholly or partially suffused with dark brown; back with a vertebral series of eight small dark spots between nape and lumbar region which is flanked by a few small scattered specks; tail light grayish brown. Below, white, tending to grayish on chin, throat, and sides.

Size. Total length of type ♂ (T.M. 17854), 90 (42 + 48) mm.

Remarks. Known to me only from the description, which should be consulted for further details, of the solitary example collected by FitzSimons on August 12, 1937.

Habitat. Taken in a rock fissure at foot of the mountain.

Locality. Known only from the type.

Range. Great Namaqualand, South West Africa.

Pachydactylus scutatus scutatus Hewitt

1927a. *Pachydactylus scutatus* Hewitt, Rec. Albany Mus., **3**, p. 395, pl. xxii, fig. 2: Kowaris, Kaokoveld, South West Africa.
1936. Lawrence, p. 38.
1938. FitzSimons, p. 178.

Description. Snout acuminate; ear-opening obliquely oval; granules on snout flattened, much larger than those on occiput, which are intermixed with subconical, keeled tubercles; mental narrower than adjacent labials; gulars minute, granular.

Back, except for a narrow vertebral strip in lumbar region where the scales are small, exclusively covered with large, strongly keeled, juxtaposed or subimbricate scales (tubercles); flanks with smaller keeled scales; ventral scales smaller than dorsals, imbricate; tubercles on hind limbs large, keeled; tail subcylindrical, only verticillate above, tapering, covered above with small, smooth scales and rows

of large, keeled, tubercle-like scales, below with irregular, subimbricate scales; tail slightly longer than head and body.

For characters common to all species, see *Remarks* on p. 338; for scale counts, etc., see statistical table opposite p. 344.

Color. Above, pale grayish brown; a pale band across snout assists in isolating a dark triangular area anteriorly; a dark streak, pale-edged above as far as ear, from nostril passes through eye to form a crescentic marking on occiput and, from the eye, is bordered below by a white stripe which again is more or less distinctly bordered below by black; back with a few, scattered, small, dark brown spots. Below, white to gray.

Juveniles are light olive above with conspicuous head markings; tail olive yellow.

Size. Length from snout to vent of type (Albany Mus.), 42 mm., tail missing, but total length of another (T.M. 17302), 74 (36 + 38) mm.

Breeding. June 17–19, at Kamanyab, two pairs of eggs, measuring from 7 to 7.4 x 5.4 to 5.6 mm., were found adhering together, being taken with a gecko from beneath a rock flake (FitzSimons).

Remarks. Known to me only from the literature. In view of the variability displayed by the three *s. angolensis* whose dorsum may be exclusively covered by large keeled scales, or with a few small scattered scales or granules intermixed, I do not think it would be advisable to attach importance to the fact that there were none in *s. scutatus* and a very few in *s. robertsi.*

Habitat. Beneath rock flakes in rocky localities.

Localities. **South West Africa:** Huab Farm; Kamanyab; Kowares; Paderburn Farm.

Range. Damaraland, South West Africa.

Pachydactylus bicolor Hewitt

1926b. *Pachydactylus punctatus bicolor* Hewitt, Ann. S. African Mus., **20**, p. 477, pl. xliv, fig. 4: Kaross, Kaokoveld, South West Africa.

1936. Lawrence, p. 38.

1938. *Pachydactylus bicolor* FitzSimons, p. 167.

Description. Snout acuminate, depressed; ear-opening small, obliquely oval; granules on snout flattened, smooth, much larger than those on occiput, which are homogeneous; cheeks not swollen; mental as broad as adjacent labials; gulars minute, granular and juxtaposed or flat and imbricate.

Body and flanks covered with small, subequal, flat, smooth, juxtaposed granules; ventral scales subequal to, or larger than, dorsals, those in middle subequal to those towards sides, imbricate; limbs moderate, moderately slender, the adpressed hind limb reaching the elbow; digits moderately long and slender, slightly more dilated at apex than at base; tail depressed, indistinctly verticillate, tapering, covered above with small, smooth, subimbricate scales, below with larger, irregular, smooth, imbricate scales, of which the median series is not or but occasionally enlarged; tail much longer than head and body.

For characters common to all species, see *Remarks* on p. 338; for scale counts, etc., see statistical table opposite p. 344.

Color. Above, pale slate to fawn, or grayish olive to grayish brown; crown of head usually tinged with yellow and variegated with brown; a dark streak from nostril passes through eye to form a crescentic marking on occiput; labials suffused with brown; limbs spotted with white; back with irregular dark chocolate brown blotches and crossbars and small scattered white or yellow spots; tail grayish brown with scattered white scales. Below, whitish, chin and throat often tinged with pink, tail dusky.

For numerous variations, see FitzSimons (1938).

Size. Total length of ♂ (T.M. 17263), 93 (40 + 53) mm., surpassed in length from snout to vent by a ♀ (T.M. —) of 43 mm., which, like the cotype (S.A.M. 17297) of 25 mm., has an imperfect tail.

Remarks. Based on two juveniles which Hewitt failed to compare with *punctatus* but differentiated it from *serval* Werner and "*pardus* Sternfeld" on characters of little consequence.

Breeding. Eggs, taken in June or July, measured 9.2 x 6 mm. (FitzSimons).

Temperament. Somewhat sluggish and easy to capture, 22 being taken. Never seen abroad during the day so presumably nocturnal (FitzSimons).

Habitat. The young cotypes were found by Lawrence among decaying leaves or under logs (Hewitt). Beneath flakes or in rock fissures (FitzSimons).

Localities. **South West Africa:** Caimaeis (seen by Lawrence); Huab Farm; *Kamanyab; Kaross in Kaokoveld; near Karub; Paderburn Farm; Rossing, *Namib Desert; Warmbad (seen by Lawrence).

Range. South West Africa.

Pachydactylus purcelli Boulenger

1910b. *Pachydactylus purcelli* Boulenger, Ann. S. African Mus., **5**, pp. 463, 494: Touw's River and Little Namaqualand, Cape Province.
1911b. Hewitt, p. 45.
1914b. Methuen & Hewitt, p. 131, fig. 15.
1935a. FitzSimons (part), p. 529.
1936. Lawrence, p. 38.
1936c. Parker, p. 130.
1938. FitzSimons, p. 176.
1911b. *Pachydactylus pardus* Sternfeld, Mitt. Zool. Mus. Berlin, **5**, p. 398: Warmbad, South West Africa.

Description. Snout acuminate, depressed; ear-opening small, subcircular or obliquely oval; granules on snout flattened, smooth, much larger than those on occiput, which are homogeneous; cheeks not swollen; mental as broad as, or narrower or broader than, adjacent labials; gulars minute granular, juxtaposed.

Body and flanks covered with small, subequal, flattened, smooth, juxtaposed granules; ventral scales larger than dorsals, those in middle subequal to those towards sides, subimbricate or imbricate; limbs moderate, moderately slender, the adpressed hind limb reaching the elbow; digits moderately long and slender, slightly more dilated at apex than at base; tail depressed, verticillate, tapering, covered above with small, smooth, imbricate scales and rows of flat, rounded, tubercle-like scales, below with larger, irregular, smooth, imbricate scales, of which the median series are not or but occasionally enlarged; tail equal to, or longer than, head and body.

For characters common to all species, see *Remarks* on p. 338; for scale counts, etc., see statistical table opposite p. 344.

Color. Above gray or olive to olive gray or pale brown; crown of head variegated with darker; sides of head and neck tinged with yellow; a dark streak from nostril passes through eye to above ear (to form an incomplete crescentic marking on occiput in young); back with reddish brown vermicular spots or darker markings which may form more or less longitudinal lines or crossbars; tail with scattered white scales. Below, whitish, uniform or tail dusky.

For numerous variations see Methuen & Hewitt (1914b). Coloring is subject to variation according to habitat. The young have three pairs of crossbars and resemble the young of "*P. m. onscepensis*" (FitzSimons) i.e. *serval*.

Size. Total length of cotype (S. Afr. Mus.), 85 (40 + 45) mm., surpassed by one (T.M. 15821) of 93 (43 + 50) mm.

Remarks. Methuen & Hewitt (1914b), after comparing the cotypes of *purcelli* with Karas Mountain material, concluded that *pardus* was specifically identical, though minor differences were noted. The snout of South West geckos was not so depressed, granules on snout thought to be a trifle smaller, the eye a trifle larger, and the head slightly narrower posteriorly.

FitzSimons (1938) after collecting almost (15 miles south) topotypical material of *pardus*, presuming that Sternfeld's "Warmbad" is that in Great Namaqualand and not the one in Damaraland, found *purcelli's* range of variation to include all the characters — length of snout, shape of ear-opening, color — by which Sternfeld sought to separate *pardus*.

Habitat. Whether Methuen & Hewitt's (1914b) gecko (No. 3099), taken on sandy soil at Narudas Sud, is referable to *purcelli* can be decided only by reëxamination in the light of modern knowledge. FitzSimons (1938) found the species inhabiting rock crevices.

Localities. **Bechuanaland Protectorate** (?, record requires checking). **Cape Province:** *Beaufort West—south of: Kenhardt; Pofadder; Touwsriver; *Van Wyksvlei and 15 miles west. **South West Africa:** Alt Wasserfall to Kraikluft; Kraikluft Farm; Maltahohe; Narudas Süd Farm (?); Warmbad and 15 miles south; Wasserfall.

Range. Bechuanaland (?) and Cape Province to South West Africa.

Pachydactylus kobosensis FitzSimons

1938. *Pachydactylus kobosensis* FitzSimons, Ann. Transvaal Mus., **19**, p. 170: Kobos Farm, 40 miles south of Rehoboth, Great Namaqualand, South West Africa.

Description. Snout acuminate, depressed; ear-opening small, subcircular; granules on snout flattened, smooth, much larger than those on occiput, which are homogeneous; cheeks not swollen, mental slightly narrower than adjacent labials; gulars minute, granular, juxtaposed.

Body and flanks covered with rather unequal, flat, smooth, juxtaposed granules, the larger more conical, rarely feebly keeled, tending to aggregate postero-laterally; ventral scales larger than dorsals, those in middle subequal to those towards sides, imbricate; limbs moderate, moderately slender, the adpressed hind limb reaching the elbow; digits moderately long and slender, slightly more dilated at

apex than at base; tail depressed, strongly verticillate, tapering, covered above with unequal, smooth, imbricate scales, below with larger, irregular, smooth, imbricate scales of which the median series is not enlarged; tail longer than head and body.

For characters common to all species, see *Remarks* on p. 338; for scale counts, etc., see statistical table opposite p. 344.

Color. Above, gray or pale olive to olive brown; crown of head more or less uniform; eyelid yellow; eye brown flecked with gold, pupil slit edged with yellow; labials stippled with reddish brown; sometimes a pale brown streak from nostril to eye; limbs more or less uniform; back with irregular reddish brown or dark sienna blotches which tend to form crossbars; tail more or less distinctly banded, the enlarged scales yellow. Below, whitish, or creamy yellow, uniform or lightly stippled with brown except in centre of throat.

Young. Above, grayish olive; a reddish brown crescentic marking on nape, a second across middle of back, a third across rump, beneath each pair of bars the enclosed area is a very pale pinkish brown; tail olive yellow with brown crossbars. Below, white.

Size. Total length of type ♂ (T.M. 17574), 107.5 (50.5 + 57) mm., and paratype ♀ (M.C.Z. 46804), 98^{+} (50 + 48^{+}) mm., tail regenerated.

Remarks. Based on nine specimens which FitzSimons considers most nearly related to *capensis* and allied forms.

Habitat. Under flakes or in fissures of rocky, boulder-strewn kopjes.

Localities. Known only from the type *locality.

Range. Great Namaqualand, South West Africa.

Pachydactylus maculatus Gray

1845. *Pachydactylus maculatus* Gray, Cat. Lizards Brit. Mus., p. 167: South Africa.
1849. Smith, A., p. 4.
1885d. Boulenger, p. 206, pl. xvi, fig. 4.
1887a. Boulenger, p. 490.
1887. Strauch, p. 19.
1889. Boettger, p. 291.
1893a. Boettger, p. 37.
1898. Sclater, p. 102.
1898. Werner, 1896–7, p. 140.
1908b. Boulenger, p. 223.
1908. Odhner, p. 3.
1910b. Boulenger, p. 462.

1910c. Hewitt, pp. 80, 84, 87.
1911b. Hewitt, p. 45.
1925. Essex, p. 336.
1926c. Hewitt, p. 446.
1928a. Essex, 1927, p. 929.
1932. Hewitt, p. 122.
1934. Pitman, p. 303.
1937e. Hewitt, pp. 18, 68, pls. vi and xxii.
1927a. *Pachydactylus capensis oculatus* Hewitt, Rec. Albany Mus., **3**, p. 394, pl. xxiii, fig. 1: Cyrilhurst Farm, 6 miles from Tarkastad, Cape Province.
1937e. Hewitt, p. 20, pl. vii.
1932. *Pachydactylus maculatus albomarginatus* Hewitt, Ann. Natal Mus., **7**, p. 121, pl. vi, figs. 6–7: Norvalspont, Cape Province.
1935. *Pachydactylus maculatus microlepis* Hewitt, Rec. Albany Mus., **4**, p. 312: Coetzeesberg, near Pearston, Cape Province.
1936. *Pachydactylus maculatus maculatus* Lawrence, p. 38.
1932b. *Pachydactylus maculosa* Brock (*lapsus*), p. 509, figs. 1, 4, 5, 7, 11, 16.

Names. Large-spotted Gecko (Hewitt); *geitjie* (Afrikaans, but not specific).

Description. Snout obtuse, slightly convex; ear-opening small, subcircular or obliquely oval; granules on snout conical, smooth, subequal to or slightly larger than those on occiput, which are intermixed with a few enlarged ones; cheeks slightly swollen; mental broader than adjacent labials; gulars minute, granular, juxtaposed.

Body and flanks covered with small, unequal, conical, smooth, juxtaposed granules intermixed with sparsely or densely scattered ones which might be termed tubercles, those on flanks more sparsely scattered; ventrals subgranular, subequal to, or smaller or larger than dorsals, those in middle subequal to those towards sides, subimbricate; limbs moderate, the adpressed hind limb reaching the elbow; digits moderately short and stout, scarcely more dilated at apex than at base; tail cylindrical, indistinctly swollen, verticillate, abruptly tapering, covered above and below with unequal, smooth, pointed, imbricate scales; tail shorter than head and body.

For characters common to all species, see *Remarks* on p. 338; for scale counts, etc., see statistical table opposite p. 344.

Color. Above, gray, olive, or brownish, sometimes tinged with purplish; crown of head variegated with darker; a broad, dark brown streak from second labial passes through eye to form an incomplete crescentic marking on occiput; limbs indistinctly mottled; back and flanks with four longitudinal series of white-edged, dark brown spots, those of both inner and outer series occasionally longitudinally con-

fluent; original tail with paired spots like back, reproduced tail spotted and reticulated with dark brown. Below, whitish; throat and flanks sometimes flecked with brown; tail — both original and reproduced, handsomely vermiculated, barred, or spotted with brown or black.

For variations see Hewitt's descriptions of subspecies.

Size. Length from snout to vent of *oculatus, albomarginatus,* and *microlepis* types, 37.5, 40, and 33 mm. respectively; surpassed by a ♂ (M.C.Z. 41848) and ♀ (M.C.Z. 21405) from Fort Brown and Grahamstown respectively, both of 45 mm., their tails reproduced.

Remarks. Hewitt (1910c, p. 84) remarks that there is considerable variation in the degree of enlargement of the larger "tubercles," which may be subconical to conical and even more numerous than the smaller granules. The two dozen examples from Cape Province and Zululand show so much variation, even those from one locality, that recognition of the three variants described by Hewitt appears unjustified, though known to me from the descriptions only.

P. c. oculatus was based on a male and juvenile collected by Essex in August, 1925. Said to exhibit characters more or less intermediate between *capensis* and *maculatus,* so that they "might reasonably be referred to either species." Differs from *capensis* in its color pattern which is that of *maculatus,* a species which Hewitt (1932) later records as occurring at Tarkastad, i.e. six miles from the type locality of *oculatus,* as *capensis* also occurs in the Tarkastad District Hewitt suggests that *oculatus* may be a hybrid.

It allegedly differs from *maculatus* in having the nasorostrals separated by a single granule (instead of several), in less minute granulation throughout, greater differentiation between dorsal granules and "tubercles," and larger and more conspicuously ocellate dorsal blotches. Hewitt adds that *maculatus* is admittedly inconstant as regards dorsal scaling, the granules being more or less equal in a Tarkastad gecko, or the enlarged "scales" may be very conspicuous, conical, and sharply pointed as in a male from Port Alfred, those on tibia and sides of tail at base very large and sharply pointed. Nor are the blotches constant, being small or large and with or without white borders.

P. c. oculatus is said to differ from *capensis* in the more granular head granules ("scales"), and the minutely granular nature of the gular granules adjacent to mental and lower labials, which in *capensis,* though sometimes granular, are often small and flat.

P. m. microlepis allegedly differs from *maculatus* in the dorsal granules being almost uniform and the dorsum almost immaculate. Of the first character Hewitt states that in true *maculatus* of the coastal and adjacent districts the dorsal tubercles are well developed, but more or less poorly developed in the drier inland Karroo areas; examples "with nearly obsolete dorsal tubercles" in the Albany Museum being from Graaf Reinet; Schurfteberg near Somerset East; and Tarkastad.

The characters on which *P. m. albomarginatus* was separated appear to be too trivial to merit detailed discussion.

I might add that in a Grahamstown series of 18 geckos lying before me, 2 (M.C.Z. 21264, 21509) have the nasorostrals separated by a single granule, in 5 they are separated by 2 granules, in 9 by 3 granules, and in 1 by 4 granules, similar variation occurs elsewhere; the dorsal granulation varies from fine to coarse and from subuniform (M.C.Z. 21507–8), to strongly differentiated (M.C.Z. 14229–30); both in size and distinctness of dorsal blotches there is great variation ranging from indistinct (M.C.Z 14230, 21263) to sharply contrasted (M.C.Z. 21501, 21507), but in none are the blotches conspicuously white-edged as described for *maculatus* by Gray, and for *albomarginatus* by Hewitt.

Anatomy. The skull development has been studied by Brock (1932b).

Breeding. Eggs measure 9 x 8 mm. (Hewitt) and are usually laid in pairs, though a cluster of as many as thirteen have been found. These hatched three weeks after being collected. Emergent young are blackish and average 20 mm. in length, their tails being slender (Essex).

Diet. Grasshoppers (Tasman in Hewitt). Hewitt suggests that the swollen tail may serve as a food reservoir during the winter months.

Parasites. Mites (*Geckobia hewitti*) found on both typical *maculatus* and *albomarginatus*.

Enemies. Recovered from a young shaapsteker (*Trimerorhinus* sp.) by Tasman (Hewitt).

Defence. Often squeaks and apt to discard its tail when caught (Essex).

Temperament. A timid and rather friendly species which does well in captivity if provided with small insects (Essex).

Habitat. Individuals frequently seen leaving decayed wood when the latter is being used for fuel (A. Smith). Usually found beneath stones, often in association with *Cordylus c. cordylus* and scorpions

(Essex). Occasionally found in old shells at the coast. Reaches an altitude of 5300 feet at Abbotsbury (Hewitt).

Localities. (**Southern Rhodesia:** Bulawayo (Pillans coll., *fide* Boulenger, 1910a; almost certainly an introduction or an error)). **Zululand:** Entondweni (Entendweni); Lake Sibayi; Umfolosi Rivers Junction. **Natal:** Helpmekkar; Thornybush; Weenen. **Cape Province:** Abbotsbury Farm near Lettskraal; Albany District; Alice; Alicedale; Amatola Mountains; Beaufort West; Braam Nek; Brakkloof; Cape Peninsula; Carlisle Bridge; Coetzeesberg near Pearston (type of *microlepis*); Cofimvaba; Cyrilhurst Farm, Tarkastad (type of *oculatus*); Debe Nek; Dunbrody; East London; Fort Beaufort; *Fort Brown; Gleniffer near Kei Road; Graaf Reinet; *Grahamstown; Hanover; Healdtown; Hermanus; Indwe; Jansenville; Jeffreys Bay; Karroo; Kentani, Transkei; Kingwilliamstown; Klerksdale near Middleberg; Kowie River; Line Drift, Peddie District; Little Namaqualand (! *fide* Boulenger, 1910a); Middle Drift; Mqanduli; Norvalspont (type of *albomarginatus*); Peddie; Pondoland; *Port Alfred; Port Elizabeth; Port St. John; Queenstown; Redhouse; Robertson; Schurfteberg, Somerset East District; Somerville near Tsolo; St. Croix Island; St. Mathews; Tarkastad; Teafontein; Walmer; Witteklip; Worcester.

Range. Zululand and Natal west through Cape Province.

Folklore. Commonly considered poisonous in South Africa (Essex).

Pachydactylus monticolus FitzSimons

1943. *Pachydactylus monticolus* FitzSimons, Transvaal Mus. Mem., **1**, p. 79: Assegaibos at source of Berg River, Lamotte Forest Station, Fransch Hoek Mountains, Cape Province.

Description. Snout more pointed and slightly longer than in *geitje*; granules on snout convex, larger than those on occiput, which are intermixed with rounded conical tubercles; cheeks slightly swollen[1]; mental as broad as adjacent labials; gulars minute, granular, juxtaposed.

Body and flanks covered with small granules, those on back subequal to those on snout, smaller than those on flanks, intermixed with enlarged rounded, conical tubercles which in general are more closely aggregated and conspicuous dorso-laterally though extending on to nape; ventral scales imbricate; scales on upper arm flat and imbricate,

[1] From information kindly supplied me by Dr. FitzSimons, as also some of the statistical data opposite p. 344.

on forearm granular; hind limb covered above with granules intermixed with tubercles as on back; digits slightly dilated at apex; tail cylindrical.

Color. Above grayish brown; a dark brown streak from nostril passes through eye to crown of head with a narrow, curved, downward-directed process reaching to the upper anterior border of the ear-opening so as to enclose a pale spot above latter; upper surfaces with scattered, white; black-edged, ocelli. Below, white, chin and throat vermiculate with dark brown; sides of belly and beneath limbs and tail speckled with dark brown.

Size. Total length of type ♂ (T.M. 1969S), 66+ (36 + 30+) mm., tail tip regenerated.

Remarks. Known to me only from the original description which was based on a type and three paratypes. These are compared by FitzSimons to *geitje* from which their heterogeneous scaling readily distinguishes them and would seem to indicate relationship with *maculatus*. In view of the variability of the corresponding temporal markings in any large series of *maculatus* it would appear inadvisable to attach undue importance to the markings described above.

Habitat. Dwells beneath stones and in rocky clefts of the mountain sides.

Localities. Known only from the type locality.

Range. Cape Province.

Pachydactylus rugosus rugosus Smith

1849. *Pachydactylus rugosus* A. Smith, Illus. Zool. S. Africa, Rept., pl. lxxv, fig. 2: Interior of South Africa.
1885d. Boulenger, p. 204.
1898. Sclater, p. 102.
1910b. Boulenger, p. 462.
1910c. Hewitt, pp. 80, 84, 87.
1910a. Werner, p. 312, fig. 9.
1911b. Hewitt, p. 45.
1911. Lampe (part), p. 157 (omit Kuibis).
1911b. Sternfeld, p. 397.
1911d. Sternfeld, p. 15, fig. 11.
1913. Hewitt & Power, p. 150.
1914a. Nieden (part), p. 450 (omit Kuibis).
1934. Brongersma, p. 165.
1936. Lawrence, p. 38.
1936c. Parker, p. 130.
1937a. FitzSimons, p. 265.

Further citations of "*rugosus*" will be found under *r. frater* and *c. barnardi*.

Description. Snout obtuse, slightly convex; ear-opening small, obliquely oval; granules on snout conical, smooth, much larger than those on occiput, which are intermixed with large, round, conical, stellate tubercles; cheeks not swollen; mental as broad as adjacent labials; gulars small, conical, juxtaposed.

Body and flanks covered with small, unequal, slightly stellate, juxtaposed granules, intermixed with more or less regular longitudinal rows of large, oval, conical, strongly keeled, spinose tubercles, those on flanks more congested; ventrals granular, subconical, subequal to dorsals, those in middle subequal to those towards sides, subimbricate; limbs moderate, the adpressed hind limb reaches the elbow; digits moderately short and stout, scarcely more dilated at apex than at base; tail cylindrical, swollen, verticillate, abruptly tapering, covered above with small, ? smooth or keeled, juxtaposed granules and rows of flat, conical, stellate, anteriorly keeled, spinose tubercles, below with small, conical, smooth granules; tail probably shorter than head and body.

For characters common to all species, see *Remarks* on p. 338; for scale counts, etc., see statistical table opposite p. 344.

Color. Above, pinkish, pale gray or gray brown; crown of head variegated with darker brown; a dark brown streak from second labial passes through eye to form a crescentic marking on occiput; limbs mottled with brown; back with irregular dark brown crossbars, broader than the interspaces between them or breaking up to form longitudinal spots. Below, whitish, tail dark gray flecked with brown.

Size. Total length of type (Brit. Mus.), 84 (56 + 28) mm., surpassed by one of 87 (48 + 39) mm., from Kamaggas, mentioned by Werner (1910a).

Remarks. FitzSimons (1937a) states that the specimen in the British Museum regarded as the type, agrees well with Smith's figure but is 13 mm. shorter in head and body than the measurement (2½ inches) furnished by Smith.

Parker (1936c) compared this type with a Naukluft gecko and found the gulars conical and ventrals pyramidal in both, though in mental shield and color pattern the Naukluft lizard agreed with *P. r. frater* Hewitt. Hewitt (1935) states that the preanal scales of females are not flattened.

Lampe's (1911) and Nieden's (1914a) Kuibis records are removed to *P. r. frater* as both specimens were collected by Dr. P. Range, and Nieden's is now M.C.Z. 21021 and referable to this perfectly distinct race. Whether the Rietmond and Rehoboth records of these authors should also be transferred I have no means of knowing, but it seems questionable as the former locality is not far distant from Naukluft.

Localities. **Cape Province:** Kakamas; Kamaggas; Kyky on Nosop River; *Little Namaqualand; Onseepkans (Onsecp) near Pella; Rietfontein, Gordonia. **South West Africa:** Churutabis; Karas Mountains; Kubub; Naukluft Mountains; Rehoboth; Rietmond; Walvis Bay.

Range. Western Cape Province north to South West Africa.

Pachydactylus rugosus frater Hewitt[1]

1911. *Pachydactylus rugosus* Lampe (part, not A. Smith), p. 157 (Kuibis).
1914a. Nieden (part, not A. Smith), p. 450 (Kuibis).
1935. *Pachydactylus rugosus frater* Hewitt, Rec. Albany Mus., **4**, p. 316: Heichamchab, South West Africa.
1937b. Mertens, p. 6.

Description. Snout obtuse, slightly convex, ear-opening small, obliquely oval; granules on snout conical, smooth or stellate, much larger than those on occiput, which are intermixed with large, round, conical, stellate tubercles; cheeks not swollen; mental broader than adjacent labials; gulars small, conical, juxtaposed.

Body and flanks covered with small, subequal, strongly stellate, juxtaposed granules, intermixed with more or less irregular longitudinal rows of large, conical, stellate, keeled, spinose tubercles, those on flanks more congested; ventrals granular, subconical, subequal to dorsals, those in middle subequal to those towards sides, subimbricate; limbs moderate, the adpressed hind limb reaching the elbow; digits moderately short and stout, scarcely more dilated at apex than at base; tail cylindrical, swollen, strongly verticillate, abruptly tapering, covered above with small, smooth or keeled, conical, juxtaposed granules, and rows of conical, stellate, anteriorly keeled, spinose tubercles, below with small, conical, smooth or rugose, occasionally spinose granules; tail shorter than head and body.

For characters common to all species, see *Remarks* on p. 338; for scale counts, etc., see statistical table opposite p. 344.

[1] FitzSimons (1943, pp. 91–92) synonymizes this race with *rugosus*, stating that the spasmodic occurrence of *frater* is without geographic significance.

Color. Above, pale cream; crown of head faintly variegated with darker; a dark brown streak from second labial passes through eye to form a crescentic marking on occiput; limbs uniform; back and tail with irregular dark brown crossbars broader than the interspaces between them, or breaking up in scapula region to form a longitudinal spot. Below, creamy white, faintly flecked with brown; tail more or less banded with dusky.

The pattern variation described by Hewitt appears to lack subspecific significance.

Size. Length from snout to vent of type ♂ (Albany Mus.), 56 mm., tail reproduced; total length of a ♀ (M.C.Z. 21021), 80 (47 + 33) mm.

Remarks. There is no difference in shape of mental as between the Museum of Comparative Zoölogy *r. rugosus* from Little Namaqualand and *r. frater* from Kuibis, both being squarish and scarcely narrowed.

Habits. When running fast this gecko curls up its tail so as to give itself the appearance of a scorpion, according to the collector, C. Mertens (R. Mertens, 1937b). A similar habit has been recorded for *Palmatogecko rangei*, a species not taken by Mertens.

Localities. **South West Africa:** Haigamchab (Heichamchab); *Kuibis; Windhoek.

Range. South West Africa.

Pachydactylus capensis barnardi FitzSimons

1910a. *Pachydactylus formosus* Werner (part, not A. Smith), p. 310 (Kamaggas only).
1910b. Boulenger (part), p. 461 (L. Namaqualand records).
1911d. Sternfeld (part), p. 15 (Kamaggas only).
1938. *Pachydactylus rugosus* FitzSimons (not A. Smith), p. 178.
1941. *Pachydactylus capensis barnardi* FitzSimons, Ann. Transvaal Mus., **20**, p. 273: Garies, Little Namaqualand, Cape Province.

Description. Snout obtuse, slightly convex; ear-opening small, obliquely oval; granules on snout subconical, keeled, much larger than those on occiput, which are intermixed with large, conical, stellate tubercles; cheeks not swollen; mental as broad as, or slightly narrower or broader than, adjacent labials; gulars small, granular, juxtaposed.

Body and flanks covered with small, unequal, smooth, juxtaposed granules, intermixed with closely set (mostly separated by a single granule), more or less regular longitudinal rows of large, oval, strongly keeled tubercles, those on flanks more congested; ventral scales

larger than dorsals, those in middle subequal to those towards sides, imbricate; limbs short, moderately stout, the adpressed hind limb reaching the wrist; digits moderately long and slender, scarcely more dilated at apex than at base; tail subcylindrical, verticillate, tapering, covered above with unequal, smooth or keeled, pointed, imbricate scales and rows of large, flat or subconical, keeled, pointed tubercles, below with unequal, smooth, spinose, imbricate scales; tail equal to, or shorter than, head and body.

For characters common to all species, see *Remarks* on p. 338; for scale counts, etc., see statistical table opposite p. 344.

Color. Above, dark brown to blackish; head marked with white, viz. a short streak from rostral to upper anterior corner of eye uniting with a transverse streak just anterior to orbits, thus isolating a small triangular dark spot on middle of snout; a well-defined, strongly dentated white streak, dark-edged below, arises on posterior labials, and passes through ear-opening to form a crescentic marking on occiput; on back of head a medio-posterior spot flanked by two others on either side; back with four irregular white crossbars, much narrower than the dark interspaces which are usually divided into more or less symmetrical, elongate, oval spots or blotches by fine longitudinal projections from the pale crossbars; tail with white crossbars. Below, creamy to grayish white, chin and throat with dark vermicular spots; chest and belly speckled with dark brown, sometimes also spotted preanally and on thighs.

Size. Total length of type ♂ (S.A.M. 18055), 91+ (53+38+) mm., tail reproduced, while a young one (M.C.Z. 21020) from Kamaggas (Schultz coll.) measures 54 (27 + 27) mm. (not 24 + 24 as stated by Werner (1910a).

Remarks. The young Kamaggas gecko (now M.C.Z. 21020) identified by Werner (1910a) as "*formosus*" is actually *P. c. barnardi*, described thirty years later by FitzSimons who considers that *barnardi* differs from *formosus* in its less depressed head and body, granules on snout more conical, tubercles on back of head larger and more numerous, tubercles on back higher and more closely set, tubercles on tail more elongate and pointed, and different color pattern. Our only specimen being so young I offer no opinion beyond agreeing as to their distinctness.

Localities. **Cape Province**—Little Namaqualand: Concordia; Garies; *Kamaggas; Kamieskroon; Kleinzee; 15 miles east of Port Nolloth.

Range. Little Namaqualand, Cape Province.

Pachydactylus capensis labialis FitzSimons

1907b. *Pachydactylus capensis* Roux (part), p. 408 (Steinkopf only).
1910a. Werner (part), p. 309 (Steinkopf only).
1911d. Sternfeld (part), p. 14 (Steinkopf only).
1910a. *Pachydactylus formosus* Werner (part, not A. Smith), p. 310 (No. 725 and Steinkopf only).
1911d. Sternfeld (part), p. 15 (Steinkopf only).
1938. *Pachydactylus capensis labialis* FitzSimons, Ann. Transvaal Mus., **19**, p. 168, fig. 7: Steinkopf, Little Namaqualand.

Description. Granules on snout subconical, slightly keeled, much larger than those on occiput, which are intermixed with round, conical, keeled tubercles; gulars minute, granular.

Back and flanks covered with small granules intermixed with more or less regular longitudinal rows of large, strongly keeled tubercles, those on flanks more congested; ventral scales subimbricate; limbs short, slender; digits moderately short and stout, scarcely more dilated at apex than at base; tail subcylindrical, covered above with unequal imbricate scales, and rows of keeled, pointed tubercles, below with somewhat pointed scales, of which the median series is not enlarged; tail probably longer than head and body.

For characters common to all species, see *Remarks* on p. 338; for scale counts, etc., see statistical table opposite p. 344.

Color. Above, gray to grayish brown; one dark streak from nostril to just above eye, another from second labial passes through eye to form an incomplete crescentic marking on occiput; labials largely infused with dark brown; back with dark markings arranged in transverse series or coalescing to form longitudinal stripes; tail with more or less distinct dark brown to blackish crossbars, but reproduced tails spotted. Below, creamy white to grayish, uniform.

Size. Total length of type (T.M. 18055), 82^{+} ($44+38^{+}$) mm., tail reproduced. Werner's (1910a) Steinkopf gecko, 75 ($35+40$) mm., if referable.

Remarks. Known to me only from the description, which was based on four specimens that are certainly separable from *c. capensis* by the single distal scale on digits as shown in FitzSimon's excellent figures. The other distinguishing characters appear to have less significance but the original description should be consulted for further details.

Habitat. Taken beneath loose stones strewing the slopes and bottom of a valley among the hills.

Locality. Known only from the *type.

Range. Little Namaqualand (at Steinkopf), Cape Province.

Pachydactylus capensis capensis (Smith)

1845. *Tarentola capensis* A. Smith, Illus. Zool. S. Africa, Rept., pl. 50, fig. 2: Interior of South Africa.
1849. *Pachydactylus capensis* A. Smith, Index to Illus. (*Tarentola* errata).
1885d. Boulenger, p. 202.
1887. Strauch, p. 19.
1889. Boettger, p. 287.
1896c. Bocage, p. 115.
1898. Sclater, p. 102.
1903e. Boulenger, p. 217.
1907b. Roux (part), p. 408 (omit Steinkopf).
1910b. Boulenger (part), p. 461 (omit P.E.A. and S.R. records).
1910a. Hewitt, p. 56.
1910c. Hewitt (part), pp. 80, 83, 87.
1910a. Werner (part), p. 309 (omit Steinkopf).
1911b. Hewitt (part), p. 44.
1911d. Sternfeld (part), p. 14 (omit Steinkopf and S.W.A. records).
1913. Hewitt & Power, p. 150.
1927c. Power, p. 406.
1928a. Essex, 1927, p. 930.
1931. Power, pp. 41, 48.
1933a. Power, p. 214.
1845. *Pachydactylus elegans* Gray, Cat. Lizards Brit. Mus., p. 168: South Africa (type lost).
1849. Smith, A., p. 5.
1882a. Müller, p. 163.
1887. *Pachydactylus formosus* Müller (not Smith), p. 290.
1907b. Roux (part), p. 410.
1910b. Boulenger (part), p. 461 (omit Transvaal and L. Namaqualand).
1910c. Hewitt (part), pp. 80, 84, 87.
1910a. Werner (part), p. 310 ("No locality" specimen ?).
1911d. Sternfeld (part), p. 15 (Mookane specimen only).
1910a. *Pachydactylus tessellatus* Werner, Denks. Med.-Nat. Ges. Jena, **16**, p. 311: "South West Africa specimens." None in present sense so restricted to Mookane, Kalahari, British Bechuanaland.
1911c. *Pachydactylus leopardinus* Sternfeld, Mitt. Zool. Mus. Berlin, **5**, p. 418: Bethany, Orange Free State and West Griqualand, Cape Province.
1926b. *Pachydactylus mentalis* Hewitt, Ann. S. African Mus., **20**, p. 475, pl. xliv, fig. 1: Longhope, Great Fish River, Cape Province.
1936. Lawrence, p. 38.
1935a. *Pachydactylus capensis capensis* FitzSimons, p. 528.
1935b. FitzSimons, p. 337.
1936. Lawrence, p. 38.
1937a. FitzSimons, p. 265.

1937e. Hewitt, p. 19.
1938. FitzSimons, p. 168, fig. 8.
1937e. *Pachydactylus capensis mentalis* Hewitt, p. 20, pl. viii.

Further citations of "*capensis*" will be found under *c. labialis*, *c. formosus*, *c. rhodesianus*, *w. acuminatus*, *w. werneri*, *fasciatus*, and *b. turneri*, while one of "*elegans*" is under *w. acuminatus*.

Description. Snout obtuse, slightly convex; ear-opening small, subcircular or vertically or obliquely oval; granules on snout subconical, smooth, much larger than those on occiput, which are intermixed with round, smooth or keeled tubercles; cheeks not swollen; mental as broad as, or narrower or broader than, adjacent labials; gulars usually minute or the row adjoining mental and adjacent labials more or less enlarged, the rest granular and juxtaposed or flat and subimbricate.

Body and flanks covered with small, unequal, smooth, juxtaposed granules, intermixed with more or less regular, longitudinal rows of large, oval or round, more (adult) or less (juvenile) strongly keeled tubercles, those on flanks more congested, frequently smoother and more conical; ventral scales larger than dorsals, those in middle subequal to those towards sides, imbricate; limbs short, moderately stout, the adpressed hind limb reaching the wrist; digits moderately long and slender, more strongly dilated at apex than at base; tail subcylindrical, verticillate, tapering, covered above with unequal, smooth or keeled, imbricate scales, and rows of flat, keeled, pointed tubercles, below with unequal, smooth, somewhat pointed, imbricate scales, of which the median series is slightly transversely enlarged; tail slightly longer or shorter than head and body.

For characters common to all species, see *Remarks* on p. 338; for scale counts, etc., see statistical table opposite p. 344.

Color. Above, pale cream, gray, or buff to pinkish brown; sometimes a dark brown streak from nostril passes through eye to form a crescentic marking on occiput; crown of head, back, and tail with irregular small brown spots which may coalesce to form crossbars, sometimes (more particularly in young) dotted with pure white, very rarely uniform. Below, white, uniform, or in young specimens a few indistinct annuli towards tip of tail.

Size. Total length of one (T.M. 16839), 119 (60 + 59) mm. from Van Zyl'srust, is surpassed in length from snout to vent by a Kuruman gecko of 64 mm. (FitzSimons, 1935b). Werner's (1910a) record of a ♂ measuring 50 + 67 mm. from Vlei Topan is probably a misprint for 37.

Remarks. FitzSimons (1937a) finds one of the nine cotypes in the British Museum agrees well with Smith's figure and dimensions. The type of *elegans* Gray, being lost, Boulenger (1885d) places it in the synonymy with a query.

Werner (1910a), in referring a number of geckos to "*formosus*", begins his discussion by saying that the differences displayed are too insignificant to warrant a new species, but ends by proposing *tessellatus* for South West African geckos if they are not. None of his material came from South West Africa in its accepted sense so I feel free to restrict the name *tessellatus* to the gecko from *Mookane*, Kalahari, so that a name is available should anyone wish to separate the geckos of southern Bechuanaland from *P. c. capensis* to which they are now referred.

This action is taken to avoid superseding two well-described races recently proposed by FitzSimons for Werner's other material came from (1). Kamaggas, Little Namaqualand (one of these Werner specimens is now M.C.Z. 21020 and is actually a *P. c. barnardi* FitzSimons, 1941). (2). Steinkopf, Little Namaqualand (type locality of *P. c. labialis* FitzSimons, 1938, to which race Werner's No. 725 appears referable). (3). A Schultz specimen without locality, described at considerable length as to the way in which it differs from a Transvaal *capensis* (in these differences it corresponds with a Kalahari gecko in the Museum of Comparative Zoölogy as contrasted with one of our Transvaal *P. c. capensis* and may be assumed to have come from Bechuanaland).

The cotypes of *leopardinus* Sternfeld, said to measure 42 + 45 and 45 + 42 mm. respectively, are thought by Hewitt & Power (1913) to be the young of *capensis*, an opinion with which I entirely agree. Though disagreeing with their suggestion that *affinis* is doubtfully distinct, a conclusion they based on the wide range of variability in dorsal lepidosis displayed by juvenile *capensis*. Had topotypic material of *affinis* been available to them they would have seen how very distinct it is, notwithstanding Roux's (1907) statement that Boulenger concurred in synonymizing *affinis* with *capensis*.

P. mentalis was separated by Hewitt (1926) on the basis of two immature geckos which had a "well-defined row of 5 or 6 chin shields, which, though not large, are well separated in size from the scales succeeding them." Scales of the row immediately bordering the labials in *capensis* are subject to erratic enlargement and sometimes form short rows. The color pattern of *mentalis* as seen in Hewitt's

figure, can be nearly matched by individuals in our series of *capensis*. Geographically there seems no reason to expect a race to be differentiated at Longhope.

Breeding. Eggs, measuring 11 x 8 mm., are usually found under stones, the longer axes often at right angles to each other (FitzSimons).

Parasites. Mites (*Geckobia transvaalensis*) found by Lawrence.

Temperament. Comparatively sluggish and easy to capture (FitzSimons).

Defence. Shedding their tails at the slightest provocation. In a series of 35 Bechuanaland geckos, regenerated tails were present in upwards of 80% of the adults (FitzSimons).

Habitat. Under a stone (Power, 1927c). In a small outcrop of surface limestone on the sandy bank of the Kuruman River. In the Kalahari sand veld found in rotting logs, beneath the loose bark of dead trees, on the ground among dead leaves beneath bushes, but apparently preferring rocky outcrops where these occur (FitzSimons, 1935b; 1938).

Localities. **Bechuanaland Protectorate:** Chukudu; Dikgatlon (Dakatlon); Damara Pan; Gemsbok Pan; Gomodimo Pan; Kalahari; *Kaotwe Pan; Kuke Pan; Kyky on Nosop River; Lobatsi; Mabeleapudi to Machumi Pan; Mookane; *Okwa River; Oup River; Sevrelela; Vlei Topan. **Transvaal:** Barberton; Botsabelo (Botschabelo); Irene; Johannesburg; Linokana; Middleburg; Pietersburg; *Pretoria District; *Vygeboompoort, Waterberg District. **Orange Free State:** *Avalon; Bethany; *Deelfontein; *Fauresmith; Kroonstad; Modder River; Orange River; Smithfield. **Basutoland. Cape Province:** Aliwal North; Beaufort West; Burghersdorp; Calvinia (? as *formosus*); Cape Town; Ceres; Clanwilliam; Deelfontein Farm, Bethulie District; Graaf Reinet; Hanover; Kalk Bay; Karreeboom; Karroo; Kimberly; Kraai Pan; Kuruman; Longhope, Great Fish River (type of *mentalis*); Mafeking; Matjesfontein; Middleburg; Modderfontein; Modder River; Orange River Station; Port Elizabeth; Richmond District; Tarkastad; Taungs; Van Zylsrust; Victoria West; West Griqualand.

Range. Bechuanaland and southern Transvaal south to Cape Province (unknown from eastern districts of Cape Province according to Hewitt (1926b, p. 475) so for Natal, Zululand, and Mozambique records see below).

Pachydactylus capensis subsp.

1907a. *Pachydactylus capensis* Roux (not A. Smith), p. 81.
1908b. Boulenger, p. 223.
1908. Odhner, p. 2.
1910b. Boulenger, p. 461.

Remarks. In view of Hewitt's statement that *capensis* does not extend to the eastern districts of Cape Province, it seems obvious that the above citations refer to some undescribed subspecies.

Localities. **Mozambique:** Delagoa Bay (Boulenger); Rikatla (Roux). **Zululand:** Entondweni (Entendweni, Odhner); Kosi Bay (Boulenger); Umfolozi Rivers Junction (Boulenger; Odhner). **Natal:** Bergville.

Pachydactylus capensis formosus Smith

1849. *Pachydactylus formosus* A. Smith, Illus. Zool. S. Africa, Rept., App. p. 4: "South Africa near Tropic of Capricorn" i.e. 20°S.
1885d. Boulenger, p. 203.
1898. Sclater, p. 102.
1910b. Boulenger (part), p. 461 (Transvaal only).
1911b. Hewitt (part), p. 44.
1934. Brongersma, p. 165.
1937a. FitzSimons, p. 265.
1936. Lawrence, p. 38.
1849. *Pachydactylus mento-marginatus* A. Smith, Illus. Zool. S. Africa, Rept., App. p. 5: Interior of South Africa.
1885d. Boulenger, p. 207, pl. xvi, fig. 5.
1898. Sclater, p. 102.
1910c. Hewitt, pp. 80, 84, 87.
1889. *Pachydactylus obscurus* Thominot, Bull. Soc. Philom. Paris (8), **1**, p. 2: No locality.
1911b. *Pachydactylus capensis* Hewitt (part), p. 44.

Further citations of "*formosus*" will be found under *c. barnardi*, *c. labialis*, *c. capensis*, *c. affinis*, *c. oshaughnessyi* and *weberi werneri*.

Description. Snout obtuse, slightly convex; ear-opening small, obliquely oval; granules on snout subconical, smooth, much larger than those on occiput, which are intermixed with numerous, round, smooth tubercles; cheeks not swollen; mental much narrower than adjacent labials; gulars minute, granular, juxtaposed.

Body and flanks covered with small, unequal, smooth, juxtaposed granules intermixed with more or less irregular, longitudinal rows of large, oval or round, stellate, more (adult) or less (juvenile) strongly

keeled tubercles, those on flanks more congested, smooth, conical; ventral scales larger than dorsals, those in middle subequal to those towards sides; limbs short, moderately stout, the adpressed hind limb reaching the wrist; digits moderately long and slender, more strongly dilated at apex than at base; tail subcylindrical, verticillate, tapering, covered above with homogeneous, keeled, imbricate scales and rows of keeled tubercles, below with smooth imbricate scales; tail longer than head and body.

For characters common to all species, see *Remarks* on p. 338; for scale counts, etc., see statistical table opposite p. 344.

Color. Above, pale creamy yellow or yellowish white to grayish variegated with brown; a dark brown streak from nostril passes through eye and widens above ear to form a crescentic marking on occiput; limbs indistinctly barred; back with irregular broad cross-bars separated by narrow white lines or series of dots. Below, whitish, uniform, or in young, yellowish, the labials margined with brown and the throat flecked with same.

Size. Total length of *formosus* type (Brit. Mus.), 92 (42 + 50) mm. and of a *mentomarginatus* cotype (Brit. Mus.), 29+ (29 + ?) mm.

Remarks. Both Boulenger (1910b) and FitzSimons (1937a) have compared the type of *formosus* with the two juvenile cotypes of *mentomarginatus* and consider them inseparable.

Boulenger (1910b) states that he has examined the type of *obscurus* and that it is synonymous with *formosus*, it is important that this should be checked as it may take precedence over some closely allied form described since 1910. Unfortunately the type was without locality.

One of Roux's (1907b) "*formosus*", now M.C.Z. 20977, is nothing but a *c. capensis*, and it should be borne in mind that many of Hewitt's early references to "*formosus*" really refer to *affinis* which he considered synonymous. In fact, as will be seen above, the majority of references to "*formosus*" really represent other races or species. Apparently true *P. c. formosus* is rather restricted in its range and scarce in collections, its distribution in relation to that of *P. c. capensis*, which also occurs in "Pretoria District", requires clarification.

Parasites. Mites (*Geckobia transvaalensis*) found by Lawrence.

Localities. **Transvaal**: Athol, Ermelo District (as stated by Hewitt to have narrow white bands); *Pretoria District.

Range. Southern Transvaal.

Pachydactylus capensis affinis Boulenger

1896g. *Pachydactylus affinis* Boulenger, Ann. Mag. Nat. Hist. (6), **17**, p. 21. Rustenburg District, Transvaal.
1898c. Boulenger, p. 914.
1898. Sclater, p. 103.
1910b. Boulenger (part), p. 461 (omit S. Rhodesia).
1910c. Hewitt (part), p. 87 (omit Krabbefontein, Zoutpansberg).
1934. Pitman, p. 303 (but does not occur).
1936. Lawrence, p. 38.
1907b. *Pachydactylus formosus* Roux (part, not A. Smith), p. 410.

Further citations of *"affinis"* will be found under *c. tigrinus* and *c. rhodesianus.*

Description. Snout obtuse, slightly convex; ear-opening small, obliquely oval; granules on snout subconical, smooth, much larger than those on occiput, which are intermixed with a few round, smooth or keeled tubercles; cheeks not swollen; mental slightly or much narrower than adjacent labials; gulars minute, granular, juxtaposed.

Body and flanks covered with small, unequal, smooth, juxtaposed granules intermixed with irregularly disposed, small, oval or round, smooth (juvenile) or keeled (adult) tubercles, those on flanks more congested, smooth and more conical; ventral scales larger than dorsals, those in middle subequal to those towards sides, imbricate; limbs short, moderately slender, the adpressed hind limb reaching the wrist; digits moderately short and slender, more strongly dilated at apex than at base; tail subcylindrical, almost depressed, verticillate, tapering, covered above with unequal, smooth or keeled, imbricate scales and rows of flat, keeled, scarcely pointed tubercles, below with larger, unequal, smooth, somewhat pointed, imbricate scales, of which a few of the median series are somewhat enlarged; tail shorter or longer than head and body.

For characters common to all species, see *Remarks* on p. 338; for scale counts, etc., see statistical table opposite p. 344.

Color. Above, grayish or pale sandy brown; a dark brown streak from nostril passes through eye to terminate above ear-opening; crown of head, back, and tail irregularly spotted with dark brown, with or without traces of narrow transverse white lines. Below, whitish, uniform.

Size. Total length of type ♂ (Brit. Mus.), 92^{+} ($68+24^{+}$) mm., of a perfect ♂ (M.C.Z. 41840), 78 (36 + 42) mm.

Remarks. Based on a single male which differed from *capensis*

and *formosus* in the great reduction of tubercles on occiput and temples, and the much smaller size of those on dorsum. A good race despite Roux's (1907b) statement that Boulenger concurred in synonymizing it with *capensis*. Incidentally one of Roux's "*formosus*", now in M.C.Z., is a *capensis*, his Rustenburg specimen is doubtless *affinis*.

Parasites. Mites (*Geckobia transvaalensis*) found by Lawrence.

Localities. **Transvaal:** *Bleskop, Rustenburg District.

Range. Rustenburg District, Transvaal.

Pachydactylus capensis vansoni FitzSimons

1933. *Pachydactylus capensis vansoni* FitzSimons, Ann. Transvaal Mus., **15**, p. 274: Zoutpansberg Mountains between Entabeni and Lake Fundusi, northern Transvaal.

1936. Lawrence, p. 38.

Description. Ear-opening small, obliquely oval; granules on snout subconical, much larger than those on occiput, which are intermixed with a few tubercles; mental much narrower than adjacent labials; gulars minute, granular.

Body and flanks covered with granules intermixed with irregularly disposed, "large", strongly keeled tubercles, those on flanks more congested "and larger"; ventral scales larger than dorsals, "subimbricate"; digits moderately short, more strongly dilated at apex than at base; tail subcylindrical, almost depressed, verticillate, tapering, covered above with unequal "granular" scales and rows of large, keeled, pointed tubercles, below with smooth, imbricate scales, of which the median series are much enlarged; tail shorter than head and body.

For characters common to all species, see *Remarks* on p. 338; for scale counts, etc., see statistical table opposite p. 344.

Color. Above, pale grayish; each white labial bearing a brown spot; across snout a whitish, black-edged band; a whitish streak from angle of jaws forms a crescentic marking on occiput; back with irregularly disposed dark brown spots and narrow white crossbars, disappearing with age, anteriorly connected with back of occiput by a median streak, seven or eight similar crossbars on proximal half of tail form complete annuli, Below, ?

Size. Length from snout to vent of type ♀ (T.M. 14179), 48 mm., tail missing, but total length of juvenile paratype (T.M. 14250), 73 (37 + 36) mm.

Remarks. Known to me only from the description of the type and two juvenile paratypes which the describer considered allied to *P. c. formosus* and *P. c. affinis*. Differing from *formosus* by the greater concentration in the dorso-lateral region of the strongly keeled tubercles, in greater convexity of head scales, united naso-rostrals (a variable character), and color pattern. Differing from *affinis* by (allegedly) fewer labials, scaling of back and tail, and color pattern.

Breeding. In November 1931, at Entabeni, the two juveniles were "each caught with a pair of eggs adhering to the anal region." These eggs averaged 7 x 5.5 mm.

Habitat. Beneath stones on sunny slopes near summit of Zoutpansberg at about 6000 feet above sea level.

Localities. **Transvaal:** Zoutpansberg; Entabeni; Entabeni to Lake Fundusi.

Range. Zoutpansberg District, northern Transvaal.

Pachydactylus capensis tigrinus van Dam

1910c. ? *P(achydactylus) affinis* Hewitt (not Boulenger), p. 87.
1921b. *Pachydactylus capensis tigrinus* van Dam, Ann. Transvaal Mus., **7**, p. 244, pl. v: Blinkwater, Brak River, Zoutpansberg District, northern Transvaal.
1936. Lawrence, p. 38.

Further citations of "*c. tigrinus*" will be found under *c. rhodesianus* subsp. nov.

Description. Snout obtuse, slightly convex; ear-opening small, obliquely oval; granules on snout flattened, smooth or slightly keeled, much larger than those on occiput, which are intermixed with a few, round, smooth or keeled tubercles; cheeks not swollen; mental as broad as adjacent labials; gulars minute, granular, juxtaposed.

Body covered with small, unequal, smooth or keeled, juxtaposed granules intermixed with irregularly disposed, smallish oval or round, smooth or keeled tubercles; flanks covered with somewhat granular, subimbricate scales and only an occasional subconical tubercle; ventral scales larger than dorsals, those in middle subequal to those towards sides, imbricate; limbs moderate, moderately stout, the adpressed hind limb reaching the elbow; digits moderately short and slender, more strongly dilated at apex than at base; tail subcylindrical, almost depressed, verticillate, tapering, covered above with unequal, smooth or keeled, imbricate scales and of white, but

otherwise scarcely differentiated, obtusely keeled tubercles, below with smooth, rounded or pointed, imbricate scales of which the median series is undifferentiated; tail shorter than head and body.

Color. Above, gray brown to blackish brown; crown of head immaculate pale brown; supraciliaries yellowish; a dark brown or blackish streak from nostril passes through eye to nape; limbs indistinctly spotted with white; back and tail with narrow, white (yellow in life), usually continuous crossbars, of which one row is on nape, two to five on body, and others on the plumbeous tail. Below, whitish minutely speckled with brown particularly towards sides; tail plumbeous.

Size. Total length of a cotype (Transvaal Mus.), 92 (52 + 40) mm., a paratype ♂ (M.C.Z. 21228) measures 48 mm. from snout to vent.

Parasites. Mites (*Geckobia transvaalensis*) found by Lawrence.

Habitat. The eight cotypes (one of which is M.C.Z. 61843) were taken among rocks.

Localities. **Transvaal**—Zoutpansberg District: *Blinkwater, Brak River; ? Krabbefontein (Hewitt's 1910c *affinis*); *Njelele River.

Range. Zoutpansberg District, northern Transvaal.

Pachydactylus capensis rhodesianus subsp. nov.

1902b. *Pachydactylus affinis* Boulenger (not Boulenger, 1896), p. 16.
1909a. Chubb, p. 593.
1909b. Chubb, p. 35.
1910b. Boulenger (part), p. 461 (omit Transvaal).
1910b. *Pachydactylus capensis* Boulenger (part, not A. Smith), p. 461.
1939b. *Pachydactylus capensis tigrinus* FitzSimons (not van Dam), p. 27.

Type. Museum of Comparative Zoölogy, No. 31,575, a semiadult ♂ from Empandeni, Southern Rhodesia, collected by the Rev. K. Tasman, July 20, 1928.

Paratypes. Museum of Comparative Zoölogy, Nos. 27,126-8 with same data as type; No. 31,575 from Gokomene, S.R.; No. 44,578 and a Transvaal Museum specimen from Devuli River Bridge, S.R., collected by V. FitzSimons, January 13, 1938.

Diagnosis. Most nearly related to *P. c. tigrinus* of northern Transvaal, but the white dorsal crossbars of that race consist of sharply-defined white lines, whereas in *rhodesianus* they are composed of a

series of not always confluent white spots; from *c. capensis* and *c. affinis* it differs as indicated in the key on p. 342.

Description. Snout obtuse, slightly convex; ear-opening small, obliquely oval; granules on snout flattened, smooth, much larger than those on occiput, which are intermixed with a few smooth tubercles; cheeks not swollen; mental as broad as (or slightly broader than) adjacent labials; gulars minute, granular, juxtaposed.

Body and flanks covered with small, unequal, smooth or rugose, juxtaposed granules, intermixed with irregularly disposed, small, round, flat, strongly keeled tubercles, those on flanks smooth and more conical; ventral scales larger than dorsals, those in middle subequal to those towards sides, imbricate; limbs short, moderately stout, the adpressed hind limb reaching the wrist; digits moderately short and slender, more strongly dilated at apex than at base; tail subcylindrical, almost depressed, slightly verticillate, tapering, covered above with homogeneous, smooth or keeled, imbricate scales, and rows of large, flattish, keeled, pointed tubercles, below with smooth, rounded, imbricate scales of which the median series is undifferentiated; tail equal to, or longer than, head and body.

Upper and lower labials 8; scansors under first and fourth toes 4; for other data see statistical table opposite p. 344.

Color. Above, dark grayish to pale brown; a blackish or dark brown streak from nostril passes through eye to form a crescentic marking on occiput in young but terminating on temple in type and adults; crown of head and back with irregularly disposed large brown spots, and back with narrow white crossbars formed by white-spotted granules or tubercles, one row on nape, four or five on body and about twelve on tail. Below, whitish, uniform.

Size. Total length of type ♂ (M.C.Z. 31575), 86 (43 + 43) mm., and paratype ♀ (M.C.Z. 31576), 83+ (50 + 33+) mm., but surpassed by one (not seen) in Brit. Mus. of 90 (45 + 45) mm., from Marandellas or Umtali (Boulenger, 1902b).

Remarks. The Devuli River gecko in the M.C.Z. is one of the two referred to *P. c. tigrinus* by FitzSimons (1939b).

Habitat. Found in association with *Afroedura t. platyceps* on rocky outcrops in thick bushveld (FitzSimons).

Localities. **Southern Rhodesia**[1]: Bulawayo; *Devuli River Bridge; *Empandeni; *Gōkomere; Marandellas; Matopos; Umtall.

[1] In a letter (1.II.1944) Dr. V. FitzSimons writes that he agrees the Devuli River Bridge geckos may "be a distinct race" but that such Southern Rhodesian material as he had seen appeared to be indistinguishable from topotypic *affinis*.

(But those from first and last three localities not seen, so their identification with this race should be received with reserve, more particularly Marandellas and Umtali.)

Range. South and eastern Southern Rhodesia.

Pachydactylus capensis levyi FitzSimons[1]

1909b. *Pachydactylus oshaughnessyi* Chubb (? not Boulenger), p. 35.
1910c. Hewitt, pp. 80, 84, 87.
1933. *Pachydactylus capensis levyi* FitzSimons, Ann. Transvaal Mus., **15**, p. 273: Wankie, western Southern Rhodesia.
1936. Lawrence, p. 38.

Description. Ear-opening small; granules on snout flattened, smooth, subequal (but specimen young) to those on occiput, which are intermixed with tubercles; mental broader than adjacent labials; gulars minute, granular.

Body and flanks covered with granules, intermixed with irregularly disposed, subequal, keeled tubercles; ventral scales subimbricate; limbs moderate; digits slightly (but young) more dilated at apex than at base; tail subcylindrical ("rounded"), tapering, covered above with strongly enlarged, subequal, imbricate scales.

For characters common to all species, see *Remarks* on p. 338; for scale counts, etc., see statistical table opposite p. 344.

Color. Above, crown of head grayish brown; a blackish streak from nostril passes through eye to form a crescentic marking on occiput, where it is bordered posteriorly by a whitish band arising at angle of jaw; back and tail black with two to four broad, whitish crossbars which narrow considerably on flanks, the last two on tail forming complete annuli (being young). Below, grayish white with some grayish brown along sides.

Size. Total length of young type ♂ (T.M. 14421), 47.7 (27.5 + 20.2) mm.

Remarks. Known to me only from the description which was based on two juveniles which may, or may not, be the young of *P. c. oshaughnessyi* as synonymized by some. The two earlier records of material from localities near Wankie are referred to this race arbitrarily and tentatively. The original description should be consulted for minor details.

[1] FitzSimons (1943, pp. 100–101) still regards this race as a synonym of *oshaughnessyi*, but actual comparison between Nyasaland and Southern Rhodesian material needs to be made.

Localities. **Southern Rhodesia:** Gatooma; Queque; Wankie.
Range. Western Southern Rhodesia.

PACHYDACTYLUS CAPENSIS OSHAUGHNESSYI Boulenger

1885d. *Pachydactylus oshaughnessyi* Boulenger, Cat. Lizards Brit. Mus., **1**, p. 204, pl. xvi, fig. 3: Lake Nyasa, Nyasaland.
1891a. Boulenger, p. 306.
1896a. Bocage, p. 103.
1912. *Pachydactylus formosus* Peracca (not A. Smith), p. 2.
1934. *Pachydactylus capensis o'shaughnessyi* Pitman, p. 303.

A further citation of "*oshaughnessyi*" will be found under *c. levyi.*

Description. Ear-opening small, obliquely oval; granules on snout "convex," much larger than those on occiput, which are intermixed with round tubercles; mental narrower than adjacent labials; gulars granular.

Body and flanks covered with small granules intermixed with irregularly disposed, large, conical, keeled tubercles; ventrals imbricate; limbs moderate; digits moderately short; tail subcylindrical ("rounded"), tapering, covered above with rather large homogeneous, imbricate scales; tail slightly shorter than head and body.

For characters common to all species, see *Remarks* on p. 338; for scale counts, etc., see statistical table opposite p. 344.

Color. Above, crown of head yellowish; a blackish streak from nostril passes through eye to form a crescentic marking on occiput, where it is bordered posteriorly by a broad, cream-colored band; back and tail light brown with a series of broad, black-edged, cream-colored, transverse spots of which there are two on the former and seven on the latter; limbs uniformly cream colored. Below, creamy white, uniform.

Size. Total length of type (Brit. Mus.), 79 (41 + 38) mm.

Remarks. Known to me only from the description which was based on an adult and young. It has been thought by some that *P. c. levyi* should be synonymized but on geographical grounds it appears that *oshaughnessyi* may be a more northern race. For this reason I arbitrarily refer Peracca's Luapula River record to *o'shaughnessyi* for the Luapula forms the Belgian Congo boundary west of Lake Bangweolo, and is certainly not *formosus.*

Localities. **Nyasaland:** Lake Nyasa. **Northern Rhodesia:** Broken Hill; Luapula River.

Range. Nyasaland and Northern Rhodesia.

Pachydactylus serval Werner

1910a. *Pachydactylus serval* Werner, Denks. Med.-Nat. Ges. Jena, **16**, p. 313, fig. 10: Chamis, Great Namaqualand, South West Africa.
1910b. Boulenger, p. 463.
1911b. Hewitt, p. 45.
1911d. Sternfeld, p. 16.
1936. Lawrence, p. 38.
1914b. *Pachydactylus montanus* Methuen & Hewitt, Ann. Transvaal Mus., **4**, p. 129: Lord Hill's Peak, Great Karas Mountains, Great Namaqualand, South West Africa.
1936. Lawrence, p. 38.
1935a. *Pachydactylus purcelli* FitzSimons (part, not Boulenger), p. 529 (Onseepkans, and some Kakamas specimens not in M.C.Z.).
1935. *Pachydactylus montanus onscepensis* Hewitt, Rec. Albany Mus., **4**, p. 318: "Onscephans" i.e. Onseepkans on Orange River near Pella, Little Bushmanland, Cape Province.
1938. FitzSimons, p. 173.

Further citations of "*serval*" have been referred tentatively to *p. punctatus*.

Description. Snout acuminate, depressed; ear-opening small or moderate, subcircular or obliquely oval; granules on snout flattened, smooth, much larger than those on occiput, which are largely homogenous, intermixed with a few, widely scattered, enlarged, round, smooth tubercles; cheeks not swollen, mental as broad as, or narrower than, adjacent labials; gulars minute, granular and juxtaposed or flat and imbricate.

Body and flanks covered with small, unequal, flat, smooth, juxtaposed granules which dorsolaterally are more or less intermixed with a few enlarged, flattish or subconical, smooth or keeled tubercles; those on flanks more congested and conical; ventral scales larger than dorsals, those in middle subequal to those towards sides, subimbricate or imbricate; limbs moderate, moderately slender, the adpressed hind limb reaching the elbow; digits moderately long and slender, more strongly dilated at apex than at base; tail subcylindrical, verticillate, tapering, covered above with small, smooth or keeled imbricate scales and rows of large, flat, keeled, tubercle-like scales, below with larger, irregular, smooth, imbricate scales of which the median series is not, or but occasionally, enlarged; tail equal to, or longer than, head and body.

For characters common to all species, see *Remarks* on p. 338; for scale counts, etc., see statistical table opposite p. 344.

Color. Above, pale olive or olive brown to brownish or purplish gray; *in juveniles*, but usually absent in adults, a dark streak, in canthal region sometimes bordered above by a pale one, from nostril passes through eye to form a crescentic marking on occiput, where it is bordered posteriorly by a pale olive yellow area enclosed by a dark streak on nape; labials pale, a light line continued from behind them over ear-opening; eyelid yellow; back and tail with dark reddish brown spots (similar to, but generally larger than, those in *purcelli*) or vermiculations which may coalesce to form interrupted or irregular crossbars; dorsal tubercles yellow; limbs indistinctly spotted. Below, grayish, uniform.

Size. Total length of *serval* type (Berlin Mus.), 69+ (38 + 31+) mm., of *montanus* type (T.M. 3080), 86.7+ (43.2 + 43.5+) mm., of *onscepensis* type ♀ (Albany Mus.), 81+ (41 + 40+) mm., all three being surpassed by (T.M. 17719), 87+ (45 + 42+) mm., all having tails which are regenerated, at least in part.

Remarks. *P. serval* was based on a type and paratype said to be related to "*ocellatus*" i.e. *geitje*. I now refer *montanus*, which was compared with *weberi* and based chiefly on an exceptionally long mental, and *m. onscepensis* to the synonymy.

FitzSimons (1938) records *onscepensis* from five localities surrounding the type locality of *serval*, a species whose figure they resemble in markings. Though his material was largely in agreement with Werner's brief description, on account of the latter's vagueness FitzSimons decided to employ Hewitt's name, though admitting that his South West Africa specimens differed slightly from typical Orange River *onscepensis*. I agree that his northern examples are somewhat stouter, head slightly broader and not very distinct from neck, tail more distinctly verticillate, and coloring darker, but these average differences are too slight to recognize a southern race.

Habitat. Beneath flakes or in crevices of rocks on steep mountain slopes or other rocky regions (Methuen & Hewitt and FitzSimons).

Localities. **Cape Province**—Little Namaqualand: Goodhouse; *Kakamas; Onseepkans, Orange River, Little Bushmanland. **South West Africa**: *Barby Farm; *Brukkaros Mountain; Chamis; Konkiep; Lord Hill Peak, Great Karas Mountains; Maltahohe; Seeheim[1]. (Monard's Angola records of *serval* are referred to ? *p. punctatus*).

[1] As FitzSimons remarked that the Seeheim gecko was without tubercles, it seemed possible that it was a *P. purcelli*. In replying to this suggestion, however, FitzSimons (1.ii.44) assures me that in all other respects this young gecko is inseparable from "*P. m. onscepensis*," i.e. *purcelli* as here understood, a synonymizing of *onscepensis* with which Dr. FitzSimons concurs.

Range. Little Namaqualand and adjacent areas of Cape Province north to South West Africa.

Pachydactylus weberi gariesensis Hewitt

1932. *Pachydactylus capensis gariesensis* Hewitt, Ann. Natal Mus., **7**, p. 124, pl. vi, figs. 8–9: Garies, western Cape Province.
1936. Lawrence, p. 38.
1935a. *Pachydactylus capensis fasciatus* FitzSimons (not Boulenger), p. 528.
1936. Lawrence, p. 38.
1938. *Pachydactylus weberi gariesensis* FitzSimons, p. 179.

Further citations of "*capensis gariesensis*" will be found under *w. weberi*.

Description. Snout acuminate, slightly depressed; ear-opening small, obliquely oval; granules on snout flattened, smooth, much larger than those on occiput, which are intermixed with round, smooth, tubercles; cheeks not swollen; mental as broad as, or slightly narrower than, adjacent labials; gulars minute, granular and juxtaposed or flat and imbricate.

Body and flanks covered with small, unequal, flattened, smooth, juxtaposed granules intermixed with more or less irregular, longitudinal rows of large, oval, flattish, keeled tubercles, those on flanks more congested and conical; ventral scales larger than dorsals, those in middle subequal to those towards sides, imbricate; limbs moderate, the adpressed hind limb reaching the elbow; digits moderately long and slender, more strongly dilated at apex than at base; tail depressed, verticillate, tapering, covered above with unequal, smooth, imbricate scales and rows of large, flat, keeled, pointed, tubercle-like scales, below with larger, irregular, smooth imbricate scales of which the median series is more or less enlarged; tail shorter or longer than head and body.

For characters common to all species, see *Remarks* on p. 338; for scale counts, etc., see statistical table opposite p. 344.

Color. Above, pale gray to olive gray; a dark brown streak, in canthal region bordered above by a pale one, from second labial passes through eye to form a crescentic marking (sometimes incomplete) on occiput; back with numerous, elongate, dark-edged, reddish brown spots which may coalesce to form about seven irregular crossbars; limbs indistinctly mottled; tail usually with ten or eleven dark crossbars which tend to disappear proximally. Below, whitish, uniform, or tail barred distally.

In juveniles occiput, nape, back, and tail all exhibit well-defined crossbars, those on the tail forming complete annuli distally.

Size. Total length of type (S.A.Mus.), 81 (42 + 39) mm., surpassed by a gecko (T.M. 18151), of 107 (49 + 58) mm.

Remarks. Described from nine cotypes in the South African Museum and a series of paratypes in the Albany Museum of which two are now in the Museum of Comparative Zoölogy. Two or three of the characters originally employed to distinguish this form from typical *weberi* fail. It may, however, be distinguished by the absence or greater paucity of tubercles on occiput and temporal region, while the dorsal tubercles are sparser, less uniform, smaller and feebly keeled, those on the flanks much smaller and less congested.

Parasites. Mites (*Geckobia namaquensis*) found by Lawrence.

Habitat. Found only in rocky regions beneath flakes or in fissures of the rocks (FitzSimons).

Localities. **Cape Province**—Little Namaqualand: *Garies; *Garies to Kamiesberg; Van Rhynsdorp; Vredendal.

Range. Northern Little Namaqualand, Cape Province.

Pachydactylus weberi weberi Roux

1907b. *Pachydactylus weberi* Roux, Zool. Jahrb. Syst., **25**, p. 408, pl. xiv, figs. 4–5: Klipfontein, Little Namaqualand, Cape Province.
1910b. Boulenger, p. 461.
1910c. Hewitt, pp. 80, 83, 87.
1911d. Sternfeld (part), p. 14 (Klipfontein only).
1934. Brongersma, p. 165.
1910a. *Pachydactylus fasciatus* Werner (not Boulenger), p. 311, fig. 8.
1911d. Sternfeld, p. 15.
1935a. *Pachydactylus capensis gariesensis* FitzSimons (not Hewitt), p. 528.
1936. *Pachydactylus capensis weberi* Lawrence, p. 38.
1938. *Pachydactylus weberi weberi* FitzSimons, p. 180.

Further citations of "*weberi*" or "*w. weberi*" will be found under *weberi acuminatus*.

Description. Snout acuminate, slightly depressed; ear-opening small, vertically (young) or obliquely (adult) oval; granules on snout flattened, smooth, much larger than those on occiput, which are intermixed with round, smooth tubercles; cheeks not swollen; mental as broad as, or slightly narrower than, adjacent labials; gulars minute, granular and juxtaposed or flat and imbricate.

Body and flanks covered with small, unequal, flattened, smooth,

juxtaposed granules intermixed with more or less regular, longitudinal rows of large, oval, flattish, keeled tubercles, those on flanks more congested and conical; ventral scales larger than dorsals, those in middle subequal to those towards sides, imbricate; limbs moderate, the adpressed hind limb reaching the elbow; digits moderately long and slender, more strongly dilated at apex than at base; tail depressed, verticillate, tapering, covered above with unequal, smooth, imbricate scales and rows of large, flat, keeled, pointed tubercle-like scales, below with larger, irregular, smooth, imbricate scales of which some of the median series are more or less enlarged; tail shorter or longer than head and body.

For characters common to all species, see *Remarks* on p. 338; for scale counts, etc., see statistical table opposite p. 344.

Color. Above, pale gray to gray brown; a dark brown streak, in canthal region bordered above by a pale one, from second labial passes through eye to form a crescentic or zigzag marking (sometimes incomplete) on occiput; back and tail with scattered reddish brown spots which may coalesce to form five or six irregular crossbars; limbs indistinctly mottled; tail usually with ten or eleven dark crossbars. Below, whitish to grayish, uniform or tail barred distally.

In juveniles the well-defined crossbars on nape and anterior part of back enclose an area paler and narrower than the interspaces.

Size. Total length of cotype (Amsterdam Mus.), 86 (41 + 45) mm.; surpassed by one (T.M. 17914) of 89+ (45 + 44+) mm.

Remarks. The Kamaggas gecko figured by Werner (1910a) as "*fasciatus*" (now M.C.Z. 21019) is actually a very young *w. weberi*.

FitzSimons (1938) himself transfers his (1935a) Soebartsfontein geckos to typical *weberi*, stating that the O'okiep to Springbok series are somewhat intermediate, approaching *gariesensis* in the longer contact of the nasorostrals and the slightly smaller, less densly arranged dorsal tubercles.

Temperament. Exceptionally active (FitzSimons).

Habitat. Found only in rocky localities (FitzSimons).

Localities. **Cape Province**—Little Namaqualand: *Kamaggas; *Kamaggas Road 32 miles from Springbok; *Klipfontein; O'okiep to Springbok; Soebatsfontein; 20 miles east of Port Nolloth.

Range. Northern Little Namaqualand, Cape Province.

Pachydactylus weberi acuminatus FitzSimons

1885. *Pachydactylus (Cantinia) elegans* Müller (not Gray), p. 709.
1911b. *Pachydactylus capensis* Sternfeld (not A. Smith), p. 397.
1915c. *Pachydactylus Weberi* Werner (not Roux), p. 334.
1938. *Pachydactylus weberi weberi* ? FitzSimons, p. 181.
1941. *Pachydactylus weberi acuminatus* FitzSimons, Ann. Transvaal Mus., **20**, p. 274: Aus and Konkiep, Great Namaqualand, South West Africa.

Description. Snout acuminate, slightly depressed; ear-opening small, obliquely oval; granules on snout flattened, smooth, much larger than those on occiput, which are intermixed with round, smooth tubercles; cheeks not swollen; mental as broad as adjacent labials; gulars minute, granular, juxtaposed.

Body and flanks covered with small, unequal, flattened, smooth, juxtaposed granules intermixed with more or less regular, longitudinal rows of large, oval, flattish, strongly keeled tubercles, those on flanks more congested and conical; ventral scales larger than dorsals, those in middle subequal to those towards sides, imbricate; limbs moderate, the adpressed hind limb reaching the elbow; digits moderately long and slender, more strongly dilated at apex than at base; tail depressed, verticillate, tapering, covered above with unequal, smooth, imbricate scales and rows of large, flat, keeled, pointed tubercles, below with larger, irregular, smooth, imbricate scales of which the median series is more or less enlarged; tail longer than head and body.

For characters common to all species, see *Remarks* on p. 338; for scale counts, etc., see statistical table opposite p. 344.

Color. Above, pale sandy (alcohol) to olive gray; head tinged with pink; upper eyelid yellow; a dark brown streak, in canthal region bordered above by yellow, from nostril passes through the reddish eye to form a crescentic marking (sometimes incomplete) on occiput; limbs indistinctly spotted; back with irrregular reddish brown crossbars which are sometimes edged with pinkish or with patches of same between the crossbars mesially; tail pale pinkish to yellowish brown with eight dark brown crossbars which are less than half as broad as the pale interspaces; enlarged tubercles yellow. Below, creamy to grayish white, uniform.

Size. Length from snout to vent of cotype ♂ (T.M. 17722), 42 mm., tail reproduced but normal tails about once and a fifth the length of head and body, for example (T.M. 17694), 80 (37 + 43) mm.

Remarks. The description was based on eight cotypes of which one is now M.C.Z. 46817. FitzSimons (1938, 1941) should be consulted for further details and alleged points of difference with *w. weberi* to which it is certainly very closely allied; few of the differences appear to be borne out by our specimen except that the tubercles are more strongly keeled.

I may be in error, therefore, in referring Sternfeld's (1911b) "*capensis*" from Luderitz Bay to *acuminatus* for Sternfeld refers to its keeling as being weak. This might be because of age or he may just have been examining some of the very strongly keeled tubercles of other species in the genus.

Breeding. On July 31, at Aus, about 50–60 eggs and eggshells, averaging 6.5 x 10 mm., were found beneath a single large slab of rock, suggesting that it was a favorite repository (FitzSimons).

Localities. **South West Africa**—Great Namaqualand: *Aus; Karibib; Keetmanshoop; Konkiep; Luderitz Bay.

Range. Southern South West Africa.

Pachydactylus weberi werneri Hewitt

1867b. *Pachydactylus capensis* Peters (not A. Smith), p. 235.
1869b. Peters, p. 657.
1911d. Sternfeld (part), p. 14 (Gobabis and Windhoek only).
1911b. *Pachydactylus Weberi* Sternfeld (not Roux), p. 397.
1911d. Sternfeld (part), p. 14 (Windhoek only).
1936c. Parker, p. 130.
1911b. *Pachydactylus formosus* Sternfeld (not A. Smith), p. 397.
1935. *Pachydactylus capensis werneri* Hewitt, Rec. Albany Mus., **4**, p. 315, pl. xxix, fig. 3: Khan River, north of Walfish Bay, South West Africa.

Description. Snout acuminate; granules on occiput intermixed with relatively few tubercles, those on back with longitudinal rows of large, flattish, strongly keeled tubercles, the tubercles on flanks more or less smooth; digits slender; tail "not or but slightly" depressed, verticillate, with rows of keeled tubercles above, below with larger, irregular, smooth, imbricate scales of which the median series is not transversely enlarged.

For characters common to all species, see *Remarks* on p. 338; for scale counts, etc., see statistical table opposite p. 344.

Color. Above, very pale; a narrow dark streak from eye forms a crescentic marking on occiput; back with dark spots (Sternfeld or)

six incipient, interrupted, dark crossbars (Sternfeld; Hewitt); tail also with obsolete crossbars.

Size. Length from snout to vent of cotype (Albany Mus.), 39 mm.

Remarks. Known to me only from the description of adult and young cotypes which Hewitt differentiated from "*c. gariesensis*" on the ground of nasorostrals being "in good contact," mental "slighty more than twice as long as (its) anterior width" (instead of once and three-quarters), and caudal characters.

Sternfeld (1911b) comments that his "*formosus*" was previously labeled "*capensis*". Parker (1936c) thinks that his Hoffnung and Windhoek geckos must belong to the same race as those from Karibib yet says they disagree in details from all the alleged races.

Localities. **South West Africa**—Damaraland: Gobabis; Hoffnung Farm near Windhoek; Khan River; Otjimbingue; (New Barmen); Windhoek (Windhuk).

Range. Northern South West Africa.

Pachydactylus fasciatus Boulenger

1870b. *Pachydactylus capensis* Peters (not A. Smith), p. 110.
1888d. *Pachydactylus fasciatus* Boulenger, Ann. Mag. Nat. Hist. (6), **2**, p. 138: Namaqualand.
1890d. Boulenger, p. 78.
1898. Sclater, p. 103.
1910b. Boulenger (? part), p. 461 (? omit Natal).
1910c. Hewitt, pp. 79, 83, 87.
1938. FitzSimons, p. 170.

Further citations of "*fasciatus*" or "*capensis fasciatus*" will be found under *weberi gariesensis*, *w. weberi*, and *bibronii turneri*.

Description. Ear-opening small, oval; granules on snout subconical, much larger than those on occiput, which are intermixed with oval, smooth or obtusely keeled tubercles; mental narrower than adjacent labials.

Body and flanks covered with granules intermixed with more or less regular, longitudinal rows of large, strongly keeled tubercles, those on flanks more congested and conical; ventral scales "moderate"; digits dilated at apex; tail subcylindrical, verticillate, tapering, with rows of keeled, pointed tubercles above, below with large imbricate scales of which the median series is much enlarged; tail longer than head and body.

For characters common to all species, see *Remarks* on p. 338; for scale counts, etc., see statistical table opposite p. 344.

Color. Above, grayish or pale brown; crown of head variegated with darker; a dark brown streak from nostril passes through eye and widens to form a crescentic marking on occiput followed by a second crescentic marking from ear-opening across nape; back with three dark crossbars of which the first and second are very broad and the third across sacrum; tail with from eight to twelve crossbars. Below, whitish, chin and throat darker.

These markings, so very distinct in juvenile geckos, tend to disappear with age.

Size. Total length of cotype, a gravid ♀ (Brit. Mus.), 107 (49 + 58) mm., the juvenile cotype is in the S. African Museum.

Remarks. Known to me only from the literature and description of two cotypes which Boulenger differentiated from *bibronii* by their smaller adult size, smaller ear-opening, less stout habitus, and coloration.

The Kamaggas gecko described and figured as "*fasciatus*" by Werner (1910a) is now M.C.Z. 21019, and is a young *w. weberi*. The Neu Barmen gecko referred to "*fasciatus*" by Sternfeld (1911b) appears from the brief color description to be a young *P. b. turneri*, a species which occurs at Neu Barmen.

Habitat. In rock fissures of mountain slopes (FitzSimons).

Localities. (The Natal, coll. Sanderson, record of Boulenger (1910b) is considered misidentified or wrongly localized and requires reëxamination[1] before it can be correctly assigned).

Cape Province: Hantam (Peters); foot of Hantamsberg (FitzSimons); Namaqualand (Boulenger).

Range. Western Cape Province.

Pachydactylus namaquensis (Sclater)

1898. *Elasmodactylus namaquensis* Sclater, Ann. S. African Mus., **1**, p. 109, pl. v, fig. 2: "Namaqualand."
1910b. Boulenger, p. 459.
1910c. Hewitt, pp. 81, 88.
1914b. *Pachydactylus namaquensis* Methuen & Hewitt, p. 128.
1932. Hewitt, p. 122.
1936. Lawrence, p. 38.
1938. FitzSimons, p. 174.

[1] This has since been done by FitzSimons (1943, p. 88) who reports its identification as correct and its structure and state of preservation approximating so closely to that of the cotype that he considers they may have been taken together, certainly the locality (Natal) is "beyond the bounds of possibility."

Description. Snout obtuse, convex; ear-opening moderate, vertically oval; granules on snout subconical, smooth, much larger than those on occiput, which are intermixed with larger, round, smooth or rarely stellate tubercles; cheeks swollen; mental as broad as, or narrower or broader than, adjacent labials; gulars small, subgranular or flat and imbricate.

Body and flanks covered with small, unequal, smooth or feebly striate, juxtaposed granules or subimbricate scales intermixed with more or less irregular longitudinal rows of large, oval or round, flattish or subconical, smooth or obtusely keeled tubercles, those on flanks less numerous; ventral scales slightly larger than dorsals, subequal to those towards sides; limbs moderate, stout, the adpressed hind limb reaching the elbow; digits moderately long and slender, more strongly dilated at apex than at base; tail depressed, verticillate, tapering, covered above with small, smooth or stellate, juxtaposed and imbricate, subgranular scales and rows of large, obtusely keeled, pointed tubercles, below with large, irregular, smooth, imbricate scales of which a few of the median series are more or less enlarged, at least distally; tail shorter than head and body.

For characters common to all species, see *Remarks* on p. 338; for scale counts, etc., see statistical table opposite p. 344.

Color. Above, pale grayish brown, pinkish brown, pinkish olive, olive brown or rich brown; eye brown to golden brown or reddish brown; limbs barred with brown; back and tail with five irregular, dark brown crossbars which may be interrupted on the vertebral line. Below, whitish; throat sometimes pale yellowish brown.

Very variable, see FitzSimons (1938).

Size. Total length of type (S.A. Mus.), 140 (80 + 60) mm., surpassed by one (T.M. 17596) of 157 (82 + 75) mm.

Remarks. Sclater compared his two specimens with *tuberculosus* from which it is separable by the nasal arrangement, more widely scattered tubercles, etc.

Methuen & Hewitt (1914b; 1932b) after examining the type and paratype, were the first to show that *Elasmodactylus* could not be separated from *Pachydactylus* on the basis of presence or absence of claws, for in a Garies series of *namaquensis* the claw was both present and absent, while the distal scansors may, or may not, be divided. The tentative suggestion that geckos from South West Africa might be separated on the basis of interorbital granules, etc., does not appear to be supported by our material from Little and Great Namaqualand.

Breeding. Between July 24–27, at Barby, some 30–40 eggs measuring about 16 x 12 mm., were found in a rock fissure, firmly adhering to the rock face.

Parasites. Mites (*Geckobia namaquensis*) found by Lawrence.

Habits. Diurnal and rupicolous, being often seen basking in the early morning sun in quiet nooks among the rocks (FitzSimons).

Habitat. The Brukkaros gecko was taken near the summit of the mountain, alt. 5000–6000 feet, and was actually captured in the cellar-like dark room hewn from the rock and used by a meteorological expedition of the past (FitzSimons).

Localities. **Cape Province**—Little Namaqualand: Garies; Goodhouse; *Klipfontein. **South West Africa**—Great Namaqualand: *Barby Farm; 20 miles east of Konkiep; Kraikluft Farm.

Range. Western Cape Province north to southern South West Africa.

Pachydactylus laevigatus laevigatus Fischer

1888b. *Pachydactylus laevigatus* Fischer, Jahrb. Hamb. Wiss. Anst., **5**, pp. 12, 15, pl. ii, fig. 3: Aus, South West Africa.
1890d. Boulenger, p. 78.
1893a. Boettger, p. 37.
1894a. Boettger, p. 88.
1894. Fleck, p. 84.
1898. Sclater, p. 103.
1910b. Boulenger, p. 460.
1910c. Hewitt, pp. 79, 87.
1910a. Werner, p. 309.
1933. Schmidt, p. 5, pl. i.
1936c. Parker, p. 130.
1937b. Mertens, p. 6.
1914b. *Pachydactylus bibroni* (sic) form *laevigatus* Methuen & Hewitt, p. 129. fig. 14.
1936. Lawrence, p. 38.
1915c. *Pachydactylus Bibronii* Werner (part, not A. Smith), p. 333.
1938. *Pachydactylus laevigatus laevigatus* FitzSimons, p. 172, fig. 5.

Description. Snout obtuse, convex; ear-opening moderate, vertically oval; granules on snout subconical, smooth, much larger than those on occiput, which are intermixed with more or less oval, mostly nonstellate, keeled tubercles; cheeks swollen; mental as broad as, or slightly narrower or broader than, adjacent labials; gulars subgranular and juxtaposed or flat and subimbricate.

Back and flanks covered with small, unequal, smooth, juxtaposed

or imbricate scales intermixed with longitudinal rows of large, roundish, flat or subconical, smooth or obtusely keeled tubercles, those on flanks slightly more conical, stellate; ventral scales slightly larger than dorsals, those in middle subequal to, or slightly smaller than, those towards sides, juxtaposed; limbs stout, the adpressed hind limb reaching the wrist; digits moderately long and slender, more strongly dilated at apex than at base; tail depressed, verticillate, tapering, covered above with small, smooth or keeled, juxtaposed or subimbricate, subgranular scales and rows of large, keeled, spinose tubercles, below with irregular, smooth, imbricate scales, of which the median series is more or less enlarged; tail shorter than head and body.

For characters common to all species, see *Remarks* on p. 338; for scale counts, etc., see statistical table opposite p. 344.

Color. Above, pale sandy gray, creamy olive, olive brown to purplish brown; crown of head more or less uniform or variegated with darker; rarely a dusky streak from nostril passes through eye to form a crescentic marking on occiput, sometimes another from nostril to supraocular region; limbs uniform or spotted with brown; back and tail with three or four irregular, wavy, blackish crossbars, those on back posteriorly edged with scattered white spots which are chiefly confined to tubercles. Below, whitish, uniform.

Size. Total length of type (Hamb. Mus.), 141^{+} ($89 + 52^{+}$) mm., surpassed by one (T.M. 17883) of 163^{+} ($91 + 72^{+}$) mm., their tails being partly reproduced.

Remarks. Methuen & Hewitt's (1914b) action in making *laevigatus* a form of *bibronii*, though they found it occurring together with *b. turneri* at Narudas Süd, is shown to be untenable by Schmidt (1933) who also found it occurring with *b. pulitzerae* at Pico Azevedo. I have been able to examine this Pico Azevedo material through the courtesy of Mr. Graham Netting, for it constitutes the first record of *laevigatus* in Angola.

FitzSimons (1938) furnishes scansor counts for all digits of 56 geckos and remarks that the tubercles are obtusely keeled in only 2 specimens, both from the Kalkveld.

Habitat. Inside walls of houses in Rehoboth, on granite blocks in Kalahari (Fleck); taken only in rock crevices and beneath flakes (FitzSimons), at 5200 feet (Hewitt).

Localities. **Bechuanaland Protectorate:** Omuramba near Okwa (Uqua), Kalahari (*fide* Boettger[1], 1894a). **Cape Province:**

[1] As Boettger writes of this as a small specimen showing only faint keeling on its conical tubercles, it is most probably a young *b. turneri*, the common species of the Kalahari.

Goodhouse; *Kakamas; Little Namaqualand. **South West Africa:** Aus; *Alt Wasserfall to Kraikluft; Barby Farm; Bethany Brukkaros Mountain; Bullspoort; Hoffnung Farm near Windhoek; Kalkveld; Keetmanshoop; Kobos Farm; Kochena Farm; Konkiep; Kraikluft; Namib Station to Nonidas; Narudas Süd Farm; Neudamm Farm; Okahandja; Rehoboth; Satansplatz; Seeheim; Windhoek. **Angola:** Pico Azevedo (seen A.L.).

Range. Little Namaqualand, Cape Province, north through South West Africa to southern Angola. (Reported from Bechuanaland, see footnote).

Pachydactylus laevigatus fitzsimonsi nom. nov.

1938. *Pachydactylus laevigatus tessellatus* FitzSimons (not Werner), Ann. Transvaal Mus., **19**, p. 172, fig. 6: Kamanyab, South West Africa.

Description. Differs from the typical form in the following respects. Head and body scales uniformly flat, the entire upper surface being covered with unequal, smooth, flat, juxtaposed scales presenting a pavement-like appearance. Sides of head before and behind ear-opening with a few smooth, conical tubercles; flanks with a few, smooth, subconical tubercles separated by "granular" interspaces; chin scales polygonal, flat, juxtaposed, larger than the imbricate ones in middle of throat; ventral scales large, hexagonal, flat, imbricate, not more than twice the size of the larger chin shields; hind limbs with distinctly conical but keelless tubercles above; digits short, stout, more strongly dilated at apex than at base; tail shorter than head and body.

For characters common to all species, see *Remarks* on p. 338; for scale counts, etc., see statistical table opposite p. 344.

Color. Above, olive yellow; crown of head variegated with irregular, longitudinal, blackish streaks; back with four or five irregular, zigzag, black crossbars, those on back posteriorly edged with scattered white spots. Below, whitish; limbs pinkish; sole pads pinkish gray.

Size. Total length of type (T.M. 17202), 150 (80 + 70) mm.

Remarks. Known to me only from the description of the four adults collected by FitzSimons. Unfortunately the name *tessellatus* is preoccupied by that of Werner (1910a, p. 311) necessitating renaming the present form, which I do for its able collector who has done so much to advance our knowledge of the reptile life of South Africa.

Habitat. Taken in rock fissures, one from the same crack in which specimens of *P. b. turneri* were sheltering.

Locality. Known only from the type.

Range. Damaraland, South West Africa.

Pachydactylus bibronii bibronii (Smith)

1845. *Tarentola bibronii* A. Smith, Illus. Zool. S. Africa, Rept., pl. 50, fig. 1, Interior of South Africa.
1849. *Pachydactylus bibronii* A. Smith, *loc. cit. supra*, correction as footnote to Index of completed Illustrations (1845–1849).
1865b. Peters, p. 457, footnote.
1885d. Boulenger (part), p. 201 (South African records only).
1887. Strauch (part), p. 18 (omit Otjimbingue).
1896c. Bocage (part), p. 115 (omit Modder River).
1898. Sclater, p. 102.
1905h. Boulenger, p. 252.
1907b. Roux (part), p. 407 (omit Pretoria).
1910b. Boulenger (? part), p. 460 (? omit Bechuanaland).
1910a. Hewitt, pp. 58, 62.
1910c. Hewitt, pp. 79, 87.
1913. Hewitt & Power (part), p. 150 (omit S. R. and ? B.P. locs.).
1920. Hewitt, pp. 91, 93.
1928. Cott (part), p. 952 (omit Charre).
1928a. Essex, 1927, p. 930.
1931. Mann, pp. 387, 398.
1933a. Power (? part), p. 214 (? omit Upington).
1934. Brongersma, p. 165.
1936c. Parker, p. 128.
1937a. FitzSimons, p. 265.
1937e. Hewitt (part), p. 19 (Cape Province references only).
1865a. *Homodactylus bibronii* Gray, p. 642 (not 612).
1935a. *Pachydactylus bibronii bibronii* FitzSimons (part), p. 527.
1936. Lawrence, p. 37.

Further citations of "*bibronii*" will be found under *l. laevigatus*, *b. pulitzerae* and *b. turneri*, but the undermentioned are omitted: 1884a. Rochebrune, p. 70 (Senegambia); 1890. Müller, p. 697 (Australia).

Name. Klipsalamander (Afrikaans, but not even generic: Hewitt).

Description. Snout obtuse, convex; ear-opening moderate, vertically oval; granules on snout convex, smooth or keeled, much larger than scales on occiput, which are intermixed with larger, round

or oval, stellate, keeled tubercles; cheeks swollen; mental as broad as, or slightly narrower than, adjacent labials; gulars granular and juxtaposed or flat and subimbricate.

Body and flanks covered with small, unequal, smooth or keeled, juxtaposed granules or imbricate scales intermixed with longitudinal rows of large, oval or round, strongly keeled tubercles, those on flanks more conical; ventral scales larger than dorsals, those in middle slightly smaller than those towards sides, imbricate; limbs moderate, the adpressed hind limb reaching the elbow; digits moderately long and slender, more strongly dilated at apex than at base; tail depressed, verticillate, tapering, covered above with unequal, irregular, keeled, juxtaposed or imbricate scales and rows of large, keeled, spinose tubercles, below with irregular, smooth, imbricate scales of which the median series are transversely enlarged; tail shorter than head and body.

For characters common to all species, see *Remarks* on p. 338; for scale counts, etc., see statistical table opposite p. 344.

Color. Above, pale sandy gray or yellowish to purplish brown; crown of head more or less uniform or variegated with darker; a faint brown streak from nostril passes through eye to above ear-opening, sometimes another from nostril to supraocular region; limbs uniform or indistinctly barred; back and tail usually with irregular, wavy, brown crossbars, those on back sometimes posteriorly edged with white or spotted with white. Below, whitish, uniform.

"Eyes light orange coloured brown, with a strong metallic lustre" (A. Smith).

Size. Total length of one (Brit. Mus.), 164 (95 + 69) mm., surpassed by a ♂ (M.C.Z. 9317) of 177 (90 + 87) mm. from Jakhalswater.

Remarks. FitzSimons (1937a) states that only 5 of the 9 cotypes in the British Museum are adult. Parker (1936c) in an admirable survey of the then involved situation, points out that the degree of stellation of the dorsal tubercles is largely an age character so that one may expect young *P. b. turneri* to resemble *P. b. bibronii* rather than adults of their own race. He resolves the confusion by providing a key which, except in the matter of snout length, has been found both by FitzSimons and myself to respond substantially to the distribution of the races as laid down by Parker and followed here. It is probable that a few of the localities from border regions will require adjustment as to subspecies when someone can undertake a reëxamination of the specimens on which they were based.

Anatomy. The so-called branchial arch is discussed by Hewitt (1920), the eye by Mann (1931).

Temperament. Sociable, as many as fifteen being taken from one rock fissure (Power).

Habits. When resident in human habitations, feeds on moths by lamplight (Power).

Habitat. Though found in little frequented and poorly lighted buildings, for it shuns the light, it resides chiefly in rock fissures (A. Smith). Common on kopjes near Kimberly (Hewitt & Power).

Localities. **Cape Province:** Bredasdorp; Burghersdorp; Caledon; Calvinia District; Cape Flats; Clanwilliam; Colesberg; Cradock; De Aar; Fort Richmond, Herbert; Garies; Graaf Reinet; Grahamstown; Hanover; Hounslow; *Jakhalswater; Jakhalswater to Orange River; Karroo Hills, Kenhardt; Kimberly; Klipfontein; Little Namaqualand; Lorenz River; Matjesfontein; Montague; Mortimer; Merwe; Nieuwerust; O'okiep; Orange River Station; Prieska; *Prince Albert; Rooidam, Kimberly; Soebartsfontein; ? Steinkopf (Roux); Swellendam; Witmoss.

Range. Cape Province (including Little Namaqualand, but excluding southern coastal belt, Pondoland, Natal and Zululand).

Superstitions. In country districts believed to bite sheep and goats with fatal results though no gecko is poisonous (Hewitt, 1937e).

Pachydactylus bibronii pulitzerae Schmidt

1867a. *Homodactylus Bibroni* Bocage (not A. Smith), p. 220.
1885d. *Pachydactylus bibronii* Boulenger (part), p. 201 (Benguela).
1887a. Bocage, pp. 202, 209.
1895a. Bocage, p. 15.
1926a. Mertens, p. 152.
1937b. Monard (part), p. 53 (omit own material).
1933. *Pachydactylus bibronii pulitzerae* Schmidt, Ann. Carnegie Mus., **22**, p. 6, pl. i: Pico Azevedo, Angola.
1936c. Parker, p. 129.
1937b. Mertens, p. 7.
1938e. Mertens, p. 431.

Native names. *Camungluquira* (also spelt *Canumgluquira*; at Catumbela: Bocage); *ongueia cocolo* (at Quissange: Bocage); *quibandobando* (at Capengombe: Bocage).

Description. Snout obtuse, convex; ear-opening moderate, vertically oval; granules on snout subconical, smooth, much larger than those on occiput, which are intermixed with larger, oval, mostly

non-stellate tubercles; cheeks swollen; mental slightly narrower or broader than adjacent labials; gular scales small, imbricate.

Body and flanks covered with small, unequal, smooth, juxtaposed or imbricate scales intermixed with longitudinal rows of large, oval, rather strongly keeled tubercles, those on flanks more conical; ventral scales slightly larger than dorsals, subequal to, or slightly smaller than, those towards sides, imbricate; limbs moderate, the adpressed hind limb reaching the elbow; digits moderately long and slender, more strongly dilated at apex than at base; tail depressed, verticillate, tapering, covered above with unequal, irregular, smooth, juxtaposed or imbricate scales and rows of large, keeled, spinose tubercles, below with irregular, smooth, imbricate scales of which the median series is transversely enlarged; tail shorter than head and body.

For characters common to all species, see *Remarks* on p. 338; for scale counts, etc., see statistical table opposite p. 344.

Color. Above, pale sandy to brownish gray; crown of head more or less uniform or variegated with darker; sometimes a faint brown streak from nostril passes through eye to above ear, sometimes another from nostril to supraocular region; limbs uniform or indistinctly barred; back and tail usually with irregular, wavy, brown crossbars, those on back often posteriorly edged with white spots which are chiefly confined to the tubercles. Below, whitish, uniform.

Size. Total length of type ♂ (C.M. 5619), 152 (91 + 61) mm., and paratype ♀ (M.C.Z. 39728), 133 (71 + 62) mm.

Habitat. In human habitations only according to Anchieta (in Bocage); at Humbi fire dislodged ten from a hollow tree which they shared with a monitor (*Varanus niloticus*) reports Monard.

Localities. **South West Africa**—Damaraland: *Erongo Mountain (possibly this specimens represents an undescribed form, but more material is required). **Angola:** Benguela; Catumbela; Cubal; Dombe; Huambo between Catumbela and Corporelo Rivers; Loanda; Morro de Pundo; *Pico Azevedo; Quissange, Mossamedes; Rio Coroca.

Range. Damaraland (Erongo Mountain), South West Africa, north to Benguela Province, Angola (considerable overlapping with *P. b. turneri* requires clarification).

Superstitions. The natives, in whose huts these large geckos live, erroneously believe their bites to be deadly, hence their name of leopard lizard (Capello in Bocage). Possibly confused with another species.

Pachydactylus bibronii turneri Gray

1854. *Pachydactylus capensis* Peters (not A. Smith), p. 615.
1855. Peters, p. 43.
1864e. *Homodactylus turneri* Gray, Proc. Zool. Soc. London, p. 59, pl. ix, fig. 2: "South East Africa" i.e. Tete, Mozambique.
1865b. Peters, p. 457, footnote.
1862a. *Platydactylus (Pachydactylus) Bibronii* Peters (not A. Smith), p. 15.
1869b. *Pachydactylus Bibronii* Peters (not A. Smith), p. 657.
1870b. Peters, p. 110.
1882a. Peters, pp. 25, 133.
1885d. Boulenger (part), p. 201 (Tete only).
1886. Boettger (part), p. 15 (omit ref. and range).
1887b. Boettger (part), p. 140 (omit repeated localities).
1887. Müller, p. 2.
1887. Strauch (part), p. 18 (Otjimbingue).
1888b. Fischer, p. 12.
1893a. Boettger, p. 37.
1895. Jeude, p. 227.
1896c. Bocage (part), p. 115 (omit Cape Province localities).
1898. Werner, 1896–7, p. 140.
1899a. Mocquard, p. 219.
1900b. Tornier, p. 588.
1902b. Tornier, p. 581.
1902a. Werner, p. 338.
1907a. Boulenger, p. 7.
1907j. Boulenger, p. 484.
1907b. Roux, p. 407.
1908b. Mocquard, p. 557.
1909a. Chubb, p. 593.
1909b. Chubb, p. 35.
1910b. Boulenger (part), p. 460 (? Bechuanaland only).
1910a. Werner, p. 308.
1911b. Hewitt, p. 43.
1911. Lampe, p. 157.
1911b. Sternfeld, p. 396.
1911c. Sternfeld, p. 416.
1911d. Sternfeld, p. 13, figs. 9–10.
1912b. Sternfeld, p. 385.
1913. Hewitt & Power (part), p. 150 (omit Cape Province locs.).
1913c. Nieden, p. 68.
1913a. Werner, pp. 27, 32.
1914a. Nieden, p. 450.
1914b. Methuen & Hewitt, p. 129.
1915c. Werner (part), p. 333 (omit Keetmanshoop; Okahandja; Windhoek).
1923d. Loveridge, p. 846.

1923h. Loveridge, p. 941.
1924b. Loveridge, p. 9.
1928. Cott (part), p. 952 (omit Mortimer).
1928d. Loveridge, p. 63.
1933a. Power (part), p. 214 (Upington only).
1934a. Cott (part), p. 148 (omit Mortimer).
1934. Pitman, p. 302.
1934. Power, p. 105.
1937b. Monard (part), p. 53 (Humbi; Kampulu; Mupanda).
1941. Witte, p. 115.
1910a. *Pachydactylus bibronii* var. *stellatus* Werner, Denks. Med.-Nat. Ges. Jena, **16**, p. 309: Great Namaqualand, South West Africa.
1911b. *Pachydactylus stellatus* Hewitt, p. 43.
1933. Schmidt, p. 5.
1911b. *Pachydactylus fasciatus* Sternfeld (not Boulenger), p. 397.
1935a. *Pachydactylus bibronii bibronii* FitzSimons (part), p. 527 (Dakatlon and Oup River, B.P.).
1935b. FitzSimons (part), p. 336 (omit part range).
1935a. *Pachydactylus bibronii stellatus* FitzSimons, p. 528.
1936c. *Pachydactylus bibroni turneri* Parker, p. 129.
1937e. Loveridge, p. 495.
1937b. Mertens, p. 6.
1937d. Mertens, p. 4.
1937f. Mertens, p. 11.
1938. FitzSimons, p. 165, fig. 4.
1939b. FitzSimons, p. 27.

Name. Amacanda-pobolo (Matabele: Chubb).

Description. Snout obtuse, convex; ear-opening moderate, vertically oval; granules on snout convex, smooth or keeled, much larger than those on occiput, which are intermixed with larger, round or oval, stellate tubercles; cheeks swollen; mental as broad as, or slightly narrower or broader than, adjacent labials; gulars flat, juxtaposed or imbricate.

Body and flanks covered with small, unequal, smooth or keeled, juxtaposed granules or imbricate scales intermixed with longitudinal rows of large, oval or round, more (adult) or less (juvenile) stellate, strongly keeled tubercles, those on flanks like those on back; ventral scales slightly larger than dorsals, those in middle smaller than those towards sides, juxtaposed or imbricate; limbs short or moderate, stout, the adpressed hind limb reaching the wrist or elbow; digits moderately long and slender, more strongly dilated at apex than at base; tail depressed, verticillate, tapering, covered above with unequal, irregular, keeled, juxtaposed or imbricate scales and rows of

large, keeled, spinose tubercles, below with irregular smooth, imbricate scales of which the median series is more or less enlarged; tail shorter than, or equal to, head and body.

For variation in gulars and characters common to all species, see *Remarks* on p. 338; for scale counts, etc., see statistical table opposite p. 344.

Color. Above, pale sandy gray or grayish to olive brown; crown of head reddish brown variegated with darker; usually a dark brown streak from loreal region passes through eye to above ear-opening, another from nostril to supraocular region; limbs uniform, or indistinctly barred; back and tail usually with irregular, wavy, brown crossbars, those on the back posteriorly edged with white; regenerated tails often uniform. Below, whitish, uniform.

Size. Total length of ♂ (M.C.Z. 21518), 169+ (95 + 74+) mm., and ♀ (M.C.Z. 21513), 162 (85 + 77) mm., from Keetmanshoop and Luderitz Bay respectively.

Remarks. Named for J. Aspinall Turner, though collected by Sir John Kirk during the Livingstone Expedition.

Juvenile *b. turneri* are often almost indistinguishable from typical *bibronii* but usually may be separated on the greater elevation and wider spacing of the dorsal tubercles, according to FitzSimons (1938), who should be consulted regarding variation in the subdigital scansors etc.

Parker (1936) employs snout length as a character on which to separate *b. turneri* (in which it is allegedly no longer than the distance between eye and ear-opening) and *b. pulitzerae* (in which it is allegedly much longer). Actually this character is individual, not even sexual, for in M.C.Z. 21514, 21518, and 42690 snout length equals the distance between eye and ear-opening, while in M.C.Z. 21513, 21519 and 42691 from the same three localities (Luderitz Bay; Keetmanshoop; Maltahöhe) it is slightly longer and not differing from our paratype (M.C.Z. 39728) of *b. pulitzerae* from Pico Azevedo.

I have examined the Mulondo specimen of "*stellatus*" recorded by Schmidt (1933) and find it definitely referable to *turneri*, on the strength of which I imagine that Monard's (1937b) material of "*bibronii*" from Humbi, Kampulo and Mupanda, localities which surround Mulondo, are also of the race *turneri*.

Diet. Five Igulwe geckos were gorged with termites, a sixth held a large cricket; in a Dodoma gecko were seven earwigs (Loveridge). In four Charre geckos were 14 termites, 23 ants including *Pheidole punctata*, 3 beetles (Lamellicorn, Tenebrionid and ? Cicindelid); a grasshopper (*Ailopus* sp.), earwig and spider (Cott).

Enemies. In stomach of a house snake (*Boaedon l. lineatus*) (Peters); one being swallowed by a spotted wood snake (*Philothamnus s. semivariegatus*) at Manyoni (Loveridge).

Defence. When handled these large geckos bite with some vigor, their powerful jaws being capable of drawing blood. Having taken hold they retain their grip with bulldog tenacity and will remain holding on for several minutes without attempting to escape. When seized they emit a shrill whistling squeak (Cott).

Habits. At Charre, unlike the nocturnal *Hemidactylus mabouia* (with which it was associated at Dodoma. A.L.), *P. b. turneri* will hunt insects on sunny walls (apparently differing from the typical form in this respect. A.L.), slipping out of sight with the utmost rapidity when approached (Cott).

Habitat. On trunk of mango at Singino (Tornier). Chiefly arboreal, favouring old tree stumps with ragged bark beneath which the gecko can seek shelter; often found in savanna forest far removed from human habitations. In the latter it is found in the thatched roofs of outbuildings such as a latrine at Charre, where they were doubtless attracted by flies (Cott). In native huts of Gordonia (Hewitt & Power). Also beneath stones and in deserted termite hills, where they may live with Namaqua mice and other small rodents. As yet the species does not appear to have invaded the central Kalahari (FitzSimons).

Localities. **Tanganyika Territory:** *Dodoma; *Igulwe; Matete Bach; Rufigi; Singino; Tendaguru Mountain; Usaramo. **Mozambique:** Boror; Tete; Zambezi Plains. **Nyasaland. Northern Rhodesia:** Muchingas near Serenje; Mumbwa; Petauke. **Southern Rhodesia:** *Birchenough Bridge; *Bulawayo; Eldorado; Fig Tree; Springvale Farm near Bulawayo. **Bechuanaland Protectorate**[1]**:** Dikgatlon (Dakatlon), Kuruman River; Francistown; Gaberones; Kalakamati; Kyky on Nosop River; Lower Molopo; Mabeleapudi to Lake Ngami; Mabeleapudi to Machumi Pan; Maun; Molepolole; Motlhatlogo; Oup River; Titumi; Witdraai. **Transvaal:** Barberton; Comati-Crocodile Rivers junction; Malelane Camp, Kruger Park; *Malta and Skelni; Leydesdorp District; Pretoria District; *Roodeplaat, Pretoria District; Satara Camp between Olifant and Sabi Rivers; Zoutpansberg. **Orange Free State:** Modder River. **Cape Province:** Brandvlei; Hantam; near

[1] Bechuanaland specimens, as pointed out by Parker, occupy a somewhat intermediate position and are often difficult to assign. The reference of all records to *P. b. turneri* is arbitrary, and may be considered tentative pending further clarification.

Kamaggas; Rietfontein; *Soebatsfontein; Taungs; Upington; Van Wyksvlei. **South West Africa:** *Aroab; Aus and vicinity; *Aus to Kubub; Barby Farm; Brukkaros Mountain; Chamis; Damaraland; Great Namaqualand; Helmeringshausen; Hereroland; Kalkveld; Kamanyab; Karibib; Karub; *Keetmanshoop; *Kolmanskop; Kovies Mountain, Namib Desert; Kubub; Kuibis (Suibes); Lake Otjikoto; *Luderitz Bay; *Maltahohe; Narubis; Narudas Sud Farm; Nauchas; Okahandja; Oshikango; Otavifontein; Otjimbingue (Neu Barmen); Otjiwarongo to Sukses; Otjosongombe; Outjo; Penguin Island, Luderitz Bay; Rehoboth; Rietmond; Seeheim; Swakopmund; Tsumeb; Warmbad; Windhoek. **Angola:** Campulu near Casinga; Humbe (Humbi); Mulundo (Mulondo); Mupanda. **Belgian Ruanda:** Volcano region (*fide* Sternfeld, 1912b).

Range. Belgian Ruanda and Tanganyika Territory south to Mozambique, west through Nyasaland, the Rhodesias, Transvaal, Bechuanaland and Orange Free State to Little Namaqualand and adjacent Cape Province, north through South West Africa to southern Angola.

Pachydactylus tuberculosus (Boulenger)

1894e. *Elasmodactylus tuberculosus* Boulenger, Proc. Zool. Soc. London, pp. 723, 727, pl. xlvii, fig. 2: Lower Congo.
1933m. Witte, p. 71.
1896. *Pachydactylus boulengeri* Tornier, Die Kriechthiere Deutsch-Ost-Afrikas, p. 26, pl. ii, fig. 1: Tabora and Kakoma, Tanganyika Territory.
1897a. Tornier, p. 63.
1898. Tornier, p. 284, fig. 3.
1900b. Tornier, p. 588.
1911b. Hewitt, p. 43.
1913c. Nieden, p. 68.
1913d. Werner, p. 40.
1923d. Loveridge, p. 846.
1923h. Loveridge, p. 941.
1924b. Loveridge, p. 9.
1933h. Loveridge, p. 293.
1933m. Witte, p. 70, pl. iii, fig. 3.
1934. Brongersma, p. 165.
1934. Pitman, p. 302.
1937f. Loveridge, p. 495.
1937d. Mertens, p. 4.

1913b. *Elasmodactylus triedrus* Boulenger, Revue Zool. Afr., **3**, p. 104, figs.: Kikondja, Katanga, Belgian Congo.
1920a. Loveridge, p. 140.
1923d. Loveridge, p. 847.
1923h. Loveridge, p. 942.
1924b. Loveridge, p. 9.
1931c. Witte, p. 42.
1928d. *Pachydactylus triedrus* Loveridge, p. 63.
1934. *Pachydactylus tuberculosus* Brongersma, p. 165.

Name. *Mwenkenyo* (Nyaturu: Loveridge).

Description. Snout obtuse, convex; ear-opening moderate, obliquely oval; granules on snout convex, smooth or keeled, much larger than those on occiput, which are intermixed with larger, round, conical, smooth (juvenile) or stellate (adult) tubercles; cheeks swollen (adult) or not swollen (juvenile); mental much broader than adjacent labials; gulars minute, granular and juxtaposed or flat and imbricate.

Body and flanks covered with small, unequal, striate or keeled, juxtaposed granules intermixed with irregularly disposed longitudinal rows of large, oval, subconical or conical, stellate, strongly keeled tubercles, those on flanks slightly more conical, stellate and keeled; ventral scales slightly larger than dorsals, those in middle subequal to those towards sides, juxtaposed, subimbricate or imbricate; limbs short or moderate, stout, the adpressed hind limb reaching the wrist (adult) or elbow (juvenile); digits moderately long and slender, more strongly dilated at apex than at base; tail depressed, verticillate, tapering, covered above with small, stellate, juxtaposed granules and rows of flattish, obtusely keeled, spinose tubercles, below with irregular, smooth, imbricate scales of which the median series is transversely enlarged; tail longer than head and body.

For characters common to all species, see *Remarks* on p. 338; for scale counts, etc., see statistical table opposite p. 344.

Color. Above, pale sandy brown, grayish brown, or dark gray brown, more or less uniform, at least when adult; rarely a dark brown streak from second labial passes through eye to above ear, sometimes another from nostril to supraocular region; back of young geckos with six pairs of dark blotches on either side of vertebral line, occasionally with an additional row on either flank; limbs uniform or indistinctly marbled with darker; tail with eleven dark crossbars in young. Below, whitish, uniform, or with a few dark annuli on end of tail in young.

Size. Total length of *triedrus* type ♂ (Congo Mus.), 107+ (64 +

43+) mm., length from snout to vent of *tuberculosus* type ♀ (Brit. Mus.), 70 mm.

Total length of ♂ (M.C.Z. 23045), 167 (79 + 88) mm., from Saranda, of ♀ (M.C.Z. 42860), 147 (67 + 80) mm., from Lukafu, being the largest of 10 males and 17 females examined by me. The smallest (M.C.Z. 30594), measuring only 47 (25 + 22) mm., being from Tanga.

Remarks. *Elasmodactylus tuberculosus*, heretofore known only from the ♀ type and a second example recorded by de Witte from Lukafu, a locality from which he recorded *boulengeri* also, judging by the description differs in no respect from *boulengeri* which I must regretfully refer to the synonymy.

The type of *E. triedrus* was reëxamined at my (Loveridge, 1933h) request by de Witte who concurred with my view that it should be synonymized with *boulengeri*.

Werner (1913d), after seeing a specimen of *boulengeri*, retracted his earlier view that it was but a race of *bibronii*. He correctly decided that it did not belong even to the *bibronii* formenkreise.

Breeding. Tornier (1896) attributes to *boulengeri* an account of mating and other habits observed by Böhm at Kakoma. But Böhm also collected *Hemidactylus mabouia* at Kakoma, and as his observations agree closely with the known habits of the latter, I am inclined to think that his remarks apply to the bolder *mabouia* rather than the timid "*boulengeri*"; for a non-herpetologist it would be easy to confuse two such superficially similar house geckos.

Diet. Beetles in one gecko, a plant bug in another (Loveridge).

Habitat. In a dry watercourse near Mwanza; beneath the bark of a dead tree near Handa; at Suna on stems of the Bussu palms whose fibre and branch stalks afforded ample cover; among discarded coconut palm thatching at Tanga; and a score of others on the whitewashed walls of houses, having emerged from the thatch or roof where they spend their days in complete concealment. So shy were they of a flashlight that no sooner did its beam fall upon them than they made for the roof. Their timidity made it necessary to shoot them with a fine charge of dust shot from a .22 that did not damage them in the least. At Suna I observed one to emerge from the thatch at dusk and move down the wall to disappear into a termite hole in the earth floor (Loveridge, 1923h, 1933h).

Localities. **Tanganyika Territory:** *Handa; Isansu to Lake Eyasi; Kakoma; *Kasanga; *Kongwa; Kwa Mtoro Mission; Lake Eyasi; *Mangasini; *Mbala; ? Morogoro; *Mwanza—15 miles

west of, on Sagayo Road; *Saranda; *Shinyanga; *Suna, Singida; Tabora; *Tanga. **Northern Rhodesia:** *Nyamkolo. **Belgian Congo:** Kabalo; Katanga; *Kiambi; Kikondja; Lower Congo; *Lukafu; *Lukonzolwa.

Range. Equatorial Africa from Tanga, Tanganyika Territory across to Lower Congo River, Belgian Congo, south to Nyamkolo, Northern Rhodesia.

Folklore. The Wanyaturu at Suna told me that if one of these lizards groans in a hut, a human occupant of the hut will die (Loveridge).

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INDEX TO GENERA, SPECIES, AND SYNONYMS

(For the purpose of this index only a single entry has been made for binomials that have become trinomials, e.g. pagination for *Ptenopus garrulus* is listed under "*garrulus, Ptenopus g.*").

PLATES

PLATE 1

PLATE 1

Digits of the Gekkonid Genera of Africa

Fig. 1. *Hemitheconyx* (ex. Duméril).
Fig. 2. *Chondrodactylus* (ex. Peters).
Fig. 3. *Ptenopus* (ex. Boulenger).
Fig. 4. *Palmatogecko* (ex. Andersson).
Fig. 5. *Stenodactylus* (ex. Guichenot).
Fig. 6. *Tropicolotes* (ex. Peters).
Fig. 7. *Alsophylax* (ex. M. A. Smith).
Fig. 8. *Gymnodactylus* (ex. J. B. Bory).
Fig. 9. *Quedenfeldtia* (as synonym *Narudasia* in Methuen and Hewitt).
Fig. 10. *Ancylodactylus* (ex. L. Müller).
Fig. 11. *Cnemaspis* (ex. Schmidt).
Fig. 12. *Hemidactylus* (ex. Boulenger).

Fig. 1

Fig. 2

Fig. 3

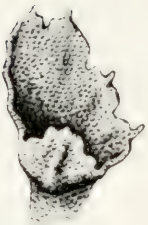


Fig. 4

Fig. 5

Fig. 6

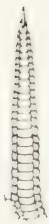


Fig. 7

Fig. 8

Fig. 9

Fig. 10

Fig. 11

Fig. 12

PLATE 2

PLATE 2

Digits of the Gekkonid Genera of Africa

Fig. 13. *Lygodactylus* (ex. A. Smith).
Fig. 14. *Phyllodactylus* (ex. Boulenger).
Fig. 15. *Diplodactylus* (ex. L. Müller).
Fig. 16. *Rhoptropus* (ex. Peters).
Fig. 17. *Phelsuma* (ex. M. A. Smith).
Fig. 18. *Homopholis* (as its synonym *Platypholis* in Boulenger).
Fig. 19. *Tarentola* (ex. Duméril).
Fig. 20. *Colopus* (ex. Peters).
Fig. 21. *Pachydactylus* (as its synonym *Elasmodactylus* in Boulenger).

Fig. 13

Fig. 14

Fig. 15

Fig. 16

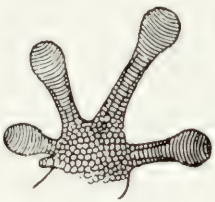


Fig. 17

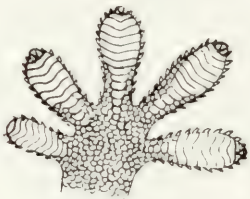


Fig. 18

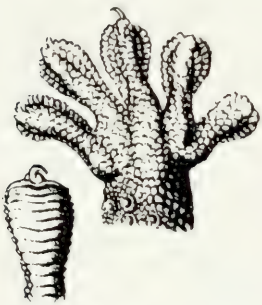


Fig. 19

Fig. 20

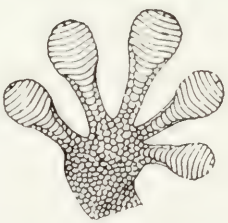


Fig. 21

PLATE 3

PLATE 3

Digits of the Gekkonid Genera of Africa

Fig. 22. *Holodactylus* (M.C.Z. 38693).
Fig. 23. *Saurodactylus* (M.C.Z. 22411).
Fig. 24. *Pristurus* (M.C.Z. 32336; paratype of *tuberculatus* of Arabia).
Fig. 25. *Afroedura* (as *Oedura* in Hewitt).
Fig. 26. *Ptyodactylus* (ex. Barbour).
Fig. 27. *Rhoptropella* (ex. Hewitt).
Fig. 28. *Geckonia* (M.C.Z. 32081).

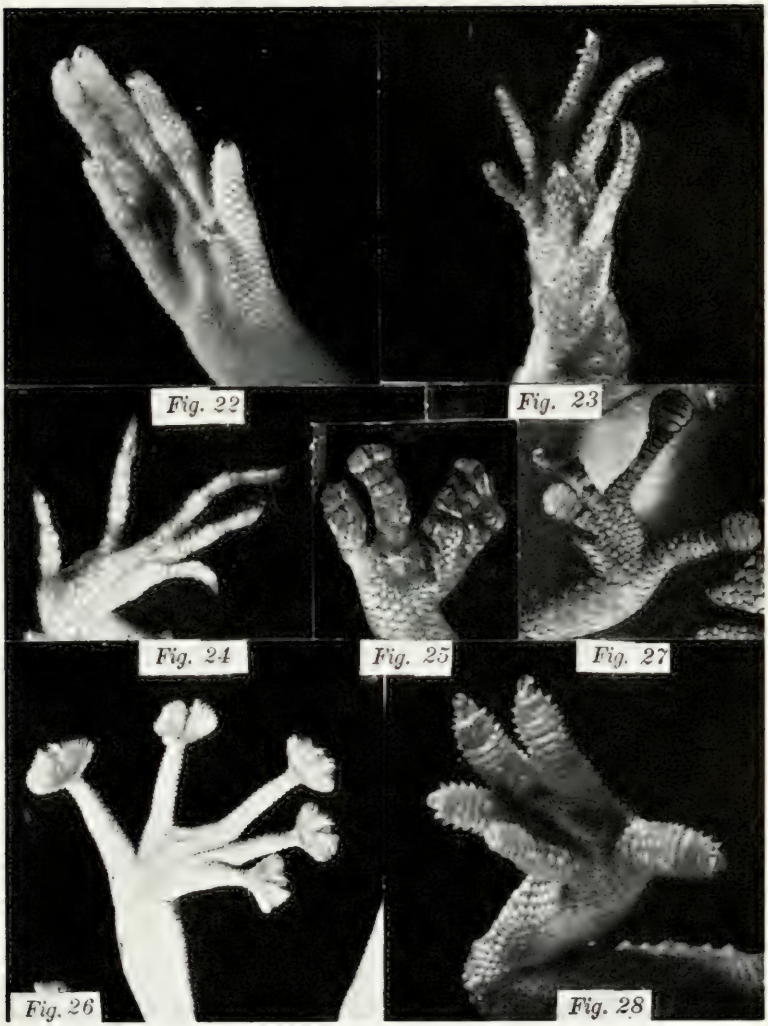


Fig. 22

Fig. 23

Fig. 24

Fig. 25

Fig. 27

Fig. 26

Fig. 28

PLATE 4

PLATE 4

Hemidactylus puccionii (type of *parkeri*. M.C.Z. 22975).

PLATE 5

PLATE 5

Hemidactylus tanganicus (holotype ♀. M.C.Z. 18253).

PLATE 6

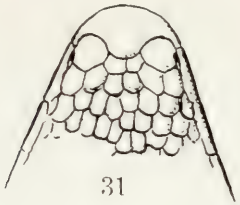
PLATE 6

Fig. 31 Elongate snout *L. angolensis* (M.C.Z. 23044) *c.* 8 x Nat. Size

Fig. 32 Broad snout *L. capensis* (M.C.Z. 40999) *c.* 8 x Nat. Size

Fig. 33 Subcaudals subequal, the median row not, or but irregularly and occasionally enlarged *Lygodactylus angolensis* (M.C.Z. 23044) *c.* 6 x Nat. Size

Fig. 34 Subcaudals with median row strongly enlarged transversely *Lygodactylus p. picturatus* (M.C.Z.) *c.* 6 x Nat. Size



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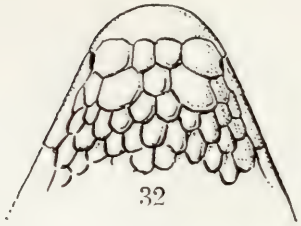

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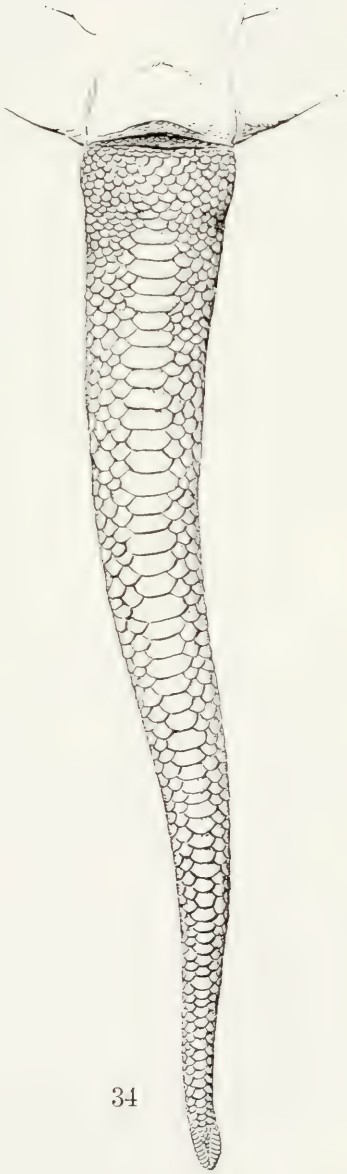

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PLATE 7

PLATE 7

Afroedura karroica bogerti (Holotype ♂. A.M.N.H. 47841).


A.W.F.

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AT HARVARD COLLEGE
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THE SPECIES OF THE PSEUDOSCORPION GENUS CHELANOPS DESCRIBED BY BANKS

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Colorado Agricultural and Mechanical College

With Four Plates

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No. 1 — *The Species of the Pseudoscorpion Genus Chelanops described by Banks*[1]

By C. Clayton Hoff

Through the kindness of Dr. Thomas Barbour and Mr. Nathan Banks, the writer was privileged to study at the Museum of Comparative Zoölogy most of the species described by Banks (1890, 1891, 1893, 1894, 1895, 1898, 1901, 1902, 1908, 1909a, 1909b, 1909c, 1914) in the pseudoscorpion genus *Chelanops* Gervais, 1849. A restudy of these species became necessary with the erection of numerous new genera based on characteristics formerly considered unimportant. In order to allow satisfactory assignment of many of the species to modern genera, it was necessary to redescribe the types in detail.

The genus *Chelanops*, as used by Banks and some other early writers, may be characterized as follows: carapace with one or two transverse furrows; chelicera with serrula exterior attached throughout, galea present; eyes sometimes two, usually wanting; palpi usually short and stout, palpal femur with a definite pedicle. Used in this wide sense, the genus *Chelanops* appears equivalent to the present superfamily *Cheliferoidea* Chamberlin, 1931, (*Cheliferides* Beier, 1932) or even to the suborder *Monosphyronida* Chamberlin, 1929, (*pro parte Cheliferina* Beier, 1932), with the exclusion in either case of species lacking one or more transverse carapacal furrows and of those with slender palpi in which the femur does not have a definite pedicle. The old genus *Chelanops* thus includes species which are now assignable to several different families, chiefly, however, to the four families of the *Cheliferoidea*: *Atemnidae* Chamberlin, 1931; *Chernetidae* Menge, 1855; *Myrmochernetidae* Chamberlin, 1931; and *Cheliferidae* Hagen, 1878. The majority of the *Chelanops* species described by Banks belong in the family *Chernetidae*.

The present study is concerned with a redescription and a generic reassignment of 26 of the 28 *Chelanops* species described by Banks. One species, *texanus*, initially described in the genus *Chelifer* by Banks (1891), and another, *pallidus*, originally placed in the genus *Chernes* (Banks, 1890), were later transferred to *Chelanops* by Banks (1895). Types of these 26 species are deposited in the Museum of Comparative Zoölogy. The two species of *Chelanops* described by Banks, not available there, are *Chelanops arizonensis* Banks, 1901, and *C. nigrimanus*[2] Banks, 1902. The former is the genotype of *Epapho-*

[1]Published with the aid of a special gift from Mr. G. R. Agassiz.

[2]*Species incertae sedis*; deposition of type individuals uncertain, perhaps in the National Museum. Dr. Chapin as yet has not located the type specimens.

chernes Beier, 1932. Type specimens of *Chelanops arizonensis* along with some cotypes of *C. tristis*, *C. validus*, *C. latus*, and *C. tumidus* are in the United States National Museum, according to a personal communication recently received from Dr. Edward A. Chapin, Curator of the Division of Insects.

The 26 species redescribed in the present paper and their systematic positions are as follows:

Family Chernetidae Menge, 1855
- Subfamily Lamprochernetinae Beier, 1932
  - *Lamprochernes grossus* (Banks, 1893)
- Subfamily Chernetinae Beier, 1932
  - Tribe Chernetini Beier, 1932
    - *Parachernes* (*Parachernes*) *Latus* (Banks, 1893)
    - *P.* (*P.*) *latimanus* (Banks, 1895)
    - *P.* (*Argentochernes*) *diversus* (Banks, 1909)
    - *P.* (*A.*) *virginica* (Banks, 1895)
    - *P.* (*A.*) *confraternus* (Banks, 1909) Beier, 1932
    - *P.* (*A.*) *pulchellus* (Banks, 1908) Beier, 1932
    - *P.* (*A.*) *tumimanus* (Banks, 1908)
    - *Mexachernes* (new genus) *calidus* (Banks, 1909)
    - *Neoallochernes* (new genus) *garcianus* (Banks, 1909)
  - Tribe Hesperochernetini Beier, 1932
    - *Mirochernes dentatus* (Banks, 1895) Beier, 1930
    - *Chelanops affinis* Banks, 1894
    - *Hesperochernes pallipes* (Banks, 1893)
    - *H. pallidus* (Banks, 1890)
    - *H. unicolor* (Banks, 1908)
    - *Dinocheirus partitus* (Banks, 1909) Roewer, 1937
    - *D. obesus* (Banks, 1909)
    - *D. æqualis* (Banks, 1908) Roewer, 1937
    - *D. dorsalis* (Banks, 1895)
    - *D. validus* (Banks, 1895) Beier, 1932
    - *D. tumidus* (Banks, 1895) Beier, 1932
    - *D. tristis* (Banks, 1891)
    - *Dendrochernes morosus* (Banks, 1895)
    - *Pseudozaona uniformis* (Banks, 1914)

Family Cheliferidae Hagen, 1878
- Subfamily Withiinae Chamberlin, 1931
  - Tribe Withiini Chamberlin, 1931
    - *Withius texanus* (Banks, 1891)
    - *Neowithius cubanus* (Banks, 1909)

The writer has attempted to describe the specimens of each species in sufficient detail to make possible assignment to the correct modern genus. To do this, one or more representatives were cleared in beechwood creosote (body but not appendages treated with KOH solution) and mounted in clarite. Outline drawings, chiefly showing the shape of the palpal podomeres, were made with the aid of a camera lucida. Measurements were made with a calibrated ocular micrometer.

Suborder MONOSPHYRONIDA Chamberlin, 1929
Superfamily CHELIFEROIDEA Chamberlin, 1931
Family CHERNETIDAE Menge, 1855
Subfamily LAMPROCHERNETINAE Beier, 1932

Lamprochernes grossus (Banks)

Chelanops grossus Banks, 1893, p. 65; Banks, 1895, p. 5; Coolidge, 1908, p. 110. *Chelanops* (?) *grossus* Beier, 1932, p. 179; Roewer, 1937, p. 302.[1]

The type collection consists of several adults and young. No males were distinguished, but sex cannot always be determined without clearing the specimen. This description is based chiefly upon two mounted females. In the vial containing the type specimens of *grossus*, there are a few individuals of another species, which was not studied.

The original description by Banks (1893) is as follows:

"Length, ♀, 4.7 mm.; ♂, 3.3 mm. Similar to *C. elongatus* Say, but very much larger. Palpi uniform dark red-brown; anterior part of cephalothorax similar but paler, beyond the suture yellowish; dorsal scutae, yellow-brown; legs, pale. Body very long and narrow; cephalothorax shining, smooth; palpi with long simple hairs. Palpi similar to *C. oblongatus*; hand longer and the sides more parallel; the tibia not so much swollen on the inner side and thus more slender.

"Colorado. [Dr. C. F. Baker.] Apparently common."

Male: Not studied.

Female: Body large, elongate, 4 to 5 mm. long; body yellowish brown to brown; palpi darker, reddish brown. *Carapace* mostly smooth, a little granular on the sides; anterior margin rounded, posterior margin nearly straight, with 16 marginal setae; much darker in color anterior to the transverse furrow than posterior to the furrow; setae

[1]The writer makes no assertion that these synonymies are complete. An attempt has been made, however, to give all important references for each species discussed.

appear sparse on the upper surface; length about 1 mm., width 0.75 to 0.85 mm.; eyes wanting; *Abdomen* yellowish brown; 3 to 3.5 mm. in length, greatest width about two-fifths of the length; tergites, except first and last, completely divided; between 16 and 20 acuminate setae on each tergite from the first through the tenth. Sternites, except the last, divided; usually 20 or more setae on each of tergites five to ten.

Chelicera. Length of base about 0.30 mm., width about 0.16 mm.; movable finger about 0.25 mm. long. Flagellum of three setae; distal seta toothed along anterior margin. Fixed finger with lamina exterior; serrula interior with five distal teeth separate and marginally serrate; terminal tooth with two small denticles on inner surface; internal margin of finger apparently with four denticles. Movable finger with serrula exterior of 20 to 22 ligulate plates; subapical lobe on inner margin of finger just distal to insertion of galeal seta; galea with 10 terminal and lateral rami, these simple and slender.

Palpus (Fig. 1). Moderately stout; partly granular; setae acuminate or subacuminate with minute subterminal denticulations. Maxilla 0.51–0.55 mm. long, 0.32–0.34 mm. wide. Trochanter fairly slender, subdorsal protuberance present; anterior or flexor margin weakly convex; length about 0.57 mm., width about 0.32 mm. Femur with pedicle about as long as wide and well set-off from rest of podomere; extensor margin convex and somewhat bulging; flexor margin basally convex but little concave distally; length[1] 0.83–0.96 mm., width 0.37–0.41 mm.; length 2.2 to 2.35 times the width. Tibia with extensor margin flatly convex in basal three-fourths; flexor margin convex becoming a little concave near distal end; pedicle about as long as wide; length 0.82–0.93 mm., width 0.38–0.41 mm.; length 2.15 to 2.25 times the width. Chela with hand stout; both margins of hand a little convex; pedicle near center of base of chela; fingers a little curved and fairly stout; length of chela 1.28–1.44 mm., width 0.49–0.55 mm.; length of chela 2.6 to 2.85 times the width; depth of chela about the same as width; length of hand without pedicle 0.75–0.77 mm.; movable finger shorter than hand without pedicle, 0.63–0.67 mm. long. Fixed finger with eight tactile setae: *et* less than one-sixth of finger length from tip; *est* near midpoint of finger or a little distal to midpoint; *ist* on nearly the level of *est*; *it* closer to *ist* than to level of *et*; other setae basal in position. Movable finger with *t* about one-third of finger length from tip; *st* a little closer to *sb* than

[1]Length and width measurements of the femur, tibia, and chela of the palp are based on four individuals, the two mounted in clarite and two in alcohol.

to *t*; *b* and *sb* not far from base of finger. Nodus ramosus of movable finger a little proximal to level of tactile seta *t*. Marginal teeth of fingers about 35 or 40 in number; external accessory teeth of fixed finger between four and eight in number; between four and six external accessory teeth on movable finger; only one or two internal accessory teeth on each finger.

Legs. Moderately stout, yellow in color; setae long and acuminate. First leg with femur (both parts taken together) 0.53–0.60 mm. long, 0.19–0.20 mm. deep, length 2.8 to 3.0 times the depth; tibia 0.40–0.45 mm. long, 0.125–0.135 mm. deep, length 3.2 to 3.3 times the depth; tarsus 0.32–0.37 mm. long, 0.08–0.09 mm. deep, length 4 to 4.1 times the depth. Fourth leg with trochanter about 0.35 mm. long or slightly less, depth a little more than one-half of length; pars basalis about 0.33 mm. long, about 0.23 mm. deep, length between 1.4 and 1.5 times the depth; pars tibialis 0.60–0.65 mm. long, 0.27–0.29 mm. deep, length 2.2 to 2.3 times the depth; entire femur 0.75–0.85 mm. long, between 2.8 and 3.0 times the depth; tibia 0.57–0.65 mm. long, 0.16–0.175 mm. deep, length 3.55 to 3.7 times the depth; tarsus 0.42–0.45 mm. long, 0.11–0.115 mm. deep, length 3.8 to 3.9 times the depth; tactile seta of tarsus about one-fourth of length of tarsus from proximal margin.

Genital complex. Anterior operculum with a group of four to five well-spaced setae on each side of a medially placed group of 10 to 12 setae; posterior operculum with 10 to 12 marginal setae.

Type Locality. Colorado. Apparently no other records.

Remarks. As indicated in the original description, this species is related to *Lamprochernes oblongus* (Say, 1821), a very common species in the United States east of the Rocky Mountains. *Lamprochernes grossus* can be separated easily from *L. oblongus* by the large body size and differences in the palps. Because of its size, *L. grossus* superficially resembles *L. samoanus* Chamberlin, 1938, from Samoa, but differences in the palps, especially the relatively much shorter chelal finger in the latter, make separation of the two species easy. The species most closely related to *L. grossus* seems to be *L. ellipticus* Hoff, 1944, from Lower California, Mexico. Separation can be made on the basis of the slightly larger size of *L. grossus*, the much stouter tibiae and tarsi of the legs, as well as other details. These differences (for females only) are shown in the accompanying table.

TABLE SHOWING IMPORTANT DIFFERENCES BETWEEN *LAMPROCHERNES ELLIPTICUS* AND *L. GROSSUS*

	L. ellipticus	*L. grossus*
Number of setae on posterior carapacal margin	8–10	16
Body length	3.5 mm.	4 mm. or more
Number of rami on galea	6	10
Number of external accessory teeth:		
on fixed finger	12	4–8
on movable finger	9	4–6
Length/width ratio, palpal tibia	1.9	2.15 to 2.25
Length/width ratio, tibia of leg I	3.9	3.2 to 3.3
Length/width ratio, tarsus of leg I	5.0	4.0 to 4.1
Length/width ratio, tibia of leg IV	4.1	3.55 to 3.7
Length/width ratio, tarsus of leg IV	4.4	3.8 to 3.9

Subfamily CHERNETINAE Beier, 1932
Tribe CHERNETINI Beier, 1932

Parachernes (Parachernes) latus (Banks)

Chelanops latus Banks, 1893, pp. 64–65; Coolidge, 1908. p. 111.
Neochernes latus Beier, 1932, p. 165; Roewer, 1937, p. 298.

The type collection consists of one gravid female, one female, one male, and one nymph. The male and female were mounted in clarite and provide most of the details for the following descriptions. The male is here designated the lectotype.

Male: Body fairly stout, ovate; yellowish brown with carapace, tergites, and palpi reddish brown; length of body 2.75 mm. *Carapace* with granular surface; setae subclavate and multidenticulate, scattered, not especially numerous; posterior margin a little convex, with ten marginal setae; anterior and lateral margins rounded; eye-spots placed far anterior and weak; median transverse furrow very heavy; posterior furrow weakly developed and much closer to posterior carapacal margin than to median furrow; greatest width close to posterior margin and little less than length; length of carapace 1.05 mm., width 0.96 mm. *Tergites*, except eleventh, divided; surface granular; maximum number of setae in any half-tergite about nine; setae subclavate. *Sternites* divided, weakly sculptured; setae acuminate, few more than on tergites; each anterior stigmatic plate with three setae, each posterior plate with one; pleural membranes with irregular but parallel striations; abdomen 1.7 mm. long, 1.3 mm. wide.

Chelicera. Base fairly stout, fingers slender; basal and subbasal setae with a few denticulations near end; flagellum of three setae, distal one with a few minute denticulations along distal one-third of anterior margin; length of chelicera 0.265 mm., width of base 0.16 mm. Fixed finger with three small denticles on inner margin of apical tooth, followed proximally by three teeth along distal end of finger margin. Movable finger a little curved; serrula exterior with 22 to 23 ligulate plates; galea with stout base and some simple, spine-like rami along distal half or less of galea; galeal seta extending beyond tip of galea.

Palpus (Fig. 2). Stout; surface granular except on chelal fingers and ventral surface of maxilla; dark reddish brown; setae paucidenticulate except for acuminate setae on fingers and on ventral surface of maxilla. Maxilla about 0.5 mm. long, 0.37 mm. wide. Trochanter with well-developed protuberance; length 0.5 mm., width 0.34 mm. Femur with pedicle much wider than long and sharply set-off from rest of femur, widest near center; flexor margin weakly convex; extensor margin flattened in proximal half but convex beyond; length 0.83 mm., width 0.37 mm. Tibia flatly convex on extensor margin; flexor margin centrally convex, flattened and almost concave near distal end; pedicle stout; length of tibia 0.85 mm., width 0.38 mm. Chela from the dorsad stout, with hand widest toward base; pedicle displaced somewhat toward extensor side; outer margin weakly to moderately convex, inner margin much more convex and somewhat bulging; chelal hand tapering rapidly toward fingers; fingers relatively slender and gently curved; length of chela 1.48 mm., width 0.57 mm., length 2.6 times the width; depth of hand 0.61 mm., a little more than width; length of hand without pedicle 0.84 mm.; movable finger shorter than hand, measuring about 0.7 mm. Chela from the side with hand very wide; ventral margin weakly convex, dorsal margin flatly convex, pedicle displaced far towards ventral side; setae numerous on both ventral and dorsal surfaces; fixed finger relatively stout in side view with inner margin convex, outer margin weakly concave; movable finger more slender, curved, with inner margin conspicuously concave, outer markedly convex. Marginal teeth of both fingers very small and contiguous, probably 60 to 70 in number; movable finger with three internal accessory teeth, external ones not determined; 13 external accessory teeth on fixed finger, internal teeth not determined. Movable finger with *t* near midpoint of finger, *b* and *sb* near base of finger and separated by about one areolar diameter, *st* almost midway between *t* and *sb* but a very little closer to latter;

nodus ramosus near level of tactile seta *t*. Fixed finger with *et* about one-fourth of finger length from tip; *est* within the basal one-fourth of finger; *esb* and *eb* close together at finger base; all interior setae within about basal one-third of finger with *it* and *ist* separated by about one areolar diameter and well removed from basal pair, *ib* and *isb*, which are located close together at finger base; *ist* a considerable distance distal to level of *est*.

Legs. Fairly stout, especially the third and fourth; light brown; setae varying from paucidenticulate on basal podomeres to acuminate on distal podomeres; proximal podomeres with granulate surface; claws simple. First leg with margins of both femoral parts weakly convex; pars basalis 0.3 mm. long, 0.2 mm. deep; pars tibialis 0.43 mm. long, 0.195 mm. deep; tibia with extensor margin weakly S-shaped, flexor margin convex, deepest near distal third, 0.4 mm. long, 0.13 mm. deep; tarsus with almost straight margins, subcylindrical, slightly deeper across the very proximal end than elsewhere, length 0.34 mm., width 0.085 mm. Fourth leg with pars basalis subtriangular, flexor margin nearly straight, extensor margin very short; length of podomere 0.37 mm., depth 0.28 mm.; pars tibialis heavy, flexor margin nearly straight and with a few long subacuminate setae, extensor margin evenly and markedly convex with setae short and paucidenticulate; length 0.68 mm., depth 0.345 mm.; length of entire femur 0.86 mm., depth 0.345 mm.; tibia with extensor margin proximally convex but distally straight, flexor margin convex, length 0.63 mm., width 0.18 mm.; tarsus narrowing a little distally, length 0.415 mm., depth 0.113 mm.; tactile seta lost from tarsus, but position indicated by an areole distal to midpoint of podomere and removed 0.255 mm. from proximal margin.

Genital complex. Posterior operculum with about 10 setae along posterior margin; anterior operculum with a large number of scattered setae, mostly broken in specimen.

Female: Measurements given in parentheses are of the gravid female in alcohol; all other measurements are of the female mounted in clarite. Body much like that of male; body length 3 (3.3) mm. *Carapace* as in male; 10 to 12 setae along posterior margin; length of carapace 1.15 (1.1) mm., width near posterior margin 1 (1.05) mm. *Abdomen* 1.9 mm. long, 1.5 mm. wide; some half-tergites with ten setae.

Chelicera. As in male; length 0.275 mm., width of base 0.175 mm.; length of movable finger 0.23 mm.; serrula exterior with 22 plates.

Palpus. Proximal podomeres much as in male, but chela more

slender. Femur 0.85 (0.82) mm. long, 0.37 (0.34) mm. wide; tibia 0.88 mm. long, 0.39 mm. wide. Chela (Fig. 3) from the dorsad subsymmetrical, with pedicle placed not far from center of base; both margins weakly to moderately convex, somewhat flattened; chelal setae appear less numerous than in male; fingers gently curved and about as stout as in male, considerably shorter than hand; length of chela 1.52 (1.44) mm., width 0.53 (0.49) mm., length 2.9 (2.95) times the width; length of hand without pedicle 0.9 mm.; depth of hand a little less than width; length of movable finger about 0.7 mm. From the side, pedicle placed towards ventral margin; both ventral and dorsal margins evenly and moderately convex; fixed finger stouter than movable finger, outer margin nearly straight, inner margin weakly convex; movable finger much as in male. Marginal teeth of each finger 55 to 65 in number; fixed finger with seven external accessory teeth, internal accessory teeth not determined; movable finger with eight external accessory teeth, internal ones not observed. Tactile setae as in male.

Legs. Much as in male, except extensor margin of tibia of each leg more conspicuously S-shaped. First leg with pars tibialis 0.46 mm. long, 0.2 mm. deep; tibia 0.42 mm. long, 0.13 mm. deep; tarsus 0.34 mm. long, 0.95 mm. deep. Fourth leg with pars basalis 0.4 mm. long, 0.275 mm. deep; pars tibialis 0.74 mm. long, 0.34 mm. deep; entire femur 0.96 mm. long, 0.34 mm. deep; tibia 0.69 mm. long, 0.19 mm. deep; tarsus 0.43 mm. long, 0.125 mm. deep, the tactile seta 0.26 mm. from proximal margin of podomere.

Genital complex. Anterior operculum with about 45 scattered setae; posterior operculum with about 10 marginal setae.

Type Locality. "East Florida. Under bark of pine trees. Common." (Banks, 1893). No other known record.

Remarks. The generic position of this and the next species, *P.* (*P.*) *latimanus* (Banks, 1895) is doubtful, since they show certain characteristics of the genus *Scapanochernes* Beier, 1932, and may even key out there in Beier's (1932) and Roewer's (1937) keys. The difficulty in separating *Parachernes* Chamberlin, 1931, and *Scapanochernes* is caused chiefly by the relative width and shape of the chelal hand of the male. Either the distinction between the genera is poor, or a false emphasis is placed upon the importance of the relative width of the palpal chela. It might be better in constructing keys to use some other characteristic, perhaps the position of the tactile seta of the fourth pedal tarsus. Even here, however, confusion is possible as this seta may have a somewhat intermediate position. Neverthe-

less I assign these two species to the genus *Parachernes* (*Parachernes*) for the following reasons: (1) the hand is no wider and no more bulging than in many of the species assigned to the subgenus *Argentochernes* of the genus *Parachernes*; (2) the legs are a little less stout in *latus* and *latimanus* than recorded for *Scapanochernes*, being much like the legs of many other species of *Parachernes*; and (3) the tactile seta of the tarsus of the fourth leg is not at the end of the tarsus but within the proximal two-thirds of the tarsus.

Parachernes (Parachernes) latimanus (Banks)

Chelanops latimanus Banks, 1895, p. 6; Coolidge, 1908, p. 111.
Hesperochernes latimanus Beier, 1932, p. 176; Roewer, 1937, p. 302.

The type collection consists of one very mutilated individual. This was mounted in clarite by the present writer, and is designated as the lectotype.

Male. (Descriptive material enclosed by quotation marks taken from Banks's original description.) "Length, 3 mm. Pale greenish, cephalothorax tinged with brownish. . . . Hard parts finely granulate, and furnished with short, thick, but not clavate hairs. . . . Cephalothorax narrowed and rounded in front, two large white eyespots; abdomen depressed, moderately broad, twice as long as cephalothorax."

Chelicera. About as in *P.* (*P.*) *latus*; length of chelicera 0.27 mm.; length of movable finger 0.235 mm.; serrula exterior with 23 plates.

Palpus. Light in color; greenish brown; surface finely granular except for ventral face of maxilla and fingers of chela; shape of basal podomeres much as in *P.* (*P.*) *latus.* "Palpi short and stout, trochanters much swollen above, convex in front; femur much shorter than cephalothorax, short pedicellate, broadest near base . . .", length 0.85 mm., width about 0.37 mm., length 2.3 times the width; "tibia as long as, but little broader than femur, pedicellate, but little convex on either side"; length of tibia 0.8 mm., width 0.395 mm., length about two times the width; "claw about as long as cephalothorax, very broad at base . . . the basal angles but little rounded, then tapering to the fingers, which are stout, but little shorter than the hand, and curved;" chela (Fig. 4) broken and length not determined; width 0.64 mm.; depth undetermined; length of hand probably about 0.75 mm.; movable finger with length slightly less than length of hand without pedicle, about 0.71 mm. long. Fixed chelal finger with

nine external accessory teeth; other accessory teeth not determined; marginal teeth of both fingers much as in *latus*. Tactile setae of chelal fingers much as in *latus*; *st* only a little closer to *sb* than to *t*.

Legs. Yellow; much as in *P.* (*P.*) *latus*. First leg with entire femur 0.59 mm. long, 0.21 mm. deep; tibia 0.4 mm. long, 0.125 mm. deep; tarsus 0.33 mm. long, 0.09 mm. deep. Fourth leg with trochanter 0.3 mm. long, 0.21 mm. deep; pars basalis 0.37 mm. long, 0.255 mm. deep; pars tibialis 0.68 mm. long, 0.34 mm. deep; entire femur 0.88 mm. long, 0.34 mm. deep; distal podomeres broken.

Genital complex. Posterior operculum with about 20 marginal setae.

Female. Unknown.

Type Locality. "Punta Gorda, Fla.", the only known record.

Remarks. This species is very similar to *P.* (*P.*) *latus* from which it differs as follows: (1) *latimanus* is greenish to light brown, while *latus* is chiefly dark reddish brown; (2) the chelal hand is much more angular in *latimanus* than in *latus*; (3) posterior operculum has 20 marginal setae in *latus*, only 10 in *latimanus*: and (4) the palpal tibia is slightly stouter in *latimanus* than in *latus*.

Parachernes (Argentochernes) diversus (Banks)

Chelanops diversus Banks, 1909b, pp. 304–305.
Neochernes diversus Beier, 1932, p. 167; Roewer, 1937, p. 299.

The type collection consists of one male, which was mounted for study by the present writer. This specimen is designated as the lectotype.

Male. Body fairly stout; brown, with palpi dark reddish brown; length about 2.4 mm., 2 to 2.2 mm. according to Banks (1909b). *Carapace* dark brown, except lighter along posterior margin where the postero-lateral corners are unpigmented; posterior margin with ten subclavate setae; carapace convex on sides; surface granular; two transverse furrows, one just posterior to midpoint, the other slightly closer to posterior margin than to median furrow; surface setae short and subclavate, scattered, not abundant; one pair of eye-spots present; greatest width of carapace across posterior portion; length 0.84 mm., greatest width about 0.72 mm. *Tergites*, except eleventh, divided; tergal halves "brown, but basal three only brown near the middle" (Banks, 1909b); tergites granular; maximum number of setae on each half-tergite about seven (or "eight" (Banks, 1909b)); setae

subclavate and multidenticulate; many microlyrifissures between the setae of each posterior row. *Sternites* little granular, divided; setae fine and acuminate, maximum number of setae in any row about ten; pleural membranes with fine, irregular, somewhat wavy striations; each anterior stigmatic plate with three small setae, each posterior plate with one; length of abdomen 1.55 mm., width about 0.95 mm.

Chelicera. Base stout, fingers slender; basal and subbasal setae with a few subterminal denticulations; flagellum of three setae, the distal one with a few minute denticulations along distal one-third of anterior margin; length of chelicera 0.225 mm., width of base 0.14 mm.; length of movable finger 0.2 mm. Fixed finger with lamina exterior; apical tooth with three small denticles on inner surface followed proximally by three larger teeth along distal end of finger margin; serrula interior with three (possibly four) free plates, the margin of each of these serrate, the distal-most plate spine-like in appearance. Movable finger gently curved; subapical tooth weak; galea with a fairly stout base, otherwise broken and no details available; galeal seta fairly well developed, probably extending slightly beyond end of galea; serrula exterior of 21 ligulate plates, the proximal-most one much longer than the remainder.

Palpus (Fig. 5). Stout and heavy; dark reddish brown; setae paucidenticulate for the most part, "those on femur and tibia almost clavate" (Banks, 1909b); surface of palp, except ventral surface of maxilla and chelal fingers, coarsely to moderately granular. Maxilla with acuminate setae; about 0.41 mm. in length. Trochanter with a large, rounded, dorso-lateral protuberance; flexor margin rounded and with several paucidenticulate setae; 0.37 mm. long, 0.24 mm. wide. Femur with pedicle about as long as wide, very markedly set-off from rest of podomere; podomere widest near pedicle, becoming slightly narrowed toward distal end; setae not especially abundant, often paucidenticulate; surface coarsely granular; extensor margin flatly convex in center; flexor margin weakly convex proximally, but very weakly concave distally; length of femur 0.61 mm., width 0.28 mm. Tibia granular, fewer and heavier setae on flexor than on extensor surface; extensor margin convex, inner side swollen centrally and flattened beyond midpoint; length 0.65 mm., width 0.275 mm. Chela from the dorsad stout, with the pedicle displaced far towards outer margin; outer margin convex but much less so than the greatly bulging inner margin; hand narrowed rapidly to the relatively slender and gently curved chelal fingers; setae of hand relatively long, each

with a few terminal and subterminal denticulations; setae of fingers acuminate; chela without pedicle 1.06 mm. long, width 0.48 mm.; depth of chela 0.46 mm., slightly less than width; length of hand without pedicle 0.56 mm.; length of movable finger 0.53 mm. From the side, chela has a stout hand; ventral margin very flatly convex, almost straight; dorsal margin very bulging and markedly but irregularly convex; basal margin of hand relatively long and straight; fixed finger from side fairly stout, outer margin virtually straight, inner margin weakly convex; movable finger a little less stout, much curved, outer margin conspicuously convex. Fixed finger with nearly 50 contiguous marginal teeth, those of distal part of row conical, becoming more rounded in proximal portion of row; movable finger with a few more marginal teeth than on opposing finger; movable finger with six external and apparently two internal accessory teeth; seven external accessory teeth on fixed finger, internal accessory teeth not determined. Movable finger with four tactile setae: *t* a little distal of midpoint of finger; *b* and *sb* near base of finger and separated by less than two areolar diameters; *st* about midway between *t* and *b*, being a little closer to *sb* than to *t*. External series of tactile setae of fixed finger with *et* about one-fourth of finger length from tip of finger, *est* near finger base not far distal of *esb* and *eb*; internal series with *it* and *ist* about one-third of finger length from base with *isb* and *ib* much more basal in position; *est* on about the same level or slightly proximal to *ist*.

Legs. Moderately stout to stout; yellow; basal podomeres with surface granular and setae paucidenticulate; more distal podomeres almost smooth and setae (as on tarsi) acuminate; each of proximal three podomeres of first leg with both margins convex, stout; pars basalis 0.19 mm. long, 0.16 mm. deep; pars tibialis 0.29 mm. long, about 0.15 mm. deep; tibia with weakly S-shaped extensor margin, flexor margin very convex especially in the distal half, deepest across distal one-third or one-fourth, length 0.29 mm., depth 0.098 mm.; tarsus with margins more or less straight, tapering a little towards distal end, length 0.265 mm., depth 0.07 mm. Fourth leg with podomeres stout; femur with weakly convex flexor margin, extensor margin highly arched and very convex; pars tibialis 0.46 mm. long, 0.255 mm. deep; tibia 0.445 mm. long, 0.14 mm. deep; tarsus 0.32 mm. long, 0.09 mm. deep; both tibia and tarsus shaped much as in first leg. Tactile seta of the tarsus of fourth leg broken, but prominent areole present and located 0.19 mm. from proximal margin of podomere, being just distal to midpoint.

Genital complex. Probably 10 to 12 setae along posterior margin of posterior operculum; eight setae on posterior wall of genital aperture; broken condition of setae on anterior operculum precludes an accurate count.

Female. Unknown.

Type Locality. "Lake Worth, Fla." Banks (1909b) also records the species from Palm Beach, Florida.

Remarks. This species cannot be referred to any other described in the literature.

Parachernes (Argentochernes) virginica (Banks)

Chelanops virginica Banks, 1895, p. 6; Coolidge, 1908, p. 111.
Dinocheirus virginicus Beier, 1932, p. 139; Roewer, 1937, p. 302.

The type collection consists of two individuals, both apparently females, although one is considerably larger than the other. The larger of the two is designated the lectotype and was mounted for study. The description given below is based chiefly on the mounted female, except that measurements are given for certain structures of the alcoholic individual. These measurements are enclosed in parentheses following the corresponding measurements of the mounted individual.

Male. Not available for study.

Female. Body moderately stout; abdomen and carapace dark brown, legs a little lighter; palpi dark reddish brown; length of body 1.9 (1.45) mm. *Carapace* moderately to coarsely granular; setae subclavate to clavate; eye-spots indistinct; posterior transverse furrow only a little closer to posterior carapacal margin than to median furrow; anterior margin rounded and with four denticulate setae; lateral margins convex; posterior margin with 10 to 12 clavate setae; posterior portion with white blotches on each side as described for the subgenus; carapace 0.7 (0.6) mm. long, greatest width equal to 0.6 (0.56) mm. and located between the transverse furrows; posterior width slightly less than greatest width. *Tergites* of abdomen divided, except eleventh; all tergites coarsely to moderately granular, with setae varying from denticulate and not distally widened to truly clavate; setae sparse, maximum number on any half-tergite four; setae at outer ends of tergal scutae more clavate than medial ones. *Sternites* lighter in color than tergites, sculptured with net-like markings; sternal setae very fine, difficult to count, probably about eight

in half-sternites of center of abdomen; each stigmatic plate apparently with only one seta; pleural membranes of wavy striations; abdomen in general short and broad, length 1.2 mm., width 0.9 mm.

Chelicera. Deep yellow; fairly stout; flagellum of three setae, at least the distal-most and longest one unilaterally serrate; basal and subbasal setae acuminate, simple; length of chelicera 0.195 mm., width of base 0.12 mm. Fixed finger gently curved; apical tooth with three denticles on inner surface; three retroconical teeth near distal end of inner margin of the finger. Movable finger little curved, subapical lobe not observed; serrula exterior with 20 to 22 plates; galea with a stout basal portion, distal half with apparently five simple rami, three of which are lateral, two are distal; galeal seta not extending beyond tip of galea; length of movable finger about 0.16 mm.

Palpus (Fig. 6). Stout, especially the chelal hand; lateral surface of maxilla, trochanter, medial surface of femur and tibia, and portion of hand near base of movable finger granular, otherwise smooth; palpi deep reddish brown, fingers a little lighter; setae chiefly pauci-denticulate, somewhat short and heavy on basal podomeres, becoming truly acuminate on fingers of hand, subacuminate on chelal hand. Maxilla with numerous small acuminate setae; two large apical and subapical tactile setae on apical process; maxilla 0.37 mm. long, 0.24 mm. wide. Trochanter 0.29 mm. long, 0.195 mm. wide. Femur stout; pedicle wider than long; extensor margin irregularly convex; flexor margin with a weak convexity in basal half, but with distal one-half weakly concave; length 0.48 (0.43) mm., width 0.225 (0.195) mm., length 2.1 to 2.2 times the width. Tibia about as long as femur; pedicle somewhat stout, a little wider than long; extensor margin more or less evenly convex; flexor margin less convex especially near distal end; length of tibia 0.485 (0.44) mm., width 0.24 (0.21) mm., length 2 to 2.1 times the width. Chela stout and heavy, especially the hand; hand wide across base; pedicle displaced far towards extensor side; both margins evenly convex; fingers from the dorsad stout, little curved; length of chela without pedicle 0.83 (0.75) mm., width 0.37 (0.32) mm., length 2.2 to 2.3 times the width; depth of hand 0.39 mm. or a little more than width; hand length without pedicle 0.44 (0.38) mm.; movable finger with length of 0.45 (0.40) mm., very little more than hand length without pedicle. From the side, chela stout; pedicle displaced far towards ventral margin; ventral margin moderately and more or less evenly convex; dorsal margin much more convex, being greatly swollen in basal portion.

Fixed finger nearly straight in lateral view; both margins a little convex; movable finger curved, outer margin more or less evenly convex, inner margin irregularly concave, angular in center so that the chela is distinctly gaping when closed. Fixed finger with about 35 contiguous marginal teeth; five external accessory teeth, and probably three internal accessory teeth. Movable finger with about 40 marginal teeth; three almost contiguous internal accessory teeth removed some distance from finger tip; three well-spaced external accessory teeth. Nodus ramosus of movable finger about one areolar diameter distal to level of tactile seta *t*. Movable finger with tactile seta *t* near midpoint of finger; *sb* between one-fifth and one-sixth of finger length from base; *b* about one areolar diameter proximal to *sb*; *st* almost midway between *sb* and *t*, showing a little variation in the two palpi of the mounted individual. Fixed finger with *et* a little more than one-fourth of finger length from tip, *est* somewhat more than one-fourth of finger length from base; *it* and *ist* close together and nearly on a level with *est*; other setae near base, as common in the genus.

Legs. Moderately stout; yellow in prepared specimen; pars tibialis of each leg with scale-like sculpturing becoming granular on extensor surface in hind legs, otherwise legs smooth; setae of extensor surface of podomeres denticulate, variable; setae of flexor surface of podomeres less denticulate, often becoming subacuminate to even acuminate on distal podomeres. First leg with pars basalis 0.163 mm. long, 0.125 mm. deep; pars tibialis 0.26 mm. long, 0.125 mm. deep; tibia 0.25 mm. long, 0.085 mm. deep; tarsus 0.25 mm. long, 0.06 mm. deep. Fourth leg with trochanter 0.2 mm. long, 0.13 mm. deep; pars basalis 0.19 mm. long, 0.163 mm. deep; pars tibialis 0.39 mm. long, 0.197 mm. deep; entire femur 0.5 mm. long, 0.197 mm. deep; tibia 0.38 mm. long, 0.105 mm. deep; tarsus 0.30 mm. long, 0.07 mm. deep; tactile seta of tarsus of fourth leg broken in specimen, but a large areole marks the place of insertion just distal to midpoint of tarsus and 0.175 mm. distant from proximal margin of podomere.

Genital complex. Posterior operculum with 13 marginal setae; anterior operculum with 45 to 50 setae; broken condition of specimen makes an accurate count impossible since areoles which have lost the setae may be mistaken for microlyrifissures.

Type Locality. "Fredricksburg, Va.;" no other locality record known.

Remarks. There seems to be some confusion with respect to the proper ending to be used for *virginica* since Beier (1932) changed the

species name to read *virginicus*, apparently in an effort to create adjectival agreement with the generic name *Dinocheirus*. It appears almost certain, however, that Banks used *virginica* as a substantive and not as an adjective, otherwise he would have used the masculine form in grammatical agreement with *Chelanops*. It seems advisable to leave the ending of the species name unchanged.

Parachernes (Argentochernes) confraternus (Banks)

Chelanops confraternus Banks, 1909a, p. 147.

Parachernes (Argentochernes) (?) confraternus Beier, 1932, p. 125; Roewer, 1937, p. 296.

The type collection consists of a single male (the lectotype), from which one of the palps has been lost. Since a single palp was available, it was examined and measured in dorsal view while temporarily mounted in xylol. All other observations and measurements were made after mounting in clarite.

Male. Body fairly stout; length about 2 mm. *Carapace* coarsely granular especially in posterior part; setae sparse, multidenticulate; anterior part of carapace rounded; posterior portion of lateral margins fairly straight and parallel; the two transverse furrows well developed, one almost median, the other closer to posterior carapacal margin than to median furrow; six setae along posterior margin; four setae along anterior margin between the eye-spots; reddish brown with a white spot or blotch on each side of posterior margin, with the two blotches meeting medially along the very posterior edge; carapace 0.78 mm. long, 0.64 mm. wide; widest along posterior margin. Abdominal *tergites*, except eleventh, divided, scutae not much separated; maximum number of setae along margin of any half-tergite five, usually less than five; first tergite with six setae; setae of tergites usually subclavate to clavate; tergites reddish brown like carapace; anterior seven tergites coarsely to moderately granular, the others nearly smooth and unsculptured; first tergite with a postero-lateral blotch at each side similar to the blotch on each posterior corner of carapace; also white blotches at outer or lateral edges of tergites four to eight, forming a row of five blotches down each side of abdomen. *Sternites* with surface of anterior ones weakly sculptured with scale-like markings, posterior three sternites without markings; sternites, except eleventh, divided; central tergal halves with as many as seven very fine but long setae; scattered microlyrifissures and discoidal lyrifissures on both sternites and tergites. Abdomen about 1.2 mm.

long and about 0.9 mm. wide; pleural membranes consisting of numerous wavy striations; as near as can be determined, each anterior stigmatic plate has three, and each posterior stigmatic plate one seta.

Chelicera. Moderately stout; yellow; length 0.21 mm., width of base 0.13 mm. Fixed finger relatively slender; serrula interior with four free plates, the distal-most one spine-like, the next three platyform, all four with serrate margins; apical tooth broken from specimen; inner margin of fixed finger with two or three retroconical denticles near distal end. Movable finger little curved; apical tooth stout, subapical lobe small; serrula exterior with 20 to 21 ligulate plates; galea not particularly stout; galea and galeal seta broken from both chelicerae; movable finger about 0.18 mm. long.

Palpus (Fig. 7). Dark reddish brown with fingers a little paler; moderately stout; trochanter and femur granular, tibia and chela smooth; setae paucidenticulate with a few subterminal and terminal denticulations, not clavate. Maxilla with ventral surface smooth, lateral surface granular; about 0.4 mm. long, about 0.25 mm. wide. Trochanter about 1.7 times as long as wide. Femur with pedicle about as long as wide; outer margin evenly and markedly convex, inner margin S-shaped beyond pedicle; femur 0.55 mm. long, 0.255 mm. wide. Tibia with extensor margin evenly and markedly convex; flexor margin somewhat bulging, nearly straight near distal end; pedicle a little longer than wide; length of tibia 0.6 mm., width 0.3 mm. Chela from the dorsad with hand fairly stout; fingers relatively slender, weakly curved; both margins of chelal hand more or less evenly convex; pedicle near center of base of hand; chela without pedicle 1 mm. long, 0.4 mm. wide; depth of chelal hand 0.44 mm., a little greater than width; length of chelal hand without pedicle 0.53 mm.; movable finger as long as chelal hand. Chela from the side stout; hand very dark reddish brown, fingers a little lighter in color; pedicle displaced far towards ventral margin; ventral margin weakly convex, dorsal margin highly convex; hand especially deep and bulging near base; fingers fairly stout; fixed finger nearly straight with both inner and outer margins weakly convex; movable finger weakly curved with inner margin weakly concave, external margin weakly convex. Movable finger with nearly 45 marginal teeth, those at distal end of row conical, pointed, and with a heavy cusp, those of proximal part of row more rounded and with the cusp reduced or wanting; eight external accessory teeth and one internal accessory tooth. Fixed finger with about 40 marginal teeth, like those of opposing finger; seven external and three internal accessory

teeth. Nodus ramosus of movable finger just a little proximal to tactile seta *t*. Movable finger with tactile seta *t* about two-fifths of finger length from tip, *st* about two-fifths of finger length from base and a very little closer to *t* than to *sb*; *sb* just within basal one-fifth of finger length, *b* less than two areolar diameters basal to *sb*. Fixed finger with *et* a little more than one-fifth of finger length from tip; *it* and *ist* proximal to midpoint of finger and a little distal to level of *est*; *est* about twice as far from *esb* as the latter is from *eb*; *isb* and *ib* near level of *esb*.

Legs. Moderately stout for the most part, especially first and second legs; fourth leg relatively more slender. Legs smooth except for scale-like granules on pars tibialis of each leg and extremely faint sculpturing, which can hardly be discerned, on the tibia of first leg. Setae variable, multidenticulate especially on extensor surface of femur and tibia; subacuminate to acuminate on flexor surfaces of podomeres. Pars tibialis of first leg with both margins much convex, deepest near center, 0.315 mm. long, 0.155 mm. deep; tibia with extensor margin weakly S-shaped, flexor margin convex, deepest near distal third, length 0.3 mm., depth 0.105 mm.; tarsus subcylindrical and with flexor margin very weakly convex, length 0.28 mm., depth 0.07 mm. Fourth leg with trochanter about 0.24 mm. long, 0.15 mm. deep; pars basalis subtriangular and smooth, length 0.23 mm., depth 0.17 mm.; pars tibialis with flexor margin very weakly convex, extensor margin rounded and much more convex, 0.45 mm. long, 0.21 mm. deep; entire femur 0.59 mm. long, 0.21 mm. deep; tibia relatively slender, both margins weakly S-shaped, length 0.47 mm., depth 0.115 mm.; tarsus subcylindrical, tapering very little towards distal end, length 0.36 mm., depth 0.08 mm.; tactile seta of tarsus broken but well-developed areole placed distal to midpoint of extensor surface, removed from proximal margin of tarsus by 0.25 mm.

Genital complex. Not studied.

Female. Unknown.

Type Locality. "Poco Grande, Brazil". No other record known.

Remarks. *Parachernes* (*A.*) *confraternus* appears to be closely related to *P.* (*A.*) *meinertii* (With, 1908) from Venezuela. The two species can be separated by the following characteristics of *confraternus*: palpal tibia and chela smooth; setae of proximal podomeres of palp paucidenticulate, not clavate; femur of palp more stout; chelal finger considerably greater in length than depth of chelal hand; and chelal finger about equal to hand length.

This species goes without difficulty in the genus *Parachernes* except that the tactile seta *st* of the movable chelal finger is a little closer to *t* than to *sb*, this being contrary to Beier's (1932) statement: "*st* nur wenig näher bei *sb* als bei *t* oder in der Mitte zwischen den beiden letztgenannten stehend." This statement should be deleted from Beier's diagnosis since in many species of the genus, the relationship of these three setae is somewhat variable and *st* often stands nearer *t* than it does to *sb*.

Parachernes (Argentochernes) pulchellus (Banks)

Chelanops pulchellus Banks, 1908, p. 41.

Parachernes (Argentochernes) pulchellus Beier, 1932, pp. 119–120; Roewer, 1937, p. 295. Non *P. (A.) pulchellus* Beier, 1933a, p. 96, fig. 6.

Of the seven pseudoscorpions in the vial labeled as being the type collection of *Chelanops pulchellus*, only one individual agrees with the original description. The other specimens differ from Banks's description in having the setae of the palps long and not clavate, and the outer side of the palpal femur is flatly, not evenly convex. Clearly the collection is mixed. The single individual that agrees in detail with the original description was selected as the lectotype and mounted on a slide (marked "2" in the MCZ collection). This mounted specimen, a female, serves as the basis for the description given here.

Male. Not known.

Female. Length of body 2.2 mm.; brown to fairly dark brown; palpi dark reddish brown to almost black in the heavier portion of podomeres, with fingers lighter. *Carapace* granular; setae short and heavy, multidenticulate, subclavate; carapace narrowed toward anterior; length 0.72 mm., width in the posterior part 0.61 mm.; with an oblong silvery white mark on each postero-lateral corner. *Abdomen* with tergal "scutae brown, the outer end of most of them with a silver mark; . . . each scutum with about 8 very short hairs on posterior margin" (Banks, 1908); abdomen much longer than broad; the writer observed usually seven subclavate setae on each tergal half.

Chelicera. Basal and subbasal setae each with three or four subterminal and terminal denticulations; serrula exterior of movable finger with about 20 plates; galea stout, with 5 or 6 subterminal and terminal rami; galeal seta not reaching tip of galea.

Palpus (Fig. 8). Somewhat short; chiefly granular; setae "on inner side of tibia, femur, and trochanter short, and almost clavate"

(Banks, 1908). Femur with "outer side evenly convex, inside slightly concave before tip" (Banks, 1908); pedicle slightly wider than long; central portion of flexor or inside margin weakly convex; length 0.485 mm., width 0.21 mm. Tibia with stout pedicle; inner margin convex but flattened near distal end; outer or extensor margin weakly convex in proximal two-thirds but more convex beyond; length 0.48 mm., width 0.23 mm. Chela stout; "hand heavy, about as long as tibia and one and a half times wider, both sides evenly convex" (Banks, 1908); pedicle displaced a little toward outer margin; fingers from the dorsad stout, little curved; length of chela without pedicle 0.83 mm., width 0.345 mm.; length of hand without pedicle 0.43 mm.; movable finger 0.42 mm. long, "a little shorter than hand" (Banks, 1908). From the side, depth of chelal hand a little greater than width; movable finger well curved; fixed finger with inner margin a little convex, outer margin weakly concave. Movable finger with five external and two internal accessory teeth; fixed finger with six external accessory teeth and apparently one internal accessory tooth. Movable finger with tactile seta *t* about two-fifths of finger length from tip; *st* a little nearer *t* than *sb*; *sb* and *b* separated by less than two areolar diameters and near base of finger. Internal series of tactile setae of fixed finger confined to basal part of finger with *it* and *ist* close together and nearly on a level with *est*; external series with *et* within distal third of finger and *est* about one-third of finger length from base; *sb* and *b* at very base of finger and close together.

Legs. Setae of extensor surface of podomeres multidenticulate; setae of flexor surface acuminate or paucidenticulate; podomeres of fourth leg with scale-like granulations. Fourth leg with femur 0.5 mm. long, 0.17 mm. deep; tibia 0.37 mm. long, 0.1 mm. deep; tarsus 0.29 mm. long, 0.072 mm. deep; tactile seta of tarsus of fourth leg long and acuminate, located distal to midpoint of podomere and about 0.2 mm. from proximal margin of tarsus.

Type Locality. Esperanza Ranch, Brownsville, Texas (Banks, 1908). No other locality record known.

Remarks. This species is very easily confused with and mistaken for *P.* (*A.*) *tumimanus* (Banks, 1908) which also occurs in Texas. On the basis of material available (a single specimen of each species) it appears that they differ in that the setae of the tergal halves, carapace, and femur of the palp are distinctly clavate in *tumimanus*, but subclavate or multidenticulate in *pulchellus*. Moreover the palpal podomeres are longer in *tumimanus* than in *pulchellus*, and the chela is a little stouter.

Parachernes (Argentochernes) tumimanus (Banks)

Chelanops tumimanus Banks, 1908, p. 40.
Dinocheirus tumimanus Beier, 1932, pp. 138–139; Roewer, 1937, p. 302.

The type collection consists of a single female. This, designated as the lectotype, was mounted and serves as the basis of the redescription below.

Male. Not available for study.

Female. Body brown; most setae clavate; length of body 2.55 mm. *Carapace* very dark brown; broad behind, tapering anteriorly; eye-spots present; surface granular and with scattered clavate setae; posterior margin with 12 to 14 clavate setae; a white to pale yellow blotch on each side of median line along posterior margin; length 0.82 mm., width 0.75 mm.; "about one and one-quarter times as long as broad behind" (alcoholic specimen, Banks, 1908). *Tergites* of abdomen dark brown; maximum number of setae on central tergal halves is eight; setae clavate; tergites granular and divided. Abdomen 1.75 mm. long, 1.12 mm. wide; "fully twice as long as broad, each side slightly convex" (alcoholic specimen, Banks, 1908).

Chelicera. Much like that of *P.* (*A.*) *pulchellus*; 0.215 mm. long, base 0.135 mm. wide; movable finger 0.19 mm. long; 20 plates in serrula exterior of one chelicera, 22 in same structure of other chelicera.

Palpus (Fig. 9). Very dark reddish brown, almost black, with fingers a little paler; palpi short and heavy; setae subclavate to clavate, except on outer side of hand and fingers; palp, including chelal hand, granular. Maxilla 0.38 mm. long, 0.27 mm. wide. Trochanter 0.35 mm. long, 0.235 mm. wide. Femur with extensor margin evenly rounded; flexor margin convex in center, straight to concave near distal end; pedicle well set-off from rest of podomere; length 0.61 mm., width 0.27 mm. Tibia with extensor margin markedly convex, flexor margin bulging in center, weakly concave beyond; length 0.6 mm., width 0.29 mm. Chela from the dorsad with hand stout; pedicle placed a little toward extensor or outer surface; hand widest near base; both margins evenly convex; fingers moderatly stout, a little curved; length of chela 1 mm., width 0.45 mm.; hand without pedicle 0.56 mm. long; depth of chela slightly greater than width; length of finger 0.54 mm., but little less than length of chelal hand without pedicle. From the side, chela (Fig. 10) very stout; pedicle displaced far towards ventral side; dorsal portion of chela swollen near base; dorsal and ventral margins more or less evenly

convex; fingers moderately stout, especially fixed finger; movable finger a little curved, outer margin convex, inner margin weakly concave; fixed finger fairly straight, with both margins very weakly convex, the inner a little more than the outer. Movable finger with about 40 marginal teeth, slightly retroconical in shape, cusps well developed, teeth contiguous, small; ten external accessory teeth scattered along much of finger margin; possibly two internal accessory teeth. Except for a few more marginal teeth, teeth of fixed finger resemble those of movable finger. Tactile setae of fingers much as in *P.* (*A.*) *pulchellus*, except *st* is almost midway between *t* and *sb*.

Legs. Light brown, with femora of legs three and four darker. First leg with pars tibialis 0.29 mm. long, 0.137 mm. deep; entire femur 0.43 mm. long, 0.15 mm. deep; tibia 0.305 mm. long, 0.09 mm. deep; tarsus 0.29 mm. long, 0.065 mm. deep. Fourth leg with trochanter 0.27 mm. long, 0.15 mm. deep; pars basalis 0.245 mm. long, 0.18 mm. deep; pars tibialis 0.475 mm. long, 0.215 mm. deep; entire femur 0.62 mm. long, 0.215 mm. deep; tibia 0.46 mm. long, 0.115 mm. deep; tarsus 0.36 mm. long, 0.08 mm. deep; tactile seta of tarsus distal to center, 0.25 mm. from proximal margin of podomere.

Type Locality. "San Antonio, Texas;" only record known.

Remarks. *Parachernes tumimanus* is very similar to *P.* (*A.*) *distinctus* Beier, 1933, but the tibia and tarsus of the fourth leg as well as the palpal tibia are more slender in *distinctus*; the setae of body and palpi are more clavate in *tumimanus*; and there are slight differences in the shape of the palpal chela. Even though these points appear somewhat trivial, it seems advisable to keep the two species distinct until more material becomes available. Additional investigation may indicate the advisability of making *distinctus* a synonym.

Mexachernes gen. nov.

Diagnosis. Carapace considerably longer than wide; surface moderately granular; no eye-spots; posterior transverse furrow a little closer to posterior carapacal margin than to median furrow. Tergites divided, weakly to moderately granular. Setae of body and palps fairly long, not clavate but subacuminate to multidenticulate. Palps fairly stout, finely to moderately granular. Movable chelal finger little longer than hand without pedicle. Tactile seta *ist* of fixed chelal finger very little distal to *est*; *st* of movable chelal finger closer to *t* than to *sb*. Legs slender, tarsus of fourth pair with

sensory seta a little distal to midpoint of podomere. Genotype: *Chelanops calidus* Banks, 1909. No other species known.

Remarks. While it may appear somewhat inadvisable to increase the number of genera in the tribe *Chernetini*, *Chelanops calidus* can not be assigned to any existing genus without radically altering its diagnosis. The genus *Mexachernes* shows considerable relationship to several others, from each of which, however, separation is easily and readily made. From the Asiatic *Megachernes* Beier, 1932[1], it differs in several ways, including the more slender carapace, the uniform color of the fourth pedal coxa, and the position of some of the tactile setae of the chela. *Mexachernes* may be separated from the palæarctic genus *Pselaphochernes* Beier, 1932[1], by the apparent absence of the venedens on the fixed finger, the tactile seta *ist* a little distal to *est*, *st* closer to *t* than to *sb*, and the tactile seta of the fourth pedal tarsus distal rather than proximal to the midpoint of the tarsus. From the European genus *Lasiochernes* Beier, 1932[1], it may be separated by the position of *st* which is closer to *t* than to *sb*, by the coarser granules on the carapace, and possibly by the nature of the palpal femur in the male, which is as yet unknown for *Chelanops calidus*.

Mexachernes calidus (Banks)

Chelanops calidus Banks, 1909a, p. 147.
Neochernes calidus Beier, 1932, p. 165; Roewer, 1937, p. 298.

The type collection now consists of a single gravid female (designated here as the lectotype), which I mounted in clarite.

Male. Not present in the type collection at the Museum of Comparative Zoölogy. Banks (1909a) in the original description indicates the size of the male as 2 mm. long.

Female. Body somewhat slender, elongate; body including carapace light brown, palpi light reddish brown (yellowish brown according to the original description); length of body 2.7 mm. (according to Banks (1909a) 2.5 mm.). *Carapace* granular but not coarsely so; transverse furrows as described for the genus; rounded anteriorly; posterior margin somewhat convex and with nine marginal setae; widest between the furrows, slightly narrowed posteriorly; setae long, multidenticulate to paucidenticulate, not especially abundant on

[1]Beier has indicated these and other genera as new in his "Revision der Chernetidae" which was published in 1933 in the *Zool. Jahrb.* (*Syst.*), **64**, pp. 509–548. These genera were diagnosed by Beier, however, in *Das Tierreich*, **58**, which appeared in 1932. As a result, 1932 rather than 1933 is the correct date.

the surface; no eye-spots; length of carapace 0.83 mm., width 0.69 mm., posterior width about 0.62 mm. *Abdomen* with tergites, except eleventh, divided; first tergite with eight setae, maximum number on any half-tergite appears to be six (five on each dorsal scutum according to the original description by Banks); setae subacuminate to perhaps even simple acuminate, mostly broken from specimen; tergites weakly granulate. Sternites very little granulate, with a few more setae than on tergites; sternal halves widely separated. Abdomen about 1.85 mm. long, 0.96 mm. wide.

Chelicera. Moderately stout; dark yellow; inner surface of apical tooth of fixed finger with three small denticles, five teeth on inner margin of finger; basal and subbasal setae of cheliceral base appear smooth; measurements of base not secured. Movable finger with inner margin somewhat straight; apical tooth and especially subapical lobe very long and finger-like; galea with possibly six (partly broken) simple and long rami, probably four side rami and two terminal ones; some of side rami originating from near base of galea; galeal seta apparently extending at least to tip of galea; serrula exterior with 17 or 18 plates.

Palpus (Fig. 11). Finely granular, except ventral surface of maxilla and outer surface of chelal hand and fingers; inner surface of chelal hand weakly granulate; setae of palpal podomeres variable, chiefly paucidenticulate on flexor surface of trochanter, femur, and tibia; setae of chelal hand with very few denticulations but not entirely simple acuminate; setae of fingers acuminate. Maxilla 0.44 mm. long, 0.25 mm. wide. Trochanter with "a few nearly clavate hairs" (Banks, 1909a); two protuberances present; length 0.42 mm., width 0.2 mm. Femur with sides subparallel; "rather broadest near base" (Banks, 1909a); pedicle a little wider than long; outer margin flatly convex in central portion, becoming more convex in distal portion; inner margin proximally very weakly convex, distally weakly concave; length 0.61 mm., width 0.225 mm., length 2.7 times the width. Tibia with pedicle stout, about as long as wide; outer margin evenly convex, inner margin bulging in center and nearly flat beyond; length 0.58 mm., width 0.27 mm., length 2.15 times the width. Chela with outer margin weakly, almost flatly, convex; inner margin more convex; pedicle nearly in center of base of hand; fingers moderately slender, gently curved; chela without pedicle 1.08 mm. long, 0.385 mm. wide, length 2.8 times the width; depth of hand 0.39 mm., about equal to the width; length of hand without pedicle 0.54 mm.; length of movable finger slightly more than length of hand, 0.56 mm. Chela from

the side (Fig. 12) moderately stout; both margins of hand flatly rounded; pedicle displaced towards ventral side; fixed finger with both margins weakly convex; movable finger with outer margin weakly convex, inner margin weakly concave, finger little curved; nodus ramosus of movable finger at level of tactile seta *t*. Fixed finger with about 45 contiguous and subconical teeth, those of proximal end of row apically rounded and almost acuspid; one external accessory tooth, three internal accessory teeth. Movable finger with a few more marginal teeth than opposing finger; movable finger with two internal accessory teeth, no external accessory teeth located. Tactile seta of movable finger: *t* near distal one-third of finger length, *st* about as far from *t* as one-half the distance of *t* from finger tip; *b* and *sb* well within basal one-fourth of finger length, with *b* about midway between finger base and *sb*. Fixed finger with *et* about one-sixth of finger length from tip; *est* near midpoint or proximal to midpoint of finger; *ist* very slightly distal to the level of *est*; *it* about midway between finger tip and *ist* or closer to *ist*; basal and subbasal setae in basal part of finger, with *ib* about on a level with *esb*; considerable variation in the two palpi with respect to the exact position of the tactile setae.

Legs. Yellow; slender, especially fourth; trochanters and part of femora weakly granulate, otherwise appearing smooth; setae acuminate; terminal claws simple and slender. First leg with pars basalis 0.21 mm. long, 0.14 mm. deep; pars tibialis 0.325 mm. long, 0.125 mm. deep; tibia 0.33 mm. long, 0.09 mm. deep; tarsus 0.355 mm. long, 0.072 mm. deep. Fourth leg with pars basalis 0.245 mm. long, 0.135 mm. deep; pars tibialis 0.465 mm. long, 0.14 mm. deep; entire femur 0.64 mm. long, 0.14 mm. deep; tibia 0.51 mm. long, 0.105 mm. deep; tarsus 0.41 mm. long, 0.08 mm. deep; sensory seta of fourth tarsus broken on specimen, but large areole present and located 0.24 mm. from proximal end of tarsus, being a little distal of midpoint of podomere.

Genital complex. Anterior operculum with 23 setae; posterior operculum with 13 marginal setae along posterior margin.

Type Locality: The type collection bears the following locality label: "San Miguel Horcasitas, Sonora, Mex." The original description by Banks (1909a) gives as localities both Sonora and Lower California. Evidently, however, Sonora is the type locality.

Neoallochernes gen. nov.

Diagnosis. Carapace about as long as wide, coarsely granular, with two cross-furrows, setae clavate. Eye-spots large and conspicuous. Tergites, except eleventh, divided, moderately granular, setae mostly clavate. Palps moderately stout, fairly granular, setae varying from multidenticulate to acuminate. Tactile seta *ist* near level of *est*, nearer to *it* than to *isb*; *st* much nearer *t* than *sb*. Fixed finger with short venedens containing a vestigial venom duct, which does not extend far into finger. Tarsus of fourth leg without a tactile seta. Genotype: *Chelanops garcianus* Banks, 1909.

Only one species known.

Remarks. *Neoallochernes* is clearly related to both *Allochernes* Beier, 1932, which is common in the Old World, and to *Neochernes* Beier, 1932, which is known from the western hemisphere. From *Allochernes*, *Neoallochernes* may be separated by the stouter palpal podomeres and the presence of eye-spots. From *Neochernes*, the new genus may be separated by the short vestigial venom duct and venedens, which is not reported for the fixed finger of *Neochernes*. While it might be possible to emend the generic diagnosis of *Neochernes* to allow the inclusion of *Chelanops garcianus* Banks, this seems inadvisable, because the genus *Neochernes* is poorly diagnosed, based on *Chernes peninsularis* Chamberlin, 1925, a species for which the description is somewhat incomplete. The difficulty incidental to basing a genus upon an imperfectly described genotype is very obvious. For *Neochernes*, Beier has given as one of the characteristics the absence of the tactile seta from the fourth pedal tarsus. Whether or not there is a seta on the fourth pedal tarsus is not known since the distal ends of the fourth legs were lost from the only known specimen of the genotype, before the original description of *Chernes peninsularis* was written by Chamberlin. The exact diagnosis of the genus *Neochernes* depends, then, upon a redescription of the genotype from additional specimens. Dr. Chamberlin[1] doubts very much the wisdom of using his imperfectly known *Chernes peninsularis* as a genotype.

[1]Personal communication from Dr. J. C. Chamberlin.

Neoallochernes garcianus (Banks)

Chelanops garcianus Banks, 1909a, pp. 147–148.
Dinocheirus garcianus Beier, 1932, p. 139.
Dinocheirus gracianus [sic!] Roewer, 1937, p. 302.

The type collection consists of four specimens, of which three appear to be females, one possibly a tritonymph. A single female was mounted, designated as the lectotype, and used as the basis for the detailed redescription given here. In the case of certain measurements, however, all three adults were used and the limits of size are then given instead of the single measurement from one individual. The tritonymph was not studied.

Male. Not available for study.

Female. Body moderately stout; yellowish brown; palps darker; length 2.1–2.3 mm. *Carapace* coarsely granular; sides nearly straight; anterior end rounded; widest across posterior margin; posterior transverse furrow much closer to posterior margin than to median furrow; setae subclavate to clavate, multidenticulate; one pair of conspicuous eye-spots present; posterior carapacal margin with about 14 clavate setae; length of carapace 0.7–0.75 mm., width about equal to or slightly greater than length in alcoholic specimens. *Tergites* divided, except eleventh; interscutal spaces narrow; tergites moderately granular, setae chiefly clavate; each first tergal half with eight setae, tergal halves of central part of body with 10 setae. *Sternites* weakly granular or sculptured; central sternal halves with 11 or 12 acuminate setae; sternites very weakly and somewhat indistinctly divided; pleural membranes with wavy striations. Abdomen 1.4 to 1.55 mm. long, 0.95 to 1.2 mm. wide.

Chelicera. Moderately stout, light; flagellum of three setae; distalmost seta coarsely serrate along one side and very blade-like and flattened; base apparently unsculptured; length of chelicera 0.19 mm., width of base 0.115 mm. Fixed finger little curved; inner margin of apical tooth with three denticles, inner margin of finger with three teeth near distal end; serrula interior with five free plates, distalmost one spine-like and the other four platyform, all with serrate margins. Movable finger nearly straight; subapical lobe well developed and very near base of apical tooth; serrula exterior with 16 plates, the proximal one much longer than the remainder; galea slender, both broken in specimen, but apparently each had a very few short rami in distal half, although Banks (1909a) states "stylet of mandibles simple, not very long, point outcurved"; galeal seta hardly reaching end of galea; length of movable finger 0.16 mm.

Palpus (Fig. 13). Moderately stout; reddish brown; moderately granular except for ventral face of maxilla and chelal fingers; setae multidenticulate on trochanter and femur, paucidenticulate on tibia and chelal hand, and acuminate on fingers. Maxilla 0.37 mm. long, about 0.24 mm. wide. Trochanter with two sublateral lobes; inner margin beyond pedicle more or less evenly convex; length 0.36 mm., width 0.235 mm. Femur with pedicle almost as long as wide and well set-off from rest of podomere; outer or extensor margin weakly, almost flatly, convex in center, more convex at distal end; inner or flexor ma gin markedly convex just beyond pedicle, then concave in distal third; greatest width in basal half; length 0.56–0.61 mm., width 0.265–0.28 mm., length 2.1 to 2.2 times the width. Tibia with extensor margin rounded, becoming increasingly convex towards distal end; flexor margin bulging and very convex, becoming a little flattened near distal end; pedicle longer than wide; length of tibia 0.545–0.58 mm., width 0.28–0.305 mm., length 1.85 to 1.95 times the width. Chela with outer margin weakly, almost flatly, convex; inner margin much more rounded and convex, somewhat bulging; pedicle near center of base; fingers from dorsad slender and gently curved; length of chela without pedicle 0.92–0.95 mm., width 0.33–0.35 mm., length 2.7 to 2.9 times the width; depth of hand a little greater than the width; length of hand without pedicle 0.44–0.45 mm.; movable finger somewhat longer than hand without pedicle, 0.52–0.54 mm. In lateral view, chelal hand (Fig. 14) stout, ventral margin a little convex, dorsal margin well rounded and passing without interruption into base; fixed finger nearly straight; movable finger gently curved with outer margin evenly convex, inner margin irregularly concave; nodus ramosus of movable finger on nearly a level with *t*. Fixed finger with vestigial venedens, which is much shorter than venedens of other finger, and a short vestigial venom duct detected in venedens and at base of venedens but not extending far into finger. Fixed finger with 35 to 40 marginal teeth, contiguous, distal ones acute and conical, proximal ones becoming a little rounded; all with well-developed cusps; marginal teeth of movable finger similar to those of fixed finger; fixed finger with five external and six internal accessory teeth; movable finger with six external and three internal accessory teeth. Tactile setae of movable finger: *t* about one-third of finger length from tip; *sb* within basal one-fourth of finger; *b* about midway between *sb* and proximal finger margin; *st* over twice as far from *sb* as from *t*. On fixed finger, *ist* and *est* on nearly the same level and near midpoint of finger; *it* about midway between *ist* and finger

tip; *et* a little closer to the level of *it* than to finger tip; *eb* and *csb* at base of finger and separated by about two areolar diameters; *ib* and *isb* on nearly a level with *csb*.

Legs. Fairly stout; all except trochanters and partes basales sculptured with scale-like lines, these developing into distinct granules on the partes tibiales, less elevated and granular on tibiae, very weakly developed on tarsi; setae variable, multidenticulate to acuminate. First leg with pars tibialis moderately stout, both margins convex, extensor more so than flexor, deepest at about proximal third, length 0.33 mm., depth 0.14 mm.; tibia a little S-shaped, 0.32 mm. long, 0.091 mm. deep; tarsus subcylindrical, length 0.275 mm., depth 0.06 mm. Fourth leg with trochanter 0.23 mm. long, 0.145 mm. deep; pars basalis 0.24 mm. long, 0.163 mm. deep; pars tibialis 0.46 mm. long, 0.21 mm. deep; flexor margin of femur straight, extensor margin convex, more so distally than proximally; femur deepest a little distal to midpoint of pars tibialis, length of femur 0.61 mm., depth 0.21 mm.; tibia very weakly S-shaped, extensor margin almost straight, length 0.49 mm., depth 0.118 mm.; tarsus subcylindrical, length 0.36 mm., depth 0.077 mm.; claws simple; all specimens carefully examined and no tactile seta found on tarsus of fourth leg.

Genital complex. Posterior margin of posterior operculum with 13 setae, eight more on the very rim of genital aperture; anterior operculum with 12 setae on rim of aperture and 31 more on face of operculum.

Type locality. "Havana, Cuba, Baker Coll."

Tribe HESPEROCHERNETINI Beire, 1932

Mirochernes dentatus (Banks)

Chelanops dentatus Banks, 1895, p. 6; Coolidge, 1908, p. 111.
Mirochernes dentatus Beier, 1930, p. 216; Beier, 1932, p. 182; Roewer, 1937, p. 303; Hoff, 1945a, p. 49.
Non Mirochernes dentatus Beier, 1930, pp. 217–218, fig. 14.
Chernes dentatus Chamberlin, 1931a, p. 124, figs. 30-J, -K.
Non Chernes dentatus Ross, 1944, fig. 56.

The type collection consists of one mature male in alcohol. Since the writer contemplates publishing in the near future a complete description of this species based on Illinois collections, only a few notes were taken on the lectotype at the Museum of Comparative Zoölogy.

Male. Length of body slightly more than 2 mm.; carapace 0.93 mm. long, 0.77 mm. wide; eye-spots lacking. Chelicera with flagellum of four setae, the two smaller ones of nearly equal length; chelicera relatively small; serrula exterior of movable finger with 19 plates. Palp agrees well with the one figured by Chamberlin (1931a, fig. 30-J), except that the inner margin of the femur is a little less convex in the type. Palp with trochanter 0.43 mm. long, 0.29 mm. wide; femur 0.75 mm. long, 0.32 mm. wide, length 2.35 times the width; chela, without pedicle and without the "side-hook" of the hand, 1.28 mm. long, 0.52 mm. wide, length 2.45 times the width; finger length 0.70 mm. No tactile seta found on tarsus of fourth leg.

Female. Type specimens not available.

Type Locality. "Without locality (Hubbard); but probably from Florida" (Banks, 1895).

Genus Chelanops Gervais, emend.

Chelanops Gervais, 1849, in Gay, Hist. Chile, v. 4, p. 13.

Diagnosis emended. Carapace somewhat longer than wide, granular, with two cross-furrows. Tergites divided, granular. Setae of body and of palps somewhat variable, usually subclavate to clavate. Flagellum with four setae. Palps moderately heavy, granular. Finger with numerous accessory teeth. The tactile seta *ist* placed on the same level with *est* or a little proximal to *est*; *st* nearer *t* than *sb*. Legs slender to moderately slender; tarsus of fourth leg without a tactile seta.

Genotype: *Chelifer* (*Chelanops*) *coecus* Gervais, 1849.

The genus *Chelanops* has been emended instead of proposing a new genus for *Chelanops affinis* Banks, 1894. Two changes have been made: (1) *ist* may be a little proximal to *est* and is not always on the level of *est* as indicated by Beier (1932); and (2) the legs may be slender or moderately slender.

Chelanops affinis Banks

Chelanops affinis Banks, 1894, p. 314; Banks, 1895, p. 8; Coolidge, 1908, p. 112.

Neochernes (?) *affinis* Beier, 1932, p. 167; Roewer, 1937, p. 299.

The type collection consists of two adults, one male and one female, and a third individual that is probably a tritonymph. The male,

designated as the lectotype, was mounted for study; the female was studied only as a temporary mount in alcohol. The tritonymph was not examined in detail.

Male. Body yellowish brown, palpi slightly darker, legs light yellow; body fairly stout; legs unusually slender; length of body about 2 mm. *Carapace* granular; lateral margins convex; no eyespots; setae subclavate to clavate; about 0.85 mm. long, width slightly less. *Tergites* of abdomen probably divided, but this is difficult to distinguish on the present specimen ("indistinctly divided" according to Banks (1894)); setae clavate, maximum number on any half-tergite about nine. *Sternites* with acuminate setae; pleural membranes rugose and wrinkled; "abdomen quite broad" (Banks, 1894).

Chelicera. Slender; yellow; a few net-like markings on cheliceral hand; length of chelicera 0.255 mm., width of base 0.16 mm. Movable finger with subapical lobe not particularly well developed; galea probably with five simple rami confined to distal half, base stout; galeal seta reaching about to a level with tip of galea; serrula exterior with about 18 (position precludes exact count) ligulate plates; length of movable finger 0.23 mm.

Palpus (Fig. 15). Not very stout; light yellowish brown; podomeres granular, even inner surface of fingers near teeth granular; setae from multidenticulate and fairly stout on trochanter and femur to paucidenticulate on tibia and chelal hand, becoming acuminate on fingers. Maxilla granular with numerous short and acuminate setae, apical setae not well developed. Trochanter with globose projections or protuberances; setae sparse, except on the evenly convex flexor surface, length 0.48 mm., width 0.285 mm. Femur with pedicle about as long as wide, not well set-off from rest of podomere; femur broadest in proximal half; extensor margin more or less evenly and weakly convex; flexor margin weakly convex basally but a little concave distally; length 0.8 mm., width 0.29 mm. Tibia with middle portion of extensor margin flatly convex, more convex at each end; flexor margin more or less evenly convex except near ends; pedicle a little longer than wide; length of tibia 0.75 mm., width 0.32 mm. Chela from the dorsad relatively slender; outer or extensor margin weakly to flatly convex, flexor margin much more convex especially near base; hand tapering towards fingers, which are long, slender, and a little curved; length of chela without pedicle 1.31 mm., width 0.4 mm.; length of hand without pedicle 0.64 mm.; depth of chela a little less than width, 0.38 mm.; length of finger considerably more than length of hand, 0.72 mm. From the side, chela moderately

stout; pedicle placed somewhat towards ventral side; ventral margin flatly rounded, dorsal margin much more convex; fixed finger virtually straight, movable finger a little curved with inner margin concave and outer margin convex; venedens of movable finger very prominent. Many marginal teeth broken, but apparently about 55 contiguous conical teeth in marginal row of each chelal finger; movable finger with six external accessory teeth and apparently two internal accessory teeth; fixed finger with seven external accessory teeth and three internal ones; all well developed but somewhat irregular in position. Movable finger with four sensory setae: *t* between one-third and one-fourth of finger length from tip, *b* and *sb* within about distal one-fifth of finger, *st* much nearer to *t* than to *sb*. Fixed finger with *et* about one-seventh of finger length from tip, *it* closer to *et* than the latter is to finger tip; *ist* near or slightly distal to midpoint of finger and a little proximal to *est*; *esb* and *eb* near base of finger and proximal to *isb* and *ib*.

Legs. Unusually slender; light; setae numerous especially on tibiae and tarsi, varying from denticulate to simple acuminate; some podomeres as the femora may be weakly granular, others are virtually smooth. First leg with trochanter fairly stout, 0.2 mm. long, 0.15 mm. deep; pars basalis with weakly convex flexor margin, length 0.26 mm., depth 0.155 mm.; pars tibialis subcylindrical with both margins weakly convex, length 0.44 mm., depth 0.125 mm.; tibia with large numbers of acuminate setae thickly set on flexor surface, extensor surface with multidenticulate setae, flexor margin weakly convex, distal part of extensor margin very weakly concave, length 0.5 mm., depth 0.091 mm.; tarsus subcylindrical, margins nearly straight, length 0.51 mm., depth 0.076 mm. Fourth leg with slender and subcylindrical trochanter, length 0.32 mm., depth 0.15 mm.; pars basalis with very weakly convex flexor margin, length 0.24 mm., depth 0.15 mm.; pars tibialis with virtually straight flexor margin, but extensor margin weakly convex, deepest near center, length 0.57 mm., depth 0.16 mm.; entire femur 0.76 mm. long, 0.16 mm. deep; tibia nearly straight, slightly deeper near distal end than elsewhere, length 0.74 mm., depth 0.095 mm.; tarsus subcylindrical, without a sensory seta on flexor surface, length 0.64 mm., depth 0. 078 mm.

Genital complex. Abdomen much contracted and not in a condition for successful examination of the external genitalia.

Female. Appears essentially like male. Examination of a chelicera in alcohol shows that the flagellum has four setae, the longest seta

has unilateral serrations along most of the anterior edge except at the very base, the next more proximal seta has a few subterminal denticulations, the two short setae are subequal in length and appear smooth; serrula exterior of 18 plates.

Measurements secured as follows: carapace 0.96 mm. long, 0.72 mm. wide; palp with trochanter 0.48 mm. long, 0.29 mm. wide; femur 0.88 mm. long, 0.3 mm. wide; tibia 0.82 mm. long, 0.33 mm. wide; chela without pedicle 1.36 mm. long, 0.42 mm. wide; hand without pedicle 0.68 mm. long; movable finger 0.73 mm. in length.

Type locality. "Crescent City, Fla." No other record known.

Remarks. *Chelanops affinis* was taken from debris at the end of galleries of land tortoises in Florida.

Hesperochernes pallipes (Banks)

Chelanops pallipes Banks, 1893, p. 64; Banks, 1895, p. 8; Coolidge, 1908, p. 111; (?) Banks, 1911, p. 638, fig. D.

Neochernes (?) *pallipes* Beier, 1932, p. 167; Roewer, 1937, p. 299.

The type collection consists of one female, the lectotype, mounted in clarite by the present writer.

Male. Not available for study.

Female. Body fairly stout; abdomen ovate; yellowish brown, palps reddish brown; length of body 3 mm. *Carapace* with two well-developed transverse furrows, the posterior much closer to posterior margin than to median furrow; anterior portion of sides rounded, posterior portion of lateral margins more or less straight and subparallel; eye-spots hardly distinguishable; posterior margin with ten subclavate setae; surface granular; 0.96 mm. long, 0.75 mm. wide; posterior width slightly less than greatest width. *Tergites* of abdomen, except eleventh, divided, intertergal spaces usually wide; each first half-tergite with five subclavate setae; maximum number of setae on any tergal half is eight, all in a marginal row except the lateral-most one; tergites yellowish brown; all tergal setae broken but no doubt they were subclavate; surface of tergites moderately granular. *Sternites* with scale-like sculpturing, setae acuminate; sternites divided; 15 setae on some sternal halves but mostly broken and exact number difficult to determine. Pleural membranes with rugose or papillose striations; anterior stigmatic plate with three setae, posterior with only one. Abdomen about 2.05 mm. long, 1.4 mm. wide.

Chelicera. Moderately slender, especially fingers; basal and sub-

basal setae appear to be subterminally paucidenticulate; fixed finger much as in *pallidus*; length of chelicera 0.3 mm., width of base 0.17 mm.; length of movable finger 0.26 mm. Movable finger little curved; galea partly broken but appears to be fairly slender, with a few stout but simple rami along distal two-thirds; apical tooth highly sclerotic, subapical lobe finger-like, well developed; galeal seta not extending to the tip of the galea; serrula exterior with plates partly broken but probably 17 or 18 in number.

Palpus (Fig. 16). Fairly stout; setae subclavate on the proximal podomeres (except the maxilla) to paucidenticulate on chela and acuminate on fingers. Maxilla with sides granular, ventral face smooth; length about 0.5 mm., 0.31 mm. wide. Trochanter granular, with rounded and moderately developed protuberances; length 0.5 mm., width 0.27 mm. Femur stout, pedicle a little longer than wide and well set-off from rest of podomere; outer margin very weakly to flatly convex in the center and a little more convex beyond; inner or flexor margin weakly convex proximally but very little concave beyond center; sides almost parallel; surface moderately granular; length 0.76 mm., width 0.29 mm. Tibia a little less granulate than femur; pedicle a little wider than long; extensor margin evenly convex; flexor margin bulging somewhat in the center but flattened beyond; length of tibia 0.73 mm., width 0.32 mm. Chela from the dorsad with pedicle displaced a little toward outer or extensor side; both margins convex, the inner more so than the outer; hand tapering toward fingers; fingers relatively slender, gently and evenly curved; chela smooth except for granules on inner surface near base of fingers; length of chela without pedicle 1.2 mm., width 0.45 mm.; depth of chela 0.42 mm., a little less than width; length of chelal hand without pedicle 0.63 mm.; length of movable finger slightly less than length of chelal hand, 0.61 mm. From the side, chela (Fig. 17) with pedicle displaced towards ventral side; ventral margin flatly convex, dorsal margin much more convex; fingers moderately slender; fixed finger with nearly straight outer margin, inner margin a little convex; movable finger with outer margin convex, inner margin concave; movable finger but little more slender than fixed finger. Marginal teeth of fingers conical, contiguous, about 45 on each finger; teeth at distal end of row with well-developed cusps, teeth of proximal part of row of each finger reduced in height, somewhat rounded; fixed finger with nine external, movable finger with eight external accessory teeth; internal teeth not determined, probably very few. Nodus ramosus of movable finger proximal to level of tactile seta

t by a little less than width of finger at level of tactile seta. Movable finger with *t* about one-third of finger length from tip, *st* one-half as far from *t* as *t* is from finger tip; *sb* within basal one-fourth of finger length with *b* a little closer to *sb* than to basal margin of finger. Fixed finger with *et* about one-seventh of finger-length from tip; *it* about as far from *et* as the latter is from finger tip, with *ist* about the same distance from *it*; *est* a little proximal to level of *ist* and near midpoint of finger; subbasal and basal setae much as in other species of the genus except the setae of each pair seem a little more separated.

Legs. Moderately slender; setae varying from denticulate on proximal podomeres to acuminate on distal podomeres; surface of most podomeres virtually smooth, but weak sculpturing occurs on some proximal podomeres, especially on femur of fourth leg. The legs resemble much those of *pallidus* except the extensor margin of the fourth tibia is weakly concave in the distal two-thirds and the flexor margin is more convex; flexor margin of fourth tarsus very weakly convex; femur of fourth leg distinctly slender. First leg with pars tibialis 0.37 mm. long, 0.14 mm. deep; tibia 0.39 mm. long, 0.11 mm. deep; tarsus 0.42 mm. long, 0.08 mm. deep. Fourth leg with trochanter 0.34 mm. long, 0.195 mm. deep; pars basalis 0.31 mm. long, 0.19 mm. deep; pars tibialis 0.545 mm. long, 0.19 mm. deep; entire femur 0.78 mm. long; tibia 0.61 mm. long, 0.13 mm. deep; tarsus 0.52 mm. long, 0.091 mm. deep; no tactile seta on tarsus of fourth leg.

Genital complex. Ten closely arranged setae in a single row along posterior margin of posterior operculum; anterior operculum with 20 scattered setae.

Type locality. California. The locality record of Colorado as given by Coolidge (1908) is of dubious validity.

Remarks. *Hesperochernes pallipes* is very closely related to *H. canadensis* Hoff, 1945b. On the basis of single females only of each species, the following differences will serve for their separation: (1) fewer setae on tergites of the central part of the abdomen in *pallipes*; (2) external margin of chelal hand less convex in *pallipes*; (3) palpal femur a little stouter and chela a little more slender in Banks's species; (4) external margin of palpal femur and tibia less flatly convex in *pallipes*; (5) legs a little more slender in *pallipes*; and (6) fewer setae on the genital opercula of *pallipes*.

Hesperochernes pallidus (Banks)

Chernes pallidus Banks, 1890, p. 152.
Chelanops pallidus Banks, 1895, p. 8; Coolidge, 1908, p. 112.
Neochernes (?) *pallidus* Beier, 1932, p. 167; Roewer, 1937, p. 299.

The Museum of Comparative Zoölogy has a single female type specimen, here designated the lectotype. It was mounted in clarite by the present writer.

Male. Unknown.

Female. Body oblong-ovate; yellowish, palpi reddish brown; length 2.3 mm. *Carapace* granular, setae multidenticulate, subclavate to clavate; transverse furrows weakly developed but distinct; posterior half of lateral margins nearly straight, anterior half convex and rounded evenly into anterior margin; posterior margin weakly convex and with about 15 irregularly placed setae; no eye-spots; length of carapace 0.91 mm., width about 0.74 mm. *Tergites* of abdomen divided, except first and eleventh; moderately granular; central tergal halves with as many as 14 clavate and multidenticulate setae confined chiefly to the marginal row. *Sternites* divided, less granular than tergites, but with distinct scale-like sculpturing; setae of sternites acuminate to subacuminate, possibly about the same number as on tergites, but so many setae are broken that an accurate count cannot be made. Pleural membranes of fine wavy striations; anterior stigmatic plate of each side with two small setae, each posterior plate with one; abdomen about 1.45 mm. long, about 1.05 mm. wide.

Chelicera. Fairly stout, yellow; flagellum of four setae; the two longer setae broken near their base and represented only by stumps; setae lost from base; length of chelicera 0.25 mm., width of base 0.145 mm. Fixed finger with three small denticles on inner surface of apical tooth and three larger teeth on inner margin of finger near distal end. Movable finger little curved; a blunt conical tooth basal to the weakly developed subapical lobe and just distal to the level of insertion of galeal seta; galea broken from both chelicerae; about 18 plates in serrula exterior; movable finger about 0.21 mm. long.

Palpus (Fig. 18). Moderately stout; surface granular except for extensor surface of chelal hand and fingers; setae variable, those of maxilla short, weak, and acuminate; setae of trochanter, femur, and tibia multidenticulate; setae of chela becoming paucidenticulate. Maxilla 0.53 mm. long, 0.32 mm. wide. Trochanter with very stout subdorsal protuberance; inner margin evenly convex; length 0.48

mm., width 0.29 mm. Femur with a pedicle about as long as wide, not well set-off from rest of podomere; extensor margin weakly convex, inner margin weakly S-shaped; femur widest near center; length 0.83 mm., width 0.27 mm. Tibia with extensor margin a little convex, inner margin convex near center, but weakly concave beyond; length 0.77 mm., width 0.3 mm. Chela from the dorsad with extensor margin flatly convex, flexor margin more convex and rounded; hand tapering toward fingers; fingers long and slender, a little curved; pedicle displaced a little towards extensor side of hand; chela 1.36 mm. long, 0.465 mm. wide; depth about equal to length; length of hand without pedicle about 0.7 mm.; movable finger 0.75 mm. long, slightly greater than hand without pedicle. From the side, chela has the pedicle placed somewhat towards ventral surface; both dorsal and ventral margins evenly convex; fingers slender; movable finger with markedly convex outer margin and very concave inner margin; fixed finger with inner margin concave, outer margin convex. Movable finger with tactile seta *t* about one-third of finger length from tip, *st* less than one-half as far from *t* as the latter is from finger tip; *sb* about one-fifth of finger length from base, *b* midway between *sb* and basal margin of finger; *st* much closer to *t* than to *sb*. Fixed finger with *et* about one-sixth of finger length from tip, *it* not far proximal to *et*; *est* near midpoint of finger with *ist* a little distal to *est*; other tactile setae of fixed finger near finger base, as common in other species of the genus. Movable finger with about 45 marginal teeth, contiguous, a little retro-conical in shape; movable finger with two widely spaced internal accessory teeth, six less widely spaced external accessory teeth; fixed finger with about 40 marginal teeth, two (possibly three) internal and six or seven external accessory teeth, all well spaced. Nodus ramosus of movable finger exactly at level of *st*.

Legs. Fairly slender; setae varying from multidenticulate on some of the basal podomeres to acuminate on the distal podomeres; basal podomeres a little granular, distal podomeres smooth. First leg with pars basalis (measured along the flexor margin) 0.28 mm. long, 0.16 mm. deep; pars tibialis fusiform, both margins weakly convex, length (measured along the extensor margin) 0.4 mm., depth 0.136 mm.; tibia with weakly concave outer or extensor margin except at very proximal end, flexor margin weakly convex, deepest near distal one-fourth; length of tibia 0.45 mm., depth 0.095 mm.; tarsus slender, subcylindrical, length about 0.43 mm., depth 0.075 mm. Fourth leg with trochanter 0.32 mm. long, 0.185 mm. deep; pars basalis 0.305

mm. long, 0.22 mm. deep; pars tibialis 0.51 mm. long, 0.235 mm. deep; entire femur with flexor margin nearly straight, except near ends, extensor margin weakly and evenly convex, length 0.8 mm., depth 0.235 mm.; tibia with extensor margin nearly straight, flexor margin very weakly convex, length 0.64 mm., depth 0.13 mm.; tarsus tapering slightly towards distal end, widest across proximal end, length 0.5 mm., depth 0.09 mm.; tarsus without sensory seta, investing setae numerous especially on flexor surface.

Genital complex. Anterior operculum with nearly 35 small setae, irregularly placed anterior and lateral to genital aperture; posterior operculum with 14 setae in a single row along posterior margin of operculum.

Type locality. "Ithaca, New York." Coolidge (1908) gives Indiana as an additional locality for this species, but the record may be erroneous.

Hesperochernes unicolor (Banks)

Chelanops unicolor Banks, 1908, pp. 39–40.
Neochernes unicolor Beier, 1932, pp. 166–167; Roewer, 1937, p. 299.

The type collection consists of two individuals, apparently both females. One female, the lectotype, gravid and with the abdomen broken, was mounted in clarite for study; the other individual was examined in alcohol.

Male. Not available for study.

Female. Detailed description based chiefly on the mounted female; measurements given in parentheses are of the unmounted specimen and follow in each instance the corresponding measurements of the mounted specimen. Body ovate, fairly stout; yellowish brown, with palps a deeper reddish brown; length of body 2 mm. or less. *Carapace* with anterior portion rounded, widest near center; posterior transverse furrow nearly midway between median furrow and posterior carapacal margin; coarsely granular, especially on sides; posterior margin apparently with eight setae; eye-spots not distinguished; setae clavate to subclavate; length of carapace about 0.7 (0.66) mm., width about 0.54 (0.54) mm. *Tergites*, except eleventh, divided; moderately granular; central tergal halves with six subclavate to clavate setae; intertergal spaces wide; length of abdomen not determined; abdomen "about twice as long as broad" (Banks, 1908). *Sternites* weakly sculptured; setae acuminate; pleural membranes rugose, with wavy and papillose striations; anterior stigmatic plate with three setae, the posterior with one.

Chelicera. Somewhat slender, fingers little curved; subbasal seta subterminally denticulate, basal seta broken; flagellum of four setae, the three smaller ones apparently entire; length of chelicera 0.21 mm., width of base 0.125 mm. Fixed finger a little curved, apparently four teeth on distal inner margin in addition to denticles of inner surface of apical tooth. Movable finger nearly straight; subapical lobe finger-like and well developed; apical tooth terminally sclerotic; galea slender and long, with five terminal and subterminal simple rami, the medial rami fairly long, the more apical ones short; serrula exterior of about 16 plates; movable finger 0.17 mm. long.

Palpus (Fig. 19). Fairly stout, coarsely to moderately granular except on ventral face of maxilla, extensor surface of tibia, and chela; setae acuminate on maxilla; setae of the trochanter, tibia, and femur very heavy, multidenticulate and chiefly subclavate but a few truly clavate; chelal hand with heavy multidenticulate setae on inner surface, multidenticulate but not so heavy on outer surface; acuminate setae on fingers. Trochanter with distal half of flexor or inner margin very weakly convex; length 0.34 mm., width 0.19 mm. Femur moderately stout; outer margin flatly rounded except at ends; inner margin weakly convex in basal two-thirds, but a little concave in distal one-third; pedicle about as long as wide, fairly well set-off from rest of podomere; length 0.52 (0.51) mm., width 0.2 mm. (width of alcoholic specimen not accurately secured). Tibia with outer margin flatly rounded, inner margin bulging but a little concave distal to center; pedicle stout; length 0.5 (0.505) mm., width 0.225 (0.24) mm. Chela with outer and inner margins more or less evenly convex; pedicle nearly in center of base, perhaps a very little towards outer side; fingers slender, curved, well set-off from hand; length of chela without pedicle 0.86 (0.85) mm., width 0.35 (0.35) mm.; depth of chela but little less than width; length of chelal hand without pedicle 0.45 (0.44) mm.; length of movable finger 0.43 (0.43) mm., slightly less than hand without pedicle. From the side, chelal hand basally stout; pedicle displaced far towards ventral side; ventral margin flatly convex, dorsal margin moderately convex; fingers moderately stout; fixed finger with inner margin weakly convex, outer margin very weakly concave to virtually straight; movable finger gently curved, outer margin convex, inner margin concave. Movable finger with about 40 marginal teeth, those of distal end of row conical and with well-developed cusps; proximal teeth rounded and acuspid; movable finger with two internal accessory teeth, six external ones. Fixed finger with marginal teeth much as in movable finger but about

45 in number; three internal accessory teeth, five external ones. Movable finger with nodus ramosus just distal to level of *st*; tactile seta *t* a little more than one-third of finger length from tip; *st* about one-third as far from *t* as *t* is from finger tip; *sb* and *b* in basal one-fourth of finger; *st* about twice as far from *sb* as from *t*. Fixed finger with *et* about one-fifth of finger length from tip; *it* one-third or one-fourth of finger length from tip; *ist* a little distal to or very near midpoint of finger, *est* a little proximal to midpoint; *eb* and *esb* near finger base and separated by less than two areolar diameters; *ib* and *isb* paired and near level of *esb*.

Legs. Moderately slender; light yellowish brown; trochanter and pars tibialis of fourth leg weakly granular, other podomeres smooth; setae of femora and also extensor surfaces of other podomeres multidenticulate, subclavate to almost clavate; setae of flexor surfaces of more distal podomere paucidenticulate to acuminate; no tactile seta distinguished on fourth pedal tarsus. First leg with flexor margin of pars tibialis nearly straight, length of pars tibialis 0.22 mm., depth 0.095 mm.; tibia with outer margin distinctly S-shaped, flexor margin convex, length 0.255 mm., depth 0.075 mm.; tarsus slender, tapering somewhat towards distal end, length 0.295 mm., depth 0.055 mm. Fourth leg with trochanter 0.21 mm. long, 0.12 mm. deep; pars basalis 0.19 mm. long, 0.12 mm. deep; pars tibialis 0.32 mm. long, 0.12 mm. deep; entire femur with flexor margin nearly straight, extensor margin weakly convex, 0.47 mm. long; tibia slender, extensor margin except at base nearly straight, flexor margin weakly convex, 0.38 mm. long, 0.08 mm. deep; tarsus with flexor margin weakly convex, extensor margin nearly straight, slightly tapering and narrowed towards distal end, length 0.33 mm., depth 0.06 mm.

Genital complex. Only six setae along posterior margin of posterior operculum (unless some are broken and areoles cannot be distinguished); apparently 17 scattered setae on anterior operculum.

Type locality. "Austin, Texas; Brues; nest *Eciton cœcum*".

Genus Dinocheirus Chamberlin, 1929, emend.

Dinocheirus Chamberlin, 1929b, pp. 171–172; Chamberlin, 1931a, p. 242; Beier, 1932, p. 137; Beier, 1933b, p. 522; Chamberlin, 1934, p. 126, 128; Roewer, 1937, p. 302.

Epaphochernes Beier, 1932, p. 173; Beier, 1933b, p. 537.

Diagnosis. Carapace with two well-developed transverse furrows; usually no eye-spots. Cheliceral hand with five setae, the subbasal

subterminally denticulate; galea of male commonly less branched than the galea of female. Palps moderately stout; chela of male stouter than that of female; well-developed accessory teeth present on chelal fingers; nodus ramosus of movable finger between *t* and *st*; *st* usually distal to midpoint of movable finger; *t* closer to *st* than to finger tip; *ist* commonly a little distal to *cst*. Fourth pedal tarsus with a short simple tactile seta distal to midpoint of podomere. Genotype: *Dinocheirus tenoch* Chamberlin, 1929.

Remarks. The changes made here in the diagnosis of the genus *Dinocheirus* are somewhat trivial and minor, but have been necessary in order to include in the genus additional species that are certainly congeneric with *D. tenoch*.

Dinocheirus partitus (Banks)

Chelanops partitus Banks, 1909b, p. 304.
Epaphochernes partitus Beier, 1932, p. 174.
Dinocheirus partitus Roewer, 1937, p. 302.

The type collection consists of several individuals apparently of both sexes, including a gravid female. Of the two females mounted for study, the one (gravid) with a longer body, slightly smaller appendages, and more slender palpal femur and chela is designated as the lectotype. Males (determination of sex not always certain in unmounted individuals) were not mounted, but some were studied in alcohol.

Male. Specimens thought to be males are very similar to the females, but much smaller. Body length 2.1 to 2.4 mm. Palpal podomeres slightly stouter than in the female; femur 0.87–0.89 mm. long, 0.31–0.32 mm. wide, length 2.8 times the width; tibia 0.85–0.86 mm. long, 0.355–0.36 mm. wide, length 2.3 to 2.4 times the width; chela 1.42–1.45 mm. long, 0.51 mm. wide, 2.8 to 2.85 times as long as wide; hand length without pedicle 0.68–0.7 mm.; length of finger exceeding slightly hand length, 0.75–0.77 mm.

Female. Description based chiefly on the two females mounted in clarite; the measurements and ratios of the lectotype are followed in parentheses by the corresponding measurements and ratios of the mounted female cotype. Body fairly stout; light brown, palps reddish brown, legs lighter; length of body 3.2 (3.0) mm. *Carapace* with anterior margin rounded, lateral margins slightly convex, posterior margin weakly convex and with eight to ten marginal setae; all setae clavate to subclavate; coarsely granular, especially anteriorly and

laterally; eye-spots not distinguished; posterior furrow much nearer to posterior margin than to median furrow; length 0.96 (1.03) mm., greatest width near center and equal to 0.77 (0.92) mm.; posterior width slightly less than greatest width, 0.73 (0.88) mm. *Abdomen* ovate, tergites divided, except eleventh; surface of tergites weakly to moderately granular; first tergal halves each with six or seven setae, central tergal halves with as many as eleven setae; tergal setae chiefly clavate. *Sternites* weakly sculptured; maximum number of setae appears to be about 12 on any one sternal half, setae acuminate; sternites divided. Posterior stigmatic plate with one seta, anterior plate with number undetermined; pleural membranes of wavy rugose striations; length of abdomen 2.25 (2.0) mm., width about 1.5 mm.

Chelicera. Moderately stout; subbasal seta subterminally denticulate, basal seta smooth, exterior seta short; chelicera yellow in color; flagellum of four blades, the most distal very much flattened and with numerous serrations, other three narrower and with very few serrations; length of chelicera 0.29 (0.33) mm., width of base 0.16 (0.17) mm.; movable finger 0.26 (0.27) mm. long. Fixed finger a little curved; three small denticles on inner surface of apical tooth, five denticles on distal part of inner finger margin. Movable finger fairly stout, a little curved; subapical lobe well developed; a small denticle near base of galeal seta on inner finger margin; galea (Fig. 20) with six simple rami scattered along much of length of galea; galeal seta not reaching to tip of galea; serrula exterior with 19 ligulate plates.

Palpus (Fig. 21). Fairly stout except for slender chelal fingers; moderately granular except for chelal fingers and extensor side of chelal hand; setae on maxilla acuminate, multidenticulate to subclavate on trochanter, femur, and flexor surface of tibia; extensor surface of tibia and chelal hand with paucidenticulate setae, becoming acuminate and simple on fingers. Maxilla about 0.5 mm. long, nearly 0.3 mm. wide. Trochanter with weak protuberances, 0.59 mm. long, 0.34 mm. wide in the cotype; lectotype with trochanter broken. Femur with pedicle longer than wide; outer margin flatly convex in center, a little more convex beyond; inner or flexor margin very weakly convex in center, very weakly concave towards distal end; femur widest beyond midpoint; length 0.85 (0.93) mm., width 0.29 (0.34) mm. Tibia with pedicle longer than wide; extensor margin more or less evenly convex, flexor margin convex centrally but a little concave in distal part; length 0.83 (0.91) mm., width 0.34 (0.395) mm. Chela slender; widest near base and tapering towards fingers,

which are very slender and gently curved; outer or extensor margin of chelal hand weakly convex, flexor or inner margin a little more convex; pedicle longer than wide and near center of base; length of chela 1.35 (1.48) mm., width of chela 0.44 (0.51) mm.; depth of chela approximate to the width; length of hand without pedicle 0.65 (0.74) mm.; movable finger with length of 0.73 (0.8) mm., somewhat greater than length of hand without pedicle. From the side, pedicle of chela (Fig. 22) displaced a little towards ventral side of base; ventral margin nearly straight except at basal end, dorsal margin fairly convex; fixed finger nearly straight with both margins very weakly convex, almost straight; movable finger a little curved, inner margin weakly concave, outer margin weakly convex; fingers slender. Movable finger with about 45 marginal teeth, contiguous, more conical and better developed at distal than at proximal end of row; teeth of fixed finger about 50 in number, similar to those of movable finger; four or five external and about the same number of internal acessory teeth on each finger. Movable finger with *st* a little distal to midpoint of finger, *t* closer to *st* than to finger tip; *sb* about one-fifth of finger length from base; *b* a little closer to *sb* than to proximal margin of finger. Fixed finger with *it* about one-fifth of finger length from tip; *ct* closer to *it* than to finger tip; *cst* somewhat distal to midpoint of finger; *ist* about as far distal to level of *cst* as *ct* is distal to level of *it*; *cb* and *csb* near base of finger and separated by about three areolar diameters; *isb* and *ib* close together and on a level about three areolar diameters distal to *csb*. Nodus ramosus of movable finger just a little distal to *st*.

Legs. Yellowish brown, fairly slender; first leg virtually without sculpturing; fourth leg with scale-like markings on trochanter and pars tibialis, otherwise virtually smooth; setae of extensor surface of podomeres chiefly multidenticulate but with few denticulations on tarsal setae, setae of flexor surface paucidenticulate on basal podomeres to acuminate on distal podomeres. First leg with tibia and tarsus much as in fourth leg; pars tibialis 0.4 (0.43) mm. long, 0.148 (0.16) mm. deep; tibia 0.45 mm. long, 0.1 mm. deep; tarsus 0.45 mm. long, 0.07 mm. deep. Fourth leg with flexor margin of femur nearly straight, extensor margin evenly but weakly convex; pars basalis 0.295 (0.35) mm. long, 0.19 (0.21) mm. deep; pars tibialis 0.56 (0.65) mm. long, 0.188 (0.215) mm. deep; entire femur 0.79 (0.91) mm. long, 0.192 (0.215) mm. deep; tibia weakly S-shaped, length 0.64 (0.735) mm. long, 0.125 (0.133) mm. deep; tarsus subcylindrical, a little curved, length 0.56 (0.61) mm. long, 0.083 (0.09) mm. deep; tarsus

with a relatively short and simple sensory seta distal to midpoint of podomere, removed from basal margin by 0.36 (0.415) mm.

Genital complex. Anterior operculum with 19 scattered setae; number on posterior operculum not determined.

Type locality. According to the label accompanying the collection, the type locality is "Ft. Yuma, Arizona". The original description by Banks (1909b) gives "Pt. Yuma, Ariz." as the type locality. Evidently this discrepancy results from a typographical error.

Dinocheirus obesus (Banks)

Chelanops obesus Banks, 1909a, pp. 146–147.
Hesperochernes obesus Beier, 1932, p. 176; Roewer, 1937, p. 302.

The type collection consists of five individuals belonging to both sexes. Two males were mounted and serve as the basis for the detailed study of this species; the females were examined in alcohol. One male (slide marked "2" in the MCZ collection) was selected as the lectotype.

Male. The measurements and ratios of the structures of the lectotype are followed in parentheses by the corresponding measurements of the other male individual. Body large, fairly stout; body and carapace brown, yellowish brown in mount; palps reddish brown; palpi stout but legs relatively slender; length 3.7 (3.6) mm. *Carapace* irregularly rounded in anterior one-half, slightly widest near center and a little narrowed posteriorly; moderately granular; setae fairly numerous, multidenticulate; 10 to 12 setae along posterior margin; posterior transverse furrow somewhat closer to posterior margin than to median furrow; very weak eye-spots; length of carapace 1.21 (1.23) mm., greatest width 0.94 (0.96) mm., posterior width 0.93 (0.94) mm. *Abdomen* oval in outline; tergites, except eleventh, divided, moderately sculptured, setae multidenticulate and not distally widened; first tergal halves each with seven or eight setae; maximum number of setae for any tergal half is eight. Sternites weakly sculptured; divided; maximum number of setae on any sternal half about 12; setae acuminate and simple. Pleural membranes with wavy, rugose striations; abdomen about 2.5 (2.4) mm. long, 1.8 (1.6) mm. wide.

Chelicera. Yellow; base fairly stout; subbasal seta with a very few subterminal denticulations; flagellum of four setae, the longest with several denticulations, the next smaller with perhaps a few very

weak denticulations; net-like markings near base of setae on hand; length of chelicera 0.37 mm., width of base 0.21 mm.; length of movable finger about 0.32 mm. Fixed finger slender; apical tooth with three denticles on inner surface, six or seven retroconical denticles on distal half of inner finger margin; lamina exterior convex, bulging; serrula interior with four platyform and one spine-like free plates, these with serrated margins. Movable finger little curved, tip of apical tooth very sclerotic; subapical lobe close to base of apical tooth and not much smaller than apical tooth; one or two conical denticles on inner finger margin nearly level with insertion of galeal seta; galea slender, apparently with a few rami in distal half, which in every specimen is broken beyond the most basal ramus; galeal seta extending apparently to tip of galea; serrula exterior of 19 to 22 ligulate plates.

Palpus (Fig. 23). Stout, especially the chela; moderately to finely granular except for ventral face of maxilla and external surface and fingers of chela; setae multidenticulate on trochanter and flexor surface of femur and tibia; setae paucidenticulate on extensor surface of femur and tibia, and on chelal hand; setae of fingers acuminate. Maxilla 0.65 (0.62) mm. long, 0.4 (0.4) mm. wide. From the dorsad, trochanter with a weakly developed subdorsal protuberance, inner margin globose; length 0.68 (0.63) mm., width 0.405 (0.4) mm. Femur with weakly convex outer margin, somewhat flatly convex in proximal half; inner margin weakly convex in center, but a little concave towards both ends; pedicle a little longer than wide and well set-off from rest of podomere; femur widest in proximal half; length 1.05 (0.97) mm., width 0.44 (0.425) mm. Tibia with stout pedicle; outer margin flatly convex in basal part; inner margin weakly concave beyond midpoint; length 1.04 (0.99) mm., width 0.46 (0.46) mm. Chela from dorsad much swollen in basal portion of hand; outer margin evenly but not markedly convex; inner margin very convex especially in basal half, with hand bulging to the inside; hand narrowing rapidly from midpoint of inner margin towards finger base; pedicle displaced far towards outer side; fingers moderately curved; length of chela 1.84 (1.78) mm., width 0.86 (0.81) mm.; depth of chelal hand a little more than width, 0.89 (0.85) mm.; length of chelal hand without pedicle 0.9 (0.88) mm.; movable finger longer than chelal hand without pedicle, equal to 1.04 (1.0) mm. In lateral view, pedicle of chela displaced far towards ventral side; basal-dorsal corner greatly bulged and swollen; dorsal margin rounded, ventral margin flatly rounded; base meets ventral margin more or less at

an angle; fingers relatively slender, fixed finger with outer margin nearly straight, inner margin weakly convex to nearly straight; movable finger with external margin much convex, inner margin concave. Marginal teeth of fingers small, uniform, conical, contiguous, and with cusps; fixed finger with about 55 marginal teeth, movable finger with about the same number. Movable finger with six to 10 external and 10 to 15 internal accessory teeth, arranged somewhat in two unequal and irregular rows; fixed finger with 9 or 10 external teeth arranged in two rows and 9 to 12 internal teeth; teeth somewhat variable in the two males. Movable finger with tactile seta *t* about one-fourth of finger length from tip, distance from *t* to finger tip one and one-half times the distance of *t* from *st*; *st* less than one-half as far from *t* as from *sb*; nodus ramosus of movable finger little nearer *st* than *t*. Fixed finger with *est* considerably distal to midpoint of finger; *it* and *ist* between levels of *est* and *et*; *ib* and *isb* on a level somewhat distal to level of *esb*; *eb* and *esb* about five areolar diameters apart.

Legs. Not especially stout, slender in relation to palpi; legs smooth, except for a few fine granules on some areas of pars tibialis and trochanter of each leg; in general, setae of flexor surface acuminate, those of extensor surface paucidenticulate. First leg with pars tibialis having both margins weakly convex, length 0.52 (0.53) mm., depth about 0.2 mm.; tibia weakly S-shaped, length 0.6 (0.59) mm., depth 0.135 (0.14) mm.; tarsus tapering a little towards distal end, deepest across proximal end, length 0.54 mm., depth 0.098 (0.095) mm. Fourth leg with pars basalis 0.37 (0.36) mm. long, 0.225 (0.235 mm. deep; pars tibialis 0.75 (0.7) mm. long, about 0.26 mm. deep; entire femur with flexor margin nearly straight, extensor margin weakly convex, length 1.02 (0.96) mm., depth 0.255 (0.26) mm.; tibia with extensor margin very weakly concave, flexor margin a little convex, length 0.895 (0.84) mm., depth 0.163 (0.16) mm.; tarsus subcylindrical, length 0.62 mm., depth about 0.113 mm.; tactile seta of fourth pedal tarsus located just distal to center, being 0.32 mm. from proximal margin of podomere.

Genital complex. Details not determined.

Female. Essentially like the male, but palpal femur and chela not so stout. Measurements of a single female in alcohol as follows: length of body 3.8 mm.; carapace 1.28 mm. long, 1.08 mm. wide, posterior width 1.05 mm.; abdomen 2.55 mm. long, width 1.7 mm.; palpal femur 1.05 mm. long, 0.41 mm. wide; tibia of palp 1.04 mm. long, width 0.46 mm.; chela 1.8 mm. long, 0.65 mm. wide; chelal

hand without pedicle 0.92 mm. long; movable finger as long as chelal hand without pedicle.

Type locality. Type collection from near Tucson, Arizona. Banks (1909a) in his original description mentions Lower California as a locality for *D. obesus*. Individuals from this locality were not checked by the present writer.

Remarks. *Dinocheirus obesus* is very closely related to *D. æqualis* (Banks, 1908) and *D. tenoch* Chamberlin, 1929. Separation of *obesus* and *æqualis* may be easily made as indicated under the discussion of *æqualis*. Separation of *obesus* and *tenoch* is chiefly based at present on the characteristics of the male chela. With the advent of additional information, especially measurements of podomeres of the palp and legs, it may be possible to find additional and better ways of distinguishing between these two species. In *obesus* the chelal hand of the male is not much deeper than broad; the chela has a length 2 to 2.1 times the depth; the movable finger is longer than the depth of the hand; and the movable finger has 10 to 15 internal accessory teeth. In *tenoch*, the chelal hand of the male is considerably deeper than broad; the chela has a length 1.8 times the depth; the movable finger is shorter than the depth of the hand; and the movable finger has six internal accessory teeth.

Dinocheirus æqualis (Banks)

Chelanops æqualis Banks, 1908, p. 41.
Epaphochernes æqualis Beier, 1932, p. 174.
Dinocheirus æqualis Roewer, 1937, p. 302.

The type collection consists of two individuals, apparently both females, one of which was mounted in clarite by me. The mounted female is designated as the lectotype.

Male. Unknown.

Female. Description is based chiefly on the lectotype. Measurements and ratios relative to the female in alcohol follow in parentheses the corresponding measurements and ratios for the lectotype. Body large; fairly stout, especially the abdomen; carapace and palps fairly dark reddish brown, rest of body lighter; length of body 3.9 (3.5) mm. *Carapace* with anterior half rounded, posterior half with sides nearly parallel; posterior margin weakly convex and with ten marginal setae; moderately granular, coarsely so on the sides; transverse furrows marked, posterior furrow much closer to posterior margin than to median furrow; setae fairly stout, multidenticulate but usually

not distally widened; eye-spots not distinguished; carapace widest across posterior margin; length 1.2 (1.2) mm., width 0.93 (1.05) mm. *Tergites* except the eleventh divided; interscutal spaces wide; tergites weakly granular; first tergite with seven setae on each scutum, central tergal halves with 8 (occasionally 9) setae; setae similar to carapacal setae. *Sternites* divided, weakly sculptured; central sternal halves with as many as 13 acuminate setae; each anterior stigmatic plate with three setae; each posterior plate with one; pleural membranes rugose with wavy parallel striations. Abdomen ovate, 2.7 (2.3) mm. long, 1.75 (1.7) mm. wide.

Chelicera. Yellow; not especially stout; base with weak net-like markings near base of fixed finger; flagellum of four setae, the longest unilaterally serrate; length of chelicera 0.37 mm., width of base 0.19 mm.; length of movable finger 0.31 mm. Fixed finger slender; apical tooth with three internal denticles; inner finger margin with six teeth, the proximal one very small; distal plate of serrula interior spine-like, the next four platyform, all five with serrate margins. Movable finger little curved; apical tooth heavy; subapical lobe nearly as large as apical tooth; galea large, distal one-half or two-thirds with simple rami, both galea broken terminally and rami cannot be counted; galeal seta not extending nearly to end of galea; serrula exterior of about 20 plates.

Palpus (Fig. 24). Fairly stout; setae of maxilla acuminate; setae of trochanter and flexor margins of tibia and femur distinctly multidenticulate, but not subclavate; setae of extensor margins of femur and tibia and both margins of chela paucidenticulate; setae of chelal fingers acuminate; maxilla moderately granular except on the very ventral face, other podomeres moderately granular except chelal fingers; granules on flexor surfaces more conspicuous than on extensor surfaces. Maxilla about 0.61 mm. long, width 0.37 mm. Trochanter with two protuberances, one sublateral and the other subdorsal; medial margin convex; length of trochanter 0.64 mm., width 0.35 mm. Femur with pedicle longer than wide; sides beyond pedicle subparallel; extensor margin with a weak concavity in proximal portion, but a little convex beyond; flexor margin weakly convex with a weak concavity near distal end; widest beyond center; length 1.01 (1.06) mm., width 0.37 (0.4) mm.; length 2.7 (2.65) times the width. Tibia with pedicle about as long as wide; extensor margin flatly convex in basal two-thirds, more convex beyond; flexor margin bulging somewhat in center but a little concave beyond; length 1.01 (1.05) mm., width 0.42 (0.45) mm. Chela with stout pedicle displaced a

little towards outer margin; hand fairly stout, extensor margin evenly convex, flexor margin more bulging and much more convex especially in basal part; chelal hand widest in basal portion; hand narrowed somewhat towards fingers which are relatively slender and gently curved; chela without pedicle 1.72 (1.82) mm. long, width 0.62 (0.61) mm.; depth little more than width, 0.65 mm.; chelal hand 0.85 (0.88) mm. long; movable finger a little longer than hand without pedicle, 0.91 (0.99) mm. long. From the side, chela (Fig. 25) is stout; pedicle displaced far towards ventral margin; ventral margin much flattened, dorsal margin a little convex; deepest across very base of hand; fingers moderately slender; fixed finger with nearly straight inner margin and weakly convex outer margin; movable finger curved, outer margin convex, inner margin weakly concave. Fixed finger margin with between 45 and 50 teeth, those at distal end and center of row acute and with cusps; at the very proximal end of row, teeth acuspid and rounded. Movable finger with about 50 marginal teeth, these like the teeth of opposing finger. Movable finger with three internal accessory teeth, almost contiguous, removed some distance from finger tip; six well-spaced external accessory teeth. Fixed finger with seven external and four or five internal accessory teeth. Movable finger with nodus ramosus very little nearer to *st* than to *t*. Movable finger with *t* about one-fourth of finger length from tip, *st* somewhat closer to *t* than the latter is to finger tip; *sb* about one-fourth of finger length from base, with *b* not far proximal to *sb*; *st* considerably distal to midpoint of finger and much closer to *t* than to *sb*. Fixed finger with *it* between one-fourth and one-fifth of finger length from tip; *et* a little closer to level of *it* than to finger tip; *est* a little distal to midpoint of finger and *ist* a little distal to *est*; *ist* about three times as far from level of *it* as from level of *est*; *ib* about on level of *esb* or a little distal to that level; basal and subbasal setae as usual in the genus.

Legs. Moderately slender to slender; yellowish brown; with very fine granules, except tarsi which are almost smooth; setae variable, chiefly acuminate, but sometimes paucidenticulate, especially on extensor surfaces of femur, tibia, and tarsus. First leg with pars tibialis very weakly convex on both margins, 0.52 mm. long, 0.19 mm. deep; tibia with weakly S-shaped extensor margin, weakly convex inner margin, length 0.61 mm., depth 0.12 mm.; tarsus with outer margin weakly concave, flexor margin nearly straight, length 0.55 mm., depth 0.0875 mm. Fourth leg with trochanter 0.46 mm. long, 0.24 mm. deep; pars basalis 0.38 mm. long, 0.225 mm. deep; pars

tibialis 0.74 mm. long, depth 0.243 mm.; entire femur with the flexor margin nearly straight except at ends, extensor margin very weakly convex, length 1.03 mm., depth 0.243 mm.; tibia slender, 0.88 mm. long, 0.152 mm. deep; tarsus with both margins very weakly concave, length 0.64 mm., depth 0.11 mm.; tarsus with a tactile seta distal to midpoint, being 0.365 mm. from proximal end.

Genital complex. Posterior operculum with 18 setae in a marginal row; anterior operculum with 35 setae somewhat compactly grouped.

Type locality. "El Paso, Texas".

Remarks. This species is related to *D. obesus*. Separation of the two forms is easily accomplished, however, by means of the following differences: weak eye-spots are present in *obesus* but not in *æqualis*; in *obesus* the movable finger of the chela equals the length of the chelal hand, in *æqualis* the movable finger exceeds the chelal hand in length; the chelal hand is relatively shorter and thus appears more swollen in *æqualis* than in *obesus*; the femur has a length 2.65 to 2.7 times the width in *æqualis*, but in *obesus* the length is only 2.55 times the width. The above differences are based on a limited number of females since the males of *æqualis* are unknown.

Dinocheirus dorsalis (Banks)

Chelanops dorsalis Banks, 1895, p. 8; Coolidge, 1908, p. 112; Banks, 1911, p. 638.

Neochernes dorsalis Beier, 1932, p. 166; Roewer, 1937, p. 299.

The collection consists of three gravid females. One of these, the lectotype, was mounted for study.

Male. Unknown.

Female. Description based chiefly on the lectotype. Measurements of the length of the body, lengths of the palpal femur, tibia, and chela along with the length of the chelal hand and movable finger are based on all three individuals. Body fairly stout; golden brown, with palpi darker than rest of animal; length of body 2.4–2.5 mm. *Carapace* granular, especially laterally and anteriorly; setae fairly numerous, multidenticulate, subclavate, with a few clavate setae; transverse furrows well marked, the posterior much nearer to posterior margin than to median furrow; broadest across the middle, may be slightly narrower posteriorly; posterior margin weakly convex and with nine marginal setae; anterior half rounded both anteriorly and laterally; anterior margin with four marginal setae; no eye-spots distinguished; length of carapace 0.74 mm., greatest

width 0.64 mm. *Tergites*, except eleventh, divided; interscutal areas between tergal halves wide, sculptured as in pleural membranes; tergites moderately granular; seven or eight setae on each first half-tergite, central tergal halves with nine setae as the maximum number; setae of tergites subclavate. *Sternites* light; weakly sculptured; tergal setae acuminate, maximum number for each tergal half not determined; posterior stigmatic plate with one seta, anterior plate with three. Pleural membranes with indistinct striations, papillose, rugose. Abdomen 1.75 mm. long, about 1.2 mm. wide.

Chelicera. Fairly stout, subbasal seta terminally denticulate, basal seta acuminate and simple; base near insertion of setae with scale-like markings; exterior seta very small; chelicera 0.2 mm. long, 0.125 mm. wide; movable finger about 0.16 mm. long. Fixed finger with a few distal denticles of which the proximal is vestigial; three small denticles on inner surface of distal tooth; serrula interior with distal plate spinelike and serrate, the next more proximal one platyform and serrate; lamina exterior very convex on outer edge. Movable finger a little curved; apical tooth with sclerotic tip; subapical tooth slender and finger-like, located at base of apical tooth; a small denticle on inner margin of finger at level of insertion of galeal seta; galea long and with five or six simple rami confined to less than distal one-half of galea; galeal seta not reaching tip of galea; serrula exterior with 17 or 18 ligulate plates.

Palpus (Fig. 26). Palpi stout, reddish brown; lateral and medio-anterior portions of maxilla, the surfaces of trochanter and femur, and flexor surfaces of tibia and chelal hand moderately granular; setae variable, those of maxilla numerous, simple; setae associated with granular areas (except on maxilla) multidenticulate and often nearly clavate; setae of smooth areas paucidenticulate; setae of fingers acuminate. Maxilla about 0.36 mm. long, 0.24 mm. wide. Trochanter with two rounded protuberances; length of trochanter 0.37 mm., width 0.21 mm. Femur with well-defined pedicle, about as long as wide; extensor margin of femur flatly convex in center, a little more convex near each end; flexor margin proximally convex, a little concave in distal portion; greatest width in basal one-half of femur; femur 0.52–0.59 mm. long, width 0.235–0.25 mm.; length 2.2 to 2.35 times the width. Tibia with fairly stout pedicle; outer margin convex; inner margin bulging and evenly rounded proximally and centrally, becoming a little concave in distal third; length 0.51–0.56 mm., width 0.25–0.27 mm., length 2.0 to 2.1 times the width. Chela not especially stout; pedicle displaced very little towards inner

side; extensor margin convex, perhaps a little flatly convex in center; flexor margin more convex especially in basal part; hand tapering toward base of fingers; fingers moderately slender and little curved; length of chela without pedicle 0.89–0.94 mm., width 0.325–0.37 mm., length 2.5 to 2.7 times the width; depth of chelal hand subequal to width; length of hand without pedicle 0.46–0.51 mm.; length of movable finger little less than hand length, 0.46–0.48 mm. In lateral view, chelal hand nearly symmetrical, with pedicle a little closer to ventral than to dorsal side; both margins evenly and moderately convex; fingers, especially fixed finger, moderately stout; movable finger a little more slender than fixed finger. Fixed finger with outer margin weakly convex, inner margin virtually straight and with nearly 35 conical and cuspid teeth, these being a little reduced towards proximal end of row; fixed finger with five external and three internal accessory teeth. Movable finger with a few more than 35 marginal teeth, similar to those of opposing finger; seven external accessory teeth present, apparently a single internal accessory tooth; nodus ramosus nearly midway between *t* and *st*. Movable finger with four tactile setae: *t* about one-third of finger length from tip, *st* just proximal to midpoint, *sb* about one-fifth of finger length from base, *b* only about one areolar diameter proximal to *sb*. Fixed finger with tactile setae as follows: *et* in distal one-fifth of fixed finger, *it* about twice as far from finger tip as *et* is from finger tip; *est* near midpoint of finger, *ist* just a little distal to *est*; basal and subbasal setae as usual in species of the genus.

Legs. Moderately slender; trochanter and pars tibialis of each leg with scale-like sculpturing and granulations, otherwise podomeres smooth; setae variable, those of extensor surfaces of pars tibialis and tibia usually multidenticulate, otherwise chiefly paucidenticulate becoming acuminate on flexor surfaces of distal podomeres. First leg with both margins of pars tibialis convex, length 0.265 mm., depth 0.12 mm.; tibia moderately stout, flexor margin convex, extensor margin very weakly S-shaped, length 0.28 mm., depth 0.085 mm.; tarsus with extensor margin straight, flexor margin very weakly convex, length 0.275 mm., depth 0.06 mm. Fourth leg with trochanter 0.24 mm. long, 0.137 mm. deep; pars basalis 0.215 mm. long, 0.145 mm. deep; pars tibialis 0.375 mm. long, 0.163 mm. deep; entire femur with flexor margin nearly straight, extensor margin rounded, length 0.53 mm., depth 0.163 mm.; tibia with flexor margin weakly convex, extensor margin with distal two-thirds nearly straight, but more proximal portion moderately convex, length 0.42 mm., depth 0.105

mm.; tarsus with both margins very weakly convex, length 0.32 mm., depth 0.075 mm.; tactile seta broken from tarsus of most legs but a long seta observed on leg of one specimen in alcohol; areole marks position of tactile seta in mounted specimen, being a little distal to center of podomere, 0.19 mm. from proximal margin.

Genital complex. Sixteen setae along posterior margin of posterior operculum; anterior operculum with about 25 more or less scattered setae.

Type locality. No locality label accompanying the type collection; type locality, according to Banks (1895), Lake Tahoe, California.

Remarks. *Dinocheirus dorsalis* appears closely related to *D. validus* (Banks, 1895). A comparison with *D. validus* is possible only with respect to the females since the male *dorsalis* is unknown. In general, *dorsalis* has a palpal femur less than 0.6 mm. long, *validus* has the palpal femur more than 0.6 mm. long; the palpal chela in *dorsalis* is less than 0.95 mm. long, more than 1.05 mm. long in *validus*; most palpal podomeres are moderately granular in *dorsalis*, less granular in *validus*; from the dorsad, the outer margin of the chela is flatly convex in *dorsalis*, more evenly rounded in *validus*; from the side, the chelal hand is somewhat subrectangular in outline in *dorsalis*, less rectangular in *validus*; in *dorsalis ist* is just a little distal to *est*, but in *validus ist* is conspicuously distal to *est*. When the male of *dorsalis* becomes known, more easily recognized differences may be found for separating the two species.

Dinocheirus validus (Banks)

Chelanops validus Banks, 1895, p. 7; Coolidge, 1908, p. 111; Banks, 1911, p. 638.

Dinocheirus validus Beier, 1932, p. 138; Roewer, 1937, p. 302.

The type collection consists of two females and four males. One male (designated as the lectotype) and one female were mounted in clarite by the present writer.

Male. Description taken chiefly from the lectotype; measurements of the body and of palpal podomeres are based on all four males. Body fairly stout, ovate in general shape; length of body 1.9–2.2 mm. *Carapace* with numerous subclavate setae; carapace brown, granular; no eye-spots distinguished by the present observer, although Banks (1895) states "two faint eye-spots" present; posterior margin with 12 clavate setae; length 0.82 mm., greatest width near center and 0.62 mm.; posterior width slightly less than greatest

width, 0.57 mm. *Tergites* except the eleventh divided; brown, granular; first tergite with 14 to 16 subclavate setae; maximum setae on any tergal half ten. *Sternites* divided; as many as 15 acuminate setae on a half-sternite; sternites sculptured with net-like lines; pleural membranes striated and rugose; length of abdomen 1.4 mm., width 0.96 mm.

Chelicera. Moderately stout; side of hand bearing setae marked by net-like lines; subbasal seta subterminally denticulate, basal seta apparently smooth; length of chelicera 0.23 mm., width of base 0.14 mm.; length of movable finger 0.21 mm. Fixed finger with three small denticles along inner edge of apical tooth followed by four or five retroconical teeth along distal end of inner margin of finger; proximal two or three of these marginal teeth small, distal two much larger; serrula interior with distal tooth serrate and spine-like, the next more proximal three teeth plate-like and with serrate margins. Movable finger little curved; subapical lobe conical and well developed; galea with about six simple rami along distal half; galeal seta hardly reaching tip of galea; serrula exterior with 18 ligulate plates.

Palpus (Fig. 27). Stout; surface weakly to moderately granular, hand almost smooth; setae subclavate to multidenticulate, becoming paucidenticulate on hand to acuminate on fingers. Maxilla 0.4 mm. long, 0.26 mm. wide. Trochanter stout, with two rounded protuberances; flexor margin markedly convex; length 0.4–0.43 mm., width 0.24–0.27 mm. Femur stout; pedicle longer than wide and well set-off from rest of podomere; extensor margin of podomere flatly convex in basal two-thirds, a little more convex beyond; flexor margin with a convexity in proximal half, concave beyond; widest in basal half, somewhat narrowed towards distal end; length of femur 0.61–0.67 mm., width 0.27–0.29 mm., length 2.2 to 2.3 times the width. Tibia with convex extensor margin; flexor margin convex in center, but a very little concave to flat beyond; pedicle stout; length 0.63–0.66 mm., width 0.29–0.32 mm.; length 2 to 2.15 times width. Chela stout, base rounded; pedicle displaced much towards outer side; outer or extensor margin evenly convex, inner margin bulging and much more convex; fingers moderately stout to slender, not much curved; chela widest across base; length of chela without pedicle 1.1–1.17 mm., width 0.48–0.5 mm.; length 2.3 to 2.4 times width; depth of chelal hand a little more than width; length of chelal hand without pedicle 0.58–0.67 mm.; movable finger subequal to or a little shorter than chelal hand without pedicle, length of movable finger 0.57–

0.6 mm. From the side, chelal hand (Fig. 28) stout; pedicle displaced towards ventral side; dorsal portion of hand very much swollen especially towards base; ventral margin flatly convex, dorsal margin much more convex; fixed finger tapering distally and not especially stout, inner margin convex, outer margin weakly concave; movable finger with outer margin convex, inner margin concave, somewhat angular near center. Each chelal finger with 40 to 50 conical, small, and contiguous marginal teeth; marginal teeth of proximal part of each row a little separated and less well developed; fixed finger with five external and four or five internal accessory teeth; movable finger with five external and four internal accessory teeth; nodus ramosus of movable finger a little proximal to tactile seta *t*. Movable finger with tactile seta *t* about one-third or a little more of finger length from tip, *st* closer to *t* than to *sb*; *sb* and *b* near finger base and separated by about one areolar diameter. Fixed finger with tactile setae *et* near distal one-sixth of finger; *it* about one-fourth of finger length from tip; *ist* a little distal to midpoint of finger; *est* a little proximal to midpoint of finger; *eb* and *esb* near finger base and separated by about two areolar diameters; *isb* and *ib* paired and a little distal to level of *esb* and *eb*.

Legs. Moderately slender to moderately stout; posterior legs a little stouter than the anterior ones; setae of extensor margin of podomeres paucidenticulate to multidenticulate, setae of flexor margin of podomeres acuminate; distal podomeres smooth; proximal podomeres weakly sculptured, especially noticeable when the margin is seen in profile. First leg with tibia 0.33 mm. long, 0.095 mm. deep; tarsus 0.32 mm. long, 0.065 mm. deep. Fourth leg with pars basalis 0.225 mm. long, 0.167 mm. deep; pars tibialis 0.42 mm. long, 0.19 mm. deep; length of entire femur 0.58 mm., depth 0.19 mm.; tibia 0.48 mm. long, 0.118 mm. deep; tarsus 0.395 mm. long, 0.082 mm. deep; tactile seta of fourth pedal tarsus about twice as long as depth of podomere at base of seta, located a little distal to midpoint, 0.23 mm. from proximal margin of tarsus.

Genital complex. Posterior genital operculum with about 25 scattered setae; anterior operculum with about 20 setae.

Female. Measurements of the mounted individual are followed in parentheses by those of the individual in alcohol, in instances where they were secured. Very similar to male in general appearance and details. Body length 2.85 (2.0) mm.; carapace with posterior width equal to greatest width, length 0.85 mm., width 0.72 mm.; abdomen about 2 mm. long, 1.1 mm. wide.

Chelicera. Essentially like male; length about 0.24 mm., width of base about 0.14 mm.; movable finger about 0.21 mm. long; apparently 18 plates in serrula exterior, but position on slide precludes an accurate count.

Palpus. Differing considerably from male; podomeres almost smooth; chela less stout from the dorsad, both margins weakly convex; fingers weakly curved; pedicle displaced towards outer margin of hand; maxilla 0.43 mm. long, 0.27 mm. wide; trochanter 0.44 (0.41) mm. long, 0.25 (0.24) mm. wide; femur 0.67 (0.6) mm. long, 0.28 (0.26) mm. wide; tibia 0.64 mm. long, 0.3 mm. wide; chela without pedicle 1.07 (1.1) mm. long, 0.415 (0.42) mm. wide; depth of chelal hand equal to width; length of chelal hand 0.58 (0.57) mm.; length of movable finger slightly less than hand length, 0.55 (about 0.52) mm. From the side, ventral and dorsal margins are more or less evenly convex, chelal hand not conspicuously swollen dorsally; fingers shaped as in male, but perhaps a little more slender. Movable finger with seven external accessory teeth and three internal accessory teeth; fixed finger with six external and four internal accessory teeth. Tactile setae of movable finger as in male; on fixed finger, *et* near distal one-fifth of finger, *it* near distal one-third; *ist* near midpoint of finger and conspicuously distal to *est*; *eb* and *esb* near finger base and separated by about two areolar diameters; *isb* and *ib* paired and little distal to level of *esb* and *eb*.

Legs. Much as in male. First leg with pars tibialis 0.31 mm. long, 0.148 mm. deep; tibia 0.33 mm. long, 0.095 mm. deep; tarsus 0.32 mm. long, 0.065 mm. deep. Fourth leg with pars basalis 0.26 mm. long, 0.18 mm. deep; pars tibialis 0.43 mm. long, 0.2 mm. deep; entire femur 0.62 mm. long, 0.2 mm. deep; tibia 0.5 mm. long, 0.125 mm. deep; tarsus 0.405 mm. long, 0.08 mm. deep.

Genital complex: Not studied.

Type locality. Label in vial indicates Lake Tahoe, California, as the type locality.

Remarks. *Dinocheirus validus* is related to *D. dorsalis*. For a discussion of this relationship, see "Remarks" under *D. dorsalis*.

Dinocheirus tumidus (Banks)

Chelanops tumidus Banks, 1895, p. 7; Coolidge, 1908, p. 111.
Dinocheirus tumidus Beier, 1932, p. 139.

The type material consists of three males and one female. One of the males, the lectotype, was mounted for study; the others were examined in alcohol.

Male. All measurements are of the lectotype, except that measurements and ratios of body, carapace, and palpal podomeres are of all three males. Body slightly ovate, not particularly stout; light yellowish brown, with carapace a little darker; palps an orange to reddish brown, not especially dark; length of body 1.5–1.8 mm. *Carapace* with anterior half more or less evenly rounded, posterior portion of lateral margins little curved; posterior margin weakly convex; sides moderately to coarsely granular, dorsal surface somewhat less granular; setae scattered, multidenticulate but not clavate; six setae along posterior margin; posterior transverse furrow a little nearer posterior margin of carapace than to median furrow; widest between furrows, slightly narrower across posterior margin; no eyespots distinguished; length of carapace 0.56–0.64 mm., greatest width 0.45–0.53 mm. *Tergites* relatively light; granules weak to moderately coarse; tergites, except eleventh, divided; first tergite with four multidenticulate and subclavate setae on each scutum; maximum number of setae on any tergal half is five. *Sternites* divided, very weakly sculptured; sternal halves of center of abdomen usually with eight slender and acuminate setae; abdomen in general oval but not stout; each anterior stigmatic plate with three setae; each posterior plate with only one; pleural membranes with very rough and wavy striations, appearing papillose or rugose; abdomen about 1.2 mm. long, about 0.75 mm. wide.

Chelicera. Yellow; moderately stout; subbasal seta denticulate near end, basal seta of each chelicera broken; exterior seta very small; flagellum with four setae; base of chelicera with a few net-like lines near base of setae; length of chelicera 0.21 mm., width of base 0.13 mm.; length of movable finger 0.185 mm. Fixed finger with five marginal teeth near distal end of inner margin and three denticles on inner surface of apical tooth. Movable finger little curved; apical tooth slender, subapical lobe finger-like and at very base of apical tooth; two small marginal denticles distal to subapical lobe; galea with about eight simple rami originating throughout most of extent of galea; galeal seta extending almost to tip of galea; apical tooth of movable finger with tip sclerotic; serrula exterior with about 18 ligulate plates.

Palpus (Fig. 29). Moderately stout; granular on sides of maxilla, on trochanter, on basal portion and along inner or flexor surface of femur, and on flexor surface of tibia; a few very weak granules on the chelal hand at the base of the fingers; setae associated with granular areas subclavate, other setae with a few denticles but becoming

acuminate on chelal fingers. Maxilla 0.33 mm. long, 0.205 mm. wide. Trochanter with two well-marked protuberances; flexor margin more or less evenly convex; length 0.27–0.32 mm. 0.17–0.19 mm. wide. Femur with pedicle about as long as wide; outer margin flatly convex, except more convex near distal end than elsewhere; inner margin convex in basal two-thirds, but weakly concave in distal one-third or fourth; length 0.45–0.48 mm., width greatest in proximal half and equal to 0.19–0.21 mm., length 2.3 to 2.4 times the width. Tibia with extensor margin flatly convex in basal two-thirds; very bulging and convex in center of inner margin and straight to weakly concave in distal fourth; pedicle very stout; length of tibia 0.42 0.48 mm., width 0.21–0.23 mm.; length 2 to 2.1 times the width. Chela from the dorsad moderately stout; extensor margin weakly convex, flexor or inner margin bulging especially near base and with margin markedly convex; pedicle displaced a little towards outer margin; hand widest across base and narrowed somewhat abruptly near base of fingers; fingers moderately slender, gently curved; length of chela without pedicle 0.78–0.88 mm., width 0.32–0.35 mm.; length 2.4 to 2.5 times the width; depth of hand a little greater than width, 0.39–0.41 mm.; hand length without pedicle 0.37–0.43 mm.; movable finger considerably longer than hand, 0.45–0.5 mm. From the side, chela (Fig. 30) very stout, pedicle displaced far towards ventral margin; ventral and basal margins meet at somewhat of an angle; dorsal margin and basal margins meet in a decided bulge, rounded and not angular; fingers in side view moderately slender; fixed finger straight, inner margin very little convex, outer margin very weakly convex; movable finger more slender than fixed finger, outer margin convex, inner margin concave. Nodus ramosus of movable finger between *t* and *st*, a little closer to the latter than to the former. Movable finger with about 50 marginal teeth, conical, cuspid, and contiguous at distal end of row, but the basal 10 or 12 teeth rounded and without cusps; marginal teeth of fixed finger about like those of movable finger in number and shape; accessory teeth present but not recorded. Movable finger with *t* about one-third of finger length from tip, *st* about one-half as far from *t* as the latter is from finger tip; *sb* within basal one-fourth of finger length, with *b* about midway between *sb* and finger base. Fixed finger with *et* within distal one-fifth or one-sixth of finger length; *est* a little proximal to midpoint of finger, *ist* a little distal to midpoint; *it* about midway between levels of *et* and *ist* or a little closer to the latter; *eb* and *esb* at base of finger separated by between two and three areolar diameters; *ib* and *isb* close together and at about the level of *esb*.

Legs. Fairly slender, especially fourth leg; yellow; legs virtually non-granular; setae variable, multidenticulate especially on extensor surface of proximal podomeres, becoming paucidenticulate to acuminate along flexor surface and in distal podomeres. First leg with pars basalis deeper than pars tibialis, both margins evenly convex, length 0.17 mm., depth 0.113 mm.; pars tibialis 0.23 mm. long, 0.1 mm. deep; tibia deepest near distal one-third, flexor margin convex, extensor margin weakly S-shaped, length of tibia 0.25 mm., depth 0.072 mm.; tarsus with extensor margin virtually straight, flexor margin weakly convex, length 0.265 mm., depth 0.057 mm. Fourth leg with trochanter 0.215 mm. long, 0.117 mm. deep; pars basalis 0.185 mm. long, 0.115 mm. deep; pars tibialis 0.32 mm. long, 0.12 mm. deep; entire femur with flexor margin virtually straight except at ends, extensor margin very weakly convex, length 0.465 mm., depth 0.12 mm.; tibia slender, most of extensor margin concave, except at very basal end, flexor margin convex, entire podomere gently curved, length 0.38 mm., depth 0.08 mm.; tarsus with extensor margin nearly straight, flexor margin weakly convex, length 0.32 mm., depth 0.06 mm.; tactile seta of fourth pedal tarsus located somewhat distal to midpoint of tarsus, being 0.19 mm. from basal margin.

Genital complex. Anterior operculum with about 14 setae; posterior operculum with about 12 setae scattered on surface and two pairs on posterior lip of genital aperture.

Female. Female studied in alcohol and apparently much like male. Body length 1.4 mm. (body may be a little contracted); carapace about 0.64 mm. long, 0.5 mm. wide. Trochanter of palp 0.3 mm. long, 0.175 mm. wide; femur 0.43 mm. long, 0.195 mm. wide; tibia 0.42 mm. long, 0.21 mm. wide; chela 0.77 mm. long, width 0.28 mm.; chela much more slender than in the male; length of hand without pedicle 0.38 mm.; movable finger longer than hand length, 0.41 mm.

Type locality. Label accompanying the type collection: "Indian Riv. Inlet, Fla.; Sea beach, under logs, Apr."

Dinocheirus tristis (Banks)

Chelanops tristis Banks, 1891, p. 163; Banks, 1895, p. 7; Coolidge, 1908, p. 111.

Chelifer scorpioides var. *tristis* Ellingsen, 1909, p. 216.

Pselaphochernes (?) *tristis* Beier, 1932, p. 134; Roewer, 1937, p. 297.

The type collection consists of nine individuals, both sexes being represented. Two females and one male were mounted for study and serve as the basis for the following descriptions. The mounted male has been selected as the lectotype.

Male. Body relatively slender; light; palps reddish brown, but not especially dark; body in general moderately granular; setae multidenticulate, but usually not subclavate or clavate; length of body 1.75 mm. *Carapace* with anterior margin and anterior parts of lateral margins rounded; its greatest width near center, slightly less wide across posterior margin; posterior margin with six setae; with numerous paucidenticulate setae; moderately granular, more so on sides and anterior portion than elsewhere; eye-spots virtually wanting; length of carapace 0.56 mm., greatest width 0.42 mm.; width across posterior end 0.38 mm. *Tergites*, except eleventh, divided; each tergal half of first tergite with four setae, maximum number of setae on any half-tergite is seven; tergites weakly granular; setae of tergites subacuminate. *Sternites* very weakly granular, light in color, setae more numerous than on tergites and apparently acuminate; sternites poorly or weakly divided; each anterior stigmatic plate with three setae, each posterior plate with only one; pleural membranes granular in general appearance, but striations still retained; length of abdomen 1.2 mm., width 0.64 mm.

Chelicera. Yellow; basal and subbasal setae appear acuminate; fixed finger with three denticles on inner surface of apical tooth, followed by four or five retroconical denticles on inner margin of finger; flagellum of four setae with the two longer blades unilaterally serrate; length of chelicera 0.19 mm., width of base 0.115 mm.; length of movable finger 0.17 mm. Movable finger little curved; both apical tooth and subapical lobe long and slender; a small denticle on the inner finger margin just proximal to subapical lobe; galea stout, with about six long rami inserted along nearly entire galea; galeal seta not reaching tip of galea; serrula exterior with 17 ligulate plates.

Palpus (Fig. 31). Moderately stout; setae variable, setae of trochanter and proximal portion of extensor margin of palpal femur multidenticulate, almost subclavate; other podomeres of palp with paucidenticulate setae becoming acuminate on chela; flexor surfaces of palpal podomeres, including chelal hand at finger base, finely granular; extensor surfaces of podomeres, except trochanter, smooth. Trochanter with two rounded protuberances; length 0.28 mm., width 0.175 mm. Femur fairly stout, pedicle longer than wide and well

separated from rest of podomere; podomere with greatest width near center; outer margin near center flatly convex, more convex beyond; inner margin convex near center, but a little concave beyond midpoint; margins more or less subparallel; length of femur 0.43 mm., width 0.18 mm. Tibia with stout pedicle about as long as wide; outer margin markedly convex; inner margin bulging in center, slightly concave beyond; length of tibia 0.43 mm., width 0.195 mm. Chela from the dorsad with pedicle displaced far towards outer side; outer margin moderately and evenly convex, inner margin more convex; chelal hand widest near base and tapering towards fingers; fingers from the dorsad gently curved and not very stout; length of chela without pedicle 0.78 mm., width 0.29 mm.; depth of hand but little less than width, 0.28 mm.; length of hand without pedicle 0.37 mm.; movable finger much longer than hand of chela without pedicle, 0.47 mm. Chela from the side relatively wide; hand not especially narrowed towards base of fingers; ventral margin flatly convex, dorsal margin a little more convex; pedicle displaced towards ventral side; hand bulging dorso-basally to produce somewhat of a corner or angle; movable finger a little curved, internal margin weakly concave, outer margin weakly convex; fixed finger straight, outer margin weakly convex, inner margin nearly straight. Marginal teeth of chelal fingers small, contiguous, those of basal part of row rounded and less well developed than those of distal part of row, between 50 and 60 teeth on each finger; movable finger with two external and two internal accessory teeth; fixed finger with two external accessory teeth, also two internal teeth as far as can be determined. Movable finger with *t* about one-third of finger length from tip; *st* much closer to *t* than to *sb* and at about midpoint of finger; *sb* and *b* near finger base. Setae of fixed finger with *et* about one-sixth of finger length from tip; *it* about as far from *et* as the latter is from finger tip; *est* near midpoint of finger and *ist* somewhat distal to *est*; basal and subbasal setae as in other species of the genus. Nodus ramosus of movable finger about midway between *t* and *st*.

Legs. Both first legs wanting from specimen. Fourth leg fairly slender, especially femur; light; setae varying from paucidenticulate to acuminate; terminal claws slender; long tactile seta of fourth pedal tarsus near center of podomere, with other more distal pseudotactile setae present. Fourth leg with trochanter 0.185 mm. long, 0.103 mm. deep; pars basalis 0.16 mm. long, 0.103 mm. deep; pars tibialis 0.29 mm. long, 0.107 mm. deep; entire femur 0.43 mm. long, 0.107 mm. deep; length of tibia 0.32 mm., depth 0.076 mm.; tarsus 0.29 mm.

in length, 0.057 mm. in depth; tactile seta 0.145 mm. from proximal margin.

Genital complex. Not examined.

Female. Description based on two mounted individuals; the measurements of one of the individuals are given in parentheses after the corresponding measurements of the other individual. Body in general much as in male, length 1.9 (2.4) mm. Carapace like that of the opposite sex, except either six or eight setae on posterior margin; eye-spots not distinguished in either female; first tergal halves with either four or five setae; carapace 0.61 (0.7) mm. long, about 0.48 (0.5) mm. wide; posterior width of carapace about 0.47 (0.46) mm.

Chelicera (Fig. 32). Chiefly as in male; length 0.19 (0.22) mm., width of base 0.12 (0.12) mm.; length of movable finger 0.175 (0.2) mm.; serrula exterior with 16 or 17 plates.

Palpus. From the dorsad much as in male, except chela more slender; extensor margin of chela flatly rounded to very much flattened, flexor margin much less bulging than in male; pedicle displaced far towards extensor side; maxilla 0.32 (0.33) mm. long, 0.18 (0.2) mm. wide; trochanter 0.28 (0.31) mm. long, 0.17 (0.19) mm. wide; femur 0.43 (0.48) mm. long, 0.18 (0.19) mm. wide; tibia 0.44 (0.46) mm. long, 0.2 (0.21) mm. wide; chela without pedicle 0.8 (0.88) mm. long, 0.26 (0.28) mm. wide; depth of hand subequal to width, 0.26 (0.27) mm.; length of hand without pedicle, 0.38 (0.42) mm.; movable finger considerably longer than hand length, 0.45 (0.48) mm. From the side, chela much as in male, but dorsal portion of hand not so bulging and without produced dorso-basal angle; ventral margin flatly convex, dorsal margin convex especially basally; fingers much as in male, but inner margin of fixed finger very weakly concave to very weakly convex. Movable finger with *st* a little proximal to midpoint of finger, but still closer to *t* than to *sb*; considerable variation, however, in the position of tactile setae; nodus ramosus between *t* and *st*, slightly nearer the latter. Fixed finger with *ist* somewhat variable, but always at least a little distal to *est*, other tactile setae much as in male. Movable finger with three to four external and one internal accessory teeth; fixed finger with four external accessory teeth and three internal accessory teeth (internal accessory teeth not determined in one female).

Legs. First leg with pars tibialis 0.23 (0.235) mm. long, 0.084 (0.084) mm. deep; tibia 0.215 (0.235) mm. long, depth 0.065 (0.068) mm.; tarsus 0.245 (0.265) mm. long, 0.05 (0.053) mm. deep. Fourth leg much as in the male; considerable variation between fourth legs

of the two females indicates that perhaps one is abnormal; length of pars basalis 0.18 (0.19) mm., depth 0.11 (0.105) mm., pars tibialis 0.32 (0.32) mm., depth 0.11 (0.1) mm.; entire femur 0.45 (0.48) mm. long, depth 0.11 (0.105) mm.; tibia 0.355 (0.37) mm. in length, 0.077 (0.073) mm. in depth; tarsus 0.32 (0.33) mm. long, 0.06 (0.057) mm. deep; tactile seta a little distal to midpoint of tarsus, 0.185 (0.175) mm. from proximal margin of podomere.

Genital complex. Anterior operculum with 15 to 17 scattered setae; posterior operculum with nine setae in a marginal row in one female, 12 setae in the marginal row of the other female.

Type locality. According to the original description (Banks, 1891), the collection was made "On the sea shore of Long Island, New York".

Genus Dendrochernes Beier, 1932, emend.

Dendrochernes Beier, 1932, pp. 171–172; Beier, 1933b, p. 537; Vachon, 1936, p. 143; Roewer, 1937, p. 302.

Revised diagnosis. Carapace scarcely to a little longer than wide, weakly to moderately granular, the posterior transverse furrow nearer to the posterior carapacal margin than to the median transverse furrow. Eye-spots lacking or indistinct. Tergites except the eleventh divided, finely to moderately granular. Setae of the body and palps toothed, not clavate. Flagellum of four setae. Palps heavy, finely to moderately granular. Chelal fingers with numerous accessory teeth. The tactile seta *ist* in almost the same level as *est*, *st* nearer to *sb* than to *t*. Fourth pedal tarsus with a sensory seta distal to the midpoint of the podomere. Genotype: *Chernes cyrneus* L. Koch, 1873.

Remarks. A few minor changes have been necessary in the generic diagnosis in order to include Banks's *Chelanops morosus* within the genus. These changes involve chiefly the extent and degree of sculpturing, the relative length and width of the carapace, and the stoutness of the palps. The really reliable generic criteria remain unchanged, indicating that *morosus* is certainly congeneric with *cyrneus*.

Dendrochernes morosus (Banks)

Chelanops morosus Banks, 1895, p. 7.
Neochernes morosus Beier, 1932, pp. 165–166; Roewer, 1937, p. 299.

The type collection consists of two individuals. One of these, the female lectotype, was mounted and studied in detail. The other, which is possibly a female but has the abdomen too shriveled to determine the sex with certainty, was measured in alcohol.

Male. Unknown.

Female. Measurements of the female lectotype are followed in parentheses by corresponding measurements of the specimen in alcohol. Body not especially stout; yellowish brown, except dark reddish brown palpi; length of body 3.1 (2.2) mm. *Carapace* with moderately coarse granules; setae scattered, fairly numerous, with a few terminal and subterminal denticulations; greatest breadth just behind median furrow; posterior margin convex, with 12 to 14 setae; eye-spots not distinguished; length of carapace 0.88 (0.85) mm., width 0.72 (0.75) mm.; posterior width very little less than greatest width. *Tergites* divided, except eleventh; sculpturing and nature of setae much as in carapace; each first tergal half with eight setae, maximum number of setae on any tergite-half eleven; tergal halves medially well separated. *Sternites* divided; very weakly sculptured; maximum number of setae on a sternal half is 17; setae acuminate; sternal halves covered with small discoidal and oval microlyrifissures, often 35 to 40 on each; pleural membranes with wavy striations; setae of stigmatic plates not determined; abdomen 2.2 mm. long, 1.4 mm. wide.

Chelicera. Moderately stout; surface of base not sculptured except for some net-like lines on surface posterior to basal and subbasal setae; basal and subbasal setae apparently simple, acuminate; flagellum of four setae, the two proximal ones much shorter than the other two; distal-most flagellar seta unilaterally serrate; chelicera about 0.25 mm. long, 0.15 mm. wide across base; movable finger about 0.24 mm. long. Fixed finger very slender; three denticles along inner margin of distal tooth and four or five retroconical and well-developed teeth along distal end of finger margin. Movable finger little curved; apical tooth with roughened distal end; subapical lobe very close to apical tooth and fairly well developed; tips of both galeae broken; serrula exterior with about 20 plates, accurate count being impossible since some plates are broken.

Palpus (Fig. 33). Fairly stout to stout, dark reddish brown; flexor surfaces of trochanter, femur, and tibia, and lateral surface of maxilla finely to moderately granular; inner surface of hand weakly granular; setae of palpi chiefly with a few subterminal and terminal denticulations, setae of fingers apparently acuminate. Maxilla

yellowish brown, not as dark as rest of palp; acuminate setae fairly numerous; length of maxilla 0.43 mm., width about 0.28 mm. Trochanter with a subdorsal protuberance; inner margin convex; length 0.43 (0.42) mm., width 0.26 (0.25) mm. Femur with pedicle well set-off from rest of podomere and hardly as long as wide; central portion of extensor margin flatly convex, more convex distally; inner margin convex in basal two-thirds, weakly concave beyond; in general femur subcylindrical; length 0.69 (0.64) mm., width 0.28 (0.27) mm. Tibia with stout pedicle; proximal two-thirds of outer margin flatly convex, more convex beyond; inner margin centrally convex, a weak sinuation beyond; length of tibia 0.69 (0.68) mm., width 0.32 (0.32) mm. Chela moderately stout; pedicle displaced somewhat towards outer side; outer margin evenly and moderately convex, inner margin much more convex; hand tapering a little towards finger base; fingers relatively stout, gently curved; chela 1.15 (1.22) mm. long without pedicle, width 0.46 (0.46) mm.; hand depth about equal to hand width; hand length without pedicle 0.61 (0.64) mm.; movable finger shorter than hand length, showing some variation in the two specimens, 0.56 (0.63) mm. long. From the side, chela somewhat subrectangular, with both dorsal and ventral margins flatly convex; pedicle displaced far towards ventral side; hand tapering but little towards fingers; fixed finger straight, both inner and outer margins weakly convex; movable finger much curved, outer margin convex, inner margin concave; nodus ramosus of movable finger much proximal to *t*, but still closer to *t* than to *st*. Movable finger with about 40 marginal teeth, those of distal end of row conical and with large cusps, those of basal end of row rounded and acuspid, greatly reduced; nine external accessory teeth, apparently six internal accessory teeth. Fixed finger with nearly same number and kind of marginal teeth as on opposing finger, 12 external accessory teeth spaced along nearly entire finger length, seven internal accessory teeth confined to distal one-half of finger. Movable finger with *t* about one-third or more of finger length from tip, *sb* about one-fifth of finger length from base; *st* about one-half as far from *sb* as from *t*; *b* about two areolar diameters distal to *sb*. Fixed finger with *et* about one-sixth of finger length from tip; *it* about one-third of finger length from tip; *ist* and *est* near or a little basal to midpoint of finger; basal and subbasal setae confined to basal portion of finger.

Legs. Not especially stout; yellow; trochanter of fourth leg and pars basalis of first and fourth legs weakly granular, other podomeres virtually smooth; setae of legs variable, those of extensor margin of

podomeres multidenticulate on basal podomeres, becoming less denticulate on distal podomeres; flexor margin of podomeres with less denticulate setae, virtually acuminate on tarsi; claws simple. First leg with pars tibialis having both margins convex, length 0.38 mm., depth 0.17 mm.; tibia much deepened towards distal end, length 0.38 mm., depth 0.115 mm.; tarsus subcylindrical, length 0.34 mm., depth 0.08 mm. Fourth leg with trochanter 0.29 mm. long, 0.165 mm. deep; pars basalis 0.27 mm. long, 0.17 mm. deep; pars tibialis 0.51 mm. long, 0.205 mm. deep; entire femur with extensor margin weakly convex, flexor margin weakly concave to straight, length 0.68 mm., depth 0.205 mm.; tibia with distal portion much deepened, length 0.5 mm., depth 0.125 mm.; tarsus subcylindrical, 0.375 mm. long, 0.09 mm. deep; fourth tarsus with a tactile seta considerably distal to midpoint, about 0.23 mm. from proximal margin of podomere.

Genital complex. Anterior operculum with about 35 setae in a more or less compact group anterior to aperture; posterior operculum with about 20 marginal setae.

Type locality. Isle Royale, Lake Superior.

Genus Pseudozaona Beier, 1932, emend.

Pseudozaona Beier, 1932, p. 182; Beier, 1933b, pp. 542–543; Roewer, 1937, p. 303.

Revised diagnosis. Carapace longer than wide, with two transverse furrows. Setae of body and palps toothed, mostly subclavate to clavate. Flagellum with four setae. Palps slender, the pedicle of the femur not well set-off from the rest of the podomere. Chelal fingers with numerous accessory teeth. The tactile seta *ist* placed distal to *est*, *st* between *t* and *sb* or a little closer to *t* than to *sb*. Legs moderately slender; the fourth pedal tarsus without a tactile seta. Genotype: *Pseudozaona communis* Beier, 1932.

Remarks. In order to accommodate the species *uniformis*, which obviously is congeneric with *communis*, it has been necessary to emend slightly the genus to include species in which the tactile seta *st* may be a little closer to *t* than to *sb*, but not, however, conspicuously closer as in the genus *Nesochernes* Beier, 1932.

Pseudozaona uniformis (Banks)

Chelanops uniformis Banks, 1914, pp. 683–684, figs. 16 and 18.

The type collection consists of one female and two males. The female, designated as the lectotype, was mounted and studied in detail; the males were studied in alcohol.

Male. Apparently much like female; the palps, however, showing much the same degree of sexual dimorphism as shown for *P. communis* (Beier, 1932, p. 183, fig. 191); in the male, the palpal podomeres are stouter than in the female, the extensor margin of the femur is much more convex, and the tibia has a more pronounced bulge on the flexor side. Measurements were taken of both males, the measurements of one are followed in parentheses by measurements of the second; length of body 2.6 (2.8) mm.; carapace 1.05 (1.05) mm. long, 1.0 (1.02) mm. wide, greatest width across the posterior margin; palpal femur 1.12 (1.08) mm. long, 0.35 (0.335) mm. wide; tibia 1.08 (1.04) mm. long, 0.41 (0.4) mm. wide; chela 1.8 (1.73) mm. long, width 0.45 (0.43) mm.; hand length without pedicle 0.93 (0.93) mm.; length of movable finger exactly equal to length of hand without pedicle.

Female. Body fairly stout; abdomen oval in shape; body yellowish brown, palps reddish brown and darker than rest of body; length of body 3.5 mm. *Carapace* with sides and anterior end rounded, posterior margin nearly straight; posterior transverse furrow nearer to posterior margin than to median furrow; moderately granular; setae subclavate to truly clavate; about ten setae along posterior margin; eyespots present but not very distinct; length of carapace 1.17 mm., greatest width across posterior margin and equal to 1.05 mm. *Tergites*, except eleventh, divided; lighter than palps; first tergites with four to five setae on each tergal half, maximum number on any tergal half is eight or nine; tergites moderately granular, setae subclavate to clavate. *Sternites* weakly sculptured, divided; as many as 11 acuminate setae on some sternal halves; pleural membranes with rugose and wavy plications continuous in sculpturing with interscutal areas of dorsum and ventrum of abdomen; abdomen stout; length 2.3 mm., width 1.75 mm.

Chelicera. Stout; flagellum of four setae, of which all seem serrate; length of chelicera 0.295 mm., width of base 0.18 mm.; length of movable finger 0.265 mm. Fixed finger slender; three denticles on inner surface of apical tooth; five large retro-conical denticles along distal half of inner finger margin. Movable finger a little curved, fairly stout; galea with six simple rami confined to distal half of

ramus; galeal seta not reaching to tip of galea; serrula exterior with about 20 ligulate plates.

Palpus (Fig. 34). Slender; setae of trochanter, femur, and flexor surfaces of tibia and chela subclavate to clavate, stout; setae of maxilla and chelal fingers acuminate; setae of external surfaces of tibia and chelal hand paucidenticulate; granular, except for ventral surface of maxilla, outer surface of chela, and fingers; granules weak on extensor surface of tibia, strong elsewhere. Maxilla 0.61 mm. long, 0.37 mm. wide. Trochanter stout and with two protuberances; length of trochanter 0.67 mm., width 0.405 mm. Femur with weakly defined pedicle, about as long as wide; extensor surface of femur with a weak concavity in center, but convex at both ends; flexor margin nearly straight in basal half, but very little concave beyond; length 1.2 mm., width 0.32 mm. Tibia with outer margin very flatly convex in distal three-fourths, more convex beyond; inner margin weakly bulging in center and a little concave beyond; length 1.08 mm., width 0.35 mm. Chela very slender; outer margin very flatly convex; inner margin more convex especially near base; pedicle stout and near center of base; fingers very slender and a little curved; length of chela without pedicle 1.85 mm., width 0.43 mm.; depth of chelal hand 0.4 mm., a little less than width; length of hand without pedicle 0.97 mm.; movable finger exactly equal in length to length of chelal hand without pedicle. Chela (Fig. 35) from the side, slender; ventral margin very flatly convex, dorsal margin more convex; fingers very slender; fixed finger nearly straight, with outer margin virtually straight and inner margin very weakly convex; movable finger slightly curved, outer margin convex, inner margin very weakly concave. Fixed finger with a few more than 60 marginal teeth, contiguous, with cusps; movable finger with about 65 similar teeth; fixed finger wth ten external accessory teeth and three internal teeth; movable finger with eleven external and probably about six internal accessory teeth. Tactile setae with relatively small areoles; movable finger with *t* about one-fourth of finger length from tip; *st* near midpoint of finger and a little closer to *t* than to *sb*; *sb* and *b* well within basal one-fifth of finger, separated by about two to three areolar diameters; nodus ramosus about midway between *t* and *st*. Fixed finger with tactile setae much as indicated for *P. communis* by Beier (1932, p. 183, fig. 191).

Legs. Yellow; not particularly stout; proximal podomeres, especially femora, finely granular, but not conspicuously so; setae variable, multidenticulate on proximal podomeres and on extensor

surface of distal podomeres; setae acuminate on flexor surface of distal podomeres; tarsus of fourth leg without a true tactile seta, but with a denticulate pseudotactile seta a little distal to center on outer margin. First leg with slender pars tibialis, both margins flatly convex, length 0.6 mm., depth 0.18 mm.; tibia with extensor margin weakly S-shaped, flexor margin uniformly and considerably convex, length of tibia 0.48 mm., depth 0.11 mm.; tarsus tapering a little towards distal end, inner margin weakly convex, outer margin weakly concave, length 0.42 mm., depth 0.08 mm. Fourth leg with trochanter 0.45 mm. long, 0.24 mm. deep; pars basalis 0.4 mm. long, 0.25 mm. deep; pars tibialis with weakly convex extensor margin, very flatly convex flexor margin, length 0.76 mm., depth 0.26 mm.; entire femur 1.04 mm. long, 0.26 mm. deep; tibia and tarsus shaped much as in first leg; length of tibia 0.71 mm., depth 0.14 mm.; tarsus 0.5 mm. long, 0.095 mm. deep.

Genital complex. Anterior operculum with 20 scattered setae; posterior margin of posterior operculum with ten setae forming a single row.

Type locality. Label with type collection reads: "La Emilia, Costa Rica (Calvert)".

Remarks. While *P. uniformis* is congeneric with *P. communis* Beier, 1932, from Mexico, the two are easily separated by the small size and the stouter palpal podomeres of *P. uniformis*.

Family CHELIFERIDAE Hagen, 1878

Subfamily WITHIINAE Chamberlin, 1931

Tribe WITHIINI Chamberlin, 1931

Withius texanus (Banks)

Chelifer texanus Banks, 1891, p. 162.

Chelanops texanus Banks, 1895, p. 5; Banks, 1908, p. 39; Coolidge, 1908, p. 110; Chamberlin, 1925, p. 332.

Parachelifer (?) *texanus* Beier, 1932, p. 241; Roewer, 1937, p. 313.

The type collection consists of three individuals, mostly in poor condition. One individual, a male with both palpal chelae wanting, was mounted for study. The second individual, a female with one palp absent, was selected as the lectotype and was studied in alcohol. The one palp of the lectotype was cleared and mounted temporarily in xylol so that both dorsal and lateral views of the chela could be obtained. The third individual, a nymph, was not studied.

Male. Length 2.2 mm. *Carapace* granular, yellowish brown; rounded and evenly convex anterior to median furrow; sides posterior to median furrow distinctly parallel; one pair of eyes; setae subclavate to clavate; 0.73 mm. long, 0.57 mm. wide. *Tergites* of abdomen divided, except first; tergal chaetotaxy much as in *W. vagrans* Chamberlin, 1925. *Sternites* with clusters of microsetae on sternites four through ten, with the setae fields on five through nine larger than on four and ten; anterior stigmatic plate with two setae, posterior plate with three setae; abdomen 1.5 mm. long, 0.95 mm. wide.

Chelicera. Yellow; basal and subbasal setae with a few subterminal denticulations; length of chelicera 0.21 mm., width of base 0.12 mm.; length of movable finger 0.16 mm. Fixed finger with outer margin nearly straight; apical tooth with three blunt denticles on inner surface, followed on inner surface of finger by three retroconical teeth. Movable finger with subapical lobe conical in shape; serrula exterior of 16 ligulate plates.

Palpus. Palps of male with chelae wanting; basal podomeres of palps appear to resemble considerably those shown for *W. vagrans* by Chamberlin (1925, fig. K), except that the femur is stouter and the pedicle is a little more abruptly set-off from the rest of the podomere; palps of male apparently much like those of female, except a little larger; maxilla 0.4 mm. long, 0.23 mm. wide; trochanter 0.38 mm. long, 0.225 mm. wide; femur 0.67 mm. long, 0.225 mm. wide; tibia 0.67 mm. long, 0.245 mm. wide.

Legs. Yellow; proximal podomeres a little granulate; most setae paucidenticulate. First leg with pars tibialis convex on both flexor and extensor margins, length measured on flexor margin 0.305 mm., depth 0.14 mm.; tibia weakly S-shaped, much deepened in distal half, length 0.31 mm., depth 0.087 mm.; tarsus subcylindrical, length not determined because of position on slide. Fourth leg with narrow and subrectangular trochanter, length 0.24 mm., depth 0.13 mm.; pars basalis subtriangular, length 0.18 mm., depth 0.148 mm.; pars tibialis with extensor margin evenly convex, flexor margin nearly straight except in distal part, length 0.48 mm., depth 0.2 mm.; entire femur 0.585 mm. long, 0.2 mm. deep; tibia with flexor margin convex, extensor margin nearly straight, length 0.46 mm., depth 0.115 mm.; tarsus subcylindrical, length 0.335 mm., depth 0.075 mm., tactile seta broken from tarsus but areole located a little distal of midpoint, 0.19 mm. from proximal margin of podomere.

Genital complex. Not examined.

Female. Very much like male in general features; body 2.9 mm.

long; carapace 0.73 mm. long, 0.56 mm. wide; abdomen 2.2 mm. long, 1.2 mm. wide.

Chelicera. Not studied in detail.

Palpus (Fig. 36). The single palp examined in xylol and returned to alcohol in vial. Reddish brown; palpal podomeres, except chela, very granular, chela almost smooth; setae multidenticulate to acuminate. Trochanter 0.38 mm. long, 0.22 mm. wide. Femur with nearly straight inner margin; outer margin convex, more so at each end than in middle; pedicle wider than long; length of femur 0.61 mm., width 0.21 mm. Tibia with proximal two-thirds of extensor margin flatly convex, more convex beyond; flexor margin moderately convex; pedicle well set-off from rest of podomere; length of tibia 0.61 mm., width 0.24 mm. Hand oblong in shape; both outer and inner margins somewhat flatly convex; pedicle displaced somewhat towards flexor side; hand not tapering much towards base of fingers; fingers moderately stout, gently curved; length of chela 0.86 mm., width 0.305 mm.; depth of hand less than width, 0.285 mm.; length of hand without pedicle about 0.5 mm.; length of movable finger distinctly less than length of hand, about 0.4 mm. Chelal hand from the side subrectangular, both dorsal and ventral margins very weakly convex; pedicle almost symmetrically placed; greatest depth of hand near center; fingers from the side stout, little curved; both fingers with outer margin a little convex, inner margin of each almost straight; both fingers with venom ducts; marginal teeth small, contiguous. Sensory setae of fingers much as shown for *W. vagrans* (Chamberlin, 1925, fig. H) with *st* closer to *t* than to *sb*, and *ist* proximal to *est*; *it* not located in specimen with certainty since seta broken and the areola could easily be confused with sensory spots on the finger; evidently, however, *it* is not distal to *est*.

Legs. Much as in male; not examined in detail.

Genital complex. Not examined.

Type locality. Label with type collection reads: "Brazos, Tex."

Remarks. Chamberlin (1925) indicated the possibility that *texanus* might belong in *Withius* and that perhpas *W. vagrans* would become a synonym of *texanus*. It is evident that *texanus* is a species of *Withius* but at the same time, *texanus* and *vagrans* appear to be separate and distinct species. It must be kept in mind, however, that nothing is known of the limits of variation in either of these two species and that, when populations of each species are studied, overlapping may be found. The following table (considering only the male) indicates differences between *W. vagrans* and *W. texanus*.

	W. vagrans ♂	*W. texanus* ♂
Sternites with microsetae	3 [*sic!*]–10	4–10
Palpal femur		
Length	0.58 mm.	0.67 mm.
Length: width ratio	3.2	2.95
Palpal tibia		
Length	0.575 mm.	0.67 mm.
Length: width ratio	2.6	2.7
Fourth leg, tibia		
Length	0.29 mm.	0.46 mm.
Length: width ratio	3.55	4.0
Fourth leg, tarsus		
Length	0.26 mm.	0.335 mm.
Length: width ratio	5.6	4.45

Neowithius cubanus (Banks)

Chelanops cubanus Banks, 1909c, p. 173, pl. 45, fig. 3.

The type collection consists of a single individual, the female lectotype, which was mounted by the writer.

Male. Unknown.

Female. Body fairly stout; abdomen ovate; carapace and tergites dark brown; palps reddish brown; legs much paler; length of body 2.6 mm. *Carapace* with anterior half rounded, posterior half with sides nearly parallel posterior to median furrow; transverse furrows very conspicuous, the posterior one much nearer to posterior margin than to median furrow; coarsely granular; narrow unpigmented band along posterior margin; a single pair of eyes present; setae sparse, clavate; four marginal setae between the eyes on anterior margin; six setae along posterior margin; length of carapace 0.7 mm., width 0.56 mm.; width just behind the eyes 0.37 mm. *Tergites*, except first and last, divided by a narrow suture; tergal halves colored and granulate like carapace; first tergite with eight setae; maximum number of setae on any tergite 18; setae clavate to subclavate. *Sternites* virtually smooth, light in color, indistinctly divided; setae small and acuminate; pleural membranes with wavy striations; length of abdomen 1.9 mm., width 1.2 mm.

Chelicera. Fairly stout, yellow; subbasal seta with numerous denticulations, other setae apparently smooth; base not sculptured; flagellum of four setae; length of chelicera 0.22 mm., width of base 0.12 mm.; length of movable finger 0.16 mm. Fixed finger a little curved, inner margin of apical tooth with three denticles, inner

margin of finger near distal end with a few irregular teeth. Movable finger little curved; subapical lobes paired and very near apical tooth; galeal seta inserted at base of subapical lobes and not reaching nearly to end of galea; galea long, slender, straight, and bearing four or five short spine-like rami near distal end; serrula exterior of probably 18–20 ligulate teeth, so many of which are broken that an accurate count is impossible.

Palpus (Fig. 37). Moderately slender, finely to moderately granular except on ventral face of maxilla and chelal hand and fingers; setae of trochanter and femur subclavate; tibia with subclavate setae on flexor surface, paucidenticulate on outer surface; setae of hand paucidenticulate, those of fingers simple. Maxilla 0.35 mm. long, 0.22 mm. wide. Trochanter with a prominent subdorsal bulge or protuberance; length 0.335 mm., width 0.175 mm. Femur with pedicle wider than long and not set-off sharply from rest of podomere; flexor margin very weakly convex, extensor margin flatly convex except at ends; sides of femur almost parallel; femur a little wider distally than in proximal part; length 0.6 mm., width 0.18 mm. Tibia slender; outer margin very much flattened in central portion, flexor margin evenly convex except slightly flattened to weakly concave near distal end; widest near distal one-third; length of tibia 0.6 mm., width 0.21 mm. Chela with pedicle near center of base; both margins of hand evenly convex; hand passing into fingers without conspicuous interruption; fingers tapering distally, gently curved; length of chela 0.96 mm., width 0.305 mm.; depth of chela subequal to the width, 0.3 mm.; length of hand without pedicle 0.55 mm.; length of movable finger less than length of hand, 0.47 mm. From the side, chela with pedicle displaced slightly towards ventral side of hand; both ventral and dorsal margins gently convex; fixed finger from side with outer margin nearly straight, inner margin weakly convex; movable finger gently and evenly curved, inner margin concave, outer margin convex; both fingers with venom ducts and teeth; nodi ramosi not located. Marginal teeth of chelal fingers small, contiguous; proximal ones with poorly developed cusps; about 40 on each finger. Tactile setae of movable finger: *t* somewhat distal to midpoint of finger, *sb* about one-fifth of finger length from base, *b* one areolar diameter proximal to *sb*, *st* about as far distal to *sb* as the latter is removed from finger base; *st* somewhat closer to *sb* than to *t*. Fixed finger with *et* between one-fifth and one-sixth of finger length from tip; *est* near or slightly proximal to midpoint of finger; *it* on a level with *est*, *ist* about three areolar diameters proximal

to *it*; *csb* and *eb* near base; *isb* and *ib* close together and about on a level with *csb* and *eb*.

Legs. Fairly stout, yellowish brown; trochanter of posterior legs finely granulate, all partes tibiales with scale-like granules; otherwise virtually smooth. Setae of legs varying from multidenticulate on outer side of femora and tibiae to acuminate on flexor side of tarsi; claws simple. First leg with pars tibialis having both margins weakly convex, length measured along extensor margin 0.25 mm., depth 0.125 mm.; tibia very weakly S-shaped, length 0.275 mm., depth 0.084 mm.; tarsus tapering somewhat towards distal end, 0.26 mm. long, 0.057 mm. deep. Fourth leg with pars basalis 0.19 mm. long, 0.15 mm. deep; pars tibialis 0.45 mm. long, 0.2 mm. deep; entire femur with flexor margin nearly straight, extensor margin considerably convex, especially in basal part of pars tibialis; entire femur 0.53 mm. long, 0.2 mm. deep; tibia and tarsus shaped much as in first leg; tibia 0.415 mm. long, 0.105 mm. deep; tarsus 0.34 mm. long, 0.068 mm. deep; tactile seta of tarsi of legs three and four slender, acuminate, and long; tactile seta considerably distal to midpoint of tarsus of fourth leg, being 0.235 mm. from proximal margin.

Genital complex. Body somewhat torn in preparation and details of genital complex not observed.

Type locality. Type collection with label: "Havana, Cuba, Baker."

Remarks. Banks's *Chelanops cubanus* is here assigned tentatively to the genus *Neowithius* Beier, 1932, on the basis of the position of the tactile seta on the fourth leg, the shape of the carapace, the position of the tactile setae of the chelal fingers, and evidence from the known geographical distribution of genera of the tribe *Withiini*. A positive generic assignment cannot be made until males are secured, since the most distinctive generic criteria involve the position of the fields of microsetae on the abdomen of the male.

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PLATE 1

PLATE 1

Fig. 1. *Lamprochernes grossus* (Banks, 1893). Dorsal view of palp, female cotype.

Fig. 2. *Parachernes* (*Parachernes*) *latus* (Banks, 1893). Dorsal view of palp, male lectotype.

Fig. 3. Idem, dorsal view of palpal chela, female cotype.

Fig. 4. *Parachernes* (*Parachernes*) *latimanus* (Banks, 1895). Basal portion of chela, male lectotype.

Fig. 5. *Parachernes* (*Argentochernes*) *diversus* (Banks, 1909). Dorsal view of palp, male lectotype.

Fig. 6. *Parachernes* (*Argentochernes*) *virginica* (Banks, 1895). Dorsal view of palp, female lectotype.

Fig. 7. *Parachernes* (*Argentochernes*) *confraternus* (Banks, 1909) Beier, 1932. Dorsal view of palp, male lectotype.

Fig. 8. *Parachernes* (*Argentochernes*) *pulchellus* (Banks, 1908) Beier, 1932. Dorsal view of palp, female lectotype.

Fig. 9. *Parachernes* (*Argentochernes*) *tumimanus* (Banks, 1908). Dorsal view of palp, female lectotype.

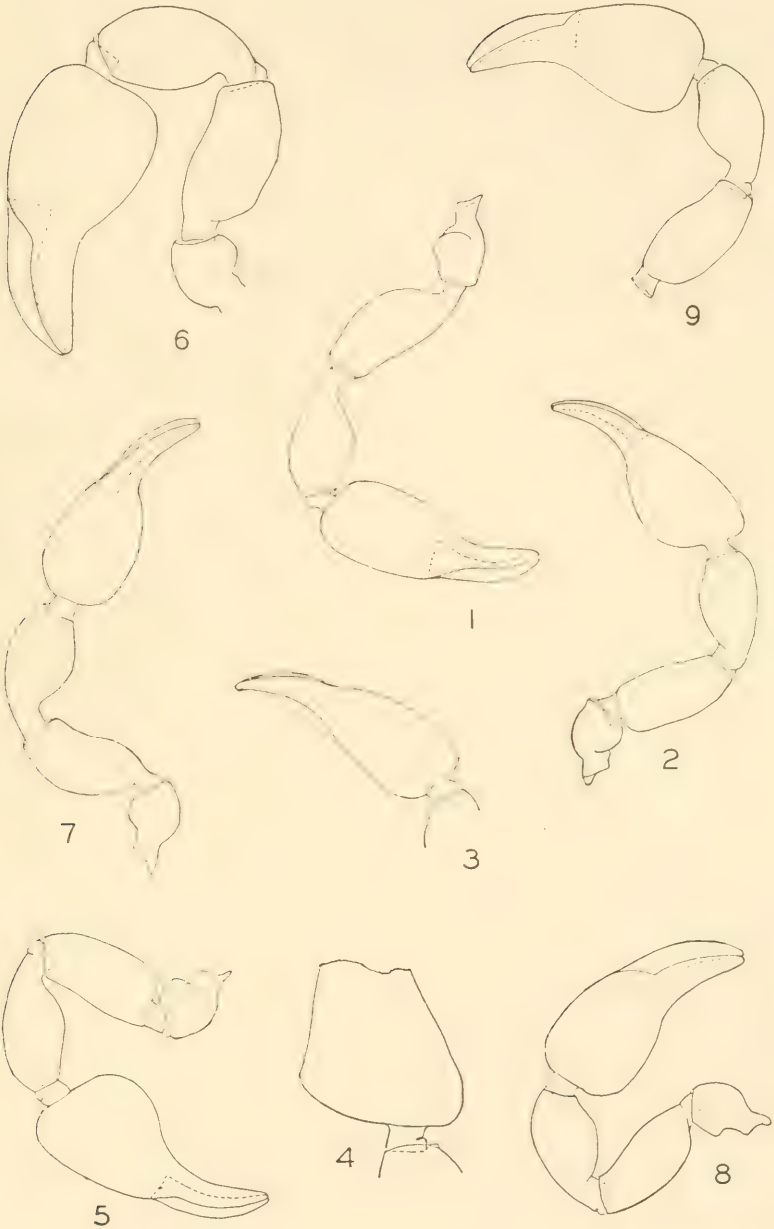
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PLATE 2

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Fig. 10. *Parachernes* (*Argentochernes*) *tumimanus* (Banks, 1908). Lateral view of palpal chela, female lectotype.

Fig. 11. *Mexachernes calidus* (Banks, 1909). Dorsal view of palp, female lectotype.

Fig. 12. Idem, lateral view of chela, female lectotype.

Fig. 13. *Neoallochernes garcianus* (Banks, 1909). Dorsal view of palp, female lectotype.

Fig. 14. Idem, lateral view of palpal chela, female lectotype.

Fig. 15. *Chelanops affinis* Banks, 1894. Dorsal view of palp, male lectotype.

Fig. 16. *Hesperochernes pallipes* (Banks, 1893). Dorsal view of palp, female lectotype.

Fig. 17. Idem, lateral view of chela, female lectotype.

Fig. 18. *Hesperochernes pallidus* (Banks, 1890). Dorsal view of palp, female lectotype.

Fig. 19. *Hesperochernes unicolor* (Banks, 1908). Dorsal view of palp, female lectotype.


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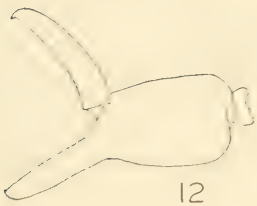
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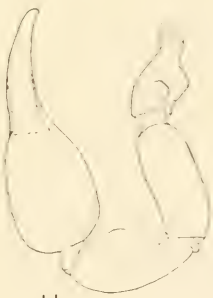
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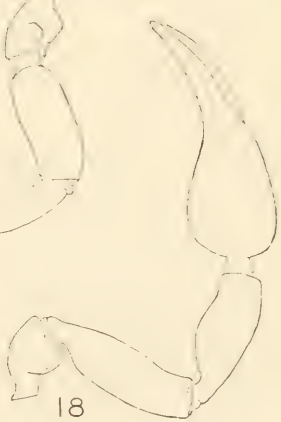
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Fig. 20. *Dinocheirus partitus* (Banks, 1909) Roewer, 1937. Galea of chelicera, female lectotype.

Fig. 21. Idem, dorsal view of palp, female lectotype.

Fig. 22. Idem, lateral view of palpal chela, female lectotype.

Fig. 23. *Dinocheirus obesus* (Banks, 1909). Dorsal view of palp, male lectotype.

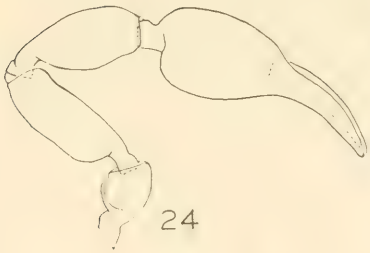
Fig. 24. *Dinocheirus æqualis* (Banks, 1908) Roewer, 1937. Dorsal view of palp, female lectotype.

Fig. 25. Idem, lateral view of palpal chela, female lectotype.

Fig. 26. *Dinocheirus dorsalis* (Banks, 1895). Dorsal view of palp, female lectotype.

Fig. 27. *Dinocheirus validus* (Banks, 1895) Beier, 1932. Dorsal view of palp, male lectotype.

Fig. 28. Idem, lateral view of palpal chela, male lectotype.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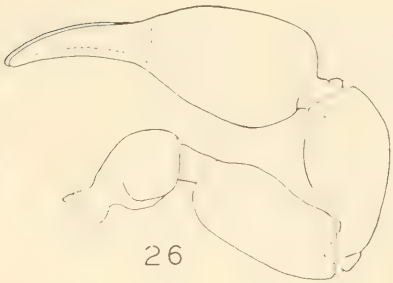
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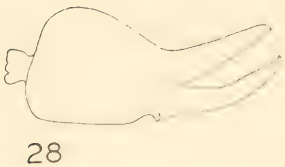
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PLATE 4

PLATE 4

Fig. 29. *Dinocheirus tumidus* (Banks, 1895) Beier, 1932. Dorsal view of palp, male lectotype.

Fig. 30. Idem, lateral view of chela, male lectotype.

Fig. 31. *Dinocheirus tristis* (Banks, 1891). Dorsal view of palp, male lectotype.

Fig. 32. Idem, cheliceral galea, female cotype.

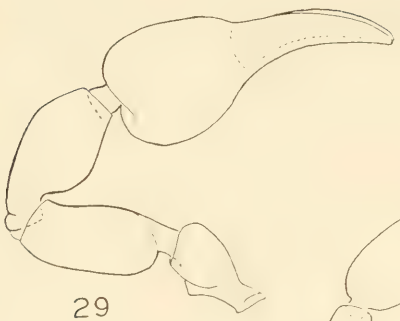
Fig. 33. *Dendrochernes morosus* (Banks, 1895). Dorsal view of palp, female lectotype.

Fig. 34. *Pseudozaona uniformis* (Banks, 1914). Dorsal view of palp, female lectotype.

Fig. 35. Idem, lateral view of chela, female lectotype. (Position of fingers on slide causes the fingers to appear somewhat shortened in the camera lucida drawing.)

Fig. 36. *Withius texanus* (Banks, 1891). Dorsal view of palp, female lectotype.

Fig. 37. *Neowithius cubanus* (Banks, 1909). Dorsal view of palp, female lectotype.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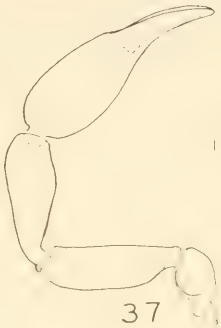
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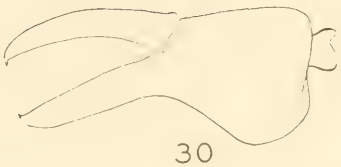
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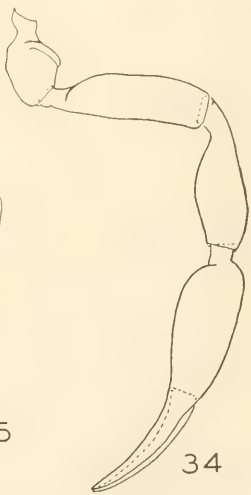
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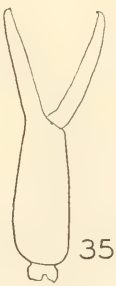
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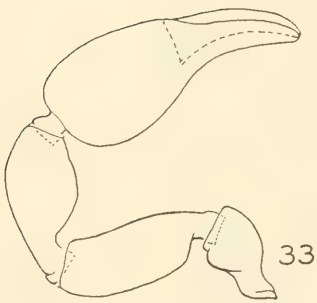
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