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ANNALS MEDEDELINGEN
OF THE VAN HET
TRANSVAAL MUSEUM

VOLUME IV.

PART 1, containing:—

*Bijdragen tot de kennis der Reptielen van de Karroo-
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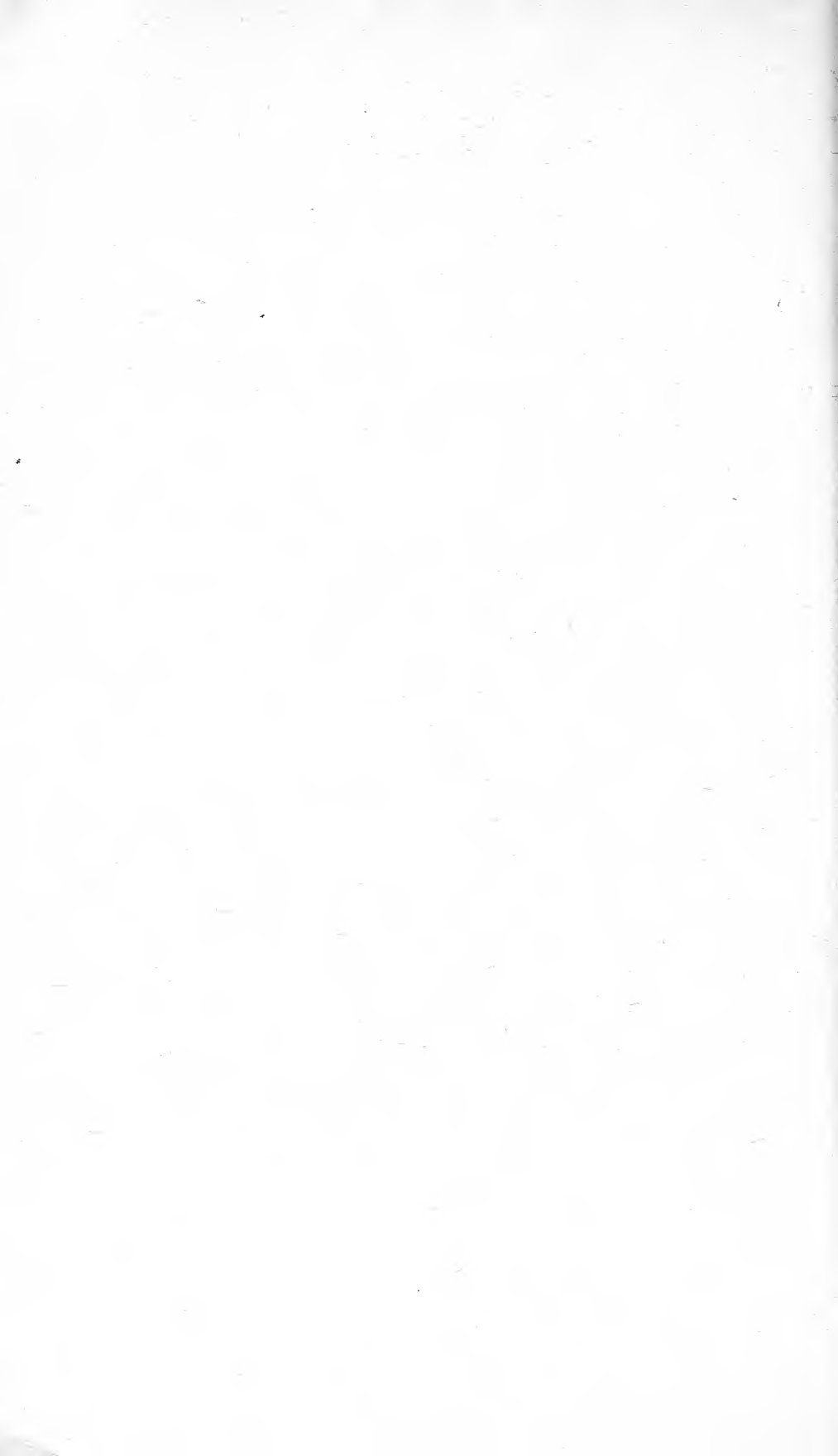
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No. 1.
DL.BIJDRAGEN TOT DE KENNIS DER REPTIELEN VAN DE
KARROOFORMATIE.

Door DR. E. C. N. VAN HOEPEN, M.I.

1. De Schedel van *Lystrosaurus latirostris* OWEN sp.

- 1860.—*Ptychognathus latirostris* OWEN—OWEN, 2, bl. 51.
 1876.—*Ptychognathus latirostris* OWEN—OWEN, 4, bl. 49.
 1890.—*Ptychosiagum latirostris* OWEN sp., LYDEKKER, 6, bl. 35.
 1903.—*Lystrosaurus latirostris* OWEN sp., BROOM, 9, bl. 4.
 1904.—*Lystrosaurus latirostris* OWEN sp., BROOM, 10, bl. 76.
 1912.—*Lystrosaurus latirostris* OWEN sp., WATSON, 13, bl. 287.

waarschijnlijk ook

- 1862.—*Ptychognathus Alfredi* OWEN—OWEN, Phil. Trans., bl. 456.
 1876.—*Ptychognathus Alfredi* OWEN—OWEN, 4, bl. 51.
 1876.—*Ptychognathus depressus* OWEN—OWEN, 4, bl. 53.

In 1859 beschreef HUXLEY de eerste *Lystrosaurus* schedel als *Dicynodon Murrayi* en reeds in 1860 kon het OWEN gelukken de groep *Ptychognathus* van *Dicynodon* af te scheiden. Ongelukkig had echter STIMPSON deze naam reeds in 1858 voor een *crustaceen*-geslacht in gebruik genomen en was dus OWEN's naam ongeldig. In 1870 beschreef COPE een verstening, die tot het door OWEN opgestelde geslacht bleek te behoren en welke hij *Lystrosaurus frontosus* noemde. Deze geslachtsnaam treedt nu dus in de plaats van *Ptychognathus*. Later, in 1889, stelde LYDEKKER de naam *Ptychosiagum* voor deze reptielen voor, doch, wat de Zuidafrikaanse versteningen betreft, mag dit slechts als een synoniem voor *Lystrosaurus* worden opgevat. Latere geslachtsnamen voor andere *Lystrosaurus*-schedels door SEELEY voorgesteld—*Rhapdotocephalus* en *Mochlorhinus*—

blijken, zoals vooral door BROOM is aangetoond, eveneens slechts synoniemen te zijn. Volgens LYDEKKER zijn *Alfredi* en *depressus* ook synoniemen van *latirostris*; dit kan echter hier niet worden gecontroleerd. Wel komen de afbeeldingen door OWEN in 1876 van deze versteningen gegeven merkwaardig goed met die van *latirostris* overeen evenals met ons te beschrijven exemplaar, en daarom zijn hun namen hierboven als waarschijnlijke synoniemen bijgevoegd.

Het meerendeel der genoemde beschrijvingen nu geeft wel een algemeen beeld van de *Anomodontes* schedel, doch gaat, vooral door gebrek aan goed materiaal, niet op detailverhoudingen in. Niet alleen wordt het daardoor bijna onmogelijk morfologische gevolgtrekkingen te maken, doch ook de systematiek wordt zodoende uiterst bemoeilikt. Het resultaat hiervan is geweest, dat er zonder voldoende grond b.v. van het geslacht *Lystrosaurus* vele exemplaren als nieuwe soorten beschreven werden en hierin dus groote verwarring ontstaan is.

LYDEKKER trachtte aan deze toestand een einde te maken door vele dezer soorten met elkaar te verenigen. De redenen, welke hij voor deze vereniging aanvoert, als b.v. de blote opmerking, dat de verschillen te wijten zijn aan verschil in ouderdom of aan het min of meer geleden hebben door druk, zijn in de betreffende publikatie in 't geheel niet te beoordeelen. Zij zijn derhalve eveneens geheel onvoldoende.

De laatste onderzoekingen op dit gebied werden door BROOM uitgevoerd, en deze heeft ons van talrijke eigenaardigheden van dit geslacht een zeer gedetailleerd en grondig beeld gegeven.

Met het oog op dit alles nu, heb ik gemeend een uitstekend bewaard gebleven schedel in dit museum, waarvan de bewerking kort geleden geëindigd is, zo uitvoerig mogelijk te moeten beschrijven.

GEBRUIKTE LITTERATUUR.

- 1.—HUXLEY, T. H. “ On some *Amphibian* and *Reptilian* Remains from South Africa and Australia. 2.—On a new species of *Dicynodon* (*D. Murrayi*), from near Colesberg, South Africa; and on the Structure of the Skull in the *Dicynodons*.” Quart. Journ. Geol. Soc. London, Vol. 15, pp. 649–658, Pl. XXII, Fig. 3–6, Pl. XXIII; London, 1859.
- 2.—OWEN, R. “ On some *Reptilian* Fossils from South Africa.” Quart. Journ. Geol. Soc. London, Vol. 16, pp. 49–63, Pl. I–III; London, 1860.
- 3.—HUXLEY, T. H. “ On *Vertebrate* Fossils from the Panchet Rocks, near Ranigunj, Bengal.” Mem. of the Geol. Surv. of India. Palaeontologia Indica, Ser. 4, No. 1. Calcutta, 1865.

- 4.—OWEN, R..... “ Descriptive and Illustrated Catalogue of the Fossil *Reptilia* of South Africa in the Collection of the British Museum.” London, 1876.
- 5.—SEELEY, H. G..... “ Researches on the Structure, Organisation, and Classification of the Fossil *Reptilia*. VI. On the *Anomodont Reptilia* and their Allies.” Phil. Trans. Roy. Soc. London, Vol. 180 (1889), B, pp. 215–296. London.
- 6.—LYDEKKER, R..... “ Catalogue of the Fossil *Reptilia* and *Amphibia* in the British Museum. Pt. IV, containing the Orders *Anomodontia*, *Ecaudata*, *Caudata*, and *Labyrinthodontia*; and Supplement.” London, 1890.
- 7.—SEELEY, H. G..... “ On the Skull of *Mochlorhinus platyceps*, from Bethulie, Orange Free State, preserved in the Albany Museum, Grahamstown.”
The Ann. and Mag. of Nat. Hist., Ser. VII, Vol. I, pp. 164–176. London, 1898.
- 8.—BROOM, R..... “ On the Structure of the Palate in *Dicynodon* and its Allies.” Trans. of the South African Phil. Soc., Vol. XI, 1900–02; pp. 169–176, Pl. XXV. Capetown, 1902.
- 9.—BROOM, R..... “ On the Remains of *Lystrosaurus* in the Albany Museum.” Rec. of the Albany Mus., Vol. I, Pt. 1, pp. 3–8, Pl. I, Fig. 3. Grahamstown, issued 24th April, 1903.
- 10.—BROOM, R..... “ On some Points in the Anatomy of the *Anomodont* Skull.” Rec. of the Albany Mus., Vol. I, Pt. II, pp. 75–82, Pl. IV, Fig. 5. Grahamstown, issued 18th March, 1904.
- 11.—JAEKEL, O..... “ Ueber den Schaedelbau der *Dicynodonten*.” Sep. uit: Sitz. Ber. d. Ges. Naturforsch. Freunde, S. 172–188; Berlin, 1904.
- 12.—JAEKEL, O..... “ Die *Wirbeltiere*.” Berlin, 1911.
- 13.—WATSON, D. M. S.... “ The Skeleton of *Lystrosaurus*.” Rec. of the Albany Mus., Vol. II, Pt. IV, pp. 287–295, Pl. XV, XVI. Grahamstown, issued 26th March, 1912.
- 14.—BROOM, R..... “ On some Points in the Structure of the *Dicynodont* Skull.” Ann. of the South African Mus., Vol. VII, Pt. V, pp. 337–351. Issued 12th July, 1912.

ALGEMENE OPMERKINGEN.

De onderkaak van onze verstening ontbreekt, evenals de stapes en het ethmoid. Van druk heeft zij weinig te lijden gehad, daar slechts de bovenrand van het linker squamosum een weinig naar beneden gedrukt is. Het verschil in hoogte der beide squamosa bedraagt 10 mm.

Een vooraanzicht geeft een achtkantige contourlijn. Het achterhoofdsvlak is rechthoekig omgrensd, met de bovenhoeken naar achter uitstekend. Een zijaanzicht heeft de vorm van een parallelogram, terwijl een onder- en boven-aanzicht omvat wordt door een gelijkzijdige driehoek, met de top voor de snuit. De helling van het preorbitale gedeelte, ten opzichte van het bovenvlak der parietalia, is ongeveer 45 graden. Bij *L. Murrayi*, de enige opgave die ik daaromtrent vond, is deze hoek volgens HUXLEY (1, bl. 650) 90–100 graden.

De oogholten zijn groot en dragelijk rond; de bovenste slaapholten eveneens groot en korter dan breed. Het schedeldak in engere zin is zeer smal. Het geheel maakt de indruk massief en krachtig te zijn.

Algemene afmetingen :

Afstand van de kondylus tot de bovenrand van de mond 171 mm.

Afstand van het achtereinde van het rechter squamosum tot het midden van de bovenrand van de mond.... 224 mm.

Grootste breedte over de squamosa..... 169 mm.

(De breedte over de bovineinden der quadrata was groter.)

Afstand van het vooreinde der onderlinge sutuur der pterygoidea op het ondervlak tot waar de onderlinge sutuur der frontalia op het bovenvlak die met het het preparietale ontmoet..... 98 mm.

HET PREMAXILLARE (Pl. I–VI).

Dit is een lang been, waarvan in dit exemplaar slechts de gezichts- en de gehemelte oppervlakken zichtbaar zijn. OWEN zegt ervan (2, bl. 52): "Beginning above by the pointed termination wedged in between the nasals, it expands to the fore part of the nostrils, the sides of the bone there beginning to bend down at an open angle (nearly approaching a right one) with the upper surface; this surface maintains almost the same breadth to the alveolar border; it is traversed along its middle by a low ridge." Het in een punt uitlopend gedeelte "wedged in between the nasals" ligt echter niet tussen doch op deze beenderen, zoals door SEELEY reeds bij *Mochlorhinus platyceps* werd aangetoond (7, bl. 172). Dit is niet te zien bij het onder bespreking zijnde exemplaar doch zeer duidelijk bij Pal. Kat. 4001. De suturen met de nasalia divergeren dus naar voren (Pl. I en II). Het zijn, zowel op het buiten- als binnen oppervlak, eenvoudige lijnen, die vóór en boven het neusgat naar binnen buigen. De overige suturen zijn eveneens zeer eenvoudig. De sutuur met het voorste septomaxillare (Pl. V, VI) is naar buiten en beneden gericht. De sutuur met het maxillare loopt, van het punt waar septomaxillare, maxillare en premaxillare bij elkaar komen, een weinig konvergerend met de straks te

vermelden, sterk in 't oog vallende randen, in de richting van de mondrand. Dit schijnt in tegenspraak te zijn met OWEN'S beschrijving van deze sutuur in 2, bl. 53, waar hij zegt, dat de zijden van het premaxillare naar voren een weinig in diepte toenemen. Het zelfde wordt gezegd van *L. Alfredi* in 4, bl. 52. Als de mondrand bijna bereikt is, buigt de sutuur zich recht naar beneden, passeert de mondrand en loopt dan, een weinig naar boven gericht, over het gehemelte tot bijna onder het achterste einde van het been. Hier buigt zij zich ineens naar boven naar de rand van het neuskanaal, bereikt echter het overeenkomstige palatinum niet (Pl. III, IV).

Het boven-oppervlak (Pl. I, II) is in het algemeen glad te noemen. Over het midden loopt een scherpe, lage rug, die begint bij de nasalia en zich tot voorbij het midden van het oppervlak voortzet. Naar de mondrand toe gaat hij van hier geleidelik in het algemene oppervlak over. Deze rug steekt scherp af tegen de brede afgeronde zijranden van het oppervlak, die zich nog als brede ruggen op een groot gedeelte van de nasalia voortzetten. HUXLEY (1, bl. 652) laat bij *L. Murrayi* de middelste rug ook op de nasalia overgaan, maar dit gebeurt niet bij de onder bespreking zijnde schedel van *latirostris*.

Het gehele oppervlak is bovendien bedekt met talrijke, fijne groeistrepen, die van uit het midden divergeren. Daar het midden zelf enigzins beschadigd is kan van dit gedeelte van het oppervlak niets worden meegedeeld. Het aanwezig is echter voldoende om aan te tonen, dat het premaxillare slechts uit één verbenings-centrum ontstaan is en dus steeds enkelvoudig is geweest. Er kan derhalve ook geen sprake zijn van een verloren gegane sutuur. Onder het midden vertoont dit oppervlak een groot aantal (meer dan vijf en twintig) min of meer ronde openingen, sommige met een middellijn van 1,5 mm. Deze openingen zijn de einden van kanalen in het been, die in 't algemeen ook van uit het midden divergeren en hoewel de meeste, zoals reeds gezegd, op het boven-oppervlak voorkomen, vindt men er ook enkele op de zijden, maar dan dicht bij de mondrand en zelfs op die rand. Zij hebben dienst gedaan als doorgang voor bloedvaten en zenuwen, waarschijnlijk naar een hoornige schede, die de buitenvoerrand van het premaxillare bedekte en als bijtrand gebruikt werd. De reeds oude idee van een hoornige schede wint door deze kanalen nog aan waarschijnlijkheid. De zijoppervlakken van het been (Pl. V, VI) maken met het boven-oppervlak bijna een rechte hoek. Bij de neusgaten buigen zij sterk naar binnen en zij ontmoeten elkaar in het midden. Zij zijn ruw door het hebben van ribben, bulten, groeven en putten.

Het gehemelte-oppervlak van het been (Pl. III, IV) is in 't algemeen konkaaf. Het voorste gedeelte is een weinig op het achterste gebogen en vormt een scherpe hoek met het boven-oppervlak van het been. Een hoge, mediane ribbe (Pl. III, c) strekt zich uit van het vomer tot het midden van het oppervlak waar zij schielik eindigt. De zijden dezer ribbe, die aan het vomer-einde zeer steil zijn, worden naar voren toe vlakker en breder en zetten zich van het einde der ribbe als twee evenwijdige ribben tot aan de mondrand voort. Tussen deze ribben ligt een diepe groeve, die naar voren open is en naar achteren afgesloten wordt door de mediane ribbe. De zijden der evenwijdige ribben zijn aan het vooreinde beide steil, doch de buitenste worden naar achteren vlakker en gaan daar over

in de vlakke zijden der mediane ribbe. De evenwijdige ribben zijn van de aan de maxillaria grenzende zijden van het premaxillare gescheiden door een brede en diepe groeve, die naar het midden toe vlakker wordt en langs de mediane ribbe weer dieper.

Zooals in 1902 reeds door BROOM bij *Oudenodon* werd aangetoond (8, bl. 171), behoort de mediane ribbe tot het premaxillare en is dus niet het vomer of ook maar een deel daarvan; dit been ligt verder naar achteren. Daar steekt ook de mediane ribbe over de rand van het neuskanaal heen en verbindt zich op een eigenaardige wijze met de voorrand van het vomer. De achterkant der ribbe heeft drie, nagenoeg evenwijdige, zeer dunne en platte uitsteeksels, waarvan de grootste vlakken vertikaal staan. Tussen deze drie dringen zich nu twee dergelijke, naar voren gerichte uitsteeksels van het vomer. Een horizontale doorsnede over deze sutuur geeft dus achtereenvolgens van links naar rechts: Het linkse uitsteeksel van het premaxillare (1), het linkse uitsteeksel van het vomer (2), het centrale uitsteeksel van 1, het rechtse uitsteeksel van 2 en het rechtse uitsteeksel van 1. BROOM (l.c.) noemt dit een "interdigitating suture."

De zijden van het premaxillare breiden zich naar beneden veel verder uit dan het centrale gedeelte. Daardoor ontstaan grote binnen-oppervlakken, die een stompe hoek vormen met het middengedeelte van het gehemelte-oppervlak. Overigens zijn deze vlakken slechts zeer weinig gebogen (holte naar binnen) en zijn zij verder, in tegenstelling met het vrij ruwe middengedeelte, glad. Het verbindingsvlak met het maxillare is zeer breed.

Van de overige binnen-oppervlakken is in dit exemplaar niets te zien. Aan stukken van andere koppen ziet men, dat er tegen het midden van het achter-oppervlak een zeer dun, breed en hoog, vertikaal staand been grenst. Dit been is door HUXLEY (1, bl. 654) bij *L. Murrayi* beschreven als een "ethmovomerine plate or nasal septum" en BROOM meent (10, bl. 75), dat het tot het premaxillare behoort. Aan de hand van het stuk Pal. Kat. No. 4001 blijkt deze opvatting de juiste te zijn. Volgens HUXLEY dan is (bij *L. Murrayi*) dit mediane been zeer dun en gaat zijn bovineinde aan de voorkant van de neusgaten zeer snel over in een dikke, sponzige massa, bestaande uit een horizontaal en een vertikaal gedeelte. De nadere beschrijving van het horizontale gedeelte komt geheel overeen met twee zelfstandige beenderen, die zich bij ons exemplaar onder het neusgat bevinden en hieronder als septomaxillaria beschreven worden. Wat met het vertikale gedeelte bedoeld wordt is niet heel duidelijk; het komt mij echter voor, dat het een gedeelte van het achtervlak van het premaxillare moet zijn. Volgens BROOM (8, bl. 171) staat de achterrand van het dunne gedeelte in nauwe samenhang met de voorrand van het vomer.

Afmetingen :

| | |
|---|----------|
| Lengte van het boven-oppervlak..... | 91 mm. |
| Breedte van het been, waar de sutuur met de nasalia in de neusgaten gaat..... | 38 mm. |
| Onderlinge afstand der punten ontstaan door de snijding der sutuurlijnen tusschen premaxillare, maxillare en septomaxillare onder de beide neusgaten..... | 43,8 mm. |

| | |
|---|----------|
| Afstand dezer punten tot de mondrand, gemeten langs de sutuur met het maxillare..... | 57,1 mm. |
| Afstand dezer punten tot de centrale ribbe op het bovenoppervlak..... | 32,2 mm. |
| Breedte van het been aan de mondrand, waar de suturen op het gehemelte beginnen..... | 45,3 mm. |
| Rechte afstand van het achterste punt van de mediane ribbe op het gehemeltevlak tot het midden van de mondrand..... | 58,1 mm. |
| Lengte der mediane ribbe ongeveer..... | 35 mm. |
| Lengte der evenwijdige ribben ongeveer..... | 20 mm. |
| Assenafstand der evenwijdige ribben ongeveer..... | 11 mm. |

(De drie laatste afmetingen op het gehemelte-vlak.)

DE MAXILLARIA (Pl. III-VI).

Het maxillare is in 't algemeen een lang, driekantig been. Het heeft twee naar achteren gerichte uitsteeksels (Pl. V, VI). Het bovenste dezer twee, reeds dóór OWEN (2, bl. 52) opgemerkt, is een voortzetting van het achterste gedeelte der buitenrand van het maxillare en vormt het onderste gedeelte van de jukboog tot vlak onder het voorste einde van het postorbitale, d.w.z. tot een goed eind voorbij de diepste plaats van de oogholterand. Het maakt echter geen deel uit van deze rand. Het andere uitsteeksel is breed en dun. Zijn buitenwand staat vertikaal en konvergeert met die van het overeenkomstige uitsteeksel van het andere maxillare naar achteren. Het ligt in het verlengde van de scherpe, hoekige rand, die het binnenste oppervlak van het maxillare scheidt van het achterste oppervlak; het bedekt een gedeelte van het buitenoppervlak van het naar voren gerichte uitsteeksel van het overeenkomstige pterygoid. Naar achteren loopt het snel uit in een punt en het reikt bijna zover achterwaarts als de achterrand van de inwendige neusopeningen. Bij *L. platyceps* werd een dergelijk uitsteeksel beschreven door SEELEY (7, bl. 173).

De sutuur met het premaxillare is reeds bij dit been behandeld. De sutuurlijn met de septomaxillaria op het buitenoppervlak (Pl. V, VI) is heel eenvoudig, bijna recht en met geen enkele biezonderheid. Het vervolg der sutuur is echter op beide zijden verschillend. Het linker maxillare grenst n.l. achter het neusgat aan het linker nasale, terwijl het rechter maxillare hier aan het lacrymale grenst. Dit komt waarschijnlijk daardoor, dat dit gedeelte van het maxillare zeer dun is en bij het verwijderen van het gesteente het stukje maxillare tegen het lacrymale aan de linkerzijde wel, doch rechts niet bewaard is gebleven. Ook is waarschijnlijk, dat de maxillaria zich enigzins verder over het resterende oppervlak van de lacrymalia hebben uitgebreid dan tans het geval is. Op het rechter lacrymale bevindt zich bovendien een stukje van het maxillare, dat hiervan door barsten gescheiden is. De grens met het lacrymale, een onregelmatig gebroken lijn, is dus geen eigenlike sutuurlijn. In zijn beschrijving van 1860 (2, bl. 52) heeft OWEN bij *latirostris* nagelaten iets omtrent de begrenzing van het maxillare tussen het neusgat en het lacrymale mee te delen. Hij verwijst hierin echter herhaaldelijk naar de beschrijving van *L. declivis*

en daarvan zegt hij (2, bl. 51): "The maxillaries form the lower boundary of the nostrils, and join above and behind with the prefrontal, lacrymal, and nasal bones." Bij onzen *latirostris* nu is het prefrontale door een uitsteeksel van het nasale van de begrenzing van het maxillare uitgesloten. Dit komt overeen met OWEN's beschrijving van *L. Alfredi* (4, bl. 52), want daarvan wordt gezegd: "Above, the maxillary bounds the lower part of the nostril, and there unites with the premaxillary and lacrymal." Het nasale wordt hierbij niet genoemd, daar OWEN het lacrymale tot aan het neusgat laat doorgaan.

De nu volgende grens met het jugale is weer een echte sutuurlijn. Zij is nagenoeg recht, helt naar achteren een weinig naar beneden en is daardoor vrijwel evenwijdig met de onder-voorrand van de oogholte. Verlengd, zou deze lijn het achtereinde van de sutuur maxillare septo-maxillare bereiken. Even voor de diepste plek van de oogholterand begint de sutuur met het naar voren gerichte uitsteeksel van het squamosum; deze eindigt op de jukboog op de onderste sutuurlijn tussen jugale en squamosum. De sutuur met het jugale op het achteroppervlak (Pl. III, IV), evenals de voorgaande een eenvoudige lijn, begint hier en is naar voren en binnenwaarts gericht. Het achterste gedeelte dezer sutuurlijn is niet meer aanwezig, daar de binnenkanten der achterste uitsteeksels der maxillaria afgebroken zijn: vermoedelijk liepen zij dwars van de onderrand der maxillaria af tot in een groeve tussen de oppervlakken van maxillare en jugale. Van hier loopt de sutuur als een rechte lijn naar de buitenrand van de opening voor de tandvaten. De reeds genoemde groeve ligt daardoor hoofdzakelijk aan de buitenzijde der sutuur. Aan de onderrand van genoemde opening ontspringt de sutuur met het palatinum, welke zeer kort is. Zij maakt plaats voor de sutuur met het pterygoid, welke zich om het onderste maxillare-uitsteeksel eerst naar achteren en dan naar voren richt. Vervolgens buigt deze zich boven en om het vooreinde van het pterygoid heen, om aan de binnenzijde van dit been weer het palatinum te ontmoeten. De sutuur met dit been is weer naar voren gericht en buigt zich vóór langs het palatinum naar de inwendige opening van het neuskanaal en wel zó, dat het maxillare nog een zeer klein gedeelte van de voorrand dezer opening vormt (Pl. III, IV). De sutuur met het premaxillare op het gehemelte is reeds beschreven.

De gezichtsoppervlakte van het maxillare (Pl. V, VI) bestaat uit twee delen. Het achterste, tevens bovenste gedeelte, is kleiner dan het voorste, onderste gedeelte. Het is veel gladder dan dit laatste en slechts bedekt met fijne groeiribben, die gericht zijn van de onder- en voorrand van de oogholte naar de mondrand, echter zó, dat zij naar voren een weinig konvergeren. De onderrand van dit gladde oppervlak vormt een scherpe ribbe, die, zoals door OWEN reeds werd vastgesteld (2, bl. 52), achter de onderste ribbe van het voorste gedeelte van het gezichtsvlak op het achtervlak van het maxillare overgaat. De twee delen van het gezichtsvlak ontmoeten elkaar ongeveer in een lijn, die van het neusgat dwars over het oppervlak loopt. (De "tandribbe" gaat alleen nog iets verder naar boven.) Zij maken hier een zeer stompe hoek met elkaar, daar het onderste deel bijna evenwijdig is met een lijn, van het midden van het gehemelte-oppervlak van het premaxillare naar de voorrand van het

preparietale gedacht, terwijl het bovenste deel met deze lijn naar boven toe divergeert.

Het onderste gedeelte is zeer ruw en draagt twee ribben, die door een groeve gescheiden zijn. Deze ribben zijn nagenoeg evenwijdig aan elkaar en aan de ribben op het premaxillare. De onderste dezer twee vormt de buitenrand van het maxillare en dus ook van de tandholte ("tandribbe") is zeer dik en gaat, de onderrand van dit oppervlak kruisend, op het enste, gladde deel der gezichtsvlakte over.

De bovenste ribbe bevindt zich dicht langs de sutuur met het premaxillare. Direkt onder de neus is zij smal, hoog en scherp, wordt echter naar voren breed en laag, zodat zij aan de mondrand geheel verdwijnt. De groeve, die deze ribbe van de onderste scheidt, ligt juist boven het midden van het gezichtsoppervlak en is natuurlijk evenwijdig aan de ribben.

Het achterste oppervlak van het maxillare (Pl. III, IV) is grotendeels glad. Alleen het buitenste deel ervan, d.w.z. dat deel, dat de onderzijde vormt van de "tandribbe" is zeer ruw; aan het vooreinde is dit ruwe gedeelte even breed als het achterste oppervlak zelf, doch naar achteren wordt het smaller, totdat het daar, waar de "tandribbe" op het gladde gedeelte van het gezichtsoppervlak begint, in een punt uitloopt en eindigt.

Het zichtbare gedeelte van het binnenoppervlak van het maxillare is een weinig konvex en vormt met de overeenkomstige zijden van het gehemelte-oppervlak van het premaxillare een doorlopend vlak. Tevens is het de binnenzijde van de driekantige tandholte, terwijl uit het bovenstaande reeds volgt, dat de andere twee zijden dezer holte gevormd worden door het achtervlak en een gedeelte van de gezichtsvlakte van het maxillare. Een klein en smal deel van het maxillare bevindt zich tussen het premaxillare en het palatinum, en bereikt de inwendige neusopening, zoals hierboven reeds is aangegeven. Hoewel dit gehemelte-vlak van het maxillare reeds lang bij *Dicynodon* bekend was, werd het voor het eerst door BROOM (8, bl. 171) duidelijker bij *Lystrosaurus* beschreven.

De assen der tandholten zijn aan de voorkant nagenoeg evenwijdig, doch naar achteren konvergeren zij met elkaar. De voorrand is bij beide tandholten afgebroken. Elk maxillare draagt slechts één tand.

Afmetingen :

| | |
|---|-----------|
| Afstand van het punt waar de sutuur met het premaxillare over de mondrand gaat (<i>a</i>) tot het achtereinde van de sutuur met de septomaxillaria (<i>b</i>) | 81 mm. |
| Afstand van punt (<i>a</i>) tot het achtereinde van het jukbooguitsteeksel van het maxillare (<i>c</i>)..... | ± 112 mm. |
| Onderlinge afstand van (<i>b</i>) en (<i>c</i>)..... | ± 58 mm. |
| Gemiddelde breedte van het ruwe gedeelte van het gezichtsvlak..... | 42 mm. |
| Afstand van het achtereinde van het uitsteeksel langs het pterygoid tot het vooreinde van het naar voren gerichte uitsteeksel van dit been..... | 33 mm. |
| Daar de einden afgebroken zijn is deze afstand nu nog.. | 28,5 mm. |
| Breedte van het stukje maxillare aan de voorrand van de inwendige neusopening..... | 3,5 mm. |

| | |
|---|----------|
| Grootste onderlinge afstand tusschen de buitenkanten der " tandribben "..... | 97,6 mm. |
| Kleinste nog aanwezige afstand van idem..... | 88,4 mm. |
| Onderlinge afstand der achtereinden van de jukboog- uitsteeksels der maxillaria..... | 131 mm. |

DE NASALIA (Pl. I, II, V, VI).

De vorm van het zichtbare oppervlak der nasalia is in 't algemeen die van een langwerpige vierkant, waarvan de grootste afmeting met de lengterichting der schedel naar achteren konvergeert. In de richting der lacrymalia bezitten zij een uitsteeksel. Zij zetten zich voort onder het puntige uitsteeksel van het premaxillare en vormen daar een mediane sutuur (zie premaxillare). Hun grootste deel behoort tot de gezichtsvlakte, terwijl slechts een heel klein deel tot het bovenzvlak der schedel gerekend kan worden.

De suturen met het premaxillare zijn reeds bij dit been besproken. Naar boven toe verenigen deze zich bij het begin der onderlinge sutuur, die slechts zeer kort is en tegen de indringende frontalia eindigt (Pl. I, II). De geaardheid dezer sutuur was niet uit te maken, doch het schijnt een eenvoudige lijn te zijn. De suturen met de frontalia ontmoeten elkaar aan het boveneinde der onderlinge sutuur; zij vormen daar een rechte hoek. Vóór zij de prefrontalia bereiken bochten zij nog heel even in de frontalia uit. Het zijn zwak golvende lijnen, die ongeveer even lang zijn als de onderlinge sutuur. De beenranden langs deze sutuur zijn niet verdikt. De, naar de voorrand van het bovenzvlak gerichte, suturen met de prefrontalia maken met de voorgaande een scherpe hoek, die bijna recht is. Deze suturen liggen op lage ribben, die op de voorrand van het bovenzvlak zich als duidelijke knobbel voordoen. De verdere sutuur met de prefrontalia, op de gezichtsvlakte (Pl. V, VI) is niet verheven en aanvankelijk heel eenvoudig. Bij het begin van het uitsteeksel naar het lacrymale richt zich deze sutuurlijn naar de inkeping in de oogholterand boven de opening van het traankanaal. Dit gedeelte vertoont kleine golvingen. Daar de sutuur met lacrymale en maxillare aan de rechter zijde niet normaal is door afbrokkeling, heb ik bij deze lijnen alleen het oog op de linker zijde. De sutuur met het lacrymale is zeer kort met een uitspringende bocht in het midden. De sutuur met het maxillare is nog korter. Beide zijn eenvoudige lijnen. Voor het overige zijn de nasalia door sutuur verbonden aan de achterste der twee septomaxillaria. Deze sutuur buigt zich eerst naar boven en gaat dan ongeveer horizontaal over de achterrand van het neusgat naar binnen. Voor de onderlinge sutuur en die met het frontale en prefrontale op het ondervlak der beenderen zie bij de frontalia.

Boven de neusgaten zetten de zijribben van het premaxillare zich, met dezelfde ruwe oppervlakte als daar, op de nasalia voort tot ongeveer in het midden van het been, waar zij eindigen (Pl. I, II). De suturen met het premaxillare liggen nu in de groeven tussen deze verhevenheden en de mediane ribbe van dit laatste been. Het einde der ribben op de nasalia is van de reeds genoemde knobbel gescheiden door een diepte (Pl. VI)

waarin enige openingen voorkomen, die in verbinding staan met kanalen door het been. Deze openingen komen verder nog verspreid voor over de oppervlakte beneden genoemde diepte. Tussen de meermalen genoemde knobbels buigt de oppervlakte der nasalia zich in het bovenvlak van de schedel, daardoor een zwakkere voortzetting vormend van zeer in 't oog vallende ribben op de prefrontalia. De twee oppervlakte stukken op dit bovenvlak zijn beide konkaf.

Van de binnenoppervlakte der nasalia is alleen het aan de frontalia grenzende deel bekend. Elk nasale heeft hier een van voor naar achteren gerichte, midden over het oppervlak lopende, brede en hoge ribbe, die op het overeenkomstige frontale overgaat. Tusschen de twee ribben vormen de nasalia een brede groeve. De ribben beginnen juist onder de knobbels van het bovenoppervlak en convergeren naar achteren. Aan de buitenzijde van elke ribbe bevindt zich weer een diepte, die zich echter reeds half op het prefrontale bevindt.

Afmetingen :

| | |
|--|----------|
| Lengte der onderlinge sutuur op het bovenvlak..... | 17 mm. |
| Afstand van het einde van het been op de zijribben van het premaxillare (<i>a</i>) tot het boveneinde der onderlinge sutuur..... | 48,4 mm. |
| Afstand van (<i>a</i>) tot het snijpunt der suturen met frontale en prefrontale (<i>b</i>)..... | 52,9 mm. |
| Onderlinge afstand van (<i>b</i>)..... | 24,6 mm. |
| Afstand van (<i>a</i>) tot het snijpunt der suturen tussen nasale, maxillare en lacrymale (<i>c</i>)..... | 39,5 mm. |
| Afstand van (<i>c</i>) tot het ondereinde der onderlinge sutuur.. | 46,6 mm. |

DE SEPTOMAXILLARIA (Pl. V, VI).

Aan den onderrand van het neusgat bevinden zich twee beenderen, die, blijkbaar bij elkaar horende, hier te zamen behandeld zullen worden. Aan de voorkant grenst het voorste der twee aan het premaxillare met een naar buiten konvexe sutuur. Zijwaarts grenzen zij beide aan het maxillare, terwijl het achterste der twee aan het nasale grenst met een grotendeels naar beneden konkave sutuur. De sutuur met het maxillare is een bijna rechte lijn met een kleine uitbocht in het maxillare onder de opening van het straks te noemen kanaal. De onderlinge sutuur der twee beenderen begint aan de achterrand van deze opening, is daar eerst naar boven gericht en buigt zich daarna, als hoeklijn tussen het vlak der twee beenderen, naar binnen. De binnenrand der beide beenderen is vrij. Onder het dunne gedeelte van het maxillare (zie maxillare) staat het achterste der twee beenderen nog in verbinding met het lacrymale.

De vorm van het voorste been is min of meer ruitvormig. De twee scherpe hoeken der ruit liggen respektievelijk binnen het neusgat tegen het premaxillare en bij de buitenste opening van het kanaal. De twee stompe hoeken liggen aan het einde der sutuur tussen premaxillare en maxillare en aan het binneneinde van het achterste septomaxillare. De oppervlak te is glad doch niet plat. Het grootste, buitenste deel helt sterk

naar de mondrand en het kleine, ver naar binnen gelegen deel, is veel minder steil.

Het achterste septomaxillare is langwerpig en zijn grootste afmeting staat dwars op het mediane vlak van de schedel. Het aan het maxillare grenzende gedeelte is tevens het breedste. Ook dit oppervlak is glad. Het is naar voren konvex gebogen en het midden-gedeelte ervan vormt een bijna rechte hoek met het vlak van het voorste been. Aan de buitenkant vormen zij echter een doorlopend vlak.

In de bovenste helft van het voorste been bevindt zich een kanaal, waarvan de opening op de gezichtsvlakte reeds genoemd is. Hoe dit kanaal in het been verloopt is bij dit exemplaar niet te zien, doch wel bij een ander, dat juist voor de bestudering der septomaxillaria nodig was.

De septomaxillaria zijn reeds door de eerste onderzoekers van dit geslacht waargenomen. OWEN noemt bij de beschrijving van *latirostris* een been, dat door een voeg van het maxillare gescheiden is, doch hij voegt er bij, dat het waarschijnlijk van het lacrymale is afgebroken (2, bl. 52). Dit been nu is zeer waarschijnlijk een septomaxillare. (Zie ook OWEN'S tekening van *declivis*, 2, Pl. I, fig. 3.) HUXLEY (1, bl. 654) beschrijft ook een been onder het neusgat. Dit zou dan een zijdelingse verdikking en uitbreiding zijn van een "ethmoverine plate or nasal septum," dat reeds bij het premaxillare besproken is. Om nu het verband te vinden tussen het nasale septum en de septomaxillaria zijn deze beenderen bij het exemplaar Pal. Kat. No. 4000 blootgelegd en het blijkt nu, dat zij niet met elkander in verbinding staan. Aan de bovenrand is het septomaxillare nog 4 mm. van het nasale septum verwijderd en deze afstand wordt naar beneden snel groter. We hebben hier dus een zelfstandig been, dat op het buitenoppervlak van de schedel zichtbaar is en zich bevindt in een hoek tussen premaxillare en maxillare. Blijkbaar is het niet altijd even duidelijk van de omringende beenderen te onderscheiden want BROOM zegt in 1902 (8, bl. 176): "I can find no trace of a transpalatine element in any *Anomodont* skull, nor of an 'infranasal' bone." JAEKEL, bij de beschrijving van *Oudenodon pusillus*, zegt: "Von einem besonderen Element zwischen diesen beiden Knochen (ein Infranasale SEELEY), das auch sehr befremdlich wäre, habe ich nicht die geringste Spur gefunden." (11, bl. 178.) Kort geleden maakte WATSON daarentegen een mededeling van "a large septomaxillary, forming part of the border of the external naris and wedged in between the prefrontal, lachrymal, maxilla and premaxilla" (13, bl. 287). Zoals uit de boven omschreven begrenzing blijkt, verschilt deze vooral in dit opzicht van WATSON'S beschrijving, dat volgens hem het prefrontale aan het septomaxillare zou grenzen, terwijl dit been in het onder bespreking zijnde exemplaar door een breed uitsteeksel, tot het nasale behorend, van het prefrontale gescheiden is. Bij Pal. Kat. No. 4000 is dit uitsteeksel veel smaller. Nadat dit was neergeschreven bereikte mij BROOM'S beschrijving van *Dicynodon Kolbei*, waarin hij zegt: "There is unquestionably a septomaxillary in *Dicynodon*, and quite a large one has been found by Mr. WATSON in *Lystrosaurus*" (14, bl. 351). Verder wordt echter van dit been niets meegedeeld. Wel beschrijft hij een dergelijk been bij *Dicynodon (Oudenodon) Kolbei*: "On the posterior wall of the nostril there is a small bone which appears to be

quite distinct from both the maxilla and the nasal, and which is evidently a small septomaxillary. Hitherto a septomaxillary has not been detected in any *Anomodont*. . . ." (14, bl. 342.) Dit laatste is echter niet juist. Want, hoewel OWEN en HUXLEY de betekenis van dit been verkeerd opvatten, was het toch reeds als zelfstandig been, wel is waar onder de naam vans ub-narial bone, aan SEELEY bekend (5, bl. 237).

HUXLEY meent dat de turbinalia van *Varanus* met deze septomaxillaria vergelijkbaar zijn en wel vooral omdat zij beide dezelfde plaats tussen de omringende beenderen innemen (1, bl. 655). Van een homologie kan hier echter geen sprake zijn. Van ditzelfde been bij *Dicynodon tigriceps* OWEN, zegt SEELEY: "Its position is such as to suggest that it may be the germ of the turbinal bones of the *Mammalia*" (5, bl. 237). Als hiermee bedoeld wordt, dat er tussen deze beenderen een fylogeneties verband zou bestaan, kan ik hiermee niet meegaan. Wel komt het mij voor, dat de septomaxillaria ten dele dezelfde functies verrichtten als de turbinalia. Ik meen dit te mogen afleiden uit enkele waarnemingen aan het schedelfragment Pal. Kat. No. 4000. Bij dit stuk komt n.l. slechts één septomaxillare aan elke zijde voor. Het rechter septomaxillare is ongeveer middendoor gebroken. Daarbij is een kanaal geopend, dat dwars door het been loopt en één opening heeft aan de vrije binnenrand en één op de sutuur met het maxillare. De as van dit kanaal ligt bijna horizontaal, het binneneinde ligt slechts een weinig hoger en meer naar voren dan het buiteneinde. Bij Pal. Kat. No. 4000 is deze buitenopening breed en plat en bij het hier te beschrijven exemplaar bijna rond. Het blijkt, dat dit einde van het kanaal niet alleen op de buitenoppervlakte doch ook op de binnenoppervlakte van het maxillare uitmondt. Het traankanaal nu is tot dicht bij deze opening te vervolgen en het geheel geeft mij de indruk, dat, zo er ook al geen benige verbinding der twee kanalen is geweest, de inhoud van het ene toch gemakkelijk in het andere kon overgaan. M.a.w. het overtollige traanvocht werd niet langs de kortste weg naar de neusgang gevoerd, doch door een lang kanaal naar de onderrand en de vrije binnenrand van het septomaxillare. Het septomaxillare en de daaronder gelegen binnenwand van het maxillare werden derhalve door traanvloeistof bevochtigd en het eerstgenoemde bevochtigde dus de instromende lucht. Door zijn stand sluit het ook een groot deel van het cavum nasale af en dient dus ook tot bescherming dezer holte.

Wat de onderlinge sutuur der septomaxillaria betreft, is het zeer waarschijnlijk, dat het geen sutuur doch een barst is. Het was echter niet uit te maken en daar ze links en rechts bijna precies hetzelfde voorkomen hebben vond ik het beter de beenderen afzonderlijk te behandelen.

Afmetingen :

| | |
|--|----------|
| Lengte van de sutuur met het premaxillare..... | ±22 mm. |
| Lengte van de sutuur der beide beenderen met het maxillare..... | 27,6 mm. |
| Lengte van de sutuur van het voorste been met het maxillare..... | 17 mm. |
| Lengte van de sutuur van het achterste been met het maxillare..... | 8,6 mm. |
| Breedte van de opening van het kanaal derhalve..... | 2 mm. |

DE LACRYMALIA (Pl. V-VIII).

Dit zijn twee kleine beenderen, waarvan alleen twee oppervlakken zichtbaar zijn, daar de rest door andere beenderen bedekt is. Eén dezer oppervlakken ligt op de gezichtsvlakte en het andere, grotere, in de oogholte. Het been ligt onder het midden van de voorste helft der oogholterand.

Naar boven grenst het lacrymale aan het prefrontale. De sutuur met dit been in de oogholte loopt van boven de inkeping in het lacrymale horizontaal naar binnen tot dicht tegen de binnenrand van het prefrontale. Hier buigt zij zich recht naar beneden, naar de vrije binnenrand van het lacrymale. Op de gezichtsoppervlakte maakt deze sutuur een golvende inbochting in het prefrontale.

De sutuur met het nasale, het septomaxillare en met het maxillare is reeds bij deze beenderen beschreven. Bij het septomaxillare is aangetoond, dat dit been aan het lacrymale grenst, zodat dit laatste dus niet het neusgat bereikt.

De sutuur met het jugale is op de gezichtsvlakte een rechte lijn, die ongeveer evenwijdig is met de ribben op maxillare en premaxillare en juist onder het foramen van de ductus lacrymalis op de orbitale oppervlakte verschijnt. Hierop is zij echter reeds direkt naar achteren gericht; zij zet zich in deze richting tot bijna halfweg naar de vertikale achterwand van het jugale voort en buigt dan, een stompe hoek met het voorgaande vormend, naar binnen toe, tot bijna bij de vrije binnenrand en buigt dan naar beneden in de richting van het palatinum. Zodoende zou het lacrymale dus een lang uitsteeksel langs de binnenzijde van het jugale bezitten, dat tot bij het palatinum zou reiken. De suturen zijn hier echter niet duidelijk.

Het gezichtsoppervlak is vrij glad en vertoont geen enkele eigenaardigheid. Het orbitale oppervlak is een weinig konkaaf en glad. Het vertoont aan zijn buitenrand een grote opening (Pl. VII, VIII), die met een kanaal in verbinding staat—de ductus lacrymalis. De langste middel-lijn van dit foramen maakt een kleine hoek met de oogholterand. Van het kanaal is bij Pal. Kat. No. 4000 te zien, dat het in bijna horizontale richting naar het neuskanaal loopt en daar waarschijnlijk met het septomaxillare kanaal in verbinding staat. Boven het foramen bevindt zich op de uiterste rand van dit oppervlak een inkeping, die regelmatig op het gezichtsoppervlak overgaat.

In twee figuren van *Dicynodon* sp. heeft JAEKEL (12, bl. 190) dit been met Pn—postnasale—aangeduid. Tevens bevindt zich bij het prefrontale de letter L en wordt dit dus lacrymale genoemd. Uit bovenstaande beschrijving volgt echter, dat het been Pn het lacrymale moet zijn.

Afmetingen :

| | |
|--|--------|
| Grootste breedte van het gezichtsoppervlak (van jugale tot prefrontale)..... | 25 mm. |
| Grootste lengte..... | 18 mm. |

| | |
|--|---------|
| Afstand van de buitenrand van het foramen tot het binneneinde van de prefrontale sutuur op het oogholtevlak..... | 19 mm. |
| Grootste middellijn van het foramen..... | 7 mm. |
| Kleinste middellijn..... | 4,5 mm. |

DE JUGALIA (Pl. I-VII).

Deze beenderen liggen boven en achter de maxillaria en zij vormen het overige deel van de onderste helft van de voorrand van de oogholte; bovendien vormen zij een klein gedeelte van de onderhelft van de achterrand daarvan. Zij zijn aan de voorkant breed, vernauwen zich zeer sterk tot midden onder de oogholte, zetten zich ongeveer met de hier verkregen breedte nog een korte afstand naar achteren toe voort en spreiden zich dan uit over de binnenkant van het onderste deel van het postorbitale en het voorste deel van het squamosum. Omtrent de verbinding met de laatste twee beenderen maakt OWEN reeds melding bij *L. Alfredi* (4, bl. 52). In een vergelijking van de verhouding der jugalia tot de andere beenderen bij de *Anomodontia* zegt BROOM van het jugale van *Lystrosaurus*, dat het grotendeels bedekt wordt door het maxillare en het squamosum en dat het een uitsteeksel heeft achter het postorbitale en aan de binnenzijde van het squamosum (10, bl. 78).

De sutuur met het maxillare en het lacrymale is reeds bij deze beenderen beschreven. De sutuur met het palatinum is kort en vertoont ongeveer in het midden een scherpe, uitspringende hoek. (De sutuur aan de linkerkant is door afbrokkeling niet meer oorspronkelijk). De onderrand vormt bovendien de bovenrand van het foramen, dat toegang geeft tot de tand-alveolus.

De sutuur met het maxillare (Pl. V, VI) maakt nog op de gezichtsvlakte plaats voor de sutuur met het squamosum. Aan het vooreinde van het uitsteeksel van het squamosum zet deze de bocht in de sutuur maxillare-squamosum voort en loopt daarna, evenwijdig aan de as van de jukboog, naar achteren, tot tegen de voorste punt van het postorbitale (Pl. III, IV). De sutuur met het postorbitale is van hier af naar boven en naar achteren gericht en loopt tot bijna op de achterrand van de buitenhelft van het postorbitale (Pl. VII, VIII). Deze sutuur is nagenoeg een rechte lijn. Van hier volgt de sutuur de achterrand van het postorbitale naar beneden tot weer het squamosum bereikt wordt. De sutuur loopt nu over de binnenzijde van de jukboog naar de onderrand ervan, doch hoe dit gebeurt, is niet duidelijk te zien, daar dit gedeelte aan beide zijden talrijke barsten vertoont. De sutuur met het squamosum aan de onderrand van de jukboog (Pl. III, IV) is een naar boven en naar buiten zwak konvexe lijn, die naar voren tegen het jukbooguitsteeksel van het maxillare uitloopt.

Het gezichtsoppervlak (Pl. V, VI) van het jugale is maar heel klein. Het heeft de vorm van een rechthoek, waarvan een der twee lange zijden aan het maxillare grenst en de andere de rand van de oogholte vormt, terwijl een der korte zijden aan het lacrymale grenst. De vierde zijde bij het squamosum is wat onregelmatig. Dit oppervlak vertoont fijne

groeistrepen, die hoofdzakelijk diagonaalsgewijze van het jukbooghoekpunt aan de oogrand naar het onderste hoekpunt bij het lacrymale verlopen.

Het orbitale oppervlak (Pl. I-VI) is aan de voorkant het breedst en wordt naar achteren toe smaller, totdat het bij het postorbitale in een punt uitloopt. Het is sterk konkaaf en vormt geheel alleen de onderrand van de oogholte; te zamen met het postorbitale bovendien een deel van de achterrand van die holte. Het buigt zich geleidelijk in het gezichtsoppervlak, dat met het voorste gedeelte van het orbitale oppervlak een rechte hoek maakt. Het voorste gedeelte gaat ook geleidelijk over in het binnenoppervlak; naar voren toe wordt de scheiding der twee vlakken echter steeds scherper, zodat zij bij het postorbitale een scherpe hoek met elkaar maken. De ribbe, die zoo ontstaat, zet zich als plat uitsteeksel aan de onderzijde van het postorbitale voort. Het buitenoppervlak van het achterste gedeelte van het jugale is grotendeels bedekt door het squamosum en het postorbitale. Aan de oogholterand is slechts een heel smal, streepvormig oppervlak overgelaten, dat naar het postorbitale toe nog iets breder wordt.

Het voorste deel van het binnenoppervlak is konvex van boven naar beneden en konkaaf van voor naar achteren. Op het smalste deel van het been is het plat. Het achterste deel is door een diepe groeve in twee delen verdeeld, waarvan het onderste, tevens het grootste, achterwaarts een groot deel van het binnenoppervlak van het jukbooguitsteeksel van het squamosum bedekt, terwijl het bovenste, het kleinste, hetzelfde doet met het ondervlak van het postorbitale. De vlakken van deze platte uitsteeksels maken ongeveer een rechte hoek met elkaar, terwijl het onderste, te zamen met het uitsteeksel van het squamosum, naar binnen ongeveer 45 graden helt. Dit deel heeft bovendien nog een lange, smalle ondervlakte, die de binnen-onderzijde van het uitsteeksel van het squamosum bedekt. Het onderste uitsteeksel strekt zich uit tot voorbij de achterrand van het postorbitale. Overigens zijn de oppervlakken der uitsteeksels glad.

Afmetingen:

| | |
|--|---------|
| Lengte van de sutuur met het maxillare op het gezichts- vlak..... | 21 mm. |
| Lengte van de sutuur met het lacrymale op het gezichts- vlak..... | 8,5 mm. |
| Afstand van de onderrand van de opening van het traan- kanaal tot het achtereinde van het been..... | ±68 mm. |
| Lengte van de voorste sutuur met het postorbitale..... | ±37 mm. |
| Grootste breedte van het been..... | ±42 mm. |
| Kleinste afmeting van het been (voor het postorbitale).. | 8,7 mm. |

DE PREFRONTALIA (Pl. I, II, V-VIII).

Deze twee beenderen vormen de bovenrand van de gezichtsvlakte en de voorrand van het bovenvlak van de schedel. Bovendien vormen zij een groot gedeelte van de boven-voorrand en de boven-voorwand van de oogholte. Hun algemene vorm is moeilijk te definiëren. Zij lijken

veel op wat in de kristallografie een sfenoid wordt genoemd en de oogholterand van het been zou dan overeenkomen met een der ribben, die in dit lichaam de vertikale as snijdt.

De suturen met nasale en lacrymale zijn reeds bij deze beenderen besproken. De sutuur met het frontale op het bovenoppervlak (Pl. I, II) is vanaf de sutuur met het nasale een bijna rechte lijn, die nabij de oogholterand naar deze toe buigt. Op het oogholteoppervlak (Pl. V, VI) is het een zigzaglijn, die in 't algemeen naar binnen en naar achteren gericht is. Zodra de sutuur over de binnenrand van het oogholtedak heen is, buigt zij zich weer naar voren en blijft ook in de diepe holte tussen deze rand en de meer naar binnen gelegen ribbe op het ondervlak van het frontale, evenals in de groeve tussen de twee ribben der frontalia, naar voren gericht. Het gedeelte in de groeve is sutuur tussen nasale en frontale. De onderlinge sutuur der nasalia op het ondervlak is evenals die op het bovenvlak een kort, recht lijntje. De sutuur van prefrontale en nasale buigt af van die met het frontale, voordat de hoogte der frontale ribbe wordt bereikt. Haar algemene richting is naar voren en naar buiten. Deze sutuur is echter niet duidelijk te vervolgen.

Het gezichtsoppervlak (Pl. I, II, V, VI) is zeer zwak konkaaf en glad. Het bovenvlak is eveneens glad. Deze vlakken ontmoeten elkaar in een dikke, breed-afgeronde ribbe, die het onderscheidene kenmerk van het geslacht is en die van de oogholterand zich voortzet tot de reeds genoemde knobbel van het nasale. Ook het prefrontale vormt hier een extra verdikking. Deze knobbel vormt met de verhoogde sutuur tussen nasale en prefrontale een ribbe, die met de ribbe op de andere zijde naar achteren konvergeert. Van een dergelijk verschijnsel wordt alleen nog melding gemaakt door HUXLEY bij de beschrijving van *L. Murrayi* (1, bl. 651): "Each of the converging ridges (de brede ribben) exhibits a thickening rather internal to its middle, which is continued for a short distance obliquely inwards." De ronding van de brede ribbe lijkt mij meer ontstaan door afbrokkeling; oorspronkelijk moet die ribbe scherper zijn geweest. Als dit zo is, zou het bovenvlak, dat nu plat te noemen is, konkaaf zijn geweest en dan ook overeenkomen met de vorm van dit vlak, zoals door OWEN bij *L. Alfredi* beschreven (4, bl. 52).

Dicht langs de sutuur met het frontale, richt het bovenvlak zich steil op, zodat de sutuur hoog boven het vlak verheven is. De andere zijde der sutuur is niet steil en daardoor geeft het geheel de indruk of deze sutuur-ribbe naar het prefrontale overhangt. Deze ribbe is dus evenwijdig aan de brede ribbe op het prefrontale.

Beide besproken vlakken ronden aan de oogholterand af in een ongeveer vertikaal staand smal vlakje (Pl. V-VIII). Deze ronding is echter m.i. niet oorspronkelijk. Van wat men bij de bewerking van andere exemplaren ziet, meen ik te moeten opmaken, dat genoemd vlakje de twee andere vlakken in een scherpe rand ontmoet en dat deze rand vooral ook scherp is waar de brede ribbe de oogholterand bereikt. Bij het lacrymale is dit vertikale vlakje eigenlijk een scherpe rand. Naar boven toe wordt deze breder en ten slotte vlak. De grootste breedte ligt daar, waar de brede ribbe de oogholterand bereikt. Voor de sutuur met het frontale vertoont dit vlakje twee groeven, die het bovenvlak met het oogholtevlak verbinden.

Aan het linker prefrontale zijn er nog een viertal dergelijke groeven, die het gezichtsvlak met het oogholtevlak verbinden. Aan het rechter frontale zijn deze waarschijnlijk door afbrokkeling verloren gegaan. Dit vlakje ontmoet het oogholtevlak in een scherpe ribbe.

Het oogholtevlak is sterk konkaaf en glad.

Het ondervlak van het prefrontale vormt een zeer diepe holte. Deze holte begint op het nasale en is daar betrekkelijk vlak en breed. Zodra echter de prefrontale sutuur overschreden is, vernauwt de groeve zich sterk en verdiept zich tevens in een zodanige richting, dat de buitenwand iets over de groeve hangt. In deze toestand gaat zij over op het frontale. Overigens is dit oppervlak glad.

Afmetingen :

| | |
|--|--------------|
| Lengte van de sutuur met het frontale op het schedeldak | 37 mm. |
| Grootste afstand der sutuur met het lacrymale tot de sutura met het frontale aan de oogholterand..... | 41 mm. |
| Lengte der sutuur met het frontale op het oogholtevlak.. | ± 30 mm. |
| Grootste diepte der groeve op het ondervlak..... | 12 mm. |

DE FRONTALIA (Pl. I-VIII).

De frontalia vormen het grootste gedeelte van het bovenvlak van de schedel. Hun gezamenlike vorm is die van een vijfhoek, waarvan twee zijden en de basis lang zijn. De twee lange zijden grenzen aan de frontalia en de hoek die zij insluiten dringt in tussen de nasalia. De twee korte zijden liggen boven de oogholten. De basis is meer denkbeeldig en werd genomen van de knobbels bij de postfrontalia over het vooreinde van het preparietale. De genoemde punten behoren wel tot de frontalia, maar daartussen zendt elk frontale nog een puntig uitsteeksel naar achteren (zie Fig. 2).

De suturen met prefrontale en nasale zijn reeds besproken. Die met postfrontale en parietale worden bij deze beenderen behandeld. De sutuur met het preparietale op het bovenvlak is in het algemeen een halve cirkel. (Pl. I, II, VII, VIII en Fig. 2.) Het is echter geen eenvoudige lijn, doch een vrij sterk golvende meander. Op het ondervlak is deze sutuur veel onregelmatiger; de algemene vorm is geen cirkel meer te noemen en er vertoont zich nog slechts een enkele slingering. De onderlinge sutuur is een rechte lijn. Deze begint aan het bovineinde van de onderlinge sutuur der nasalia en eindigt aan het vooreinde van het preparietale. Zij vertoont geen, zelfs geen fijne, slingeringen. De onderlinge sutuur op het ondervlak heeft dezelfde eigenschappen.

Het bovenvlak der frontalia (Pl. I, II, VII, VIII) is aan de randen en langs het voorste gedeelte der onderlinge sutuur vrij glad. Overigens, d.w.z. hoofdzakelijk achter het midden is het zeer ruw. De ruwheid bestaat grotendeels uit een verheffing van een deel van het oppervlak boven de randen en het midden en wel in de vorm van een U met de open kant naar voren. De achterrand van deze U bevat een gedeelte van de sutuur met het preparietale. Het oppervlak tussen de benen der U is ook grotendeels ruw, doch het ligt in een lager niveau dan deze. Aan de buitenzijde,

doch vooral aan de voorkant der U-benen, bevinden zich een aantal putten, die waarschijnlijk in verband staan met kanalen in het been. De breedte der U-benen is ongeveer een derde van de breedte van elk frontale. Zij eindigen iets voor een lijn, die de sutuureinden met de prefrontalia aan de oogholterand met elkaar verbindt. Vooral aan de voorkant vormt het bovenvlak een ribbe, waarop de onderlinge sutuur ligt. In het midden is deze ribbe het meest geprononceerd. Volgens HUXLEY (1, bl. 651) komt bij *L. Murrayi* ook een dergelijke ribbe voor. Of deze bij andere over het hoofd gezien of in 't geheel niet aanwezig is, kan niet worden uitgemaakt. Aan OWEN's figuur van *L. declivis* (2, Pl. 1, fig. 5) schijnt deze aanwezig te zijn, hoewel de beschrijving er niets van geeft. Wel wordt deze ribbe genoemd in de beschrijving van *L. Alfredi* (4, bl. 51), en is zij bovendien zichtbaar in de figuren van *declivis* en *latirostris* in dezelfde publikatie.

Aan de oogholterand gaat het bovenvlak met een scherpe rand over in een smal zijvlakje (Pl. V-VIII), dat de achterwaartse voortzetting is van het zijvlakte van het prefrontale. Dit vlakje gaat op zijn beurt weer met een scherpe rand over in het oogholtevlak.

Het oogholtevlak (Pl. III-VI) is smal, glad en een weinig konkaaf. Zijn grootste afmeting is ongeveer evenwijdig met de sutuur met het prefrontale in de oogholte.

Het ondervlak heeft een groeve in het midden, die de voortzetting is van een brede groeve in het midden der beide nasalia. Naar achteren wordt deze groeve steeds smaller. Voordat het preparietale bereikt wordt rijst de bodem dezer groeve vrij snel op in een gedeelte van het ondervlak, dat, voor het preparietale gelegen, in hetzelfde niveau ligt als het ondervlak van dit been. De groeve wordt op zijde begrensd door twee naar achteren konvergerende ribben. Deze beginnen zeer breed op het achterste gedeelte van het nasale en het binnenste gedeelte van het prefrontale. Naar voren toe worden zij snel smaller en scherper en daar, waar de bodem der centrale groeve opstijgt, eindigen zij tegen het verhoogde gedeelte van het ondervlak. De bij de prefrontalia reeds genoemde, aan de buitenzijde der genoemde ribben zich bevindende diepe groeven, zetten zich ook op de frontalia voort. Zij worden dan heel snel smaller en hun bodem rijst ook dadelik zo sterk, dat de groeven reeds ophouden voor het einde der binnenste ribben. De ribbe, die op het prefrontale deze groeve aan de buitenzijde begrenst, zet zich ook voort op de frontalia. Van af het punt echter, waar de groeve ophoudt, eindigt ook haar geprononceerd karakter. Zij zet zich dan nog als een lage, zwakke ribbe langs de buitenzijden van het ondervlak voort tot achter op het been en staat daar in verbinding met het uitsteeksel van het parietale. Voor het ondervlak van het preparietale ligt een gedeelte van het ondervlak der frontalia (hierboven reeds genoemd) nagenoeg in het zelfde niveau als het eerstgenoemde. Op zij wordt het begrensd door de genoemde, lage ribben en naar voren buigt he af om respectievelijk over te gaan in de genoemde drie groeven en twee ribben. In het midden heeft het een smal groefje, waarin de onderlinge sutuur ligt en aan weerskanten hiervan een kleine verhevenheid. Tussen deze en de buitenste ribbe ligt nog een zwakke depressie.

Afmetingen :

| | |
|---|----------|
| Lengte der onderlinge sutuur op het bovenzvlak..... | 59,3 mm. |
| Lengte der zijvlakjes..... | ±22 mm. |
| Onderlinge afstand der vooreinden der zijvlakjes..... | 81 mm. |
| Onderlinge afstand der achtereinden der zijvlakjes..... | 66,6 mm. |
| Dikte der frontalia direkt voor het preparietale..... | 21 mm. |

DE POSTFRONTALIA (Pl. I-VIII en fig. 1).

Over de vorm dezer beenderen kan maar weinig worden gezegd, daar zij hoofdzakelijk tussen andere beenderen verscholen liggen. Zij bevinden zich juist daar, waar de bovenrand van de oogholte een inspringende hoek maakt en overigens vooral tussen het postorbitale en het frontale. De eerste mededeling omtrent een been tussen het postorbitale en het frontale werd gedaan door SEELEY in 1898 bij *L. platyceps*. Hij noemde het een

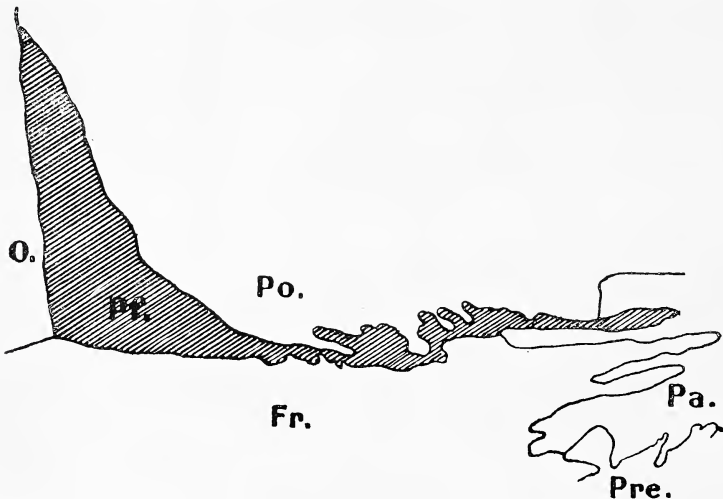


Fig. 1. Schets van de suturen om het rechter postfrontale en van de sutuur tussen frontale en parietale op het bovenzvlak. (Bijna 2,5×).

Fr. = frontale; O. = oogholte; Pa. = parietale; Pf. = postfrontale;
Po. = postorbitale; Pre. = preparietale.

postorbitale en beschouwde het meer als een deel van zijn postfrontale dan een zelfstandig been (7, bl. 171 en 172). In 1903 gelukte het nu aan BROOM dergelijke beenderen bij *latirostris* aan te tonen. Hij zegt daarvan (9, bl. 4): "These are very similar to those figured by SEELEY in the skull of *Mochlorhinus platyceps* (l.c.) and regarded by him as postorbitals. But as it has been customary to regard the anterior and upper of the two bones behind the orbit, as the postfrontal and the posterior, the postorbital, we must look upon the narrow bone as the true postfrontal and the large bone which has hitherto been looked upon as the postfrontal as really the postorbital." Kort geleden beschreef BROOM weer duidelijke postfrontalia bij *Oudenodon Kolbei* (14, bl. 343).

De sutuur met het frontale op het bovenzvlak (Pl. I, II, VII, VIII, en fig. 1) is een bochtige lijn, die hier en daar kleine slingeringen vertoont.

Zij loopt van de hoek in de oogholterand tot het vooreinde van een zeer dun uitsteeksel van het parietale, waar de sutuur met dit been begint. Bij de oogholterand ligt zij op een knobbelvormige, hoge verhevenheid, die grotendeels gevormd wordt door het frontale, zodat de sutuur meer op de buitenzijde der verhevenheid ligt. De lengte dezer verhevenheid is meer dan twee derden van de gehele lengte der sutuur.

De sutuur met het parietale wordt daar besproken. De sutuur met het postorbitale op het bovenzvlak is hoofdzakelijk een meandersutuur (zie Fig. 1). Beginnende bij het parietale, ligt zij in het verlengde der sutuur met dit been en zet zich nog even aan de binnenzijde van de postorbitale ribbe voort om daarna deze ribbe te verlaten en dwars over te steken naar de verhevenheid, die de sutuur met het frontale draagt. Aan de onder- en buitenzijde van deze ribbe buigt de sutuur zich weer naar buiten en gaat ten slotte over de postorbitale oogholterand op het orbitale vlak over. Van af het parietale tot waar de sutuur naar de postorbitale rand afbuigt, loopt zij zo dicht langs de sutuur met het frontale, dat het soms moeilijk is de twee suturen uit elkaar te houden; zie fig.

Op het oogholtevlak (Pl. III-VI) is de sutuur met het postorbitale een lijn, die slechts weinige slingeringen vertoont en in hoofdzaak aan de voorkant van het postorbitale blijft. Het meest naar binnen gelegen deel gaat slechts even over de onderrand van het postorbitale heen naar de plaats, waar de korte sutuur met het parietale zich bevindt; deze buigt zich direkt weer over de genoemde rand terug en loopt dan met vele bochten naar de plaats, waar de sutuur met het frontale begint. Laatstgenoemde zet zich in 't algemeen evenwijdig aan de ribbe op het ondervlak van het frontale naar voren toe voort, tot ongeveer zover als waar de grote centrale groeve van het ondervlak der frontalia begint; dan buigt zij zich in een grote, aan de voorkant konvexe boog naar de hoek in de bovenrand van de oogholte.

Uit het voorgaande volgt reeds, dat het bovenzvlak zeer smal is. Naar voren toe wordt het plotseling breder, doch gaat dan direkt daarna over in een smal voorvlakje (Pl. I, II, V, VI), dat bijna vertikaal staat en overeenkomt met de zijvlakjes van frontale en prefrontale. Dit vlakje is even breed als genoemde andere vlakjes en vormt een vrij groot deel van de postorbitale oogholterand. Het maakt met het zijvlakje van het frontale een bijna rechte hoek. Met het oogholtevlak vormt het een scherpe rand.

Het oogholtevlak vertoont talrijke, fijne groeistrepen, die uitgaan van een punt dichtbij het frontale gelegen; overigens is het glad. Het is ongeveer half zo breed als lang en dus veel breder dan het bovenzvlak.

Afmetingen :

| | |
|---|----------|
| Rechte afstand van het achtereinde van het bovenzvlak tot waar de sutuur van het ondervlak in de hoek van de oogholterand begint..... | 31,7 mm. |
| Algemene breedte van het bovenzvlak..... | 2 mm. |
| Lengte van het voorvlakje..... | 16 mm. |
| Grootste lengte van het oogholtevlak..... | 34,5 mm. |
| Grootste breedte van het oogholtevlak..... | 14 mm. |

DE POSTORBITALIA (Pl. I-VIII).

Dit zijn lange, dunne beenderen, die, van de laterale uitsteeksels der squamosa (bij de parietalia), reiken tot de onderrand der oogholte en dus tot dichtbij de jukbooguitsteeksels der maxillaria. Zij leggen zich aanvankelijk met een grote, naar voren konvexe bocht tegen de buitenwand van postfrontalia, parietalia en van de laterale uitsteeksels der squamosa. Daarna buigen zij zich met een naar voren konkave bocht van de achterwand der postfrontalia naar de voorwaarts gerichte uitsteeksels der squamosa. Zij vormen zo de binnen- en voorrand der slaapholten en de achterrand der oogholten. Deze randen zijn derhalve vrij. Vroeger werden deze beenderen algemeen postfrontalia genoemd, doch sinds BROOM de werkelijke postfrontalia vond (zie daar), kunnen zij nog slechts als postorbitalia beschouwd worden.

De sutuur met het jugale en het postfrontale is reeds bij deze beenderen beschreven. Die met het parietale zal daar worden behandeld. De sutuur met het naar voren gerichte uitsteeksel van het squamosum heeft de vorm van een cirkelboog en is overigens een eenvoudige lijn.

Op de parietalen kam, ongeveer tegenover het achtereinde der onderlinge sutuur der parietalia, begint de sutuur met het laterale uitsteeksel van het squamosum (Pl. I, II, VII, VIII). Deze loopt vrijwel evenwijdig aan de suturen van het parietale uitsteeksel tot ongeveer tegenover de plaats waar dit uitsteeksel ophoudt. Vandaar vormt het vervolg der sutuur een scherpe hoek met het voorgaande. De sutuur buigt n.l. ineens als een rechte lijn over het uitsteeksel van het squamosum terug naar de sutuur met het parietale op het ondervlak. Hieruit blijkt dus, dat het parietale einde van het postorbitale een groot deel van het zijdelingse uitsteeksel van het squamosum bedekt. Dat dit het geval is blijkt niet uit SEELEY's beschrijving van *L. platyceps*, waarbij hij echter wel aangeeft, dat het postorbitale zich tegen de parietalia aanlegt (7, bl. 171). BROOM geeft het wel aan bij *Oudenodon (Dicynodon) Kolbei* (14, bl. 345) en in een vroegere beschrijving van *O. trigoniceps* (Rec. Albany Mus., Vol. 1, Part II, 1904). Ook blijkt deze verhouding uit zijn tekening van *L. Mc. Cavigi* SEELEY (9, Pl. I, fig. 3).

Het boven- en voorvlak van het gedeelte, dat aan het naar voren gerichte uitsteeksel van het squamosum grenst (Pl. I, II, V-VIII), is aanvankelijk plat, doch krijgt al heel spoedig, lang voor het jugale ophoudt, een verhevenheid, die iets naar voren van het midden ligt en die naar boven toe zo krachtig wordt, dat het voorvlak reeds ver voor het postfrontale, gescheiden is in een oogholtevlak en een boven-buitenvlak. De hiertussen gelegen ribbe zet zich tot tegen de sutuur met het postfrontale voort en is te beschouwen als een voortzetting van het smalle voorvlakje van dit been. Dit gedeelte van het postorbitale is bedekt met talrijke groeistrepen, die van het vooreinde naar boven toe een weinig konvergeren en waarvan er vele zich van het bovenbuitenvlak over de pas besproken ribbe op het oogholtevlak begeven. Dit gedeelte van het been heeft ook nog een ondervlak, dat aanvankelijk bedekt wordt door het jugale, naar binnen toe smaller wordt en langs het parietale ten slotte in een punt uitloopt. Met het oogholtevlak vormt het een scherpe rand, die zich naar binnen toe voortzet tot achter het postfrontale. Het boven-buitenvlak

buigt zich nog voor het postfrontale over in het achtervlak, terwijl er daar, ongeveer op de grens van de twee een kleine, knobbelvormige verhevenheid ligt. Het achtervlak is aanvankelijk breed, wordt echter naar achteren toe smaller. Het rondt regelmatig af in het ondervlak. Nabij de bovenrand loopt, als voortzetting van de parietale kam, een zwakke ribbe, die, van af het vooreinde van het parietale, zich van de sutuur afwendt en bijna rechthoekig verloopt naar de plaats waar de sutuur met het postfrontale op het bovenvlak zich op het voorvlakje begeeft. Deze ribbe wordt duidelijk beschreven door OWEN bij *declivis* (2, bl. 49): “. . . the sides of the notch (de parietale kammen) being continued forward and gradually subsiding on the parietal plane as they curve outward to the postfrontals.” Het achtervlak is voorzien van zwakke strepen, die in het midden van het been van het ondervlak uitgaan en achterwaarts steeds tegen de bovensutuur uitloopen. Het gedeelte direkt achter het voorvlakje van het postfrontale vertoont geen strepen doch fijne putjes.

Afmetingen :

| | |
|---|----------|
| Afstand van het achtereinde tot het vooreinde..... | 92,5 mm. |
| Grootste breedte van het been..... | ±23 mm. |
| Grootste breedte boven het einde van het jugale..... | 13 mm. |
| Grootste dikte boven het einde van het jugale..... | 8,5 mm. |
| Lengte van de sutuur met het vooreinde van het squamosum..... | ±23 mm. |
| Onderlinge afstand der vooreinden der beide beenderen.. | 138 mm. |
| Idem der achtereinden..... | 51 mm. |

HET PREPARIETALE (Pl. I, II, VII, VIII, en Fig. 2).

Dit been wordt begrensd door het foramen parietale, de naar voren gerichte uitsteeksels van de parietalia en de frontalia met hunne naar achteren gerichte uitsteeksels. Omtrent de vorm van het been kan alleen worden gezegd, dat, daar het bovenvlak groter is dan het ondervlak en de afstand dezer vlakken de grootste afmeting van het been is en beide vlakken een min of meer cirkelvormige gedaante hebben, deze in het algemeen te vergelijken is met een afgeknotte kegel, waarvan de top naar beneden gekeerd is en de as ongeveer vertikaal staat.

De eerste opmerking omtrent een dergelijk been vind ik bij HUXLEY (3, bl. 11), die het eerst bij een Indische vorm en toen bij *L. murrayi* aantrof. Daarna noemt SEELEY het eerst parietale (5, bl. 231). Bij de beschrijving van *L. platyceps* beschrijft en noemt hij een duidelijk preparietale (7, bl. 170), dat hartvormig is en de punt naar achteren keert. In 10, bl. 79 vergelijkt BROOM het preparietale van verschillende *Anomodontia*. Van *Lystrosaurus* noemt hij alleen dat van SEELEY's *platyceps*. JAEKEL (12, bl. 182) noemde dit been kort geleden bij *Oudenodon* parietale, doch geeft geen naam aan wat hier parietalia zijn genoemd.

De sutuur op het bovenvlak is bijna een volkomen cirkel (zie echter Fig. 2). De helft van deze cirkel ligt tussen frontalia en preparietale, de andere helft tussen dit been en de parietalia. Slechts bij het foramen parietale is de sutuur op het bovenvlak onderbroken. De sutuur met de frontalia is reeds besproken en die met de parietalia zal daar worden behandeld.

Het bovenzvlak is vrij glad, het vertoont alleen aan de voorrand van het foramen parietale twee naar achteren konvergerende groefjes, die gescheiden worden door een kleine verhevenheid aan het vooreinde van het foramen en ter zijde begrensd worden door de verhevenheden waarop de suturen met de parietalia liggen. Deze groefjes verenigen zich zodra zij in het foramen overgaan. Overigens is het bovenzvlak vrij sterk konkaaf in een richting van voor naar achteren en zwak konkaaf in een richting loodrecht hierop (Pl. I, II). Van de hoge achterrand der frontalia helt n.l. het voorste gedeelte van het bovenzvlak vrij sterk naar achteren met regelmatig verminderende helling, terwijl het achterste gedeelte daarentegen naar het foramen toe weer een weinig stijgt.

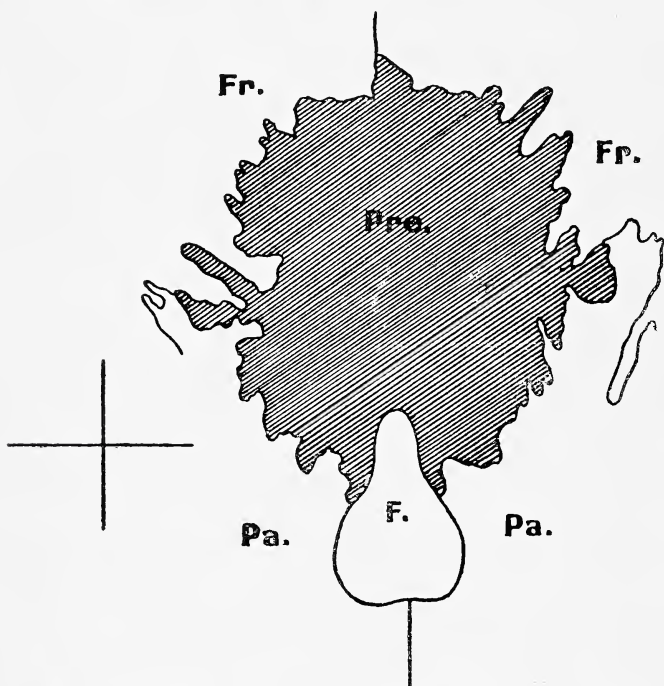


Fig. 2. Schets van de suturen om het preparietale op het bovenzvlak.

(Bijna 2,5 ×).

F. = foramen parietale; Fr. = frontale; Pa. = parietale;

Pre. = preparietale.

Het foramen heeft aan de oppervlakte een peervormige gedaante, met het nauwe gedeelte naar voren gericht en een plat basis deel naar achteren, welke vorm het naar beneden slechts nog even blijft behouden om over te gaan in een doorsnede, waarvan zoowel de voorrand als de achterrand een meer regelmatige ronding heeft. Deze ovaalvormige doorsnede blijft tot op het ondervlak behouden. De peervormige punt nu wordt gevormd door een sterk ingebogen oppervlakje van het preparietale, dat zich naar beneden toe plotseling vernauwt en zich als een smal strookje tot voorbij het midden van het foramen voortzet, vanwaar het zich weer begint te verbreden om over de rand van de binnenopening op het ondervlak over te gaan.

Het kleine ondervlak is zwak konvex in een richting van voor naar achter en zwak konkav in een richting loodrecht daarop. De voorrand van het vlak ligt daarbij nog nagenoeg in het niveau van het ondervlak van de frontalia, doch naar achteren beginnen het midden van het vlak en daarna ook de zijanten steeds sterker naar het bovenzvlak te buigen tot het foramen bereikt wordt, waar met het reeds besproken foramen-vlakje een duidelijke rand gevormd wordt. Overigens is het ondervlak glad.

Afmetingen :

| | |
|--|----------|
| Grootste breedte van het bovenzvlak..... | 22,9 mm. |
| Rechte afstand van het achterste der onderlinge sutuur der frontalia tot het achterste punt der sutuur met de parietalia op het bovenzvlak (lengte)..... | 21,3 mm. |
| Lengte van het ondervlak..... | ±12 mm. |
| Breedte van het ondervlak..... | ±12 mm. |
| Diepte van het foramen..... | ±17 mm. |
| Lengte van het foramen op het bovenzvlak..... | ±10 mm. |
| Breedte van het foramen op het bovenzvlak..... | 7 mm. |

DE PARIETALIA (Pl. I, II, VII, VIII).

De vertikale en lengte uitbreiding dezer beenderen is veel groter dan hun breedte, doordat zij naar voren, naar achteren en naar beneden grote uitsteeksels ontwikkeld hebben. Het naar voren gerichte deel (Pl. I, II) is smal en diep, omsluit het achterste gedeelte van het foramen parietale en stoot tegen het preparietale, het frontale, het postfrontale en het post-orbitale. Het eindigt juist tegenover het midden van het preparietale. Het naar beneden gerichte deel strekt zich nog eens zo ver uit als het onderste oppervlak van het preparietale. De onderste rand hiervan is dun, doch het been wordt naar boven toe snel dikker, zoodat de beide parietalia zich nog beneden het onderste vlak van het preparietale verenigen. Het voorste, naar achteren en beneden gerichte gedeelte van de onderrand van dit uitsteeksel is verbonden met het verbrede bovineinde van het columellare. Het achterste gedeelte van deze rand staat in verbinding met het voorvlak van het supraoccipitale. Het achterste uitsteeksel is lang, breed en zeer dun. Het bevindt zich in de naar buiten hellende parietale rand. SEELEY (5, bl. 230) beschrijft de parietalia van *L. microtrema* als hoofdzakelijk uit deze uitsteeksels bestaand. Hij beschouwt ze niet als de echte parietalia, doch overeenkomende met de parietalia der hogere *vertebraten*. Een been vóór het parietale foramen, blijkbaar het preparietale, beschouwt hij als eigenlijk parietale. Hoofdzakelijk wordt dit uitsteeksel aan de buitenzijde bedekt door het naar binnen gekeerde, laterale uitsteeksel van het squamosum; bij de oorsprong van het uitsteeksel in kwestie echter krijgt het postorbitale nog een kleine gelegenheid aan deze bedekking mee te doen. Aan de binnen- of achterzijde wordt het aan de voorkant bedekt door het interparietale, terwijl de achterste helft bedekt wordt door het tabulare (Pl. VII, VIII). De bedekking door dit been is niet altijd bespeurd en erkend. OWEN beschouwt het achtervlak

van de kam eenvoudig als het achtervlak van het parietale uitsteeksel (2, bl. 50) en dezelfde mening is LYDEKKER toegedaan (6, bl. 11 en 34). SEELEY daarentegen vindt hier zelfstandige beenderen, die hij epiotica noemt (zie tabularia). COPE noemt ze opisthotica. Bij geen enkele andere onderzoeker vind ik hieromtrent iets aangegeven. In verband met de bedekking door het squamosum haal ik even aan wat HUXLEY daaromtrent zegt van *L. Murrayi*: "The parietal process, whose end is rather more than two inches from the centre of the bone, passes in front of, and overlaps the inward process of the squamosal." (1, bl. 653). Daar echter in onze schedel, zoals hierboven uiteengezet, het laterale uitsteeksel van het squamosum voor het parietale komt, schijnt het mij toe, dat bij *Murrayi* een deel van het postorbitale voor parietale gehouden is, want bij *latirostris* en de *Anomodontia* in 't algemeen ligt dit wél voor het squamosum.

De bovenste sutuurlijn met het preparietale is meandervormig (zie Fig. 2); die met het frontale eveneens, doch hier zijn de slingeringen weinig maar zeer krachtig, zodat de sutuurzone hier meer dan 1 cm. breed is (zie Fig. 1). De grens met het postfrontale wordt gevormd door een langgerekte, zeer smalle, inspringende bocht, waarvan de binnenzijde en het achterste gedeelte van de buitenzijde tussen parietale en postfrontale liggen, terwijl de naar voren gerichte voortzetting ervan tussen postfrontale en postorbitale ligt (zie Fig. 1). Het punt, waar de aanraking met het postfrontale ophoudt en die met het postorbitale begint, ligt ongeveer in een loodlijn op het mediane vlak, getrokken door het vooreinde van het foramen parietale. Van hier is de sutuur met het postorbitale en het squamosum een min of meer konstant gebogen lijn, die zich eerst aan de buitenkant van de parietale rand bevindt, doch ongeveer in het midden er over heen gaat en dan aan de binnenzijde ervan te vinden is. Deze lijn loopt door tot voorbij het midden van het tabulare en keert dan terug ongeveer evenwijdig aan zichzelf en zeer nabij het voorgaande gedeelte. Vervolgens buigt zij langs de bovenrand van het interparietale in de grote diepte tussen de parietale randen af en vertoont zich op de kleine rug in het midden dezer diepte als een slingerende sutuur (Pl. VII, VIII). De sutuur door HUXLEY van dit gedeelte van *L. Murrayi* beschreven, wijkt hier sterk van af (1, bl. 653). Hij noemt een opening van een kwart duim breedte tusschen het "occipital-bone" (het interparietale) en de parietalia. Deze opening komt goed overeen met een barst van 1 mm. breedte dwars over de mediane ribbe van het interparietale van ons exemplaar en is dus waarschijnlijk ook een barst. Uit de tekening Pl. XXIII, fig. 2, blijkt, dat de barst dwars over het interparietale loopt en lager ligt dan bij ons exemplaar. Op de genoemde, straks verder te bespreken rug bevindt zich de onderlinge sutuur der beide parietalia. Dit is een lijn met zeer kleine bochtjes, die echter bij het ingaan van het foramen parietale verdwijnen. OWEN zegt, dat er geen spoor is van een onderlinge sutuur der parietalia en deze dus één been vormen. BROOM meent, dat OWEN tot deze veronderstelling kwam, omdat hij geen sutuur vond waar het preparietale gelegen is. De genoemde rug komt blijkbaar niet bij alle soorten op gelijke wijze voor. Volgens SEELEY (7, bl. 170) is er bij *L. platyceps* slechts een kleine verdikking aan het achtereinde der onderlinge sutuur.

De sutuur met het preparietale op het ondervlak is zeer kort. Spoedig treedt de sutuur met het frontale op, die eerst dwars over de onderrand van parietale-frontale loopt en dan ineens naar voren buigt. De sutuur met het postfrontale begint hier zover naar voren, dat de lijn, die de beide beginpunten verbindt, de onderlinge sutuurlijn der frontalia snijdt en dus nog vóór het ondervlak van het preparietale voorbij gaat. Dit komt ook door de geringe uitbreiding van het ondervlak van het preparietale. Van dit punt nu is de sutuur naar achteren te vervolgen tot op de rug tussen postfrontale en parietale. Achter deze rug loopt de sutuur nog een weinig naar buiten en verloopt onder de buitenrand van het postorbitale naar het squamosum. De sutuur met dit been vormt een scherpe hoek, een spits oppervlak van het parietale insluitend, daar dit het squamosum binnendringt. Het bovenste been van dezen hoek is het vervolg van de sutuur met het postorbitale en helt naar beneden. Het onderste been helt ook nog een weinig naar de zelfde kant, doch buigt ten slotte in de diepe put tussen squamosum en supraoccipitale en vormt hierin de grens tussen deze beenderen. Van hier gaat de sutuur nog een kleine afstand naar beneden om dan achter het onderste uitsteeksel van het parietale in de ruimte te buigen door deze twee uitsteekfels begrensd. De verbinding met de onderlinge sutuur in het foramen parietale is hier echter bedekt.

Het zichtbare oppervlak der beide parietalia aan de boven- en achterkant van de schedel vormt aan de buitenkanten een verheven rand, die grotendeels de voortzetting is van de postorbitale rand en naar achteren toe meehelpt om de parietale kammen te vormen. Hierop vormt het oppervlak slechts een zeer smal reepje. Van deze rand nu helt het oppervlak sterk naar binnen tot nabij het midden, waar het een kleine rug vormt, die zich van het midden van het foramen parietale tot het interparietale uitstrekt. Op de naar voren gerichte uitsteekfels vindt men nog de voortzetting van een klein groefje tussen frontale en postfrontale; aan de binnenzijde hiervan vindt men eerst nog een verhevenheid langs de sutuur met het frontale, dan een klein groefje en ten slotte een verdikking langs de sutuur met het preparietale. Het benedenoppervlak en de zijoppervlakken zijn glad.

Afmetingen :

| | |
|--|----------|
| Afstand van het achtereinde der onderlinge sutuur tot de snijpunten der suturen van parietalia, frontalia en preparietale..... | 29,6 mm. |
| Afstand van het achtereinde der onderlinge sutuur tot het einde van het bovenvlakje op het achterwaartse uitsteeksel..... | 39,9 mm. |
| Lengte der onderlinge sutuur..... | ±9 mm. |
| Kleinste breedte van het bovenvlak..... | 17,5 mm. |

HET INTERPARIETALE (Pl. I, II, VII, VIII).

In de bovenhoek, van het achterhoofd en hoofdzakelijk tussen de twee parietale randen bevindt zich dit, alleen een achtervlak tonende been. Langs het midden is het nagenoeg plat, doch zijwaarts bezit het aan de

binnenzijde der parietale kammen twee platte uitsteeksels. Het doet niet mee aan de begrenzing van het foramen magnum. Dit been werd vooral door OWEN supraoccipitale genoemd (2, bl. 50, 4, bl. 49, 51, enz.). OWEN zegt echter (1 c.), dat hij geen sutuur vond tussen het parietale en het supraoccipitale en dat hij door vergelijking er toe gebracht is, het onderste deel van dit been als supraoccipitale te beschouwen. Waarschijnlijk was zijn bedoeling het bovenste deel dan aan "het parietale" toe te schrijven. HUXLEY (1, bl. 653) schrijft het deel van het interparietale, boven een als sutuur genoemde barst gelegen, toe aan het parietale, waardoor dit been dan een driehoekig kaudaal vlak krijgt; het onder deze barst gelegen deel rekent hij tot het supraoccipitale. HUXLEY onderscheidde het interparietale dus niet. Dit gebeurde voor het eerst door SEELEY (zie hieronder). Daar het interparietale zich ver naar voren tussen de achterwaartse uitsteeksels der parietalia indringt, vormt het een diepe inkeping in de bovenrand van het occipitale vlak, een insnijding, waarvan vorm en diepte bij de verschillende soorten nog al veranderlijk schijnt te zijn en waarvan, vooral ook omdat deze rand zo in 't oog valt, herhaaldelijk melding wordt gemaakt.

De sutuur met de parietalia is reeds daar besproken. Die met de tabularia begint iets achter het hoogste punt van de parietale kam, buigt van daar naar beneden in de richting van het bovineinde van het foramen magnum. Voordat nu het supraoccipitale bereikt wordt vertoont deze sutuur nog een paar krachtige slingeren. De sutuur met het supraoccipitale is in 't algemeen half cirkelvormig. De bovineinden dezer sutuur buigen met een naar onder konkave bocht naar de einden der suturen met de tabularia. Nauwkeuriger kan zij niet beschreven worden, daar het interparietale en het supraoccipitale zich ten opzichte van elkaar een weinig hebben verplaatst en nu de onderrand van het bovenste been 2 mm. verder naar achter ligt dan de bovenrand van het onderste been.

Het zichtbare oppervlak van het interparietale is in hoofdzaak glad. Over het midden loopt een lage ribbe, die een voortzetting is van de centrale ribbe der parietalia. Deze ribbe zet zich tot bijna aan het ondereinde voort. SEELEY (5, bl. 229) zegt, dat het "superoccipital" van *L. microtrema*, waarvan hij later vermoedt, dat het een interparietale kan zijn (bl. 230), door een mediane sutuur in tweeën gedeeld is. Om zeker te zijn, heb ik het interparietale van ons exemplaar nog eens nauwkeurig nagezien en gevonden, dat er een kleine barst loopt van het midden van de onderrand naar boven toe tot op ongeveer een vierde deel van het been, om daarna naar links af te buigen. Een mediane sutuur is bij onzen *latirostris* dus niet aanwezig. De zijkanen van het oppervlak, welke tegen de parietale kammen gelegen zijn, maken met het middelste gedeelte een hoek van ± 120 graden. Zij zijn bedekt met fijne groeistrepen, die van de plaats, waar deze vlakjes in het centrale gedeelte overgaan, naar de rand toe zwak divergeren.

Afmetingen :

| | |
|--|----------|
| Lengte van het achtervlak..... | 37,5 mm. |
| Grootste breedte nabij de sutuur met het supraoccipitale . | 33,5 mm. |
| Grootste afstand der zijvlakjes..... | 22,7 mm. |

DE TABULARIA (Pl. VII, VIII).

Aan beide zijden van het interparietale ligt een plat, vierkantig been tegen de binnen-achterwand van de parietale kammen. Zij worden bovendien nog begrensd door het squamosum en het supraoccipitale. Deze beenderen wilde ik eerst met SEELEY epiotica noemen, en wel omdat ik ze als homologieën opvat van de algemeen aldus genoemde beenderen der *Stegocephalen*. Met de gehoorbeenderen hebben zij echter, althans bij onzen *Lystrosaurus*, niets te maken. Bovendien is er geen enkele aanwijzing, dat zij, hoe dan ook, met het gehoororgaan in verbinding stonden. Dit lijkt trouwens reeds zeer onwaarschijnlijk. Het is daarom, dat ik, na door DR. BROOM er op gewezen te zijn, dat COPE dit been een andere naam had gegeven, liever diens benaming hier gebruik.

Voorzover kon worden nagegaan, is dit been tot nog toe alleen door COPE in 1870 en door SEELEY in 1889 waargenomen. Bij de beschrijving van de schedel van *L. microtrema* vergelijkt SEELEY het interparietale van *Lystrosaurus* met de beenderen, die bij *Amphibia* zooals *Loxomma*, b.v. in ZITTEL'S handboek, supraoccipitalia worden genoemd. Terzijde van de supraoccipitalia van *Loxomma* liggen nu nog twee andere beenderen, de epiotica, en SEELEY vindt nu aan elke zijde van het interparietale van *L. microtrema* een been, dat met deze te vergelijken is. SEELEY'S mededeling hieromtrent laat aan duidelijkheid niets te wensen. Hij zegt (5, bl. 230): "It is well seen at the side of the skull of R.868, as a broad plate of bone, which extends between the interparietal and the squamosal, and rests upon the supraoccipital part of the occipital plate, so that in plan of construction of this region of the skull there is a close approximation to the *Labyrinthodont* type, which in so far as I can judge from Mr. MAW'S specimen of *Loxomma* in the British Museum, has a vertical occipital region. The transverse extent of this (?) epi-otic bone is 4 cm. in R.868; its position is oblique, and its breadth about 1.5 cm. In other species the position of the bone is different; in *Dicynodon leoniceps* it appears to descend obliquely downward, outward, and backward. In *D. tigriceps* its development appears to be greater upon the roof of the skull, where it seems to me to overlap the parietal bone, and to be defined by difference of colour of the bone, and a convex sutural border, which the undivided parietal to extend back between the epi-otic bones. The epi-otic bones are in contact with the pair of remarkable bones which form the roof of the temporal region of the skull." Het is wel merkwaardig, dat, na zulk een duidelijke beschrijving, er nooit meer melding van is gemaakt.

Van de suturen zijn alleen de reeds beschrevene met het interparietale en die met het squamosum duidelijk zichtbaar. De laatste loopt van de sutuur met het interparietale op de kam evenwijdig aan de kamhoogte naar achteren tot voorbij het einde van het parietale uitsteeksel. Daar buigt zij naar beneden naar het supraoccipitale, doch dit gedeelte is onduidelijk, daar de verstening hier gebroken is geweest. Op de plaats waar de sutuur met het supraoccipitale moet liggen is het been beschadigd.

Het enige zichtbare oppervlak van deze beenderen is glad en bedekt met van uit het midden divergerende groeistrepen. Deze maken met de groeistrepen op de zijvlakken van het interparietale in het midden van de

sutuur met dit been een hoek van 90–120 graden. Daar waar bij het interparietale de sutuur met het supraoccipitale begint, maken zij met de groeistrepen op dit laatste been een zelfde hoek. Bij de sutuur met het interparietale is duidelijk te zien, dat de zijvlakken van dit been een gedeelte van de buiten-achtervlakte der tabularia bedekken en deze daar dus inwiggjen tussen het interparietale en de achterwaartse uitsteeksels der parietalia.

Afmetingen :

| | |
|----------------------|--------|
| Lengte minstens..... | 26 mm. |
| Breedte..... | 19 mm. |

HET SUPRAOCCIPITALE (Pl. VII, VIII).

Dit been vormt een groot gedeelte van het achterhoofdsvlak en ligt tussen interparietale, tabularia en squamosa aan de boven- en zijkanten en de exoccipitalia aan de onderzijde. Het is een breed been, waarvan aan de voorzijde slechts twee kleine vlakjes zichtbaar zijn. Bij de suturen met de exoccipitalia is het zeer dun; een dun en smal gedeelte van het been ligt hier tegen het achtervlak der exoccipitalia en bedekt deze dus gedeeltelik. Iets hoger echter reikt de dikte reeds tot aan het voorvlak.

De sutuur met interparietale en tabularia is reeds besproken; die met de squamosa op het achtervlak is onduidelik, daar deze gedeelten der verstening beschadigd zijn. Slechts een klein gedeelte der sutuur is te zien aan de rechterkant dichtbij het exoccipitale. De suturen met de exoccipitalia zijn ook niet over hun gehele lengte duidelijk. Bij het foramen magnum, onder het midden van de zijranden, bevinden zich op de exoccipitalia twee knobbels en hierboven, ongeveer in het midden der randen, bevindt zich een vlakje, dat zich duidelijk naar boven toe onder het been voortzet, dat hier supraoccipitale wordt genoemd. De grenslijn der twee beenderen zet zich aan beide kanten eerst dwars over het achterhoofdsvlak voort en vervolgens over een lage, meer naar boven gerichte rug. De grenslijn is aan de linkerkant tot aan het squamosum te vervolgen, doch rechts is zij slechts tot op een halve cm. van het squamosum duidelijk. Hoewel dus deze grenslijn veel te wensen overlaat, kan ik haar toch niet als een barst beschouwen, daar het mij evenmin gelukte zelfs maar een enkele der talrijke groeistrepen op de beide beenderen van de een op de ander te vervolgen. Bovendien is langs een klein gedeelte van de linker grenslijn op beide beenderen een klein plekje, waar de groeistrepen duidelijk met de grenslijn naar buiten toe konvergeren. Aan een andere *Lystrosaurus* schedel (Pal. Kat. No. 4001), te hulp geroepen om hierover beter uitsluitsel te geven, is deze konvergentie aan beide grenslijnen zeer duidelijk. Dit is daarom van veel belang, omdat vroeger meestal de beide helften van het supraoccipitale beschouwd werden door een sutuur van elkander gescheiden te zijn en tot het overeenkomstige exoccipitale te behoren. Deze sutuur lag dan juist onder het interparietale en liep naar de bovenrand van het foramen magnum. Zoo zegt OWEN van *declivis* (2, bl. 50): "The exoccipitals meet and join together above the foramen magnum." Ook *Lydekker* geeft bij *declivis* alleen een grens onder het interparietale aan (6, bl. 34). Op genoemde plaats nu komt aan ons exem-

plaar een barst voor, waarvan het wel degelijk nodig was te onderzoeken, met het oog op de onduidelijkheid der suturen met de exoccipitalia, of men hier misschien met een suture te doen had. In de eerste plaats ligt deze barst niet mediaan, want zij treft de bovenrand van het foramen ver rechts van het midden. Bij drie andere exemplaren op weer geheel andere plaatsen. Bij het hier boven reeds aangehaalde exemplaar No. 4001, komt ook een barst voor, doch deze is op haar beurt zo onduidelijk, dat zij met de loep eerst voor de dag komt. De groeistrepen op beide helften van het supraoccipitale van het hier beschreven exemplaar zijn nabij de barst onderling evenwijdig, terwijl de barst een kleine hoek met hen maakt. Bij exemplaar No. 4001 zijn de groeistrepen ook evenwijdig terwijl de barst onregelmatig tussen hen doorgaat. Er kon niet worden aangetoond, dat groeistrepen van het ene op het andere gedeelte overgaan. Het "barst" karakter wordt echter verhoogd door de scherpe randen en de hoekigheid.

De suture met de exoccipitalia in het foramen magnum loopt eerst schuin naar boven en dan waarschijnlijk recht naar voren, doch dit is niet duidelijk te zien. De suture op het voorvlak begint aan de rand van het foramen dicht onder de reeds genoemde suture met het parietale, loopt boven langs de verdikking op het exoccipitale en buigt langs de buitenzijde hiervan naar beneden tot nog boven het midden der verdikking. Hier begint de suture met het squamosum, die naar boven en tevens naar binnen gaat en een scherpe hoek maakt met het voorgaande gedeelte van de suture. Deze suture zet zich nu voort tot in de holte tussen parietale, squamosum en supraoccipitale, waar de suture met het parietale begint. Het verdere verloop is bij de parietalia beschreven.

Het achtervlak is glad en bedekt met talrijke groeistrepen, die van de rand van het foramen magnum divergeren. De twee voor-zijvlakken maken een scherpe hoek met het achtervlak en zij konvergeren naar voren. Zij zijn zeer weinig konkaf en overigens glad. Van het oppervlak in het foramen is slechts een klein gedeelte zichtbaar, dat glad is en schuin naar boven loopt. De rand van het foramen is afgerond.

Afmetingen :

| | |
|---|--------|
| Breedte..... | 79 mm. |
| Grootste hoogte..... | 31 mm. |
| Grootste dikte..... | 21 mm. |
| Afstand van de rand van het foramen tot het interparietale..... | 10 mm. |

DE EXOCCIPITALIA (Pl. I-VIII).

Deze beenderen vormen een groot gedeelte van het achterhoofdsvlak, zenden uitsteeksels naar de squamosa, sluiten het basioccipitale tussen hun ondereinden in en vormen de onderste helft van den rand van het foramen magnum en de bovenste helft van de kondylus.

De suture met het supraoccipitale is reeds beschreven. Die met het squamosum op het achtervlak is onduidelijk, doordat de verstening juist in deze streek barsten heeft (Pl. VII, VIII). Links en rechts vullen elkander echter vrij goed aan. Rechts kan men de suture vervolgen als voortzetting van de suture supraoccipitale-squamosum tot juist boven een

foramen. Links zet zich de sutuur onder het foramen voort door een diepe holte en buigt zich daarna weer naar voren over de hoogte heen, welke gevormd wordt door het squamosum en het exoccipitale uitsteeksel. Het exoccipitale is hier in aanraking met het kwadraatbeen. Daar, waar de sutuur op het voorvlak zal treden, legt zich het achterwaartse uitsteeksel van het pterygoid tegen het exoccipitale (Pl. III, IV); de sutuur hiermede is echter zeer kort. Op het voorvlak komt dan nog een korte sutuur met het kwadraatbeen en daarna de sutuur met het squamosum. Deze loopt eerst een weinig naar buiten en dan naar de onderrand van het reeds genoemde foramen. Van de bovenrand van dit foramen zet de sutuur zich nu naar binnen voort tot het supraoccipitale (Pl. I, II). De hele sutuur met het squamosum op het voorvlak is een zigzaglijn. De sutuur op het achtervlak is, voor zover duidelijk zichtbaar, slechts zwak golvend. OWEN noemt deze sutuur bij *declivis* "deeply indented" (2, bl. 50).

De volgende sutuur op het voorvlak is die met het basisphenoid. Beginnend aan de binnenrand van het foramen magnum, aan de binnenzijde van het straks te noemen uitsteeksel, zet deze zigzagsutuur zich schuin naar onder en naar buiten toe voort tot aan de binnenzijde van het naar voren en beneden gerichte uitsteeksel. Daarna gaat de sutuur in het daarachter gelegen foramen en van daar ongeveer in dezelfde richting als het voorgaande langs het naar onder gerichte uitsteeksel van het basisphenoid naar een foramen tussen de naar onder gerichte uitsteeksel van exoccipitale en basioccipitale. Op de achterwand van deze opening komt de sutuur met het basioccipitale weer te voorschijn (Pl. VII, VIII), buigt zich over de onderrand naar het achtervlak en loopt daar, met de overeenkomstige sutuur naar boven toe konvergerend, als een rechte lijn naar den kondylus. Hierop buigen beide suturen zich sterker naar elkaar toe, zodat zij elkaar boven het midden van de kondylus ontmoeten. Hier begint de onderlinge sutuur der exoccipitalia, die zich over de bovenrand van de kondylus heen voortzet tot in het foramen magnum. Hier stoot zij echter direkt tegen het basioccipitale, dat in het foramen weer te voorschijn komt. De beide suturen met dit been maken hier een hoek van ongeveer 90 graden met elkaar en dalen spoedig af in een diepte tussen basioccipitale en exoccipitale gelegen. Hierin is echter de sutuur niet verder te vervolgen.

Het achtervlak dezer beenderen is oneffen door diepe putten en brede, hoge verhevenheden. De merkwaardigste dezer laatsten is wel diegene, die deel uitmaakt van de kondylus. Deze verhevenheid rijst hoog boven haar naaste omgeving. Haar gewrichtsvlakte is konvex doch niet bolvormig, bedekt met vele putjes en overigens niet glad. De randen ervan hangen over het lagere gedeelte van het been heen. Het exoccipitale gedeelte van de kondylus-oppervlakte is min of meer gelijk aan het basioccipitale gedeelte. Evenals bij *Oudenodon pusillus* JAEKEL (11, bl. 185) steken ook hier de beide exoccipitale gedeeltes verder naar achteren dan het basioccipitale, hoewel blijkbaar niet in dezelfde verhouding. Ten opzichte van het vlakke gedeelte van het achtervlak van de exoccipitalia steken zij 2 mm. verder naar achteren dan het basioccipitale. JAEKEL zegt l.c. "Immerhin tritt die Tendenz zur Theilung des Condylus und zur Zurückdrängung des basioccipitale unverkennbar deutlich hervor."

Terzijde van de kondylus en onder de rand bevindt zich een vrij grote opening, die als doorgang diende voor de IXde, Xde, XIde en XIIde zenuw. Deze opening ligt in een vlakke uitdieping, die zich schuin naar onder en naar buiten toe voortzet, aan de binnenzijde begrensd door een in dezelfde richting verloopende, zwakke rug, welke nog aan de onderzijde van de kondylus-verhevenheid ontspringt en langs de sutuur met het basioccipitale naar de onderrand loopt en aan de buitenzijde begeleidt door een krachtigere en bredere rug, welke ontspringt op een rug tussen kondylus en laterale opening in het exoccipitale. Deze rug zet zich voort op een breed en dik uitsteeksel, dat aan het kwadraatbeen en het squamosum grenst. Bij het squamosum is deze rug het hoogst. Volgens zijn lengte-richting is hij konkaaf. Van de boven-buitenhoek der kondylus-verhevenheid tot aan de laterale opening, reeds bij de sutuur met het squamosum genoemd, strekt zich een brede, lage verhevenheid uit; deze loopt dus nagenoeg evenwijdig aan de sutuur met het supraoccipitale. Tussen deze rug en die op het brede uitsteeksel naar het squamosum-kwadraatbeen bevindt zich een zeer diepe put, die door een plat vlak van het squamosum naar buiten wordt begrensd. De exoccipitale wand van deze put is konkaaf van boven naar beneden doch convex van de rand naar de diepste plaats der diepte. Boven de kondylus-verhevenheid, aan de rand van het foramen magnum, bevindt zich nog een klein bultje, dat echter zoowel links als rechts beschadigd is. Bovendien is er nog een kleine, smalle en lage rug in het midden van de sutuur met het supraoccipitale. Overigens is het grootste gedeelte van het oppervlak bedekt met groeistrepen. Deze divergeren in 't algemeen van de voet van de kondylus-verhevenheid en van het kleine bultje daarboven. De rand van het foramen magnum is scherp afgerond en loopt niet door bij de kondylus. De zijkanten zijn bijna recht en slechts in het midden een weinig naar binnen gebogen. De bovenrand is sterk konkaaf en de kondylus-zijde zwak konkaaf.

Bij de beschrijving van dit achtervlak bij *L. Murrayi* maakt HUXLEY reeds melding van de laterale opening, van de diepe groeve en het brede uitsteeksel, dat tegen het squamosum en het kwadraatbeen stoot. Van de laterale opening werd door SEELEY (5, bl. 245) evenals door JAEKEL (11, bl. 187) gedacht, dat het een gehooring opening kon zijn; deze ligt echter, zoals BROOM ook reeds aangeeft (14, bl. 350), aan het ondereinde van het basioccipitale uitsteeksel.

Het voorvlak (Pl. I, II, V, VI) vertoont een grote verhevenheid en twee dunne uitsteeksel. De verhevenheid is langgerekt in de richting van de sutuur met het supraoccipitale bij het foramen magnum tot het achterwaartse uitsteeksel van het pterygoid. Zij is ongeveer twee keer zo lang als breed. De buitenrand er van is steil, de onderrand loopt geleidelijk over in het eigenlike vlak en de binnenrand is minder steil dan de buitenrand. De bovenrand is slechts zwak geprononceerd. Het vlak op deze verhevenheid is wat gewrongen, zodat het bovenste gedeelte zich een weinig naar buiten keert, terwijl het onderste gedeelte recht naar voren wijst.

Aan het bovineinde van de sutuur met het basisphenoid, welke alleen rechts is blootgelegd, bevindt zich een lang en dun uitsteeksel, dat echter bij het prepareren gebroken is. Dit uitsteeksel wijst bijna recht naar

boven; het helt slechts zeer weinig naar de hersenholte. Het is nu nog 11 mm. lang, doch het was oorspronkelijk langer. Aan het onderende dezer sutuur op het voorvlak bevondt zich een uitsteeksel, dat naar beneden gericht was. Door het prepareren is ook dit afgebroken; dit uitsteeksel is echter zeer kort. Overigens is het voorvlak glad. Het vertoont slechts zeer onduidelijke groeistrepen langs de sutuur met het squamosum. Zij snijden deze sutuur bijna rechthoekig. Dit voorste gedeelte van het been noemt BROOM bij *Oudenodon Kolbei* perioticum (14, bl. 349). Het komt zeer zeker in plaats met een perioticum overeen en het is ook niet onmogelijk, dat dit gedeelte eens in fylogenetische zin, zelfstandig is geweest. Ik vond echter geen suturen of aanwijzingen daarvan tussen dit en het achterste gedeelte en reken het dus tot het exoccipitale.

Het kleine ondervlakje, gelegen tussen het uitsteeksel langs het basioccipitale en het uitsteeksel naar het quadratum en het squamosum is gootvormig gebogen tussen deze uitsteeksels. Het gaat met een brede ronding over in het voorvlak en eveneens op het uiterste gedeelte van het laatstgenoemde uitsteeksel in het achtervlak. Overigens is de grens tussen het ondervlak en het achtervlak echter een scherpe rand. Op de grens van het ondervlak met het basisphenoid, juist achter het hierboven genoemde, naar onderen gerichte uitsteeksel, bevindt zich een ronde opening in het been. Het kanaal, dat hierna in verbinding staat, kon niet worden onderzocht. Het diende waarschijnlijk als doorgang voor de VIIde zenuw. Tussen het ondervlak en het basioccipitale bevindt zich nog een andere, grotere, ovaalvormige opening (Fo, Pl. III). Van het ondervlak is deze opening gescheiden door een dunne verhevenheid, waarvan de rand naar onder toe konkaaf is. Het gedeelte van de achterrand dezer opening, dat gevormd wordt door het uitsteeksel langs het basioccipitale, vormt aan de onderzijde een plat vlakje, dat scherpe randen maakt met het achtervlak en de binnenzijde der opening. Dit vlakje zet zich op het basioccipitale voort. De genoemde opening is zeer waarschijnlijk de gehooropening; bij andere exemplaren ligt er een klein beentje op, dat tot het quadratum reikt. Dit zou dan de stapes kunnen zijn en de holte tussen quadratum en de onderrand van het basioccipitale uitsteeksel het cavum tympanicum. Als zodanig doet SEELEY het reeds vermoeden in zijn beschrijving van *L. microtremæ* (5, bl. 231). Hij wijst er verder op, dat het exoccipitale zo dik is bij het medullare kanaal en dat er enige aanwijzingen zijn, dat deze dikte haar oorzaak in een pro-oticum vindt. Hoewel JAEKEL de uitwendige gehooropening hier ver vandaan zoekt, noemt hij de holte tussen basioccipitale uitsteeksel, exoccipitale uitsteeksel en quadratum een oorholte (11, bl. 184).

Afmetingen :

| | |
|---|---------|
| Grootste breedte der beide beenderen op het achtervlak..... | 102 mm. |
| Grootste dikte der beenderen..... | 38 mm. |
| Grootste breedte van de kondylus..... | 31 mm. |
| Grootste breedte van het foramen magnum..... | 15 mm. |
| Grootste hoogte van het foramen..... | 23 mm. |
| Lengte van de verhevenheid op het voorvlak..... | ±28 mm. |

HET BASIOCCIPITALE (Pl. III, IV, VII, VIII).

Een dik, hoog en tamelijk smal been, waarvan slechts twee oppervlakken te zien zijn, een in het foramen magnum en een achter-ondervlak.

De sutuur met de exoccipitalia, voor zover zichtbaar, is reeds bij deze beenderen behandeld. Aan de voorkant grenst dit been bovendien nog aan het basisphenoid (Pl. III, IV). De sutuur hiermede wordt voornamelijk gekarakteriseerd door de nederwaartse uitbochtigen rond de twee naar onder gerichte uitsteeksels van dit been. Tussen deze twee maakt de sutuur een bocht naar boven. Overigens is het een eenvoudige lijn.

Het achter-ondervlak vertoont een hoge verhevenheid, die de kondylus helpt vormen en waaronder het overige gedeelte van het vlak zich als een naar het midden en naar beneden steeds dieper wordende depressie uitbreidt. De kondylus verhevenheid is breder dan hoog en de zich daarop bevindende oppervlakte is, evenals bij de exoccipitale gedeelten, met talrijke, kleine putjes voorzien en bovendien zwak konvex. Het gevolg van het konvex zijn der drie kondylus delen is, dat de suturen op de kondylus diepe groeven vormen en dat op de plaats van vereniging der drie suturen zich een diepe put bevindt. De onderrand van de kondylus is ook overhangend. Het overige gedeelte van het achter-ondervlak loopt van de kondylus eerst recht naar voren, buigt dan geleidelik naar beneden, om op een bepaalde afstand weer naar voren te buigen en zelfs nog iets naar boven. De zijkanten van dit gedeelte echter blijven van de kondylus af langs de sutuur met de exoccipitalia lopen tot bij de brede, platte rand, die het basioccipitale rond de openingen vormt, welke bij de exoccipitalia reeds genoemd zijn. Deze platte rand is een voortzetting van het platte ondervlakje van het korte, exoccipitale uitsteeksel en strekt zich uit tot het basisphenoid. Het is dus halve-maانvormig. Het maakt met het overige gedeelte van het achter-ondervlak een scherpe rand. Het ondervlak, tussen de twee randen der genoemde openingen, is konkaf. Daardoor geeft het gedeelte aan de openingen grenzende de indruk van een uitsteeksel.

Van het vlak in het medullare kanaal (Pl. VII, VIII) is slechts weinig mee te delen, daar het niet geheel kon blootgelegd worden. Langs het midden van de basis van het kanaal loopt een smalle rug, die naar beide zijden afloopt en dan verder door gesteente bedekt is. Deze rug strekt zich uit van het basisphenoid tot de onderlinge sutuur der exoccipitalia. Hier is hij trouwens veel breder dan verder naar voren toe. Dit gedeelte wordt waarschijnlijk door OWEN bedoeld, waar hij van *L. Alfredi* (4, bl. 51) zegt: “. . . the basioccipital appearing at the interspace of the exoccipitals immediately within the cranial cavity.”

Het achtervlak vertoont zeer fijne groeistrepen, die, van een plaats midden onder de kondylus-verhevenheid, divergeren.

Afmetingen :

| | |
|---|----------|
| Grootste breedte van het been..... | 38 mm. |
| Grootste hoogte..... | 35 mm. |
| Breedte van het basioccipitale deel van de kondylus.... | 21,2 mm. |
| Hoogte van dit kondylus gedeelte..... | 13,8 mm. |

DE QUADRATA (Pl. I-VIII).

Deze beenderen bevinden zich in de uiterste, onderste buitenhoeken van het achterhoofdsvlak. Zij zijn verbonden aan de ondereinden der squamosa en zij zijn bovendien in aanraking met de exoccipitalia en de uitsteeksels der pterygoidea. Aan hun onderzijde bevindt zich de gewrichtsvlakte voor de onderkaak. Door een grote spleet zijn de beenderen elk in twee delen gedeeld, welke bij het gewrichtseinde door een dun beengedeelte zijn verbonden.

De sutuur met het squamosum op het voorvlak (Pl. V, VI) begint reeds kort boven het uitsteeksel van het pterygoid en buigt zich dan om de ronde rand van het binnenstuk naar de scheidingspleet. Van het eind dezer spleet gaat de sutuur recht naar boven tot halfweg naar de plaats, waar het naar voren gerichte uitsteeksel van het squamosum begint. Dan gaat zij weer halverwege terug en sluit daardoor met het opgaande gedeelte een smal stuk van het quadratum in. Nu buigt zij zich weer naar boven en gaat dan met een wijde boog langs de bovenrand van het quadratum naar de buitenrand van het achterhoofd. Deze buitenrand nu is in beide gevallen bij dit exemplaar beschadigd. In 't algemeen kan echter worden gezegd, dat de sutuur nu de buitenrand naar beneden volgt tot dichtbij het gewrichtsgedeelte; hier verloopt zij nagenoeg horizontaal tot voorbij de groeve op het gezichtsvlak, vanwaar zij zich recht naar boven buigt tot bij de sutuur tussen squamosum en exoccipitale. De nu volgende sutuur met het exoccipitale maakt een scherpe hoek met het voorgaande gedeelte en loopt naar voren tot bij het uitsteeksel van het pterygoid. Hier buigt de sutuur met een konvexe bocht naar buiten om het uitsteeksel heen en bereikt zo weer het reeds genoemde, korte sutuurlijntje met het exoccipitale. De geaardheid der sutuurlijn is niet overal duidelijk te zien. De sutuur met het exoccipitale is hoofdzakelijk nog bedekt met gesteente en een groot gedeelte van de sutuur met het squamosum is afgebroken; het aanwezige en zichtbare gedeelte doet zich voor als een eenvoudige lijn.

De buitenste helft van het voorvlak is hoofdzakelijk konkav naar voren; slechts de buitenrand is een weinig konvex, welke konvexiteit zich naar beneden toe meer naar het midden van het vlak wendt, zodat hier het vlak van boven naar beneden konvex is en konkav in een richting loodrecht hierop. Aan het ondereinde van dit deel komt een vrij diepe depressie voor, welke van de in het midden van het been liggende spleet gescheiden is door de verhoogde rand van dit deel. Onder deze depressie buigt het oppervlak sterk naar voren op de brede, platte schijf, welke een deel van het gewrichtsvlak draagt. De voorrand van deze schijf springt dus uit voor de vlakte van het reeds beschreven stuk. Deze schijf nu zet zich als zodanig binnenwaarts een eind voort, begint dan ineens sterk te verbreden tot een andere schijf, die met de eerste ongeveer een rechte hoek maakt en met het caudale einde van de asrichting van de schedel een hoek van ongeveer 45 graden. Deze tweede schijf is eigenlijk het tweede, binnenste deel van het been. De onderste helft dezer tweede schijf vormt het overige gedeelte van het gewrichtsvlak. Uit het bovenstaande volgt reeds, dat het buitenste deel van het gewrichtsvlak met het binnenste deel ongeveer een rechte hoek maakt. Dit buitenste deel is een

weinig konvex en is binnenwaarts een weinig naar boven gericht. Het ontmoet het binnenste deel in een diepe goot. Laatstgenoemd deel is kamvormig; het vertoont twee gewrichtsoppervlakken waarvan het ene ongeveer een rechte hoek maakt met het buitenste deel en het andere, op de rand der kam, weer een rechte hoek met het voorgaande.

Het binnenvlak is eerst sterk konvex bij de rand van de kam, en wordt daarna sterk konkav tot bij de sutuurlijn.

De groeistrepen lopen op het platte buitendeel van het been van de boven-suturaalijn met het squamosum naar beneden, doch zo, dat zij van uit de grote depressie onder aan dit deel naar boven toe zwak divergeren. De groeistrepen op de binnenrand van dit deel zetten zich tot op de horizontale schijf voort. De brede min of meer konkave rand van deze schijf is ruw. Groeistrepen komen op de vertikale schijf alleen voor, waar het oppervlak niet tevens gewrichtsoppervlak is. Zij divergeren van het dunne gedeelte naar de rand van dit stuk. Zij komen vooral ook uit de spleet te voorschijn. Op het dunne verbindingsstuk der twee delen ziet men de groeistrepen van de binnenrand van het buitenste deel afkomen en op een gegeven plaats eindigen. Dan komt een glad gedeelte en daarachter ziet men de groeistrepen uit de spleet opstijgen en naar het dunne gedeelte terug buigen; dit laatste natuurlijk aan de binnenrand der spleet. Waar bovengenoemde groeistrepen eindigen, bevinden zich ongeveer rechthoekig daarop korte, afgebroken groefjes, die als het ware de einden der groeistrepen omgrenzen. Een sutuur komt echter tussen de twee delen niet voor. Wel zijn er in deze streek enkele barstjes, doch deze zijn dadelik als zodanig te herkennen. In tegenstelling met wat door andere onderzoekers bij andere versteningen gevonden werd, blijkt hier dus een afzonderlijk been, dat als quadratojugale zou aangeduid moeten worden, niet aanwezig te zijn. JAEKEL geeft een dergelijk been bij een *Lystrosaurus* aan, echter zonder beschrijving (12, bl. 90); eveneens bij een *Oudenodon* (*O. Kolbei* BROOM, l.c. bl. 192 en 193), waar duidelijk uit de tekening blijkt, dat het quadratojugale overeenkomt met de buitenste gewrichtsrand van het quadratum van onze *Lystrosaurus*. WATSON daarentegen vond, dat het quadratum van *latirostris* wel grotendeels in twee delen gescheiden was, doch dat deze tegen de gewrichtsvlakte één been vormden. BROOM had hem bovendien reeds te toestand bij *Oudenodon* getoond (13, bl. 288). BROOM beschrijft uitvoerig een quadratojugale bij *Oudenodon Kolbei* (14, bl. 347), dat een derde gedeelte van de gewrichtsoppervlakte vormt. De sutuur ligt daarbij juist op het smalle gedeelte. Uit bovenstaande beschrijving volgt echter, dat wij bij deze *Lystrosaurus* met een enkel been of met twee, met elkaar vergroeide beenderen te doen hebben. Dit laatste schijnt werkelijk het geval te zijn. De vroegere sutuur zou dan gelopen hebben van uit de onderhoek der spleet tot midden op het smalle gedeelte en van daar dwars naar buiten, langs het midden van de konkave rand van de schijf. Het buitenste deel van het quadratum zou dus vroeger quadratojugale zijn geweest en dit deel zou niet, zoals dit volgens BROOM het geval bij *Oudenodon Kolbei* schijnt te zijn, een deel van de gewrichtsoppervlakte helpen vormen, doch aangegroeid zijn op een dun dwars uitsteeksel van het kwadraatbeen, welk laatste voor de gehele gewrichtsvlakte zorgt. Wat deze gewrichtsoppervlakte zelf betreft,

wijst WATSON nog op de grootte daarvan, een grootte, die de onderkaak gelegenheid geeft over meer dan een rechte hoek te bewegen (13, bl. 293).

Afmetingen :

| | |
|---|-----------|
| Grootste hoogte..... | 48 mm. |
| Hoogte van het binnenste deel..... | 33-36 mm. |
| Grootste breedte..... | 58 mm. |
| Afstand van de buitenrand van de horizontale schijf tot de buitenrand van de gewrichtskam..... | 30 mm. |
| Breedte van de gewrichtskam..... | 9 mm. |

DE SQUAMOSA (Pl. I-VIII).

Deze beenderen vormen de gehele zijkanen van het achterhoofd, misschien op een klein deel na, dat door de quadrata wordt ingenomen. Zij zenden een breed en dun uitsteeksel naar beneden, een smaller uitsteeksel naar de parietalia en een breed, dun, kamvormig uitsteeksel, dat later een langgerekte punt wordt, naar de maxillaria. Deze kam maakt een rechte hoek met zijn platte basis.

De suturen met de maxillaria, de jugalia, de postorbitalia, de parietalia, de tabularia, het supraoccipitale, de exoccipitalia en de quadrata zijn reeds bij deze beenderen behandeld. De genoemde zijn al de beenderen waarmee de squamosa in verbinding staan; bij *Oudenodon Kolbei* zou het squamosum ook nog verbonden zijn aan het interparietale (14, bl. 346). Dit is hier echter niet zo.

Het achtervlak van het nederwaartse uitsteeksel (Pl. VII, VIII) is aan de onderkant plat, doch naar boven toe buigt het middengedeelte van het vlak een weinig en naar achter naar binnen, terwijl de buitenrand daar sterk naar achteren buigt en de binnenrand sterk naar voren. Dit deel is reeds genoemd als buitengrens van een diepe put op de exoccipitalia. Hierboven gaat dit vlak over in het achtervlak van de parietale kam. Dit bovenste deel is in hoofdzaak plat, daar het slechts bij het einde der suturen tussen exoccipitalia en supraoccipitale een kleine welving vertoont. Het achtervlak van het laterale (parietale) uitsteeksel is bedekt door het tabulare en het interparietale. De groeistrepen op het achtervlak van het been stralen uit van een plaats onder het midden van het achtervlak van het kamvormig uitsteeksel. Hier zijn zij natuurlijk onduidelijk, doch overigens zijn zij zeer goed zichtbaar. Het achtervlak is overigens glad op een kleine ribbe na, welke zich bevindt tegenover de laterale opening in de exoccipitalia. Deze ribbe loopt van de plaats, van waaruit de groeistrepen divergeren, naar de buitenrand der opening, begeleid door een hoger liggende groeve, welke gevormd wordt door deze ribbe en de reeds genoemde welving.

Het buitenoppervlak van het squamosum (Pl. V-VIII) is sterk U-vormig gebogen. Het hooggelegen been der U wordt gevormd door het kamvormig uitsteeksel, het lagere been door de achter-zijwand. Het kamvormig uitsteeksel helt naar binnen en tevens naar voren. De achterwand helt aan het achtereinde zwak naar voren, doch deze helling wordt naar voren toe steeds sterker, totdat het vlak aan de bovenrand van het quadratabeen bijna vertikaal staat. Dit, naar voren dus breder wordende,

holle vlak vertoont geen verhevenheden. Het is wel bedekt met talrijke, fijne groeistrepen. Op het voorste gedeelte van het kamvormig uitsteeksel zijn deze van de voor-buitenrand naar achteren gericht. Op het achterste gedeelte zijn zij divergerend verspreid van een lijn in het midden der diepte van de U gelegen naar de rand en wel zo, dat zij op het uiterste achtereinde van het uitsteeksel naar achter gericht zijn. Op de onderste helft der U zijn zij van uit deze lijn divergerend gericht naar de randen van het vlak.

Het binnen-voorvlak (Pl. I, II, VII, VIII) is konvex in een richting van boven naar beneden en konkav in een richting loodrecht daarop. Ook dit vlak vertoont geen bijzondere verhevenheden. De groeistrepen lopen dwars over dit vlak en divergeren hoofdzakelijk naar de rand van het kamvormig uitsteeksel. Dit vlak ontmoet het buitenvlak onder het naar voren gerichte kamvormig uitsteeksel zodanig, dat nabij dit uitsteeksel een scherpe rand gevormd wordt, die naar beneden toe overgaat in een brede rug.

Afmetingen :

| | |
|--|---------|
| Afstand van het vooreinde tot het achtereinde..... | 124 mm. |
| Afstand van het vooreinde tot het ondereinde..... | 82 mm. |
| Afstand van het achtereinde tot het ondereinde (aan de rechterzijde; links is iets in elkaar gedrukt)..... | 96 mm. |
| Breedte van het ondereinde minstens..... | 60 mm. |
| Breedte van het boveneinde ongeveer..... | 75 mm. |
| Dikte van het kamvormig uitsteeksel bij de rand..... | 5 mm. |

HET BASISPHENOID (Pl. III, IV).

Dit been ligt voor het basioccipitale en de exoccipitalia en gedeeltelijk achter, doch grotendeels boven de pterygoidea. Het vormt de onderste en een deel van de voorste begrenzing der "hersenholve." Het bestaat hoofdzakelijk uit een dun, mediaanliggend, voorste gedeelte, dat een brede basis heeft op de pterygoidea en een breed achterste gedeelte, dat naar beneden twee uitsteeksel voor tegen het basioccipitale aanlegt, welke zich tot een brede, in het midden iets ingesneden plaat verenigen.

De sutuur met het basioccipitale en de exoccipitalia is reeds behandeld. Bij deze verstening is overigens alleen nog zichtbaar de sutuur met de pterygoidea. Deze vertoont zich op het mondholtevlak als een meandersutuur en bevindt zich juist vóór de beide openingen in het basisphenoid; zij begeeft zich zelfs nog een weinig op het nauwe gedeelte tussen deze openingen. Zij zet zich nu over de smalle zijribben, die deze openingen van de holte tussen pterygoideaal uitsteeksel en basisphenoid afscheiden, voort en gaat in bijna horizontale richting langs de scherpe bovenrand van genoemd uitsteeksel nog een eindweegs naar achteren en buigt zich dan rond het kleine uitsteeksel van het basisphenoid, dat op het pterygoïdale uitsteeksel ligt, weer naar voren. De sutuur loopt nu evenwijdig aan de buitenrand van de pterygoidea naar voren. Op welke wijze de sutuur nu rond het vooreinde van het basisphenoid verloopt is niet te zien. (Aan de linkerzijde der mediane beenderen is een gedeelte van het gesteente gelaten, zodat hier ook niets te zien valt.) Rechts was aan het achterwaartse uitsteeksel, dat op het pterygoïdale uitsteeksel ligt, het

columellare verbonden. Of nu dit uitsteeksel zelf tot het columellare behoort, wat ik wel vermoed, is hier niet uit te maken. Wel bestaat er een barst, die uit het voorste gedeelte van de holte tussen pterygoidaal uitsteeksel en basioccipitale loopt in de richting van de straks te noemen ovale opening. Daar in het voorste gedeelte dezer scheidingslijn de groeistrepen zich van de ene zijde op de andere voortzetten en daar bovendien de scherpe randen en hoeken van een typiese barst ook aanwezig zijn, kan ik deze lijn ook slechts als zodanig aangeven. Aan de linkerzijde, waar het gehele columellare is blootgelegd, geeft het bedoelde uitsteeksel de indruk tot dit been te behoren, hoewel er op de plaats waar het smalle columellare in het brede voetstuk overgaat een barst of voeg aanwezig is (Pl. V, VI).

De sutuur met het vomer en het ethmoid zijn niet bekend, daar het eerste been naar boven toe niet blootgelegd is en het tweede door het prepareren is vernietigd.

Het mondholte-oppervlak helt sterk van het vlak der pterygoidea naar beneden. In zijn hoogste deel bezit het twee ovaalvormige, dicht bij elkaar gelegen openingen, welke waarschijnlijk gediend hebben voor de inwendige carotiden. SEELEY kon het verloop der kanalen naar de "hersenholte" bij *L. microtrema* vervolgen (5, bl. 229). Zij verenigen zich daar, voor zij de "hersenholte" bereiken en monden hierin uit met een ronde opening. Blijkbaar zijn er belangrijke verschillen met *Oudenodon*, want het schijnt, dat er bij *O. Kabei* slechts een enkelvoudig carotid kanaal is en dit mondt volgens BROOM uit in het pterygoid, dus niet in het basi-sphenoid (14, bl. 348). Het oppervlak draagt twee ruggen, die, terzijde hiervan ontspringend, lopen tot aan de onderrand van het basioccipitale. Tussen deze verhevenheden vertoont het oppervlak een zwakke depressie. De groeistrepen op dit oppervlak verlopen van de smallere voorrand naar de bredere achterrand en divergeren dus in deze richting. Dit vlak gaat met een brede ronding over in het vlakje, dat zich bevindt in de holte tussen exoccipitale en pterygoidaal uitsteeksel en dit gaat direkt daarna over in het binnen-zijoppervlak. Dit laatste is in hoofdzaak glad, alleen dicht bij de buitenrand komt enige oneffenheid voor. Het naar achteren gerichte, op het pterygoidale uitsteeksel liggende gedeelte, vernauwt zich sterk naar boven tot de plaats, waar het columellare afgebroken is. Het einde van dit uitsteeksel vormt een schuin naar achteren en naar boven gerichte lijn.

Het onderste gedeelte van het binnen-zijvlak is bijna horizontaal en ontmoet het vertikale gedeelte in een ruime bocht. De voorrand van het vertikale gedeelte is aan de onderkant ingesneden door een ovale opening, welke in verbinding staat met de opening tussen de twee achterste vomerplaten, die op het gehemelte zichtbaar is. Verder is de voorrand niet zichtbaar. De bovenrand is beschadigd. Naar achteren loopt het zijoppervlak op tegen de exoccipitalia. Het gehele oppervlak is bedekt met groeistrepen. Op het vertikale gedeelte zijn deze hoofdzakelijk van onder-achter naar boven-voor en bovendien in deze richting divergerend. Naar de achterrand toe vindt men ook nog fijne streepjes ongeveer in dezelfde richting.

Het bovenzvlak is nog bedekt met gesteente. Het is echter duidelijk te zien, dat het achterste gedeelte het breedst is en een holte vormt en aldus de basis van de hersenholte, terwijl het voorste gedeelte stijl opstijgt en bovendien gauw zeer smal wordt. Dit is tevens de enige bescherming door been aan de voor-onderkant der "hersenholte." Het is zeer onwaarschijnlijk, dat een gedeelte van dit been presphenoid zou zijn, daar er geen aanwijzing voor gevonden is.

Afmetingen :

| | |
|---|----------|
| Lengte, gemeten van het boveneinde der sutuur met de exoccipitalia tot het vooreinde van de mediane plaat | 42 mm. |
| Breedte..... | 50,5 mm. |
| Breedte van het mondholtevlak..... | 41 mm. |
| Lengte van het mondholtevlak..... | 14 mm. |

DE PTERYGOIDEA (Pl. III-VI).

Deze beenderen verbinden de quadrata, de exoccipitalia en het basisphenoid met de maxillaria en de palatina. Bovendien grenst hun voorrand nog aan het vomer en zijn zij waarschijnlijk met de columellaria verbonden. Zij zijn vrij plat en bezitten elk één uitsteeksel zijdelings naar achteren, waar het de grens van exoccipitale en kwadraatbeen bereikt en één naar voren. De laatste divergeren ook met elkaar maar met verminderende divergentie, zodat hun einden nagenoeg evenwijdig zijn. Zij zijn dik en hun einden vormen hoge randen.

De suturen met deze beenderen zijn bijna alle reeds besproken. Die met het vomer is hier niet te zien. De sutuur met de palatina zal zij bij deze beenderen worden behandeld. De onderlinge sutuur loopt van het achtereinde van de opening tussen de pterygoidea en de twee vomer-platen naar het midden van de sutuur met het basisphenoid op het mondholtevlak. Deze lijn vertoont talrijke kleine bochtjes en is boven haar omgeving verheven.

Het mondholtevlak is glad en vertoont in het midden slechts flauwe groeistrepen. Deze schijnen van het midden van elk been naar alle richtingen uit te stralen. Naar de uitsteeksels toe worden zij duidelijker. Naar achter buigt het gehemeltevlak geleidelik in het achtervlak van het achterwaartse uitsteeksel. De ronde zijrand van het vlak gaat daarbij over in de scherpe onderrand van dit uitsteeksel. Het achtervlak hiervan en de onderrand zijn bedekt met duidelijke lengte-groeistrepen. Op de naar voren gerichte uitsteeksels is het gehemeltevlak maar zeer smal en het rondt af naar het binnen- en buitenvlak. Hier draagt het bovendien nog een zwakke lengte-ribbe.

Het buitenvlak is sterk konkaf. Het helt een weinig naar buiten, is glad en bedekt met fijne groeistrepen, evenwijdig aan de lengterichting. Aan de voorzijde is het gedeeltelijk bedekt door het achterwaartse uitsteeksel van het maxillare en wel zo, dat het oppervlak in twee naar voren gerichte, scherpe punten verdeeld is (Pl. V, VI).

Van het kleine stukje, zichtbare bovenzvlak kan niet gezegd worden tot welk been het behoort.

De twee naar voren gerichte uitsteeksels vormen de achter- en zijrand van de inwendige neusopeningen (Pl. III, IV). Aan de voorkant worden

zij hierin bijgestaan door de palatina. Het centrale gedeelte van de achterrand behoort echter niet aan het neuskanaal, doch aan een langwerpig, kort kanaal, dat de ruimte boven de pterygoidea met de mondholte verbindt. De vorm van de opening van dit kanaal in de mondholte is langgerekt met konkave zijden, welke elkaar naar voren onder een zeer scherpe hoek ontmoeten. Het grootste deel dezer zijden behoort tot het vomer. Naar achteren ontmoeten zij elkaar in een afgeronde bocht. Het deel, dat door de pterygoidea begrensd wordt, is ongeveer een vierde van het geheel.

Afmetingen :

| | |
|--|----------|
| Lengte van de onderlinge suture..... | 19 mm. |
| Afstand van het achtereinde der achterste uitsteeksels tot het vooreinde van de voorste uitsteeksels..... | 68 mm. |
| Kleinste breedte..... | 27,5 mm. |
| Afstand der uiteinden der achterste uitsteeksels..... | ±72 mm. |
| Afstand der uiteinden der voorste uitsteeksels..... | 41 mm. |

DE COLUMELLARIA (Pl. V, VI).

Dit lange, dunne beenje verbindt aan beide zijden van de schedel het onderste uitsteeksel van het parietale met het zijdelings naar achteren gerichte uitsteeksel van het basisphenoid. Behoort dit stuk echter ook tot het columellare, wat waarschijnlijk het geval is (zie basisphenoid), dan leze men hiervoor de bovenrand van het vooreinde van het naar achteren gerichte pterygoïdale uitsteeksel. Bij *Oudenodon Kolbei* heeft het een overeenkomstige vorm; BROOM zegt ervan (14, bi. 349): "At its lower end it has an antero-posterior development which is closely articulated with the side of the basisphenoid and rests on the side of the pterygoid." In het midden is dit been het smalst; naar boven wordt het geleidelijk breder en naar onder blijft het ongeveer even breed tot bij het reeds beschreven uitsteeksel van het basisphenoid. De suture met het parietale is reeds bekend. De zichtbare oppervlakte van het been is voorzien van groeistrepen evenwijdig aan de lengterichting.

Afmetingen :

| | |
|---|--------|
| Lengte (van parietale tot pterygoid)..... | 61 mm. |
| Dikte..... | 1 mm. |
| Breedte (in het midden)..... | 3 mm. |

DE PALATINA (Pl. III-VI).

Alleen het rechter palatinum is tamelijk opengelegd. Van het linker is alleen het ruwe oppervlak zichtbaar. De palatina bevinden zich in de mondholte aan de buiten- voor- en achterzijde van het neuskanaal; hoger op vormen zij alleen de achterzijde hiervan. Tegen de buitenzijde van het onderste deel ligt het voorste uitsteeksel van het pterygoid en geheel vooraan het maxillare. De binnenzijde vormt de wand van het neuskanaal. Dit onderste stuk is nagenoeg plat in een richting evenwijdig aan het mediane vlak. Het bovenste stuk is plat in een richting loodrecht daarop. Dit stuk grenst aan het maxillare en het jugale.

Het zichtbare gedeelte van de suture met het pterygoid begint aan het vooreinde van het pterygoïdale uitsteeksel en zet zich achterwaarts

aan de binnenzijde van dit uitsteeksel op geringe afstand boven de onder-rand ervan voort tot tegen het vomer. Hier buigt zij naar beneden. De overige suturen zijn of niet zichtbaar of reeds op een andere plaats beschreven.

Het gehemelte-oppervlak dezer beenderen (Pl. III, IV) is zeer ruw. Langs het vooreinde van het pterygoid ligt een diepe groeve, begrensd door het pterygoidale uitsteeksel en een vierkantige verhevenheid op het palatinum. Een van de assen van dit vierkant staat loodrecht op, de andere is nagenoeg evenwijdig aan het mediane vlak. Op elke hoek van het ondervlak der verhevenheid komt nog een ekstra knobbeltje voor, behalve op de voorhoek. De voorste punt van het palatinum ligt weer veel lager dan het bovenzvlak der verhevenheid. Op de genoemde groeve na is het gehemeltevlak nog met talrijke, zeer kleine oneffenheden voorzien. Deze ruwheid komt ook bij andere *Anomodontia* voor; zoo b.v. bij *Oudenodon Kolbei*, waarvan SEELEY meende, dat deze ruwe oppervlakte tanden droeg; BROOM beschreef kort geleden deze soort en zegt, dat hij geen tandstructuur vond; het zijn slechts onregelmatigheden in het beenoppervlak (14). Ook bij onze *latirostris* kan er geen sprake zijn van tanden.

Het vlak in de neusgang is van voor naar achter, doch vooral achteraan konkaaf. Terzijde is het van boven naar beneden zeer weinig konvex. Overigens is het glad. De groeistrepen op dit vlak zijn op het voorste gedeelte van voor naar achter gericht. Op het achterste gedeelte lopen zij naar boven.

Het achtervlak (Pl. V, VI) van het bovenste stuk is eveneens glad en weinig konkaaf van het pterygoid naar het jugale, konvex van het voorste deel van het basisphenoid naar het maxillare. Groeistrepen zijn op dit vlak zeer onduidelijk.

Afmetingen :

| | |
|--|----------|
| Afstand van het vooreinde tot het begin van de suture met het vomer..... | 43,2 mm. |
| Grootste breedte van het gehemeltevlak..... | 12,6 mm. |
| Afstand van het bovineinde van de suture met het jugale tot het vooreinde van het gehemeltevlak..... | 52,6 mm. |
| Onderlinge afstand der vooreinden van de gehemeltevlakken..... | 17,6 mm. |

HET VOMER (Pl. III, IV).

Het vomer is een zeer dun been, dat in het mediane vlak ligt en zich op het gehemelte vertoont als een zeer dunne, naar achteren zich splitsende streep tussen het centrale gedeelte van de pterygoidea en de centrale ribbe op het gehemeltevlak van het premaxillare. Het staat vertikaal en verdeelt daardoor dus de neusgang in twee kanalen. De verbinding met de genoemde, centrale ribbe is heel eigenaardig. Het premaxillare zendt hier drie uitsteeksels naar achteren: één centraal en twee symmetries terzijde daarvan. Het vomer zendt twee uitsteeksels naar voren, welke zich tussen die van het premaxillare invoegen (zie premaxillare).

Naar achteren splitst zich het vomer in twee lappen, die de opening omsluiten, welke reeds bij de pterygoidea is genoemd. De randen dezer gedeelten verbinden zich met de achterranden van de palatina.

Daar een van de neuskanalen wat uitgewerkt is, kan men één zijde van het vomer gedeeltelijk zien; deze is glad. De groeistrepen, voor zover zichtbaar, lopen van voor-onder naar achter-boven.

Het vomer werd voor het eerst als zodanig herkend door BROOM (8, bl. 171 en 172). SEELEY hield de centrale verhevenheid op het gehemeltevlak van het premaxillare ervoor (7, bl. 174).

Afmetingen :

| | |
|-----------------------------------|--------|
| Lengte op het gehemeltevlak..... | 48 mm. |
| Breedte der omsloten opening..... | 5 mm. |

HET ETHMOID.

Dit been is bij ons exemplaar afwezig. Ten minste, het is niet waar men het zou verwachten. Bij het uitwerken van de holte onder de frontalia werd echter een dik been aangetroffen bijna onder het rechter nasale, dat duidelijk van zijn plaats verschoven was. Door het prepareren is dit been grotendeels verloren gegaan. Het exemplaar No. 4000 heeft echter boven het basisphenoid een dik been, dat mediaan symmetries ligt. Bovendien ligt het zowat midden onder de frontalia. Het achtereinde van dit been is bijkbaar beschadigd. Het bovenste deel ervan is dun, doch lager draagt het aan beide zijden een driezijdige verhevenheid met een bijna plat bovenzvlak en hellende zijden. Deze verhevenheden geven het been een dikte van minstens 5 mm. Ik zal er hier echter niet meer van zeggen, daar ik dit exemplaar voor een latere gelegenheid bewaren wil.

BROOM beschrijft het ethmoid als een betrekkelijk dunne plaat, gelegen tussen de frontalia en het bovineinde van het basisphenoid; de achterrand heeft volgens hem een uitholling waarschijnlijk voor het voorste gedeelte der hersenen en een inkeping waarschijnlijk voor de gezichtszenen (10, bl. 76).

DE STAPES.

Ook deze beenderen zijn niet meer aanwezig. Het zijn blijkbaar dezelfde als het door HUXLEY bedoelde "intercalary bone" (1, bl. 653), en de door SEELEY "malleus" genoemde beenderen (b.v. 5, bl. 241). BROOM beschrijft ze als "dumb-bell shaped bone" bij *Oudenodon Kolbei* (14, bl. 348 en 350); hij noemt ze daar stapes.

DE SCLEROTICA.

Deze zijn niet aangetroffen. Eens zijn zij gevonden bij *Lystrosaurus declivis* (2, bl. 50), overigens is er nooit melding van gemaakt.

TRANSVERSA.

Daar de verhoudingen in deze schedel zo duidelijk zijn te bestuderen, kan worden geconstateerd, dat er in de schedel van *Lystrosaurus latirostris*

geen transversa aanwezig zijn. Dergelijke beenderen worden wel afgebeeld bij *Oudenodon Kolbei* door JAEKEL (12, bl. 133) en Dr. BROOM was zo vriendelijk mij mee te delen, dat zij ook voorkomen bij *Endothiodon* en *Dicynodon*.

DE NEUSOPENINGEN.

De uitwendige neusopeningen (Pl. V, VI) liggen vóór de oogholten en veel dichtër bij deze dan bij de mond. Hun omtrek kan wel vierzijdig genoemd worden. Een der in 't oog vallende hoeken ligt aan het vooreinde der neusopening op de grens van de zijribbe van het premaxillare en het nasale.

De inwendige neusopeningen (Pl. III, IV) zijn gezamenlik eivormig, met de smalle punt naar voren gekeerd. Zij worden van elkaar gescheiden door het zeer dunne vomer en begrensd door de pterygoidea, de palatina, de maxillaria en het premaxillare.

Afmetingen :

| | |
|---|--------|
| Grootste lengte der inwendige openingen..... | 48 mm. |
| Grootste breedte der inwendige openingen..... | 12 mm. |
| Grootste hoogte der uitwendige openingen..... | 16 mm. |
| Grootste lengte der uitwendige openingen..... | 20 mm. |

DE OOGHOLTEN.

De vorm der oogholten is eveneens zeer hoekig. De rand vormt een bijna rechte hoek op de grens van frontale en postfrontale. Dan is er een scherpe bocht in het postorbitale en een in het jugale. Er is er nog een in de bovenrand van het lacrymale en een in het prefrontale nabij het frontale. Het gedeelte van de rand, dat gevormd wordt door het postfrontale, het postorbitale en een gedeelte van het jugale tot de scherpe bocht in dit been (Pl. I, II, V, VI), ligt in een vlak, dat een bijna rechte hoek maakt het met vlak, waarin dat gedeelte van de rand ligt, hetwelk gevormd wordt door het frontale en het postfrontale. De rand, gevormd door het overige deel van het jugale en door het lacrymale is bijna recht en vormt als het ware een korte verbinding der twee genoemde bogen. Het eerstgenoemde vlak helt naar voren en naar buiten, terwijl het tweede vlak naar genoeg vertikaal staat en met de schedelas naar achteren zo sterk konvergeert, dat het deze ongeveer in het achterhoofdsvlak snijdt.

OWEN merkt terecht op, dat deze vorm van oogholte het dier blijkbaar in staat stelde, niet alleen zijwaarts, doch ook naar achteren en naar boven te kijken (2, bl. 50).

Afmetingen :

| | |
|---|--------|
| Grootste doorsnede (tussen de bocht in het postorbitale en de opening van het traankanaal)..... | 62 mm. |
| Kleinste doorsnede (tussen de bocht in het frontale en het einde der ribbe op het vooreinde van het postorbitale) | 43 mm. |

De slaapholten zijn breder dan lang.

Een eigenlike " hersenholte " of een " hersenkamer " is niet aanwezig, d.w.z. de hersenen lagen los, hadden dus bijna geen benige bescherming. Zij lagen direkt voor het einde van het medullare kanaal en geheel onder de parietalia en het interparietale. De langste afmeting der hersenen maakte ongeveer een rechte hoek met de richting van het medullare kanaal.

DESCRIPTION OF A NEW TRAP-DOOR SPIDER FROM CAPE COLONY.

By JOHN HEWITT, B.A. (Cantab.).

Moggridgea crudeni, sp. nov.

Types: A series of female specimens from Alicedale, collected February, 1913, by Mr. F. Cruden, who presented them to the Albany and Transvaal Museums. The species is closely related to *M. dyeri* O.P. Cambr., from which it is to be distinguished through the spinulation of the third coxa, through the arrangement of the anterior row of eyes, and in the form of the fovea.

Colour: Carapace and upper surfaces of appendages olive-brown with pale markings on the anterior half of the carapace, and less conspicuously on the legs; abdomen dull brown; ventral surfaces pale.

Carapace longer than broad, its length equal to that of the tibia, metatarsus, and half the tarsus of the fourth leg, and considerably exceeding that of the tibia, metatarsus, and tarsus of the first leg. Fovea crescentic with a short backward prolongation in the mid-line posteriorly (in *M. dyeri* this is absent as such, being represented only by a fine median groove). Anterior row of eyes with its front margins forming a slightly procurved line (in *dyeri* strongly procurved), the lateral eyes comparatively small, their area only about twice that of an anterior median; posterior medians larger than the posterior laterals. Width of ocular area exceeding the length of the first metatarsus.

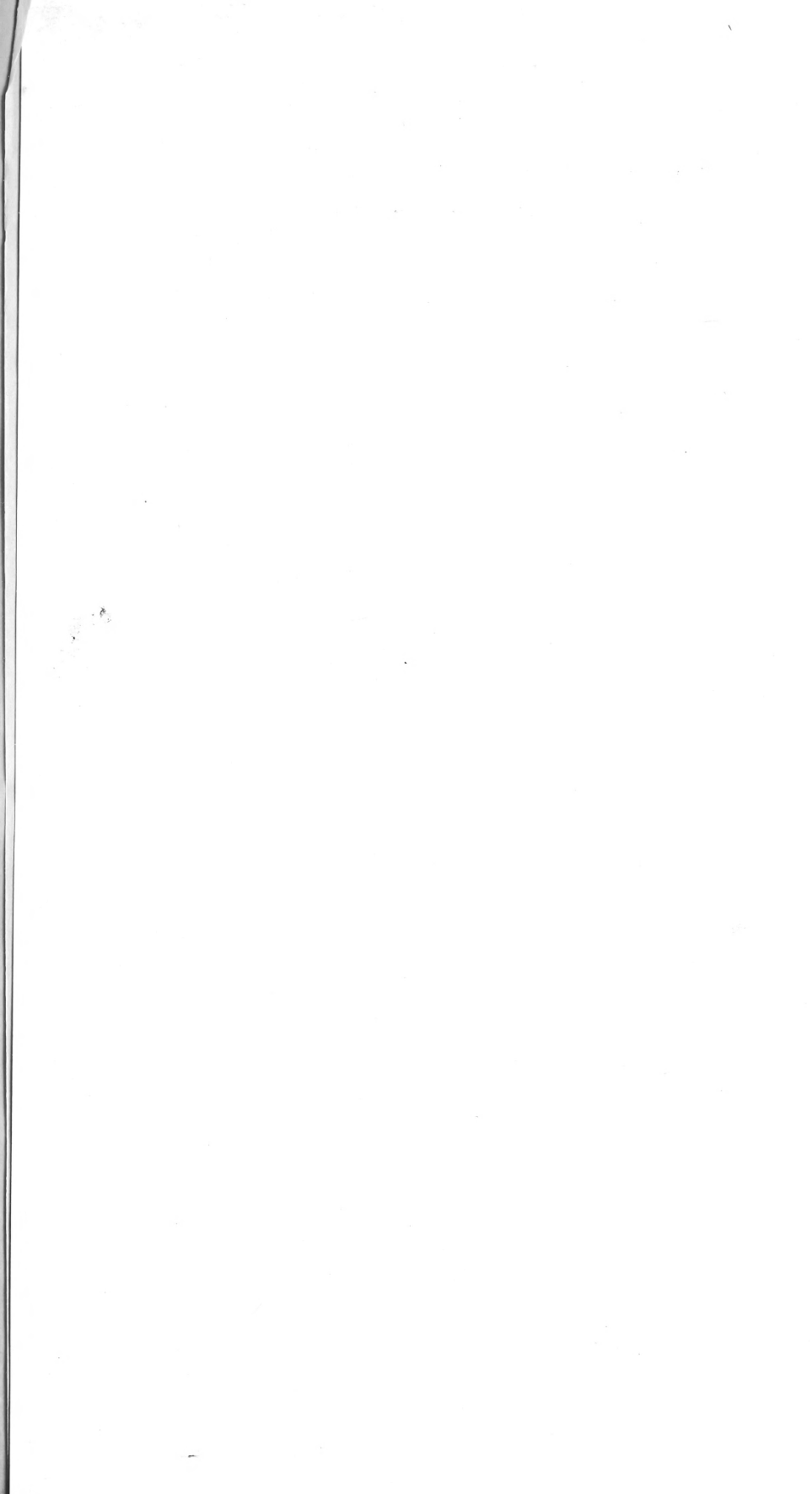
Legs: Coxae of first, second, and third legs with a large compact basal patch of short, stout spinules, that of the third coxa including about 30 to 40 spinules (in *dyeri* only about 5 to 10 spinules).

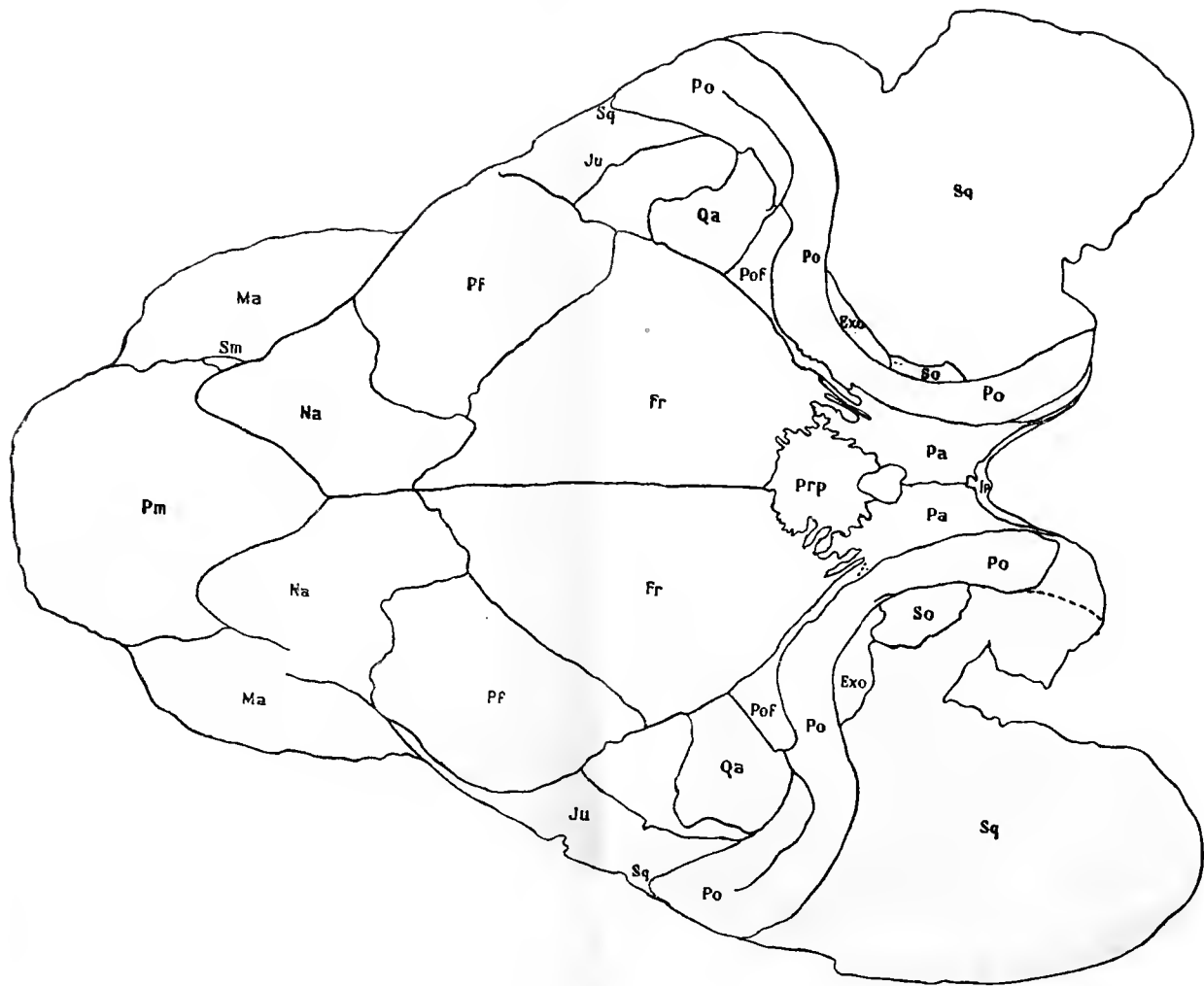
Labium with about 20 teeth.

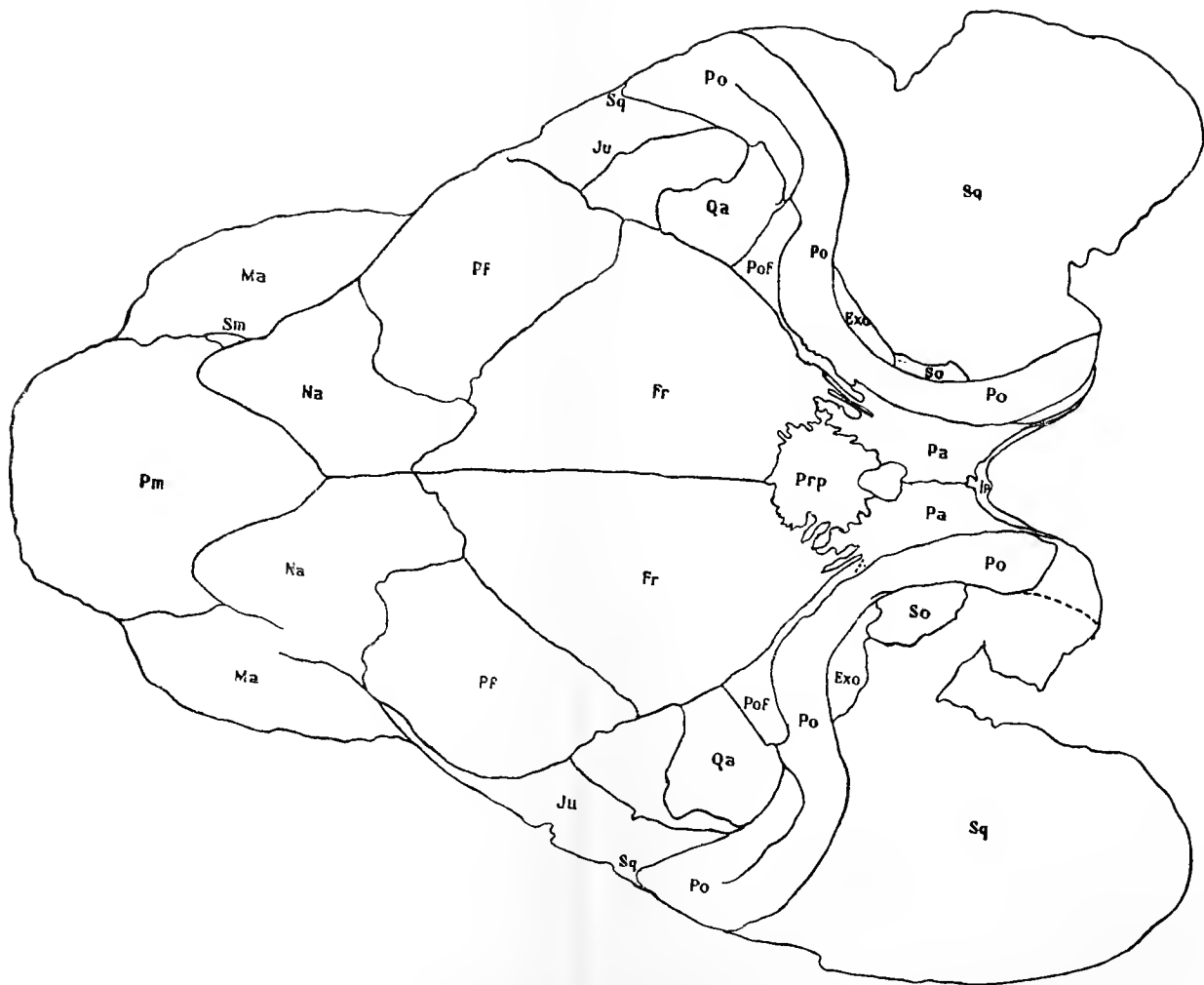
Total length 13.5 mm.

This is a rock-frequenting species. Mr. Cruden found the nests in earth-filled cracks and cavities of the rocks in the poort at Alicedale. The nests were often wedged into very narrow spaces, and were difficult to remove without injury to the spiders.

The nests of *Moggridgea crudeni* are of the usual type for this genus, but it may be noted that the lids are regularly oval. The lid is thus very different from that of *M. mordax* Purcell ("Annals of South African Museum," III, p. 70), and of *M. coegensis* Purcell, as known to me from a specimen collected at Redhouse by Mrs. Paterson, which are very pronouncedly D-shaped.



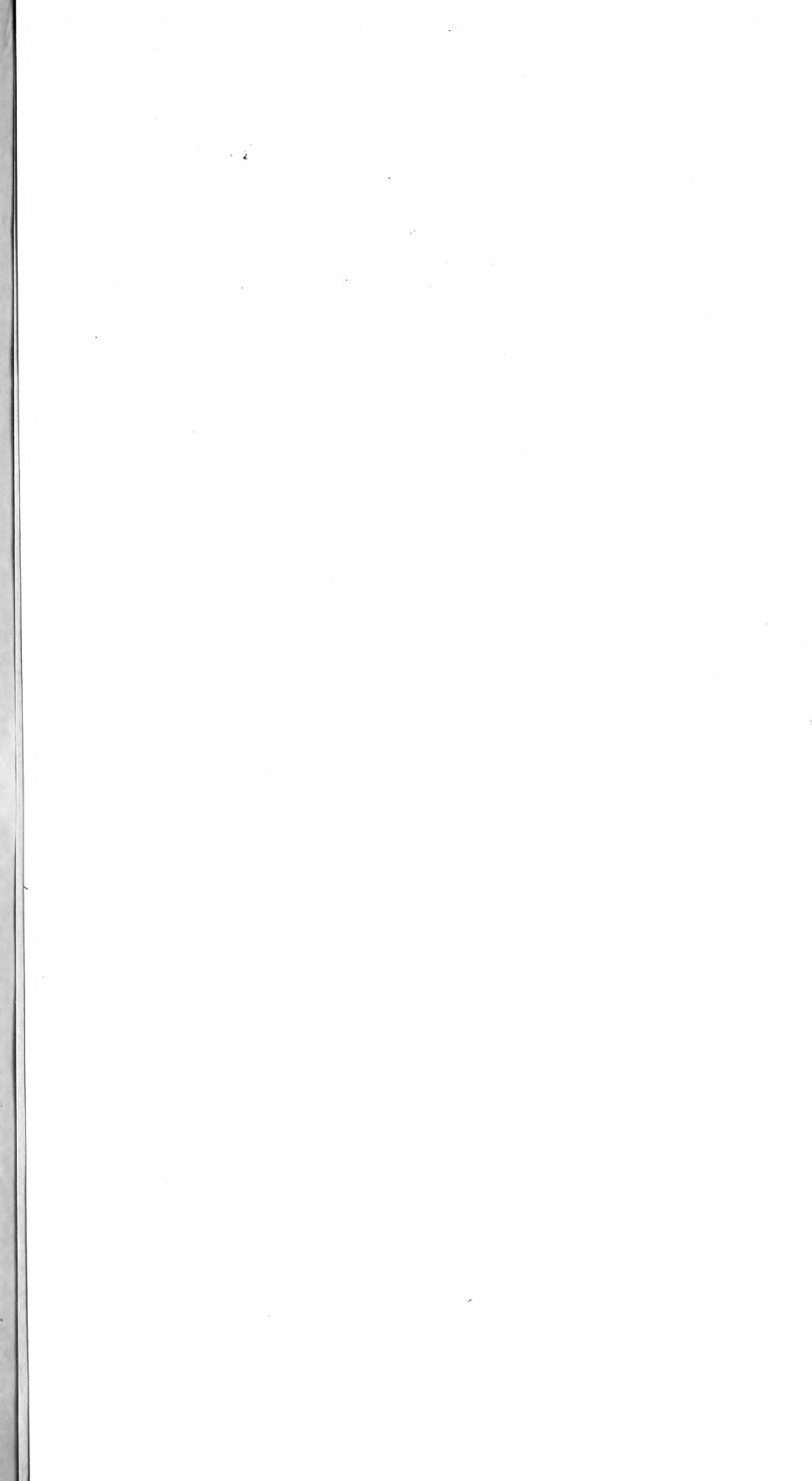


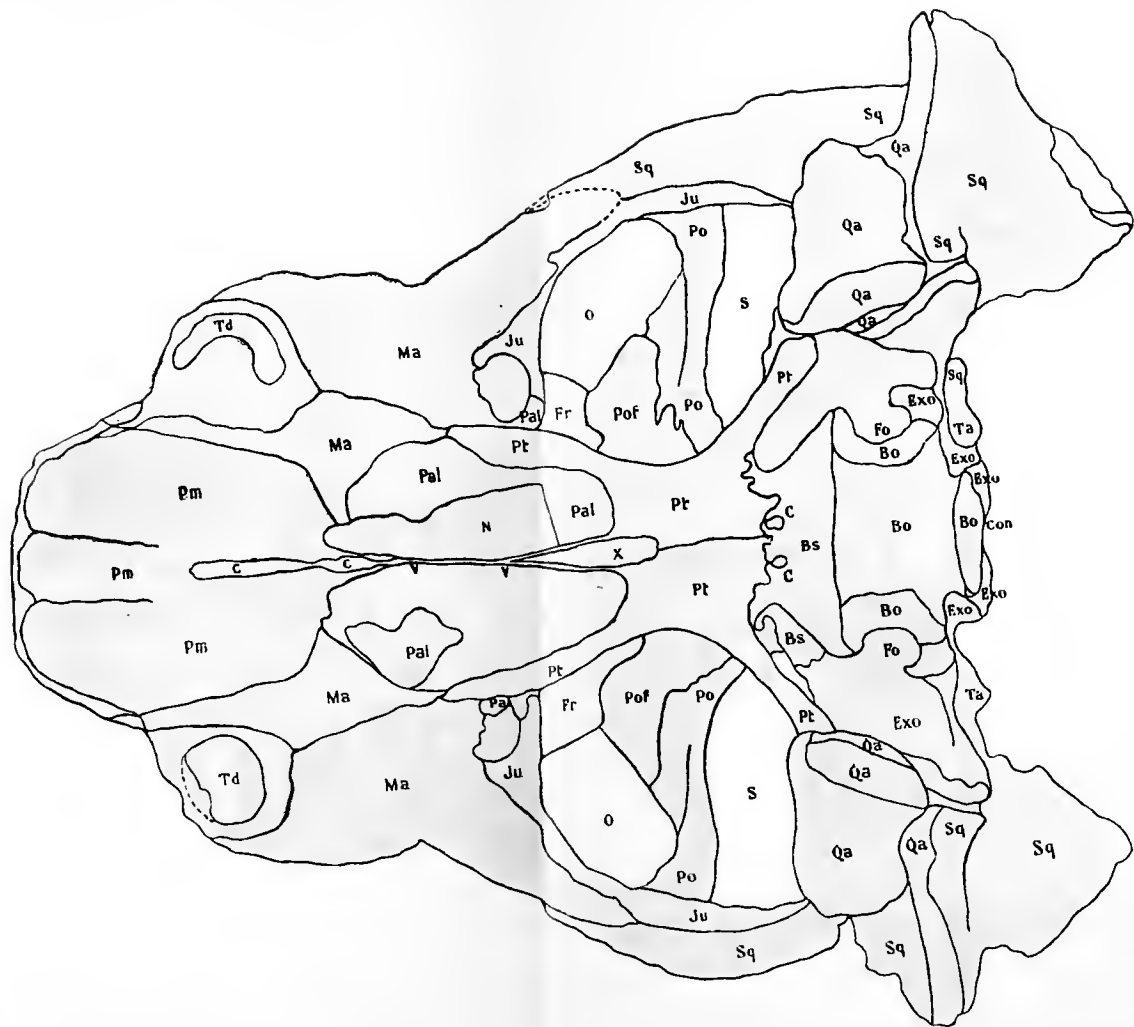




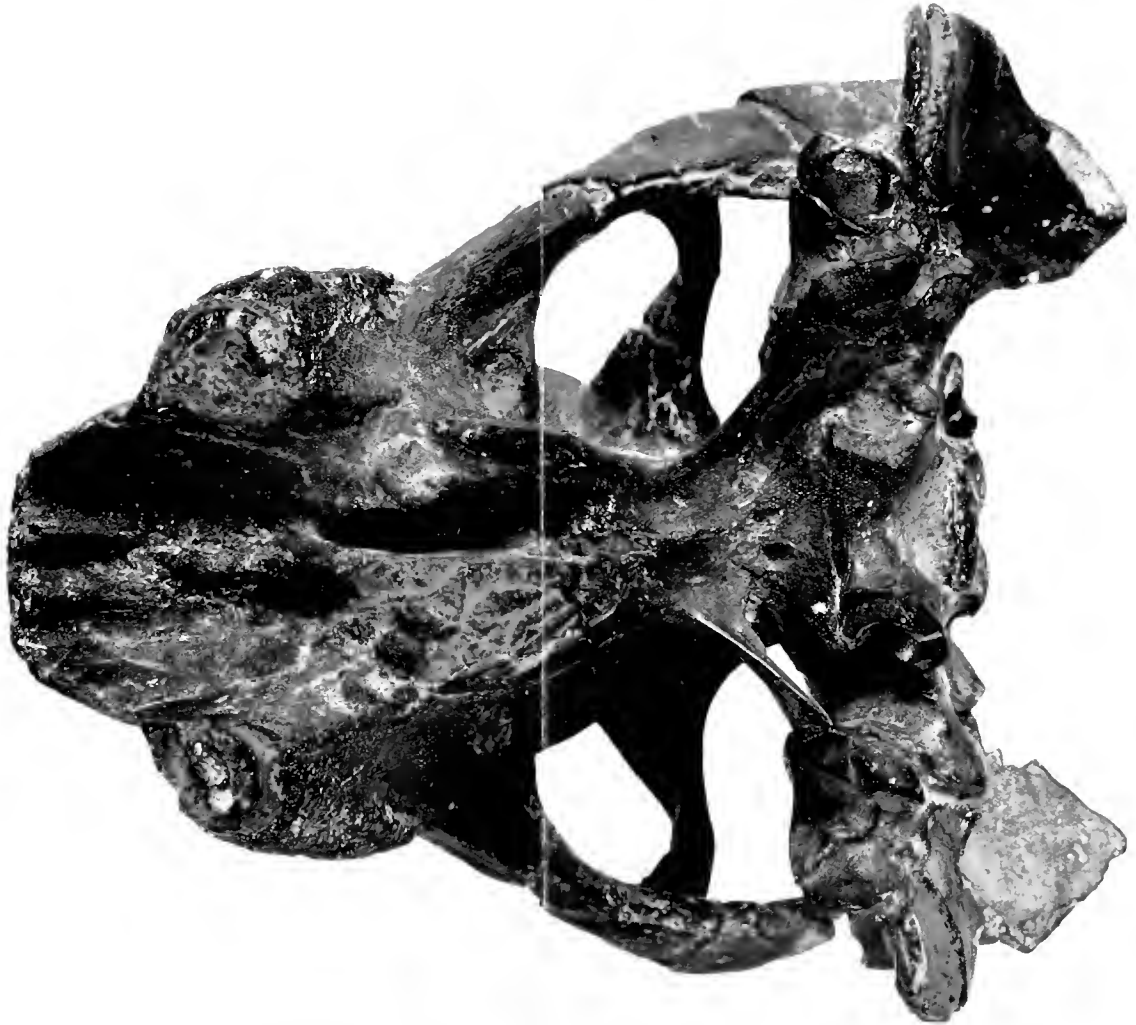
Lystrosaurus latirostris OWEN sp. Platen I en II. Bovenaanzicht van de schedel. Exo, exoccipitale; Fr, frontale; Ip, interparietale; Jn, jugale; Ma, maxillare; Na, nasale; Pa, parietale; Pf, prefrontale; Pm, premaxillare; Po, postorbitale; Pof, postfrontale; Prp, preparietale; Qa, quadratum; Sm, septomaxillare; So, supraoccipitale; Sq, squamosum. (Alle platen zijn op ware grootte.)



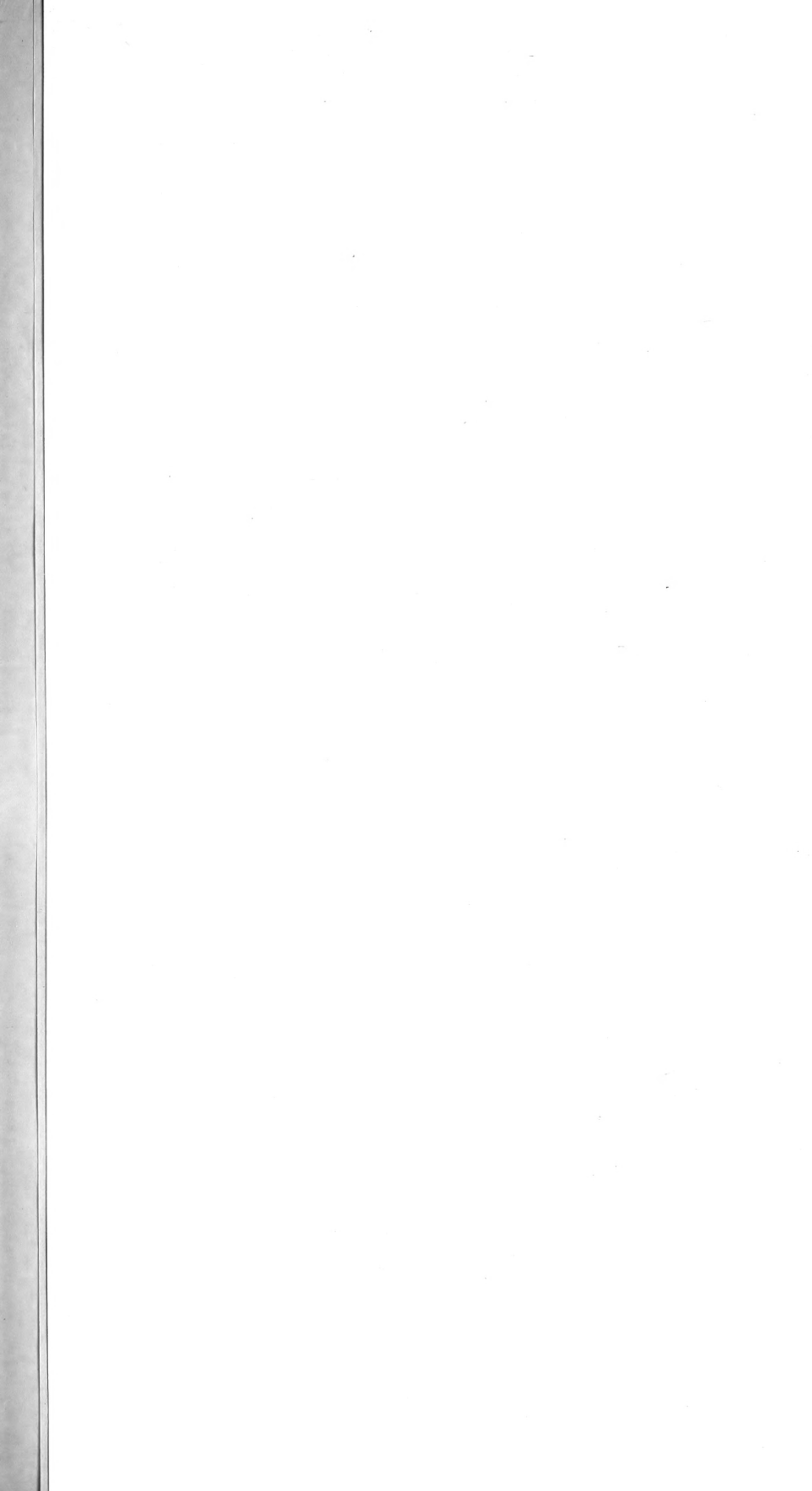


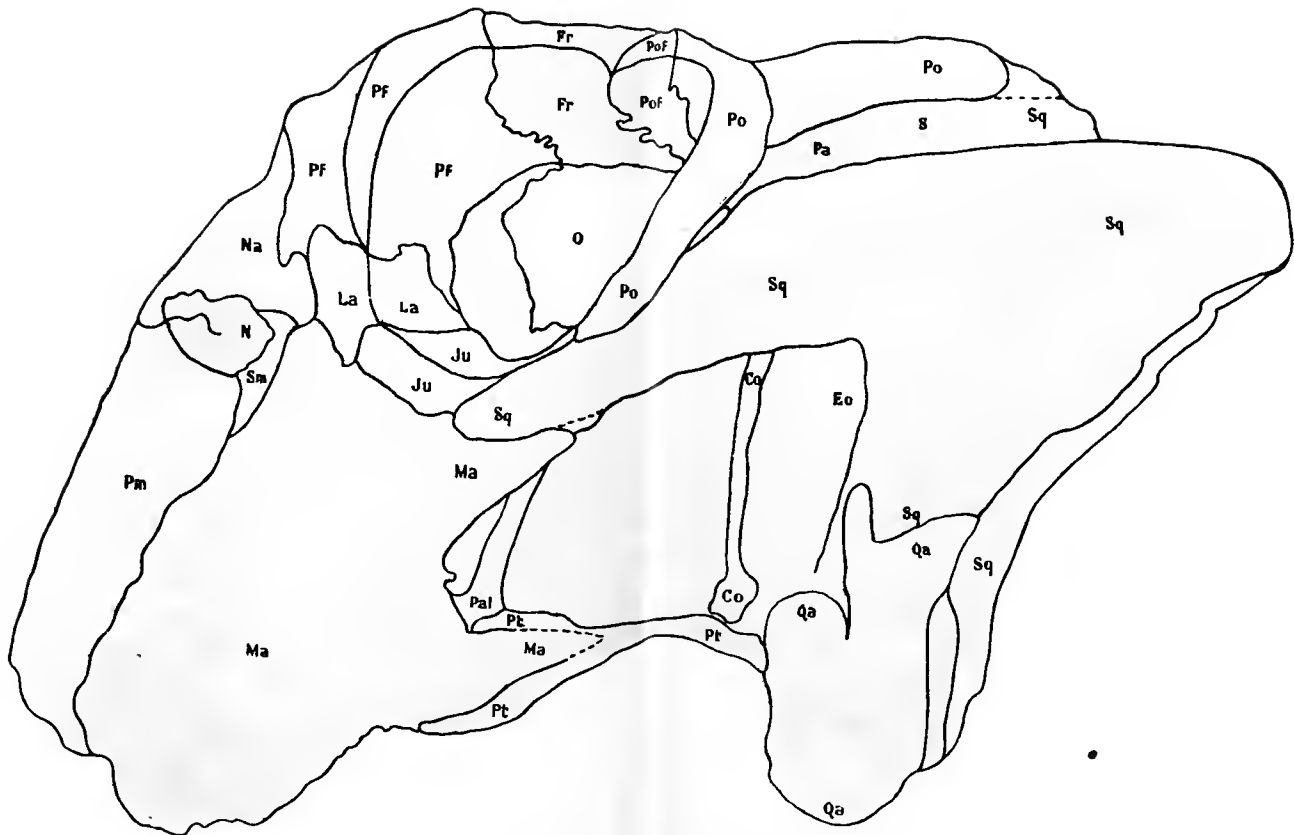






Lystrosaurus latirostris OWEN sp. Platen III en IV. Onderaanzicht van de schedel. Bo, basioccipitale; Bs, basisphenoid; C, openingen der interne carotiden; c, centrale ribbe op het premaxillare; Con, condylus; Exo, exoccipitale; Fo, fenestra ovatis; Fr, frontale; Ju, jugale; Ma, maxillare; N, neusopening; O, oogholte; Pal, palatinum; Pm, premaxillare; Po, postorbitale; Pof, postfrontale; Pt, pterygoid; Qa, quadratum; S, sphenolite; Sq, squamosum; Ta, tabulare; Td, tand; V, vomer; X, opening tusschen vomer en pterygoidea.



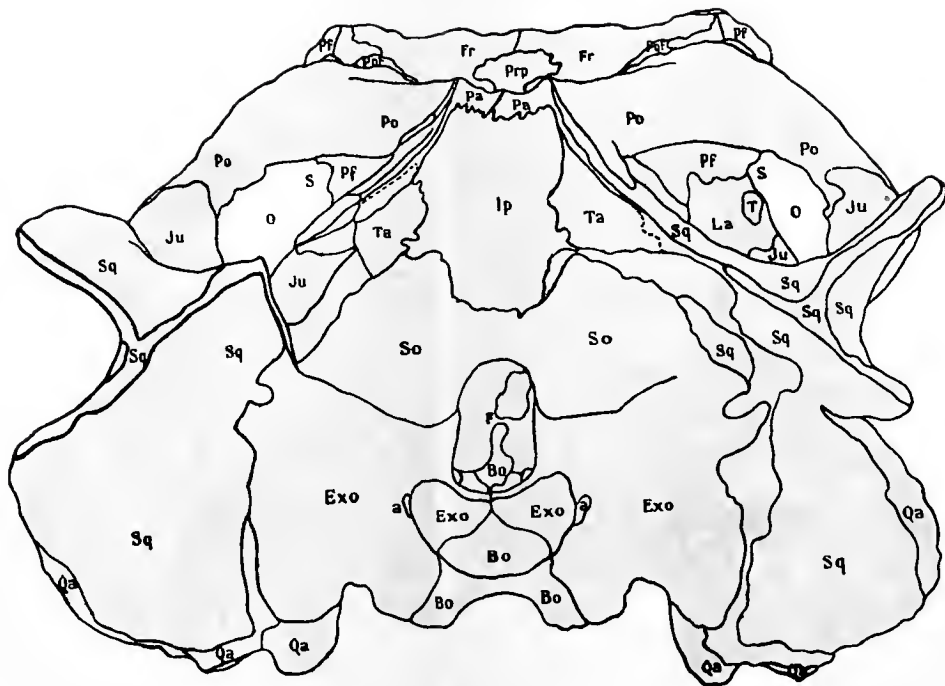


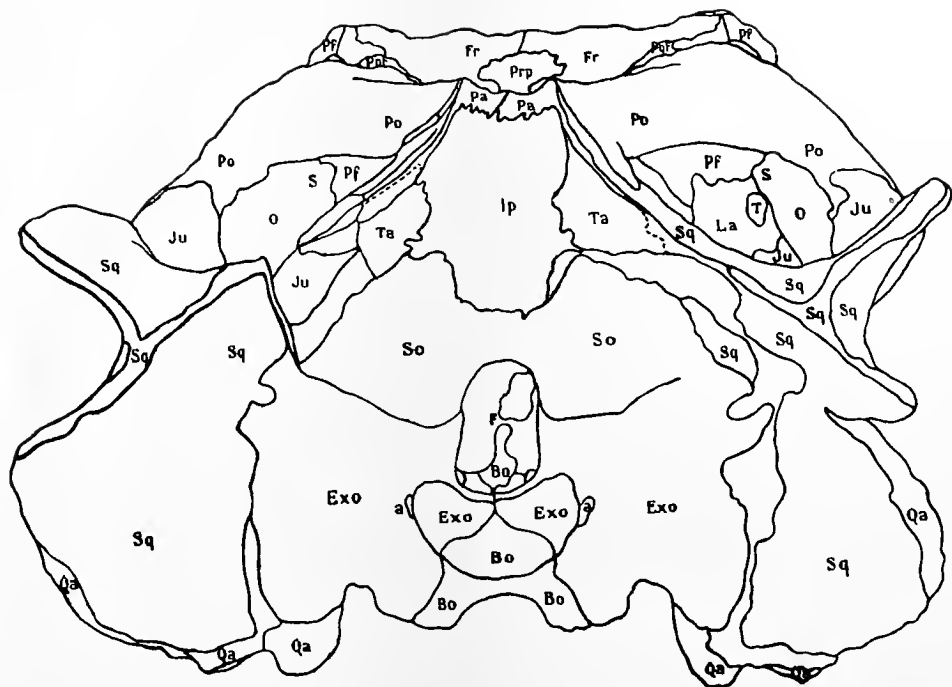






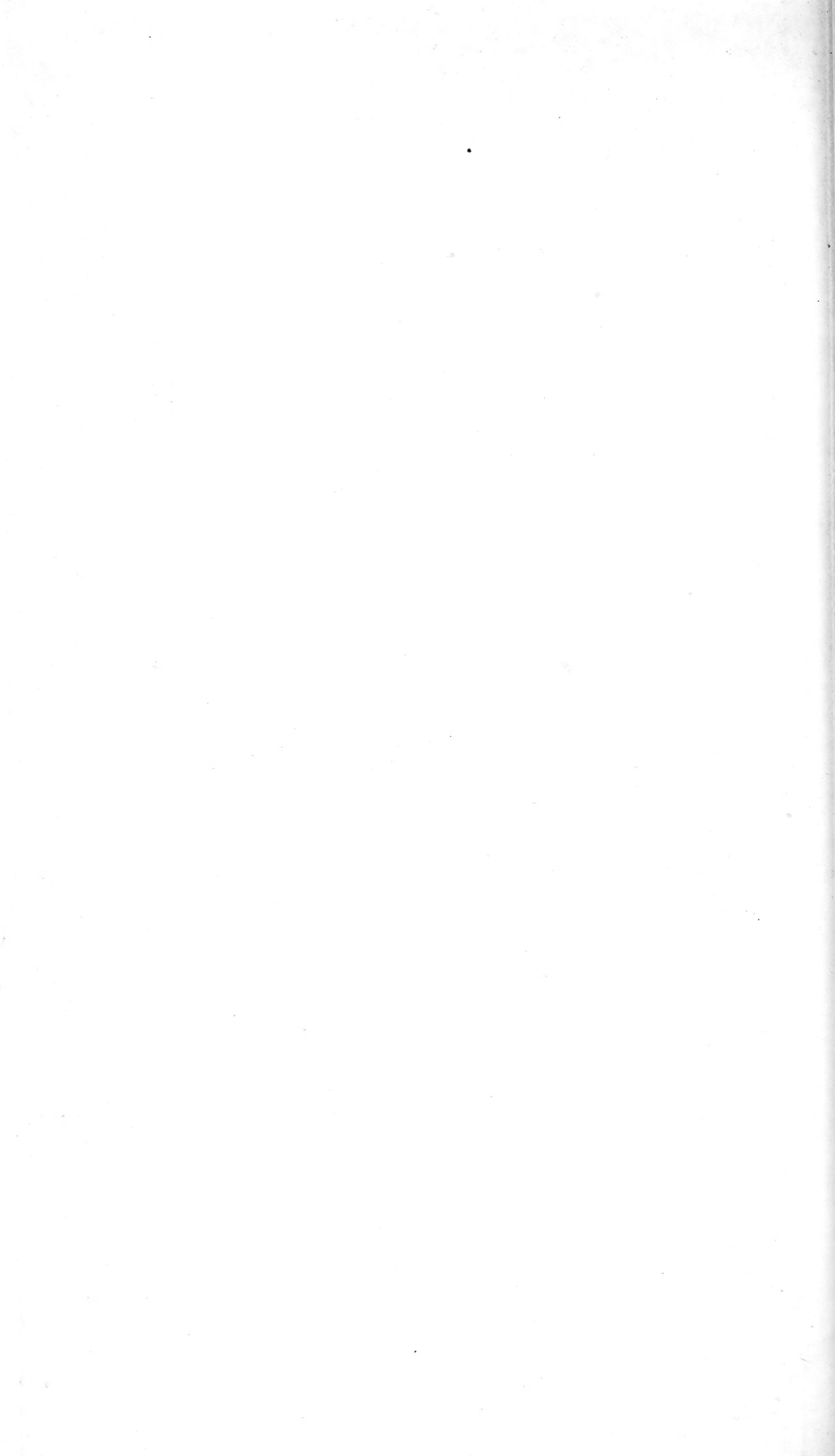
Lystrorhynchus latirostris OWEN sp. Platen V en VI. Aanzicht van de rechterzijde van de schedel. Co, columellare; Eo, exoccipitale; Fr, frontale; Ju, jugale; La, lacrymale; Ma, maxillare; N, nensopening; Na, nasale; O, oogholte; Pa, parietale; Pal, palatum; Pf, prefrontale; Pm, premaxillare; Po, postorbitale; Pol, postfrontale; Pt, pterygoid; Qa, quadratum; S, shaftolte; Sm, septomaxillare; Sq, squamosum.







Lystrosaurus latirostris OWEN sp. Platen VII en VIII. Achteraanzicht van de schedel. a, opening voor de IXde, Xde, XIde en XIIde zenuw; Bo, basioccipitale; Exo, exoccipitale; F, foramen magnum; Fr, frontale; Ip, interparietale; Ju, jugale; La, lacrymale; O, oogholte; Pa, parietale; Pf, prefrontale; Po, postorbitale; Pof, postfrontale; Pp, preparietale; Qa, quadratum; S, Slaapholte; So, supraoccipitale; Sq, squamosum; T, tranopening; Ta, tabulare.





ANNALS MEDEDELINGEN

OF THE VAN HET

TRANSVAAL MUSEUM

VOLUME IV.

PART 2, containing:—

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The Collection of Mammals in the Transvaal Museum registered up to the 31st March, 1913, with Descriptions of New Species. By AUSTIN ROBERTS.

Supplement to List of Mammals in the Transvaal Museum. By AUSTIN ROBERTS.

Obituary: Dr. J. W. B. Gunning.

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THE LATE DR J. W. B. GUNNING M.D.

ANNALS

MEDEDELINGEN

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VAN HET

Transvaal Museum.

VOL.
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OCTOBER, 1913.

No. 2.
DL.

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

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

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

INTRODUCTION.

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

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

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

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

LIST OF THE BATRACHIA COLLECTED.*

Family RANIDAE.

Genus RANA, L.

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

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

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

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



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

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

Genus MANTIDACTYLUS, Blgr.

Owing to the want of comparative material we have been forced to reject the idea of assigning a score or so of specimens to any known species after many ineffectual attempts to do so, although we have had access to the original descriptions of the species given by all the authors except that of F. Müller.* Moreover, after a careful study of the key given by Mocquard (13, pp. 55, 53), of the original descriptions especially those of Peracca, and of our own specimens, we believe that many of the species of *Mantidactylus*, as the genus is known at present, are separated by

* Vide Addenda (p. 60).

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

M. OPIPARIS, Per (15). Three examples; locality Folohe. Two are juveniles, one indeed being without vomerine teeth. The specimen which we presume to be an adult (length 30.5 mm. from snout to vent) does not entirely agree with Peracca's description (p. 9), differing therefrom in the following respects. The feet are slightly more than half-webbed: the discs of the fingers are comparatively large (according to the original description they are moderate in size): the three longitudinal folds which are said to be present on the back are not developed in this specimen, although indications of the lateral fold can be recognized. The nostril in our three specimens is nearer the tip of the snout than the eye. And lastly the inner metatarsal tubercle is not prominent. 1009-1011.

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

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

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

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

Genus RHACOPHORUS, Kuhl.

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

R. MADAGASCARIENSIS, Pet. A single specimen at Ambatoharanana. In life, colour above chestnut-brown, without the large irregular grey spots as given in the *Brit. Mus. Cat.* description (p. 91): tympanum about two-thirds the diameter of eye: vomerine teeth somewhat obliquely set on the palate: the nostril a trifle nearer the eye than the tip of the snout. Length from tip of snout to vent 63.5 mm. 965.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Type, No. 1100, in the Transvaal Museum.

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

Genus nov. MICROPHYNE.

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

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

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

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

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

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

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

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

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

Length from snout to vent 20 mm.

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

Type, No. 1155, in the Transvaal Museum.

Genus RAPPJA, Gthr.

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

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

The larger specimen measures 16.5 mm. from snout to vent.

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

Genus MEGALIXALUS, Gthr.

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

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

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

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

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

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

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

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

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

Family DENDROBATIDAE.

Genus MANTELLA, Blgr.

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

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

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

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

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

M. AURIANTIACA, Mocq. Fourteen examples from Ambatoharanana.

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

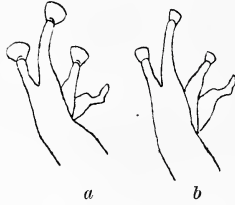
The orange-vermilion colouring in life of this species is soon lost after preservation. 1251-1264.

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

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

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

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



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

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

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

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

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

The largest specimen measures from snout to vent 25 mm.

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

Family ENGISTOMATIDAE.

Sub-Family ENGISTOMATINAE.

Genus CALOPHRYNUS, Tschudi.

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

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

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

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

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

The tongue which is entire behind is elongated and oval.

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

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

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

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

Genus SCAPHIOPHYNE, Blgr.

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

Sub-family DYSOPHINAE.

Genus DYSOPHUS, Grand.

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

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

Genus PLETHODONTOHYLA, Blgr.

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

Genus MANTIPUS, Pet.

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

Genus PLATYHYLA, Blgr.

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

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

Genus ANODONTOHYLA, F. Müller.

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

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

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

ADDENDA.

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

Mantidactylus albofrenatus, F. Müller.

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

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

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

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

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

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

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



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

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

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

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

Length from tip of snout to vent 23 mm.

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

Anodontohyla boulengeri, F. Müller.

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

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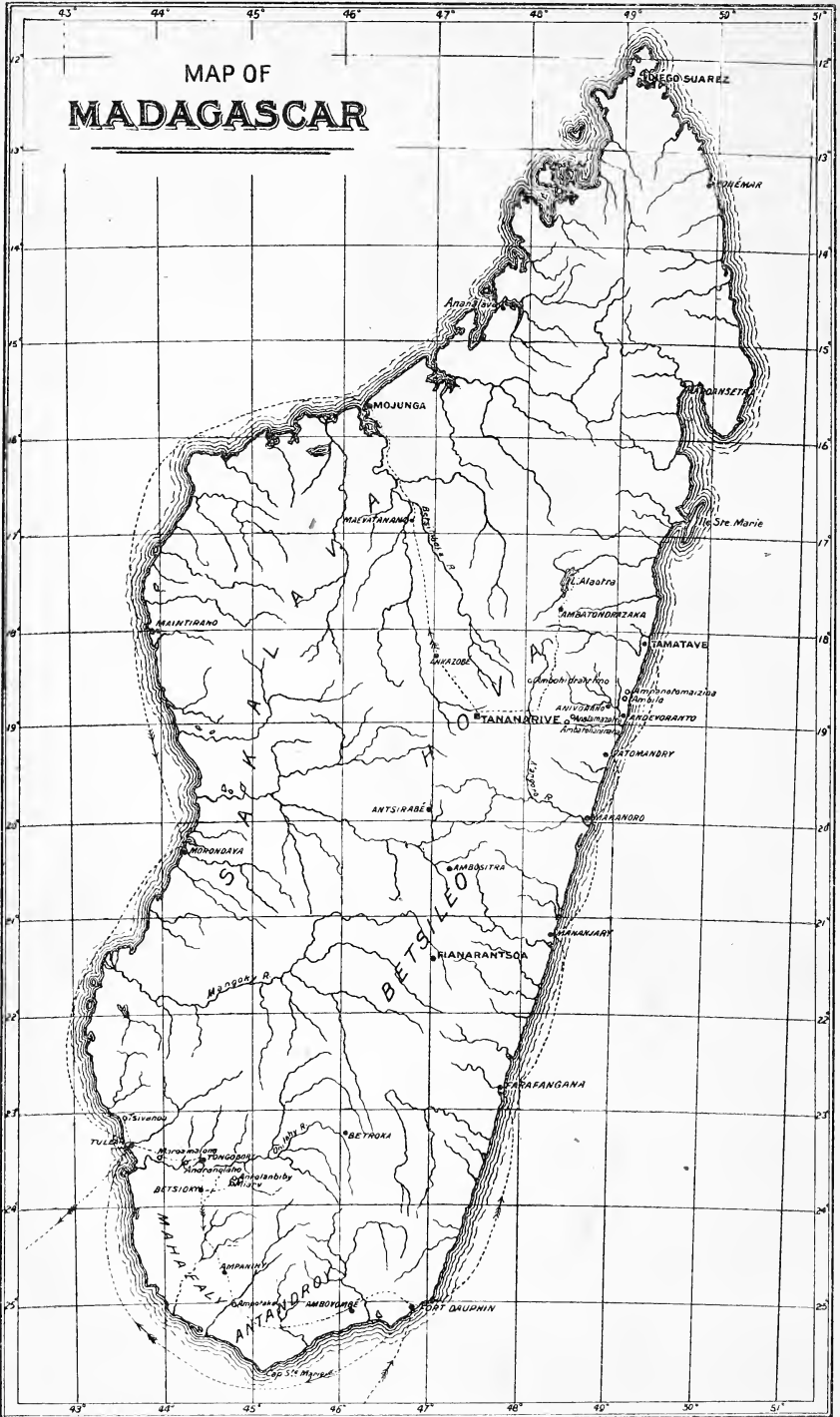
(15) PERACCA, M. G.—“Descrizione di nuove specie di Rettili e Anfibi di Madagascar.” *Boll. d. Mus. di Zool. ed Anat. comp. d. R. Univ. d. Torino*, N. 156, pub. vol. VIII, p. 1–16, Turin, 1893.

EXPLANATION OF PLATES.

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

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

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



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



Annals of the Transvaal Museum





P.A.Methuen del.

West, Newman chr.

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

ADDENDA AND CORRIGENDA.

In the paper on the "Mammals in the Collection of the Transvaal Museum," published in *Ann. Trans. Museum*, vol. iv, part 2, a number of errors have arisen. In explanation it may be stated that the author was absent in S. Rhodesia while the paper was in the Press and the text figures were being prepared.

Page 94.—Text figure 6A should be placed under No. 207 of the list: the skull figured is that of the specimen referred to from Pirie.

Text figure 7 represents the skull of *G. jamesoni*, sp. nov., and is taken from the co-type.

Page 95.—Text figure 8 is taken from the type specimen, a ♀ (not a ♂).

Page 96.—Text figure 9 is taken from the type specimen, a ♀ (not a ♂).

Page 97.—Text figure 10 is taken from the abnormally large ♂ mentioned in the text and quoted in the first column of measurements. This specimen may not be referable to *G. anomalus* as it is apparently not an old one judging by its dental characters, though in other respects it has the appearance of age.

Page 100.—In No. 219 of the list, read in the description "Mammæ 2 ing" for "2mg."

Page 101.—All the specimens mentioned after No. 223 are in the Mounted Collection, and should be so distinguished by insertion between Nos. 223 and 224 in large type of the words "Mounted Specimens."

Page 102.—No. (66), read "*Chrysochloris*" for "*Chrisochloris*."

Pages 108 and 109.—In the description of *G. mahali* read "(No. 207 in the list)" for 200.

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**THE COLLECTION OF MAMMALS IN THE TRANSVAAL MUSEUM
REGISTERED UP TO THE 31st MARCH, 1913, WITH DE-
SCRIPTIONS OF NEW SPECIES.** (Text figures 6-11.)

By AUSTIN ROBERTS.

1. *Otolemur crassicaudatus kirki*, (Gray).
1 ♂, Boror (Kirby & Roberts).
2. *Otolemur crassicaudatus garnetti*, (O'Gilby).
1 juv. ♀, Tambarara, P.E.A. (Grant).
1 ♂, 1 ♀, 1 juv. ♀, Woodbush (Jameson).
2 ♂, Zimbiti, Beira (Sheppard).
1 ♂ (juv.), Ngoye Hills, Zululand (Grant).
3. *Galago maholi*, A. Sm.
2 ♂, 1 ♀, Zoutpan, Pretoria District (Roberts).
1 juv. ♂, Mazoe, Mashonaland (Darling).
4. *Galago granti*, Thos. and Wr.
1 ♂, Coguna, Inhambane, P.E.A. (Grant).
1 ♀, Mzimbiti, Beira (Sheppard).
2 ♂, Boror (Kirby and Roberts).
5. *Galago nyassae*, Elliot.
1 ♂, Blantyre District (pres. Col. Lyell).
6. *Hypsignathus monstrosus*, (Allen).
2, ? West Africa.
7. *Epomophorus Wahlbergi*, Sund.
1 ♂, 1 ♀, 1 juv. without skull, Port St. Johns District (Swinny).
1 ♂, Malvern, Natal (Jameson).
1 ♀, 3 juv. (2 ♂, 1 ♀), Hector Spruit, Transvaal (Streeter).
1 ♂, 1 ♀, Tzaneen Estate, Transvaal (Jameson).
In spirits: 1, Hector Spruit (Streeter); 1, Komatipoort (pres. Major Hamilton).
8. *Epomophorus crypturus*, Ptrs.
1 ♀, Tzaneen Estate (Jameson).
5 ♂, Inkomati River, Transvaal (Roberts, Joubert).
In spirits: 1, Barberton (pres. H. C. Williams, Esq.); 1, Kalomo, N.W. Rhodesia (Jameson).
9. *Rousettus Leachi*, (A. Sm.).
10, Knysna (Rex).
10. *Eidolon helvum* (Kerr.)
In spirits: 1, Rustenburg (pres. J. P. Shaw, Esq.).
11. *Rhinolophus augur*, K. And.
4 ♂, 1 juv. (and 1 in spirits), Knysna (Rex).

12. *Rhinolophus aurgur zuluensis*, K. And.
 1 ♂, Port St. Johns (Swinny).
 1 ♂, Insuzie Valley (Grant).
 2 ♂, Venterskroon, Potchefstroom (Roberts).
 5 ♂, 9 ♀, and 6 in spirits, Wonderfontein Caves (Jameson).
 2 ♂, 1 ♀, and 1 in spirits, Johannesburg (Jameson).
 1 ♀, Pretoria (Roberts), and 2 in spirits (Jenkins and v. Dam).
 2 ♂, Makapan Caves (Jameson).
 Also in spirits: 1, Folderia, Ermelo (Swierstra and v. Hoepen);
 6, Lydenburg (Krantz); 7, Louws Creek (Gough); and 1, Woodbush
 (pres. Hon. P. A. Methuen).
13. *Rhinolophus empusa*, K. And.
 In spirits: 3, Hennops River (Swierstra); 1, Irene (Taylor); 1 Pretoria
 District (v. Niekerk).
14. *Rhinolophus simulator*, K. And.
 1 ♀, Klein Letaba (Grant).
 1 ♂, 1 ♀, Hector Spruit (Streeter).
15. *Rhinolophus capensis*, (Lcht.).
 In spirits: 1, Knysna (Rex).
16. *Rhinolophus Swinnyi*, Gough.
 4 ♂, 2 ♀, Port St. Johns (Swinny), including type and cotype.
17. *Hipposiderus Commersoni*, (Geoffr.).
 1 ♂, Zimbiti, Beira (Sheppard).
18. *Hipposiderus caffer*, (Sund.).
 1 ♂, Port St. Johns (Swinny).
 1 ♀, and 1 in spirits, Malvern, Natal (Jameson).
 9 ♂, Hector Spruit (Streeter).
 1 ♂, Tete (Grant).
 In spirits: 1, Sabi, Transvaal (pres. Major Hamilton); Victoria Falls
 (pres. Hon. P. A. Methuen).
19. *Nycteris capensis*, (A. Sm.).
 3 ♂, 2 ♀, Port St. Johns (Swinny).
 2 ♂, and 1 in spirits, Malvern, Natal (Jameson).
 2 ♂, 3 ♀, Fountain Grove (Jameson).
 1 ♀, Pretoria (Roberts), and 1 in spirits (Dr. Meyer).
 1 in spirits, Metlapetsi River, Transvaal (pres. Dr. Breyer).
- The specimens from the Transvaal are paler and larger (in so far as
 body and ear measurements are given by collectors) than those from
 elsewhere, though the skulls are identical, and they should perhaps rather
 be referred to *damarensis* of Peters. The following will illustrate the
 difference in size:—
- | | H. and B. | Tail. | Ear. |
|---------------------------|-----------|-------|-------|
| 5 <i>capensis</i> ... | 51-55 | 47-50 | 25-32 |
| 5 <i>damarensis</i> ? ... | 57-62 | 55-63 | 34-38 |
20. *Vespertilio capensis*, (A. Sm.).
 1 each, Johannesburg (Jameson), Pretoria City (Roberts), and Bush-
 veld, Pretoria District (Roberts).
 In spirits: 4, Krabbefontein, Transvaal (pres. Dr. Breyer); 2, Johannes-
 burg (Jameson); 6, Pretoria; 1, De Kroon, Pretoria District (van
 Dam); 5, Modderfontein (Haagner); 3, Lydenburg (2 Gurr, 1
 Krantz); 1, Grahamstown.

21. *Pipistrellus kuhli fuscatus*, Thos.
 1 ♂, Malvern (Jameson).
 1 ♂, 1 ♀, Tzaneen Estate (Jameson).
 1 ♀, Port St. Johns (Swinny).
22. *Pipistrellus rusticus*, Tomes.
 1 ♀, Tzaneen Estate (Jameson).
 1, Olifants River, Pretoria District (Noomé).
 1 ♂, 1 juv., Hector Spruit (Stréeter).
23. *Pipistrellus nanus*, Ptrs.
 4 ♂, 1 ♀, and 3 in spirits, Malvern (Jameson).
24. *Pipistrellus nanus australis*, subsp. nov.
 1 ♂, 4 ♀, Port St. Johns District (Swinny).
 1 ♀, Port St. Johns (Shortridge).

Darker in shade of colour and with a slightly larger skull than the specimens from Malvern, Natal, which agree with Peters' description of *nanus*. According to Thomas and Schwann (*Proc. Zool. Soc.*, 1905, p. 258) the skull of the type specimen of *Vespertilio subtilis*, Sund., is not like that of *nanus*, but of a typical *Pipistrellus* of small size; the measurements recorded by them also indicate that *subtilis* is smaller than this southern race of *nanus*. Type: ♀, F.M. No. 1076, ex coll. H. H. Swinny, Port St. Johns, 20.4.08. "H. and B., 36 mm.; tail, 34; hind foot, 5; ear, 9." Skull: gr. length 12.5, basal length 9.6, breadth 7.1, C.-M. series 4.2, breadth at molars 5. Forearm (skin) 30.

The following figures will illustrate the difference in size between the skulls of the two races:—

| | Gr. leng. | Basal leng. | Breadth. | C.-M. leng. | Br. of Mol. |
|------------------|-----------|-------------|----------|-------------|-------------|
| <i>nanus</i> ... | 11.6-12 | 9.1-9.3 | 6.4-7 | 3.9-4 | 4.6-4.9 |
| <i>australis</i> | 11.7-12.6 | 9.3-9.7 | 6.8-7.1 | 4.1-4.3 | 4.8-5 |

25. *Scoteinus schlieffeni australis*, Thos. and Schwann.
 1 ♂, Tete (Grant); also skin without skull.
26. *Scotophilus nigrita dingani*, (A. Sm.).
 1 juv., Malvern (Jameson).
 1 juv., Lourenço Marques (pres. C. W. Howard).
27. *Scotophilus nigrita herero*, Thos.
 1, ♂, Pretoria (pres. Dr. J. W. B. Gunning).
28. *Scotophilus viridis*, Ptrs.
 2 ♂, Beira (Sheppard).
29. *Kerivoula lanosa*, (A. Sm.).¹
 1 ♀, Knysna (Rex); also 1 in spirits.
30. *Kerivoula nidicola*, (Kirk).
 1, Boror (Kirby and Roberts).

This specimen is much more brightly coloured than those from Knysna (*lanosa*), and the skulls differ considerably in size, measuring:—

| | Gr. leng. | Basal leng. | Breadth. | C.-M. Series. | Br. of Mol. |
|------------------------|-----------|-------------|----------|---------------|-------------|
| <i>K. lanosa</i> ... | 13.5 | 10.5 | 8.3 | 5.2 | 5.2 |
| <i>K. nidicola</i> ... | 15.4 | 11.6 | 9.9 | 6 | 6 |

In preparing his monograph of the Chiroptera, Dobson seems to have taken one of Smith's typical specimens of *K. lanosa* and given it the name

of *K. brunnea*. At the same time he mistook Kirk's *K. nidicola* for *lanosa*, basing his description of the latter upon the type of the former. Recently this Borer specimen of *K. nidicola* has been identified with *K. brunnea* (vide *Ann. Transv. Mus.*, Vol. III, No. 1, p. 56).

31. *Taphozous mauritianus*, Geof.
1, Tzaneen Estate (Uhrde).
32. *Miniopterus dasythrix*, (Temm).
2 ♂, 1 ♀, Knysna (1 Grant, 2 Rex).
33. *Miniopterus natalensis*, (A. Smith).
14, Wonderfontein Caves (Jameson); also 3 in spirits.
7, Gatkoppies, Waterberg (Jameson).
1 ♀, Tzaneen Estate (Jameson).
6, Hector Spruit (Streeter).
In spirits : 79, Pretoria District (Jenkins and v. Dam); 2, Makapan Caves (Hon. P. A. Methuen).

The specimens from Gatkoppies were given the subspecific name of *M. n. Breyeri*, but the difference in colour is so very slight, while there is no other means of distinguishing them, that I do not feel justified in recognizing the race. The specimens from Hector Spruit are quite distinct in colour, some of them having the whole of the throat down to the middle of the breast, the sides of the neck, and a collar over the back of the neck of a dull earthy maroon; but in other respects they are similar to those from elsewhere in the Transvaal.

34. *Miniopterus fraterculus*, Thos. and Schw.
2 ♀, Knysna (Grant).
35. *Nyctinomus Bocagei*, Seabra.
1 ♂, Potchefstroom (Jameson); also 2 in spirits.
2 ♂, 1 ♀, Florida, Transvaal (Jameson).
36. *Nyctinomus aegyptiacus*, E. Geof.
1 in spirits, Grahamstown (pres. Mrs. G. White).
2 in spirits, Pretoria (pres. C. W. Howard and Schwann).
37. *Chaerophon limbatus*, Ptrs.
1 in spirits, Lourenco Marques (pres. C. W. Howard).
38. *Macroscelides melanotis*, (O'Gilby).
1 ♀, Klipfontein (Grant).
39. *Macroscelides proboscideus*, (Shaw).
1 ♀, Deelfontein (Grant).
40. *Nasilio brachyrhynchus*, (A. Sm.).
1 ♂, 1 ♀, 1 juv., Tzaneen Estate (Jameson).
(?) 1 ♂, Nylstroom (Roberts).
41. *Elephantulus Edwardsi*, (A. Sm.).
1 ♂, Hanover, C.P. (Shortridge).
1 ♀, Deelfontein (Grant).
42. *Elephantulus rupestris Jamesoni*, Chubb.
6 ♂, 6 ♀, Johannesburg (Jameson).
43. *Petrodromus tetradactylus*, Ptrs.
3 ad. 1 juv. ♂♂, 3 ad. 1 juv. ♀♀, Boror, P.E. Afr. (Kirby and Roberts).
4, Chirinda Forest, S. Rhod. (C. F. M. Swynnerton).

An old ♂ from Boror measures "H. and B. 190, tail 171, hind foot 54, ear 32"; skull: gr. leng. 53·2, bas. leng. 46·6, zyg. br. 27·9, dent. ser. 28·3, mol. ser. 18·2, br. at m¹. 17·9.

44. *Petrodromus Beirae*, spec. nov.

1 ad. ♂ (type), 1 juv. ♀, and 3 without skulls, Zimbiti, Beira.

This species differs from the foregoing, which it resembles in colour, in having longer feet, a larger skull, and wide diastema between all the teeth from the canine to the third premolar in the lower jaw; in the maxilla the teeth are also somewhat more widely separated than in *tetradactylus*, especially P2 and P3. The skull of the type and an adult ♂ of *tetradactylus* of the same age measure, respectively:—

| | Gr. leng. | Bas. leng. | Zyg. br. | Dent. | Mol. | Br. Mol. |
|--------------------------|-----------|------------|----------|-------|------|----------|
| <i>Beirae</i> ... | 55·4 | 49·5 | 28·6 | 29·2 | 18·2 | 18 |
| <i>tetradactylus</i> ... | 50·8 | 45 | 26 | 27·5 | 17 | 18 |

Unfortunately, none of the specimens have been measured in the flesh; but it is clear from measurements of the hind feet taken from the skins that those from Beira are longer, the measurements being 55–57 as against 48–51 (50–54 in flesh). The cotype, in which the skull is not complete, measures 54 in the hind foot and 17·6 across the molars, although it is very young, the hindmost molar being still absent.

It is clear from Peters' figure of the skull of *tetradactylus* that he took a Boror specimen as the type, unless, of course, those taken at Tette were similar; but he states that he found it to be more common in Boror, probably at the same place on the Liquari River where the specimens of *tetradactylus* above mentioned were taken, and it seems most likely that he chose the type from the larger series.

45. *Petrodromus occidentalis*, spec. nov.

1 ♂, 2 ♀, N.W. Rhodesia (C. Wilde).

This species apparently agrees with the description of *P. venustus*, Thos., as regards colour, but has a longer tail, hind foot, and ear. In regard to the teeth, their position seems to be similar to those of *tetradactylus*, but the inner cusp of P2 is missing; this character is, however, not to be relied on, as the cusp apparently wears down with advancing age.

Type: Young adult ♀, T.M. No. 677, ex coll. C. Wilde, N.W. Rhodesia, 11.9.07. "H. and B. 205, tail 180, hind foot 58 (in skin 54), ear 35"; skull: gr. leng. 53·4, bas. leng. 47·1, zyg. br. 27·8, dental ser. 28, molar ser. 17·6, breadth at molars 18 mm.

46. *Petrodromus Schwanni*, Thos. and Wr.

1 ♀, Coguno, Inhambane, P.E. Afr. (Grant).

The peculiar knobs on the bristles of the under surface of the tail of this species are probably the result of grass fires having scorched the ground over which the animals are forced to run, and thus the bristles have become burnt and formed into peculiar knobs. It is significant that this specimen was taken about the time grass fires are generally found to be in progress in that belt of country.

47. *Rhynchocyon Cirnei*, Ptrs.

1 young ad. ♂, 1 ♀, Boror, P.E. Afr. (Kirby and Roberts).

These are topo-types of the species, but are not as large as the type, which was probably very old.

48. *Myosorex varius*, Smuts.

4, Knysna (Rex).

49. *Myosorex caffer*, Sund.
Large series, Port St. Johns (Swinny).
1 ♀, Hilton Road, Natal (Jameson).
1, Wakkerstroom (Jameson).

50. *Myosorex Sclateri*, Thos. and Schw.
2 ♀, Ngoye Hills (Grant).

51. *Myosorex Swinnyi*, Chubb.
Large series, Port St. Johns (Swinny).

The type of this species is the smallest in the series, but the largest do not appear to overlap the measurements of *M. Sclateri* to which this species is allied.

52. *Myosorex tenuis*, Thos. and Schw.
1 ♂, Tzaneen Estate (Jameson).

The following table of measurements may be found useful for reference :—

| | <i>M. varius.</i> | <i>M. caffer.</i> | <i>M. Sclateri.</i> | <i>M. Swinnyi.</i> | <i>M. tenuis.</i> |
|------------------|-------------------|-------------------|---------------------|--------------------|-------------------|
| H. and B. ... | 79-90 | 73-92 | 98-103 | 74-95 | 81 |
| Tail ... | 51-56 | 37-46 | 49-55 | 36-46 | 40 |
| Hd. ft. ... | 13-14 | 13-14.5 | 16 | 14-15 | 14 |
| Ear ... | 9 | 9-10.5 | 10-11 | 9-11 | 11 |
| Skull :— | | | | | |
| Gr. leng. ... | 21-21.8 | 22.3-23.7 | 24.5-25.5 | 23-24 | — |
| Bas. leng. ... | 18.5-19 | 19.5-21 | 21.8-22.3 | 20.2-21.5 | — |
| Gr. br. ... | 10.3 | 10.3-11.2 | 11.9-12.1 | 10.9-11.5 | — |
| Dent. ser. ... | 8.9-9.7 | 9.5-10.5 | 10.5-10.8 | 9.8-10.5 | 9.3 |
| Molar ser. ... | 5.4-5.7 | 5.6-6 | 6.2 | 5.6-6.2 | 5.3 |
| Br. max. at mol. | 6.5-7.1 | 7.1-7.5 | 7.5-7.6 | 6.8-7.4 | 6.7 |

53. *Pachyura gracilis*, Blainv.
1 ♀, Wonderfontein (Jameson).
1 in spirits, Krabbefontein (pres. Dr. Breyer).
54. *Crocidura flavescens*, I. Geof.
2, Knysna (Rex).

55. *Crocidura cinnamomea*, (Leht.).
Very large series, Port St. Johns (Swinny).
These specimens all lack the dull reddish orange colour on the chin and chest which characterises *flavescens*, and also differ in having a smaller skull.

The following specimens seem also to be referable to this species :—
1 ♀, Wakkerstroom; 1 ♂, Hilton Road; 1 ♂ and 2 in spirits, Malvern (Jameson); and 1 ♂, Wakkerstroom (Roberts).

56. *Crocidura hirta*, Ptrs. (?)
1 ♂, Boror (Kirby and Roberts).
57. *Crocidura flavidula*, Thos. and Schw.
1 ♀, Tzaneen Estate (Uhrde).
2 in spirits, Woodbush (pres. Hon. P. A. Methuen).

If my identification of this species is correct, it seems to me to be best to retain this as a distinct species on account of its slender feet and smaller skull.

The following is a table of measurements taken from the specimens of the genus referred to above:—

| | <i>C. flavescens.</i> | | | | <i>cinnamomea.</i> | | | | <i>hirta(?)</i> | | | | <i>flavidula</i> (Tzaneen). | | | | |
|-----------------|-----------------------|------|-----------|-------|--------------------|---|---|---|-----------------|---|---|---|-----------------------------|---|---|---|------|
| H. and B. ... | ... | — | 90 | -112 | — | — | — | — | — | — | — | — | — | — | — | — | 92 |
| Tail ... | ... | — | 41 | -55 | — | — | — | — | — | — | — | — | — | — | — | — | 43 |
| Hd. ft. ... | ... | — | 14 | -16 | — | — | — | — | — | — | — | — | — | — | — | — | 15 |
| Ear ... | ... | — | 9 | -11 | — | — | — | — | — | — | — | — | — | — | — | — | 12 |
| Gr. leng. ... | ... | 29·3 | 26 | -27·9 | 24·4 | — | — | — | — | — | — | — | — | — | — | — | 23·4 |
| Bas. leng. ... | ... | 26·1 | 22·3-24·6 | — | 21·2 | — | — | — | — | — | — | — | — | — | — | — | 20·8 |
| Gr. br. ... | ... | 12·3 | 10·1-11·5 | — | 9·7 | — | — | — | — | — | — | — | — | — | — | — | 9·8 |
| Dent. ser. ... | ... | 12·6 | 10·5-12·6 | — | 11·1 | — | — | — | — | — | — | — | — | — | — | — | 10·2 |
| Mol. ser. ... | ... | 7·4 | 6·1-7 | — | 6·1 | — | — | — | — | — | — | — | — | — | — | — | 5·6 |
| Br. at mol. ... | ... | 10·2 | 8-9·4 | — | 7·6 | — | — | — | — | — | — | — | — | — | — | — | 7·2 |

58. *Crocidura pondoensis*, spec. nov.

Very large series, Port St. Johns (Swiny).

This species is a dwarf form of *cinnamomea*, side by side with which it is found. In colour and all external characters it so closely resembles *cinnamomea*, that it might well be thought to be the young of that species; but a comparison of a large table of measurements shows that it in no way approaches the larger form in size, and there are obviously young specimens of both species in the respective series. It is probably more closely allied to Smith's *C. mariquensis*. Type: ♂, T.M. No. M. 901, ex coll. H. H. Swiny, Ngqeleni District, Pondoland, 16.7.08. "H. and B. 78, tail 59, hd. ft. 13, ear 10." Skull: gr. leng. 22, bas. leng. 19, br. 9·5, dent. ser. 9·3, mol. ser. 5·2, br. maxilla at mol. 6·5.

The range of variation in size is as follows:—

H. and B. 68-84, tail 51-59, hd. ft. 13-14, ear 8-10. Skull: gr. leng. 20·6-22·1, bas. leng. 18·2-19·1, br. 8·9-9·6, dent. ser. 9-9·6, mol. ser. 5-5·4, br. of maxilla 6·4-6·8.

I may here note that there are a number of specimens in the series of this species and the larger ones, that have much shorter fur than the majority. Careful examination proves that this is more often characteristic of smaller and younger specimens, and that it is due to the growth of new fur; this conclusion is supported by the presence of several specimens in which the greater part of the fur is short but a patch of longer fur of double the length still remains, conspicuously projecting out, either on the sides of the body or lower back.

59. *Crocidura argentata*, Sund.

1 ♂, Deelfontein (Grant).

This specimen is labelled "*C. capensoides*, Sm.": but it agrees better with the description of *C. argentata*, to which species I am therefore referring it; *C. capensis* of Smith's "Illustrations" is a darker coloured animal, and the muzzle is said to be entire.

60. *Crocidura silacea*, Thos.

1 ♂, Pretoria (pres. Mrs. Swierstra).

61. *Crocidura sylvia*, Thos. and Schw.

2, Beira (Sheppard).

1 ♂, Pretoria (pres. Mrs. Noomé).

The skulls of the Beira specimens are broken, but such measurements as can be taken show that they must have been larger than the typical specimen from Woodbush. The Pretoria specimen, on the other hand, is somewhat smaller and apparently much darker than the type of *sylvia*.

62. *Crocidura Martensi*, Dobs.

1, Knysna (?).

This specimen bears no label indicating where it was taken, but as the "make-up" of the skin is like that of Rex, it most likely came from Knysna. The skin measures, about: H. and B. 86, tail 67, hind foot 15.5.

63. *Chrysochloris Duthiae*, Broom.

1 ♂, 1 ♀, and 2 in spirits, Knysna (Rex).

64. *Chrysochloris Gunningi*, Broom.

1 ♂, 1 ♀ (type), Woodbush (Kirby and pres. Miss A. Eastwood).

65. *Amblysomus hottentottus*, (A. Sm.).

1 ♂, Pirie (Stenning).

1 ♀, Pirie (Stenning).

The ♂ has a skull of the average size, while the ♀ has a much larger skull (length 29.9 mm.), though in other respects it does not differ materially from the ♂. It is possible that these skulls have been attached to the wrong skins, but against this the measurements recorded on the labels are: for the ♂, head and body 116, and for the ♀ 120.

66. *Amblysomus hottentottus longiceps*, Broom.

2 ♂, 2 ♀, Dargle District, Natal (Roberts).

11, Wakkerstroom (Roberts); and 7 skulls.

4, Belfast, Transvaal (pres. E. E. Yates, Esq., and Roberts).

This series does not throw much light upon the variation of the species. Specimens from the Dargle District are similar to those from Pirie: the Wakkerstroom specimens are darker and larger than those from the Dargle; while two of the four specimens from Belfast are very bright red, matching in colour the two specimens of *C. gunningi* from Woodbush, while the larger are like the Wakkerstroom specimens. The following table of measurements will better illustrate the measurements of skulls of specimens from the four districts mentioned:—

| | Males. | | | |
|-------------------|---------------|----------------|----------------------|-----------------|
| | Pirie. (1) | Dargle. (2) | Wakkerstroom. (9) | Belfast. (1) |
| Gr. leng. ... | 26.9 | 28-28.7 | 29.5-30.5 | 29.7 |
| Bas. leng. ... | 18.8 | 19-19.2 | 20 -21.1 | 20 |
| Gr. br. ... | 16.5 | 16.6-17 | 18.2-18.8 | 18.2 |
| Int.-orb. br. ... | 7.8 | 8.6-9 | 8.2- 9.2 | 9.4 |
| Dent. ser. ... | 9.9 | 10.5 | 11 -11.5 | 11.5 |
| Br at mol. ... | 8.6 | 8.8 | 8.6- 9.2 | 9.3 |
| | Females. | | | |
| | (1) | (2) | (7) | (3) |
| Gr. leng. ... | 29.9 | 26.8-27.1 | 27.8-29 | 28 -29.5 |
| Bas. leng. ... | 20.9 | 18.5-19 | 19 -19.9 | 19.3 |
| Gr. br. ... | 18.2 | 15.1-16.5 | 17.2-17.6 | 16.5-17 |
| Int.-orb. br. ... | 8.4 | 8.3- 8.6 | 8.5- 8.9 | 8.2- 8.8 |
| Dent. ser. ... | 11.3 | 10 -10.1 | 10.5-11 | 10.8-11 |
| Br. at mol. ... | 8.7 | 8.4- 8.6 | 8.1-9 | 8.2- 8.7 |

There are also skins of a ♂ collected at Kastrol Nek, east of Wakkerstroom (6000 ft.), and of an unsexed specimen from Wakkerstroom (5500 ft.), and the skull of a ♀ from the latter place, which are smaller than those above mentioned, having regard to the sex. The unsexed specimen is apparently juvenile and of the usual colour; but whether the

other two are also young is not evident, though probable. The specimen from Kastrol Nek is dark coloured, of about the same shade as the majority of ♀♀ taken at Wakkerstroom. The skulls of these three specimens measure :—

| | ♂ Kastrol Nek. | Wakkerstroom (♀?) | Wakkerstroom (skull ♀). |
|-------------------|----------------|-------------------|-------------------------|
| Gr. leng. ... | 29 | 27.2 | 26.6 |
| Bas. leng. ... | 20 | 18.7 | 18 |
| Gr. breadth ... | 17.4 | 15.8 | 16.3 |
| Int.-orb. br. ... | 8.8 | 8.4 | 8 |
| Dent. ser. ... | 11.5 | 10.5 | 10 |
| Br. at molars ... | 9 | 8.3 | 8 |

67. *Amblysomus hottentottus albirostris*, Wagn.

13, Port St. Johns (Swinny and Thortridge).

It is clear from a study of this series of skins that the young are altogether darker coloured on the back than adults, and the sides of the face are also whiter, in the young stage being typical of Wagner's *albirostris*; the series clearly shows the transition from *albirostris* to Thomas and Schwann's *A. h. pondoliae*, which must therefore revert to the synonymy of the former.

The skulls measure in greatest length, ♂ 27, ♀ under 26 mm.

68. *Amblysomus corriæ*, Thos. and Schw.

1 ♂, ♀, and 1 in spirits, Knysna (Rex and Grant).

In colour this species is so distinct from *hottentottus* that, despite the similarity in general of its cranial characters, I think it is advisable to retain it as a distinct species. There are also two more specimens without labels, apparently from the same place.

69. *Amblysomus corriæ septentrionalis*, subspec. nov.

This subspecies is founded on a single gravid ♀ taken at Wakkerstroom on 14th September, 1909, in precisely similar conditions as *A. h. longiceps*. In colour it much resembles the specimens of *corriæ* known to have been collected at Knysna, though more like the two without labels; it differs also in having a very conspicuous yellowish patch at the sides of the snout. The skull is very much larger, having regard to its sex, than in any member of the subgenus so far recorded. At the time this specimen was taken I was collecting gravid ♀♀ for the purpose of preserving the embryos; but, although about sixty specimens of the common species (*A. h. longiceps*) were captured, this was the only one taken of the black species. I have since made special efforts to get more, and, although I have on several occasions been told of its having been captured by farmers and Kaffirs, have not so far met with success. The single specimen taken was dug out when it was throwing up a mound, and showed extraordinary activity in trying to escape.

The following are measurements of the skulls of four specimens of this species mentioned above and of the one from Wakkerstroom :—

| | ♀ (Grant). | ♂ ? (Rex). | ♂ ? (Loc.?) | ♀ ? (Loc.?) | ♀ W/strm. |
|-------------------|------------|------------|-------------|-------------|-----------|
| Gr. leng. ... | 25.8 | 27.3 | 28.3 | 26 | 30 |
| Bas. leng. ... | 17.5 | 19 | 19.1 | 18.5 | 20.5 |
| Gr. br. ... | 15.1 | 16.5 | 17.5 | 15.6 | 19 |
| Int.-orb. br. ... | 7.9 | 8.2 | 8.8 | 7.9 | 9.3 |
| Dent. ser. ... | 9.5 | 9.9 | 10.5 | 10 | 11 |
| Br. at mol. ... | 7.3 | 7.8 | 8.4 | 7.3 | 8.3 |

70. *Amblysomus obtusirostris*, (Ptrs.).

1 ♂, Coguno (Grant).

71. *Chrysofalax Trevelyani*, (Gunther).

1 ♂, 1 ♀, Pirie Forest (Stenning).

3 ♂, 2 ♀, Port St. Johns (Swiny and Shortridge).

72. *Chrysofalax pratensis*, spec. nov.

Of about the same size as *C. villosa*, but rufous coloured in place of grey-brown.

Hair of the whole upper surface of body and sides grey-brown for the basal half, the terminal half being brownish-red, with the extreme tips purple; on the sides, the brownish-red colour is replaced by whitish. Fore part of the head greyer than the back, with the base of the hairs buff, which colour is clearer on the lips and extends in a well-defined line down the throat. The reddish colour of the upper surface becomes almost obsolete on the sides of the throat, breast, and a patch at the sides of the abdomen: but on the abdomen itself is very conspicuous owing indeed to the base of the hair being reddish. Feet, variegated brown. Type: old ♂, taken at Pretoria on 21st January, 1913. "H. and B. 175, hind foot 17." Skull: greatest leng. 36 mm., bas. leng. 25, gr. br. 24·2, inter. orb. br. 7·7, dent. ser. 14·3, molar ser. 9·1, br. at molars 11·4.

This species was discovered at the end of December, 1912, at Wakkerstroom; but as the only old ♂ with all the most marked characters present taken at that place has an incomplete skull, owing apparently to an accident in youth, I have thought it advisable to take a Pretoria specimen as the type. Five specimens which were skinned at Wakkerstroom are all somewhat lighter coloured than the type, but a sixth, which was kept alive for a fortnight and then preserved in spirits, was dark coloured, precisely like the two from Pretoria. Two ♀♀ from Wakkerstroom are the lightest coloured in the series, and considerably smaller, as might be expected; their skulls are of about the same length as that recorded by Broom for a ♀ specimen of *C. villosa*. Unfortunately, I have no specimen of that species for comparison, and cannot now state whether any cranial differences exist between the two species.

The habits of this species are peculiar: for instead of making regular rows of mounds as does *C. hottentottus*, it leaves its burrows open and comes out in search of food upon the surface of the ground. Its burrows are usually situated near large mounds, underneath which the earth is intersected by passages leading off in different directions and no doubt form the regular home of a number of individuals. At night, after rains, it roots about on the surface of the ground after the fashion of pigs. Two young are born at a time, and to accommodate them a large round chamber is made a few inches under the surface of the ground, filled with grass and so surrounded with passages running in various directions as well as downwards, that in case of intrusion from the single open entrance the occupants can easily escape by burrowing through the thin surrounding sides of the chamber. The presence of a nest is usually indicated by a small mound of earth thrown up close to the chamber, the holes at ordinary times being left open. The breeding season is probably affected by the rains, the specimens taken at Wakkerstroom being gravid shortly after rains had set in. The first specimen I saw of this species was one caught by my mother at Belfast in January, 1909; but the skull was unfortunately thrown away by the Kaffir servant, and it was only after

long and careful observation that I at last discovered its habits at Wakkerstroom. The Belfast specimen is smaller than any of those in my present series, and, having the sides of its face whiter, is probably a young one. This species is apparently also found in the Orange Free State and Basutoland, as four people to whom I have shown the specimens recognized them at once, and one informed me that he had often caught them at daybreak when they were out feeding.

73. *Erinaceus frontalis*, A. Sm.

- 1 ♀, 1 juv., Rooiberg, Transvaal (Jameson).
1 ♂, Ventersburg Road (Jameson).
1 in spirits, Pretoria.

74. *Ictonyx capensis*, (Kaup).

- 1 ♂, Port St. Johns (Swinny).
1 juv., Wakkerstroom (Roberts).
1 juv., Wonderfontein (Jameson).
Also skins without skulls from Knysna and Pretoria.

75. *Pocilogale albinucha*, (Gray).

- 1 ♀, Port St. Johns (Swinny).
1 ♂, Surbiton, C.P. (Dell).
1 ♂, Tzaneen Estate (Jameson).
Also skins without skulls from Pretoria and Knysna.

76. *Genetta rubiginosa*, Puch.

- 1 ♂, 1 ♀, Tzaneen Estate (Jameson).

77. *Genetta zambesiana*, (Matschie) ? (description not available).

- 1 ♀, Boror (Kirby and Roberts).

78. *Genetta tigrina*, Schreb.

- 8, Knysna (Rex).

79. *Genetta felina*, (Thunb.).

- 1 juv. ♀, Potchefstroom (Ayres).

80. *Mungos caawi*, (A. Sm.).

- 1 juv. ♀, Venterskroon, Transvaal (Roberts).
1 ad., 1 juv. ♀, Pretoria (pres. V. Manen, Esq., and Zool. Gard.).
1 ♂, 1 ♀, Johannesburg (Jameson).
1 ♂, 1 ♀, Tzaneen Estate (Jameson).

In dealing with this species, Wroughton states that Gray's *punctulatus* may be taken as typical; but on the face of the series of skins above mentioned, I think it more likely that those from the Transvaal are typical, as they give fairly even measurements both in the high and low country, and taking the climatic conditions into consideration we may expect to find much the same (though perhaps not identical) colouring as in those from Bechuanaland. Along the coastline there would seem to be another larger race, for Wroughton has apparently given measurements of the type of *punctulatus*; and further south a still larger race exists, which I am here naming.

81. *Mungos caawi Swinnyi*, subsp. nov.

In most respects this new subspecies is larger than the typical *M. caawi*, but has a shorter tail and short black tip measuring about 75-85 mm., as against over 100 in the others. Type: No. 940, ad. ♂, ex coll. H. H. Swinny, Ngqeleni District, 13.10.07. "H. and B. 325, tail 256, hind foot 48 (? skin 50), ear 24." Skull: cond. bas. leng. 67, bas. leng. 60.3

zyg. gr. 36, br. brain case 28, interorb. br. at constr. 14·2, intertemp. br. 13·8, br. at P¹ 23·5, C-M¹ 23·3. Another specimen, the cotype, is even larger, measuring: "H. and B. 336, tail 256, hind foot 66 (? skin 55), ear 26. Skull: cond. bas. leng. 67·3, bas. leng. 61·5, br. at P¹ 24·6, br. intertemp. constriction, 12·3.

The following figures will illustrate the difference in size, the comparison being restricted to adult males;—

| | Johannesburg. | Tzaneen. | Durban (Wroughton). | Port. St. Johns. |
|---------------------------|---------------|----------|------------------------|------------------|
| H. and B. ... | 300 | 310 | 300 | 325 -336 |
| Tail ... | 300 | 270 | 275 | 256 -256 |
| Hd. ft. ... | 60 | 60 | 58 | (50) -(55) |
| Ear ... | 25 | 26 | 25 | 24 -26 |
| Skull: | | | | |
| Cond. bas. leng. | 62·8 | 63 | 65 | 67 -67·3 |
| Bas. leng. ... | 58·1 | 58 | 60 | 60·3-61·5 |
| Zyg. br.... | 34·2 | 32·5 | 33-35 | 36 |
| Br. at P ¹ ... | 20·7 | 20·5 | 20-23 | 23·5-24 |
| C-M ¹ ... | 21 | 22·5 | 22 | 23·3-23·4 |

In colour there is a decided difference amongst individuals, but the series is not large enough to tell whether this is constant within certain limits in certain localities. The type and cotype of this new subspecies cannot therefore be said to differ very much in colour from those taken in the Transvaal.

82. *Mungos ignitus*, spec. nov.

This species is apparently most closely related to the *M. melanurus* group; but not agreeing with any of the sub-species enumerated by Wroughton, I have thought it advisable to place it as a distinct species. Description: Upper surface of body fiery chesnut red intermingled with tawny yellowish in general appearance, the individual hairs being brown at the roots, then yellowish, followed by alternate bands of first black, then yellowish, black, redder yellow, merging into red brown, and, finally, dark brown at the tips; the top of the head and face is more uniform and slightly redder than the back. Sides of the back lighter coloured than the dorsal line, with less of the red brown colour, becoming still lighter towards the under surface of body, which is uniform tawny yellow. On the upper surface, the base of the tail is like the back, soon merging into a richer fiery chesnut-red which continues until meeting the black tip; the base of the tail on the under surface is uniform tawny yellow like the body, replaced on the central half by uniform bright chesnut-red; limbs like the sides, becoming uniform tawny on the digits.

Type: Ad. ♀, ex coll. Kirby and Roberts, Malava, Boror, P.E. Africa, 13.8.08. This specimen was not measured in the flesh, but the skin gives the following: H. and B. 300, tail 216, hind foot 46. The skull measures: Con. bas. leng. 62·2, bas. leng. 56·6, zyg. br. 31·3, interorb. constriction 11·5, intertemp. const. 11, br. brain case 25, br. at P¹ 21·2, C-M¹ 21·8, mol. ser. 18·6.

83. *Mungos paludinosus*, (Cuv.).
9, Knysna (Rex).

84. *Mungos paludinosus rubellus*, Thos. and Wr.
2 juv., Tzaneen Estate (Jameson).

85. *Mungos caffer*, (Gm.).
4, Knysna (Rex).

86. *Mungos pulverulentus*, (Wagn).
3, Knysna (Rex).
87. *Mungos grandis*, (Thos.).
1 ad. ♂, 1 juv. ♂, Hector Spruit (Streeter).
The skull of the adult measures: Cond. basal length 120, basal length 110, zyg. br. 58, and that of the younger one, in which the second molar has not yet appeared, cond. bas. leng. 106.
88. *Helogale brunnula*, Thos. and Schwann.
4 ad., 1 juv., ♂♂, Hector Spruit (Streeter).
1 ♀, Klein Letaba (Grant).
Skulls of adult males measure 45.5–47.7 mm. in greatest length, and the female and young male 42.3.
89. *Helogale undulata* (Ptrs.).
3, Boror, P. E. Afr. (Kirby and Roberts).
90. *Cynictis penicillata*, (G. Cuv.).
1 juv., Ventersburg Road (Jameson).
1 juv., Potchefstroom (Roberts).
Also, skins without skulls from Uitenhage, Grahamstown, and Potchefstroom.
91. *Suricatta tetradactylus*, (Erxl.).
1 ♂, Grahamstown (Albany Museum).
2 juv. ♂, Wonderfontein (Jameson).
92. *Crossarchus fasciatus*, (Desm.).
1 ♀, Boror (Kirby and Roberts).
Skin without skull from Beira (Sheppard).
93. *Paraxerus cepapi*, (A. Sm.).
1 ♂, Blaauwberg, Transvaal (Noomé).
1 ♀, Plumtree, Rhodesia (Wilde).
1 ♂, Lusakas, N.W. Rhodesia (Treneweth).
5 ♂, 2 ♀, Zimbiti, Beira (Sheppard).
3 ♂, Boror, P. E. Afr. (Kirby and Roberts).
94. *Heliosciurus mutabilis*, (Ptrs.).
1 ♂, 1 ♀, Boror, P. E. Afr. (Kirby and Roberts, Aug. and Sept., 1908).
Both these specimens are slightly larger than the type as described by Peters, and are no doubt older. The presence of an extra premolar in the type is probably a juvenile character.
The male is almost entirely of a bleached reddish tawny colour on the upper surface of the body, only a small patch of grey annulated hairs appearing behind the right shoulder; the forehead, cheeks, legs, and tail have the hairs greyish, tipped with dull white, and the middle of the under surface of the body is almost entirely dull white. The hands and feet are coloured as in the female, as also the forehead and tail, though lighter coloured. The whole appearance of the specimen suggests that the hair has become bleached with age, and the patch of grey behind the shoulder seems to indicate that a growth of new hair is just beginning to take the place of the old.
The female is also bleached in colour, and has a curious parti-coloured appearance owing to the presence of brown patches on the forehead and middle of the back, surrounded by bleached reddish tawny, which extends from the crown to the shoulders, less conspicuously round the brown patch on the back, and in a broad band across the middle of

the back; the lower part of the back is coloured like the tail, the external half of the hairs being of a dark fiery red; the sides of the lower back, sides of the neck, fore and hind limbs, are lighter coloured, and the annulations are more conspicuous; the under surface of the body is like that of the male; and the pectoral mammae are conspicuously situated in barer patches.

In both specimens the hairs of the tail are brown at the base, ringed with white, brown and white, and the external half is lighter red-brown; the hairs of the lower back are brown at the base, followed by a narrow and ill-defined band of dull buff-orange, and the external three-fifths coloured like the tail. The hair of the lower back measures about 30 mm., and that of the tail, three inches from the root, from 37 above to 43 mm. at the sides.

95. *Heliosciurus mutabilis beirae*, subsp. nov.

Specimens from Beira, of which there are three with skulls and two without, are larger than those from Boror, and on these grounds, apart from their colour which is little understood at present, should be recognized subspecifically.

Two of the specimens with skulls (taken in August, 1908) are altogether differently coloured from the Boror specimens, the rings of colour on the body being very dark brown, buff-orange, very dark brown, white, and (the extreme tips) very dark brown, so that the prevailing colour on the upper surface is dark brown with white tips, and when the hair is disturbed the buff-orange is conspicuous. On the tail, too, the rings are very conspicuous, but lack the buff-orange under colouring, thus producing regular rings of brown and white almost to the end of the tail. The two specimens without skulls (taken in April and May, 1908) are slightly darker coloured and somewhat smaller; they are probably younger than the others.

The fifth specimen (taken in October, 1907), in which the skull is incomplete, has the hair bleached, but still retains the pattern of coloration of the other five specimens, and does not show any of the uniform light red-brown on the back which characterizes the two from Boror.

Type: ♂, ex coll. P. A. Sheppard, Zimbiti, Beira, 11th August, 1908. Measurements taken from dried skin:—H. and B. 255, tail 290, hind foot (c.u.) 54. Skull: Gr. leng. 56·8, basal leng. 43·7, zyg. br. 32·5, int.-orb. br. 17, int. temp. br. 16·2, br. brain case 23·9, mol. ser. 10·2, nasals 19 × 8. Hair of lower back about 30: of tail, three inches from root, 36–45.

96. *Heliosciurus mutabilis chirindensis*, subsp. nov.

Distinguished from *H. m. beirae* by its more bushy tail, the hair of which measures 45–55 mm., at a point three inches from the root.

Type: ♂ ex coll. C. F. M. Swynnerton, Chirinda Forest, 6.9.07. "H. and B. 230, tail 290, hind foot 54, ear 20." Skull: gr. leng. 56, basal leng. 43·4, zyg. br. 32, int. orb. br. 18·5, int. temp. br. 14·5, br. brain case 22·1, molar ser. 10·1, diastema 12·5, nasals 17·3 × 8·6.

This specimen is intermediate in colour between the grey specimens from Beira and the light red ones from Boror, and in addition is brighter coloured on the under surface, the throat and sides particularly being richly coloured with orange-yellow; the white tips to the hairs found in Beira specimens are here replaced by tawny.

97. *Paraxerus sponsus*, Thos. and Wr.

1 ♂, Beira (Sheppard).

98. *Paraxerus palliatus Swynnertoni*, Wr.
1 ♂, Chirinda Forest (Swynnerton).
99. *Geosciurus capensis*, Kerr.
1 ♀, Van Wijks Vlei, Carnarvon (Littledale).
2 juv. ♂, Ventersburg Road (Jameson).
100. *Graphiurus murinus*, (Desm.).
3, Knysna (Rex).
12, Port St. Johns (Swinny).

These specimens have all, more or less, a rufous tinge on the chest, with three exceptions, which are probably juvenile. The skulls of the Knysna specimens are not quite complete in two cases, while the third is very slightly smaller than those from Port St. Johns. The following measurements taken from the series will serve for comparison with those of other species to be hereafter dealt with:—

| | Knysna (2). | Port St. Johns (10). | Port St. Johns (abnormal ♂). |
|----------------|--------------------|----------------------|---------------------------------|
| H. and B. | ... 101 | 84 -95 | 104 |
| Tail ... | ... 90 | 59 -95 | 83 |
| Hd. ft. | ... — | 14 -18 | 17 |
| Ear ... | ... — | 11 -14 | 14 |
| Skull : | | | |
| Gr. leng. | ... 26·5-? | 27 -27·5 | ? |
| Bas. leng. | ... 19·7-? | 19·5 -20·5 | 21·4 |
| Zyg. br. | ... — | 14·3 -15·2 | 16·1 |
| Mol. ser. | ... 3·4 | 3·3 - 3·5 | 3·6 |
| Diastema | ... -4·7 | 5·5 - 6·3 | 6·3 |
| Nasals... | ... 9·4-10 × 3·5-3 | 10 -10·3 × 3·1-3·6 | ? × 3·2 |
| Int. orb. br. | ... 4·5 | 4·3-5 | 4·6 |
| Br. brain case | ... 12·3-? | 12·2-13 | 13 |

101. *Graphiurus murinus tzaneenensis*, subsp. nov.

Specimens from the northern Transvaal have been referred to *G. murinus* and *nanus* by Jameson, but a comparison of his specimens with the series of skins from Knysna and Port St. Johns clearly shows that they are distinct. The only point of importance in common is the slenderness of the tail, the skull being smaller than in *murinus* and larger than in *nanus*, the dark vinous tinge of the underparts being confined to a dull mark round the mouth, and the tip of the tail being white. In the last character, as well as the small molars, there is an affinity to other Transvaal species and to *nanus*.

Type: ♂ (ad. but not old) ex coll. H. L. Jameson, Tzaneen Estate, Transvaal, 7.7.07. "H. and B. 82, tail 78, hind foot 18, ear 16." Skull: gr. leng. 26, bas. leng. 19, zyg. br. 13·7, int. orb. br. 4·6, br. brain case 11·5, mol. ser. 3·1, diastema 5·5, nasals 9·8 × 3·5.

An old ♀ from the same place measures: "H. and B. 95, tail 75, hd. ft. 15, ear 12." Skull: gr. leng. 26·2, bas. leng. 19·4, zyg. br. 14·4, int. orb. br. 4·5, br. brain case 12, mol. ser. 3, diastema 5·5, nasals 9·8 × 3·5.

A third specimen (juv. ♀) from Waynek is slightly smaller.

102. *Graphiurus pretoriae*, spec. nov.

A grey species having a very bushy tail with a white tip, and underparts without a trace of vinous colouring. The skull is of about the same size as that of *G. murinus* from Port St. Johns, but the teeth are smaller, and the white tipped and very bushy tail at once distinguish it from that species.

Type: Old ♂, Little Wonderboom, Pretoria, 22.9.12. "H. and B. 86, tail 80, hind foot 15.5, ear 15." Skull: gr. leng. 27.3, bas. leng. 20.7, zyg. br. 15.3, int. orb. br. 4.5, br. brain case 12.3, mol. ser. 3, diastema 6, nasals 10.2×3.2 , height at bullae 10.5, at nasion 5.3.

103. *Graphiurus Streeteri*, spec. nov. ✓

A very bushy-tailed species with a strong suffusion of vinous pink on the underparts and all four feet. The skull is much larger than in *G. murinus*, its only relationship to which lies in the underparts being coloured, but even in this the shade of colouring is very much brighter. This might be thought to be Smith's *M. erythrobronchus*, were it not that that species has been definitely assigned by all authorities (including Smith) to the more richly coloured specimens of *G. murinus*, and, in addition, the very bushy tail is so very marked that the two species could not be confused.

Type: Old ♂, ex coll. F. Streeter, Hector Spruit, Transvaal, 11.3.10. "H. and B. 101, tail 101" (with hairs). Hair at tip of tail 24 mm. Skull: gr. leng. 30.5, bas. leng. 23.3, zyg. br. 16, int. orb. br. 4, br. brain case 12.5, mol. ser. 3.1, nasals 12×3.4 , height at bullae 10.1, at nasion 5.7.

The cotype is not sexed, but is most likely a ♀. Its tail shows the peculiar shortening sometimes noticed in individuals in this family, in this case being reduced to about half the normal length. The skull is smaller than in the type, measuring in greatest length 29 mm., and other measurements in proportion. A third specimen with a broken skull is of about the same size as the cotype, and the tail intermediate in length between those of the type and cotype.

104. *Graphiurus Eastwoodae*, spec. nov. ✓

A species most closely related to *G. ocularis*, but with smaller teeth and skull, and in colour entirely lacking the vinous tinge on the chest and face, this tinge being replaced by dull yellowish white on the underparts though not on the face.

In general appearance grey with a large admixture of dark brown on the upper surface of the body; tail brown with the external half of the longer hairs white, the white increasing in quantity to the tip; under surface of body yellowish white down the middle line and region of the throat, merging into grey on the sides; hands and feet brown on the upper surface, terminating abruptly at the toes, which are pure white; forehead darker than the body, with a lighter coloured patch down the middle line to the nose. Whiskers black with lighter coloured tips, the longest bristles measuring about 48 mm.

Type: Pres. by Miss A. Eastwood, Woodbush, Transvaal.

Skull: Gr. leng. 30.8, bas. leng. 24, zyg. br. 17.8, int. orb. br. 5, br. brain case 14.1, mol. ser. 2.9, nasals 12.2×3.8 , height at bullae 10.2, at nasion 5.6, bullae 10.2. Hair on lower back 12, at tip of tail 35.

105. *Tatera nyassae*, Wr.

1, Katanga (Neave).

106. *Tatera leucogaster*, (Ptrs.).

5, Boror, P. E. Afr. (Kirby and Roberts).

The oldest specimen is considerably larger than the next in size as seems to be not infrequently the case in members of the genus, these measuring respectively: H. and B. 184 and 167-170, tail 173 and 140-150, hind foot 40 and 32(?) - 36, ear 25 and 22-23. Skull: gr. leng. 45.2 and 39.7-41.8, bas. leng. 35.4 and 31.5-32.3, zyg. br. 23.9 and 20.3-21.5,

mol. ser. 6·5, diastema 12·2 and 10·3–11·5, bullae 12·1 and 10·5–11·2, nasals 18 × 4·8 and 15·2–16·5 × 4·2–4·5, br. brain case 18·9 and 16·8–18·2.

The measurements of the skulls are quite in accord with the condition of the teeth, leaving no doubt as to all the specimens being referable to the same species.

107. *Tatera panja*, Wr.

1 ad. ♀, 30 miles above Tete (Alexander).

? 3, Boror (Kirby and Roberts).

4, Hector Spruit, Transvaal (Streeter).

An old specimen from Hector Spruit gives the following measurements:—"H. and B. 136, tail 138": hind foot (skin) 29·5. Skull: br. leng. 38·8, bas. leng. 29·3, mol. ser. 6·1, bullae 10·2. Younger specimens from Hector Spruit measure in the greatest length of the skull 35–36 mm.

The Boror specimens are in a bad state of preservation, but seem to be darker. The skulls are of the same size as those from Hector Spruit.

108. *Tatera lobengulae*, De Wint.

1 ♂, Essex Vale (Selous).

1 yg. ♀, 1 old ♂, Tete (Grant).

109. *Tatera lobengulae mashonae*, Wr.

1 old ♂, Mazoe (Darling).

5, Zimbiti, Beira (Sheppard).

1 yg. ad., 1 ad. ♂, Hector Spruit (Streeter).

110. *Tatera lobengulae bechuanae*, Wr.

1 ♂, Malopo (Woosnam).

111. *Tatera lobengulae*, subsp.?

1 ♂, 5 ♀, Wonderfontein, Transvaal (Jameson).

2 ♂, Zoutpan, Pretoria District (Jameson).

1 ♀, Suburbs, Pretoria (Roberts).

1 ♀, Vryburg, B.P.

These specimens cannot be definitely assigned to any of the races of this species until larger series are available for comparison.

112. *Tatera miliaria*, Wr.

2 ♂, Deelfontein.

1 very old ♀, Modder River.

113. *Tatera miliaria stellae*, Wr.

1 yg. ad. ♀, Kuruman (Dent).

114. *Tatera miliaria salsa*, Wr.

1 ♂, Woodbush (Grant).

6 ad., 2 juv., Tzaneen Estate (Jameson).

115. *Tatera draco*, Wr.

2 old ♀, 1 ad. ♀, 1 yg. ad. ♂, 4 juv., Wakkerstroom (Jameson and Roberts).

116. *Tatera brantsi*, (A. Sm.)?

3 ad., 2 juv., Hartebeestfontein, near Warmbaths, Transvaal (Jameson).

1 juv., Florida, Transvaal (Jameson).

117. *Desmodillus auricularis*, (A. Sm.).

1 ♂, Hanover, C.P. (Shortridge).

1 ♀, Kuruman (Woosnam).

118. *Otomys Brantsi* (A. Sm.).
 1, Anenous, C.P. (Grant).
 2 in spirits, Victoria West (P. D. Morris).
119. *Otomys Brantsi luteolus*, Thos. and Schw.
 1 ♀, Deelfontein, C.P. (Sloggett).
120. *Otomys unisulcatus*, Cuv.
 1 ♂, Hanover, C.P. (Shortridge).
121. *Otomys unisulcatus Granti*, Thos.
 1 ♀, Deelfontein (Sloggett).
122. *Otomys unisulcatus Broomi*, Thos.
 1 ♀, Klipfontein (Grant).
123. *Otomys Sloggetti*, Thos.
 1 ♀, Hanover, C.P. (Shortridge).

124. *Otomys Turneri*, Wr.
 7 ad., 3 juv., Wakkerstroom (Jameson and Roberts).

One of these was recorded by Jameson as *O. Brantsi*. A very old ♂ is peculiar in having the hairs on the cheeks very stiff and spine-like. The fur on the back of these specimens is of the same length as in the specimen of *sloggetti* from Hanover, and the only apparent difference lies in the length of the molar series, which is larger in *turneri*.

125. *Otomys irroratus*, (Brants).
 3, Knysna (Rex).
 2, Grahamstown.
 5, Port St. Johns (Swinny).
 1, Malvern, Natal (Jameson).
 3, Wakkerstroom (Jameson and Roberts).
 4, Pretoria (Noomé and Roberts).
 2, Hector Spruit, Transvaal (Streeter).
 1, Mazoe (*auratus*) (Darling).
126. *Otomys irroratus cupreus*, Wr.
 9, and 2 in spirits, Tzaneen Estate (Jameson).
127. *Otomys irroratus nyikae*, Wr.
 1 ♂, Boror (Kirby and Roberts).

128. *Otomys Anchietae*, Boc.
 20, N.W. Rhodesia (Wilde).

These specimens are all very much larger than those from South Africa, the skulls measuring in old ♂♂ up to 50 mm. in length. None of them show the aberrant character in M^1 to which Wroughton has particularly drawn attention in his paper on the genus. The number of laminae in M^3 varies by one more or less, principally in the ♀♀.

129. *Otomys laminatus*, Thos. and Schw.
 1 old ♂, 3 very young, Port St. Johns (Swinny).

Although the hindmost molars in the young specimens are not fully developed, they still clearly show that the number is more than seven. The very old specimen is rather whiter on the under surface of the body than the generality of specimens of *O. irroratus*.

130. *Malacothrix typicus*, A. Sm.
 1 ♂, Deelfontein (Sloggett).

131. *Dendromus longicaudatus*, spec. nov.

Very similar to *D. melanotis*, but with a longer tail and larger skull; in colour, also, rather brighter rufous in general effect. Type: Old ♂, ex collection H. L. Jameson, Tzaneen Estate, Transvaal, 21.7.07. "H. and B. 76, tail 107, hind foot 19, ear 16.5"; skull: gr. leng. 23, bas. leng. 17, gr. br. 11.8, molar ser. 3.3.

132. *Dendromus mesomelas*, (Brants).

2, Knysna (?), skulls in skins.

These two specimens are without labels, but one at least of the skins is prepared like those of Rex of Knysna.

133. *Dendromus Ayresi*, spec. nov.

Rather darker coloured, as a rule, than *D. mesomelas* and smaller in size, but like that species in having a dorsal stripe in adults, and with claws to four toes.

This species is represented by four fully adult and five younger specimens taken by H. H. Swinny, and one, like the five, taken by Shortridge, at Port St. Johns. The following table of measurements of striped and unstriped specimens will show that there is good reason for supposing the former to be fully adult and the latter to be younger:—

| | | Striped ♂♂ (2). | Striped ♀♀ (2). | Unstriped (5). |
|--------------|-----|-----------------|-----------------|----------------|
| H. and B.... | ... | 75-76 | 71 (?) -76 | 68-76 |
| Tail | ... | 103 | 95-96 | 89-95 |
| Hd. foot | ... | 19-20 | 17-19 | 18-19 |
| Ear | ... | 14-15 | 14 | 11-13 |
| Skull:— | | | | |
| Gr. leng. | ... | 23.5 | 22.3 | 21-22.6 |
| Bas. leng. | ... | 17.5 | 16.5-17 | 15.5-16.5 |
| Zyg. br.... | ... | 11.5 | 11.4 | 10-11.7 |
| Mol. ser. | ... | 3.4-3.6 | 3.2-3.3 | 3.1-3.3 |

I have named this species after my old friend the well-known naturalist, Mr. Thomas Ayres; he remitted some specimens to Mr. Sclater, who referred them to *D. mesomelas* in his "Fauna of South Africa."

134. *Dendromus pumilio*, (Wagner) (?).

At Port St. Johns another striped species is found which is coloured like *D. mesomelas*, but it is smaller even than *Ayresi*: and as the unstriped specimens are smaller than the striped and measure about the size as Wagner's *Mus pumilio*, it is not unlikely that the species was described from a young individual.

Specimens in the collection measure as follows:—

| | | Striped ♂♂ (4). | Striped ♀♀ (4). | Unstriped (4). |
|---------------|-----|-----------------|-----------------|----------------|
| H. and B. ... | ... | 68 | 68-69 | 61-64 |
| Tail | ... | 92 | 81-87 | 81-89 |
| Hd. foot | ... | 18-19 | 16-17 | 16-19 |
| Ear | ... | 11.5-13 | 11-12 | 12 |
| Skull:— | | | | |
| Gr. leng... | ... | 22 | 20.3-21.2 | 20.2-21 |
| Bas. leng. | ... | 15.8-16.5 | 15-15.7 | 15.2-15.6 |
| Zyg. br.... | ... | 11-11.3 | 10.4-10.5 | 10.6-11 |
| Mol. ser. | ... | 3.2-3.5 | 3-3.1 | 3.2 |

An old striped ♀ collected by Dr. H. L. Jameson at Sweetwaters in Natal is very slightly larger than these ♀♀ from Pondoland, but still not as large as the ♂♂.

135. *Dendromus Jamesoni*, Wr.

3, Tzaneen Estate (Jameson); also 1 in spirits.

7, Port St. Johns (Swinny).

In spirits: 1, Knysna, and 2, Lydenburg.

This species is the smallest of the group found in South Africa, and, as with the preceding, the unstriped specimens are invariably the smallest in the series. In colour it is like *D. mesomelas*, but has a broader dorsal stripe.

As there is no material difference in the size between specimens from Tzaneen and Port St. Johns, I have included them all under one head in the following table:—

| | | Striped ♂♂ (6). | Striped ♀♀ (2). | Unstriped (1♂, 1♀). |
|----------------|-----|-----------------|-----------------|---------------------|
| H. and B. ... | ... | 58-62 | 60 | 53-55 |
| Tail ... | ... | 75-85 | 75 | 78-83 |
| Hd. ft. ... | ... | 16-19 | 16 | 16-18 |
| Ear ... | ... | 11-13 | 13 | 12 |
| Skull:— | | | | |
| Gr. leng. ... | ... | 19-20·1 | 19 | 19-19·4 |
| Bas. leng. ... | ... | 13·7-14·7 | 14-14·1 | 14 |
| Zyg. br.... | ... | 10-10·5 | 10-10·4 | 10-10·2 |
| Mol. ser. ... | ... | 3- 3·2 | 3 | 3·2-3·4 |

136. *Dendromus Whytei*, Wr.

1 old ♀, 1 young from same nest, Boror (Kirby and Roberts).

The young specimen has not yet cut its last back tooth, but the skull measures 17·5 as against 20 in the mother. From this it would seem that, as with the majority of insectivorous mammalia, the skull is not very much smaller in the very young than in the fully adult. This supports the supposition that the unstriped individuals from Port St. Johns are the young of the species next in size above them in the scale, although it still does not prove that a species which never assumes the dorsal stripe does not occur in South Africa. I may here mention that in the series of striped specimens of the three species found at Port St. Johns nearly every month of the year is represented in the dates of capture; whereas, in the unstriped specimens, only the winter months are recorded. The details are as follows:—

D. Ayresi, one in March, one in May, and five in June.

D. pumilio (?), one in each month, April, June, August, and September.

D. Jamesoni, two in June.

137. *Steatomys pratensis*, Ptrs.

2 ♂, 1 ♀, 1 juv. ♂, Boror (Kirby and Roberts).

1 ♂, Tete (Grant).

1 ♂, Hector Spruit (Streeter).

2 ♂, 6 ♀, and 2 in spirits, Tzaneen Estate (Jameson).

138. *Steatomys Bocagei*, Thos.

1 ♂, Angola (Ansorge).

139. *Saccostomus campestris*, Ptrs.

1 ♂, 2 ♀, Tzaneen Estate (Jameson).

1 juv. ♀, Zimbiti, Beira.

1 in spirits, Grahamstown (? , skull crushed).

140. *Saccostomus mashonae*, De Wint.

2 ♂, 1 ♀, Hector Spruit (Streeter).

1 in spirits, Louws Creek, Barberton (Gough).

141. *Mus norvegicus*, Erxl.
Maritzburg, Hilton Road, Johannesburg, Potchefstroom, Pretoria,
Beira, and Boror.
142. *Mus rattus*, Linn.
Potchefstroom, Johannesburg, and Pretoria.
143. *Mus chrysophilus*, De Wint.
1 ♂, Mazoe (Darling).
144. *Mus chrysophilus acticola*, Thos. and Wr.
1 ♀, Beira (Grant).
145. *Mus chrysophilus ineptus*, Thos. and Wr.
1 ♂, Tete (Grant).
146. *Mus chrysophilus tzaneenensis*, Jameson.
8. Tzaneen Estate (Jameson).
1 ♂, Malvern, Natal (Jameson).
147. *Mus chrysophilus pretoriae*, subsp. nov. ✓
Similar in colour to the specimen from Tete (*ineptus*), but tail much shorter, in the same proportion as in *M. c. tzaneenensis*.
Type: Old ♀, Fountains, Pretoria, 10.9.12. "H. and B. 140, tail 155, hind foot 27, ear 20." Skull: gr. leng. 36·8, bas. leng. 28·5, zyg. br. 18, mol. ser. 5·8, diastema 8·7, nasals 14 × 4, bullae 6·3.
The cotype is an old ♂ taken at the same place and on the same day, and measures: "H. and B. 135, tail 150, hind foot 26, ear 19·5." The skull is of the same size as the type. An old ♂ and young ♀ taken by Dr. Jameson at Zoutpan in the Bushveld of Pretoria District are apparently identical with this subspecies.
148. *Mus namaquensis*, A. Sm.
1 ♂, Klipfontein (Grant).
149. *Mus namaquensis lehochla*, A. Sm.
1 ♀, Kuruman (Woosnam).
150. *Mus namaquensis centralis*, Thos. and Schw.
1 ♀, Deelfontein (Sloggett).
151. *Mus namaquensis auricomys*, De Wint.
1 ♀, Essex Vale, Mashonaland (Selous).
152. *Mus namaquensis monticularis*, Jameson.
1 ♂, 3 ♀, Wonderfontein (Jameson).
7 ♂, 7 ♀, Johannesburg (Jameson).
2 ♂, 2 ♀, Pretoria (Roberts).
153. *Mus Woosnami*, Schwann.
1 ♀, Kuruman (Dent).

154. *Mus Moggi*, spec. nov. ✓

Apparently allied to *Mus muscardinus*, Wagner, but with a longer tail, equal in length to the head and body.

General colour above mixed tawny and light brown, the individual hairs being dark ashy brown for the greater part, the exposed parts tawny and the longer projecting hairs brown; forehead, cheeks, and flanks greyer; a dark ring round the eyes, extending to the nose; hairs on the

under surface of the body pure white throughout; fore feet coloured like the flanks, the fingers, hind feet, and sides of limbs pure white. The hairs and the fore and hind feet are short and crisp, extending as bristles on the toes beyond the tips of the claws, which are short, strong, and much curved. Entire tail dark brown, sparingly covered with short brown and a few white hairs. Feet very short. Ears rounded, lightly covered for the greater part with tawny brown hairs. Whiskers black, with lighter coloured tips, very long, measuring about 38 mm. in the longest. Fur of the back about 8 mm., the longer projecting bristles about 14.

Type: Old ♂, Zoutpan, Pretoria District, 22.12.09. "H. and B. 137, tail 137, hind foot 18, ear 20." Skull: gr. leng. 31·6, bas. leng. 25·8, zyg. br. 16·4, int. orb. br. 4·5, br. brain case 13·7, mol. ser. 4·4, diastema 8·5, bullae 7·2, nasals 11·8 × 3·5.

This specimen was captured at the foot of an old hollow thorn tree, in which, no doubt, it had its habitation. I have named it after my friend Mr. Ernest Mogg, who was with me on the occasion when this specimen was taken and on many other collecting excursions.

155. *Mus*, spec.?

1 yg. ad. ♂, Magaliesberg (Roberts).

This specimen differs from all others in the collection, but not being quite adult, I have left the question of its identity open until more specimens are obtained.

156. *Mus paedulcus*, Sund.

4 ♂, Port St. Johns (Swinny).

157. *Mus colonus*, Brants.

1 ♂, 3 ♀, 1 juv., Port St. Johns (Swinny).

158. *Mus caffer*, A. Sm.

4 ♂, 1 ♀, 2 juv., Port St. Johns (Swinny).

With regard to this and the two preceding species, the series of skins call for some comment. The series is so small in each case that I am not at all sure that all the specimens are not referable to one and the same species. The four males referred to *paedulcus* are in general effect on the upper surface of body dull tawny with a spare admixture of long black bristles, which show up clearly on the lower back; the smallest specimen has the molars still unworn, and the largest very much worn.

In the series of skins of *colonus*, one of the females is coloured like the four males of *paedulcus*, and, though its teeth are still unworn, at least seven pairs of mammae can be counted on the flanks; but its skull and measurements are precisely those of the other specimens of *colonus*. The four specimens are much blacker on the upper surface of body than in those of *paedulcus*. None of the skulls exhibit signs of age.

In the series of skins of *caffer*, none of the teeth are worn, and two are obviously very young. In them the hair is shorter and closer and of a more uniform slate grey in both the small and large specimens. But the smallest specimen in the whole of the three series is a very young one which is coloured like the specimens of *colonus*, and also has long silky hair. Were it not for this specimen I should have placed all the specimens as being of one species, the three series representing as many stages of growth. The molar series, it will be observed, is the same size throughout,

but the three series are well marked off in size in other respects, and on these grounds and the presence of the very young specimen of *colonus* and the two young but larger specimens of *caffer*, it seems advisable to keep the three series apart. Whether my identification is right is another matter, as the original descriptions are none to clear.

The following will illustrate the range of variation in each case:—

| | | | <i>paedulcus</i> . | <i>colonus</i> ♂ and ♀♀ | <i>caffer</i> . |
|---------------|-----|-----|--------------------|-------------------------|-----------------|
| H. and B. ... | ... | ... | 118 -137 | 111 and 99-102 | 85 -90 |
| Tail ... | ... | ... | 108 -132 | 108 and 101-107 | 80 -84 |
| Hd. ft. ... | ... | ... | 23 - 25 | 25 and 23 | 21 -22 |
| Ear ... | ... | ... | 16 - 20 | 16 -18 | 16 -17 |
| Skull:— | | | | | |
| Gr. leng. | ... | ... | 30·5- 32·6 | 26·9-28 | 25·2-25·8 |
| Bas. leng. | ... | ... | 25·7- 27·7 | 21·6-23 | 19·4-19·8 |
| Zyg. br. ... | ... | ... | 15·4- 15·5 | 13·2-13·4 | 12·3-12·9 |
| Mol. ser. | ... | ... | 4·6 | 4·6 | 4·6 |

The very young specimen of *colonus* is given as: H. and B. 56 mm., and the two young of *caffer* as: 65-68, respectively.

159. *Mus coucha*, A. Sm.

- 1 ♂, 1 ♀, Potchefstroom (Ayres).
- 1 ♀, Wonderfontein (Jameson).
- 2 ♂, 2 ♀, Houghton Estate, Johannesburg (Jameson).
- 1 ♂, Wakkerstroom (Roberts).
- 1 ♂, 2 ♀, Zoutpan, District Pretoria (Jameson).
- 1 ♂, Pretoria (Roberts).
- 1 ♂, 1 ♀, Boror (Kirby and Roberts).

The number of mammae is, unfortunately, not given on the labels of any of the specimens; but the tail is always shorter than the head and body, and the skull in old specimens does not exceed 27 mm. in greatest length (*vide* table of measurements given hereafter).

160. *Mus natalensis*, A. Sm.

- 2 ♀, Malvern, Natal (Jameson).
- 1 ♂, 4 ♀, Wakkerstroom (Jameson).
- 6 ♂, 6 ♀, 6 yg., Tzaneen Estate (Jameson).

There is very little difference between specimens from Natal and Zululand, which have been named *zuluensis* by Thomas and Schwann, and *M. microdon* of Peters from Tette; and as the last-named writer seemed to find but little difference between his species and Smith's *natalensis*, it is obvious that the latter name should be used with reference to the southern form, and *microdon* distinguished as a sub-species.

In this species the tail is normally of about the same length as the head and body, while the skull is of about the same size as, or perhaps a little smaller than, that of *M. paedulcus*. The number of mammae in all recorded cases is given as eighteen.

161. *Mus natalensis microdon*, Ptrs.

- 1 yg. ♂, Tette (Grant).
- 5, Zimbiti, Beira (Sheppard).

These specimens are whiter on the under surface of the body, and on this *microdon* may be distinguished from *M. natalensis*.

162. *Mus socialis*, spec. nov.

Very similar to *M. natalensis*, but with twenty-four mammae and the tail much shorter than the head and body; colour very similar to *M. pavidulus* (specimens from Port St. Johns), but tail shorter than in that species.

Type: ♀, ex coll. Dr. H. L. Jameson, Wonderfontein, Transvaal. "H. and B. 108, tail 93, hind foot 21." Skull: gr. leng. 29, basal leng. 23·6, mol. ser. 4·5.

A ♂ from Potchefstroom (Ayres) is probably referable to this species: it measures "H. and B. 120, tail 101, hind foot 22." Skull: gr. leng. 29·8, bas. leng. 24·9, mol. ser. 4·6.

163. *Mus*, spec.?

3 ♂, 5 ♀, Hilton Road, Natal (Jameson).

These specimens are slightly smaller than those of *natalensis* recorded above, and in all cases the ♀♀ are labelled as having only sixteen mammae. None of them are very old, however, and it is possible that they are referable to young adults of *natalensis*.

The following are measurements of adult specimens of *coucha*, *natalensis*, *socialis*, and those from Hilton Road:—

| | <i>coucha</i> . (13 spec.) | <i>natalensis</i> . (17 spec.) | <i>natalensis</i> ? (Hilton Road). (8 spec.) | <i>socialis</i> . (2 spec.) |
|----------------|-------------------------------|-----------------------------------|--|--------------------------------|
| H. and B. ... | 83 - 103 | 110 - 131 | 100 - 110 | 108 - 120 |
| Tail ... | 70 - 84 | 109 - 123 | 95 - 110 | 93 - 101 |
| Hd. ft. ... | 20 - 22 | 21 - 25 | 22 - 25 | 21 - 22 |
| Ear ... | 16 - 19 | 16 - 20 | 17 - 19 | ? |
| Skull:— | | | | |
| Gr. leng. ... | 26 - 27 | 28·4- 32·3 | 27 - 28·1 | 29 - 29·8 |
| Bas. leng. ... | 20·5- 22 | 23 - 25·3 | 22·2- 23·3 | 23·6- 24·9 |
| Zyg. br. ... | 13 - 13·7 | 13·5- 15 | 13 - 15·5 | — |
| Mol. ser. ... | 4·5- 4·7 | 4·5- 5·1 | 4·5- 4·9 | 4·5- 4·6 |

164. *Leggada minutoides*, (A. Sm.).

Very large series, Port St. Johns (Swinny).

1 ♂, 1 ♀, Pirie, Kingwilliamstown (Stenning).

The large series from Port St. Johns represents all stages of adult growth, and displays considerable variation in shade of colour between rufous and brown, without, however, regard to size or sex. The following is the range of variation in size between fairly young and old specimens: H. and B. 45-65, tail 40-54, hind foot 12-14, ear 9-11. Skull: gr. leng. 18-20·5, bas. leng. 13·5-15, zyg. br. 9·2-10·1, mol. ser. 2·8-3·4.

165. *Leggada bella marica*, Thos.

1 ♂, Beira (Sheppard).

166. *Leggada bella*, subsp.?

2 ♀, Tzaneen Estate (Jameson).

167. *Leggada deserti*, Thos.

1 ♂, Pretoria (Roberts).

168. *Thamnomys dolichurus*, (Smuts).

16, Port St. Johns (Swinny).

1 in spirits, Malvern, Natal (Jameson).

169. *Thamnomys surdaster*, Thos. and Wr.

1 ♂, Katanga (Neave).

170. *Cricetomys gambianus viator*, Thos.
1 ♂, with skull, 1 ♀, without skull, Boror (Kirby and Roberts).
171. *Cricetomys gambianus proparator*, Wr.
1 ♀, E. Ruwenzori (Woosnam).
172. *Acomys Selousi*, de Wint.
1, Beira (Sheppard).
173. *Acomys spinosissimus*, Ptrs.
1, Boror (Kirby and Roberts).
174. *Dasymys incomtus*, Sund.
1 very old ♂, Hector Spruit (Streeter).
14, Tzaneen Estate (Jameson).
1 ♂, N. W. Rhodesia (Wilde).
175. *Arvicanthis pumilio*, (Sparrm.).
6, Knysna (Rex).
2, Grahamstown (?).
176. *Arvicanthis p. cinereus*, Thos. and Schw.
1 ♂, Klipfontein (Grant).
177. *Arvicanthis p. meridionalis*, Wr.
1 skin without skull, Carnarvon (Littledale).
178. *Arvicanthis p. griquae*, Wr.
1 ♀, Kuruman (Woosnam).
1, Bechuanaland (flat skin and skull) (pres. R. W. Hadron).
179. *Arvicanthis p. Chakae*, Wr.
10, Port St. Johns (Swinny).
? 1 ♀, Pietersburg (Jameson).
180. *Arvicanthis p. Moshesh*, Wr.
1 ♂, 1 ♀, Hilton Road, Natal (Jameson).
2 ♂, 4 ♀, Wakkerstroom (Jameson and Roberts).
2 ♂, 2 ♀, Wonderfontein (Jameson).
1 ♂, Johannesburg (Jameson).
3 ♂, Potchefstroom (Ayes).
2, Pretoria (Roberts).
1, Waterberg (Jameson).
181. *Arvicanthis p. dilectus*, Wr.
4 ♂, 2 ♀, Tzaneen Estate (Jameson).
182. *Arvicanthis dorsalis*, (A. Sm.).
2 ♂, 1 ♀, Hector Spruit (Streeter).
6 ♂, 6 ♀, Tzaneen Estate (Jameson).
4, Boror (Kirby and Roberts).
183. *Arvicanthis d. calidior*, Thos. and Wr.
1 ♂, Tambararra (Grant).
184. *Pelomys fallax*, Ptrs.
1 old ♂, 1 young ad. ♂, Boror (Kirby and Roberts); also 1 skull.

These specimens agree with Peters' description, and clearly prove that the specimens from south of the Zambezi are referable to another long-tailed species. The old ♂ is slightly more tawny coloured on the back than the young ♂, which has the molars still untouched by wear.

Peters' ♀ specimen would seem to have been a very young one, judging by the measurements recorded and the figure of the skull. The following measurements may therefore be of interest:—

| | Old ♂. | Ad. ♂. | Young ad. ♂. |
|------------------------|--------|----------|--------------|
| H. and B. ... | 161 | — | 130 |
| Tail ... | 137 | — | 120 |
| Hd. ft. ... | 30 | — | 31 |
| Ear ... | 20 | — | 17 |
| Skull:— | | | |
| Gr. leng. ... | 36·5 | 34·6 | 33·1 |
| Bas. leng. ... | 30 | 29·4 | 27 |
| Zyg. br. ... | 17·6 | 17·3 | 16·8 |
| Mol. ser. ... | 6·7 | 6·9 | 6·3 |
| Nasals ... | 13 × 4 | 13 × 3·7 | 12·5 × 3·5 |
| Br. M ¹ ... | 2·1 | 2·3 | 2·2 |

185. *Pelomys australis*, spec. nov.

Similar to *P. fallax*, but with the tail longer than the head and body. (See *P. Z. S.* 1907, p. 779).

Type: Ad. ♂, ex coll. C. H. B. Grant, Mazambeti, Beira (B. M. No. 7. 6.2.51), now in the collection of the Transvaal Museum. "H. and B. 153, tail 165, hind foot 30, ear 18" (C. H. B. G.). Skull: gr. leng. 35·3, bas. leng. 28·5, zyg. br. 16·8, mol. ser. 6·5, nasals 14 × 4, bullae 6.

There are also two old specimens from N. W. Rhodesia (Wilde), which are somewhat larger than the type, but with the same proportionate length of tail. There are also five younger specimens from the same place which are given as having tails of about the same length as the head and body and a sixth with a tail much shorter than the head and body; but, as it seems to be the rule that the growth of the tail is checked at a certain age in a number of different species of rodents, while the head and body still continue to grow even to very old age, I think it not unlikely that these six specimens are referable to a different species. This is supported in this case by the fact that the single large one in the series of six is obviously older than the other five, though of the same age as one of the two with very long tails. Should these specimens from N. W. Rhodesia therefore prove to belong to two species, we have the interesting overlapping of the north and south of Zambezi species in the higher reaches of that river. This I have no doubt is the case, judging by comparison of specimens of the same age. The six specimens are not, however, referable to *P. fallax*, but more likely a western race linking up with the species found occurring in Angola. In these specimens measurements of the hind foot are given as varying from 31 to 37 mm. without regard to the size of the other parts.

The following table of measurements will illustrate the facts above mentioned:—

| | Old ♂ and ♀. | Old ♂. | Younger ♂♂ and ♀. |
|----------------|--------------|--------|-------------------|
| H. and B. ... | 163 - 164 | 165 | 135 - 155 |
| Tail ... | 170 - 177 | 156 | 133 - 156 |
| Hd. ft. ... | 32 - 36 | 35 | 31 - 37 |
| Ear ... | 19 - 20 | 20 | 18 - 20 |
| Skull:— | | | |
| Gr. leng. ... | 37·4- 37·5 | 37·5 | 33·1- 34 |
| Bas. leng. ... | 31 - 31·5 | 30·8 | 27 - 27·6 |
| Zyg. br. ... | 18·4- 19 | 18·3 | 16·6- 18 |

186. *Mystromys albicaudatus fumosus*, Thos. and Schw.
 1 ♀, 2 yg. ♂, 2 juv., Wakkerstroom (3 Roberts, 2 Jameson).
 ? 1, Modderfontein, Transvaal (P. J. Pohl) (skull in skin).
187. *Mystromys albipes*, Wagn.
 2 ♀, Wonderfontein (Jameson).
188. *Petromys typicus*, A. Sm.
 1, Klipfontein (Grant).
189. *Heliophobius argenteo-cinereus*, Ptrs.
 8, Boror (Kirby and Roberts).

It is not quite clear from a study of these specimens that two species do not occur side by side, but as the differences which can be observed are confined to the two sexes, it is possible that this species is dimorphous.

An adult male with five back teeth has a white blaze on the forehead, long nasals produced backwards level with or slightly beyond the fronto-premaxillary suture, and with the outer lateral nasal sutures straight. A smaller ♂, with the hindmost molar only just appearing, has a smaller white blaze and the nasals are like those of the larger specimen. Four large and one small ♀ have four or five back teeth, which show some remarkable anomalies in their rate of growth and number on either side and jaws; in them the nasals are shorter, bulge out laterally towards the back, and then narrow off either to a point or a semicircle, while the sides of the premaxilla are produced backwards behind them, thus forming a forward projection of the frontals where they meet the nasals. In a very much smaller ♂ specimen the nasals are similar to those of the ♀♀; it has the rudiment of a milk tooth on one side of the lower jaw, three back teeth of the normal size and the fourth just beginning to show; it is too young to be of use in settling the question of whether two species occur side by side or whether all the specimens are referable to one species. The teeth present so many anomalies in the series, that a brief discussion may not be out of place.

The hindmost molar appears to grow out in two divisions, the posterior half of which is often only half the length of the anterior when it has grown to the level of the adjoining molar. The first premolar is not always present, or may be present on one side only. The second premolar (if it be a premolar) is small and of the same size throughout the series, including the very young male; and the remaining molars are apparently equivalent to those of *Georychus*. The roots of the molars in the upper jaw curve strongly outwards, and in the lower jaw are either straight or curved slightly inwards. The rate of growth of the hindmost molar is, more often than not, much faster on one side than on the other, so that though the one may present a worn appearance that on the opposite side may not yet have reached the level of M².

The following is a table of measurements given in four divisions:—

| | ♂♂. | | Largest ♀♀. | Smallest ♀♀. | Youngest ♂. | |
|------------------|-------|-------|-------------|--------------|-------------|------|
| H. and B. ... | 151 | -182 | 165 | -179 | 145 | — |
| Tail ... | 12 | | 8 | -14 | 13 | — |
| Hd. ft. ... | 31 | -33 | 28 | -31 | 28 | — |
| Skull:— | | | | | | |
| l-cond. lg. ... | 46 | -47·8 | 40·5- | 41·5 | 40 | 34·6 |
| Nas. cond. leng. | 41 | -43·3 | 36·3- | 36·6 | 36·4 | 30·7 |
| Zyg. br. ... | 30·3- | 32·4 | 27·3- | 29·2 | 27·3 | 25 |
| Br. case ... | 17·3- | 18·4 | 16·1- | 17·2 | 15·8 | 15·5 |
| Nas. leng. ... | 14·4- | 15·1 | 11·2- | 12·8 | 13 | 10·1 |
| Nas. br. ... | 4·7- | 4·9 | 4·2- | 4·9 | 4·2 | 3·7 |

190. *Bathyergus suillus*, (Schreb.).
20, Knysna (Grant and Rex).
191. *Bathyergus janetta*, Thos. and Schw.
1 ♀, Port Nolloth (Grant).
192. *Georychus capensis*, Pall.
1 old ♂, Stellenbosch (S. A. Mus.).
? 1 juv. in spirits. No locality indicated (pres. Dr. Breyer).
193. *Georychus capensis canescens*, Thos. and Schw.
1 ad., Knysna (?).
1 grav. ♀, 5 juv. in spirits, Knysna (Rex).
The young are born with a white muzzle.
194. *Georychus Yatesi*, spec. nov. ✓
Similar in coloration to *G. capensis*, but with the upper surface of body rich buff-orange, and the head darker; the skull and teeth also show distinct characters.
Colour: eyes, ears, and forehead all marked with a small patch of pure white; muzzle, tail, and feet also pure white; forehead black to the white muzzle, this colour extending laterally below, but not joining behind, the eyes, and backwards above the eyes until lost in an admixture of buff-orange in the region of the white frontal spot; whole of the rest of the upper surface of head and body rich buff-orange, with blackish tips to the longer hairs, which are most conspicuous just above the tail and on the lower back: the sides of the upper surface soon lose the blackish coloured tips and the flanks are clear buff-orange: under surface of body slightly paler than the flanks. The hairs throughout the body are dark brown for the basal half. Skull: in general appearance similar to that of *G. capensis*, but with a larger brain case, and a more conspicuous outward projection of the frontals in the anterior angle of the orbital region. Cheek teeth much larger in the case of the two first than in *capensis*, while the hindmost in the upper jaw is smaller and differs in pattern. The hindmost molar in the lower jaw is only just beginning to show on the one side (a juvenile character), while on the other it is not much larger, but blackened at the tip, seeming to indicate that growth had ceased before the tooth had attained its full size. This would seem to be an anomaly, as the animal was tough to skin and the skull is obviously that of a fully adult specimen. The type was caught at Belfast, Transvaal, by the sons of E. E. Yates, Esq., as it was running across the road after a heavy hailstorm. Knowing that I was in search of more specimens of a certain golden mole, of which my mother had caught a single specimen at Belfast (see *Chryso spalax pratensis*), Mr. Yates very kindly sent this to me alive. Its discovery is quite as interesting as that of the golden mole I was in search of, for it forms yet another connecting link between the Cape Peninsula and Transvaal highveld fauna.
Measurements taken in the flesh before *rigor mortis* had set in are: H. and B. 180, tail 25, hind foot 32. Skull (dry): cond. inc. leng. 49, cond. nasal leng. 45, bas. leng. 40, zyg. br. 35·2, br. premax. 10, int. orb. br. 9·5, at outward projecting process mentioned above 13·2, immediately in front of process 10·6, br. brain case 19, mol. ser. (crown) 8·8, diastema 15·5, leng. M¹ 2·3, M² 2, M³ 2·5, M⁴ 2, breadth at M³ 8·4.
195. *Georychus beirae*, Thos. and Wr.
1 ♂, Beira (Grant).
4, Beira (Sheppard).

196. *Georychus*, spec. ?1 ♀, juv., Knysna (Rex, *ex* Daneel).

This specimen is similar to the young of *G. hottentottus* from the same place, as regards size; but it is altogether paler in colour and has a small white blaze on the forehead. This must, I think, belong to a distinct species allied to *G. Darlingi*. I also captured a similarly marked specimen in the Dargle district, but it is unfortunately not now in the collection; it was taken in the burrow of *Chrysochloris*, a specimen of which it had severely mauled in the same trap the day before.

197. *Georychus Darlingi*, Thos.

1 ♂, Salisbury (Marshall).

Thanks to the kindness of Mr. Hewitt, curator of the Albany Museum, I have been able to examine the specimens of *G. Darlingi* from Grahams-town mentioned by Sclater in his "Fauna of South Africa." They are not referable to *Darlingi*, but another undescribed species allied to it. A curious feature of these specimens is that only the ♂♂ have a white frontal mark, the ♀♀, which are slightly smaller, lacking it. Under the circumstances I have thought it advisable not to apply a name, as it is possible that the type of one of the three species now relegated to the synonymy of *hottentottus* may have been a ♀ of this species. In these specimens the premaxilla usually closes up behind the nasals, as in *Darlingi*, but on the whole they are smaller and offer slight differences in other respects.

198. *Georychus amatus*, Wr.

1 ♂, Katanga (Neave).

199. *Georychus Bocagei*, De Wint.

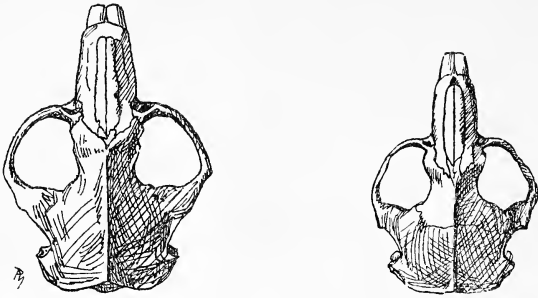
1 juv. ♂, Angola (Ansorge).

200. *Georychus hottentottus*, (Less.). (Text fig. 6.)

16, Knysna (Rex).

The nasals in old specimens are blunt at the hinder end, near which is the broadest part, then taper forwards to the tips in straight lateral lines: they measure 3·5 mm. across at the back and 2 mm. at the tip. There are six very old specimens in the series which are so very much larger than the rest that it is possible they may belong to a larger species; but from a study of several large series of skins taken from the same burrows in places in other parts of South Africa, it would seem that the full dentition is often obtained at a young age, as the following table will illustrate:—

| | 6 old spec. | 8 yg. adults. | 2 very young (only 3 molars). |
|----------------------|----------------|---------------|----------------------------------|
| H. and B. ... | ... 152 -170 | 120 -135 | 101 -114 |
| Cond. ins. leng. ... | ... 36·9- 39·5 | 31·3- 36 | 27·2- 31·5 |
| Con. nas. leng. ... | ... 32 - 35 | 27·6- 31·4 | 24·3- 28·2 |
| Zyg. br. ... | ... 26 - 27·2 | 19·6- 22·6 | ? - 19 |
| Br. premax. ... | ... 6·7- 8 | 5·5- 6·9 | 5 - 5·4 |
| Int. orb. br. ... | ... 6·5- 7·3 | 6·4- 6·8 | 6·1- 6·5 |
| Br. brain case ... | ... 13·6- 15·5 | 12·6- 13·4 | 12·9- 13·2 |
| Nas. leng. ... | ... 11·2- 13·4 | 9·7- 11·5 | ? - 9·7 |
| Nas. br. ... | ... 2·8- 3·8 | 2·6- 3·4 | ? - 3 |
| Mol. ser. ... | ... 5·3- 6·1 | 5·2- 5·5 | ? - 5·2 |
| Diastema ... | ... 11·3- 12·5 | 9 - 10·5 | - 8·9 |
| Br. inc. ... | ... 4·4- 5·8 | 3·7- 4·5 | 3·1- 3·5 |



Text fig. 6.—Skulls of *Georychus hottentottus*, Less., from dorsal aspect.

(a) ♂ specimen, T. M. Cat.,
No. M. 572.

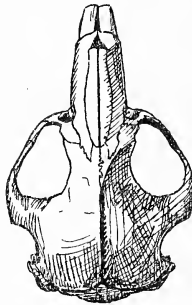
(b) ♀ specimen, T. M. Cat.,
No. M. 601.

The measurements given on the labels are not altogether satisfactory, and I cannot therefore now venture to give a definite opinion as to whether two or only one species are represented in this series.

201. *Georychus holosericeus*, Wagn. (Text fig. 7.)

1 juv. ♀, Pirie Forest (Stenning).

This specimen is very young, judging by the fragment of the skull attached. The nasals are broadest rather further forward than in the specimens from Knysna, and more pointed at both ends; they measure 3 mm. at the broadest part and 1·7 at the tip. The following measurements of the available parts of the skull will show that it is not referable to the same species as a specimen from the same place mentioned hereafter: Br. premax. 6, int. orb. br. 6·7, nasals 10·3 × 3, diastema 9·5, br. incisors 4·1.



Text fig. 7.—Skull of *Georychus holosericeus*, Wagn., from dorsal aspect.

♂ specimen, T. M. Cat., No. M. 582.

202. *Georychus natalensis*, spec. nov. (Text fig. 8.)

Similar to *G. holosericeus*, but with the nasals pointed at the back, widest at about two-thirds of the length from the front and with the foremost third produced straight forward to the tip or with a very slight broadening at the tip.

Type: old ♀, Wakkerstroom, 10.12.12. H. and B. 160, tail 21·5, hind foot 25. Mammae 2 p. (1 in front, 1 at side)=4.

Text fig. 8.—Skull of *Georychus natalensis*, sp. nov., from dorsal aspect.1

Type specimen: a ♂, T. M. Cat., No. 1245.

This species is founded on a series of eleven skins (two of which are now in the Albany Museum) giving the following measurements:—

| | 6 old spec. | | 3 adults. | | 2 very young (with 3 molars). | |
|------------------|-------------|--------|-----------|--------|----------------------------------|--------|
| H. and B. ... | 165 | -177 | 150 | -155 | 120 | -130 |
| Tail ... | 20 | - 25 | 19 | - 21.5 | 23 | - 23.5 |
| Hind foot ... | 24 | - 26 | 24.5 | - 25 | 21.5 | - 22 |
| Cond. inc. leng. | 40 | - 41 | 38.8 | - 39.6 | 34.8 | - 35.5 |
| Cond. nas. leng. | 36.3 | - 37.3 | 35.2 | - 35.6 | 31.6 | - 32.6 |
| Zyg. br. ... | 26.3 | - 28.6 | 25.6 | - 26.8 | 23.4 | - 23.9 |
| Br. premax.... | 8 | - 8.6 | 7.5 | - 8.3 | 6.6 | - 6.7 |
| Int. orb. br.... | 7.6 | - 8.2 | 7.9 | - 8.3 | 7.6 | - 8.1 |
| Br. brain case | 15.4 | - 16 | 14.8 | - 15.8 | 14.6 | - 15 |
| Nasals, leng ... | 13.6 | - 15.2 | 13.2 | - 13.6 | 10.6 | - 12 |
| Nasals, br. ... | 3.6 | - 4 | 3.1 | - 3.7 | 3 | |
| Mol. ser. ... | 6.2 | - 6.9 | 6.5 | - 7 | | |
| Diastema ... | 11.3 | - 13 | 11.4 | - 11.8 | 9.5 | - 10.5 |
| Br. incisors ... | 5.5 | - 6.1 | 5.2 | - 5.5 | 4.3 | - 5 |
| Br. mol. ... | 6 | - 6.8 | 6.1 | - 7.1 | 5.6 | - 5.9 |

Three specimens from the Dargle district and one from Hilton Road appear to be referable to this species; but none of them are fully adult.

203. *Georychus Jamesoni*, spec. nov.

Very similar to *G. natalensis*, but somewhat smaller in size; nasals intermediate in shape between *natalensis* and *arenarius*.

Type: Old ♀, ex coll. H. L. Jameson, Houghton Estate, Johannesburg, 4.6.07. "H. and B. 135, tail 15, hind foot 24." Mammas 2 p. (1 in front, 1 at side) = 4. Cotype; Old ♂, same place, "H. and B. 130, tail 17, hind foot 25." Also young ♂, same place, "H. and B. 117, tail 18, hind foot 23."

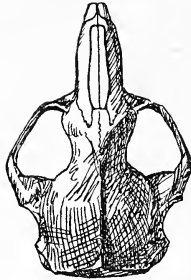
The skulls measure:—

| | Type ♀. | Old ♂. | Young ♂. (3½ molars.) |
|----------------------|---------|--------|--------------------------|
| Cond. inc. leng. ... | 36.7 | 39.3 | 35.5 |
| Cond. nas. leng. ... | 32.8 | 33.8 | 32.5 |
| Zyg. br. ... | 24.3 | 24.1 | 21.6 |
| Br. premax. ... | 6.5 | 7 | 6.3 |
| Int. orb. br. ... | 8.2 | 7.8 | 8 |
| Br. brain case | 16 | 15.2 | 14.6 |
| Nas. leng. ... | 13.3 | 13.8 | 12.2 |
| Nas. br. ... | 3.3 | 3.4 | 3.1 |
| Mol. ser. ... | 6.2 | 6.8 | 6.4 |
| Diastema ... | 10.7 | 10.8 | 10 |
| Br. inc. ... | 4.8 | 5.4 | 4.3 |
| Br. mol. ... | 5.9 | 6.4 | 6.1 |

204. *Georychus arenarius*, spec. nov. (Text fig. 9.) ✓

Differs from the preceding species in having narrow nasals that are only slightly broadened at about the middle of their length and posteriorly squared or at any rate not pointed: the premaxilla is produced straight back considerably beyond the back of the nasals in all the specimens examined.*

Type: Old ♀, Rietondale (East), Pretoria, 2.3.13. "H. and B. 145, tail 20, hind foot 25, mammae 2 p.=4." Cotype, an old ♂ from the same burrows; "H. and B. 145, tail 20, hind foot 27." Also two young specimens from the same burrows, taken on the same day, "H. and B. 110-120, tail 20-22, hind foot 22-24." These four specimens were all taken in white sandy soil and are rather lighter coloured than is the rule. In four other specimens taken in red soil not far off the fur is stained with the soil, but in other respects there does not appear to be any material difference.



Text fig. 9.—Skull of *Georychus arenarius*, sp. nov., from dorsal aspect.
♂ specimen, T. M. Cat., No. 1265.

| | Old ♂. | Type ♀. | Young ♂. (3 molars.) | Young ♀. (3½ molars.) |
|------------------|----------|---------|-------------------------|--------------------------|
| Cond. inc. leng. | ... 40·2 | 37·3 | 33·4 | 35·8 |
| Cond. nas. leng. | ... 36·8 | 34·3 | 29·6 | 32·1 |
| Zyg. br. | ... 26·5 | 24·4 | 19·2 | 21·3 |
| Br. premax. | ... 7·3 | 6·4 | 5·2 | 5·8 |
| Int. orb. br. | ... 7·5 | 7·2 | 7·5 | 7 |
| Br. brain case | ... 15·5 | 15 | 14 | 14·4 |
| Nas. leng. | ... 14 | 11·6 | 10·2 | 11·4 |
| Nas. br. | ... 3·3 | 3 | 3 | 3 |
| Mol. ser. | ... 6·8 | 6·3 | — | 6·5 |
| Diastema | ... 12·2 | 11·8 | 8·8 | 10·6 |
| Br. inc. | ... 5·1 | 4·5 | 3·8 | 4·2 |
| Br. mol. | ... 6·8 | 6·2 | — | 5·8 |

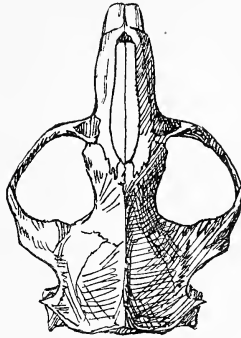
205. *Georychus anomalus*, subsp. nov. (Text fig. 10.) ✓

A large form with the nasals long and narrow, about the same breadth throughout their length: mammae six in number.

Type: Fairly old ♀, Skinners Court Valley, Pretoria, 23.2.13. "H. and B. 140, tail 21, hind foot 26, mammae 3 p. (1 in front, 2 at side) =6." A ♂ taken in burrows not far from where the type was obtained is very much larger in all respects, although the incisors are narrow and the molars still unworn, seeming to show that it is fairly young; but on

* The closing up of the backward projecting points of the premaxilla varies in some species, while in others it seems to be a fixed character.

the other hand the colour is that of an old ♂. Traps were set for a week in the same burrows where the large ♂ was taken, but only resulted in the capture of a fairly young ♀ which does not differ from others of the same age caught in burrows not far off, although the traps were nearly always found set off. Eight skins with skulls and one skull were preserved of the specimens taken at the same place within an area of two hundred square yards.



Text fig. 10.—Skull of *Georychus anomalus*, sp. nov., from dorsal aspect.
♂ specimen, T. M. Cat., No. 1253.

In some specimens the premaxilla does not project backwards beyond the nasals: thus the transverse suture cuts almost straight across.

| | Old (?) ♂. | Type ♀. | 2 ad. ♂. | 4 ad. ♀. | 1 young ♀. (3 molars.) |
|-------------------|------------|---------|------------|------------|---------------------------|
| H. and B. ... | 160 | 140 | 145 - 150 | 135 - 145 | 105 |
| Tail ... | 20 | 20 | 15 - ? | 17 - 21 | 19 |
| Hd. ft. ... | 32 | 26 | 24 - 26 | 23 - 26.5 | 22 |
| Cond. inc. ... | 44 | 40 | 39.3- 40.2 | 38 - 39 | 34.1 |
| Cond. nas. ... | 39.2 | 36 | 34.4- 36 | 33.4- 34.4 | 30.7 |
| Zyg. br. ... | 29.6 | 28 | 26.5- 27.5 | 25.3- 26.2 | 22.9 |
| Br. premax. ... | 8.5 | 7.3 | 6.8- 7.5 | 6.6- 7 | 6.3 |
| Int. orb. br. ... | 8.4 | 7.5 | 7.3- 8 | 7.4- 7.5 | 7.4 |
| Br. brain case | 16.5 | 16.1 | 15.3- 16.8 | 15.7- 16.2 | 15.1 |
| Nas. leng. ... | 16.3 | 14.5 | 13.7- 14.5 | 14 - 14.7 | 12 |
| Nas. br. ... | 3.5 | 3 | 2.9- 3.3 | 3 - 3.2 | 2.8 |
| Mol. ser. ... | 7.5 | 7.1 | 6 - 7 | 6.4- 7 | — |
| Diastema ... | 13.5 | 12 | 11.2- 12.8 | 10.5- 11 | 10.2 |
| Br. inc. ... | 5.5 | 5.3 | 5 - 5.7 | 4.5- 5 | 4.3 |
| Br. mol. ... | 6.5 | 6.3 | 6.5- 6.6 | 5.6- 6.3 | 5.4 |

An old ♂ and a young adult ♂ taken in stony ground on the hillside above "The Fountains," Pretoria, seem to be referable to the same subspecies, the nasals being about the same shape and measurements about the same:—

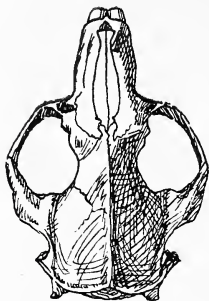
| H. and B. | Tail. | Hd. ft. | Cond. inc. | Cond. nas. | Zyg. br. | Mol. | Br. i. |
|-----------|-------|---------|------------|------------|----------|------|--------|
| 152 | 19 | 27 | 42.8 | 39 | 28.7 | 7.1 | 6.1 |
| 140 | 21 | 26.5 | 40 | 37 | 25.2 | 7.2 | 5 |

206. *Georychus aberrans*, spec. nov. (Text fig. 11.) ✓

Quite different from all the preceding species in having the nasals pointed at the back, swelling out broadly forwards, then tapering down to a very narrow neck, and finally swelling out again at the tip; the nasals

measure 4·2 at the broadest part, 1·4 at the neck, and 2·6 at the tip. This peculiarity is very pronounced and is quite distinct in a young adult and even in a very young specimen with only three visible molars.

Type: very old ♂, *ex coll.* H. H. Swinny, Port St. Johns, 10.10.11. "H. and B. 159, tail 14, hind foot 22."



Text fig. 11.—Skull of *Georychus aberrans*, sp. nov., from dorsal aspect.
Type specimen, T. M. Cat., No. M. 587.

The young adult ♂ from the same place is given as: "H. and B. 137, tail 14, hind foot 21," and the very young one as: "H. and B. 115, tail 13, hind foot 20." The skulls measure:—

| | Type. | Young ad. | Very young. |
|-----------------------|-------|-----------|-------------|
| Cond. inc. | 40 | 36·2 | 31·8 |
| Cond. nas. | 36·9 | 33·6 | 28·5 |
| Zyg. br. | 28 | 24·5 | 20·1 |
| Br. premax. | 8·5 | 7·2 | 6 |
| Int. orb. br. | 8 | 7·4 | 7·4 |
| Br. brain case | 15 | 14·5 | 14·1 |
| Nas. leng. | 13·8 | 12·3 | 11·5 |
| Nas. br. | 4·2 | 3·1 | 3 |
| Mol. ser. | 6·1 | 5·8 | — |
| Diastema | 12·5 | 11·9 | 8·7 |
| Br. inc. | 6 | 5 | 4 |
| Br. mol. | 6·8 | 6·1 | 5·6 |

207. *Georychus*, spec.?

In dealing with the Rudd collection of small mammals, Thomas and Schwann placed Knysna specimens of the grey mole as *G. hottentottus*, and I have therefore done likewise. The question of whether the names of *G. hottentottus*, *caecutiens*, and *ludwigi* are synonymous is still open to doubt, however, and it is not until a very careful research into the life history of the species found in different parts of the Cape Province has been studied that we shall be able to prove their validity. The shape of the nasals and the general colouring is like that of the specimens placed with *G. Darlingi* by Sclater, but the white blaze on the forehead is absent in the ♂♂.

The present species is smaller than any of the grey species described above, and in addition has a rich suffusion of sandy buff over the whole of the body. It is not a stain due to the colour of the soil, as in the case of some of the specimens of *G. arenarius*, but a fixed character found in specimens taken in widely separated localities.

This smaller, richer-coloured, species, is represented in the collection by specimens from Pirie Forest (old ♀, Stenning), Malvern, Natal (old ♂

and ♀, Jameson), Hector Spruit (old ♂, Streeter), and Tzaneen Estate (old ♂ and ♀ and young ♀, Jameson). There are also six skins with skulls collectively said to have been taken in the Waterberg District by Dr. H. L. Jameson and kept alive in the Zoological Gardens.

| | Pirie. | Malvern. | Hector Spruit. | Tzaneen. |
|--------------------|--------|------------|----------------|------------|
| H. and B. ... | 125 | 120 - 121 | 130 | 110 - 125 |
| Tail ... | 12 | 19 - 20 | 12 | 15 - 17 |
| Hd. ft. ... | 19 | 21 | — | 17 - 20 |
| Cond. inc. ... | 31 | 33·1- 36 | 34·7 | 30·2- 34·5 |
| Cond. nas. ... | 27·8 | 30 - 32 | 30·4 | 28·2- 30·8 |
| Zyg. br. ... | 21 | 22·2- 22·3 | 22·3 | 20·7- 22·7 |
| Br. premax. ... | 6·6 | 6·3- 7·1 | 6·5 | 5·2- 6·4 |
| Int. orb. br. ... | 6·5 | 7·2 | 7 | 6·4- 7·5 |
| Br. brain case ... | 13·2 | 14·2- 14·5 | 13·2 | 13·2- 14·2 |
| Nas. leng. ... | 11·2 | 11·5- 12 | 11 | 10 - 11·5 |
| Nas. br.... | 3·1 | 2·8- 3·3 | 2·9 | 2·6- 3·2 |
| Mol. ser. ... | 5·5 | 5·5- 5·9 | 5·3 | 5 - 5·5 |
| Diastema ... | 8·8 | 10 - 10·8 | 10 | 9·5- 10 |
| Br. inc.... | 4·2 | 4·2- 4·5 | 4·5 | 3·8- 4·1 |
| Br. mol. ... | 6 | 5·2- 5·8 | 6 | 5 - 5·5 |

208. *Georychus talpoides*, Thos. and Schw.

7, Knysna (Rex, ex Daneel and Edinborough).

1 ♂, Hector Spruit (Streeter).

209. *Georychus pretoriae*, spec. nov.

Very similar to *G. talpoides*, but much larger in size and with a stronger suffusion of sandy buff on the under surface, sides, and cheeks.

Type: adult, but not old, ♂, Skinners Court Valley, Pretoria, 19.1.13. "H. and B. 140, tail 20, hind foot 24."

G. talpoides was made a subspecies of *G. hottentottus* by the discoverers, but the fact of its being found side by side with the grey coloured species would seem to show that it is distinct. The occurrence of this species in the open veld at Pretoria and *Chrysochloris corriac septentrionalis* at Wakkerstroom explodes the fallacy that the dark coloration is due to residence of the species in forested regions.

Two very young specimens were taken in the same hole as the type, but they were unfortunately so badly infested with ants that they could not be preserved. In colour they do not differ materially from the type.

| | 3 Knysna. (<i>talpoides</i> .) | 1 Hector Spruit. (<i>talpoides</i> .) | 1 Pretoria. (<i>pretoriae</i> .) |
|----------------------|------------------------------------|---|--------------------------------------|
| Cond. inc. leng. ... | ... | 31·4-35 | 35 |
| Cond. nas. leng. ... | ... | 27·5-31 | 31·2 |
| Zyg. br. ... | ... | 19 - 22·4 | 21·8 |
| Br. premax. ... | ... | 5·3- 6·2 | 6·5 |
| Int. orb. br. ... | ... | 6·4- 6·5 | 7·1 |
| Br. brain case ... | ... | 12·4-13·8 | 14·3 |
| Nas. leng. ... | ... | 9·8-11 | 11·5 |
| Nas. br. ... | ... | 2·8- 3 | 3·4 |
| Mol. ser. ... | ... | 5·4- 5·6 | 5 |
| Diastema ... | ... | 9·5-11 | 10·8 |
| Br. inc. ... | ... | 3·6- 4·3 | 4·4 |
| Br. mol. ... | ... | 5 - 5·5 | 5·5 |

210. *Georychus Jorrissenii*, Jameson.

1 ♀ (cotype), Waynek, Waterberg District (Jameson).

3 yg. (two and three molars), Tzaneen Estate (Jameson).

211. *Georychus albus*, spec. nov.

In colour pure white throughout. Skull smaller than in any of the species recorded above, with the exception of *G. Jorrissenii*.

This species is represented by two specimens without labels and another in spirits bearing a torn label with the words "—nberg, K.K., Jan., 1899." It seems likely, therefore, that the three specimens all came from the same place, most likely Wynberg in the Cape Province.

The two specimens without labels, which have a full, and one a worn, dentition, measure in the skull: condylo-incisor length 29·5–30·2, cond. nasal leng. 26·3–27, zyg. br. ?–18·8, br. premax. 5·5, int. orb. br. 15·5, molar series 5–5·4, diastema 8·1–8·5, nasals 9·7–10 × 2·7–3, br. inc. 3·5–4, br. brain case 12·5.

212. *Thamnomys Swindernianus*, Temm.

2 ♂, 2 ♀, Tzaneen Estate (Jameson).

213. *Pronolagus crassicaudatus melanurus*, Rupp.

1 ♀, Klipfontein (Grant).

214. *Pronolagus ruddi*, Thos. and Schw.

1 Legogot, Barberton (Grant).

215. *Pronolagus ruddi randensis*, Jameson.

1 ♂, Houghton Estate (Jameson).

1 ♂, Makapan Caves (Jameson)?

216. *Pronolagus crassicaudatus Curryi*, Thos.

1 ♀, Deelfontein (Grant).

217. *Lepus ochropus*, Wagn.

3 ad., 1 juv. ♂, Ventersburg Road (Jameson).

1 ad. ♂, Potchefstroom (Ayles).

218. *Lepus capensis Granti*, Thos. and Schw.

1 ♂, Port Nolloth (Grant).

218a. *Lepus zuluensis*, Thos. and Schw.

1 ♀, Klein Letaba (Grant).

219. *Lepus zuluensis subrufus*, subsp. nov.

Somewhat larger in size than *L. z. typicus*, with a clear suffusion of sandy rufous over the upper parts, sides, and gular patch and less black on the back.

Type: old ♀, Wakkerstroom, 6.12.12. "H. and B. 530, tail 110, hind foot 115, ear 110. Mammae 2 mg. = 4." Skull: br. leng. 92·5, bas. leng. 71·2, zyg. br. 44, int. orb. br. 18·5, int. temp. br. 13, br. brain case 29·5, nasals 39·5 × 20·5, molar series 17, br. molars 27, palatal foramina 23·2 × 11·7, palatal bridge 6·2, bullae (including meatus) 17. The nasals differ from those of Klein Letaba specimen of *zuluensis* in being cut short across at the tips of the two backward projecting ends instead of ending in swallowtail-like points: hence they are shorter than in the typical race in proportion to the size of the skull.

A specimen from Potchefstroom (Jameson) is coloured like the Wakkerstroom specimen, or is perhaps a little more rufous, and has the backward projecting ends of the nasals rounded instead of being cut across, and in this respect is still not like the Klein Letaba specimen.

220. *Lepus saxatilis*, F. Cuv.
2 ad. ♂, 1 juv. ♂, Knysna (Grant, and Rex *ex* Daneel).
221. *Procavia capensis*, (Pall).
2 ad., 2 juv., Knysna (Rex).
223. *Dendrohyrax arboreus*, (A. Sm.).
2 ♀, Ngqeleni District, Pondoland (Swinnny).
224. *Cercopithecus pygerythrus*, Cuv.
2, Pretoria (Zoo).
1, Pretoria (pres. Mrs. Humphreys).
225. *Cercopithecus schmidti*, Matsch.
1, Uganda (pres. the Misses Lawley).
226. *Cercopithecus labiatus*, I. Geoffr.
1, Pondoland (Zoo).
1, Pirie Forest (Albany Mus.).
227. *Cercopithecus albogularis kolbi*, Neum.
1, Brit. E. Africa (?).
228. *Papio cynocephalus*, E. Geoffr.
1, Transvaal (Zoo) : and skeleton (Zoo).
223. *Papio porcarius*, (Bodd.).
3, Transvaal (Krantz, Zoo, and Market).
- (2) *Galago crassicaudatus garnetti*, (Ogilby).
1, Natal (Zoo).
- (3) *Galago moholi*, (A. Sm.).
3, Pretoria (2 Zoo and 1 pres. W. Tolsma, Esq.).
- (7) *Epomophorus Wahlbergi*, Sund.
1, Delagoa Bay (pres. Dr. L. Bostock).
- (9) *Roussettus leachi*, A. Sm.
1, Delagoa Bay.
- (19) *Nycteris capensis damarensis*, Ptrs.
2, Pretoria (pres. Dr. Gunning).
- (12) *Rhinolophus augur zuluensis*, K. And.
2, Pretoria (pres. A. J. Rutjers, Esq.).
2, Pretoria (in spirits), and one skeleton.
- (20) *Vespertilio capensis*, A. Sm.
2, Pretoria (pres. Dr. H. G. Breyer).
- (33) *Miniopterus natalensis*, (A. Sm.).
1, Pretoria (in spirits).
- (27) *Scotophilis nigrata herrero*, (Thos.).
1, Pretoria (pres. Dr. Gunning).
230. *Nyctinomus aegyptiacus*, E. Geoffr.
1, Grahamstown (Albany Mus.).
- (?) *Elephantulus intufi*, (A. Sm.).
2, Pretoria (Zoo).
- (?) *Elephantulus rupestris jamesoni*, Chubb.
1, Pretoria (Zoo).
- (73) *Erinaceus frontalis*, A. Sm.
1 ad., 1 juv., Pretoria (Zoo).

- Myosorex* (? *tenuis*, Thos. and Schw.)
No history.
- Crociodura* (? *cinnamomea*, Licht.)
1, Pretoria (pres. C. W. Howard, Esq.).
- Crociodura* (? *sylvia*, Thos. and Schw.)
1, Wonderboom (pres. Miss Adendorff).
- (66) *Chrisochloris hottentotus longiceps*, Brown.
1, Volksrust.
A very bright reddish specimen.
231. *Mellivora ratel*, (Sparrm.).
2, Transvaal.
One of the specimens is tawny reddish in place of the black parts in the other specimen.
- (74) *Ictonyx capensis*, (Kaup.).
1, Pretoria (Zoo); 1, Platriver, Pretoria (Noomé).
- (75) *Poecilogale albinucha*, (Gray).
1, Hennops River; 1, Zuurfontein, Pretoria District (pres.).
232. *Aonyx capensis*, (Schinz).
2, Pretoria District (purchased).
233. *Canis mesomelas*, Schreb.
1, Pretoria (Zoo).
234. *Canis adustus*, Sund.
1, Komatipoort (pres. J. P. Hotchkiss, Esq.).
235. *Vulpes chama*, A. Sm.
1, Bloemfontein (pres. J. Visscher, Esq.).
2, Vryburg (pres. de Villiers, Esq.).
1, Pretoria (Zoo).
236. *Otocyon megalotis*, Desm.
1 ad., Palapye, B.P.; 1 juv., no label.
237. *Lyaon pictus zuluensis*, Thos.
2, Sabie Game Reserve (pres. Maj. J. S. Hamilton).
238. *Proteles cristatus*, (Sparrm.).
1 ad., 3 juv., and 1 skeleton, Pretoria (Zoo).
239. *Hyaena crocuta*, Erxl.
1, Lydenburg (Krantz).
1, no history.
240. *Viverra civetta*, Schreb.
2, Transvaal (Krantz and Zoo).
- (78) *Genetta tigrina*, (Schreb.).
1, Mowbray, Cape Province (Zoo).
- (?) *Genetta felina*, Thunb.
1, Pretoria (pres. L. G. Lynwood, Esq.).
- (80) *Mungos caui*, (A. Sm.).
1, Lydenburg (Krantz).
1, Komatipoort (?).
1, Pretoria (Zoo).
241. *Mungos paludinosus rubellus*, Thos. and Schw.
1, Transvaal (Krantz).

- (88) *Helogale brunnula*, Thos. and Schw.
 1, Waterberg (Krantz).
 1, Barberton (pres. Master Glaum).
 1, Pretoria (Zoo).
- (90) *Cynictis penicillata*, (G. Cuv.).
 1, Pretoria (pres. Ledebøer, Esq.).
- (92) *Crossarchus fasciatus*, (Desm.).
 1 Mashonaland (?), (Marais).
- (91) *Suricatta tetradactyla*, (Schreb.).
 3, Pretoria (Zoo).
242. *Felis leo*, Linn.
 1, Nubia (pres. Sir J. G. Maxwell).
 1 ♂, 1 ♀, Transvaal (Krantz).
 1, skeleton, Mashonaland (pres. Capt. Taylor).
 1 ♂, head and shoulders, Lydenburg (dep. by Mrs. F. Watkins).
243. *Felis pardus*, L. (? *melanotica*).
 1, juv. ♀, Grahamstown (Zoo).
244. *Felis capensis*, Gm.
 1, Krugersdorp (pres. Mr. Barclay).
245. *Felis ocreata caffra*, Desm.
 1, Pienaars River, Transvaal (Zoo).
 1, juv. ♀, Pretoria (Zoo).
246. *Felis nigripes*, Burch.
 1 ♀, Klerksdorp (pres. Raym. Gooch, Esq.).
247. *Cynailurus jubatus*, Fitz.
 1, Nairobi (pres. Mr. Percival).
248. *Caracal caracal nubica*, Fitz.
 1, Lydenburg (Zoo); 1, Transvaal (Zoo).
249. *Arctocephalus pusillus*, Schreb.
 1 ad., 1 juv., coast of S. Africa (Zoo).
- (93) *Paraxerus cepapi* (A. Sm.).
 1, Waterberg (Krantz).
 2, Mashonaland (Wilde).
- (99) *Geosciurus capensis*, A. Sm.
 2 ad., 3 juv., Kroonstad (pres. Dr. Symonds and Messrs. L. T. Griffin and A. K. Haagner).
- (101) *Graphiurus murinus transvaalensis*, Rbts.
 1, Middelburg, Transvaal (pres. Mr. Lombard).
- (102) *Graphiurus pretoriae*, Rbts.
 No history.
- (104) *Graphiurus Eastwoodae*, Rbts.
 No history.
- (?) *Otomys unisulcatus*, Brauts.
 1, Fish River, Cape Province.
- (116) *Tatera Brantsi*, A. Sm.
 Waterberg (pres. Dr. H. L. Jameson).
- (137) *Steatomys pratensis*, Ptrs.
 1, Sabi River (pres. Mr. Goldfinch).

- (141) *Mus norvegicus*, Erxl.
1, Pretoria (Krantz).
- (142) *Mus rattus*, L.
2, Pretoria (pres. S. M. Tweeddil, Esq.).
- (180) *Arvicanthis pumilio Moshesh*, Wr.
3, Pretoria.
250. *Arvicanthis pumilio bechuanæ*, Thos.
2, Palapye.
251. *Pedetes caffer salinae*, Wr.
1 ♂, Transvaal (Zoo).
- (212) *Thryononys Swindernianus*, Temm.
1, juv., Pretoria (Zoo).
1, Zoutpansberg (Zoo).
252. *Hystrix africae-australis*, Ptrs.
1 ♂, Transvaal (Zoo).
- (217) *Lepus ochropus*, Wagn.
1, Pretoria (pres. Dr. Arnold).
Pronolagus, spec. ?
1, juv., Pretoria.
- (221) *Procavia capensis*, (Pall.).
1 ad., 1 juv., Pretoria (Zoo).
- (223) *Dendrohyrax arborea*, (A. Sm.).
1, Port Elizabeth (Brown).
253. *Diceros simus*, Burch.
1 ♀, Zululand (pres. Carl Jeppe, Esq.).
2 horns, Brit. E. Africa (purchased).
254. *Diceros bicornis*, L.
1 ♀, Lomagunda, Mashonaland (pres. Julius Jeppe, Esq.).
2, horns, Brit. East Africa (purchased).
255. *Hippotigris Chapmani transvaalensis*, Ewart.
1 ♂, 1 ♀, and skeleton, Transvaal (Krantz and Zoo).
256. *Hylochoerus Meinertzhageni*, Thos.
1, West Africa (purchased).
257. *Potamochoerus choeropotamus*, (Desm.).
1, Transvaal.
258. *Phacochoerus aethiopicus*, Linn.
1 ♀, Pretoria Dist. (pres. O. Liebengath, Esq.).
259. *Hippopotamus amphibius*, (Linn.).
1, South Africa (pres. Sir T. Cullinan).
1, South Africa (skeleton).
260. *Giraffe camelopardalis capensis*, E. Geoffr.
1 ad. ♂, 1 juv., 1 head and neck, and 1 skeleton, Germ. S.W. Africa
(Wilde and pres. Messrs. E. T. Bourke and Geo. Heys).
261. *Bubalis Lichtensteini*, Ptrs.
1 ♀, E. Africa (Krantz).
1 ♂, 1 ♀, N.W. Rhodesia (Wilde).
1 ♂, 1 ♀ (heads), N.W. Rhodesia (Wilde).

262. *Damaliscus albifrons*, (Burch.).
 1 ♂, Potchefstroom (pres. Mr. Pistorius).
 1 ♀, Orange Free State (pres. E. Esselen, Esq.).
 1 ♂ (head), Orange Free State (Noomé).
263. *Damaliscus lunatus*, Burch.
 1 ♂, E. Transvaal (pres. Maj. J. S. Hamilton).
 1 ♀, Germ. S.W. Africa (Wilde).
 1 ♂, 1 ♀ (heads), Bechuanaland (Noomé).
264. *Connochaetes taurinus*, (Burch.).
 1 ♂, Transvaal (pres. Dr. Breyer).
 1 ♂, E. Transvaal (pres. Maj. J. S. Hamilton).
 1 ♀, N.W. Rhodesia (Wilde).
 1 ♂, 1 ♀ (heads), N.W. Rhodesia (Wilde).
265. *Connochaetes taurinus Johnstoni*, Sel.
 1 ♂, 1 ♀ (heads), Boror, P. E. Afr. (Kirby and Roberts).
266. *Connochaetes albojubatus*, Thos.
 1 juv. ♀, E. Africa (Ward).
267. *Connochaetes gnu*, Zimm.
 1 ♂, Kroonstad (pres. E. Esselen, Esq.).
 1 ♀, Kroonstad (pres. Julius Jeppe, Esq.).
 1 juv. ♀, S. Africa (Zoo).
 1 ♂, 1 ♀ (heads), Orange Free State (Noomé).
268. *Cephalophus Harveyi*, Thos.
 1 ♂, Nairobi, B. E. Afr. (Zoo).
269. *Cephalophus natalensis amoenus*, Wr.
 1 ♀, Barberton (pres. Master Glaum).
270. *Cephalophus monticola*, (Thunb.).
 1 juv., Port Elizabeth (P. E. Museum).
 1 ♀, Cape Colony (Taylor).
 1 ♀, S. Africa (Zoo).
271. *Cephalophus Grimmi*, Linn.
 1 ♂, Transvaal (Krantz).
 1 juv., Pretoria (Zoo).
 1, Transvaal (Zoo).
 1 ♀ (albino), Lydenburg (pres.).
272. *Oreotragus oreotragus*, (Zimm.).
 1 ♂, Transvaal (Krantz)
273. *Ourebia ourebi*, (Zimm.).
 1 juv., Pretoria District (Zoo).
 1 ♀ juv., Pretoria District (Zoo).
274. *Rhaphiceros campestris*, (Thunb.).
 2 ♂, Transvaal (Zoo).
 1 ♀, Transvaal (pres. H. Wilson, Esq.).
275. *Rhaphiceros melanotis*, (Thunb.).
 1 ♂, Stellenbosch.
276. *Rhaphiceros Sharpei*, Thos.
 1 ♂, N. W. Rhodesia (Wilde).
277. *Nesotragus Livingstonianus*, Kirk.
 1 ♂, Delagoa Bay.

278. *Cobus ellipsiprymnus*, (Ogilby).
 1 ♀, Transvaal (Krantz).
 1 ♂, 1 ♀, Sabi Game Reserve (pres. Maj. J. S. Hamilton).
 1 juv., Transvaal (Zoo).
279. *Cobus Penricei*, Rothsch.
 1 ♂, 1 ♀, N. W. Rhodesia (Wilde).
280. *Adenota Vardonii*, (Livingst.).
 1 ♂, 1 ♀, N. W. Rhodesia (Wilde).
 1 ♂ (head), N. W. Rhodesia (Wilde).
281. *Adenota leche*, Gray.
 1 ♂, 1 ♀, N. W. Rhodesia (Wilde).
282. *Redunca arundinum*, (Bodd.).
 1 ♂, Transvaal (Krantz).
 1 ♂, N. W. Rhodesia (Wilde).
 1 ♀ (albino), Sabi (pres. Maj. J. S. Hamilton).
 1 ♀, no history.
283. *Cervicapra fulvorufula*, (Afzel.).
 1 ♀, 1 juv., Transvaal (Krantz and purchased).
284. *Pelea capreolus* (Bchst.).
 1 ♂, Transvaal (Krantz).
285. *Aepyceros melampus*, Lcht.
 1 ♂, Transvaal (Wilde).
 1 ♀, Transvaal (Krantz).
286. *Antidorcas euchoire*, (Sparrm.).
 1 juv., Transvaal (Krantz).
 1 ♂, Cape (pres. Mrs. Pirie).
 1 ♂ (albino), Carlton, C.P. (pres. A. J. Visser, Esq.).
287. *Hippotragus equinus*, (Is. Geoff.).
 1, Transvaal (Krantz).
 1 ♂, 1 ♀, N. W. Rhodesia (Wilde).
 1 ♂, 1 ♀ (heads), N. W. Rhodesia (Wilde).
288. *Hippotragus niger*, (Harris).
 2 ♂, Transvaal (Krantz).
 1 ♀, S. Africa (Zoo).
289. *Oryx gazella*, Linn.
 1 ♀, Bechuanaland.
290. *Tragelaphus scriptus*, (Pall.).
 1 ♂, N. W. Rhodesia.
291. *Tragelaphus sylvaticus*, (Sparrm.).
 1 juv. ♀, Barberton (pres. Master Glaum).
292. *Tragelaphus Spekei*, ScL.
 1 juv. ♂, N. W. Rhodesia (pres. by King Lewanika).
293. *Strepsiceros strepsiceros*, Pall.
 1 ♂, 1 ♀, 1 juv., Transvaal (Krantz).
294. *Strepsiceros Angasi*, Angas.
 1 ♂, P. E. Africa (pres. Maj. J. C. B. Statham).
295. *Taurotragus oryx Livingstonei*, ScL.
 1 ♂, 1 ♀, N. W. Rhodesia (Wilde).
 1 ♂, 1 ♀ (heads), N. W. Rhodesia (Wilde).

296. *Manis Temmincki*, (Smuts).
1, Barberton (pres. Messrs. Edwards Bros.).
1, Komatipoort (pres. J. G. Hotchkiss, Esq.).
1, Komatipoort (pres. J. v. d. Veen, Esq.).
1 skeleton, South Africa (Zoo).
297. *Orycteropus capensis*, Gm.
1, Pretoria.
1, Knapdaar, C.P. (pres. A. M. Hughes, Esq.).
298. *Buffelus caffer*, (Sparrm.).
1 ♂, N. W. Rhodesia (Wilde).

There is also a considerable collection of skulls which should be included in this paper; but owing to the fact that the data appended to them being so unsatisfactory and many of the skulls having been acquired from the Zoological Gardens without localities being indicated, I have thought it advisable to ignore them entirely.

SUPPLEMENT TO LIST OF MAMMALS IN THE TRANSVAAL MUSEUM.

(Text fig. 12.)

By AUSTIN ROBERTS.

IN May, 1913, I made special excursions to the Rustenburg District for the purpose of obtaining specimens of a certain *Chrysochloris*, of which there are three specimens in the collection without skulls. The *Chrysochloris* was not discovered, but a few *Georychi* were taken, one series apparently representing a species new to science. To this species I am applying the name of

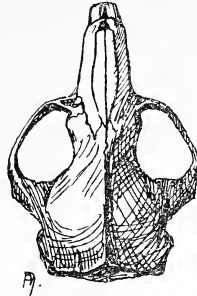
Georychus mahali, spec. nov. (text fig. 12).

Description : resembling the small reddish coloured species (No. 200 in the List) found to the east of the Drakensberg ; but larger in size, as the following table will illustrate :—

| | | 3 ad. ♀♀ | 1 yg. ad. ♂ | 1 juv. (3 mol.). |
|-----------------------|------------|----------|-------------|------------------|
| H. and B. | | 135-142 | 140 | 120 |
| Tail | | 17-23 | 17 | 21 |
| Hd. ft. | | 25-26 | 23 | 24 |
| In. cond. leng.... | 36 - 38 | | 36·5 | 35 |
| Nas. cond. leng. | 32·7- 34 | | 33 | 31·7 |
| Zyg. br.... | 24·1- 25·5 | | 24·3 | 23 |
| Br. premax. | 6·4- 7 | | 6·2 | 6·2 |
| Int. orb. br. | 7·3- 7·9 | | 7·5 | 8·2 |
| Br. brain case | 14 - 15·5 | | 14·5 | 14·5 |
| Nas. leng. | 12·1- 13 | | 13 | 12 |
| Nas. br.... | 3 - 3·4 | | 3 | 3·2 |
| Mol. ser. | 6·6- 7 | | 6·2 | — |
| Diastema | 10·2- 10·7 | | 11 | 9·5 |
| Br. incisors | 4·3- 4·9 | | 4·2 | 4·2 |
| Br. molars | 6 | | 6 | 6 |

This species was first discovered at Bleskop, a small native village seven miles east of Rustenburg, four specimens being taken there, of which two were kept alive but unfortunately escaped a week later. It seems to be very locally distributed, for it was only observed at one other place along the railway line, namely at Rosslyn, some five miles N.W. of Pretoria North. At this last place it was found to be very abundant, and five specimens were taken, of which two very young ones were kept alive, but subsequently escaped. The type is an adult female taken from the three from Rosslyn. In none of the specimens are the teeth so worn down that the folds cannot be seen, and it is probable therefore that the very old ones are larger than the measurements given above; but the nasals are so distinctly different from those of another larger species found

at Rosslyn, that there is no doubt as to their being of a different species; in all respects they most closely resemble the small species (No. 200 in the List), the difference being a matter of size only.



Text fig. 12.—Skull of *Georychus mahali*, sp. nov., from dorsal aspect.
Type specimen: a ♀, T. M. Cat., No. 1272.

Of the larger species mentioned above as having been taken at Rosslyn, one specimen is an old female and two others young females with the hindmost molar just beginning to push its way out. These measure as follows:—

| | Old ♀. | Young ♀♀. |
|-------------------------|--------|-----------|
| H. and B. | 150 | 145 |
| Hd. ft. | 26 | 25 -26 |
| Inc. cond. leng. | 40·2 | 36 -37·2 |
| Nas. cond. leng. | 36 | 32·8-33·8 |
| Zyg. br.... | 26·5 | 24 -26 |
| Br. premax. | 8 | 6·8- 7 |
| Int. orb. br. | 7·5 | 7·5- 7·8 |
| Br. brain case | 16 | 15·3-15·5 |
| Nas. leng. | 15 | 12·5-13·4 |
| Nas. br.... | 4 | 3·1- 3·2 |
| Mol. ser. | 6·7 | — |
| Diastema | 12·5 | 11·2-11·4 |
| Br. incisors | 5·5 | 4·5- 4·6 |
| Br. mol. | 6·9 | 5·4- 5·7 |

These large specimens appear to be referable to *G. anomalus*, in all but the greater breadth of the nasals in the single old female. I have already remarked in regard to *G. anomalus* when describing that species (*vide* p. 97), that in some cases the premaxilla does not extend beyond the back of the nasals. In this old female, the back of the nasals is squared and the premaxilla does not extend backwards; but in the two younger specimens this is not so, the premaxilla extending slightly backwards beyond the nasals; whether the later development would have produced a similar shape to that of the old female is of course open to question.

OBITUARY : Dr. J. W. B. GUNNING.

WE regret to announce the death of the Director of the Transvaal Museum, Dr. J. W. B. Gunning, at the comparatively young age of fifty-two.

Born in Holland, on the 3rd September, 1860, at Hilversum, the second son of the late Professor Dr. J. H. Gunning of the University of Leiden, Dr. Gunning received his education in Holland and Germany, at the Universities of Amsterdam, Leiden, and Jena, taking his M.D. Degree at the last named university.

In 1884 he came to South Africa where he practised medicine. From his youth he had always been devoted to the study of natural history; but not until 1896 when he was appointed Director to the Transvaal Museum was he able to give his full time to the study of the fauna of this country.

When still a student his principle hobby was entomology and ornithology, and he received a medal of merit through the agency of the Leiden Museum authorities for a collection of birds and insects.

As Director of this Institution, Dr. Gunning started in 1898 by collecting live animals, and some ten different species formed the nucleus of the present Zoological Gardens. Through his own strenuous efforts and by the assistance of a sympathetic Committee this humble beginning has grown into not only the finest Zoological Garden of South Africa, but into one which would compare favourably with most of the older "Zoos" in other parts of the world. It was mainly due to the late Director's unflagging energy that the collections contained in this Museum have grown during his term of office to such an extent, that the late Transvaal Government, on representations made by the Committee of the Museum, provided a new building to house these valuable collections. This magnificent building was finished some time ago, and it is much to be regretted that Dr. Gunning was not destined to move and arrange the collections in their new and more fitting quarters.

However, the Museum now in use and the Zoological Gardens will remain as a lasting monument to the name of one who gave the best part of his life to the furtherance of the study of natural science in South Africa.

Dr. Gunning's scientific writings were not numerous; the greater part of his time was absorbed in the administration of both institutions and in enlarging the collections: this prevented him from paying such attention to working out scientific problems as had been his constant wish and ambition.

Dr. Gunning was a life Vice-President of the Transvaal Agricultural Union. Owing to his services rendered in this connection and to his keen interest in agriculture, the French Government were induced to bestow on him the order of the "Chevalier du Mérite Agricole." He was also one of the founders of the South African Ornithological Union and of the Transvaal Philosophical Society: and of both he held the office of President and Vice-President on several occasions.

As a token of esteem for and as a memorial to the splendid services rendered by the late Director, the Museum Committee have decided to place a tablet in the Museum to his memory.

C. J. S.





ANNALS MEDEDELINGEN

OF THE VAN HET

TRANSVAAL MUSEUM

VOLUME IV.

PART 3, containing:—

The Percy Sladen Memorial Expedition to Great Namaqualand, 1912-1913: Zoology. By PAUL A. METHUEN.

Records of the Mammals. By AUSTIN POBERTS.

Records and Descriptions of the Reptilia and Batrachia.
By PAUL A. METHUEN and JOHN HEWITT.

Records and Descriptions of the Arachnida. By JOHN HEWITT.

Records of Species of Solifugae in the Collection of the Transvaal Museum, and Descriptions of several New Species of the Family Solpugidae. By JOHN HEWITT.

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ANNALS

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OF THE

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DECEMBER, 1913.

No. 3.
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THE PERCY SLADEN MEMORIAL EXPEDITION TO GREAT NAMAQUALAND, 1912—1913.

ZOOLOGY.

By PAUL A. METHUEN.

Introduction.

ON the kind invitation of Dr. H. H. W. Pearson, Professor of Botany at the South African College, Capetown, to accompany him on a trip to Great Namaqualand, I was enabled to investigate the fauna of the Great Karas Mountains, a part of German South West Africa which had not apparently been previously traversed by scientists.

I wish here to acknowledge my indebtedness to the Royal Society of South Africa for having granted me the sum of £50 towards the cost of this expedition and to the Trustees of the Percy Sladen Memorial Funds for having defrayed a large portion of the expenses towards the zoological investigations carried out.

I would also like to add that during the whole of the time spent in Great Namaqualand we experienced the greatest kindness on the part of the German officials and others who did whatever lay in their power to facilitate the expedition.

Itinerary. Having obtained authority from the late Director and the Committee of the Transvaal Museum to undertake the work, I left Capetown in company with Dr. Pearson on 23rd November, and arrived by boat at Lüderitzbucht two days later. Here we stayed a few days and then left for our final destination, stopping for a short time at Aus (4700') 27th to 30th November, and at Quibis (4500') 30th November to 3rd December *en route*. We reached Nakeis (4500') on 4th December, the farm of Groendoorn (3700') in the Little Karas Mountains on the following day, and Wasserfall (4200') which lies at the foot of the western slopes of the Great Karas Mountains on 8th December. At Wasserfall collecting was carried on chiefly in the sandy plains below the mountains. On 23rd December we reached Kraikluft situated in the very heart of the mountains at an elevation of about 5200 feet; we left

this place on Christmas Day, outspanning at Bavianspoort (or Paviansforte) on 26th December and Sandmund on the eastern side of the mountains the following day, and on 28th December we reached the small military station at Narudas Süd (4500'). The last named place we made our headquarters for a fortnight or so, collecting being carried out as much in the mountains as in the broken plains which stretch towards the south-east and the Kalahari. Narudas Süd proved to be the most productive place we visited (at least in connection with the fauna). On 14th January we struck our camp and, the wagon retracing its way to Kraikluft, we ourselves took a short cut through Narudas Nord (5300') reaching Kraikluft two days later. The day following we ascended the highest peak of the range, namely Lord Hill's Peak or the "Scharfenstein" which rises to 7523 feet. On 20th January we quitted Kraikluft and encamped the next day at Alt Wasserfall (near Wasserfall) where we stayed until the 24th: then moving on we skirted the mountains as far as Dassiefontein (24th), and soon after re-entered upon the higher plateau (5000'), arriving at the farm of Noachabeb on the 25th: and passing back through Groendoorn we reached the railway at Holoog on 30th January. By 5th February we were back again in Capetown.

Physical Features and Geography of the Karas District. That part of the district through which we passed can perhaps be most appropriately styled a country of sandy plains traversed by rocky—in fact exceedingly rough—mountains. It is not within my province to dwell at all on the nature of the flora, suffice to say that it is of a semi-desert character: the bushes are dwarfed and only in river beds does one see trees of any size; at Dassiefontein indeed the large specimens of *Acacia giraffue* and other species of *Acacia* give the landscape an aspect approaching the luxuriant, at any rate for Namaqualand. Water, as can well be imagined, is not particularly plentiful, though in the mountains there are several places where permanent water pools exist. We were fortunate enough to experience fairly good rains during January.

The Karas District is no other than that which was formerly occupied by the Bondelzwart Hottentots. As the crow flies, the Groot Karasbergen lie about 230 miles from Lüderitzbucht and at their nearest point roughly 100 miles north of the Orange River (due north of Warmbad), in Long. 18° 40' E.G. and Lat. 27° to 27° 30' S.

Faunistic Features. The nature of the fauna of the Groot Karasbergen may be said to be typical for that of Namaqualand. It is true that several new forms were found, but we may reasonably expect that further data will be added concerning the distribution of such later on. It is interesting to note that several forms described from Little Namaqualand were taken in the Karas Mountains, such as *Pachydactylus purcelli*, *P. (Elasmodactylus) namaquensis*, species of scorpions, etc. It would be hardly correct to say that Namaqualand as a whole possesses a fauna peculiar to itself since its fauna shows marked affinities to those of the Cape Upper Region and of the Kalahari; on the other hand it is characterized by several types which are not apparently found elsewhere: such types are *Palmatogecko rangei*, the genus here described, *Narudasia*, and others: these are certainly in some cases highly specialized forms. Though it is in the coastal stretch that one would expect to find the majority of peculiar Namaqualand animals—this is a distinct zone characterized by marked desert conditions—yet it is not surprising that the comparatively lofty range of the Karas Mountains should have yielded new forms. Among the Zonuridae this was certainly expected beforehand,

and the discovery of a new species only tends to confirm the statement which Mr. Hewitt and I made a little time ago, namely that the species of *Zonurus* have in some cases a localized and limited distribution.*

A list of the species collected, together with descriptions, etc., is included in this issue for all the groups except the Crustacea Entomostraca, and certain families of Spiders, an account of which will follow at a later date.



Text fig. 13. Inspanning. Between Klein Karas and Holoog, Great Namaqualand.

The collections of which an account is given in this issue belong to the Transvaal Museum, a second set having been sent to the British Museum.

The numbers given in the account of the Reptiles and Batrachians refer to the Transvaal Museum Catalogues, those for the Solifugae are my own numbers.

* Trans. Roy. Soc. S. Africa III. I, 1913, p. 111.

THE RECORDS OF MAMMALS COLLECTED.

By AUSTIN ROBERTS.

1. *Petromys typicus*, A. Sm.

1 ♂ in spirits and 1 skull (juvenile). Narudas Süd in the old fortifications at the foot of the Great Karas Mountains, 8/1/13.

The specimens are apparently typical.

2. *Tatera paeba*, (A. Sm.).

1 ♂ in spirits. Little Karas Mountains between Groendoorn and Wasserfall, 7/12/12.

Measurements in flesh: "H. and B. 99 mm.: tail 124 mm.: hind foot 35 mm.: head 32·5 mm."

The specimen seems to be quite typical.

3. *Desmodillus auricularis*, (A. Sm.).

2 ♂, and 2 ♀ in spirits. In plains and in river bed at Wasserfall, below the Great Karas Mountains, 12/12, 1/13.

4. *Otomys unisulcatus*, F. Cuv. (typical).

1 ♂, and 1 ♀ in spirits. Narudas Süd, at foot of Great Karas Mountains, 6/1/13.

It was noticed that this species inhabited large burrows in sandy parts.

5. *Mus namaquensis*, A. Sm. (typical).

1 ♂, and 1 ♀ in spirits. One specimen from the Little Karas Mountains between Groendoorn and Wasserfall, the other at Nakeis (Klein Karas), from the stomach of a horned viper (*Bitis caudalis*).

6. *Arvicanthus pumilio griquae*, Wroughton.

2 ♂ in spirits, and another specimen in formol. Wasserfall and Narudas Süd, in sandy parts below the mountains.

Measurements taken from spirit specimens:—

1. H. and B. 95 mm.: tail 100 mm.: hd. ft. 22 mm.: ear 13 mm.

2. H. and B. 90 mm.: tail 100 mm.: hd. ft. 22 mm.: ear 11 mm.

Skulls:

1. Gr. leng. 26·5 mm.: bas. leng. 20·5 mm.: zyg. br. ? 13·5 mm.: mol. ser. 4·5 mm.: bullae 6·5 mm.

2. Gr. leng. 25·8 mm.: bas. leng. 20·5 mm.: zyg. br. 13·2 mm.: mol. ser. 4·5 mm.: bullae 6·4 mm.

7. *Elephantulus rupestris*, (A. Sm.).

2 i. sp. in spirits. Narudas Süd in mountains, 5 and 7/1/13.

Measurements of one specimen (in spirits): H. and B. 115 mm.: tail 130 mm.: hind foot 32 mm.: ear 26 mm.: Skull broken.

8. *Macroscelides melanotis*, Ogilby.

1 specimen in spirits. Narudas Süd, in river bed below mountains, 5/1/13.

9. *Pronolagus crassicaudatus*, subsp. ?. (c.f. *curryi*).

Portions of 2 specimens. 1. Fragments of hair, tail and hind foot, and skull with skin attached: a ♀ which contained two embryos: Narudas Süd, below mountains, 8/1/13. 2. Skull: Wasserfall, in the Great Karas Mountains.

10. *Lepus* sp. ?.

A single skull. Great Karas Mountains.

The dimensions of this skull are almost identical with those of *L. zuluensis*, but in the absence of the skin it would perhaps be unwise to refer it to any particular species.

11. *Procavia capensis*, (Pall).

A single skull. Narudas Süd.

This skull is much shorter and broader than those of specimens from Knysna in the Museum collection, but our series is not large enough to allow us to judge of the range in size that may obtain.

RECORDS AND DESCRIPTIONS OF THE REPTILES AND BATRACHIANS OF THE COLLECTION.

(Plate XIV, text figures 14-16.)

By PAUL A. METHUEN and JOHN HEWITT.

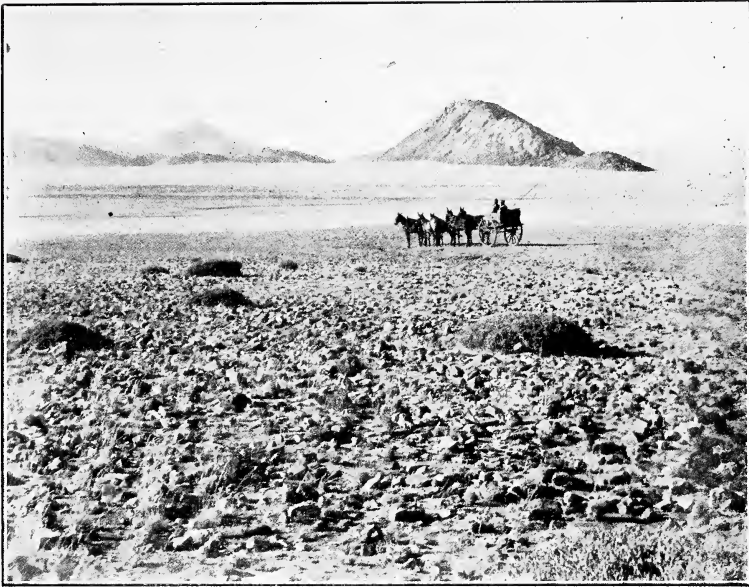
Some general remarks on the colour of species dealt with in this paper in relation to the environment.

THE phenomenon rightly or wrongly termed "Protective Colouration" is well exhibited by many species of reptiles in Great Namaqualand. One of the best instances noticed is that of the viper *Bitis caudalis*, one of the commonest snakes of the country; the distinctive markings and contrasting colours only serve the more effectively to conceal this sluggish creature in its natural surroundings, so much so that the traveller runs a risk of treading on the snake before noticing its presence. The great variation in intensity of colour shown amongst different individuals of this species was found to be correlated with the changing aspects of the surroundings. This species was easily captured and natives who were well aware of its poisonous properties collected living specimens without any hesitation.

All the species of *Eremias*, (with the exception of *E. lugubris*), the single species of *Scapteira* and of *Nucras* which were taken resemble their surroundings: at the same time it may be worth recording that *Eremias lugubris*, which is rather conspicuous in its natural haunts, is a very difficult lizard to catch partly because it conceals itself in thorn bushes when approached, and partly because it is very fleet, and clever in avoiding its would-be capturer.

The "whip snake" *Psammodphis notostictus* has also the power of concealing itself very effectively. Its markings and whip-like body render it an inconspicuous object among the bushes on or under which (for it is not strictly a tree-climber) it was always found. When chased it will move from one bush to another with great rapidity, and it is exceedingly difficult to locate it on these occasions, for the creature ceases to move directly it is ensconced in a bush.

The species of *Agama* are particularly interesting in that whereas under certain circumstances they are protectively coloured to a great degree, the same individuals may at other times be ranked among the most conspicuous of natural objects. *Agama atra* which was invariably found in rocky or stony places was found usually to harmonize well with its surroundings, the colours of various individuals varying somewhat according to these surroundings. A striking case was noticed in the Little Karas Mountains when a ♀ specimen, as black as the stones among which it was taken, lost some of its black colour after capture and became brown. The gaudily coloured ♂♂ on the other hand are most conspicuous objects in their natural surroundings, at all events to the human observer,



Plote XII.

From photographs by Professor H. H. W. Pearson, D.Sc.

Fig. 1. The Plains near Aus.

Fig. 2. Between the Little and Great Karas Mountains: a "social weaver" bird's nest in foreground.

When undisturbed they perch on the rocks and display their splendid colours in the bright blue head and neck, and in the yellow back.

Agama aculeata occurred in great abundance on the sandy plains: here it was quite an inconspicuous animal, its colours harmonizing with those of the ground: it was also found on bushes, but the arboreal individuals were usually characterised by the most magnificent colours which rendered these creatures as conspicuous as large flowers.*

We are inclined to suspect that these gay colours are only assumed during the breeding season, and that at other times all the individuals both ♂ and ♀ are protectively coloured. The preference for arboreal life exhibited by *Agama aculeata* when in breeding costume may perhaps be due to the fact that a conspicuous lizard is safer in trees than on open ground: it is also probable that the colour of the vegetation has a stimulating effect on that of the lizard. It is scarcely possible to believe that the gayly coloured arboreal individuals of *A. aculeata* and the equally gorgeous rock frequenting ones of *A. atra* are in any wise concealed from their enemies. Such individuals of *A. atra* are hard to catch and bite fiercely when molested: on the other hand protectively coloured ♀ specimens found on the ground are easily caught.

A few reptiles in Namaqualand would seem to be under no circumstances protectively coloured. A striking example of this type is found in the small lizard *Cordylosaurus trivittatus* which has a distinctive pattern of strongly contrasted colours of black and light buff and a bright blue tail: the latter part of the creature is extremely conspicuous, and is very easily broken when the animal is handled. In its natural haunts it is certainly one of the most brilliantly coloured animals of Namaqualand and its colours are obviously in direct contrast with those of its surroundings. This creature which is very swift may be seen running about in rocky places during the heat of the day. It may be that this species affords an example of warning colouration: but on this point there is no real evidence (see however page 140 footnote), and its alertness is decidedly against such an explanation of its striking colours. On the other hand its colouration may be epigamic though the sexes are alike: to this principle Professor Poulton (in lit.) refers the colouration of flamingoes.†

The black variety of the black-necked cobra, *Naja nigricollis*, is another example of a reptile which is not protectively coloured and which makes no attempt to conceal itself. In this case it is possible that both aposematic and epigamic influences have operated. ♂ and ♀ cobras often differ greatly in colour the ♂♂ being more conspicuous than the ♀♀: the specimen we took was a ♂.

* *Agama distanti*, which, like *A. aculeata*, is in all probability one of the geographical forms of *A. hispida* has according to observations made by Master B. Penfold and myself at Pretoria the power of changing its colours to some extent so as to match its surroundings. Master Penfold has written to me that "*A. distanti*, though the usual colour is sandy brown, can develop a dark brown or a light brown body with blue head or cheeks and an orange chest or a plain brown body with a few dark markings." A dark coloured specimen which I caught in the winter of this year near Pretoria on dark soil which it matched very closely, was placed upon a light grey rock which was here and there covered with an orange coloured lichen. After a short time the animal changed its colours, the body becoming light and the head and anterior parts of the body developing in places a chestnut brown colouration: the flanks also became lighter and were seen to be spotted with orange.—P. A. M.

† We wish here to express our thanks to Professor E. B. Poulton for his kindness in writing to us at length on the phenomena here alluded to.

At present we do not desire to draw any general conclusions with regard to the meaning of colours and patterns among the reptiles of Namaqualand. Experimental evidence and continued observations over a considerable time will no doubt solve some of the questions at issue. For the present we are unable to form any opinion as to whether the phenomena here alluded to as "Protective Colouration" is brought about by the agency of natural selection or by some inherent condition or "state of things" in the organism itself acting in direct response to the physical environment.

Note on the localised Distribution of various species of Lizards found in the Karas Mountains and immediate neighbourhood.

The phenomenon here alluded to relates chiefly to the Lacertidae: three genera of this family were taken, namely, *Nucras*, *Scapteira*, and *Eremias*.

In the case of *Eremias* four species were found within a perimeter about a mile or less from Narudas Süd; at the same time these species were not all found living under precisely similar conditions. The four species found at this locality were *Eremias lugubris*, *E. lineo-ocellata pulchella*, *E. namaquensis*, and *E. inornata*: of these *E. pulchella* appeared to be the least exclusive in its preference for particular environment, though it was generally seen together with *E. inornata* on rocky or stony ground, especially in the heart of the mountains: *E. namaquensis* was invariably seen on the sandy plains and on the sandy stretches which lie at the foot of and here and there in the mountains, its habitat being in fact in marked contrast to that of *E. inornata*: although the two species were found within a few yards of each other, they were never actually taken together at the same spot; *E. lugubris* was only taken in the sandy beds of rivers, generally in company with *E. namaquensis*.

Now of this list the two species which are most closely allied are *E. namaquensis* and *E. inornata*: it is a noteworthy fact that whereas other two species of *Eremias*, not so closely related to each other as those two just mentioned, may live together under the same conditions, such is not the case with *E. namaquensis* and *E. inornata*. On this same trip another close ally of *E. namaquensis*, namely *E. undata*, was taken in the Namib Desert at Lüderitzbucht where the conditions are very much different from those in the Karas District, the rainfall at Lüderitzbucht being almost a negligible quantity whereas in the Karas District rain can usually be expected from December to February or March: further the vegetation is a good deal different in the two districts.

Again, whereas the four species of *Eremias* appeared to separate themselves more or less into their several environments, it may be noted that the single species of *Scapteira* was found under various conditions in different localities, namely on the sandy plains which separate the Little Karas from the Great Karas Mountains, and in the arid region of the Namib Desert.*

Among the Geckonidae six species were taken: *P. bibroni*, a very distinct species, was found to occur along with *P. purcelli* in the Great

* We must add that according to Werner (l. i. c.) *E. undata* has been found at Windhuk, Rehoboth, and at Aus: and *E. pulchella* at Lüderitzbucht.



Plate XIII.

From photographs by Professor H. H. W. Pearson, D.Sc.

Fig. 1. The "Scharfenstein."

Fig. 2. A pool in the Great Karas Mountains.

Karas Mountains and with *P. punctatus*, at Quibis. Now *P. punctatus*, *P. purcelli*, and *P. mariquensis* are three closely related species, but no two of these were ever taken together. *P. punctatus* was found hiding under stones in the daytime in somewhat broken country: *P. purcelli* was invariably found in crevices of rocks at a fairly high elevation in the Great Karas Mountains: *P. mariquensis* of which only two specimens were taken was found at the foot of the eastern slopes of the same mountains in sandy soil.

Two species of *Agama* were found, rather closely related species—*A. atra* and *A. aculeata*—, and in this connection again it was noticed that *A. aculeata* was in the Karas District invariably taken in sandy parts, whereas *A. atra* preferred the rocky parts of the mountains.*

The two species of Zonuridae taken were found under precisely the same conditions as far as could be judged but not in precisely the same localities.

Among the five species of *Mabuia* which were taken it was noticed that the two which are most closely related, namely *M. trivittata* and *M. occidentalis*, did not occur together: the former was found on rocky ground, in one case at the height of 6000 feet, the latter in the sandy river bed on the western side of the Great Karas Mountains. *M. sulcata*, not closely related to either of these two was found under various environmental conditions, often occupying the same locality as *M. occidentalis* on the one hand, and as *M. trivittata* on the other hand.

Again the three species *M. sulcata*, *M. varia* and *M. trivittata* were found to occur together: but no two of these three species can be said to be closely related: *M. sulcata* and *M. varia* belong to the same group of the genus, but neither is so closely related to each other as either one is to *M. striata*, a species which was not taken on this expedition.

We may conclude by saying that we have not found any instance of two closely allied species occupying precisely the same environment in the same locality.† The facts seem to us to point to the supposition that the formation of closely allied species is only possible when the diverging stocks can in some way be separated from each other (so as to prevent interbreeding), this isolation being frequently brought about in all probability by differences in habits.

We do not wish to suggest however that all species are formed in this way though such may conceivably be the case: so far as one may judge from distribution data it seems possible that some species may have arisen without the aid of topographical or even habitual isolation.

* In August of this year I took a specimen of *Agama atra* and *A. distanti* together in the vicinity of Pretoria: both were found hiding under the same stone, and were probably hibernating. This is however the only case I have noticed, after numerous observations, of these two lizards occurring side by side. Further the habits of the two species are different. Thus *A. distanti* is usually found in the open veld, in flat country free of rocks: they live largely on termites into whose nests they frequently burrow: they are partly arboreal. *A. atra* on the other hand is found in the rocky hills: this species never, as far as I know, makes burrows but lives among the rocks, into the crevices of which it retires for concealment. The third species of *Agama* in the Transvaal, namely *A. atricollis*, is probably exclusively arboreal.—P. A. M.

† A partial exception to this rule was furnished by *Pachydaetylus bibroni* var. *laevigatus* which was found together with *P. bibroni* var. *typicus* (but see page 129).

BATRACHIA SALIENTIA.*AGLOSSA.*

Family PIPIDAE.

Genus XENOPUS, Wagl.

Bouleng. B. M. Cat. Batr. Sal. 1882, p. 456.

X. laevis, Daud.

Bouleng. l. c. : Hewitt and Power, Trans. Roy. Soc. S. Africa, III, 1913, p. 175.

14 examples from the Great Karas Mountains and District. Localities: 1373, 1374, Narudas Süd: 1375-1383, Narudas Nord (juveniles): 1384, Kraikluft (at 5000 feet): 1385, Baviaanspoort: 1386, in a spring at Groendoorn, Little Karas Mountains.

All these were taken in more or less permanent pools of water.

PHANEROGLOSSA FIRMISTERNIA.

Family ENGYSTOMATIDAE.

Sub-Family ENGYSTOMATINAE.

Genus PHRYNOMANTIS, Peters.

Bouleng., Cat. Batr. 1882. p. 172: Werner, Rept. Amph. Schultzes Reise, B. 4, L. I, 1910, p. 294.

Phrynomantis nasuta, sp. nov. (pl. XIV, fig. 2).

Description: habit stout: head very large and broad: head and body much flattened: snout acutely rounded, projecting well beyond the lower lip, almost one and a half times as long as diameter of orbit: nostril nearer the tip of the snout than the eye: inter-orbital space broader than the length of the upper eyelid. Tympanum visible, not very distinct, about half the diameter of orbit.

Fingers free, moderate, their tips slightly expanded, but hardly what could be termed triangular: the sub-articular tubercles fairly prominent: several distinct small tubercles below the metacarpals of the second third and fourth fingers: the first finger much shorter than the second which does not extend as far as the fourth. Toes short, one quarter to one third webbed, their distal extremities not expanded: the inner metatarsal tubercle is moderate in size but prominent, being in fact more or less shovel-shaped: there is no distinct outer tubercle but in addition to the subarticular tubercles which are fairly prominent there are several small tubercles on the palmar surface.

If the hind limb be carried forwards the tarso-metatarsal joint reaches just beyond the axilla but not beyond the shoulder: the fourth toe reaches a point about half way between the eye and the tip of the snout.

Skin smooth. On each side a fairly prominent gland in the coccygeal region just above the cloaca. A glandular fold passes from the eye over the tympanum and loses itself behind the shoulder: between the tympanum and the shoulder this fold is much swollen.

No cutaneous fold across the palate between the choanae. A cutaneous fold across the chest between the shoulders is present.

Colour: above dark chocolate brown, with reddish markings: below somewhat lighter, without the red markings.

One example taken in a pool at Kraikluft in the Great Karas Mountains at an altitude of 5000 feet. Length from tip of snout to vent 31 mm.: greatest breadth of head 11.5 mm., and of body 14 mm. Type, T. M. Cat. Batr. No. 1317, in the Transvaal Museum.

The comparatively long projecting snout, the rather small eye, the large broad head, the webbing of the feet, and the fact that the discs of the fingers are very little expanded are characters which would seem to distinguish this species from any known representative of the genus *Phrynomantis*. On the other hand it would seem to be related to *P. annectens*, Werner (l. c.) by the fact that the head and body are much depressed, that the interorbital space is broad, in the absence of a cutaneous fold across the palate, in the character of the inner metatarsal tubercle, in the length of the hind limb, and by the presence of a prominent fold on the side of the head.

Unfortunately the characters of *P. annectens* are not fully known, as the type specimen is almost certainly very juvenile. The identity of that species cannot be established until adult specimens are obtained from the same locality as that of the type.

Sub-Family DYSCOPHINAE.

Genus CACOSTERNUM, Blgr.

Bouleng., A. M. N. H. (5) XX, 1887, p. 51, and (7) XVII, p. 321.

C. boettgeri, Blgr.

Arthroleptis boettgeri, Bouleng., B. M. Cat. p. 118, Pl. XI, fig. 6.

C. boettgeri, Bouleng., Ann. S. A. Mus. V, 1910, p. 533: Hewitt, Rec. Albany Mus. II, p. 215.

C. nanum, Bouleng., A. N. M. H. (5) XX, 1887, p. 51.

C. namaquense, Werner, Rept. Amph. Schultzes Reise, 1910, p. 293, fig.

55 specimens from more or less permanent pools in the Great Karas Mountains. Localities: 1318-1358, Kraikluft, altitude 5000 to 5300 feet: 1359, 1360, Sandmund: 1361-1372 (*neque* 1364), Narudas Süd.

In the same pools *Rana delalandi* and *Xenopus laevis* occurred, and in one case *Phrynomantis nasuta*.

At Kraikluft this little frog was observed to be a burrower, making its holes a few inches deep in the soft mud surrounding the pools; these holes were apparently used for retreat when occasion demanded. We may mention that at Prieska in March 1912 when the country was in a very parched condition this species was found hidden in cracks of the ground near ponds, sometimes at the depths of 12 to 18 inches.

During daytime the whereabouts of this little frog could be detected by the low, somewhat jarring or clicking croak which it would utter when approached.

In these specimens it is notable that the feet are distinctly webbed at the base, the webbing being easy to distinguish between the third and fourth digits.

Most of the examples are dark brown or olive above (in one case light brown), with fairly large dark spots arranged more or less regularly; no bright green specimens were seen. A white vertebral line is present in a few, in three or four of which there is also present a light line on each side starting on the back above the shoulder and losing itself about half way between the shoulder and the leg. Dorsally the skin is generally smooth, but in a few specimens there are small warts; in one specimen (1334) large elongate and smaller blister-like or warty excrescences are

scattered over the head and back in a more or less symmetrical way. Below white with or without grey or black spots which vary in size. As in *Phrynomantis* a pair of fairly prominent glands is found in the coccygeal region just above the vent.

Our largest specimen measures 26 mm. from snout to vent.

Family RANIDAE.

Sub-Family RANINAE.

Genus RANA, L.

Rana, Bouleng., B. M. Cat. p. 6.

Rana and *Pyxicephalus*, Nieden, Zool. Anz. 1908, p. 651.

Rana, Hewitt, Ann. Transv. Mus. III, 1911, p. 51.

R. delalandi, Tschudi.

Pyxicephalus delalandi, Tschudi, Class. Batr., p. 83. Bouleng., Ann. S. A. Mus., V, 1910 p. 528.

R. delalandi, Bouleng., Cat. Batr. Sal. p. 31.

11 adult specimens, besides juveniles and tadpoles from the Great Karas Mountains. Localities: 1300–1309, 1312, Kraikluft at 4800 to 5000 feet: 1310, 1311, 1313–1316, 1364, Narudas Süd.

This species was found breeding in pools which for the most part were formed in the river beds after a spate, and were likely to dry up after two or three months if not replenished. The metamorphosis of the tadpole seems to take place fairly rapidly; several tailless juveniles, 15 mm. from snout to vent, were taken; in other places tailed larvae, their fore-limbs not developed, up to 23 mm., were procured. It was noticed that in larger and deeper pools the tadpoles were large but not otherwise advanced: in shallower pools at higher elevations the tadpoles were smaller but much further advanced. A few of the adult specimens have the back quite smooth, but in the majority the back bears small warts. The largest specimen measures 47 mm. from snout to vent.

We have not employed the generic term *Pyxicephalus*, since we are of opinion that owing to the close relationship of *R. grayi* to *R. natalensis* and perhaps of *R. ruddi* to the *R. mascareniensis* group (in respect to the presence in ♂♂ of external vocal sacs) the separation of the *Pyxicephalus* from the *Rana* section proper leads to an unnatural arrangement.

SQUAMATA.

LACERTILIA.

Family GECKONIDAE.

Genus CHONDRODACTYLUS, Peters.

Chondrodactylus, Peters: Mon. Ber. Ac., 1870, p. 110. Bouleng.: B. M. Cat. Liz. I. p. 10: Ann. S. A. Mus. V, 1910, p. 456. Werner: Rept. Amph. Schultzes Reise, B. 4, L. I., 1910, p. 306. Hewitt: Ann. Trans. Mus., II, 1910, p. 77, 82, 85.

Chondrodactylus angulifer, Peters.

C. angulifer, Pet.: auct. and loc. cit.

C. weiri, Blgr., P. Z. S., 1887, p. 339.

22 examples from the Great Karas Mountains and immediate neighbourhood.

The following table relates in part to the variation in the characters employed by Mr. Boulenger in the separation of *C. weiri*.

| No. | Dorsal tubercles | Supraorbitals separated by | No. of ventral scales corresponding to horizontal diameter of eye. | Labials. | Length in mm. |
|------|------------------------------------|----------------------------|--|-----------------------|---------------|
| 3002 | Not strongly keeled | 2 rows of tubercles | 8-9 | $\frac{11}{11}$ | 86 |
| 3003 | Moderately enlarged | 2 " " | 8 | $\frac{10}{10}$ | 87 |
| 3004 | Keeled, moderate | 2 " " | 6 | $\frac{11}{12}$ | 86 |
| 3005 | Keeled, moderately enlarged | 3 " " | 6 | $\frac{11}{12}$ | 94 |
| 3006 | Nearly smooth, moderately enlarged | 3 " " | 6 | $\frac{11-10}{12-10}$ | 86 |
| 3007 | Keeled, moderate | 3 " " | 8 | $\frac{9}{10}$ | 82 |
| 3008 | " " | 3 " " | 9 | $\frac{9}{11}$ | 87 |
| 3009 | Keeled, rather small to moderate | | 6 | $\frac{11}{10}$ | 87 |
| 3010 | Moderate to rather small | 2 " " | 9 | $\frac{8}{10}$ | 86 |
| 3011 | Keeled, moderate | 2 " " | 8 | $\frac{9}{11}$ | |
| 3012 | " " | 2 " " | 7 | $\frac{11}{13}$ | 66 |
| 3013 | " " | 2 to 3 rows of tubercles | 10 | $\frac{10}{10}$ | 67 |
| 3014 | Keeled, rather large | 2 to 3 " " | 9 | $\frac{10}{11}$ | 54 |
| 3015 | Keeled, moderate | 3 rows of tubercles | 9 | $\frac{10}{10}$ | 59 |
| 3016 | | 2 " " | 11 | $\frac{10}{11}$ | |
| 3017 | | 2 " " | 12 | $\frac{11}{11}$ | |
| 3018 | | 2 " " | 10 | $\frac{10}{10}$ | |
| 3019 | Keeled, moderate | 2 " " | 8 | $\frac{10}{11}$ | 68 |
| 3020 | Rather strongly keeled, moderate | 2 " " | 6 | $\frac{11}{10}$ | 86 |
| 3021 | | 3 " " | 5 | $\frac{10}{11}$ | |
| 3022 | Keeled, rather small | 2 " " | 10 | $\frac{11}{11}$ | 48 |
| 3023 | | 2 " " | 8 | $\frac{10}{10}$ | |

Boulenger (loc. cit.) states that *C. weiri* is distinguished from *C. angulifer* by its larger ventral scales but adds that the two species are probably not separable. We find that the characters on which *C. weiri* was founded are variable in specimens from the same locality: we have therefore united the two.

The habits of this peculiar Gecko have never been recorded so far as we know. The creature is to be found in sandy and generally flat country or in dry river beds or occasionally in old houses. Nocturnal in habits, they spend the day in holes, which are generally a metre or so in depth, every individual occupying a burrow to itself. These burrows which do not connect one with another would often seem to be old holes of scorpions which *Chondrodictylus* has enlarged and accommodated for its own requirements. At night these lizards squat near the mouth of their holes, and from dusk to dawn keep up such a chirping that they may become a real nuisance to the traveller in want of slumber. On a moonlight night one may sometimes surprise them wandering from their retreat: in this way two young specimens were taken. All the others were dug out. After a little experience one can tell pretty accurately which holes are occupied by this Gecko before commencing to dig: or, one can at night mark certain holes from which their chirp may appear to proceed and dig them up the next morning. The bastard Hottentots of Namaqualand affirm that both *Chondrodictylus* and *Ptenopus* make this

noise: however they do not distinguish between the two species, calling them both “//on //on” (the sign // standing for a click, similar to that which most riders make when trying to persuade their mount to improve its pace). Where *Chondrodactylus* was found, there also *Ptenopus* occurred. But the latter was dug from burrows of a dissimilar nature, generally inhabited as well by a common Namaqualand rat, *Desmodillus auricularis*.

After rains they are said to leave their burrows, and may then be seen in thousands over the plains.

In spirit this animal loses its natural colouring rapidly. In life it is brownish or greenish with black angular markings across the back: just behind every angular marking on each side is a conspicuous white spot; below pure white. In the young the colouring is more contrasted than in the adult: the angular markings are darker, and between these are lemon-yellow bars, the rest of the back being brown and the head darker: the proximal half of the tail is barred with brown and yellow, the distal half with dark brown and white.

Genus PTENOPUS, Gray.

Bouleng.: B. M. Cat. I, p. 15, and Ann. S. A. Mus. V, 1910, p. 456. Werner: Rept. Amph. Schultzes Reise, 1910, p. 306.

Ptenopus garrulus, Smith: auct. and loc. cit.

6 examples from the Great Karas Mountains and immediate neighbourhood, 3024–3029. Localities: Narudas Süd, Alt Wasserfall, and between Dassiefontein and Noakabeb.

Colour of these specimens for the most part light chestnut brown, mottled with very light brown. One individual has darker brown markings edged with black. The throat is aureolin. Labials $\frac{8.9}{7.9}$.

Andrew Smith says of this species: “Inhabits sandy districts, in the interior of southern Africa, is gregarious, and lives in small, nearly perpendicular burrows; it seeks its food probably during the night, at least I have never seen more than its head above ground during the day” (two of our specimens were caught during the day in the open veld, but undoubtedly it is mainly nocturnal). “In the localities in which it occurs many individuals may be seen peeping from their hiding places any time during the day, each uttering a sharp sound, somewhat like *chick, chick*; and the number thus occupied is at times so great, and the noise so disagreeable as to cause the traveller to change his quarters.”

Three of our specimens were dug out from holes in the immediate neighbourhood of those occupied by *Chondrodactylus* on the sandy plains near Wasserfall.

Gen. nov. NARUDASIA.

Diagnosis: digits long and slender, not dilated, strongly clawed, rather feebly denticulated laterally but not fringed: inferiorly with a series of smooth transverse plates which in places, especially in the basal half of the digit, are somewhat enlarged and swollen into minute pads: palmar surfaces with small smooth convex scales. Lower surface of the body covered with comparatively large imbricate scales: upper surface with small round juxtaposed scales of slightly varying size, those on the upper surface of the head being polygonal. No gular shields. No anal nor femoral pores. Pupil vertical.

This genus is therefore very like *Homonota* of South America and *Stenodactylus* of Asia and North Africa, but is distinct from both through the nature of the infradigital scales.

N. festiva, sp. nov. (pl. XIV, fig. 1).

Description : head, body, and tail depressed : head rather long (in the figure it appears too short owing to foreshortening) : limbs well developed : tail rather long and tapering. Snout rather pointed, much longer than the diameter of the eye which is small : ear-opening small, more or less rotund, situated the same distance from the eye as the tip of the snout. Forehead between the eyes slightly concave. The rostral which is twice as broad as deep is cleft above. The nostril is pierced between two small nasal granules, naso-rostral, rostral, and the first labial. The naso-rostrals may or may not be separated. The symphysial as deep or not quite as deep as the adjoining labials, and narrower : it is rather more than twice as deep as broad. Labials $\frac{9-8}{7-6}$, usually $\frac{8}{6}$. The scales on the snout are larger than those on the back, and are about twice the size as those on the back of the head : the scales on the belly are rather more than twice as large as those on the back. The tail above has the scales about twice the size of those on the back, imbricate : each segment of the tail, indicated only by the dark cross bars, has about ten transverse series of scales : below the scales are larger and are arranged in irregular longitudinal series.

The colour is variable, but the markings are constant. Above, usually dark brown, sometimes tinged with violet, or a lighter chestnut-brown (in young olive-brown), with thin black zigzag transverse stripes : behind, in the corners of these vermiculations are white spots : the stripes are continued on the tail which is generally dirty yellow in colour. Below, light grey or dirty white.

18 examples at Narudas Süd, in crevices of rocks in the river bed at the foot of the Great Karas Mountains.

The specific name has reference to a characteristic habit: Dr. H. H. W. Pearson noticing this species at Narudas Süd described it to Mr. Methuen as "a ridiculous little beast sitting on a rock and waving its yellow tail in the air."

It is exceedingly swift in its movements.

Type, T. M. Cat. Rept. No. 3038, in the Transvaal Museum. 3031-3048.

Genus LYGODACTYLUS, Gray.

Bouleng., B. M. Cat. I, p. 158.

L. capensis, Smith.

Hemidactylus capensis, Smith, Ill. Rept., Pl. LXXV, fig. 3.

L. capensis, Bouleng., l. c., p. 160.

6 examples all taken on trees: 3049, 3050, from Wasserfall: 3051-3053, Narudas Süd: 3054, from Quibis. No. 3054 was found with its nest containing two eggs under the bark of an Acacia tree.

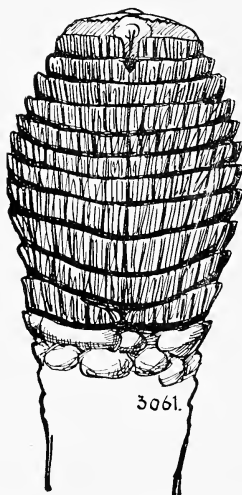
Genus PACHYDACTYLUS, Wiegman.

Pachydactylus, Wiegman. Herp. Mex. p. 19 : Bouleng., B. M. Cat. I, p. 200 : and Ann. S. A. Mus. V, 1910, p. 456, and 459.

Elasmodactylus, Bouleng., P. Z. S. 1894, p. 727.

According to the earlier descriptions relating to *Pachydactylus* and *Elasmodactylus* these two genera were separable through the absence of a

claw on the toes in the former and its presence in the latter. We have observed however that a minute claw is present in all species of *Pachydactylus* at our disposal, the arrangement being precisely as in *Elasmodactylus namaquensis*, Scat. (we have examined all the known species except *P. fasciatus*, *P. amoenus*, *P. serval*, and *P. weberi*). Mr. Boulenger (*vide* Ann. S. A. Mus. V, p. 456) has evidently observed the presence of claws on the toes in *Pachydactylus* but endeavours to maintain the generic distinction of *Elasmodactylus* by contrasting the degree of dilatation of the digits: thus he writes "digits strongly dilated" in *Elasmodactylus*, "digits more or less dilated" in *Pachydactylus*. We can only add that in our judgment *Pachydactylus bibroni* and "*Elasmodactylus*" *namaquensis* are precisely alike in this respect.



Text fig. 14. Toe of *Pachydactylus bibroni* var. *laevigatus*, from underside, with claw partially extended (diagrammatic): enlarged. The claw seems to be retained in a minute circular muscular pad: a small scale above this pad and below the "nail-like" scale protects the pad from above. The claw can only be seen when the distal extremity of the toe is extended.

We may mention that the claws are present only on the toes not on the fingers (*vide* text fig. 14).

P. namaquensis, Sclater.

Elasmodactylus namaquensis, Scat., Ann. S. A. Mus., I, 1899, p. 109, Pl. V, fig. 2: Bouleng., id. V, 1910, p. 459.

2 examples at Kraikluft, at an altitude of 5000 feet: 3100, length 81 + 55 mm., tip of tail regenerated: 3101, length 75 + 82 mm. The skin of this Gecko is very loose, and is easily torn if the animal is roughly handled. Both specimens were taken in a deep ravine in crevices of rocks.

In neither specimen does the first labial enter the nostril: the rostral is considerably broader than deep: the naso-rostrals are separated by a small scale: the tail is distinctly annulated, each annulus including seven rows of scales dorsally, the transverse row separating two adjacent annuli including five or six enlarged scales: the ventral scales of the tail are much larger than the dorsal ones.

Type and co-type have been examined by us.

P. bibroni, Smith.

Tarentola bibronii, Smith, Ill., Rept. pl. L, fig. 1.

P. bibroni, Bouleng., Cat. Liz. I, p. 201: Ann. S. A. Mus. V, 1910, p. 460. Werner, Rept. Amph. Schultzes Reise, 1910, p. 308.

P. laevigatus, Fischer, Jahrb. Hamb. Wiss. Anst. V, 1888, p. 15, pl. II, fig. 3. Bouleng., Ann. S. A. Mus. I. c. p. 460: *var.*, Werner I. c. p. 309.

P. stellatus, Wern. *var.*, I. c. p. 309.

25 specimens from the Great Karas Mountains, and from Quibis. They were all found in the crevices of rocks.

The form *laevigatus* was taken at Kraikluft (elevation 5200 feet), at Narudas Süd, and between Kraikluft and Alt Wasserfall. The keeled forms (three specimens) were taken at Narudas Süd in precisely the same localities as *laevigatus*. These keeled forms appear to agree with Werner's variety *stellatus* but we do not think the form can be maintained as of varietal importance since it merges completely into *bibroni* proper.

P. montanus, sp. nov.

A single example from Lord Hill's Peak in the Great Karas Mountains, at an altitude of 7300 feet. Type, T. M. Cat. Rept. No. 3080 in the Transvaal Museum.

Related to *P. weberi*, Roux (Zool. Jahrb. 25, 1907, p. 408, Taf. 14, Fig. 4, 5): the differences therefrom are mentioned later.

Description: head rather large: head and body depressed. Snout one and a half times as long as the diameter of the orbit. Ear-opening elliptic nearly vertically oblique. Third toe bears inferiorly seven lamellae. Rostral, which is about twice as broad as deep, enters the nostril. The latter is pierced between two postnasals, naso-rostral, first labial, and rostral. Naso-rostrals in contact. The first labial is not pentagonal as described for *P. weberi*, but normal, i.e. four-sided. The symphyial is practically as deep as the adjoining labials, not as broad: it is a little more than twice as deep as broad. Labials $\frac{3}{3}$ on the one, $\frac{1}{3}$ on the other side.

The dorsal lepidosis is heterogeneous. The granules on the snout are enlarged and are twice or a little more than twice as large as the granules on the back. On the back mixed with the small granules are tubercles of moderate size somewhat flattened but keeled: these tubercles are quite separate from one another and arranged more or less in longitudinal lines: on the flanks however they are close together, less regularly arranged and less flattened. The tubercles on the back lose themselves gradually on the back of the head and behind the eyes. Further, there is a narrow mid-dorsal area on the back free of tubercles. Below, the scales are sub-imbriate, those in middle of belly slightly larger than those on the sides thereof.

The scutellation of the tail differs from that of *P. weberi*. The tail is the original one, the tip only (8 mm.) having been regenerated. It is divided into a number of segments, each segment carrying dorsally four to five transverse rows of scales: marking each segment is a single row of flattened moderately keeled tubercles.

Colour and markings in life: behind the head a dark horse-shoe band, and across the back a number of dark ferruginous broken bands, some forming large ocelli, others in the form of vermiculations: tail with broken cross-bars. Rest of upper surface purplish grey inclining on flanks and between eyes to olive: a lighter streak behind the upper lip and over the ear: the lips still lighter. A light yellowish streak from the anterior border of the eye to the snout. Anterior and posterior borders

of the eye yellow. Tail and limbs more of an olive colour than the body. Lower parts grey.

Length, 43.2 + 43.5 mm.

This species is the only known representative of the *capensis* group in which the rostral enters the nostril; it is also distinct from *uebereri* in the character and disposition of the dorsal tubercles, in the scutellation of the tail, and in the shape of the first labial.

Two specimens were seen: they were occupying crevices in the rocks on the steep sides of the mountain.

P. mariquensis, Smith.

P. mariquensis, Smith: Ill., Rept., App. p. 3: Bouleng., Cat. Liz. p. 207, pl. XVI, fig. 6: Hewitt: Ann. Trans. Mus. II, 1910, p. 81, 87, and III, 1911, p. 45.

2 examples, one adult, the other half-grown, at Narudas Süd: 3097, 3098. This species was found under stones in sandy places.

The naso-rostrals are widely separated: the dorsal scales are about as large as or a trifle larger than those on the belly.

P. punctatus, Pet.

P. punctatus, Peters, Mon. Berl. Ac. 1854, p. 615, and Reise Moss. III, p. 26, pl. V, fig. 2: Bouleng., B. M. Cat. p. 206, and Ann. S. A. Mus. V, 1910, p. 462: Hewitt, Ann. Natal Mus. II, 1913, p. 483.

7 examples mostly from Quibis. Localities: 3081-3085, from Quibis; 3086, Nakeis (mine, Klein Karas); 3087, Kraikluft, at 5200 feet.

On comparing the series with typical specimens of this species from Bechuanaland (Serowe) and from Rhodesia (Bulawayo Museum), we find that our Namaqualand form differs somewhat therefrom: but we do not consider these differences to be of specific importance.

The profile of the head is rather more like that of *ocellatus* than of *punctatus*: the eye is a trifle larger and the rostral broader than in typical *punctatus*.

In our specimens the head and snout are convex, a slight concavity existing between the eyes; the eye is fairly large; the snout may be rounded as in *ocellatus*, or more or less pointed as in typical *punctatus*; it may be as long as or slightly longer than the orbit. The rostral which is separated from the nostril is nearly or fully twice as broad as deep. The naso-rostrals are separated in four specimens, in contact in three. Labials $\frac{9.7}{5.6}$ (individually $\frac{8.7}{6.7}, \frac{7.7}{6.5}, \frac{8.7}{6.5}, \frac{8.9}{6.7}$). The scales on the tail are twice as large as the dorsals: the latter are about the same size as or a little smaller than those on the snout. The ventral scales are only slightly larger than the dorsals, whereas in typical *punctatus* from Serowe and from Rhodesia (Bulawayo Museum) the difference in size between the dorsals and ventrals is more pronounced. Symphyial deeper than the adjoining labials, about twice as deep as broad. Ear opening generally rotund, sometimes elliptical.

We consider that these specimens represent a form intermediate between *punctatus* and *ocellatus*, on account of the large size of the scales on the snout, and in view of the other characters our individuals possess, as mentioned above.

On the other hand they appear to be very closely allied to Werner's *P. brunthaleri* from Bulawayo which has been lately described.*

* Forschungsreise nach Deutsch-Ost-Africa und Süd Afrika (J. Brunthaller). (I) Reptilien und Amphibien von Dr. Prof. F. Werner, (1913) Wien.

From this species however our form may differ in the comparative lengths of the eye and snout. Werner in his description of *P. brunnthaleri* states that the scales on the back and on the tail are distinctly imbricated ("deutlich geschieldelten"): this is also the case in our Namaqualand specimens of *P. punctatus*, though it would be more correct to state that the scales on the back and posterior part of the neck are sub-imbricate. We are not therefore using this last mentioned character in our key. It is unfortunate that no mention is made of the scales on the snout in the description of *P. brunnthaleri*, for this seems to us to be a character of considerable importance in separating some of the small species of *Pachydactylus* which possess homogeneous dorsal lepidosis. Werner also attaches importance to the position of the nostril in his new species: we find however in our Namaqualand specimens of *P. punctatus* that the first labial may be distinctly separated from the nostril or may very closely approach it.

We think it probable that *P. brunnthaleri* will prove to be the same as *P. punctatus*.

The markings are very variable: generally reddish-brown with darker or lighter (or both) variations dorsally. Light, immaculate below. Tail fairly long, thin, and tapering. The largest specimen measures 36 mm. from snout to vent.

Found hiding under stones during the daytime.

P. purcelli, Blgr.

P. purcelli, Bouleng., Ann. S. A. Mus. V, 1910, p. 494.

P. pardus, Sternfeld, Mitt. Zool. Mus. Berlin, V, 3, p. 398.

11 examples from the Great Karas Mountains. Localities: 3088, Wasserfall; 3089-3096, Kraikluft, at an altitude of 5200 feet, in crevices of rocks; 3099, Narudas Süd; 3102, 3103, between Kraikluft and Alt Wasserfall.

There can be little doubt but that this Karasberg species is the same as that described by Sternfeld from Warmbad under the name of *P. pardus*, and after carefully comparing our series with the types of *P. purcelli* Blgr. we are compelled to regard the two as specifically identical though some minor differences of structure do exist between our specimens and the types of *purcelli*. When compared with *P. purcelli* the Karasberg specimens have (1) the granules on the snout a trifle smaller, (2) the snout not so depressed and the head somewhat narrower posteriorly, (3) the eye just a trifle larger.

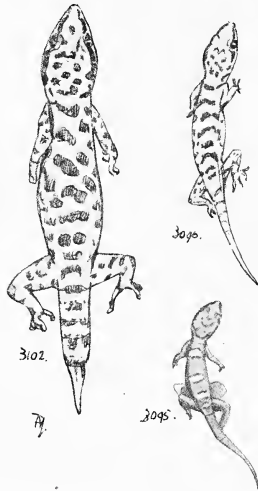
Sternfeld distinguishes his species from that of Boulenger in (1) the shape of the ear-opening which is round and larger than in *purcelli*: in the types of *purcelli* this structure is oval: (2) in the longer snout, and (3) in the colour. With reference to the length of the snout, however, we may remark that there can be little difference between the snout which is "one and two-thirds as long as the diameter of the eye" (*pardus*), and the snout which is "a little longer than the diameter of the orbit" (*purcelli*).

After careful examination of our specimens we have concluded that Sternfeld has composed the diagnosis of his species from unimportant characters which are subject to much variation. Thus the ear-opening in our specimens may be almost horizontally elliptic or nearly round, and may vary in actual size. The colour and the markings are also variable.

The Karasberg form of *P. purcelli*, Blgr. may be described as follows: head depressed: snout a little longer than the orbit; ear-opening an

oblique or almost horizontal slit, or subrotund, or of any form intermediate between these two. The rostral which is not quite twice as broad as deep enters the nostril. The symphysial may be a little larger or a little smaller than the adjoining labials: it is about twice as deep as broad. Labials $\frac{8-11}{8-10}$. Naso-rostrals in contact. The ventral scales are flat, sub-imbricate, and larger than the dorsals: the granules on the snout are enlarged, being about as large as or a trifle larger than the granules on the middle of the back. The tail is annulate above, a single transverse series of about six small tubercles occurring at regular intervals above, those at the sides being largest and all being separated by scales: each annulus comprises about six rows of scales (this character has not been recorded in *P. pardus*). The scales on the tail above and below are larger than those on the body.

The markings in the adults are variable, but in the young they seem to be fairly constant. Thus in the adult stage the head back and flanks are generally of a lightish brown colour on which are imposed dark



Text fig. 15. Figures illustrating the markings in adult, half-grown, and embryo specimens of *Pachydaetylus purcelli*, from the Great Karas Mountains.

irregular blotches: these tend to coalesce on the back, to the extent of forming irregular vermiculations or transverse or oblique bars. From the nostril to the eye and thence over the ear passes a dark streak which in the very young tends to meet its fellow behind the head.

In the embryo just before hatching or in the very young stage there are dorsally five light transverse bars which have irregular dark edges.

This variation in the markings is made evident in the accompanying list (*vide* also text fig. 15).

3088. The dark markings take the form of small blotches which tend to coalesce and form irregular cross-bars on the back. The ear-opening is subrotund. The tail which has been regenerated is devoid of enlarged tubercles.

3091. The dark markings some of which enclose a light centre take the form of irregular blotches: they are smallest on the sides. Ear-opening a small oblique slit. Length 37.5 + 39 mm.

3092. The dark markings dorsally and on flanks coalesce more than in 3091. Length 38+? mm. (tail imperfect).

3093. The dark blotches are normal and rather large: there is not much coalescence. Length 41·5+23+10 mm. (regenerated part of tail).

3094. The dark markings owing to coalescence are almost in the form of transverse vermiculations.

3102. The dark markings are very irregular: on the back they take the form of large oblique or transverse bars. Ear-opening an oblique nearly horizontal slit. Length 39+? mm. (tail imperfect).

3103. Dark markings in form of rather small irregular blotches which tend to coalesce on the back. The head is flatter than in others. Ear-opening an oblique slit.

3096. The dark markings in the form of irregular transverse broken vermiculations. Ear-opening subrotund, oblique. Transverse lamellae under the third toe five in number. Length from snout to vent 24·5 mm.

3090, 3095. Both taken from eggs. The dark streak through the eye is continued behind the head. A light region succeeds this streak, and then a thin dark band. Between this region and the base of the tail are four light transverse bars with dark edges. Elsewhere dorsally and on the sides are black granular markings.

3099 calls for some notice. It was found on sandy soil and in its habitat, therefore, differed from the rest. The specimen is a half-grown individual, its length being 27·5+33 mm. The head which is egg-shaped, is much narrower than in the others: the granules on the snout are considerably larger than those on the back: the snout is a trifle longer and more pointed than in the case of our other specimens: under the third toe are six lamellae: the ear-opening is subrotund, oblique: a dark streak passes from the snout through the eye to a point above the ear-opening: the general colouring above and below is light straw, with black spots and flecks above: the markings would appear to be similar to those of *P. serval*, Werner. From *P. serval* however, it is quite distinct in the size of the eye, in the size of the granules on the snout, and above all in the nostril character.

Through the kindness of the Director of the South African Museum, Dr. L. Péringuey, we have been able to examine the types of *P. purcelli*.

We have considered it expedient to draw up a Key to the genus *Pachydaetylus*.

KEY TO THE GENUS *Pachydaetylus*.

1. Dorsal lepidosis homogeneous, none of the scales being enlarged into tubercles.
 - A. Rostral bordering on the nostril..... 1. *P. purcelli*, Blgr.
 - B. Rostral not bordering on the nostril.
 - a. Three subdigital lamellae under the third toe.
 - Naso-rostrals in contact: dorsal scales not smaller than ventrals..... 2. *P. mariquensis*, Smith.
 - b. More than three subdigital lamellae.
 - Aa. Scales on snout three or four times as large as those on back of head.

- Rostral shield about twice as broad as deep: dorsal scales much smaller than ventrals: 4 or 5 subdigital lamellae: snout at the most one and one-third as long as diameter of orbit.....
3. *P. punctatus*, Pet.
- Ab.* Scales on snout? Like *P. punctatus*, except that snout is one and three-quarters as long as diameter of eye.....
4. *P. brunnthaleri*, Wern.*
- Ac.* Scales on snout not much bigger than those on back of head.
- i. 4 to 5 subdigital lamellae: rostral shield not or only slightly broader than deep: naso-rostrals usually separated: snout a little longer than the diameter of eye.....
5. *P. ocellatus*, Cuv.
- ii. 5 to 6 subdigital lamellae: naso-rostrals separated: snout one and a half times the diameter of eye.....
6. *P. amoenus*, Wern.
- iii. 6 subdigital lamellae: naso-rostrals in contact: eye small, the snout being one and three-quarters times the diameter of eye.....
7. *P. serval*, Wern.
2. Dorsal lepidosis heterogeneous, some of the scales being enlarged into tubercles.
- A.* Tubercles small, distinguished from the granules only by their larger size, sometimes conical.
- 3 or 4 subdigital lamellae: naso-rostrals widely separated: tibia with conical tubercles.....
8. *P. maculatus*, Gray.
- B.* Tubercles larger than in the preceding species, conical, subconical, keeled, or smooth.
- a.* Scales on the head not very finely granular.
- Aa.* Ventral scales granular, subconical.
- 4 to 5 subdigital lamellae: naso-rostrals separated: dorsal tubercles large, conical, spinose
9. *P. rugosus*, Smith.
- Ab.* Ventral scales quite smooth and flat, imbricate.
- i. 4 to 9 subdigital lamellae (species of moderate size): scales on middle of belly moderate, only a little smaller than those on sides of belly.

* For remarks on this species see page 130.

- z. Nostril not bounded either by rostral or by first labial..... *P. capensis*, Smith* and its
 † Scales on snout and on greater part of head large, smooth, and almost flat: scales on back subconical, weakly keeled..... 10. *P. capensis* var. *o'shaughnessi*, Blgr.
 †† Scales on snout and on greater part of head keeled, or at any rate not quite smooth and flat.
 * Dorsal tubercles very strongly keeled: 4 to 5 subdigital lamellae..... 11. *P. capensis* var. *formosus*, [Smith.
 ** Dorsal tubercles moderately keeled: 5 to 6 subdigital lamellae..... 12. *P. capensis* var. nov. [*typicus*.
 *** Dorsal tubercles large, trihedral: 6 to 9 subdigital lamellae..... 13. *P. capensis* var. *fasciatus*, [Blgr.
 β. Rostral and first labial entering the nostril.
 First labial four-sided: 7 subdigital lamellae..... 14. *P. montanus*, sp. nov.
 γ. First labial, but not the rostral, entering the nostril.
 First labial pentagonal: 5 to 6 lamellae 15. *P. weberi*, Roux.
 ii. About 10 to 12 subdigital lamellae (species of large size): scales on middle of belly small, considerably smaller than on sides of belly..... *P. bibroni*, Smith and its var.
 z. Dorsal tubercles smooth..... 16. *P. bibroni* var. *laevigatus*, [Fisch.
 β. Dorsal tubercles strongly keeled..... 17. *P. bibroni* var. nov. [*typicus*, (Werner [part).
 b. Scales on head very finely granular. [part).
 About 12 subdigital lamellae: dorsal tubercles flat, quite smooth, and of unequal size: rostral entering the nostril 18. *P. namaquensis*, Sclat.

Family AGAMIDAE.

Genus AGAMA, Daud.

Bouleng., B. M. Cat. 1, p. 335.

A. atra, Daud.*A. atra*, Daud. Hist. Rept. III, p. 349: Bouleng., B. M. Cat., I, p. 352: Ann. S. A. Mus. V, 1910, p. 465.*A. micropholis*, Matschie, Zool. Jahrb., Syst. V, 1890, p. 115.*A. microterolepis*, Bouleng., A. M. N. H. (6) XVII, 1896, p. 22.*A. holubi*, Bocage, J. Sc. Lisbon. (2) IV, 1896, p. 115.

17 examples from various localities. 3111, 3123, 3144, from Aus: 3115, Lüderitzbucht: 3113, 3114, 3116, 3118, 3120-3122, 3128, 3134,

* *P. affinis*, Blgr. and *P. leopardinus*, Sternf. seem to be synonyms of this species.

3140, 3143, in the Great Karas Mountains up to 6200 feet : 3119, in the Little Karas Mountains, between Groendoorn and Wasserfall : 3117, Quibis.

Juvenile specimens in our series usually exhibit heterogeneous dorsal scaling and very young specimens are not easily distinguished from *A. aculeata*.

A. aculeata, Merrem.

A. aculeata, Merrem. Tent. Syst. Amph. p. 53 : Bouleng. B. M. Cat. I, p. 351 : Hewitt & Power, Trans. R. S. S. A. III, 1913, p. 151.

24 examples : localities, 3108, 3124, Quibis : 3105-3107, 3125, 3127, 3129, 3133, 3135, 3137, 3141, 3145, from the sandy plains near Wasserfall : 3109, 3112, 3132, 3136, 3138, 3142, in the Great Karas Mountains : 3110, 3131, 3139, Groendoorn : 3126, 3130, Narudas Süd.

Most of these specimens may be described as fairly typical ; they exhibit much variation with regard to the relative proportion of the toes, as may be seen from the list below. Four specimens are noteworthy owing to the fact that the dorsal crest is practically obsolete on the back : moreover the enlarged dorsal tubercles are not numerous and are arranged in an irregular fashion such as is often met with in *A. atra* : these might be confused with the latter species from which they are distinct, however, in the length of the toes. We may mention that Rhodesian examples of *A. aculeata* also lack the dorsal crest and they differ further from the typical form in possessing shorter toes, the third being longer than the fourth.

It was noticed that this species was to a great extent arboreal in its habits : it prefers sandy soil for its habitat, whereas *A. atra* was found in rocky country.

We note the following characters in our series :

Toes and fingers slender. Ventral scales smooth, without spines. 3rd and 4th fingers subequal.

| | | |
|------------|--------------------------------------|------------------------------------|
| 3127♂. | Fifth toe not quite as far as first* | Fourth a little longer than third. |
| 3131♂. | " " | " : " equal to " |
| 3125♀. | " a trifle beyond | " : " longer than " |
| 3130♀. | " as far as | " : " shorter than " |
| 3124♀ juv. | Fifth nearly as far as | " : " a little longer than " |
| 3126♀. | Fifth toe not quite as far as | " : " longer than " |
| 3133♀ juv. | " " | " : " " " |
| 3106♂. | Fifth toe a trifle beyond | " : " " " |
| 3105♂. | " toe as far as | " : " a trifle longer than " |
| 3107♀. | " toe not quite as far as | " : " longer than " |
| 3110♀. | " " | " : " " " |
| 3109♂. | " " | " : " " " |
| 3138♀. | " as far as | " : " a trifle longer than " |
| 3136. | " not quite as far as | " : " " " |
| 3135♀. | " " | " : " " " |
| 3145♂. | " as far as | " : " longer than " |
| 3129♀. | " not quite as far as | " : " " " |
| 3137♂. | " " | " : " a trifle longer than " |
| 3139♀ juv. | Fifth not quite as far as | " : " " " |
| 3141♀. | Fifth as far as | " : " " " |

* By this is meant that the claw of the fifth toe does not reach an imaginary line passing through the claw of the first toe and drawn transversely to the axis of the limb.

Family ZONURIDAE.

Genus ZONURUS, Merrem.

Bouleng., B. M. Cat. II, p. 252.

Z. polyzonus, Smith.

Cordylus polyzonus, Smith, Mag. N. H. (2) II, 1838, p. 34: Ill. Rept. Pl. XXVIII, fig. 1, and XXX, fig. 7.

Z. polyzonus, Bouleng., l. c. p. 257: Hewitt and Power, Trans. R. S. S. A. III, p. 154.

12 examples from Aus and the Great Karas Mountains.

The largest specimen measures 120 + 93 mm. (tail regenerated) from Aus, 3150: another specimen taken between Kraikluft and Wasserfall measures 102 + 118 mm., 3149. Other localities: 3146, 3147, 3152, 3154-3156, Kraikluft, at 5200 feet: 3148 (102 + 130 mm.), between Sandmund and Kraikluft: 3151, 3157, between Kraikluft and Alt Wasserfall.

Our specimens were found in the crevices of rocks. The species occurs frequently in the neighbourhood of human dwellings.

Z. namaquensis, sp. nov.

11 examples from the Great Karas Mountains. Localities: on the top of a mountain at about 6200 feet, near Wasserfall, 3161 and 3168: 3166, Sandmund: 3158-3160 (3160, juvenile), 3162-3165, and 3167, at Narudas Süd, in the crevices of rocks in the river bed.

Related to *Z. pustulatus*, Pet., but in the character of the nostril resembling *Z. cataphractus*, Boie.

Description: head and body much depressed: head expanded, more or less triangular in shape, and a trifle longer than broad: temporal spines moderately or even poorly developed: scutes of the head rugose and ribbed: nostril facing laterally or laterally and upwards in a single nasal, which is large, much swollen, and tubular: nasals usually in contact—the suture so formed being short—sometimes separated by a small scale. Fronto-nasal large, not reaching the rostral. Labials not entering the eye: lower eyelid opaque.

Dorsal scales usually in 28 transverse series (in one specimen only 24, and in a juvenile individual as many as 32). The dorsal scales are moderately or even weakly keeled, much more strongly so and spinose at the sides: those on the sides of the neck particularly spinose. This dorsal scaling is sharply marked off at the sides: along the flanks is a narrow area covered with smooth small or very small almost granular scales which pass gradually into the ventrals. The second, third, and sometimes the fourth transverse row of scales immediately behind the occiput a little longer than the succeeding ones: those over the lumbar region the shortest. Ventral scales in 18 longitudinal series, those in the middle of the belly including about 14 scales. Anterior gulars smooth not granular. Caudal scales strongly keeled and spinose throughout, the spines longest laterally: about 26 to 30 whorls of scales on the tail.

Colour: lighter or darker chestnut brown above, with dark brown or black mottlings: head darker than the rest of the body; below generally a light muddy brown colour.

Measurements: length 81.4 + 89 mm.: length of head 21 mm., breadth 18 mm.

Type, T. M. Cat. Rept. No. 3163, in the Transvaal Museum.

Family LACERTIDAE.

Genus EREMIAS, Wiegman.

Boulenger, B. M. Cat. III, p. 80, and Ann. S. A. Mus. V, 1910, p. 473.

E. lugubris, Smith.

E. lugubris, Smith, Ill. Rept. 1849, pl. XLVI, fig. 2, pl. XLVIII, fig. 5 : Boulenger, l. c. p. 84.

5 examples : 3173-3176 at Narudas Süd : 3177 at Wasserfall : all these specimens were found in sandy river beds.

In one specimen the anterior border of the ear is feebly denticulated. The largest specimen, in life, measured 214 mm., of which the tail was 156 mm.

This is a very handsome species : the colour in life is as follows :— dorsally the head is olive-brown, the body chestnut-brown crossed with ink-black stripes which are broadest posteriorly, and the flanks ink-black broken with white spots : a light brown medio-dorsal line is present : the dorso-lateral line is white but yellowish posteriorly : the back posteriorly becomes paler the contrasting colours giving the creature a jacketed appearance : forearms blackish-brown with round white spots : hind limbs fairly light brown with round black-edged very light brown spots : tail light olive-brown : a white line passes along the upper lip to the ear and above the shoulder, and is continued along the flanks where it is much broken : lower surfaces white (description taken from a specimen 185 mm. in total length).

E. namaquensis, D. B.

Boulenger, l. c. p. 91 : Werner, Rept. Amph. Schultzes Reise, p. 330.

17 examples in sandy places below the Great Karas Mountains. Localities : 3179, 3180, 3186-3192, 3195, in the neighbourhood of Wasserfall : 3181-3185, at Narudas Süd, 3193, 3194, between Groendoorn and Wasserfall.

E. inornata, Roux. (text fig. 16.)

E. inornata, Roux, Zool. Jahrb. Syst. XXV, 1907, p. 427, Pl. XV, figs. 1-3 : Hewitt, Ann. Trans. Mus. II, p. 109, and III, p. 48.

E. undata, part Boulenger : Ann. S. A. Mus., V, 1910, p. 477.

10 examples from the Great Karas Mountains and neighbourhood, and from Quibis. Localities : 3199-3022, Wasserfall : 3203, 3204, from Quibis : 3205, 3206, Narudas Süd : 3208, Kraikluft at 5000 feet : 3207, between Groendoorn and Wasserfall in the Little Karas Mountains. Occurring on stony or rocky ground it was often taken along with *E. pulchella* but never with *E. namaquensis*.

The scaling of the lower eyelid is variable : the transparent disc, usually with four or five scales, may have the upper two so much developed at the expense of the others that a two-scaled condition is thereby approached, but not actually attained in our series : or on the other hand the two upper scales may themselves be divided. (*Vide* text fig. 16.)

Boulenger in 1910 (l. c.) considered this species to be the same as *undata* : with this decision we do not agree, as we can recognize several points of difference between the two species, namely :—(1) that the anterior border of the ear in *inornata* is not denticulated as is the case in *undata* : (2) that an elongated crescent-shaped scale on the supero-anterior border of the ear is invariably present in *inornata*, whereas it

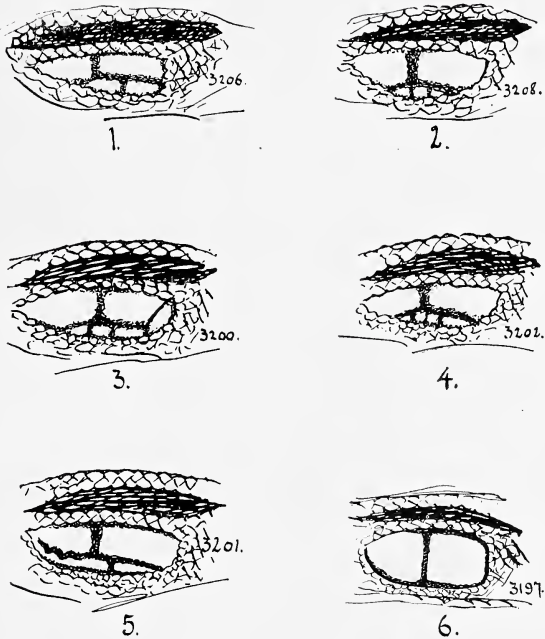
is absent in *undata*: (3) the two transparent scales of *undata* are appreciably larger than the transparent disc in *inornata*.

In one specimen the skin on each side of the throat is loosely expanded; it was noticed that this was the case in life.

E. undata, Smith.

E. undata, Smith, Ill. Rept. Pl. 44, fig. 1: Bouleng., l. c. p. 92: Werner, Rept. Amph. Schultzes Reise, p. 331.

3 examples from the Namib Desert, at Lüderitzbucht. Nos. 3196-3198.



Text fig. 16. Figures 1 to 5 of *Eremias inornata* from the Great Karas Mountains.
Fig. 6 of *Eremias undata* from Lüderitzbucht. (Somewhat diagrammatic.)

E. lineo-ocellata, D. B., geogr. var. *pulchella*, Gray.

E. pulchella: Bouleng., l. c. p. 93: Hewitt, Ann. Transv. Mus., II, 1910, pp. 106, 109, and 113, and III, 1911, p. 48; Hewitt and Power, Trans. R. S. S. A. III, 1913, p. 156.

46 examples from the Great Karas Mountains and vicinity, and from Quibis. Localities: 3209, 3219-3246, Quibis; 3210-3218, Narudas Süd; 3247, 3248, between Groendoorn and Wasserfall in the Little Karas Mountains; 3249, Baviaanspoort (between Kraikluft and Sandmünd); 3250, 3251, in the plains between Groendoorn and Wasserfall; 3252, 3253, Nakeis (mine near Klein Karas Station); 3254, Alt Wasserfall.

The colour is variable: those taken at Quibis usually with green black-edged ocelli dorso-laterally, the dorsal surface being normally light chestnut brown but sometimes with a tinge of yellow or grey: an orange line of varying length almost always present passing from the commissure of the mouth to a point just above the shoulder, becoming somewhat broken along the flanks, and continued behind the thigh for a short distance along the tail. Some were straw-coloured above, others bright chestnut brown.

Genus SCAPTEIRA, Wiegman.

Boulenger, B. M. Cat. III, p. 107.

S. depressa, Merrem.

Boulenger, l. c. p. 110: Werner, Rept. Amph. Schultzes Reise, p. 336.

7 examples from the Namib Desert, and the sandy plains between the Great and Little Karas Mountains. Localities: 3178 (juvenile), Wasserfall; 3263, Lüderitzbucht; 3264–3268, Groendoorn.

In colour the specimens from the two localities differ: those from the Karasberg District are coppery-brown above, that from Lüderitzbucht is greenish. The juvenile individual shows the markings as cited in the Brit. Mus. Cat., but differed in life in so far as the dark stripes were quite black, and slightly broader than the light stripes: these latter were, moreover a light saffron or buff in colour: the limbs were inclined to pink, and the tail was lemon-yellow.

Genus NUCRAS, Gray.

Boulenger, B. M. Cat., III, p. 52.

N. tessellata, Smith.

Boulenger, l. c., and Ann. S. A. Mus., V, 1910, p. 474: Hewitt, Ann. Transv. Mus., II, 1910, p. 107, and III, 1911, p. 48.

4 examples: 3169–3171 at Kraikluft in the Great Karas Mountains at 5000 feet: 3172 between Nakeis and Groendoorn. All agree with the form referred to by Boulenger as *typica*: buff or sand colour above, head and neck darker: on sides dark vertical bars as far as the groin. Largest specimen 243 mm. long of which the tail is 177 mm.

This species was found to frequent sandy places.

Family GERRHOSAURIDAE.

Genus CORDYLOSAURUS, Gray.

Gray, P. Z. S., 1865, p. 641: Boulenger, B. M. Cat. III, p. 126.

C. trivittatus, Pet.

Boulenger, l. c.: Werner, Rept. Batr. Schultzes Reise, 1910, p. 341.

6 examples. 3269–3273 from Quibis; 3274 from Narudas Süd: another individual was also seen at Kraikluft, altitude 5000 feet. They were found under stones usually in rocky or stony localities. They were extremely rapid in their movements and very readily dropped the tail when seized.

The colour of this animal in life is exceedingly rich and beautiful, the effect being very striking in the bright sunshine. A broad jet-black stripe passes from a point just behind the rostral, over the head and back, and along one-half the length of the tail: on each side of this stripe is one which is narrower, pale buff or light ochre on the head and the anterior three-quarters of the back, a brilliant coerulean blue on the hinder part of the back and on the tail. There is also a black lateral stripe on each side. The digits and under parts of the limbs are reddish.*

* I was told by some bastard Hottentots who accompanied us that this animal was greatly valued by them as a remedy against snake bites: at the same time they looked upon the creature as very poisonous (to eat apparently): after some discussion as to the merits of this little animal and of its comparative rarity one of my informants solemnly proposed buying a specimen from me for a sovereign—the usual market price for these things I believe. It was with much reluctance that I had to refuse such a tempting offer.—P.A.M.

An individual of this genus answering to the colour description of *C. subtessellatus*, Smith was seen at Quibis, but unfortunately was not procured. We are of opinion that *subtessellatus* is merely a variety of *trivittatus*, after an examination of a specimen of the former in the Capetown Museum.

Family SCINCIDAE.

Genus MABUIA, Fitzing.

Bouleng., B. M. Cat., III, p. 150.

M. trivittata, Cuv.

M. trivittata, Bouleng., l. c. p. 195.

M. gruet-neri, Roux, nec Peters, Zool. Jahrb. Syst. 1907, p. 431.

M. kalaharica, Werner, Rept. Amph. Schultzes Reise, p. 350, taf. VIII, fig. 11.

M. varia, Werner, l. c. taf. VIII, fig. 12.

2 examples: 3283, Kraikluft, at 6000 feet, on the top of a mountain; 3285, a juvenile, at Nakeis (Klein Karas).

M. occidentalis, Pet.

Bouleng., l. c. p. 196; Werner, l. c. p. 79; Hewitt and Power, Trans. R. S. S. A. III, 1913, p. 158.

6 examples: 3275-3279 in the dry river-bed at Wasserfall: 3280, a juvenile, in the sandy plains at the foot of the Little Karas Mountains, between Groendoorn and Wasserfall.

Lengths of three specimens, 3279, 87 + 150 mm.: 3277, 91 + 126 mm.: 3275, 98 + 101 mm.

This species was found in burrows under the bushes which grow in the sandy bed of the river, the same burrows often being occupied by scorpions (*Opisthophthalmus* and *Parabuthus*).

It is unusual to find both *occidentalis* and *trivittata* occurring in such close proximity to each other; on the other hand it was noticed that whereas the former preferred sandy soil, the latter sought rocky and stony ground for its retreat.

M. varia, Pet.

Bouleng., l. c. p. 202, and Ann. S. A. Mus. V, 1910, p. 485.

11 examples from various places. Localities: 3284, 3291, 3292, Kraikluft, at 5100 feet: 3286, Nakeis (Klein Karas): 3287, Groendoorn: 3288, 3289, Lüderitzbucht: 3290, 3293-3295, Narudas Süd.

Our specimens differ somewhat from those known to us from the Transvaal and the eastern parts of South Africa, but agree with the form which was referred to by Mr. Boulenger (Annals S. A. Museum) as *M. hildebrandti*: through the courtesy of the Director of the South African Museum, Dr. Péringuey, we have been able to make a careful examination of the actual specimens upon which that determination was made.

Mr. Boulenger endeavours in his key to separate this form from *M. varia* through the relative proportions of the hind limb and the body. If it be true that the Karasberg form does in the main differ from the Transvaal form in this respect, though we have specimens from the Zoutpansberg District which on this character alone might be referred to either species. Further, in examples of *M. varia* from the Karroo we meet with intermediate conditions.

At the same time we can point to another differentiating character probably of much greater importance, namely that of the ear-lobules.

The Karasberg form has long lanceolate lobules, whereas those from the Transvaal have lobules which are short and relatively inconspicuous. Now, all our specimens from the Karroo localities, namely from Steytlerville, Victoria West, Middelburg (C.P.), Klerksdale (near Middelburg), Cradock, and Steinkopf, agree in the character just cited with our Karasberg form, whereas they differ in that the hind limbs are somewhat shorter.

Although that of the ear-lobules is the only structural character which can be utilized as far as we can see, it may be noted that there is some difference in colouration: in the Transvaal form the light lateral streak is white and sharply defined, while in specimens from the Karasbergen and the Karroo it is either absent or comparatively inconspicuous. And further, all our specimens from the Karasbergen and the Karroo have the hind limbs, the inguinal region, and the base of the tail (below and at sides) brick-red in colour. We cannot, however, attach much importance to these colour characters, since the white lateral streak is not conspicuous in Serowe specimens, and the red colouration of the hind limbs appears in an example from Pirie, both these forms being referable to the variety characterized by the possession of short ear-lobules.

We are not inclined to regard the two forms as specifically distinct, but we are prepared to recognize two varieties, distinguished by the length of the ear-lobules.

M. varia, Pet. var. nov. *longiloba*.

The form with short ear-lobules we regard as the typical form: for the form with long ear-lobules we are applying a new name, *M. varia* var. *longiloba*, as we do not think that it can be precisely identical with the form described by Peters under the name of *M. hildebrandti*, judging from Peters' figure and the British Museum Catalogue description: compare the relationship of the loreal to the upper labial: the size of the second supra-ocular as compared with the first: the relation of the parietal shields to each other.

We may note that Mr. Boulenger in Ann. S. A. Mus., V, 1910, p. 485, records *M. varia* from various localities in Little Namaqualand and in the Karroo: it is most probable that these specimens belong to the form with long ear-lobules, that is to say to the same form which he referred to *M. hildebrandti* in the same paper. Sternfeld appears to have followed Werner and Boulenger (*vide* Mitt. Zool. Mus. Berlin, III, 1911, pp. 406 and 408, and in Fauna Deuts. Kol. R. 4: D. S. W. A. H. 2, 1911, p. 39-40: in the latter paper the author made use of the character of the length of the hind limb to the body in separating the two forms) in his identification and diagnosis of the two supposed species.

M. sulcata, Pet.

M. sulcata: Bouleng., l. c. p. 206; and Ann. S. A. Mus. V, 1910, p. 486; Werner, l. c. p. 345; Hewitt, Ann. Transv. Mus. II, 1910, pp. 94 and 100; Hewitt and Power, Trans. R. S. S. A. III, 1913, p. 158.

23 examples from various localities. 3282, 3302, 3309, Kraikluft (5000 to 5200 feet); 3296, 3297, 3308, 3308a, 3311-3317, Narudas Süd; 3298, 3299, Lüderitzbucht; 3300, 3301, 3305, Wasserfall; 3303, 3304, Nakeis (Klein Karas); 3306, Aus; 3307, Quibis; 3310, between Kraikluft and Alt Wasserfall.

A number of juveniles were taken in the Great Karas Mountains: the dorsal pattern in all these is constant and distinctive, there being on the back five light buff streaks and four somewhat broader black streaks,

besides a black lateral line passing from the eye over the ear to a point about half way along the tail: and below this last another light streak from the rostral along the upper lip below the eye through the ear to the tail.

This animal was frequently found in rocky places and was observed to be partly arboreal.

M. acutilabris, Pet.

Bouleng., l. c. p. 208: and Ann. S. A. Mus. V. 1910, p. 486: Werner, l. c. p. 319.

A single specimen, No. 3281, from the dry river-bed at Wasserfall below the Great Karas Mountains. Length, 58 + 102 mm.

Genus SCELOTES, Fitzing.

Bouleng., B. M. Cat. III, p. 408.

S. capensis, Smith.

Gongylus capensis, Smith, Ill. Rept., App. p. 10.

S. capensis, Bouleng., l. c., p. 412, pl. 39, fig. 12: Werner, Rept. Amph. Schultzes Reise, 1910, p. 350.

2 examples, one from under a stone, the other from earth mould lodged in crevices of rocks, in the mountains at Narudas Süd; altitude about 4800 feet. Nos. 3318, and 3319.

Colour olive-brown above, every scale with a dark spot at the base: a light dorso-lateral streak: flanks darker: tail bluish: lower surfaces grey, each scale dirty white with a dark spot: chin and throat almost white.

Length of largest specimen 47 + 29 mm.: in both cases the tail has been regenerated and is considerably shorter than the body.

Family CHAMAELEONTIDAE.

Genus CHAMAELEON, Laur.

Bouleng., B. M. Cat. III, p. 438.

C. namaquensis, Smith.

Bouleng., l. c. p. 462: Werner, Zool. Jahrb. Syst. XV, 1902, p. 369, Taf. 16, and "Das Tierreich," 27, Chamaeleontidae, 1911, p. 40.

2 examples, on the higher plateau, between Kraikluft and Alt Wasserfall. One was found crossing a road, and the other perched on the top of a bush. It did not appear to be more active on the ground than *C. quilensis*.

OPHIDIA.

Family COLUBRIDAE.

AGLYPHEAE.

Genus PROSYMNA, Gray.

Bouleng., B. M. Cat. II, p. 246.

P. bergeri, Lindholm.

P. bergeri, Lindholm, Jahrb. Nassau. Ver. 55, 1902, p. 57: Bouleng. Ann. S. A. Mus. V. 1910, p. 509.

A single example (2000) at Narudas Süd, in the mountains, at about 4800 feet.

Ventrals 185, caudals in 36 rows.

Colour above light chestnut-brown, with mosaic pattern of lighter and darker scales which are for the most part dark-edged. Behind the head a broad black collar. Below light brown. The first lower labials form a suture with each other: four pairs of labials are in contact with the gulars, of which the anterior are considerably larger than the posterior. Labials $\frac{7}{5}$.

OPISTHOGLYPHAE.

Genus RHAMPHIOPHIS, Pet.

Bouleng., B. M. Cat. III, p. 144.

R. multimaculatus, Smith.

Coronella multimaculata, Smith, II. Rept. Pl. 61.

R. multimaculata, Bouleng., l. c. p. 148: Sternfeld, Mitt. Zool. Mus. Berlin, 1910, p. 58: Werner, Rept. Amph. Schultzzes Reise, 1910, p. 359: Hewitt and Power, Trans. R. S. S. A. III, 1913, p. 166.

A single example, 2001, in the dry river-bed at Wasserfall. Ventrals 160, caudals in 37 rows. Colour above pale mottled olive: in life some of the scales were tinged with blue. Below white. The characteristic horse-shoe shaped marking on the back of the head is present. The prae-ocular is single on one side, divided below on the other. The posterior gulars are separated by five elongate scales which are arranged in two rows. Labials $\frac{8}{5}$. Length, 266 mm. + 38 mm.

Genus PSAMMOPHIS, Boie.

Bouleng., B. M. Cat. III, p. 152.

P. notostictus, Pet.

Bouleng., l. c. p. 156, and Ann. S. A. Mus. V, 1910, p. 513: Werner, Rept. Amph. Schultzzes Reise, 1910, p. 360: Hewitt, Rec. Albany Mus. II, p. 268.

9 examples, from the Great Karas Mountains and district. Localities: 2002-2005, Narudas Süd; 2006, Groendoorn; 2007, in the Little Karas Mountains, between Groendoorn and Wasserfall; 2008, 2009, Wasserfall; 2010, Sandmund.

This snake prefers sandy soil for its habitat and is to some extent a tree-climber: in its movements it is exceedingly swift. Locally this creature is known as the "whip snake."

In 2008 the prae-ocular is single on both sides. In our specimens the upper labials are constantly 8 in number, while the lower labials number 8 or 9.

PROTEROGLYPHAE.

Genus NAIA, Laur.

Bouleng., B. M. Cat. III, p. 372.

N. nigricollis, Reihn.

Bouleng., l. c. p. 378: Werner, Rept. Amph. Schultzzes Reise, 1910, p. 364.

A single example at Narudas Süd, 2011. This specimen was killed in the military fortifications of this place by the Sergeant in charge who kindly presented it to us. Though this is the most southern record known to us from the western parts of South Africa, we have reason to suppose from information received on the trip that this snake occurs commonly enough further south in the vicinity of Warmbad, Ukamas, etc. It is known locally by the German soldiers as the

“schwarze momba.” Our specimen is black in colour. Length, 1280 mm. of which the tail occupies 245 mm.: 225 ventrals, caudals in 70 rows. This black form we have never seen previously in South Africa but it may be noted that according to Smith a black variety of *Naiia laie* occurs in the subcontinent.

Family VIPERIDAE.

Genus BITIS, Gray.

Bouleng., B. M. Cat. III, p. 492.

B. caudalis, Smith.

Vipera caudalis, Smith, Ill. Rept. Pl. vii.

B. caudalis, Bouleng., l. c. p. 498 : Werner, Rept. Amph. Schultzes Reise, 1910, p. 367.

33 specimens, of which 12 are embryos taken from a single specimen, from the Great Karas Mountains and district. Localities : 2012, a large female from Wasserfall ; 2013–2015, 2032, also from Wasserfall ; 2016–2019, Narudas Süd ; 2020–2022, Kraikluft (5000 to 5200 feet) ; 2023–2027, Sandmund ; 2028, Groendoorn ; 2029, between Groendoorn and Nakeis ; 2030, 2031, Nakeis (Klein Karas).

All our specimens are typical *caudalis*, but in a few cases there may be a small auxiliary horn-like scale at the side of the large pointed scute above the eye. It would seem that this horn may be formed by the coalescence of two enlarged scales. In the very young and in embryos the horn is very ill-developed, and may be indicated by nothing more than a prominence above the eye, the scale which is later to form the horn being only slightly larger and longer than the adjacent scales. The median subcaudals near the vent are smooth or feebly keeled. The development of the keel in our series cannot be correlated with age, the embryos possessing about the same degree of keeling to the subcaudals as the largest individuals.

The colouring is variable. Some of our specimens are chestnut-brown ; others are a dark grey-brown ; one specimen from Narudas Süd is very beautifully marked with dark brown edged with light yellow, amber, and slate-blue, these markings being continued on to the head in a very distinctive way. The largest example measures 473 mm. in total length, of which the tail is 43 mm. : ventrals 153, caudals in 31 rows : 25 scales round the middle of the body.

It may be added that no specimen of *B. cornuta* was seen on this expedition.

RECORDS AND DESCRIPTIONS OF THE ARACHNIDA OF THE COLLECTION.

(Plate XV, Text figures 17-22).

By JOHN HEWITT.

Order SCORPIONES.

THE Scorpion material comprises thirteen species most of which are represented by several specimens; a new genus near *Uroplectes*, Ptrs., is described: also a new species of *Parabuthus*, Poc., and a new variety of *Uroplectes carinatus*, Poc.

In most cases I have not thought it necessary to give references to original or other descriptions as the synonymy is now for the most part well established, complete bibliographies being available in the works which form the basis of our modern knowledge of Scorpion systematics in South Africa, especially Dr. Purcell's papers in the first two volumes of the Annals of the South African Museum (Capetown), and Prof. Kraepelin's work on the Scorpions in "Das Tierreich": an important paper dealing with the Scorpions collected by Dr. Schultze in the Kalahari and German South-West Africa is published by Kraepelin in Denkschr. d. Med.-Naturwiss. Gesell. Jena XIII, p. 247-268 (1908).

Family BUTHIDAE.

Parabuthus brevimanus, Thor.

A single example from Quibis.

Parabuthus schlechteri, Purc.

Two examples, one from rocks at Kraikluft, the other from the sandy river-bed at Wasserfall.

Parabuthus villosus, Ptrs.

Taken at Quibis (1437m.), in sandy soil at Narudas Süd, and amongst rocks at Kraikluft. In the valley above Narudas Süd, Prof. Pearson heard an individual of this species in the act of stridulating and Mr. Methuen noticed the same phenomenon on other occasions amongst Parabuthi.

Parabuthus granulatus, H. and E.

The specimens are dark, being referable to the form described by Simon as *fulvipes*. The middle lateral crest on the fourth caudal segment is distinct though weak, in one adult specimen almost extending the whole length of the segment, but not so in another example of nearly adult size.

Found on sandy plains and in the sandy river-bed at Wasserfall.

Parabuthus stridulus, sp. nov. (pl. XV, fig. 1).

This species is related to *P. flavidus*, Poc., *P. mosambicensis*, Pet. and apparently very closely so to a species recently described by Mr. S. Hirst from Loangwa in Portuguese East Africa under the name of *P. truculentus* (Manchester Memoirs Vol. 56, No. 2, p. 2).

Type. A single male specimen, probably not quite adult, from Lüderitzbucht, Nov. 26, 1912; T. M. Cat. Scorp. No. 1030 in the Transvaal Museum Collection.

Colour yellow except for the sting which is dark brown.

Carapace granular throughout, except on the ocular tubercle where it is quite smooth. Length and breadth subequal.

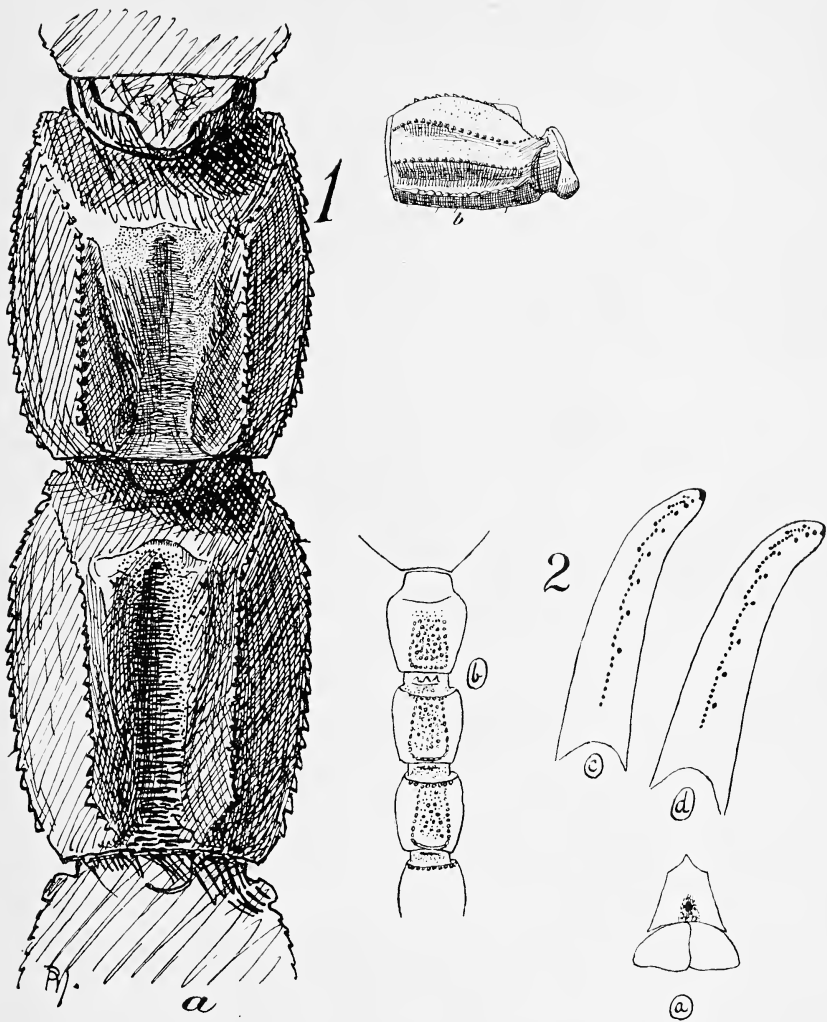


Plate XV.

Fig. 1. Figures of *Parabuthus stridulus*, sp. nov. *a*. First and second segments, dorsal aspect. *b*. First caudal segment in side view.

Fig. 2. Figures of *Karasbergia methueni*, gen. and sp. nov. (*a*) Sternum and genital operculum: (*b*) first three caudal segments in ventral view: (*c*) movable finger of pedipalp showing granular rows, and (*d*) the same in another individual.



Tergites of abdomen very finely granular anteriorly, posteriorly much coarser but not very coarse: on the last tergite the granulation is very fine over the whole length of the median area.

Sternites: first four finely granular at the sides but smooth in the middle: last sternite practically smooth in the middle, with only two distinct keels (the median pair being practically obsolete) which are faintly cretated.

Tail. The upper surface of first and second caudal segments projects step-like in front and then suddenly descends perpendicularly at the anterior margin of the stridulating area. The large stridulating area of the first segment occupies a shallow concavity and is composed of very fine granules which anteriorly and laterally are distinct but posteriorly and along the whole length of the area in the middle are fused to form very fine wavy transverse ridges which are interrupted or more or less continuous. In the second segment the ridges are very much stronger and much fewer and are confined to a long narrow median groove: a few of them are quite continuous and uninterrupted across the breadth of the area but the majority only reach about half way across or less. Segments 1-4 each with 10 keels, the granules of which are smaller and more numerous than those of *flavidus* or *mosambicensis*. The median ventral keels of segment 1 are quite smooth: in segments 2 and 3 they are granular, more strongly so in the posterior half: in segment 4 they come to an end at some distance from the posterior end of the segment. Median lateral keel of segment 4 very weak but more or less distinct. Superior keel in segment 3 strong in its posterior half but rather weak in segment 4: in segment 5 distinct in the anterior third and represented in the posterior third of the segment by a few weak granules which are a little larger than the adjacent granules on the sides of the segment; the granulation of the sides of this segment is moderately fine but includes some coarse granules: dorsal accessory crest very indistinct, represented by one or two low granules more or less enlarged. Fourth caudal segment very slightly narrower than the first. Caudal segments 1-3 sparsely and finely granular laterally and ventrally, the ventral surface of segment 1 only very finely so, ventral and lateral surfaces of segments 4 and 5 with coarser granulation which is moderately dense.

Hand of pedipalp stout and rounded, considerably wider than the tibia, the movable finger only about $1\frac{1}{4}$ times the length of the hand back.

Pectines with 41 teeth, 3 of which are attached to the basal lamella which is angular behind.

Vesicle sparsely but coarsely granular below, above very deeply excavated at the base, the two sides of the excavation forming an acute angle anteriorly.

Measurements in millimetres. Total length 74, length of carapace 8.25, of 5th caudal segment 8.75, of 2nd caudal segment 7. Breadth of second caudal segment 5.

Remarks. One of the most striking features of this species is the very deep excavation at the base of the vesicle: something similar thereto occurs in *P. flavidus*, Poc., but is not greatly pronounced in that species. It seems to differ from *P. truculentus*, Hirst, in the character of the stridulatory areas of the first two caudal segments, and in the granulation of the surfaces of body and tail (ocular tubercle, 3rd, 4th, and 5th caudal segments).

Uroplectes carinatus, Poc. var. nov. *gracilior*.

This form is closely related to the variety described by Dr. Purcell under the name of *U. karrooicus* (Ann. S. Afr. Mus. 11, p. 182) but differs in the

following respects: fourth caudal segment of the male slightly more than three times as long as broad, in the female about twice as long as broad; inferomedian crests of first caudal segment granular in the female, very weak and punctured but not granular in the male: segment 5 practically smooth above but with a few weak granules laterally at about the middle of the segment in the female, similar but with still weaker granulation in the male, the sides also being for the most part quite smooth, a few granules occurring near the superior edge. Tibia of pedipalps in the male smooth on the upper surface except along the anterior edge which is granular, in the female with a few small scattered granules on that surface, the anterior edge also granular. Hand quite smooth in both sexes. Pectines with 24 teeth in female, and 27 in male, the basal tooth in the female very broad almost oval. Colour yellow, in the female with no pronounced infuscation except on the lower surface of the 5th caudal segment and especially on the granular keels of the 5th, 4th and 3rd segments: in the male the cephalothorax is infuscated near the lateral margins, on the anterior margin, and over the ocular tubercle; the tergites are infuscated over their anterior halves but not on the keels; the legs are blackened along their lower edges and on the posterior side over the upper part of the surfaces: the 5th caudal segment is infuscated especially inferiorly: the chelicerae have a dark reticulation.

Measurements: total length 38 mm. (♂), 37 mm. (♀): length of cephalothorax 3·8 (♂), 3·8 (♀): length of tail 26 (♂), 22·7 (♀): length of fourth caudal segment 5 (♂), 4 (♀), width of same 1·6 (♂), 2 (♀).

Types: 5 specimens T. M. Cat. Scorp. Nos. 1031-1033, 1036, 1037 in the Transvaal Museum. They were taken amongst rocks in the river bed at Narudas Süd, at Quibis, and at Nakeis (Klein Karas).

KARASBERGIA, gen. nov.

This genus is closely related to *Uroplectes*, Ptrs. as defined by Kraepelin in "Das Tierreich," being distinguished therefrom through the granulation of the fingers and of the inferior surface of the first three caudal segments.

No teeth on the inferior surface of the immovable finger of the chelicera: tarsal spurs present on the proximal tarsal joint of both third and fourth legs: abdominal terga with median keel: cephalothorax without keels: sternum 5-sided, only slightly longer than broad: the granules on the movable finger of the pedipalp comprise 8 or 9 main rows and 8 or 9 anterior large flanking granules, the single more or less enlarged proximal granule in each main row without any flanking granules externally: genital operculum almost as long as the sternum: the whole inferior surface of first, second and third caudal segments with numerous coarse irregularly arranged granules, the granular area being bounded laterally by a well-defined row of enlarged granules which along the posterior edge of the segment are continued into a more or less continuous granular ridge.

K. methueni, sp. nov. (pl. XV, fig. 2).

Types. Three specimens (T. M. Cat. Scorp. Nos. 1038, 1039, 1041, in the collection of the Transvaal Museum) taken at Narudas Süd and at Quibis. They are all ♀ apparently, the genital operculum having no stylets.

Colour uniformly yellowish and without any ornamentation: the aculeus black.

Cephalothorax granular throughout.

Tergites finely shagreened, the median keel moderate or very weak, the last tergite without keels or with the merest indication of two oblique ones laterally.

Sternites. First four sternites smooth and polished throughout except for some fine shagreen at the anterior corners of the first only: fifth sternite smooth anteriorly but granular over the hinder half or two-thirds of its surface, entirely without keels.

Tail. The tail is relatively short, and its segments stout, the upper surface of each segment being grooved. Upper surface of segment 1 is more or less sparsely covered with fine granules and there is a small area similarly granulated about the middle of the lateral surface posteriorly, but otherwise that surface is smooth: the superior keel is very weak and, as in all the segments, is strongest anteriorly, the middle and posterior portions being barely distinguishable, whilst two other lateral keels are feebly represented in the posterior portion of each lateral surface: the granular margin which bounds the granulation of the ventral surface is composed of smaller granules than those in segments 2 and 3 and the posterior transverse portion is not a continuous ridge as in those two segments. Segment 2 is similar but, apart from the rudimentary keels, the upper and lateral surfaces are devoid of granules: on the ventral surface the granular area has a well defined margin of granules at the anterior edge of the segment—which is not the case in segment 1—this row of granules extending upwards about half way along the anterior edge of the lateral surface. Segment 3 is similar thereto but differs in that only one of the two lateral keels is present whilst the superior keel in its anterior half is strongly developed as a row of granules; the granules on the anterior edge of the lateral surface extend upwards for rather more than half the total distance. In segment 4 the granulated area of the ventral surface is absent but the entire anterior edge of the segment ventrally and laterally is granular: there are no ventral keels but the posterior portion of the lateral keel is strongly developed (it is in the same line with the anterior portion of the superior keel of segment 5). Segment 5 has large scattered granules but no keels on the ventral and lateral surfaces of the posterior half. The vesicle is broad and short, the lower surface with a few coarse granules: the aculeus is short and has no tubercle inferiorly.

Pedipalps. Femur and tibia finely granular above, the former with a rather ill-defined supero-anterior edge formed by a row of slightly enlarged granules: tibia strongly prominent on its anterior side, its length about twice its greatest breadth. Hand short and small, slightly narrower than the tibia, rounded, not angular, smooth above and below: fingers about $1\frac{1}{3}$ times the length of the hand back.

Legs: external surface of femur finely granular, of tibia only granular in the inferior half.

Pectines with 11–13 teeth, the basal one not enlarged: the scape toothed throughout its length and angular at the base behind, the basal lamella carrying 1 or 2 teeth.

Measurements. Total length 28 mm., length of tail 13, of hand 4, of cephalothorax 2·8, width of first caudal segment 2 mm.

Family SCORPIONIDAE.

Opisthophthalmus wahlbergi, Thor.

Dug up from sandy soil at Wasserfall, Narudas Süd and Kraikluft, at elevations varying between 4000 ft. and 5100 ft. The series includes

fifteen examples some of which agree with Dr. Purcell's variety *gariensis* whilst others are intermediates between that form and *nigrovesicalis*, Purc. (Ann. S. Afr. Mus. II, p. 195).

In one specimen (1004) there is a single short spine on the antero-inferior edge of the tarsus of the third leg.

Opisthophthalmus carinatus, Ptrs.

Dug up from sandy soil and from the river bed at Wasserfall, from Kraikluft at 5200 ft., and from Nakeis (Klein Karas): 13 examples.

Opisthophthalmus gigas, Purc.?

The two specimens are immature. The larger one, a ♀, is remarkable for the small size and narrowness of the hands: the colour is olive green except on the anterior part of the carapace, the legs, the vesicle, and the hinder half of the fifth caudal segment where it is yellow: 23 pectinal teeth. Taken amongst rocks at Kraikluft (5100 ft.), and in the rocky river bed at Narudas Süd.

Opisthophthalmus schultzei, Kraep.

(Denkschr. Med.-Nat. Jena XIII, p. 262.)

A single ♂ example from Aus at 1450 m. The distal portion of the chelicerae including the jaws is strongly infuscated.

Opisthophthalmus opinatus, Sim.?

The identification is not absolutely certain as the two examples, both ♂♂, differ slightly from the typical form as described by Kraepelin, after Simon, and may represent a distinct variety. The cephalothorax is entirely granular, coarsely so in front, and in one specimen the granulation extends over the ocular tubercle. The terga of the abdomen are very finely granular throughout. The larger specimen has a total length of 64 mm.

Taken in sandy soil at Narudas Süd, and at Quibis (1374 m.).

An immature example probably referable to this species was taken at Kraikluft (5000 ft.).

Hadogenes, sp.

The collection includes five immature examples which are probably referable to *H. taeniurus*, Thor. Taken in the crevices of rocks at Kraikluft, under bark of trees and in the rocky river bed at Narudas Süd, and amongst rocks at a place three miles below Narudas Süd.

Order ARANEAE.

Family MIGIDAE.

Moggridgea pallida, sp. nov.

Type in the Transvaal Museum: a single adult ♀ from Kraikluft at 5200 feet (15/1/1913). Two half-grown specimens and a brood of young, the progeny of the type, were taken at the same time.

Colour: carapace and proximal segments of appendages pale yellow, the ocular area and the posterior half of the cephalic groove on either side brown, tarsi and metatarsi of first three pairs of legs also brown: sternum and coxa of pedipalp pale brown.

Carapace: longer than broad, its length exceeding that of the tibia metatarsus and tarsus of the first leg, but scarcely longer than the tibia

and metatarsus of the fourth. Fovea crescentic: a fine median groove immediately posterior thereto. Anterior row of eyes with its front margins forming a procurved line, the lateral eyes large their area four or five times that of the anterior medians: posterior medians a little larger than the posterior laterals. Distance between the anterior medians (clear areas) very slightly greater than that between an anterior median and the anterior lateral of the same side: posterior medians and posterior laterals separated from each other by a distance only about half the diameter of the latter in length. Width of ocular area very slightly less than length of the first metatarsus.

Legs: the coxae without spinules inferiorly. Metatarsus IV with three long spiniform setae in the apical tuft. Patella III and IV with a broad anterior band of spines and setiform spines.

Labium: with fourteen teeth in the anterior part, the posterior ones weakest. The teeth on the coxae of the *Pedipalps* few, the whole strip including only twelve to sixteen teeth.

Measurements: length of cephalothorax 8.3 mm., breadth 6.8 mm.

This species is related to *Moggridgea peringueyi*, Simon* from Matjesfontein, a species known to me from Worcester (G. B. Townshend). The ocular arrangement differs considerably in the two species, the postero-median and postero-lateral eyes of *M. peringueyi* being separated by a distance equal to twice the diameter of the latter, and the antero-medians being much nearer together than to the antero-laterals: further, in that species the teeth on the labium and on the coxae of the pedipalps are more numerous than in *M. pallida*. The pale colour of the type specimen of this new species is probably normal as it occurs also in the two half-grown examples.

Family CTENIZIDAE.

Stasimopus, sp.

A single immature example, too young for exact determination, was taken at Kraikluft (5200 ft.).

Gorgyrella namaquensis, Purc. ? sp.

An immature example, in poor condition, probably referable to this species was taken in sandy soil at the foot of the hills at Narudas Süd.

Order SOLIFUGAE.

Family SOLPUGIDAE.

Solpuga ornithorhyncha, sp. nov. (text fig. 17).

Types in the Transvaal Museum: four ♂ examples, No. 33 from Kraikluft, Nos. 31 and 32 from between Kraikluft and Sandmund, and No. 36 from Narudas Süd.

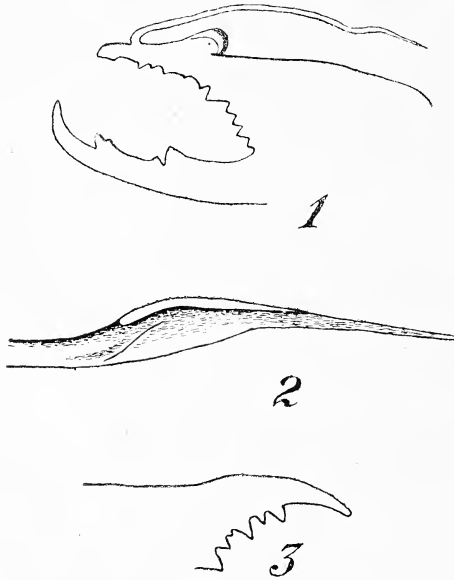
Colour. Headplate, mandibles and legs yellowish brown: tarsus and metatarsus of pedipalps, and distal two-thirds of the fourth leg dark brown: abdominal tergites reddish brown in the middle, becoming darker in the posterior segments: a thin blackish dorsolateral band: lateral surfaces yellow. Malleoli with infuscated edges.

* Annales Soc. Ent. Belgique, 47, p. 23 (1903).

Pedipalp subequal to the third leg in length. Metatarsus scopulate over the greater portion of its length inferiorly, excepting in the distal fourth.

Posterior legs with some very long silky hairs forming a more or less distinct mane on the patella and tibia.

Chelicerae. In the upper jaw the first tooth is rather small, second small, third of moderate size, fourth very small or even absent (No. 33), fifth rather small, sixth large: the double series comprises an outer row of four teeth and an inner row of three of which the basal one in each case is small, especially that of the inner row. Terminal fang of moderate length, curved outwards a little, hollowed out below forming a kind of beak with rounded apex like the bill of a duck, not strongly curved downwards at the apex: on the inner upper edge quite near to the curve of the flagellum is a small tooth, but there is no keel in connection with this tooth. Lower jaw with two large curved teeth and a smaller one between them nearer the hind tooth: on the front tooth near its apex is situated a secondary tooth.



Text fig. 17. *Solpuga ornithorhyncha*, sp. nov. Showing (1) dentition and flagellum of ♂, (2) apex of flagellum, enlarged, (3) portion of upper jaw of ♀.

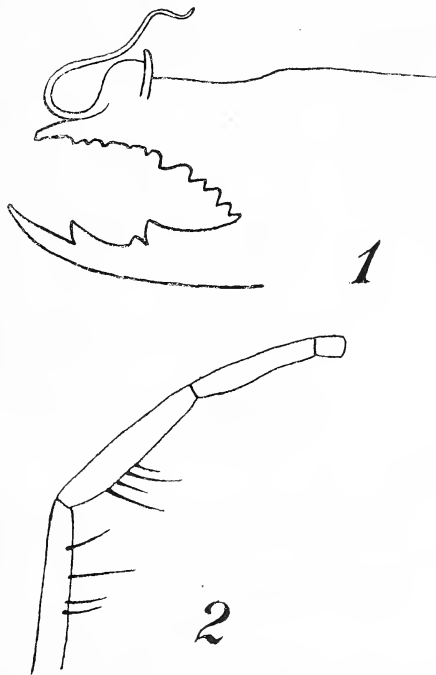
Flagellum reaching back about as far as the ocular tubercle the anterior bend considerably in front of the first tooth: the recurrent portion more or less cylindrical, not twisted but slightly curved in the first three-fourths of its length then suddenly curving upwards a little and for the rest of its length directed horizontally: its terminal fourth deeply grooved above and for a short distance keeled below, tapering to a fine point: seen from above, the flagellum has the appearance of a spear with very hollow-ground blade. The basal enlargement is longer than high being produced anteriorly.

Measurements. Total length 31 mm.: length of flagellum 8 mm., of palp 30, of tibia of palp 8.5, of metatarsus and tarsus of palp 8.2, of tibia of fourth leg 8, of metatarsus of same 8 mm.

Female.

The collection includes two ♀ examples (Nos. 34 and 35) from Kraikluft. The ♀ resembles the ♂ in colouration though the abdomen and appendages are rather more deeply coloured: the abdominal sterna are infuscated laterally: hairs on the posterior tergal plates almost black. Lower jaw with no secondary tooth on the distal tooth near its apex. Teeth of upper jaw in a continuous series, much stronger than those of the ♂, first fairly large, second moderate, third large, fourth minute, fifth moderate, sixth the longest. The double series of teeth includes four in the outer row and two in the inner row. Terminal fang pointed, not grooved below. Hind legs with a more or less distinct mane on the upper side.

Measurements. Total length 25 mm., length of pedipalp 24, of tibia of same 6.5, of metatarsus and tarsus 7.25, of third leg 24.5.



Text fig. 18. *Solpuga methueni*, sp. nov. Showing (1) dentition and flagellum of ♂, (2) pedipalp of ♂.

Remarks. This species is closely related to *S. hastata*, Krpln, a species known to me only from Prof. Kraepelin's description and figure based on a single ♂ example (Das Tierreich p. 58, fig. 15, 16). The distal end of the flagellum, as figured and described by the author of *hastata*, is quite different from that of *ornithorhyncha*. However it is possible that the two forms may eventually prove to be connected by intermediates.

Solpuga methueni, sp. nov. (text fig. 18).

Type in the Transvaal Museum: a single male specimen, No. 30, from Quibis (1. XII. 1912).

Colour dull brown above, the under surface of the trunk and of the bases of the legs pale yellowish: metatarsus and tarsus of pedipalps, and

metatarsus, tibia, and apex of femur of fourth leg, blackish: malleoli infuscated at the edges: abdominal tergites dark brown above becoming blackish in the posterior segments, a broad white dorsolateral band, below which the sides of the abdomen are blackish in the posterior segments but pale brown in the anterior segments.

Pedipalp distinctly shorter than the third leg. Metatarsus densely scopulate inferiorly except in the distal fifth. On the inner inferior edge of the tibia in its basal half are four long stout spines, and on the inner side of the femur in its distal half are four similar spines of which the two proximal ones are stoutest: there are numerous truncated bristles below the metatarsus and tarsus but none below the tibia.

Chelicerae. Upper finger curved slightly outwards at the apex and provided below with a somewhat interrupted row of teeth of which the first five are small, the second and fourth being very small, whilst the sixth is large: in the double series the outer row includes four large teeth and the inner row three. Terminal fang short, hollowed below. Lower finger with two strong curved teeth and a small intermediate one.

Flagellum. Basal enlargement high, and, seen from the side, rounded in outline excepting along the posterior edge which is thickened and produced slightly upwards as a short outstanding process, the superior edge not sharp: procurvent portion of the shaft rather short, the anterior bend in a line with the terminal fang of the lower finger when the jaws are tightly closed: recurrent portion of the shaft gradually ascends in an oblique curved line to a point immediately posterior to and above the ascending processes of the basal enlargement, and there it becomes thinner, curves downwards a little, and then quickly tapers to a point, being slightly incurved at its termination: the shaft for the greater part of its length is flattened from above.

Measurements. Total length 27.5 mm. width of cephalothorax 5.6. Length of pedipalp 28.5 mm., of tibia of same 8 mm., of metatarsus and tarsus of same 7.75 mm.

Remarks. This is a very distinct species, quite different from any other known species in the form of the flagellum and in the spinulation of the pedipalp.

Solpuga lethalis, Koch.

No ♂♂ of this species, nor of *S. venator*, Poc. were taken. The collection includes a large adult ♀ (No. 1) from Kraikluft, two small examples from Qubis (Nos. 15 and 16), also two juvenile specimens (Nos. 12 and 13) from Narudas Süd. Besides these is a series of immature examples which agree better with *S. venator* in respect to the dentition but as they were taken in the same place as No. 1 and agree very closely therewith in most respects I am regarding them as immature examples of *lethalis*. Nos. 3, 4, 5 and 6 all from Kraikluft have only a single tooth between the second and third large teeth of the upper jaw: No. 2, also from Kraikluft, has two intermediate teeth in the right jaw but only one in the left: No. 7 from Alt Wasserfall has only one intermediate tooth. It may be noted that in Nos. 15 and 16 the third tooth is much more strongly developed than in Nos. 12 and 13.

Solpuga, sp.

Nos. 18, 19, 21, and 29 are too young for precise determination.

Daesia pearsoni, sp. nov. (text fig. 19).

Type, in the Transvaal Museum, a single ♂ example (No. 8) taken on the sandy plains at Alt Wasserfall, (23/1/1913).

Colour: ground colour pale yellow. Headplate infuscated over a small area immediately posterior and lateral to the black ocular tubercle, and fainter infuscations occur on other parts of the headplate. Mandibles only faintly infuscated at the base of the upper fang. All the abdominal terga are infuscated at the lateral borders and along the median line, thus forming three rows of dark spots more or less fused. Palp with the upper surfaces of the tarsus, metatarsus, and less distinctly of the tibia, infuscated. No conspicuous dark colouring occurs on the legs except on the distal part of the femur and proximal portion of the tibia of the fourth leg.

Pedipalp. Metatarsus inferiorly with two rows of spines each comprising three shorter and stouter distal ones, and two longer and rather more slender ones proximally. Tibia inferiorly with an inner row of three long spiniform setae (there are others on the lower part of the lateral surface) and an outer row of four such setae of which the most distal is weakest and is not quite in a line with the other three. Under surface of femur with an inner row of four spines.

Legs. Metatarsus of second leg with a row of four dorsal spines, a pair at the apex inferiorly and three along the inner lower edge, of which the two proximal ones are setiform, the basal one being weakest. Metatarsus of third leg with three short and stout dorsal spines, also an



Text fig. 19. *Daesia pearsoni*, sp. nov. Showing dentition and flagellum of ♂ (No. 8).

anterior row including one and a posterior row of two slender and longer spines as well as a pair at the apex inferiorly.

Chelicerae. Terminal fang of upper finger much compressed laterally, deeply concave on the inner side, the concavity extending as a groove almost to the tip of the fang, which curves slightly outwards: dorsal edge of terminal fang (seen from the side) lightly curved, lower edge curved: distal tooth is strong, remote from the apex, the next is still larger, then follow two small teeth, and the single series is terminated by a moderate sized tooth: the double series includes five inner and four outer teeth. Lower jaw with two large teeth and a small intermediate one.

Flagellum a thin-walled capsule strongly compressed laterally, shaped somewhat like a tobacco pouch but posteriorly drawn out for a short distance into a narrow tapering style, lower edge straight. It is rotatably attached at a point distant from the anterior end scarcely more than one-fifth of the total length. Rotated forwards, the end of the style does not quite reach the tip of the fang.

Abdomen. Ventral side of segment two with two patches of stout pinkish modified hairs, each patch including about twenty hairs: segment four inferiorly is fringed with pinkish hairs posteriorly.

Measurements. Total length 24.5 mm., length of pedipalp 27 mm.

Remarks. This species seems to be closely allied to *D. hottentota*, Krpln. from "Great Namaqualand and Walfish Bay" as described and

figured in "Das Tierreich," p. 95, fig. 64. It differs therefrom in possessing two small intervening teeth (instead of one only) between the second and third larger teeth of the upper jaw, also in the spinulation of the pedipalp, and apparently in the double patch of modified hairs on the second abdominal segment inferiorly.

A ♂ described by Kraepelin in "Das Tierreich" under the heading of *D. kolbei* Purc., but without locality data, seems to be very like the species now described: however *D. kolbei* is founded on a ♀ specimen from Bulawayo, and, most probably ♂♂ from that locality will prove to be different from *sladeni*.

Female.

No ♀ example of the genus was taken at Alt Wasserfall but the collection includes three specimens of that sex from Quibis which are probably referable to this species. The largest example (No. 17) has the following characters:—

Colour. Very much as described in the ♂ but rather more strongly infuscated. Headplate with an extensive dark patch on either side. Mandibles with two faint dark lines above. Distal end of third femur infuscated superiorly. Some faintly pinkish hairs fringe the posterior border of the fourth abdominal sternite.

Pedipalp. Femur with a distinct anterior row of four stout spiniform setae inferiorly, the distal one much the strongest. Tibia inferiorly with two very distinct rows of long and very stout spiniform setae, three in each row. Metatarsus inferiorly with an outer row of three shorter but stouter distal spines and two longer proximal setiform spines, and an inner row of one short apical spine and four long setiform spines.

Dentition. Between the second and third large teeth of the upper jaw there are two small teeth: in the lower jaw one small tooth between the two larger ones.

Measurements. Total length 23 mm., length of pedipalp 22.5 mm.

Blossia tricolor, sp. nov. (text fig. 20).

Types, in the Transvaal Museum, two ♂ examples (Nos. 27 and 28) from Quibis, collected 30.XI.—2. XII, 1912.

Colour. Headplate and chelicerae chocolate brown, thoracic tergites pale yellow, abdominal segments light brown above, blackish at the sides: pedipalps brown: basal parts of fourth leg as far as the proximal third of the femur pale yellow, rest of the leg brown: femur and tibia of third leg brownish.

Headplate. The upper surface is devoid of long spines or bristles except on the posterior edge, but has a number of short scattered spines and spinules: those on the posterior edge stout, but not very long and not bifurcate at the tips.

Abdomen. The tergites, excepting the most posterior ones, are quite devoid of long setae or bristles: the two clusters of modified hairs on the second segment inferiorly meet distally in the midline to form an arch: each cluster composed of two thick and fleshy curved structures of moderate length.

Pedipalp. Under the tibia there is an outer row of three spines and an inner row of four: under the metatarsus are three short spines.

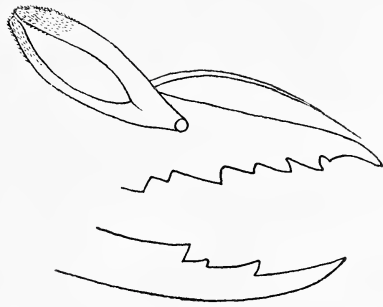
Chelicerae with numerous stout spines some of which are only moderately long and others quite short: the tips of the long spines usually truncated and only very slightly cleft. The distal dorsal bristle curved, fairly thick basally, becoming gradually thinner and filiform, the distal

two-thirds covered with very fine spinules. Upper finger curved at the apex, the most distal tooth quite small and obtuse, the other four of the single series large, the first two being most prominent and the third least conspicuous: lower finger with two large teeth and a small one between them: distal tooth much nearer the apex of the fang in the upper than in the lower finger.

Flagellum, a transparent membrane with infolded edges which meet to form a funnel in the basal third, the whole structure elongated and pearshaped, the basal part narrowest but not narrowed to a stalk, rotatably attached at its anterior end to the inner surface of the upper finger at a point just above the commencement of the double series of teeth. Rotated forwards, the apex of the flagellum just reaches the tip of the upper finger. The distal portion is densely covered with short setae. Outer wall of flagellum with no thickened axis.

Total length, 12 mm.

Remarks. This seems to be a very distinct species. It is perhaps most nearly allied to *B. unguicornis* Purc. (Ann. S. Afr. Mus. Vol. II, p. 214, fig. 3) from Dunbrody, but is distinguished therefrom in the dentition and in the absence of a longitudinal thickened rib on the flagellum. *B. crepidulifera*, Purc. (l. c. p. 215, fig. 4) from Worcester Div.,



Text fig. 20. *Blossia tricolor*, sp. nov. Showing dentition and flagellum of ♂ (No. 27).

and *B. clunigera*, Krpln. (Jena Denkschr. XIII, p. 275, fig. 7) from Little Namaqualand, are also related thereto, but in these species the flagellum has a narrow stalk.

A ♀ specimen, which, judging from the colour, seems to be closely related to *tricolor* and may prove to be identical therewith, was described by Prof. Kraepelin from Khakea in the Kalahari under the name of *Blossia obscura* (Jena. Denkschr. XIII, p. 278).

B. falcifera, Krpln.

Denks. d. med-nat. Gesells. Jena XIII, p. 277, fig. 8.

Two ♂♂ (24, 25) were taken at Quibis. The flagellum is almost precisely like that figured by Prof. Kraepelin but the dentition differs slightly. In these specimens there is no accessory tooth on the large distal tooth of the lower jaw, as figured in *falcifera*, though there is a raised inner lamina arising from the inner surface of the jaw alongside the posterior edge of the distal tooth. In the upper jaw the terminal fang is not so long as in the specimen figured by Kraepelin.

Nos. 22 a young example, and 23 a damaged ♀, both from Quibis, are no doubt referable to this species. The dentition of No. 23 is remarkable for the bluntness of all the teeth, especially those of the lower jaw.

Blossia filicornis, sp. nov. (text figs. 21 and 22).

Types, in the Transvaal Museum, two ♂ specimens, Nos. 10 and 11, from the sandy plains at Alt Wasserfall (22-23/1/1913).

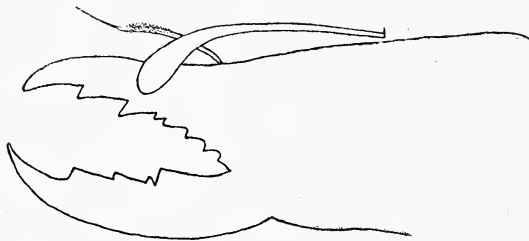
Colour. Pale yellow or reddish yellow throughout, with no definite infuscation.

Headplate. With some long notched cylindrical bristles scattered about on the surfaces as well as on the posterior margin.

Abdominal tergites with some stout notched bristles or notched setae on all the segments. Second abdominal segment below with two clusters of three fleshy hairs each, almost meeting distally in the median line: these hairs long filiform and curved.

Pedipalps with three long rather slender spines under the tibia, and three shorter but somewhat stronger ones under the metatarsus.

Chelicerae with numerous very long and some shorter bristles, the longer ones being notched at the tip except in the case of a few more anteriorly situated: the distal dorsal bristle curved, its proximal two-thirds stout and denticulated except basally, the distal third smooth, slender, and tapering to a fine point. Dorsal finger with the superior edge convex, the tip of the finger gently curved and thus forming a long fang: the two



Text fig. 21. *Blossia filicornis*, sp. nov. Showing dentition and flagellum of ♂ (No. 11).

distal teeth are much the largest of the series and are rather widely separated from each other, as also is the distal one from the apex of the finger: the next two teeth, both rather small, follow closely after the second large tooth and complete the single series. Ventral finger with four teeth, the distal one blunt, having a straight posterior edge; the intermediate tooth between the other two small.

Flagellum long, slender, and transparent, the basal portion not greatly expanded, rotatably attached to the upper finger at a point immediately above the interval between the second and third teeth, the distal portion subcylindrical and lightly curved, tapering very gradually to the tip where it is sharply hooked (this is best seen in side view after rotating the flagellum forwards).

Total length, 8.75 mm.

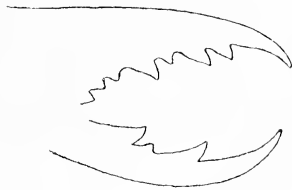
Female (text fig. 22).

A single female example (No. 9) from the same locality is probably referable to this species. It has the following characters. Upper finger with four teeth in the single series, the first, second, and fourth being large, and the third small: the double series has two rows of three teeth each: lower finger with two large teeth and a small one between them. The bristles on the chelicerae are much shorter and stouter than those of the male and the tips are only slightly, if at all, bifurcated. The headplate

and thoracic tergites are quite devoid of long bristles or spines except on the posterior margin where the stout bristles are slightly cleft at the tip. Metatarsus of pedipalp carrying four short spines ventrally, the tibia with a median row of five short spines as well as several others more laterally situated. No definite infuscation on the body or appendages.

Total length, 13·5 mm.

Remarks. This species seems to be distinct from any hitherto described in the character of the flagellum. On first examining the ♂♂ I supposed them to be referable to *B. falcifera*, Krpln. but the flagellum will easily serve to distinguish the two forms. The dentition of the upper jaw in the ♂ is also a distinguishing character apparently, the first and second teeth in *falcifera* being much nearer together than in *filicornis*. The type specimens of this species are possibly immature, but they are not likely to be merely immature forms of *falcifera*. The dentition of the ♀ referred



Text fig. 22. *Blossia filicornis*, sp. nov. Dentition of ♀ (No. 9).

to *filicornis* is different from that of the ♀ referred to *falcifera*, the teeth of the former being much more acute. Further, the spines on the tibia and metatarsus of the pedipalp are much longer in *falcifera*.

Blossia, sp.

An adult ♀ from Narudas Süd (No. 20) differs from ♀ examples here referred to *falcifera* and *filicornis* in regard to dentition and spinulation of the pedipalps.

Pseudoblossia, sp.?

To this genus (cf. Kraepelin in Denk. m.n. Gesell. Jena XIII, p. 280), I refer with some hesitation a very small example (No. 26) from Quibis. The specimen has only three malleoli, the fourth tarsus is unsegmented, the metatarsus and tarsus of the pedipalp are quite without spines and truncated cylindrical bristles. The specimen is too young for exact determination.

RECORDS OF SPECIES OF SOLIFUGAE IN THE COLLECTION OF THE TRANSVAAL MUSEUM AND DESCRIPTIONS OF SEVERAL NEW SPECIES OF THE FAMILY SOLPUGIDAE.

(Text figures 22-26.)

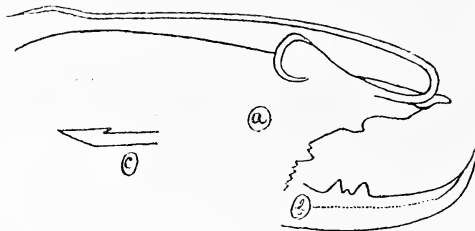
By JOHN HEWITT.

Solpuga hamata, sp. nov. (text fig. 22).

THIS species is related to *S. hostilis*, White and *S. marshalli*, Poc. (Ann. Mag. Nat. Hist., (6) 16, p. 91, pl. IV, fig. 9) differing therefrom in the dentition of the upper jaw. The barbed tip of the flagellum, to which the specific name refers, is a character sometimes found in *hostilis*.

Type. A single ♂ example from Mamiaanshoek near Zwagershoek, Waterberg District, Transvaal, presented to the Albany Museum by Mr. C. R. Prance.

Flagellum reaching back as far as the ocular tubercle, the anterior bend situated far forwards, only a little behind the tip of the terminal fang: recurrent portion cylindrical, lightly curved over the greater portion of its length, the terminal fifth more strongly curved: towards the apex it is flattened out from above and notched on the inner edge thus resembling a miniature fish-hook or arrow-head with single barb. Basal



Text fig. 22. *Solpuga hamata*, sp. nov. (♂). (a) Left upper jaw from inside. (b) Right lower jaw from outside. (c) Apex of flagellum.

enlargement longer than high being produced anteriorly: upper margin forming a prominent keel raised above the exposed outer turgid portion.

Upper jaw of mandibles. First tooth rudimentary, followed after a rather long interval by a larger tooth, then after a still longer straight toothless interval comes the third tooth which is very small and lies at the base of the fourth tooth which is large: no other teeth in the single series. The double series includes four outer teeth of moderate size and four inner teeth of which the second and fourth are very small. Terminal fang short, the apex curved slightly inwards but not downwards or only slightly so.

Lower jaw with two moderate sized teeth and a small one between them. On its outer surface is a strong lateral keel commencing at the apex but stretching only for a short distance being continued over the greater portion of the length of the jaw as a row of granules.

Pedipalp longer than the third leg. Metatarsus scopulate over the greater portion of its length.

Posterior legs with some very long hairs forming a mane.

Colour. Headplate, mandibles and legs pale brownish, slightly darker on the tarsus and metatarsus of the pedipalps, the posterior legs somewhat reddish. Dorsal plates of abdomen brown, the last three infuscated. Sides of abdomen with pale golden hairs bordered inferiorly by a thin dark band.

Abdominal sterna not infuscated except on the last two segments. Malleoli not infuscated.

Measurements. Total length 27 mm., length of flagellum 8.5, of tibia of pedipalp 8, of tarsus and metatarsus of pedipalp 8.75, of tibia of fourth leg 7.5, of metatarsus of fourth leg 7.

Since this description was drawn up the Transvaal Museum has received two ♂ examples of this species from Vygeboompoort, Waterberg District, collected by Mr. G. van Dam in October 1913. These specimens differ from the type in that the hook near the apex of the flagellum is less strongly developed: the pedipalps and legs are dull reddish brown, except the last pair of legs which are bright red.

The Transvaal Museum has also an adult ♀ from the same locality (coll. C. Truter, 13.10.1913) which is probably referable to this species. Except in its smaller size, this ♀ seems indistinguishable from that of



Text fig. 23. *Solpuga bechuanica*, sp. nov. (♂). Showing (a) portion of left upper jaw from inside, and the flagellum, (b) apex of flagellum, more enlarged.

hostilis: its total length is 27 mm. The headplate and chelicerae are yellowish in the specimen, instead of reddish as in the case of *hostilis*.

Solpuga bechuanica, sp. nov. (text fig. 23).

Type: a single male example from Serowe, Bechuanaland Protectorate, presented to the Albany Museum by Mr. S. Blackbeard.

Flagellum reaching back to a point a little posterior to the ocular tubercle, the anterior bend far forwards, only a little behind the tip of the terminal fang of the upper jaw: recurrent portion cylindrical and slender, for the greater part of its length almost straight but the terminal fifth is bent strongly downwards: towards the end, this bent portion is somewhat flattened obliquely and the thickened outer upper edge is notched at a short distance from the apex (cf. fig.) which is forked. Basal enlargement high, presenting a more or less circular outline, greatly produced anteriorly but this anterior prolongation not rising above the surface of the jaw: upper margin forming a well developed sharp keel which is raised above the exposed outer turgid portion.

Upper jaw of mandibles. First tooth large, second larger followed by a long slightly concave toothless interval, after which comes a small tooth springing from the base of the large tooth which terminates the single series. Terminal fang curved downwards but not outwards.

Lower jaw with two large curved teeth and a smaller one between them nearer the hind tooth.

Pedipalp slightly larger than the third leg. Metatarsus not scopulate in its basal sixth nor at the apex.

Posterior legs with some very long white hairs which form a mane.

Colour. Headplate, mandibles and legs brownish with darker brown on the tarsus and metatarsus of the pedipalps, and blackish brown on the metatarsus and tarsus of the fourth leg. Dorsal plates of abdomen brown in the middle, blackened laterally, the posterior plates wholly black. Sides of abdomen with silvery white hairs. Abdominal sterna not infuscated. Malleoli without darkened edges.

Measurements. Total length 23 mm.; length of flagellum 7·5, of tibia of pedipalp 7·5, of metatarsus and tarsus of palp 8·25, of tibia of fourth leg 8, of metatarsus of fourth leg 7·75.

This species is closely related to *S. marshalli*, Poc. (Ann. Mag. Nat. Hist. (6) 16. p. 91. pl. 4. fig 9) mainly differing therefrom in respect to the terminal portion of the flagellum.

Female.

From the same locality and donor, the Albany Museum received an adult female *Solpuga* along with the male just described but it cannot be positively stated that the two are co-specific. The female of *marshalli*, according to Kraepelin ("Das Tierreich," p. 63), has only one intermediate tooth between the second and third large teeth in the single series of the upper jaw but in the Serowe specimen there are two intermediate teeth the first of which is much smaller than the second, the latter being of quite moderate size. The headplate and appendages are yellow, the anterior margin of the former being infuscated, and a pair of faintly infuscated lines occur on the upper surface of each chelicera. Abdomen inferiorly pale coloured. Posterior median angles of the first abdominal sternite broadly rounded but not produced. Tibia of pedipalp without cylinder bristles, those of the metatarsus being very slender and not numerous.

Measurements. Total length 44 mm.; length of metatarsus and tarsus of pedipalp 12, of tibia of same 10·5, of metatarsus of fourth leg 10, of tibia of same 10.

Solpuga serraticornis, Purcell, var. nov. *umtaliica* (text fig. 24).

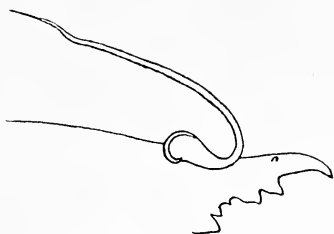
A ♂ specimen of the form thus designated was taken at Umtali by Miss Campbell who presented it to the Albany Museum. It differs from the ♂ of *serraticornis* as described and figured by Purcell (Ann. S. A. Mus. I, p. 409, fig. 16) and by Kraepelin ("Das Tierreich," p. 69) as follows:—

The flagellum is longer and more slender, its tip when depressed just reaching the ocular tubercle; the terminal portion is not curved but quite straight, tapering gradually to a fine point; the fourth tooth of the single series in the upper jaw is of moderate size, being considerably larger than the third tooth; abdominal tergites brownish.

Total length 30 mm.; length of flagellum 5·75, of tibia of pedipalp 10·5, of metatarsus and tarsus of pedipalp 10·75, of tibia of fourth leg 9, of metatarsus of fourth leg 9.

This form has a superficial resemblance to *S. spiralicornis*, Purc. [Novitates Zoologicae vol. X (1903) p. 304] and to *S. pugillator*, Hirst (Ann. Mag. Nat. Hist. (8) IX. p. 232)—which is probably the same species as *spiralicornis*—but the serrated edge on the flagellum agrees with that of *serraticornis* and the distal portion of the flagellum is not curved outwards.

A ♀ specimen from the same locality and donor has the following characters:—dentition resembling that of the ♂ in respect to the relative size of the third and fourth teeth: the posterior median angles of the halves of the first abdominal sternite are rounded but not produced; headplate and chelicerae chestnut brown: length of tibia of pedipalp 10·2 mm., of metatarsus and tarsus of pedipalp 10·75 mm., of tibia of fourth leg 9, of metatarsus of fourth leg 8·5.



Text fig. 24. *Solpuga serraticornis*, Purcell var. nov. *unitalica* (♂). Showing flagellum and portion of left upper jaw viewed from inside.

Zeriassa purcelli, sp. nov. (text fig. 25).

Type. A single ♂ example from Newington, N. E. Transvaal, presented to the Albany Museum by Dr. J. P. Fenoulhet.

Flagellum. Free portion short, reaching back only just beyond the posterior margin of the basal enlargement, flattened throughout its length and twisted outwards distally, the apical portion being flattened laterally, though somewhat obliquely, whilst the basal portion is flattened from above; near the end it widens a little, and the apex is notched, a short minute hook-like extension projecting posteriorly from the lower side of



Text fig. 25. *Zeriassa purcelli*, sp. nov. (♂). Showing portion of left upper jaw from inside, and of right lower jaw from outside.

the notch. Basal enlargement longer than high, the posterior and dorsal margins forming an acute angle with each other, the most elevated and posterior portion of the latter having a serrated edge, and forming a well developed projecting keel which is raised above the exposed outer turgid portion of the basal enlargement.

Upper jaw of mandibles. First tooth rather small, second large, third fourth and fifth progressively increasing in size, the third being small and the fifth about as big as the first, sixth large: all the teeth of the single series are separated from each other, the interval between the fourth and

fifth being longest: the double series includes four or five outer teeth and three inner ones, of which latter the first is far the largest and the third very small.

Terminal fang moderate, curved outwards and gently downwards at the apex: on the inner edge superiorly is a short projecting keel immediately above the first tooth, only very slightly nearer to the anterior portion of the flagellum than to the tip of the fang.

Lower jaw with two large curved teeth and two small ones between them, the more anterior of the two being very small: on the outer side of the jaw is a well defined lateral keel extending from the apex for a short distance along the jaw.

Pedipalp. Metatarsus scopulate in its posterior half ventrally but the scopular area only extends over a distance about equal to one third the length of the segment. The short stout spines characteristic of the lower surface of the metatarsus occur also on the tarsus proximally and on the tibia distally, but not on the femur.

Posterior legs with only very few long hairs.

Abdominal tergites quite devoid of fine hairs except on the last two segments.

Colour. Headplate and abdominal tergites dull brownish, the appendages paler and more yellowish except the pedipalps which are brown and the distal half of the femur of the fourth leg which is also brown: lower surfaces yellowish: malleoli pale.

Measurements. Total length 26 mm.; length of tibia of pedipalp 8.5, of metatarsus and tarsus of pedipalp 7.5, of tibia of fourth leg 7.5, of metatarsus of fourth leg 6.75.

This species is named after the eminent arachnologist Dr. W. F. Purcell, whose works on various families of South African Arachnida constitute our chief source of knowledge on the subject.

It is referred to the genus *Zeriassa* Poc. solely on account of the spinulation of the pedipalp.

Only one other species of this genus is known from Southern Africa, viz., *Z. cuneicornis*, Purc. (*Solpuga cuneicornis*, Purc.) described from Southern Rhodesia (Annals S. A. Mus. 1, p. 413, fig. 20): in both the flagellum and the dentition the two species are very distinct. The ♀ of *cuneiformis* is unknown. A fairly large ♀ sent to the Albany Museum along with the ♂ of *purcelli* is probably the ♀ of this species but without further evidence of its identity it cannot be described as such: the specimen seems to differ in no way from a ♀ *Solpuga*.

Daesia rhodesiana, sp. nov.

Type, a single ♂ specimen in the Transvaal Museum, collected near the Lundi River, S. E. Rhodesia, by Messrs. Noomé and Roberts (24th August, 1913).

Colour. Headplate reddish brown, infuscated in places, paler over a narrow median area, mandible yellowish with two more or less distinct dark lines above. Abdominal terga reddish brown throughout, except along the median line and at the sides where they are black: sides and lower surfaces pale. Palp brown, the metatarsus and tarsus brownish black. Fourth leg brownish, more deeply so on the distal portion of the femur.

Pedipalp. Metatarsus in its distal half inferiorly with two rows of spines, three in each row: proximally there are several long spiniform setae on each side. Tibia inferiorly with an inner and outer row of three

or four very long setae each. Under surface of femur with an inner row of six long spiniform setae.

Legs. Metatarsus of second leg with a row of five dorsal spines, a pair at the apex inferiorly, and along the inner lower edge one spine more distally situated and two long setae proximally, the more distal one of which may be termed spiniform. (Third leg absent in the specimen.)

Chelicerae. Terminal fang of upper finger much compressed laterally, deeply concave on the inner side (to receive the flagellum when directed anteriorly) and with a small but distinct concavity above on the outer side: the fang curved slightly outwards at the tip: upper and lower edges of fang, seen from the side, curved: distal tooth rather small, remote from the apex, then, after a long interval occupied by a deep toothless bay, comes a very long and slender tooth which is closely followed by another long tooth: the double series includes three inner and three outer teeth. Lower jaw with two large teeth and a small intermediate one, which is separated from either of the former but is much nearer to the basal than to the distal tooth: the basal tooth has a broad indented apex.

Flagellum a very thin lamina with infolded edges forming a shallow capsule with a long and wide opening in its lower half: lower margin practically straight, upper margin convex, the apex a little drawn out but



Text fig. 26. *Daesia rhodesiana*, sp. nov. Upper and lower jaws of left side showing dentition and flagellum of ♂.

not tapering to a point, the whole outline more or less shaped like an elongated pear. It is rotatably attached at a point distant from its anterior end about one fifth of the total length: rotated forwards, the apex of the flagellum does not reach as far as the tip of the fang.

Abdomen. Ventral side of segment II with a cluster of pinkish fleshy modified hairs, about twenty-four in number.

Measurements. Total length 18 mm., length of tarsus and metatarsus of pedipalp 8.2 mm.

This species is closely related to *D. betshuanica*, Krpln. (Denk. med. nat. Gesell. Jena XIII p. 273) from Lobatsi, but differs therefrom in the dentition of the upper jaw. It may prove to be the same as *D. kolbei*, Purcell (Ann. S. African Mus. vol. I. p. 391) which was founded on a ♀ specimen from Bulawayo. Prof. Kraepelin in "Das Tierreich" (p. 97) gave a brief description, without figure, of a ♂ which he believed to be referable to *kolbei* and which is evidently not the same as the one here described, the two differing in dentition at any rate.

Solpuga hostilis, White.

From the following localities in the Pretoria District:—Pretoria, 5/12/1910 (G. van Dam); Pretoria, Dec. 1910 (M. C. v. Niekerk); Gezina, 9/3/1911 (Rev. N. Roberts); Mayville, (F. Noomé); Sunnyside, 12/4/1913

(B. Penfold); Garstfontein, Dec. 1909 (W. H. Manté); Magaliesberg, Nov. 1910 (F. C. Zwarts); Dewaalslaagte, Nov. 1910 (F. C. Zwarts); Olifantsfontein, Nov. 1910 (L. Kruyshaar); Zwartspruit, 17/12/10 (F. C. Zwarts); De Kroon (G. v. Dam); Hennops River, Oct., 1909 (J. Hewitt); Pretoria District, 7/11/1909 (T. Jenkins).

Waterberg District: Vygeboompoort (G. van Dam).

Middelburg District: Doornkop, near Belfast, May 1910 (R. Gerhardt).

Johannesburg District: Rietfontein (M. Coch).

Zoutpansberg District: Turfloop near Pietersburg, March, 1910 (Messrs. Israelsohn); Shilowane, January, 1910 (Rev. J. Maphophe); Shilowane (Rev. H. Junod); Zoutpansberg District, 7/8/1913 (W. v. W. de Vries).

Wakkerstroom District: Wakkerstroom, 19/1/1912 (A. Roberts) ? sp. (♀ juv.).

Lydenburg District: Lydenburg (Flygare).

Solpuga spiralicornis, Purcell. (Novitates Zoologicae, vol. X, p. 304). *S. pugillator*, Hirst. [Ann. Mag. Nat. Hist., (8) 9. 232] is probably a synonym of this species. Hectorspruit, 7/11/1911 (F. Streeter).

Solpuga monteiroi, Pocock. Victoria Falls (J. W. Soper).

Solpuga junodi, Purcell. (Novitates Zoologicae, vol. X, p. 304). Vygeboompoort, Waterberg District, July 1909 (G. van Dam).

Solpuga celeripes, Hirst. (Mem. Manchester Phil. Soc., 1911, No. 2). Several specimens without locality data.

Solpuga strepsiceros, Kraepelin. Barberton, 3/12/1906, 12/6/1911, and 1/4/1912 (Miss L. de Beer). Also a single specimen labelled "Pretoria, Dr. Breyer," but the locality is I think doubtful.

The ♀ of this species is very handsomely coloured: the abdominal tergites are black, the malleoli are dark edged, the sides of the abdomen are covered with golden hairs and the appendages are golden yellow. There are two small intermediate teeth in the single series of the upper jaw: the internal corners of the halves of the first abdominal sternite posteriorly are rounded but not produced.

Solpuga tubicen, Kraepelin (Mit. a.d. Nat. Mus. Hamburg 28, p. 102). A single specimen without data.

Solpuga ferox, Pocock. Rustenberg (N. L. Mansvelt). The Albany Museum has it from Kimberley (Bro. J. H. Power).

Solpuga globicornis, Kraepelin.

From the following localities in the Pretoria District:—Pretoria, Nov. 1910 (G. van Dam); Garstfontein, Dec. 1909 (W. H. Manté); Pretoria (H. C. Choveaux); Gezina, 8/1/1908 (— Jones); Wonderboom, Dec. 1910 (F. C. Zwarts); Pretoria District, 1/12/1911 (M. C. van Niekerk); Irene (L. Taylor); Gezina (Rev. N. Roberts); Pretoria, 27/11/1911 and 17/12/1912; Pretoria 3/2/08 (Dr. Knobel); Pretoria, 12/11/1912 (J. Burt Davy); Crocodile River, Dec. 1909 (van Niekerk) ? sp.

Zoutpansberg District:—Krabbefontein (Dr. Breyer); Shilowane (J. Maphophe) ? sp.; Turfloop near Pietersburg, March, 1910 (Israelsohn Bros.) ? sp.

Lydenburg District:—Lydenburg (Krantz).

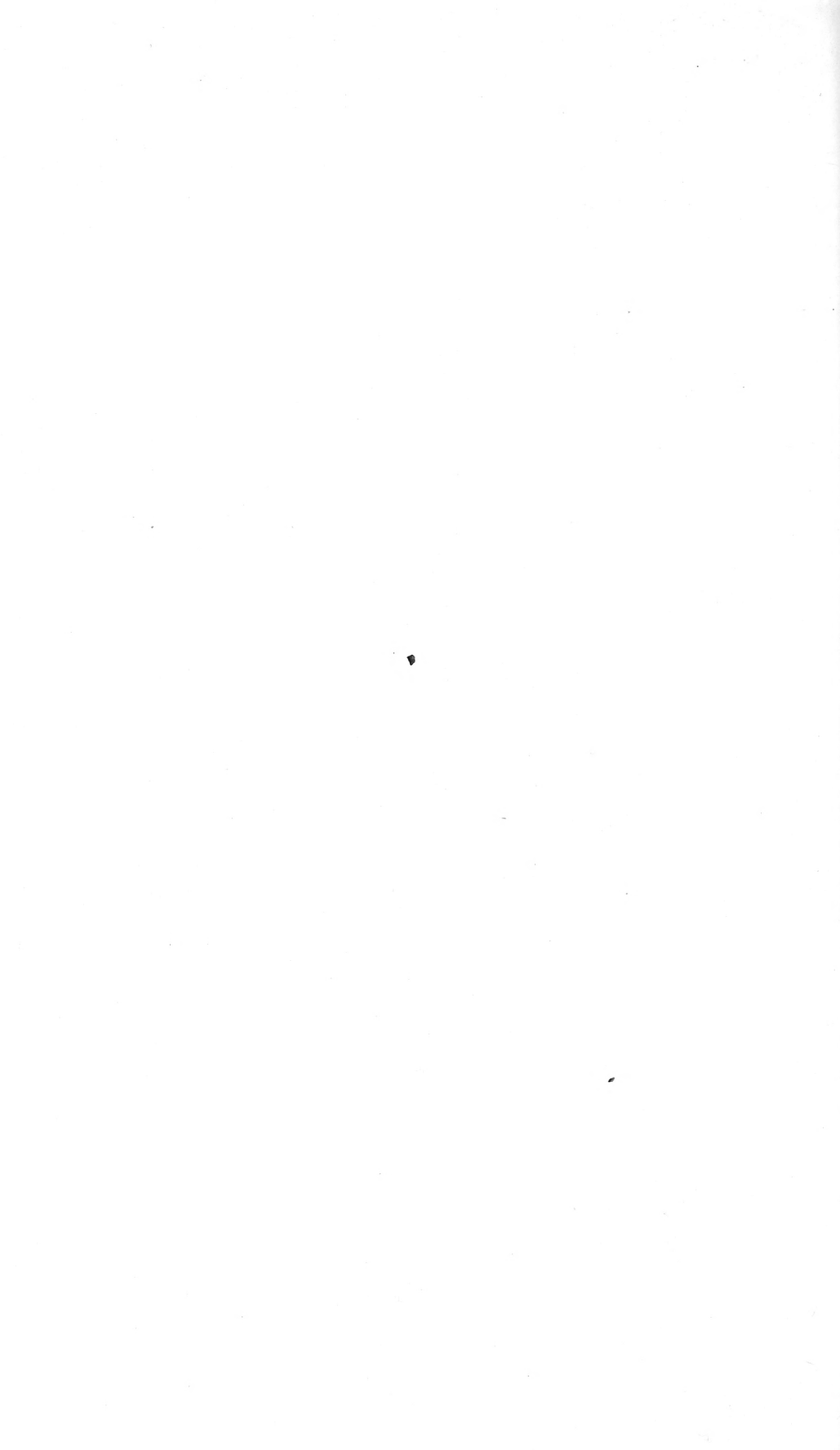
The records from the Zoutpansberg and Lydenburg Districts should be confirmed.

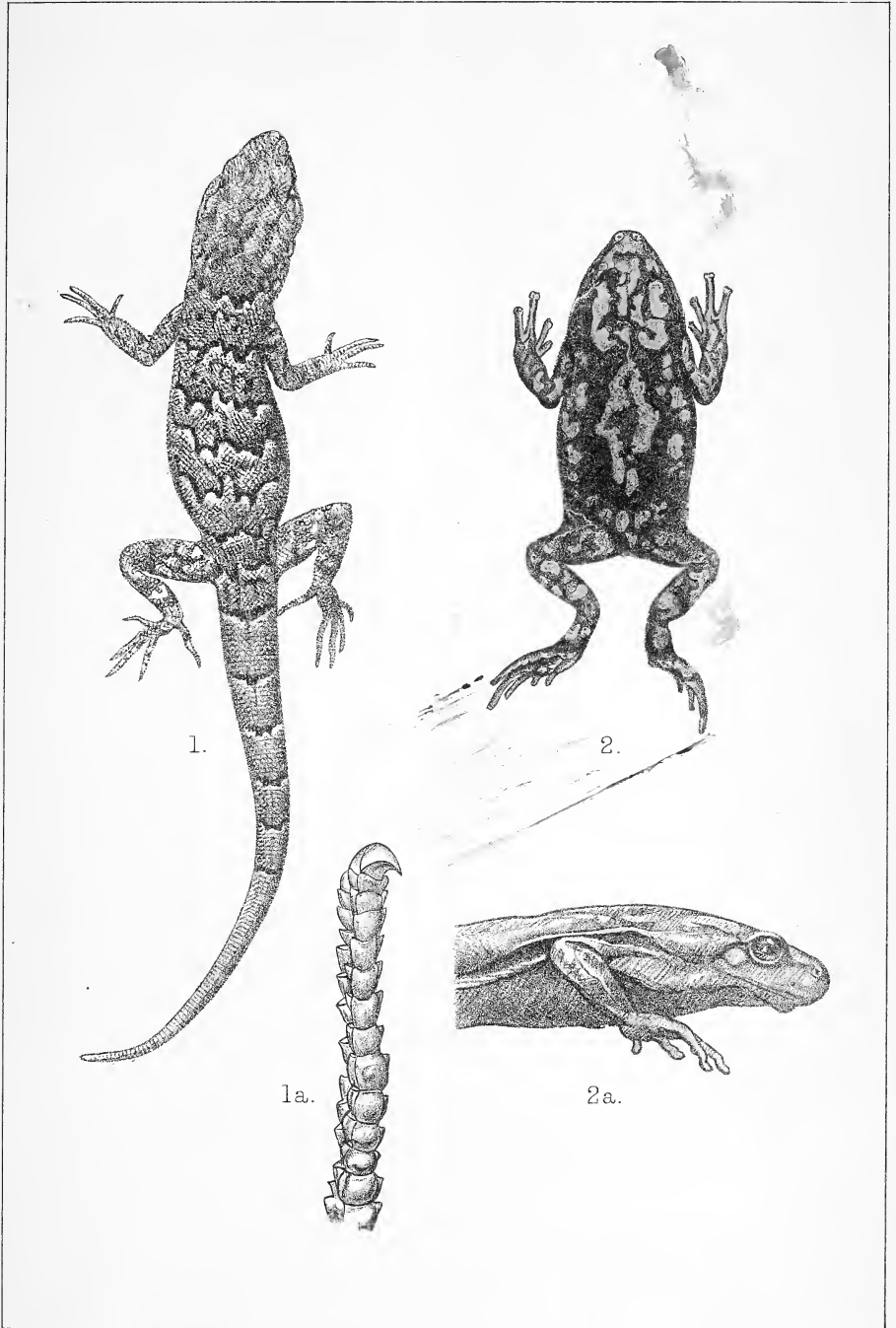
Solpuga schoenlandi, Pocock [Ann. Mag. Nat. Hist. (7) 6. 316].

Rietfontein near Johannesburg (M. Coch); Saltpan, Pretoria District, 3/2/1912 (W. Bernard); Mooiplaats, Nov. 1910 (F. C. Zwarts); Zwartspuit, 17/12/1910 (F. C. Zwarts); Hammans Kraal, 8/1/1913 (C. L. Preller). The Albany Museum has this species from Kimberley (Bro. J. H. Power). The locality cited for the type, "Grahamstown," is probably incorrect. The ♀ of this species greatly resembles that of *globoicornis* and indeed I am unable satisfactorily to distinguish between them. The general colour is yellowish, abdominal tergites pale brown, darker at the sides but not black; malleoli not infuscated. No mane or long hairs on the hind legs. The whole hind margin of each half of the first abdominal sternite is strongly rounded. There are two small intermediate teeth in the single series of the upper jaw, the posterior one of which is more or less fused with the fifth tooth.

A large adult ♀ from Rietfontein (M. Coch) has the following measurements: Total length 50 mm. Breadth of headplate 12·75. Length of tibia of pedalpalp 10·6, of metatarsus and tarsus of same 12, of tibia of fourth leg 9·5, of metatarsus of same 9.

Blossia spp. Sunnyside Kopje, Pretoria, 16/8/1913 (Master B. Penfold): a single ♀ specimen of an undescribed species of this genus from Lydenburg (Krantz). These are the first records for the genus *Blossia* from the Transvaal.





P.A.Methuen del.

West, Newman lith.

1. NARUDASIA FESTIVA, *gen. et sp. nov.*
2. PHRYNOMANTIS NASUTA, *sp. nov.*



ANNALS MEDEDELINGEN
OF THE VAN HET
TRANSVAAL MUSEUM

VOLUME IV.

PART 4, containing:—

Notes on Birds in the Collection of the Transvaal Museum, with Descriptions of several New Subspecies. By AUSTIN ROBERTS.

Supplementary List of African Mammals in the Collection of the Transvaal Museum, with Descriptions of some New Species. By AUSTIN ROBERTS.

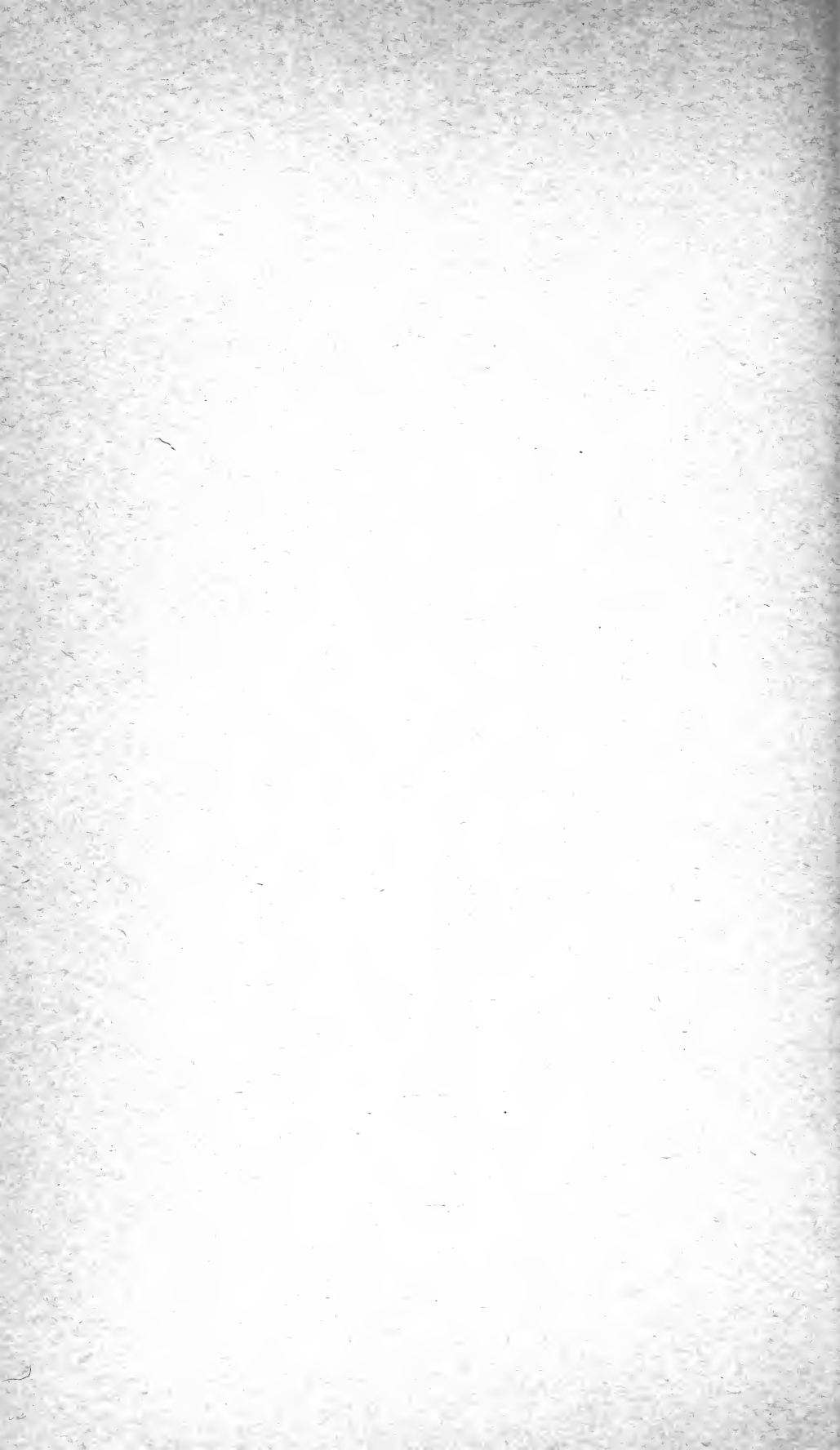
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ANNALS

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VAN HET

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No. 4.
DL.

NOTES ON BIRDS IN THE COLLECTION OF THE TRANSVAAL MUSEUM, WITH DESCRIPTIONS OF SEVERAL NEW SUBSPECIES.

By AUSTIN ROBERTS.

Charadrius rufocinctus, Rehw.

I find on examining the specimens of *C. venustus* mentioned in the "Check List" that they are referable to *C. rufocinctus*; in colour and measurements they agree with Reichenow's description of the latter.

Microparra capensis, (A. Smith).

So far this species has been recorded from the eastern parts of South Africa only; a specimen received from Potchefstroom (F. D. Ayres) is therefore a new record, and indicates the possibility of its occurrence considerably farther west along the course of the Vaal and Orange Rivers, Potchefstroom being situated on a tributary of the former.

Theristicus hagedash, (L.).

Neumann has recently shown ("Ornis," No. XIII) that there are four geographical forms of this species, the typical one being from the Cape and Union territory. Two of the three remaining forms described by Neumann are apparently represented by specimens in the Transvaal Museum collection, namely, two ♀♀ of *guineensis* from Sesheke on the Upper Zambezi, and one specimen (unsexed) of *erlangeri* from Beira. Both these forms should, therefore, be included in our list of South African birds.

Buteo augur, Rupp.

This species does not appear to have been recorded farther south on the western side of Africa than Angola; a specimen from Windhuk, German South-West Africa, therefore considerably extends its range.

This specimen is in the white-breasted phase of plumage, having the whole of the under surface of the body white, as also the throat, which has, however, a very few narrow streaks on the lower part and somewhat broader marks on the sides. The following notes are recorded of the bird in the flesh: length 470, wing 382, tail 195; cere and feet yellow.

+ *Lophoceros nasutus maraisi*, subsp. nov.

Similar in colour and general appearance to *L. nasutus*, but smaller in size in all respects: male (type), wing 202, tail 180, tarsus 35, culmen 80; female (cotype), wing 187, tail 175, tarsus 31, culmen 68.

Three forms of this species are recognized by Reichenow in his "Vögel Afrikas," namely, *L. nasutus*, (L.), *L. n. forskali*, (Hemp. Ehr.), and *L. n. epirhinus*, (Sund.). Of these, the first seems to be widely dispersed over North-West Africa and North-East Africa as far south as the Pangani River in German East Africa; the second occurs in North-East Africa only; and the third in South Africa (both on the west and east), its range apparently extending to German East Africa. From this it seems that there is a certain amount of overlapping of *forskali* and *nasutus* in North-East Africa and *epirhinus* and *nasutus* in German East Africa; but whether this is really so or merely the result of hasty identification can only be ascertained by more careful research. *L. forskali* differs from *nasutus* in having a longer wing, and *epirhinus* from *nasutus* in the casque being produced farther forward with a more pointed tip. The fourth form which I have here described is like *nasutus* in the shape of the casque, but in size is so very much smaller in all respects that I have no hesitation in describing it as new. Both the type and cotype are fully adult, and seem to have been a pair. The following figures (the lesser of which in each case are referable to females) are taken from "Die Vögel Afrikas" and the type and cotype of *maraisi*:—

| | Wing. | Tail. | Culmen. |
|------------------------------|---------|---------|---------|
| <i>L. n. nasutus</i> | 200-225 | 200-220 | 75-97 |
| <i>L. n. epirhinus</i> | 200-230 | 190-215 | 75-100 |
| <i>L. n. forskali</i> | 220-240 | 215-235 | 90-113 |
| <i>L. n. maraisi</i> | 187-202 | 175-180 | 68-80 |

The type and cotype of this new form are from the collection of the late J. v. O. Marais, but the labels bear no indication of the locality except "Rhodesia," and, as all the specimens he collected in East Africa on his ill-fated expedition were so labelled, that cannot be accepted as a guide. His note-book is in the Museum, however, and in it a pair of hornbills, with remarks on the colour of the bill in the two sexes, is recorded on the 29th June; no precise locality is given about that time, but he seems to have left Bagamojo on the 25th June, and after four days' marching he seems to have settled down to collect specimens, although he suffered considerably from recurring attacks of malarial fever. His notes on the two specimens agree exactly with the two now in the Museum, and as only two others of the family have been recorded in his diary and are obviously referable to *L. deckeni* in his notes, I do not think there can be any doubt as to the locality in which they were taken.

Irrisor erythrorhynchus brevirostris, Gunn. Rbts.

Three specimens of this species have recently been acquired from P. A. Sheppard, of Zimbiti, Beira, which, while closely resembling the typical form from the Transvaal, are still like *brevirostris* from Boror in the length of the wing and culmen. Two are sexed as males, but one of these and the other (not sexed) are so much smaller that I think, on analogy, the one must have been wrongly sexed and both are females. The largest measures: wing 137, tail 225, culmen 49; and in the two smaller ones: wing 132-134, tail 204-214, culmen 36.5-37. In the specimens from Beira the culmen is shaped as in the typical form, and they are in fact a link between the typical form and *brevirostris*; but for the present I do not propose to apply a new trinomial, thinking it advisable to wait for more material.

Rhinopomastus cyanomelas intermedius, subsp. nov.

Specimens of this species from the Orange Free State, Damaraland, and the western half of the Transvaal have the tail feathers uniform or with only a very little white on the outer ones, the longest feathers measuring in males 131-145 and in the females 120-136. These represent the typical form. Then from Beira northwards to East Africa we get the longer tailed subspecies (*schalowi*) giving measurements of 170-200 in the longest tail feathers and with a great deal of white on all but the middle ones, the white extending in most cases across both webs. In the eastern half of the Transvaal and the adjacent territories an intermediate form is found, which has less white on the tail feathers than *schalowi* and gives measurements in the longest feathers of 155-165 in males and 136-146 in females. To this form I am giving the name of "*intermedius*." The type is from the Koedoes River, Zoutpansberg District, taken on the 21st September, 1910, by F. O. Noomé. Wing 115, tail 165, culmen 50.

Pitta angolensis, (Vieill.).

This species has only once been recorded south of the Zambezi, namely, by Swynnerton, who saw and heard it in the forests of Gazaland. There are two specimens in the Transvaal Museum collection which prove that it sometimes occurs considerably farther south. The first of these is one taken at night by Mr. M. v. d. Ende in a house in Pietersburg on 6th December, 1909; and the second by Mr. F. D. Ayres (son of the late Thomas Ayres) in Potchefstroom on the 24th November, 1912. Both these records are remarkable, as there are no natural forests within a considerable distance of the towns in which they were taken, and it seems to be most probable that they strayed from their natural haunts in the north and were attracted by the trees of the towns. Mr. Ayres informs me that he picked up the specimen (dead) under the trees in his garden and that it was much emaciated.

Batis sheppardi, Haagner=*Batis fratrum*, Shelley.

W. L. Sclater (Ibis, 1911, p. 424) has recently recorded a single specimen of *B. fratrum* from Beira, the type locality of *B. sheppardi*. This led me to compare a series of skins from Beira, including the type of

sheppardi, with Shelley's description of *fratrum*, with the result that I think there can be no doubt as to the two species being synonymous. Sclater in writing of the specimen from Beira does not refer to *B. sheppardi*; but remarks that Shelley was wrong in stating that the type of *fratrum* was a female, the error having arisen on account of the label not indicating the sex, and the specimen not having a black breast band like its congeners in South Africa. It is evident that the type was a male, for the discoverers, after whom the species was named, expressly stated in their notes, to which the description was appended by Shelley, that the two specimens remitted (the type and cotype) were a male and a female respectively.

Anthus daviesi, spec. nov.

Most closely allied to *A. vaalensis*, Shelley, but differing in having a longer wing and a shorter and more curved hind claw. In colour it is like *A. leucophrys* on the under surface of the head and body, but like *vaalensis* on the upper parts. *A. vaalensis* formerly had the longest wing of any South African species of the genus, but the present species has an even longer wing, in three males from the type locality measuring not less than 111 mm. as against not more than 106 in *vaalensis*. Having regard to the little variation apparent in wing measurements of specimens of the same sex of other members of the genus, this difference of 5 mm. is of considerable importance, and having regard to the difference in the hind claw, I think its separation as a distinct species is warranted. The type is T.M. No. 8666, ex C. G. Davies, Matatiele, East Griqualand, 4th May, 1911. Wing 111, tail 83, tarsus 27, culmen 16; hind claw, dorsal length 9, ventral length 7.5.

Cossypha haagneri, Gunning.

There are good reasons for supposing this species to be a synonym of *C. bicolor*. There are in the collection at the present time sixteen typical specimens of *C. bicolor* from Ngqeleni or Port St. Johns District, all taken by the same collector (H. H. Swinny), from whom the type of *C. haagneri* was obtained; also another specimen from the same place and collector, which was identified by Haagner with *C. bicolor*, but which might equally well be placed with *C. haagneri*, as it has a yellow eyebrow and black ear-coverts ribbed with yellow. The yellow pigmentation of the feathers in the three allied species—*bicolor*, *natalensis*, and *heuglini*—is by no means always evenly dispersed over certain groups of feathers, but sometimes strays into the darker ones adjoining. This is frequently seen in the feathers of the hind neck in specimens of *bicolor*. There is a specimen of *heuglini* in the collection which has half of one eyebrow yellow in place of white, and a single yellowish plume in the midst of the black ear-coverts. Then, again, if we examine a number of specimens of *C. natalensis*, it is remarkable how much the yellow colouring runs into the slate colour of the back, the amount varying considerably in different individuals. Finally, the immature birds of all three species have a mottled yellow and black appearance. It is easy to conceive, therefore, of yellow having predominated in certain parts, either to the exclusion of black or slate

colour throughout life or, which is very likely, to be displaced at a later age by black or whatever colour the yellow may have encroached upon. This thesis is supported by the presence of black tips in the ear-coverts of the type of *C. haagneri*. Under the circumstances it seems to me to be evident that the type of *C. haagneri* is nothing more nor less than an abnormally coloured specimen of *C. bicolor*, which would very likely (having regard to the black tips to the ear-coverts) in the next moult have reverted to the normal coloration.

I may mention that the type of *C. haagneri* is a female, and the parti-coloured specimen a male; but it is not likely one species would be different in colour in the two sexes, seeing that this does not occur in any other species of the genus. We must, therefore, reject any hypothesis that may be brought forward on the grounds that these differences are typical of the two sexes of a species distinct from *C. bicolor*.

Cinnyris chalybeus, (L.).

There appear to be five forms of this species in South Africa, judging by the material available for comparison. According to W. L. Sclater (Ibis, 1911, p. 274), the typical form, of which he examined six males from Klipfontein, differs from *subalaris*, Reichenow, in having a shorter bill and no wash of yellowish on the lower breast. He does not seem to have had typical specimens of *subalaris* from Pondoland, and, therefore, placed specimens from Knysna (all females and juveniles), Durban, Zululand, and the eastern Transvaal under that name. With more material and the advantage of Mr. Sclater's notes, I have arrived at a different conclusion. A single specimen from Port Elizabeth agrees with his diagnosis of the typical form, having a short culmen and the abdominal region with hardly a trace of the yellowish suffusion found in specimens from farther east. I have found in many cases that the typical forms of species found in the neighbourhood of the Cape Peninsula extend their range eastwards as far as Knysna and Port Elizabeth, and beyond that are replaced by other forms; and I have no doubt that this is another instance. Six specimens from Port Alfred differ from the one from Port Elizabeth in having a faint wash of yellowish on the abdomen. One from Grahamstown is yellower than those from Port Alfred; and single specimens from Lusikisiki (East Pondoland) and Matatiele (East Griqualand) are like that from Grahamstown. Two from Port St. Johns District (probably the type locality of *subalaris*) are yellower than the last, and differ from all the others in having the under tail-coverts yellowish like the abdomen. Single specimens from Wakkerstroom and Haenertsburg (near Woodbush) differ from all the preceding in having darker grey on the abdominal region and hardly a trace of yellowish. All these specimens are males in full plumage, and, with the exception of the specimen from Port Elizabeth, give measurements of the culmen of about 22 mm. Briefly the outstanding characters of these forms are as follows:—

1. Culmen less than 20 mm.—Cape to Port Elizabeth.

Culmen more than 20 mm.—North and east of the Sundays River, Cape Province.

2. Abdominal region light grey, only faintly tinged with yellowish; under tail-coverts not yellowish—Port Alfred.
3. Like 2, but with a stronger wash of yellowish—Grahamstown, Lusikisiki, and Matatiele.
4. Abdominal region grey, with a very strong wash of yellowish which extends over the under tail-coverts as well—Port St. Johns.
5. Abdominal region dark grey, with a very slight wash of yellowish—Eastern Transvaal.

No doubt these forms will be found to merge into each other, having regard to the fact that there is some difficulty in placing specimens when they are taken in situations not far apart, as in the case of Port Alfred and Grahamstown.

Anthoscopus caroli, Sharpe.

In the eighteenth volume of Wytsman's "Genera Avium," Hellmayr has pointed out that specimens of *A. caroli* from the eastern parts of South Africa are subspecifically distinct from those found in the western parts. Those from the Transvaal and Southern Rhodesia he has placed as *A. robertsi*, the type of which came from Boror, north of the Zambezi, apparently under the impression that the north and south of Zambezi forms were identical. *A. robertsi* is creamy white (it should rather have been described as creamy yellow) on the throat and breast, and "above pale grey-brown, with a distinct yellow-olivaceous tinge." In specimens from the eastern Transvaal, the cream coloured parts are much paler (white, in fact, on the throat), and the upper surface of the body and head is almost devoid of the "yellow olivaceous tinge." This distinct subspecies from south of the Zambezi I am therefore naming

Anthoscopus caroli hellmayri, subsp. nov.,

after the author to whom is due the credit of drawing attention to the difference between the eastern and western forms of the species.

This subspecies is represented in the collection by two specimens from Mapagone and one from Klein Letaba, in the north-eastern Transvaal and two from the Buby River in south-eastern Rhodesia. The type (a ♂) is from Mapagone and was taken by Mr. F. O. Noomé on 19th September, 1913 (T.M. No. 10478).

Description of *A. c. hellmayri*: Upper parts, except the forehead, light greyish olive, the rump becoming more yellowish. Wings and tail browner than the back. Forehead and sides of the face white with a tinge of cream colour; chin and throat clearer white, merging gradually into pale ochraceous buff on the abdomen and under tail-coverts. Under wing-coverts white. Wing 52, tail 24, tarsus 12, culmen 9 mm.

The two specimens from the Buby River are slightly darker ochraceous buff than the three from Transvaal.

While writing of *A. caroli*, I may mention that Mr. Noomé procured two specimens of *A. minutus smithi* as well as the two of *A. caroli hellmayri* at Mapagone.

Tarsiger stellatus chirindensis, subsp. nov.

Larger than *T. s. transvaalensis*, but similar in that the bastard wing feathers are white on the outer webs. Type: ♂, ex coll. C. F. M. Swynnerton, Chirinda Forest, south-eastern Rhodesia, 27th June, 1906. "Bill black, iris dark brown, legs yellowish grey, length in the flesh 6.65 inches" (= 168 mm.), wing 93, tail 72, tarsus 25, culmen 15.5 mm.

Centropus pyimi, spec. nov.

In colour similar to *C. superciliosus* from North-East and East Africa, but considerably larger in size.

The occurrence of *C. superciliosus* in South Africa has on several occasions been called into question, and I am personally of opinion that most, if not all, the records have been based upon immature specimens of *C. burchelli*. Some years ago I had occasion to go over the large series of specimens of this species in the collection, and was struck by the difficulty in separating specimens apparently referable to these two species. One specimen from Izeli, Kaffraria, however, differed remarkably from all the others in being marked almost exactly like a typical specimen of *C. superciliosus* from German East Africa; but in the absence of more specimens like it, I left the question in abeyance. A few months ago the Rev. Robert Godfrey, of Pirie Mission, kindly sent me a copy of a series of papers he has been publishing in a local newspaper on birds found in the Buffalo Basin; in this I observed that he recorded a specimen of *C. superciliosus* as having been taken by Mr. F. A. O. Pym at Breidbach in Kaffraria. I immediately wrote to Mr. Pym asking him to let me see the specimen to make sure of its identity, and in reply he kindly forwarded four specimens to me. The specimen referred to by Mr. Godfrey has a distinct white eyebrow and a few whitish streaks down the hind neck; but in all other respects is like *C. burchelli*. Another specimen is also typical of *C. burchelli*, but the remaining two are quite different and exactly resemble the *superciliosus*-like specimen in the Transvaal Museum mentioned above. With the aid of this additional material, I have gone over the series again, and have now not the slightest doubt that all the specimens of *superciliosus* recorded by Gunning and Haagner in the "Journal of the South African Ornithologists' Union," Vol. IV, p. 37, with the exception of the specimen from "Rhodesia," are referable to immature birds of *C. burchelli*. The specimen said to have come from "Rhodesia" was collected by the late J. v. O. Marais at Bagamoyo in German East Africa. Since the above-mentioned paper was written by Gunning and Haagner, another adult specimen of *superciliosus* has been acquired from German East Africa, and two (juvenile and immature) from British East Africa; a specimen typical in colour of *senegalensis* has also been acquired from the Nata River in Bechuanaland, while I find that the two specimens of *senegalensis* recorded by Gunning and Haagner agree exactly with Reichenow's description of *C. flecki*, which seems to me, however, to be the immature plumage of *senegalensis*. Mr. J. C. Ingle has also kindly presented a pair of *C. grilli caeruleiceps*, Neumann, obtained at Sabi in the eastern Transvaal. Before passing on to a fuller discussion of the specimens of *burchelli* and the

superciliosus-like specimens from Kaffraria, I may mention that the female of *C. g. caeruleiceps* is larger than the male, and is more or less profusely banded on the whole of the upper surface from the forehead to the upper tail-coverts, the wings, and the tail, and rather less on the under surface, with only a patch on the throat and another down the middle of the breast not banded; there is no black in the plumage except for these bands; and the collector has noted the following points: "Iris, darkish hazel; legs, slate black; lower mandible, pale flesh; upper mandible has lower portion pale flesh and upper portion tip flesh, deepening to dark brownish black at posterior portion; stomach, grasshoppers, beetles, and caterpillar. J. C. Ingle, Roodeval, 8th April, 1910."

The series of skins of *C. burchelli* in the Transvaal Museum collection contains the following, including some very young specimens:—

- 10 Knysna (Marais and Rex).
- 5 Grahamstown.
- 5 Red Hill, coast Natal (Arnold).
- 1 Pietermaritzburg (Natal Museum).
- 1 Barberton (Dreyer).
- 4 Hector Spruit (Streeter).
- 3 Beira (Sheppard).
- 1 Bezwe River, south-eastern Rhodesia (Roberts).
- 2 Woodbush (Noomé).
- 1 Rustenburg (Noomé).
- 1 Warmbaths (Noomé).
- 1 Crocodile River Valley (Littledale).
- 1 Pienaars River, Pretoria District (N. Roberts).
- 1 Modderfontein, Transvaal (Haagner).
- 1 Potchefstroom (Ayres).
- 3 Transvaal (no locality given).

A study of this series clearly shows the transitions of markings from the very young to fully adult stages. The juvenile specimens show the following characters: Wing quills much banded; top of head brown; hind neck to scapulars with numerous white streaks; sides of throat, crop, and breast with feathers having a serrated line down each side; and a distinct yellowish eyebrow. As the birds become older these characters gradually disappear, until in fully adult ones the wing quills are uniform; the top of the head bluish black, this colour extending over the hind neck and losing the pale shaft lines, though some light coloured shafts sometimes remain on the lower part either on or beyond the limits of the bluish black colour; sides of throat, crop, and breast without the serrated lines on the feathers; and the eyebrow not white. It is to be noted, however, that adults frequently still show traces of these juvenile characters, either one or other of them still sometimes remaining after all the other juvenile characters have disappeared; but it seldom happens that this remnant of juvenility is very pronounced after the head has become bluish black and the wing quills have become uniform. Precisely the same characters appear in the different stages of *superciliosus*, and it is on these grounds that I am doubtful as to the distinctness of *C. flecki*, which is found in

the same places as *C. senegalensis* on the upper Zambezi, though it is to be noted that the wing quills are banded in the specimen from Nata River, which has a bright bluish black head and hind neck. On measuring the specimens, it became apparent that specimens of full size still retain juvenile characters in the plumage; but this does not necessarily mean that they are fully adult, for the change might be effected before the following breeding season. The explanation of the few anomalies of the retention of more or less of a juvenile character is probably that it takes more than a year to discard it altogether, or it might in that case even remain throughout life if it was a character not easily discarded. The outstanding fact remains, however, that in adult specimens with blue heads and wing quills not banded, the retention of a trace of juvenile characters is the exception rather than the rule. Taking then these specimens as adults, of which the specimens with their measurements given below have been picked out from the series mentioned above, it becomes immediately apparent that the three specimens from Kaffraria are of a distinct species, for not only are the wing quills uniform, but the head is brown, the hind neck and mantle feathers broadly and distinctly streaked with white, and the sides of the throat, crop, and breast very distinctly marked with serrated lines on the feathers. The following table of measurements of adults will serve to show how very much larger the Kaffrarian birds are when compared with those from East Africa, and also that the female is larger than the male:—

Centropus grilli caeruleiceps.

| | | Wing. | Tail. | Tarsus. | Culmen. |
|---|------------------------------|----------|-------|---------|---------|
| ♂ | Roodeval, Sabi (Ingle) | Feb. 160 | 165 | 33 | 24·5 |
| ♀ | „ „ „ | Apr. 173 | 161 | 35 | 25·5 |

Centropus superciliosus.

| | | Wing. | Tail. | Tarsus. | Culmen. |
|-------|---------------------------------|----------|-------|---------|---------|
| ♂ | Bagamoyo, G.E.A. (Marais)..... | June 153 | 200 | 32 | 29 |
| ? (♀) | Rascha Rascha, G.E.A. (Joubert) | Apr. 170 | 230 | 34 | 30 |

Centropus pyimi, spec. nov.

(Kingwilliamstown Museum.)

| | | Wing. | Tail. | Tarsus. | Culmen. |
|-------|------------------------------|----------|-------|---------|---------|
| ♂ | Draaibosch, Kaff. (Pym)..... | Feb. 179 | 230 | 38 | 36 |
| ♀ | Izeli „ „ | Nov. 185 | 240 | 39·5 | 35 |
| ? (♂) | Frankfort „ „ | ? 175 | 223 | 38 | 36 |

Centropus burchelli.

(Kingwilliamstown Museum.)

| | | Wing. | Tail. | Tarsus. | Culmen. |
|---------|------------------------------|----------|-------|---------|---------|
| ♂ (? ♀) | Stutterheim, Kaff. (Pym).... | July 176 | 218 | 38 | 31 |
| ♂ | Breidbach, „ „ | Mar. 165 | 202 | 36 | 32 |

(Transvaal Museum.)

| | | Wing. | Tail. | Tarsus. | Culmen. |
|-------|-------------------------------------|----------|-------|---------|---------|
| ♂ | Knysna (Rex)..... | Nov. 166 | 205 | 36.5 | 34.5 |
| ♀ | " "..... | Nov. 178 | 232 | 38 | 33 |
| ♂ | Grahamstown (Ivy)..... | Dec. 169 | 208 | 37 | 34.5 |
| ♀ | " "..... | Mar. 171 | 195 | 36 | 33.5 |
| ♂ | " "..... | Feb. 182 | 212 | 38 | 35 |
| ♂ | Red Hill (Arnold)..... | Nov. 163 | 201 | 36.5 | 31 |
| ♂ | " "..... | Oct. 170 | 205 | 37.5 | 32 |
| ♂ | " "..... | Apr. 173 | 205 | 36 | 29 |
| ♂ | Pietermaritzburg (Natal Museum) | ? 166 | 200 | 40 | 34 |
| ♀ | (? ♂) Barberton (Dreyer)..... | Jan. 164 | 210 | 40 | ? |
| ♂ | Hector Spruit (Streeter)..... | Feb. 168 | 204 | 39 | 31 |
| ♂ | " " "..... | Feb. 175 | 203 | 40 | 33 |
| ♂ | Beira (Sheppard)..... | June 160 | 185 | 37.5 | 31 |
| ♂ | " " "..... | June 165 | 195 | 36 | 31 |
| ♂ | " " "..... | Jan. 165 | 216 | 37 | 31.5 |
| ♂ | Woodbush (Noomé)..... | Dec. 163 | 205 | 35 | 32 |
| ♂ | " " "..... | Dec. 166 | 216 | 38.5 | 34 |
| ♂ | Rustenburg " "..... | Nov. 166 | 212 | 37 | 30 |
| ♂ | Pretoria District (Littledale)..... | May 167 | 205 | 35 | 31 |
| ♂ | " " " (Roberts)..... | Jan. 163 | 196 | 38 | 30.5 |
| ♂ | Potchefstroom (F. D. Ayres)..... | Jan. 163 | 208 | 37 | 32.5 |
| ? (♀) | " " Transvaal "..... | ? 182 | 222 | 38 | 32 |
| ? (♂) | " " "..... | ? 165 | 209 | 38 | 31.5 |

The difference in size between the sexes does not seem to have been previously noticed, and it is possible that collectors when shooting a pair may have sexed them according to size, so that errors may have so occurred. Disregarding such a possibility and the sex signs in brackets which I have inserted when in doubt, it is still apparent that the majority of the specimens are sexed as males and the few that are sexed as females are the largest in the series. Taking the specimens as they stand, it will be seen that those from the same localities are fairly consistent in the length of the culmen, though in different localities the average length varies. If then we compare the Kaffrarian specimens of *C. burchelli* and *pymi* it will be seen that the latter has a considerably longer culmen.

In conclusion, I may mention that though there is a possibility of *C. pyimi* being found in parts of South Africa other than Kaffraria; but there is nothing to show in the skins I have examined that this is the case, and for the present I am inclined to the belief that it is an isolated species.

Chlorophoneus olivaceus taylori, subsp. nov.

In examining the specimens of *C. olivaceus* recorded by C. H. Taylor from Indhlovudwalile, eastern Transvaal (*vide* "Journal of the South African Ornithologists' Union," Vol. III, p. 20), which are now in the collection of the Transvaal Museum, I find that the adult male differs from an adult male from the Dargle District, Natal, in having the feathers at the base of the bill white (but yellow on the lores), a narrow whitish line below

the ear-coverts, and the throat with a suffusion of pale salmon colour. These characters are those of *C. rubiginosus*, except for the yellow lores; but in the remaining colours of the under parts of the body, under tail-coverts, and top of the head, the specimen shows without doubt that it is allied to *C. olivaceus*, and a new subspecies to which I am therefore referring it. The other two specimens seem to me to be referable to *C. rubiginosus*, of which species Mr. Taylor also recorded several specimens from the same place. The male above mentioned is the type of the subspecies, particulars of which are as follows: Adult ♂, Indhlovudwalile, Amsterdam District, eastern Transvaal, 28.7.06. Length in the flesh, $7\frac{1}{2}$ inches (= 190 mm.). Wing 88, tail 90, tarsus 25, culmen 16·5 mm.

SUPPLEMENTARY LIST OF AFRICAN MAMMALS IN THE COLLECTION OF THE TRANSVAAL MUSEUM, WITH DESCRIPTIONS OF SOME NEW SPECIES.

By AUSTIN ROBERTS.

SINCE the catalogue of African Mammals in the collection of the Transvaal Museum was published last year (Ann. T.M., Vol. III, part 2, pp. 65-109), some notable additions have been made by an expedition to south-eastern Rhodesia, undertaken by the Taxidermist and the writer, for the purpose of procuring specimens to replace those formerly in the mounted collection, and skeletons of some of the larger antelopes. A few specimens have also been acquired by purchase or donation, and a number of specimens of scientific value have been found in the store of flat skins in charge of the Taxidermist. In addition to these the names of a few species found amongst the exotic specimens and overlooked in my former paper are now included to complete the list of species.

Pan satyrus, (Linn.).

1 ♂, mounted, Central Africa (purchased from Tramond, Paris).

Cercopithecus roloway, (Erxl.).

1 ♀, mounted, Niger Coast (E. S. Joseph).

Cercopithecus boutourlini, (Gigli.).

1 ♀, mounted, West Africa (presented by Lady Lawley).

Cercopithecus pygerythrus, (Cuv.).

1 ♀, Manetsi River, north-eastern Transvaal (Museum Expedition).

Cercocebus torquatus, (Kerr.).

1 ♂, mounted, West Coast Africa (Zoo.).

Papio sphinx, (Linn.).

1 ♂, mounted, German West Africa (Zoo.).

Epomophorus crypturus, Ptrs.

1 ♀, Hector Spruit (Streeter).

Rhinolophus denti, Thos.

1 ♂, Bezwe River, south-eastern Rhodesia (Mus. Exped.).

This specimen is bright orange yellow, with the tips of the fur of the back darker. Judging by the series of skins of *Rh. simulator* hereafter mentioned, it would seem that this species also assumes a rufous phase

of colouring. I can find very little difference besides this of colouring between the Bezwe specimen and those recorded as *Rh. swinnyi* in my previous paper. Seeing that there is very little difference between these and *Rh. denti* except in colour, I am inclined to consider *swinnyi* as a synonym of *denti*, or at most a subspecies. This is supported by recorded occurrence of *Rh. denti* at Zuurbron,* on the Drakensberg, a locality situated about equally distant from the type localities of *denti* (Bechuanaland) and *swinnyi* (Port St. Johns), and the Bezwe River.

Rhinolophus simulator, K. And.

3 ♂♂, Hector Spruit (Streeter).

These three specimens clearly show a transition from dull white to orange in the colour of the fur. Correlated with this there is a difference in the length of the tail, seeming to show that the dull white specimen is the youngest and the orange coloured one the oldest. The length of the tail is given as 28, 19, and 7 mm. respectively, in the three specimens, while in two females previously recorded from Klein Letaba and Hector Spruit the measurements are respectively 28 and 12.5 mm. The two last specimens are both grey, but that from Hector Spruit is darker and duller, seeming to show that it is the younger of the two. Anderson has given the length of the tail in the type as 25.7 mm., and the colour as being "exactly as in *Rh. augur*."

Nycteris capensis, (A. Smith).

5 ♂♂, 2 ♀♀, Hector Spruit (Streeter).

Miniopterus natalensis, (A. Smith).

1 ♂, 1 ♀, Hector Spruit (Streeter).

Elephantulus rupestris, (A. Smith).

1 ♂, Schweizer Reneke, western Transvaal (Noomé).

Nasilio brachyrhynchus, (A. Smith).

1 (?), Bubyne River, south-eastern Rhodesia (Mus. Exped.).

Amblysomus hottentottus albirostris, Wagn.

1 ♀, Port St. Johns (Swinny).

Mellivora ratel, (Sparrm.).

1 ♀, Manetsi River, north-eastern Transvaal (Mus. Exped.).

Ictonyx capensis, (Kaup.).

1 (?), Pretoria (presented by J. Bindon, Esq.).

Genetta rubiginosa, Puch.

1 ♂, Manetsi River, north-eastern Transvaal (Mus. Exped.).

* Proc. Zool. Soc., 1905, p. 130.

Genetta mossambica, Matsch.

2 ♂♂, Boror, Portuguese East Africa (Kirby and Roberts).

Matschie's paper on this genus is now available, and I find that the specimen previously recorded as *G. zambeziana* from Boror is referable to *G. mossambica*.

Mungos caavi, (A. Smith).

1 ♂, Sand River, north-eastern Transvaal; 1 ♀, Buby River, south-eastern Rhodesia (Mus. Exped.).

Felis leo, Linn.

1 ♂, Sand River, north-eastern Transvaal (Mus. Exped.).

Felis pardus, Linn.

1 ♀, Bezwe River, south-eastern Rhodesia (Mus. Exped.).

Felis ocreata caffra, Desm.

1 ♂, Mapagone, north-eastern Transvaal (Mus. Exped.).

Hyaena crocuta, Erxl.

1 ♂, Buby River, south-eastern Rhodesia (Mus. Exped.).

Lycaon pictus zuluensis, Thos.

1 ♂, 1 ♀, Limpopo River, south-eastern Rhodesia (Mus. Exped.).

Paraxerus cepapi, (A. Smith).

1 ♀, Sand River, north-eastern Transvaal (Mus. Exped.).

Graphiurus murinus, (Desm.).

1 ♀, Port St. Johns (Swinny).

Tatera panja, Wroughton.

2 ♂♂, Buby River; 4 ♂♂, Sand River (Mus. Exped.).

Tatera lobengulae bechuanæ, Wroughton.

1 ♂, 1 ♀, Sand River, north-eastern Transvaal (Mus. Exped.).

Steatomys pratensis, Ptrs.

1 ♂, Bezwe River, south-eastern Rhodesia (Mus. Exped.).

Dendromus ayresi, Rbts.

1 ♀ (juv.), Port St. Johns (Swinny).

Mus chrysophilus ineptus, Thos. and Wr.

1 ♂, 'Msingwenyane, south-eastern Rhodesia (Mus. Exped.).

Mus namaquensis auricomis, De Wint.

1 ♂, 'Msingwenyane, south-eastern Rhodesia (Mus. Exped.).

Mus limpopoensis, spec. nov.

1 ♂, Sand River, north-eastern Transvaal (Mus. Exped.).

A small species closely resembling *M. coucha*, but with a much longer tail. "H. and B. 80, tail 98, hind foot 22, ear 18 mm." Skull: greatest length 25·9, basal length 20·5, zygomatic width 12·8, width brain case 11·5, nasals 9·8 by 3, molar series 4·6, diastema 6·8.

Saccostomus limpopoensis, spec. nov.

1 ♂ (type), Sand River, north-eastern Transvaal (Mus. Exped.).

1 ♀, Mapagone, north-eastern Transvaal (Mus. Exped.).

Resembling *S. mashonae* in having a well-developed external cusp to M^2 , but with a shorter tail and smaller skull. In colour this species has hardly a trace of dark brown to the tips of the fur, so that the whole of the upper surface presents a pale sandy buff appearance; both the male and female are of this colour, though the female is somewhat smaller in size. The type is a fairly old male, the teeth being partly worn. Measurements of the type are: "H. and B. 127, tail 30, hind foot 17, ear 17." Skull: greatest length 31·7, basal length 26, zygomatic width 16·2, molar series 4·1, diastema 9, bullae 7, width brain case 12 mm. The female measures in the skull: greatest length 30·7, basal length 24·5, zygomatic width 15·5, molar series 4·4, diastema 8·6 mm.

I find on re-examining our specimens of this genus that a specimen from Boror not mentioned in my previous paper should be referred to *S. elegans*, Thomas, and with the acquisition of another specimen from Hector Spruit that those from there should not be referred of *S. mashonae*, but another species, which I propose to name

Saccostomus streeteri, spec. nov.

This species is similar to *S. mashonae* in having the external cusp of M^2 well developed, but otherwise the colour is like that of *S. campestris*, the tail longer (45-57 mm. in four specimens) and the skull smaller. Type: ad. ♂, ex collection F. Streeter, Hector Spruit, 14th May, 1913. "H. and B. 127, tail 50." Skull: greatest length 32·7, basal length 27·3, zygomatic width 15·8, molar series 4·6, diastema 10·5, bullae 7·5, width brain case 12. The cotype (♀) measures: "H. and B. 114, tail 45." Skull: greatest length 30·1, zygomatic width 15·1, molar series 4·9, diastema 9 mm.

Mystromys albicaudatus fumosus, Thos. and Schw.

1 ♀, Potchefstroom (F. D. Ayres).

Specimens referred to *M. albipes* in my previous paper seem also to be referable to this species. They are labelled *M. albipes* by Jameson; but in the published list of his specimens he recorded them as *M. albicaudatus*. In so far as can be judged by the literature, it would seem that the two species are synonymous, but specimens from Transvaal are somewhat larger and should be distinguished as *M. albicaudatus fumosus*.

Georychus spec. ?

1 ♀, Limpopo; 1 ♂, Stimelas Kraal, south-eastern Rhodesia (Mus. Exped.).

These specimens cannot be determined with certainty until a larger series has been obtained. They most closely resemble the small reddish coloured species (No. 207 in my previous list), but are greyer in colour and broader in the zygomatic width of the skull.

Pedetes caffer, Pall.

1 ♂, Deelfontein, Cape Province (Sloggett).

Pedetes caffer orangiae, Wr.

1 ♀, Ventersburg Road, Orange Free State (Jameson).

Pedetes caffer salinae, Wr.

1 ♂, Sand River, north-eastern Transvaal (Mus. Exped.).

Lepus gungunyanae, spec. nov.

1 ♂, Jabwielu, between Bubyee and Nuanetsi Rivers, south-eastern Rhodesia (Mus. Exped.).

Most closely allied to *L. zuluensis*, but much smaller in size, smaller even than *L. z. mickleimi*, Chubb, from Bulawayo. In colour like *L. zuluensis* except on the ears, which are more rufous coloured. "Head and body 405, tail 83, hind foot 101, ear 114." Skull: condylo-premaxillary length 75·3, greatest length 74·5, basilar length 56·5, zygomatic width 39, width brain case 28, interorbital constriction 17·3, intertemporal constriction 14·3, nasals, length 32, breadth 16, length palatal foramen 18·5, width palatal bridge 5·9 mm.

Procavia brucei granti, Wr.

2 ♂♂, Limpopo Hills, south-eastern Rhodesia (Mus. Exped.).

Hippotigris chapmani, subsp. ?

2 ♀♀, Sabi Game Reserve (presented by Major S. Hamilton).

2 ♀♀, south-eastern Rhodesia (Mus. Exped.).

Potamachoerus choeropotamus, (Desm.).

1 ♂, Knysna (Rex).

Phacochoerus aethiopicus, (Linn.).

1 yg. ad. ♂, Jabwielu, south-eastern Rhodesia (Mus. Exped.).

Hippopotamus amphibius, Linn.

1 skeleton ♂, Inkomati River, eastern Transvaal.

1 juv. skin and skull, Barotseland (from Johannesburg Zoo).

Giraffa camelopardalis wardi, Lyd.

1 ♂, Transvaal (Dr. Breyer).

1 ♀, head-skin and skull, Jabwielu, south-eastern Rhodesia (Mus. Exped.).

Connochaetes taurinus, (Burch).

2 ♀♀, Lydenburg (Dr. Breyer).

Connochaetes taurinus johnstoni, Sclater.

1 ♀, Portuguese East Africa (Krantz).

Bubalis cokei, (Günth.).

1 ♂, British East Africa (F. A. O. Pym).

Bubalis jacksoni, Thos.

1 ♂, British East Africa (F. A. O. Pym).

Bubalis lichtensteini, (Ptrs.).

1 ♀, Portuguese East Africa (Messrs. Elsworthy).

1 ♀, Lydenburg District (Krantz).

Damaliscus lunatus phalius, Cabrera.

1 ♀, British East Africa (F. A. O. Pym).

Damaliscus jimela, (Match.).

1 ♂, British East Africa (F. A. O. Pym).

Damaliscus pygargus, (Pall.).

1 ♀, skeleton and skin, Cape Province (from Zoo).

Cephalophus grimmi, (Linn.).

3 ♂♂, Rustenburg (Krantz).

1 ♂, Lydenburg District (Dr. Breyer).

1 ♂, 1 ♀, south-eastern Rhodesia (Mus. Exped.).

Cephalophus caeruleus, Ham. Sm.

6 young and bad skins with skulls, Knysna (Rex).

Oreotragus oreotragus, (Zimm.).

1 ♂, Sabi Game Reserve (presented by Major Hamilton).

1 ♀, Limpopo Hill, south-eastern Rhodesia (Mus. Exped.).

Rhaphiceros campestris, (Thunb.).

1 ♂, Rustenburg (Krantz).

1 ♀ (melanic specimen), Pietersburg.

Rhaphiceros neumanni capricornis, Thos. and Schw.

2 ♂♂, 1 ♀, south-eastern Rhodesia (Mus. Exped.).

Rhaphiceros melanotis, (Thunb.).

1 ♂, Knysna (Rex).

Rhaphiceros sharpei colonicus, Thos. and Schw.

1 ♀, south-eastern Rhodesia (Mus. Exped.).

Cobus ellipsiprymnus, (Ogilby).

1 ♂, Limpopo, south-eastern Rhodesia (Mus. Exped.).

Cobus smithemani, Lyd.

1 ♂, mounted (Rowland Ward, Ltd.).

Cervicapra arundinum, (Bodd.).

1 ♀, Bezwe River, south-eastern Rhodesia (Mus. Exped.).

Aepyceros melampus, (Leht.).

5 ♀♀, Lydenburg District (Dr. Breyer).

1 ♂, 1 ♀, Jabwielu, south-eastern Rhodesia (Mus. Exped.).

Gazella thomsoni, Günth.

1 ♂, British East Africa (F. A. O. Pym).

Gazella dama, (Pall.).

1 ♂, mounted, Senegal ? (from Zoo).

Gazella soemmeringi, (Cretschm.).

1 ♂, north-east Africa (Rowland Ward, Ltd.).

Lithocranius walleri, (Brooke).

1 ♂, north-east Africa (Rowland Ward, Ltd.).

Antidorcas euchore, (Zimm.).

2 ♂♂, albinistic specimens, Orange Free State.

Hippotragus equinus, (Desm.).

1 ♂, 1 ♀, and 1 ♂ skin and skeleton, south-eastern Rhodesia (Mus. Exped.).

Hippotragus niger, (Harris).

1 ♂, 1 ♀, and 1 ♂ skin and skeleton, south-eastern Rhodesia (Mus. Exped.).

Tragelaphus sylvaticus, (Sparrm.).

2 ♂♂, 1 ♂ juv., Knysna (Rex).

Tragelaphus roueleynei, (Cumming).

1 ♀, Injehl River, north-eastern Transvaal (Mus. Exped.).

Tragelaphus scriptus ornatus, Pocock.

1 ♀, north-western Rhodesia (Wilde).

Boocerus eurycerus isaaci, Thos.

1 ♂, Mau Forest, British East Africa (presented by Dr. Sauer).

Strepsiceros strepsiceros, (Pall.).

1 ♂, 1 ♀, 1 ♂ juv., south-eastern Rhodesia (Mus. Exped.).

Strepsiceros imberbis, Blyth.

1 ♂, mounted, East Africa (Rowland Ward, Ltd.).

Bufellus caffer, Sparrm.

1 ♀, Lydenburg District (Dr. Breyer).

DESCRIPTIONS OF SOUTH AFRICAN MICRO-LEPIDOPTERA.

By E. MEYRICK, B.A., F.R.S.

V.

ORNEODIDAE.

Microschismus serricornis, n. sp.

♂. 21 mm., ♀ 26–27 mm. Head and thorax fuscous sprinkled with whitish. Palpi 7–8, whitish-fuscous irrorated with dark fuscous, margins mixed with white. Antennae in ♂ with strong triangular pointed dentations, moderately ciliated. Abdomen fuscous more or less suffused with whitish posteriorly, base white. Forewings fuscous sprinkled with whitish; costa indistinctly marked with white dots or strigulae; an indistinct whitish line from beneath middle of costa to slightly before middle of dorsum, hardly traceable in ♂, followed by an undefined band of darker suffusion; a slender transverse whitish line at $\frac{4}{5}$; blackish dots at apex of segments; cilia pale fuscous sprinkled with darker, with series of fine somewhat oblique whitish bars on posterior line, and two faint similar series before apex, opposite tips of segments with indistinct transverse blackish marks. Hindwings grey-whitish finely irrorated with dark grey; cilia pale greyish, with three or four transverse series of faint fine somewhat oblique whitish bars on posterior half.

Pretoria, in March and April (Janse); three specimens. Much like *premnias*, but larger, and certainly distinct by different dentation of antennae in ♂; in *premnias* these teeth are rhomboidal, flat-topped.

CARPOSINIDAE.

Carposina irata, n. sp.

♀. 17 mm. Head and thorax whitish-ochreous. Palpi 4, whitish-ochreous, externally irrorated with blackish. Abdomen ochreous-whitish. Forewings elongate, posteriorly slightly dilated, costa slightly arched, apex pointed, termen almost straight, rather strongly oblique; pale ochreous; costal edge dark fuscous on anterior half, more strongly near base; an elongate blackish-fuscous mark on costa at $\frac{2}{5}$, followed by three smaller marks; a black dot beneath costa at $\frac{1}{5}$, one towards dorsum near base, one towards dorsum at $\frac{2}{5}$, one smaller towards costa at $\frac{2}{5}$, one below middle of disc, and two large round ones on angles of cell, preceded by an irregular patch of fuscous suffusion extending nearly to costa; cilia pale ochreous suffused with fuscous, appearing to form two broad very undefined shades. Hindwings ochreous-whitish; cilia whitish-ochreous.

Pretoria, in October (Janse); one specimen.

Carposina brachycentra, n. sp.

♂. 14 mm. Head white. Palpi $1\frac{3}{4}$, porrected, white, second joint blackish except apex, terminal joint with a blackish median ring. Antennal ciliations 4. Thorax white, anterior margin light brownish. Abdomen grey-whitish. Forewings elongate, rather narrow, costa gently arched, apex obtuse, termen straight, rather oblique; pale greyish-ochreous, irrorated with white and grey specks; costal edge blackish towards base; a small light brownish spot centred with blackish on costa near base, and a blackish dot on dorsum near base, connected by a very faint pale brownish line; six cloudy blackish dots on costa from $\frac{1}{3}$ to near apex, with short blackish marks beneath first two, and a longer oblique black mark beneath fourth; a faint greyish subquadrate blotch in disc beyond middle, its lateral margins concave, with a short blackish mark beneath middle of its upper margin; a faint greyish curved transverse shade from fourth costal dot to tornus; cilia pale greyish irrorated with white. Hindwings with basal pecten of very short scales; whitish-grey, greyer towards apex; cilia grey-whitish.

Sarnia, Natal, in January (Janse); one specimen. Allied to *impavida* from the Comoro Islands.

EUCOSMIDAE.

Ancylis falsicoma, n. sp.

♂ ♀. 13–15 mm. Head white, somewhat mixed with blackish, crown brown. Palpi white, second joint with three or four small grey spots. Thorax brown, patagia white mixed with dark fuscous. Abdomen grey. Forewings elongate, rather narrow, costa gently arched, apex tolerably pointed, prominent, termen abruptly concave on upper half, rounded beneath, rather oblique; white, with some scattered black scales; costa black strigulated throughout with white; an irregular elongate black patch transversely streaked with white irroration extending along dorsum from base to beyond middle, and reaching about half across wing; a very oblique black streak from middle of costa, reaching half-way towards concavity of termen; black costal space between this and apex edged beneath with fulvous-ochreous; posterior third of wing otherwise black closely and finely irrorated with white, margins of ocellus formed by two thick irregular silvery-metallic streaks reaching $\frac{3}{4}$ across wing; cilia white, tinged with grey towards tornus and tips, above apex black. Hindwings with 3 and 4 short-stalked; grey, darker on veins and posteriorly; cilia grey.

Pretoria, in November and December (Janse); two specimens. Also one in my collection from Pinetown, Natal, in January (Leigh).

Eucosma lutrocopa, n. sp.

♂. 15 mm. Head whitish-ochreous-grey. Palpi with dense long rough scales, pale grey. Thorax ochreous-whitish, with grey spots on shoulders and three in a triangle on back. Abdomen grey, anal tuft whitish. Forewings elongate, posteriorly slightly dilated, costa gently arched, apex obtuse, termen slightly sinuate above middle, hardly oblique, rounded beneath; light greyish-ochreous; costa dark fuscous, with pairs

of rather oblique whitish strigulae; dorsum strigulated with dark fuscous; a suprmedian band of grey suffusion and submedian band of ochreous-whitish suffusion, both very undefined; basal patch indicated by dark fuscous strigulation; a more conspicuous dark fuscous strigula on submedian band at $\frac{2}{3}$; central fascia represented by an oblique dark fuscous streak from middle of costa, reaching half across wing; ocellus irregularly suffused with white, enclosed laterally by thick pale silvery streaks, anterior preceded by a black mark in middle, ocellus enclosing upper and lower irregular black marks or groups of scales, and surmounted by a patch of very fine irregular grey-whitish striation separated by dark fuscous scales; two white strigulae on termen beneath apex; cilia white irrorated with fuscous except towards tips, on upper part of termen rather dark fuscous irrorated with white. Hindwings with 3 and 4 stalked; grey; cilia whitish-grey with faint darker subbasal line, tips grey irrorated with white.

Barberton, in January (Janse); one specimen. Allied to *psammacta*.

Coccothera, n. g.

Antennae in ♂ minutely ciliated. Palpi rather short, porrected or subascending, second joint expanded with rough scales beneath and at apex above, terminal joint very short. Thorax smooth. Forewings with 7 separate, to termen. Hindwings with basal pecten; 3 and 4 approximated at base, 5 parallel, 6 and 7 connate.

Type *spissana*, Zell. The examination of examples bred from larvae feeding on the scale-insect *Ceroplasta* (Hardenberg) shows that this species forms a new genus, allied to *Laspeyresia*.

Laspeyresia campestris, n. sp.

♀. 14 mm. Head and thorax fuscous sprinkled with whitish. Palpi pale greyish-ochreous, anteriorly whitish. Abdomen dark grey. Posterior tibiae pale ochreous, above with whitish scales. Forewings elongate, moderate, slightly dilated posteriorly, costa slightly arched, apex obtuse, termen rounded, little oblique; fuscous, finely irrorated with grey-whitish with lilac-purplish suffusion forming faint hardly definable irregular transverse streaks, especially a median group dilated towards dorsum; costa from $\frac{1}{4}$ to apex suffused with olive-ochreous, with seven pairs of indistinct ochreous-whitish oblique strigulae, each pair emitting a short oblique violet-lead line, third and fifth longer, very oblique, sinuate, fourth running into third, sixth and seventh running into fifth; posterior edge of ocellus represented by a short indistinct purplish-lead streak, edged anteriorly by three minute irregular black dots; cilia pale greyish-ochreous, somewhat sprinkled with blackish and towards termen with whitish. Hindwings with 3 and 4 short-stalked; fuscous, darker towards termen; cilia whitish-fuscous, with darker subbasal line.

Pretoria, in November (Janse); one specimen, bred from a larva feeding in fruit of *Combretum*. An obscure insect, near *modica*, but apparently quite distinct, very uniform in colouring; the ♂ may possess special structural characters; I should not, however, have described it from a single specimen but for ascertainment of larval habit.

GELECHIADAE.

Epiphthora cirrhaea, n. sp.

♀. 16 mm. Head and thorax white. Palpi white, terminal joint somewhat less than half second. Abdomen yellow-whitish. Forewings elongate-lanceolate, acute, apex somewhat produced; white, tinged with yellowish posteriorly; cilia yellow-whitish. Hindwings with obtuse emargination, produced apex $\frac{1}{8}$; light grey; cilia yellow-whitish.

Pretoria, in February (Janse); one specimen.

Aristotelia fluidescens, n. sp.

♂. 12 mm. Head whitish. Palpi whitish, second joint irrorated with dark fuscous except apex, terminal joint with a more or less marked median ring of dark fuscous irroration. Thorax whitish-ochreous, shoulders sprinkled with dark fuscous. Abdomen whitish-ochreous. Forewings elongate-lanceolate, acute; 6 and 7 out of 8; pale ochreous sprinkled with dark fuscous, more strongly in disc posteriorly, and tending sometimes to form fine streaks towards costa; stigmata black, plical obliquely before first discal, second discal below middle of wing; some groups of black scales towards apex on margins, and an undefined black apical dot; cilia whitish-ochreous. Hindwings pale greyish; cilia whitish-ochreous.

New Hanover (Hardenberg); two specimens.

Aristotelia balanocentra, n. sp.

♀. 11–12 mm. Head, thorax, and abdomen fuscous. Palpi whitish, second joint fuscous sprinkled with dark fuscous, apex white. Forewings elongate-lanceolate, acute; 6 separate; fuscous irregularly mixed with dark fuscous; a blackish dot beneath costa at $\frac{1}{6}$, one obliquely beneath and beyond it, a larger one beneath costa beyond $\frac{1}{3}$, a black dash on fold beneath this, and an elongate dot in disc at $\frac{2}{3}$; cilia pale fuscous, round apex with two darker lines (imperfect). Hindwings pale grey; cilia pale fuscous.

New Hanover (Hardenberg); two specimens. Perhaps nearest *prominula*.

Aristotelia chlorographa, n. sp.

♀. 11 mm. Head and thorax pale whitish-ochreous, patagia dark fuscous. Palpi ochreous-whitish, second joint with two bands of blackish irroration, terminal joint with extreme base and two bands blackish. Abdomen grey. Forewings elongate-lanceolate; 6 separate; dark grey, with the bases of scales whitish; a narrow irregular blackish basal fascia; a whitish-yellowish streak formed of three confluent subtriangular spots extending along dorsum from this to near tornus, connected with a crescentic posteriorly convex whitish-yellowish mark in disc at $\frac{2}{5}$, marked in concavity with a black dot; three black slenderly white-edged fasciae from costa terminated by this streak, first at $\frac{1}{6}$, slender, little oblique, second at $\frac{1}{3}$, moderate, rather more oblique, mostly brown in disc and with a discal projection posteriorly, these two cut by a fine light brown longitudinal streak above middle, third at $\frac{2}{3}$, broader on costa, in disc with an acute

projection posteriorly, mostly occupied anteriorly by the yellowish discal mark; a blackish spot on apical portion of costa, containing two minute white dots, and separated from preceding by a grey-whitish spot; a brown streak along termen, containing three or four minute white dots in a fine blackish marginal line; cilia grey. Hindwings grey, somewhat darker posteriorly; cilia grey.

Pretoria, in March (Janse); one specimen. This belongs to the *decurtella* group, characteristic of Europe and North America.

Phthorimaea cretigena, n. sp.

♀. 12 mm. Head, palpi, thorax, and abdomen ochreous-white. Forewings lanceolate, acute; ochreous-whitish; cilia concolorous. Hindwings and cilia ochreous-whitish.

Pretoria, in September (Janse); one specimen.

Phthorimaea concreta, n. sp.

♂ ♀. 15-16 mm. Head and thorax ochreous-whitish, sometimes slightly sprinkled with dark grey. Palpi whitish-ochreous or ochreous-whitish, slightly sprinkled with dark fuscous specks. Abdomen whitish-ochreous. Forewings elongate, rather narrow, costa gently arched, apex pointed, termen very obliquely rounded; whitish-ochreous, sometimes slightly yellowish-tinged, variably sprinkled with fuscous and dark fuscous specks, sometimes very slightly, sometimes tending to form several undefined small spots along costa; a dark fuscous dot near base in middle, and one slightly beyond it beneath costa; stigmata small, dark fuscous, plical beneath first discal; sometimes dots of dark fuscous irroration round posterior part of costa and termen; cilia concolorous with wing and similarly sprinkled. Hindwings pale grey or whitish-grey; cilia whitish-ochreous, sometimes tinged with grey.

Pretoria, in February and March (Janse); two specimens. Also one in my collection from Pinetown, Natal, in January (Leigh), more strongly irrorated than the others.

Parapsectris mappigera, n. sp.

♂ ♀. 10-11 mm. Head and thorax white sprinkled with dark fuscous, shoulders blotched with dark fuscous irroration. Palpi white, second joint irrorated with blackish except tip, terminal joint with basal ring and suprmedian band of blackish irroration. Abdomen grey, with dorsal patch of whitish-ochreous suffusion at base. Forewings elongate, rather narrow, costa gently arched, apex pointed, termen slightly rounded, very oblique; 6 out of 7 near base; brown, more or less sprinkled with blackish; a broad band of blackish suffusion sprinkled with grey-whitish along costa from base to $\frac{2}{3}$, cut by a narrow oblique white fascia sprinkled with black from costa at $\frac{1}{4}$, which reaches to about fold, and is surrounded on its lower portion by raised spots of blackish suffusion, of which the posterior represents plical stigma; discal stigmata represented by similar raised spots, first slightly beyond plical, second almost resting on a triangular blackish dorsal spot before tornus; some undefined groups of blackish scales along termen; cilia greyish irrorated with darker. Hindwings grey; cilia light ochreous-grey.

Pretoria, in November and February (Janse); three specimens.

Parapsectris neograptata, n. sp.

♀. 11–13 mm. Head and thorax white. Palpi white, second joint with suprmedian band of grey irroration, terminal joint with basal ring and suprmedian band of blackish irroration. Abdomen whitish-ochreous. Forewings elongate, narrow, costa gently arched, apex pointed, termen slightly rounded, extremely oblique; 6 separate; white, with scattered black specks; a pale ochreous streak from base beneath costa, terminating in a spot surrounding a dot of raised black scales representing first discal stigma; a pale ochreous streak along fold throughout, marked with black plical stigma very obliquely before first discal, and interrupted beyond this; some faint ochreous suffusion towards dorsum; a pale ochreous transverse streak at $\frac{3}{4}$ parallel to termen, marked with a black raised spot above tornus; a pale ochreous streak along termen; a series of irregular black dots or groups of scales round posterior part of costa and termen; cilia pale ochreous irrorated with grey. Hindwings and cilia grey.

Pretoria, in December and January (Janse); three specimens.

Gelechia trisignis, Meyr.

An example from Pretoria has the costal area of forewings wholly suffused with blackish, the upper margin of black median stripe only faintly discernible; it appears to be only an extreme form of variation.

Gelechia polygramma, n. sp.

♂ ♀. 20–23 mm. Head and thorax light brownish-ochreous mixed with dark fuscous, thorax with two dark fuscous stripes. Palpi ochreous-whitish slightly sprinkled with dark fuscous. Abdomen whitish-ochreous with some dark fuscous specks. Forewings elongate, rather narrow, costa slightly arched, apex obtuse-pointed, termen straight, rather strongly oblique; purplish-fuscous mixed with dark fuscous and blackish; costal edge and all veins marked with ochreous-whitish lines; cilia whitish-fuscous with two broad darker fuscous shades. Hindwings over 1, termen not sinuate; light ochreous-grey; cilia pale ochreous tinged with fuscous.

Sarnia, Natal, in January (Janse); one specimen. Also one in my collection from Camperdown, Natal, in March (Leigh).

Anacamptis embrocha, n. sp.

♂. 8 mm. Head and thorax bronzy-grey, face whitish. Palpi white, terminal joint with anterior and inner lateral black lines. Abdomen dark grey. Forewings lanceolate; 6 out of 7 towards base; dark fuscous; a slender white hardly incurved slightly inwards-oblique fascia at $\frac{2}{3}$; cilia dark fuscous; round apex with two blackish lines. Hindwings under 1, apex very long-produced; rather dark grey; cilia grey.

New Hanover, in February (Hardenberg); one specimen.

Anacamptis faceta, n. sp.

♂. 8 mm. Head and thorax bronzy-grey, face white. Palpi white, anterior edge of terminal joint black. Abdomen grey. Forewings lanceolate; 6 out of 7 near base; blackish, basal $\frac{2}{3}$ bronzy-fuscous, division suffused; a rather narrow direct white fascia at $\frac{3}{5}$, anterior edge straight,

posterior irregular; marginal scales of apical area long, coarse, whitish-fuscous with black tips, projecting into cilia; cilia light fuscous. Hindwings 1, apex acute, strongly produced; light grey; cilia light greyish-ochreous.

Pretoria, in September (Janse); one specimen.

Anacamptis cirrhocoma, n. sp.

♂. 16 mm. Head light ochreous-yellowish. Palpi pale ochreous-yellowish, terminal joint with a fine black anterior line on apical half. Thorax dark ashy-fuscous. Abdomen fuscous, second segment with a pale ochreous suffused dorsal patch. Forewings elongate-lanceolate; 6 separate; dark purplish-fuscous; stigmata obscure, elongate, blackish, discal nearly approximated, plical very obliquely before first discal; cilia rather dark fuscous. Hindwings 1, apex strongly produced, acute; grey; cilia light fuscous.

New Hanover, in January (Hardenberg); one specimen. Intermediate between *circaea* and *thoracica*.

Anacamptis inumbrata, n. sp.

♂. 12-15 mm. Head and thorax dark greyish-bronze, lower part of face sometimes tinged with whitish. Palpi with second joint dark greyish-bronze, apex white, terminal joint white lined with black. Abdomen dark fuscous. Forewings elongate-lanceolate; 6 separate; dark purplish-fuscous, tips of scales pale purplish-grey; stigmata obscure, cloudy, dark fuscous, plical obliquely before first discal; a small indistinct grey-whitish spot on costa at $\frac{2}{3}$; cilia light fuscous, mixed with darker towards base. Hindwings with apex strongly produced; dark grey; cilia lilac-grey.

Pretoria and Three Sisters, in November and February (Janse); three specimens.

Polyhymno deuteraula, n. sp.

♂. 9 mm. Head white. Palpi white, anterior edge of terminal joint blackish. Thorax ochreous mixed with fuscous, with five white stripes, central one narrowest. Abdomen ochreous-whitish. Forewings elongate, narrow, costa hardly arched, apex pointed, considerably produced, termen concave beneath apex, then obliquely rounded; rather dark bronzy-ochreous-fuscous; a moderate shining white median streak from base to $\frac{4}{5}$, lower edge straight to nearly $\frac{2}{3}$, thence sinuate to pointed apex; a white line almost from base along costa to middle, thence very obliquely to just beyond apex of median streak; a rather narrow white subdorsal streak from base to just beyond apex of median streak, cut by a fine very oblique fuscous line on tornus, and its posterior edge irregular above this; a light ochreous-yellow apical patch connecting costal line and subdorsal streak; a white oblique strigula from costa just before $\frac{3}{4}$, whence an angulated fine silvery-metallic line runs to termen above tornus; cilia on costa dark fuscous, with an ochreous-yellow and a white strigula towards apex, two wedgeshaped white marks above apex, on upper part of termen white with a black mark in concavity, towards tornus pale ochreous-greyish. Hindwings pale grey, towards base whitish-tinged; cilia ochreous-whitish.

Pretoria, in December (Janse); one specimen. Well characterized by the subdorsal streak and absence of projection on median streak.

Chelaria melanecta, Meyr.

A fine specimen from Pretoria shows that second joint of palpi really carries a second narrow projecting tuft behind the long apical one.

Brachmia graphicodes, n. sp.

♂ ♀. 13–14 mm. Head and thorax ochreous-whitish, patagia pale ochreous with white margins. Palpi white, with a fuscous streak on each side, sometimes obsolete on terminal joint, terminal joint much shorter than second. Antennal ciliations of ♂ nearly 1. Abdomen ochreous-whitish. Forewings elongate, narrow, costa slightly arched, apex pointed, termen straight, rather strongly oblique, more so in ♀; 2 and 3 stalked, 8 and 9 out of 7, 7 to apex; fuscous, all veins marked with clear white lines; stigmata black, discal approximated, plical obliquely before first discal; some minute black dots along termen; cilia whitish, with fuscous antemedian shade and two or three posterior lines of points, at apex with a slender fuscous bar sprinkled with black. Hindwings and cilia ochreous-whitish.

New Hanover (Hardenberg); Sarnia, Natal, in January (Janse); three specimens. Near the Indian *arotraea*, but immediately distinguished by whitish hindwings.

METACHANDIDAE.

Xenophanta, n. g.

Head smooth; ocelli absent; tongue developed. Antennae $\frac{3}{4}$, in ♂ serrate, shortly ciliated, basal joint elongate, without pecten. Labial palpi rather long, curved, ascending, slender, with appressed scales, terminal joint shorter than second, pointed. Maxillary palpi obsolete. Posterior tibiae smooth. Forewings with 2 from near angle, 7 absent, 11 from middle. Hindwings under 1, elongate-oblong, cilia $1\frac{1}{2}$; 3 absent, 5 parallel, 6 absent.

Xenophanta ecliptis, n. sp.

♂ ♀. 8–9 mm. Head and thorax dark grey, face mixed with whitish. Antennae dark fuscous ringed with ochreous-whitish, towards apex with several broader rings. Palpi dark grey sprinkled with yellow-whitish. Abdomen dark grey. Forewings elongate, rather narrow, costa moderately arched, apex obtuse, termen extremely obliquely rounded; dark ashy-purplish-fuscous; a broad rather oblique whitish-yellowish antemedian fascia, suffused with ochreous-yellow or lower portion except towards margins, more or less narrowed towards costa; a whitish-yellowish wedge-shaped spot on costa beyond $\frac{3}{4}$; a small round blackish spot near before tornus, edged with whitish-yellowish except posteriorly, the yellowish margin sometimes enlarged into a spot which coalesces on dorsum with preceding fascia; sometimes a pale yellowish dot on tornus, and another in disc above it; cilia greyish, with two dark fuscous shades. Hindwings rather dark grey; in ♂ beneath with a thinly scaled groove in cell, above

which is a patch of oblique transverse striation, a short dense dark fuscous basal tuft, and costal cilia very long throughout; cilia grey.

Comoro Islands, in August (Leigh); one specimen submitted by Mr. Janse, and I have also two in my collection.

COSMOPTERYGIDAE.

Erechthiodes, n. g.

Head with appressed scales; ocelli present; tongue developed. Antennae $\frac{4}{5}$, in ♂ shortly ciliated, basal joint elongate, slender, with slight pecten. Labial palpi very long, recurved, second joint with rough projecting hairs above and beneath except towards base, terminal joint as long as second, slender, acute. Maxillary palpi very short; filiform, appressed to tongue. Posterior tibiae clothed with very long hairs above. Forewings with 1b furcate, 2 from towards angle, 7 and 8 stalked, 7 to costa, 11 from middle. Hindwings $\frac{3}{3}$, lanceolate, cilia 3; 2-5 parallel, 6 and 7 short-stalked.

Erechthiodes audax, n. sp.

♂ ♀. 14-16 mm. Head white. Palpi white, basal half of second joint blackish, terminal joint with more or less marked blackish supramedian ring. Thorax ochreous-white, patagia black. Abdomen ochreous-whitish. Forewings elongate-lanceolate; white, suffused with pale ochreous-yellowish except between costal markings and on margins of discal streak; a thick slightly irregular-edged black longitudinal streak somewhat below middle from base to apex; three thick very oblique black streaks from costa at base, $\frac{1}{4}$, and beyond middle, only reaching $\frac{1}{4}$ across wing; a black dot on middle of termen; cilia white, with two irregular blackish lines, on tornus grey. Hindwings rather dark grey; cilia pale greyish, more or less whitish-ochreous towards base.

Pretoria, in December and January (Janse); three specimens.

Mompha antibathra, n. sp.

♀. 11-13 mm. Head glossy grey, forehead whitish. Palpi dark fuscous sprinkled with whitish. Thorax dark fuscous, sometimes whitish-sprinkled. Abdomen grey. Forewings elongate-lanceolate; dark fuscous, bases of scales pale; a broad pale ochreous fascia near base, becoming abruptly very narrow on costa, a narrow irregular and suffused pale ochreous fascia at $\frac{3}{4}$; area between these except towards costa indistinctly and irregularly marked with small suffused pale ochreous spots, with some tufts of dark fuscous scales; cilia greyish. Hindwings and cilia grey.

Pretoria, in September (Janse); two specimens.

BLASTOBASIDAE.

Blastobasis fatigata, n. sp.

♂. 13 mm. Head and thorax fuscous sprinkled with whitish. Palpi pale fuscous sprinkled with dark fuscous, terminal joint moderately stout, pointed. Antennae without notch. Abdomen pale glossy greyish-ochreous. Forewings elongate, narrow, costa anteriorly hardly arched, rather bent at $\frac{2}{3}$,

apex pointed, termen extremely obliquely rounded; light fuscous, with some scattered dark fuscous scales; extreme base mixed with dark fuscous; a somewhat oblique triangular spot of dark fuscous suffusion on dorsum before middle of wing, reaching $\frac{2}{3}$ across wing; a small dark fuscous spot on tornus, and another in disc above it: some indistinct dark fuscous dots round posterior part of costa and apex; cilia light fuscous, round costa and apex mixed with darker fuscous. Hindwings $\frac{1}{2}$, narrow-lanceolate; grey; cilia light fuscous.

Pretoria, in February (Janse); one specimen.

ELACHISTIDAE.

Phthinostoma, n. g.

Head smooth; tongue developed. Antennae $\frac{2}{3}$, in ♂ somewhat stout, simple, basal joint moderate, with strong pecten. Labial palpi extremely short, drooping, filiform, pointed. Maxillary palpi absent. Posterior tibiae clothed with long hairs above. Forewings with 2 from angle, 5 absent, 6 and 7 stalked, 7 to costa, 8 absent, 11 from middle. Hindwings $\frac{1}{2}$, narrow-lanceolate, cilia 3; 4 absent, 6 and 7 stalked.

Phthinostoma infumata, n. sp.

♂ ♀. 6–8 mm. Head and thorax grey-whitish more or less irrorated with blackish. Abdomen grey. Forewings rather broad-lanceolate; grey-whitish irrorated with blackish; narrow obscure very oblique fasciae of denser irroration from costa before and beyond middle, latter running to termen above tornus; a basal patch and cloudy spot on fold before middle are also obscurely defined; cilia pale greyish, with scattered blackish points. Hindwings grey; cilia pale greyish.

Pretoria, in October and November (Janse); two specimens.

Elachista epicoena, n. sp.

♂. 13–14 mm. Head, palpi, and thorax whitish. Abdomen ochreous-whitish. Forewings lanceolate; 4 present, 6 separate, 8 present; whitish, with some scattered light brownish scales in disc and posteriorly; cilia whitish, becoming whitish-ochreous towards tornus. Hindwings 1, transverse vein well-marked, 3 and 4 near together; grey; cilia whitish-ochreous.

Pretoria, in November and December (Janse); two specimens.

Mendesia secutrix, n. sp.

♂ ♀. 11–13 mm. Head, palpi, thorax, and abdomen ochreous-whitish. Forewings lanceolate; 3 and 5 absent; ochreous-whitish; cilia concolorous. Hindwings $\frac{2}{3}$, pale greyish; cilia whitish-ochreous.

Pretoria, in December and February (Janse); three specimens. Forewings more narrowly elongate than in *inscia*.

SCYTHRIDAE.

Scythris glaphyropa, n. sp.

♂. 13 mm. Head, palpi, and thorax dark glossy greyish-bronze. Abdomen dark grey, beneath whitish, becoming yellowish posteriorly.

Forewings elongate, rather narrow, costa gently arched, apex acute, termen sinuate, very oblique; glossy dark lilac-grey-bronze; two very obscure blackish dots transversely placed in disc at $\frac{2}{3}$; cilia concolorous. Hindwings and cilia dark grey; 4 and 5 stalked.

Three Sisters, in April (Snooke); one specimen.

Scythris fluctuosa, n. sp.

♂. 11-12 mm. Head and thorax greyish-ochreous. Palpi whitish-ochreous mixed with grey. Abdomen grey, anal tuft whitish-ochreous, ventral surface whitish. Forewings elongate-lanceolate, apex produced, acute; grey, very obscurely streaked on veins with ochreous-whitish, fold more or less distinctly suffused with whitish; an indistinct line of darker or blackish grey scales above middle from near base to near second discal stigma; plical and second discal stigmata indistinct, blackish, plical elongate, beneath middle of wing, second discal at $\frac{3}{4}$; cilia grey, base mixed with ochreous-whitish. Hindwings $\frac{2}{3}$, 4 and 5 separate; rather dark grey; cilia fuscous.

Pretoria, in October and January (Janse); two specimens.

Scythris stagnosa Meyr.

More strongly marked specimens, apparently of this species, have the costal area suffused with fuscous, plical and second discal stigmata fuscous.

Scythris accumulata, n. sp.

♂. 14 mm. Head and thorax white sprinkled with dark fuscous specks, thorax with an interrupted blackish bar on back behind collar. Palpi white sprinkled with dark fuscous. Abdomen whitish-ochreous irrorated with grey. Forewings elongate-lanceolate; white, finely and irregularly irrorated with dark fuscous, tinged with grey towards costa posteriorly, the white colour more conspicuous along an undefined and irregular median longitudinal streak, becoming a more defined white line on apical third; plical stigma elongate, blackish, with anterior extremity connected by an undefined oblique blackish mark with dorsum, these edged above with clear white, dorsal area beneath them tinged with grey; second discal stigma blackish; cilia light ochreous-grey, base mixed with white, on costa mixed with darker fuscous. Hindwings $\frac{3}{4}$, 4 and 5 stalked; light grey; cilia light ochreous-grey.

Pretoria, in February (Janse); one specimen.

Scythris vulgata, n. sp.

♂. 9-10 mm. Head, palpi, and thorax ochreous-whitish. Abdomen greyish-ochreous, anal tuft and ventral surface ochreous-whitish. Forewings lanceolate; ochreous-whitish or pale whitish-ochreous; costal edge grey towards base; cilia ochreous-whitish, becoming pale ochreous towards tornus. Hindwings $\frac{1}{2}$, 4 and 5 separate; grey; cilia pale ochreous.

Pretoria, in January (Janse); two specimens.

OECOPHORIDAE.

Promalactis recurva, n. sp.

♂. 10 mm. Head and thorax fulvous-orange, face white. Palpi fulvous-orange, terminal joint white. Antennal ciliations $1\frac{1}{2}$. Abdomen ochreous-whitish. Forewings elongate, rather narrow, costa gently arched, apex obtuse-pointed, termen very obliquely rounded; fulvous-orange; extreme costal edge dark fuscous from base to costal streak; markings white, irregularly edged with some black scales; a slender straight streak from base to $\frac{1}{4}$ of dorsum; a narrow sinuate streak from disc at $\frac{1}{4}$ to middle of dorsum, thence evenly curved to below disc at $\frac{2}{5}$, and again angulated to dorsum before tornus; a transverse thicker streak from costa before $\frac{2}{3}$, edged with dark fuscous suffusion posteriorly, its apex touching preceding streak beyond angle; cilia orange. Hindwings with 3 and 4 approximated at base; light grey; cilia pale whitish-ochreous tinged with grey.

Pretoria, in January (Janse); one specimen.

Promalactis veridica Meyr.

Of three examples communicated by Mr. Janse one at least shows vein 3 of hindwings present, but very short, approximated to 4.

XYLORYCTIDAE.

Odites carcharopa, n. sp.

♂ ♀. 13-17 mm. Head whitish. Palpi white, second joint blackish towards base, terminal joint with anterior edge and an oblique subapical ring black. Antennal ciliations of ♂ $1\frac{1}{2}$. Thorax whitish more or less tinged with fuscous, sometimes with distinct fuscous anterior and posterior bars on back. Abdomen ochreous-whitish. Forewings elongate, suboblong, costa slightly arched, with slight median prominence somewhat heightened by cilia, apex rounded-obtuse, termen slightly rounded, hardly oblique; 7 to apex; pale greyish-ochreous or whitish-ochreous, becoming white towards costa posteriorly; a blackish dot almost on base of dorsum; a fuscous blotch on dorsum before middle, sometimes reduced to an oblique streak representing its anterior edge, its apex representing plical stigma; discal stigmata dark fuscous, sometimes tinged with orange-ochreous; a more or less developed transverse fuscous blotch on dorsum before tornus, sometimes suffusedly extended to termen, its anterior angle almost reaching second discal stigma; a short oblique black strigula from costa before middle, and another from median prominence, giving rise to a more or less developed very oblique orange-ochreous streak; two or three fine blackish lines on costal portions of veins towards apex, and a black mark along costa at apex; several small indistinct dark fuscous dots on termen; cilia white, sometimes with faint fuscous median line. Hindwings pale whitish-ochreous; cilia concolorous, round apex whitish with grey median line.

Comoro Islands (Leigh); one specimen communicated by Mr. Janse, and five others in my own collection.

Odites pedicata, n. sp.

♂. 22 mm. Head, thorax, and abdomen white. (Palpi broken.) Antennae with fine short pectinations furnished with fascicles of long cilia.

Forewings elongate, moderate, costa moderately arched, apex rounded-obtuse, termen rounded, hardly oblique; white; costal edge pale brownish-ochreous; stigmata minute, blackish, plical very obliquely beyond first discal, nearer second; a strongly curved subterminal series of cloudy dark fuscous dots between veins, and a similar praemarginal series round apex and termen; cilia white. Hindwings and cilia white.

Comoro Islands (Leigh); one specimen. Also one in my collection.

Odites assidua, n. sp.

♂. 18 mm. Head, thorax, and abdomen ochreous-whitish. Palpi white, second joint grey except apical third. Antennal ciliations $\frac{1}{2}$. Forewings elongate, rather broad, costa moderately arched, apex obtuse, termen nearly straight, hardly oblique; ochreous-whitish; costal edge light ochreous; discal stigmata minute, black; cilia whitish. Hindwings and cilia ochreous-whitish.

Sarnia, Natal, in January (Janse); one specimen.

Procometis milvina, n. sp.

♀. 38-44 mm. Head and thorax whitish-fuscous. Palpi light brownish somewhat mixed with dark fuscous, terminal joint $\frac{1}{4}$, sometimes suffused with white. Abdomen whitish tinged with pale brownish. Forewings elongate, rather narrow, costa gently arched, apex pointed, slightly produced, termen almost straight, very oblique; light greyish-ochreous, with a faint pinkish tinge, costal area slightly darker; costal edge white except towards extremities; discal stigmata minute, fuscous, placed on a very undefined median longitudinal streak of whitish suffusion; cilia ochreous-whitish. Hindwings pale greyish, suffused with whitish towards base; cilia white, round apex, greyish-tinged.

White River, in January (Cook), one specimen; also one in my collection from Pinetown, Natal, in January (Leigh).

Stenoma simulatrix, n. sp.

♂ ♀. 20-21 mm. Head light ochreous-yellowish. Palpi moderately long, pale ochreous-yellowish, suffused anteriorly with fuscous. Antennal ciliations of ♂ 4. Thorax light ochreous-grey. Abdomen grey, apex ochreous-yellow. Forewings elongate, narrow, somewhat dilated posteriorly, costa hardly arched, apex obtuse, termen slightly rounded, little oblique; 2 and 3 stalked; light ochreous-grey; a narrow suffused ochreous-yellow costal streak throughout; cilia light ochreous-yellow. Hindwings grey; cilia light ochreous-yellow.

Pretoria, in December (Janse); two specimens. This interesting species has the aspect of a *Lithosiad*.

HELIODINIDAE.

Stathmopoda tharsalea, n. sp.

♂ ♀. 12-13 mm. Head bronzy, face and palpi whitish. Thorax yellow. Abdomen grey, anal tuft whitish-ochreous. Forewings very narrow, widest near base, thence narrowed to pointed apex; orange-

yellow; a small dark fuscous mark on costa near base; a broad lilac-brown direct transverse median fascia, connected on dorsum with a lilac-brown apical patch occupying $\frac{1}{4}$ of wing; cilia yellowish-brown. Hindwings grey, paler towards base, dark grey towards apex; cilia pale greyish.

Comoro Islands (Leigh); two specimens.

Eretmocera illucens, n. sp.

♀. 11 mm. Head and thorax dark bluish-fuscous. Abdomen reddish-yellow, apical third black. Forewings narrow, costa somewhat sinuate in middle, posteriorly gently arched, apex obtuse-pointed, termen very obliquely rounded; deep yellow, suffused with bronzy-fuscous towards middle, and becoming dark bluish-fuscous on apical third; extreme base dark bluish-fuscous; cilia dark bluish-fuscous. Hindwings orange-yellow, paler towards costa anteriorly; apical third dark fuscous; cilia orange-yellow, round apical portion dark grey.

Three Sisters, in December (Snooke); one specimen.

HYPONOMEUTIDAE.

Amalthina, n. g.

Head loosely scaled, face smooth; ocelli present; tongue developed. Antennae $\frac{3}{5}$, in ♂ moderately fasciculate-ciliated, basal joint stout, without pecten. Labial palpi rather short, curved, ascending, second joint with appressed scales, terminal joint shorter than second, slender, pointed. Maxillary palpi obsolete. Posterior tibiae clothed with rough hairs. Forewings with 2 and 3 stalked from angle, 7 and 8 stalked, 7 to apex, 9 and 10 stalked, 11 from middle. Hindwings over 1, ovate, cilia $\frac{1}{5}$; 3 and 4 connate, 5-7 nearly parallel, transverse vein very oblique inwards from 4 to 7.

Allied to *Ethmia*.

Amalthina lacteata, n. sp.

♂. 21 mm. Head, thorax, and abdomen white. Palpi white, terminal joint with a black lateral line. Forewings elongate, moderate, posteriorly dilated, costa gently arched, apex rounded-obtuse, termen rounded, little oblique; rather light fuscous, with a few darker and whitish scales; basal fourth irregularly suffused with white; several black scales scattered across disc at $\frac{1}{3}$; first discal stigma black-edged with white, second fuscous preceded by white; cilia whitish, with fuscous subbasal line. Hindwings white, apical half rather dark fuscous, division suffused; cilia white, round apical portion infuscated, with darker fuscous subbasal shade.

Sarnia, Natal, in January (Janse); one specimen.

Abacistis teligera, n. sp.

♂. 22 mm. Head white. Palpi white, second joint with a black streak (injured). Antennae strongly dentate, moderately ciliated. Thorax white, with three black anterior dots and a transverse mark on back. Abdomen whitish. Forewings elongate, moderate, costa gently arched,

apex rounded, termen rounded, rather oblique; 7 and 8 stalked, 9 and 10 stalked, a transversely striated subhyaline space between 12 and cell; shining white; about fourteen rather large black dots, viz., one on base of costa, one almost on base of dorsum, one near base in middle, one beneath costa at $\frac{1}{6}$, two near dorsum at $\frac{1}{8}$, and middle, two above and beneath fold before $\frac{1}{3}$, one towards costa at $\frac{2}{5}$, one in disc above middle, one above fold at $\frac{3}{8}$, one little marked towards costa at $\frac{3}{4}$, and two almost on termen in middle; cilia white. Hindwings light grey; cilia white.

Barberton (L. de Beer); one specimen. This genus nearly approaches *Aetherastis* and *Comocritis*, and may have to be united with them, as the structure varies specifically.

Lytrophila ingeminata, n. sp.

♂. 18 mm. Head white. Palpi white mixed with grey. Antennal ciliations 1. Thorax white, mixed with grey anteriorly. Abdomen grey, apex whitish. Forewings elongate, costa gently arched, apex obtuse, termen obliquely rounded; white, with a few grey black-tipped scales scattered in pairs posteriorly; second discal stigma indicated by a very small dot of similar scales; cilia white. Hindwings with 6 and 7 approximated towards base; whitish-grey, suffused with ochreous-whitish towards termen; cilia ochreous-white.

Pretoria, in January (Janse); one specimen.

GRACILARIADAE.

Acrocercops procellaris, n. sp.

♀. 11 mm. Head and thorax pale ochreous, slightly sprinkled with pale grey. Palpi smooth-scaled, dark grey, terminal joint with whitish median ring. Abdomen light greyish, beneath whitish-ochreous. Forewings very narrowly elongate, short-pointed; light brownish-ochreous, dorsal area marked with short oblique suffused paler streaks separated by some dark fuscous irroration; a blackish-fuscous patch occupying nearly costal half of wing and extending from base nearly to $\frac{3}{4}$, cut by a pale oblique striga beyond middle of wing; two angulated leaden-metallic transverse lines towards apex, becoming ochreous-whitish at extremities, apical area between and beyond these ochreous-orange, with a small whitish spot on costa near apex, a small blackish apical spot, and a black terminal dot beneath it; cilia light greyish, round apex with a black basal line, and blackish mark on tips opposite apex. Hindwings dark fuscous; cilia fuscous.

Sarnia, Natal, in January (Janse); one specimen.

Acrocercops conflua, n. sp.

♀. 9 mm. Head white. Palpi white, second joint with short apical tuft of scales beneath and fuscous subapical ring, terminal joint with fuscous subbasal and subapical rings. Thorax whitish, shoulders fuscous. Abdomen dark fuscous, beneath ochreous-white with lateral series of oblique dark fuscous stripes. Forewings very narrowly elongate, moderately pointed, pale ochreous suffusedly mixed with dark fuscous

irroration and irregularly striated transversely with whitish; a very irregular-edged white dorsal streak from base to tornus; two adjacent very oblique white dark-edged streaks from tornus and two similar ones from costa opposite, meeting in disc; immediately beyond these a transverse oblique white dark-edged streak; apical area yellow-ochreous, with a white dark-edged mark on costa and a black apical dot; cilia pale grey, round apex with dark fuscous basal line followed by a white shade, and two projecting dark fuscous apical hooks. Hindwings grey; cilia light grey.

Sarnia, Natal, in January (Janse); one specimen.

Acrocereops aptata, n. sp.

♂. 9 mm. Head whitish, crown mixed with grey. Palpi whitish, second joint with moderate triangular tuft at apex beneath and dark fuscous subapical band, terminal joint with two dark fuscous bands. Thorax whitish transversely barred with dark fuscous. Abdomen grey, beneath white, with lateral series of oblique dark grey bars. Forewings narrowly elongate-lanceolate; fuscous irrorated with dark fuscous; two transverse whitish striae about $\frac{1}{4}$; a group of three transverse striae about $\frac{1}{3}$, rather diverging dorsally, central one whitish, others whitish-ochreous; a similar group beyond middle, angulated in disc, lower portion of two posterior striae nearly obsolete; a small yellowish spot on tornus, closely preceded by a curved oblique white line; two oblique white strigulae from costa above this spot; a moderate yellow-ochreous apical patch, including a black apical dot preceded by a short white costal mark; cilia greyish, round apex with two darker lines separated with whitish. Hindwings and cilia grey.

Pretoria, in October (Janse); one specimen.

Gracilaria isotoma, n. sp.

♀. 10 mm. Head pale prismatic-fuscous, face whitish. Palpi whitish, terminal joint thickened with scales, with a dark fuscous lateral streak. Thorax purplish-fuscous. Abdomen rather dark grey. Forewings very narrowly elongate, short-pointed; purplish-fuscous, slightly blackish-sprinkled along margins; a broad isosceles-triangular pale yellow patch extending on costa from $\frac{1}{3}$ to $\frac{3}{5}$ and nearly reaching dorsum, edged laterally with scattered black scales, and marked on costa with three or four scattered black scales; cilia whitish-fuscous with rows of blackish points, towards tornus greyish. Hindwings and cilia grey.

Three Sisters, in April (Snooke); one specimen.

Gracilaria grypota, n. sp.

♂. 12 mm. Head and thorax whitish-ochreous. Palpi smooth-scaled, whitish-ochreous sprinkled with fuscous. Abdomen pale grey. Forewings very narrowly elongate, costa moderately arched on posterior third, apex pointed, termen extremely oblique; light reddish-ochreous sprinkled with reddish-fuscous; dorsal area paler and tinged with whitish-ochreous; a moderate suffused ochreous-whitish streak along costa from base to beyond middle, costal edge suffused with ochreous from base to a small fuscous

spot at $\frac{1}{4}$, and marked with an elongate fuscous spot near beyond this; cilia pale reddish-ochreous, towards tornus grey. Hindwings and cilia grey. Pretoria, in April (Janse); one specimen.

COLEOPHORIDAE.

Batrachedra isochtha, n. sp.

♂. 11–12 mm. Head and thorax ochreous-whitish. Palpi rather stout, ochreous-whitish, second joint grey externally except apex, terminal joint with some grey scales near base. Abdomen ochreous-whitish tinged with grey. Forewings very narrowly elongate-lanceolate; light lilac-brownish irrorated with dark fuscous; a moderately broad whitish-ochreous median longitudinal streak from base to apex; plical and second discal stigmata minute, black; a minute dark fuscous apical dot; cilia whitish-grey, round apex whitish-ochreous. Hindwings and cilia pale grey.

Sarnia, Natal, in January (Janse); two specimens.

Batrachedra microbias, n. sp.

♂. 13 mm. Head, palpi, and thorax whitish-ochreous. Abdomen ochreous-whitish, praeanal and two basal segments yellow-ochreous. Forewings narrowly elongate-lanceolate; whitish-ochreous, irregularly clouded with pale yellow-ochreous, with some very minute scattered grey specks; second discal stigma small, grey; cilia whitish-ochreous. Hindwings grey-whitish; cilia pale whitish-ochreous.

Three Sisters, in February (Janse); one specimen.

NEPTICULIDAE.

Nepticula vannifera, n. sp.

♂ ♀. 4–5 mm. Head white mixed with blackish, collar and eyecaps white. Thorax ochreous-white sprinkled with black. Abdomen grey-whitish. Forewings lanceolate; ochreous-white with scattered blackish specks; markings formed by close black irroration; a streak along basal portion of costa; a spot on base of dorsum; an elongate submedian patch from near base to near middle; an elongate patch or broad streak extending in disc from middle to apex, its anterior extremity connected with costa by a somewhat oblique bar, its posterior portion sometimes extending suffusedly to costa; cilia white, with some black specks on basal half. Hindwings grey, in ♂ with a slender median streak of black scales from base to $\frac{2}{3}$; cilia grey-whitish. Forewings on undersurface with a light yellowish subdorsal hairpencil from base surrounded with deep black scales.

Pretoria, in September and October (Janse); three specimens.

LYONETIADAE.

Opostega symbolica, n. sp.

♀. 8 mm. Head and thorax white. Antennae ochreous-whitish, eyecaps white. Abdomen ochreous-whitish. Forewings lanceolate, apex somewhat produced, acute; shining white; an indistinct greyish dot on

dorsum beyond middle; a slender oblique brownish streak from costa beyond middle, reaching half across wing; apex ochreous-yellowish, extending a projection along apical fifth of costa; a small black apical dot; cilia whitish, above and below apex with subbasal fine grey lines forming an obtuse angle but not quite meeting, above apex with a faint grey line nearly at right angles to the first. Hindwings whitish; cilia yellow-whitish.

Sarnia, Natal, in January (Janse); one specimen. Intermediate between *clastozone* and *cirrhocoma*.

Bucculatrix melipecta, n. sp.

♀. 7 mm. Head ochreous-whitish, frontal tuft mixed with fuscous, face whiter. Thorax ochreous-whitish with some black specks, shoulders yellowish-tinged. Abdomen whitish-grey. Forewings lanceolate, acute, broader than usual in the genus; ochreous-whitish, finely sprinkled with black specks; markings formed by close black irroration; a short streak on base of costa; a patch in disc at $\frac{1}{4}$; a patch on costa slightly before middle, with some ochreous-yellowish suffusion beneath it; a patch in disc beneath middle, and a thick streak from $\frac{3}{5}$ of costa to termen above tornus, space between these suffused with ochreous-yellowish extending to tornus; some coarse black scales towards dorsum before tornus; a patch on costa before apex, preceded by some ochreous-yellowish suffusion; cilia whitish, basal half round apex light yellowish sprinkled with fine black specks and limited by a black line. Hindwings whitish-grey; cilia grey-whitish.

Pretoria, in January (Janse); one specimen.

TINEIDAE.

Melasina numeraria, n. sp.

♂. 23 mm. Head yellow-ochreous. Palpi rather long, densely scaled, rather dark fuscous, upper edge yellow-ochreous. Antennal pectinations 3. Thorax pale ochreous-yellowish, anteriorly suffused with brownish. Abdomen elongate, light fuscous, anal tuft pale yellowish. Forewings elongate, rather narrow, costa hardly arched except towards apex, apex obtuse, termen rounded, rather strongly oblique; all veins separate; light ochreous-yellowish, strewn except along costa with scattered dark fuscous scales more or less arranged in longitudinal lines, and tending to form small transverse strigulae; costal edge dark fuscous towards base; a dark fuscous dot on end of cell, and an irregular streak of dark fuscous irroration running from this to apex; scattered dark fuscous scales along terminal edge; cilia pale ochreous-yellowish, outer $\frac{2}{3}$ suffused with pale fuscous. Hindwings pale greyish; cilia whitish-ochreous.

Johannesburg, in November (Linford); one specimen.

Melasina terrestris, n. sp.

♂, 16–18 mm.; ♀, 22–23 mm. Head whitish-fuscous. Palpi moderate, second joint thickened with dense somewhat projecting scales, whitish-fuscous irrorated with dark fuscous. Antennal pectinations of ♂ 2. Thorax and abdomen rather dark fuscous, anal tuft of ♂ pale ochreous tinged with

fuscous. Forewings elongate, rather narrow, costa gently arched, apex obtuse, termen obliquely rounded, all veins separate; fuscous somewhat sprinkled with whitish-fuscous, and with dark fuscous scales tending to form very obscure scattered strigulae; cilia whitish-fuscous with rows of dark fuscous points. Hindwings rather dark fuscous; cilia light fuscous with dark fuscous subbasal shade.

Pretoria, in November and December (Janse); four specimens.

Scardia saccharata, n. sp.

♀. 19 mm. Head and palpi ochreous-whitish. Thorax whitish-ochreous, shoulders mixed with brownish. Abdomen light fuscous. Forewings elongate, rather narrow, costa gently arched, faintly sinuate in middle, apex obtuse, termen rounded, rather strongly oblique; all veins separate; pale yellow-ochreous, suffusedly mixed and mottled with white, with some scattered blackish scales tending to form strigulae, in disc posteriorly and towards termen in middle with several small white spots edged with distinct blackish strigulae; base of costa and a subbasal strigula beneath costa black; an oblong fuscous spot irrorated with black on middle of costa; a semioval fuscous spot irrorated with black and surrounded with white on dorsum beyond middle, including a small white spot on dorsal edge; cilia pale yellow-ochreous barred with white. Hindwings light ochreous-grey; cilia whitish, base pale ochreous.

New Hanover, in January (Hardenberg); one specimen.

ADELIDAE.

Ceromitia graptosema, n. sp.

♀. 20 mm. Head, palpi, and antennae white. Thorax white, towards middle infuscated. Abdomen grey. Forewings elongate, rather narrow, costa gently arched towards extremities, apex obtuse-pointed, termen very obliquely rounded; all veins separate; white; markings rather dark fuscous; a moderate costal streak from base to near middle, costa thence to $\frac{2}{3}$ marked with about nine oblique blackish strigulae, and posteriorly with two others more remote; an oblique-trapezoidal blotch extending on dorsum from $\frac{1}{5}$ to middle, narrowed upwards, reaching to about fold, its posterior angle produced as a rather thick streak to disc above middle; a flattened triangular patch extending beneath costal strigulae from middle to $\frac{3}{4}$, crossed by an oblique leaden-metallic line near its anterior margin; its apex extended as a curved streak near termen almost to costa, thus enclosing a clear white oval spot; posterior dorsal half of wing enclosed between these markings strigulated with fuscous and dark fuscous; a blackish line round termen; cilia white, on costa with dark fuscous basal and apical lines, on termen mixed with fuscous at base and apex. Hindwings with all veins separate; grey, with bronzy-violet reflections; cilia grey-whitish, with two faint grey shades.

Pretoria, in October (Janse); one specimen.

NEW SPECIES OF ALEPIDEA.

By MRS. R. POTT, Botanist of the Transvaal Museum.

Alepidea jenkinsii Pott, sp. nov.

Planta glabra, 4-5 dm. alta. Caulis angulatus, foliatus, apicem versus paniculato-vel corymboso-ramosus, ramis 2·5-5 cm. longis, bracteatis, patentibus vel adscendentibus. Folia radicalia 4-8, petiolata; petiolus complanatus, basin versus latior 3-4·5 cm. longus; lamina 2-4·5 cm. longa, 9-11 mm. lata, oblonga, apice obtusa vel subacuta, basi rotundata, margine serrato-setosa, setis remotis; caulina ovato-lanceolata, acuminata, amplexicaulia, auriculata, setis rigidis; folia ad basin caulis 4·5-6·5 cm. longa, ad apicem caulis 12 mm. longa. Capitula plurima, 12 mm. diametro. Involuceri segmenta 10, inaequalia, rigida, acuminata, carinata, alba. Calycis-dentes minuti, ovati, acuminati. Styli longi, graciles, acuminati, calycis-dentibus majores. Fructus muricatus.

Plant glabrous, $1\frac{1}{2}$ - $1\frac{3}{4}$ ft. high. Stem angular, leafy throughout, but leaves getting gradually smaller, paniculately or corymbosely branched towards the apex; branches spreading or ascending, bracteate, 1-2 in. long. Radical leaves 4-8, petiolate; petiole flattened, broadening towards the base and clasping the base of the stem, $1\frac{1}{4}$ - $1\frac{3}{4}$ in. long; blade oblong, base rounded, apex obtuse or subacute, $\frac{3}{4}$ - $1\frac{3}{4}$ in. long, $\frac{1}{3}$ - $\frac{5}{12}$ in. broad, margin serrate-setose, serratures distant. Cauline leaves linear-oblong, acuminate, amplexicaul, auriculate, serrate-setose, setae rigid; lower leaves $1\frac{3}{4}$ - $2\frac{1}{2}$ in. long, gradually getting smaller, the highest being only just $\frac{1}{2}$ in. long. Involucre $\frac{1}{2}$ in. in diameter of 10 rigid, unequal, acuminate, keeled, white segments. Calyx-teeth minute, ovate, acuminate, Styles long, slender, pointed, much exceeding the calyx-teeth. Fruit muricate.

Transvaal; Middelburg; Jenkins, 9859 in Transvaal Museum Herbarium; flowering November.

This new species is nearest *A. longifolia* E. Mey, but the basal leaves are shorter and cordate or rounded at the base and the involucre are smaller.

The type is in the herbarium of the Transvaal Museum.

Alepidea basinuda Pott, sp. nov.

Caulis erectus 23-46 cm. altus, angulatus, distincte scaberulus, paucè foliatus, basin versus nudus, superne corymbosoramosus, ramis paucis, adscendentibus, distincte scaberulis, 2·5-4·5 cm. longis. Folia radicalia 5-7, glabra, rosulata, patentia, petiolata; petiolus complanatus, 1·2-1·9 cm. longus lamina elliptica, obtusa vel subacuta, 2·5-3·7 cm. longa, 1·2-1·9 cm. lata, margine dentata vel serrato-setosa; lamina caulina remota, adscendentia, glabra, ovato-lanceolata, amplexicaulia, auriculata, dentato-setosa,

setis longis, rigidis. Capitula minora, 6-9 mm. diametro, 15-flores. Involuceri segmenta 10, inaequalia, rigida, acuminata, glabra, carinata, interiora alba. Calycis-dentes minuti, mucronati, styli calycis dentibus majores. Fructus muricatus.

Stem erect, $\frac{3}{4}$ - $1\frac{1}{2}$ ft. high, angular, distinctly scaberulous, thinly leafy, nude at the base, usually for $\frac{1}{4}$ - $\frac{1}{3}$ of its length, corymbosely branched towards the apex; branches few, ascending, distinctly scaberulous, 1- $1\frac{3}{4}$ in. long. Radical leaves 5-7, glabrous, spreading, petiolate; petiole flattened, $\frac{1}{2}$ - $\frac{3}{4}$ in. long, clasping the base of the stem; blade elliptic, obtuse or subacute, 1- $1\frac{1}{2}$ in. long, $\frac{1}{2}$ - $\frac{3}{4}$ in. broad; margin dentate or serrate-setose. Stem-leaves distant, mostly shorter than the internodes, ascending, glabrous, ovate-lanceolate, amplexicaul, auriculate, dentate-setose; setae long, rigid. Flowerheads small, 15-flowered. Involucre of 10 rigid, acuminate, keeled, smooth segments, alternately $\frac{1}{6}$ - $\frac{1}{8}$ in. long, white, greenish on the back. Calyx-teeth minute, mucronate. Styles exceeding the calyx-teeth. Fruit muricate.

Transvaal: on open grassy veld, Woodbush, Jenkins in Transvaal Museum Herbarium, 7443; Haenertsburg, Mrs. Pott, 4656. Flowering November.

The stem, nude at the base, the thinly scattered cauline leaves and the basal leaves, longer in proportion to their breadth, distinguish this species from *A. setifera* N. E. Br., to which it is closely allied.

The type is in the herbarium of the Transvaal Museum.

CONTRIBUTIONS TO THE KNOWLEDGE OF THE REPTILES OF THE KARROO FORMATION.

By Dr. E. C. N. VAN HOEPEN, M.I.

2. The Lower Jaw of *Lystrosaurus*.

While describing the skull of *Lystrosaurus Putterilli* many difficulties were encountered through the fact that our knowledge of the lower jaw of *Lystrosaurus* is still in a very unsatisfactory state. It was necessary before proceeding any further with this fossil, especially its lower jaw, of which only two disconnected portions are visible, to study the elements of this part and their exact relations in other specimens.

The following is a review of what had been made known before on this subject. I could not go further back than 1855, because OWEN'S previous work could not be obtained.

OWEN only mentions the dentary in the description of *Dicynodon tigriceps* (1). A low, obtuse, longitudinal ridge projects from this bone, corresponding with the one on the premaxillary. There are two ridges separated by a groove on the upper border of the left ramus. The groove gradually deepens backwards (for so far present). There is another ridge on the outside of the rami and a vacuity further backwards.

HUXLEY adds to this in 1859 that there are three ridges on the symphysis, which fit into grooves on the palatal surface of the premaxillary. These ridges are separated from each other by deep grooves. The upper border of the dentary is broad, and is formed by a thick inner and a thin outer wall, separated by a groove. The thick inner wall becomes thinner downwards and reaches the opercular. The surangular is covered by the outer wall. The opercular elements are united in the symphysis.

OWEN contributes further to the knowledge of this subject in 1860 in the description of *Lystrosaurus latirostris* (3, p. 53):—The lower jaw is continued backwards for a small distance behind the articulation with the quadrate. The articulation surface is hollow. It was impossible to distinguish the angular, surangular, and articular from each other. Angular and surangular diverge forwards. The angular forms the hind and lower boundary of the vacuity in the outside of the jaw. The fore part of the vacuity is formed by a bifurcation of the dentary element. The angular is wedged in between the opercular and the dentary in the symphyseal region. The ridge on the outside of the dentary subsides forwards at the vertical channel upon the side of the symphysis, which receives the corresponding tusk when the mouth is shut.

In 1862, while describing *L. Alfredi* (4, p. 458), OWEN states that he is still unable to distinguish the articular from the surangular. There is no coronoidal process and no complementary. The longitudinal ridge on the outside of the dentary parallels that formed by the canine alveolus of the maxillary.

OWEN described the lower jaw of *Oudenodon brevirostris* in 1876 (5, p. 58). He states there that the angular elements converge and unite to prolong backward the symphysial part of the lower jaw. In the following it will be shown that these are the opercular elements.

In discussing the lower jaw of the *Anomodontia* (6, p. 80), BROOM adds the following to our knowledge of this part:—The opercular elements form a sort of axis round which the dentaries are built up. That part of the angular, which forms a process directed downwards and backwards, rests with its upper edge on the articular and the surangular. The articular forms a considerable part of the inner side of the posterior third of the jaw. When the jaw is viewed from the outer side the greater part of the articular is hidden by the surangular and the angular. Essentially the same is said of the lower jaw of *Oudenodon*.

JAEKEL gives a figure of the lower jaw of a *Dicynodon* in "Die Wirbeltiere," p. 190. Judging by the dental end, this must be an outside view of the right ramus. According to the explanation given under the figure, an opercular and a complementary are in this way visible behind the dentary. As will be seen from the following description, I cannot agree with this interpretation.

According to WATSON (8, p. 288), the articular is fused with the surangular. The outer face of the combined bones is largely covered by the angular, which is divided by a notch. The articulating surface of the articular and the inner side of the jaw are unknown, but there is definite evidence of the presence of an opercular.

From these abstracts it will be seen that only very little indeed has been made known on this subject, and even that "facts" recorded on one occasion were contradicted on another, and sometimes by the same author. Therefore I think to have done sufficient justice to the different authors in the above, and will abstain from further references, except where necessary for completeness.

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The Dentary.—The dentaries fuse in the symphysis, of which they form the greater and upper part. The fore part of the symphysis is convex both vertically and transversely, and shows two parallel, longitudinal grooves (fig. 3). These grooves divide the symphysis in three parts, which end upwards, according to HUXLEY, in three projections, fitting into the grooves on the palatal surface of the premaxillary (see p. 1). This, however, could not be confirmed, as the extreme end of the symphysis in our specimen is damaged. The inner surface of the symphysis forms a deep, longitudinal groove, slightly inclining backwards between the upper borders of the rami of the jaw. This surface bends down vertically where the rami part from each other to diverge backwards. It then shows in its upper part a narrow pit, of which the axis is directed forwards, and below this a much broader excavation, formed by the opercular elements, the axis of which is also directed forwards (figs. 2 and 17). The suture of the opercular elements with the upper bones enters into the upper pit.

The dentaries have broad upper borders, which form the sides of the symphyseal groove. These borders are thickest at the back end of the symphysis (figs. 14, 16, 17); they become only slightly thinner forwards, but gradually diminish to half this thickness from this point backwards. Two ridges extend longitudinally parallel over the whole length of the border (fig. 16). The inner ridge is well developed in front, but diminishes gradually in height backwards until it reaches the greatest thickness of the border; the height increases from this point backwards. The hind part of this ridge passes on to the complementary element. The front end of the outer ridge is merely an acute

edge between the outer and upper surfaces of the border. It rises, however, to a high and acute wall, after passing the broadest part of the border, and continues up to the end of the dentary. The hind end of the groove between these ridges is situated on the complementary.

There is a depression on the outer surface of the dentary near the symphysis, which accommodates the corresponding canine of the upper jaw when the mouth is closed. This depression runs parallel with the front surface of the symphysis, and extends from the upper border downwards and backwards till near the lower one. The described position of this depression seems to me to be the normal one, corresponding with a more or less vertical position of the occipital plate. When this condition has been complied with the alveolus of the canine inclines downwards and forwards under an average angle of 45 degrees. To fit into the depression of the lower jaw the end of the canine must therefore curve backwards. Those cases where the canine passes abruptly over the ridge, dividing the symphyseal outer surface from the outer surface of the dentary, or which, generally speaking, do not comply with the above conditions, must be strongly distrusted, for there is every reason to believe that they have suffered through fossilization.

In the upper front part of this depression there is a small ridge, parallel to the ridge between the outer surfaces of the symphysis and the dentary and separated therefrom by a deep and narrow groove. This ridge originates at the upper border and passes downwards to near the middle of the depression. The deepest part of the depression is situated directly behind this ridge.

The hind part of the dentary is deeply notched by a vacuity in the jaw, the upper projection forming the whole upper border and surrounding with the lower projection the fore end of the vacuity. The upper border of the vacuity is slightly convex downwards; the fore end strongly concave backwards. The lower projection is the shortest, and terminates in a point covering the outside of the angular. The upper projection retains the same breadth up to its end at the hinder end of the vacuity, where it reaches the visible surface of the surangular, just above the upper connection of the two parts of the angular.

The Angular.—This is the first bone following on the dentary on the outside. It is already distinguishable in front of the lower end of the canine depression on the dentary (fig. 3). In this region it is a very high and thin bone (figs. 14, 16), of which the outer surface is covered by the dentary and the inner surface by the opercular. The narrow lower border only remains free. The height of the bone diminishes quickly backwards and becomes a minimum below the centre of the vacuity in the jaw. The outer surface of the angular is hollow from this point forwards, thus accommodating the lower projection of the dentary (fig. 1). The lower border of the bone is broadest where the height is a minimum. The outer surface expands fan-like from this point backwards. It forms a narrow process towards the hinder end of the upper projection of the dentary, which process there broadens into a thin vertical plate. Another process is formed at its lower border. This starts in front of the hinder end of the vacuity in the jaw, and is united inwardly to the lower border of the inner vertical part of the bone. The extreme end of the process is, however,

not in connection with this part. A vertical section over the upper and lower connections of the two parts of the angular will make their position clear (fig. 13).

The outer part of the angular continues backwards past the connecting portions, but does not reach the protruding border of the articulation surface (see also fig. 10). Its hinder border is smooth and convex backwards (fig. 4). The surface of this part of the bone is slightly convex outwards, but that part of the surface formed by the lower process is strongly concave behind, becoming less so towards its fore end.

The inner part of the angular is a thin vertical plate which covers the outside of the surangular. It is continued downwards to the lower border of that part of the jaw, also behind the outer portion of the angular, but the two parts are here divided by an opening. The lower border is connected by suture with the parallel prearticular; the hinder border in the same way with the surangular (figs. 5, 8, 10).

The Surangular.—Only two small parts of this bone are visible from the outside, one in the upper hind corner of the vacuity in the jaw and the other along the upper and hinder border of the inner part of the angular (fig. 1). An inside view shows the greater part of the bone between the articular and the complementary, forming the whole upper border of the inner end of the vacuity in the jaw (fig. 2). The prearticular and the complementary meet further forwards, and the surangular disappears behind these bones in the Meckelian cavity, wherein it may be followed far forwards (figs. 9, 15).

The bone has the shape of a wedge directly behind the dentary (figs. 8, 10). The border of this wedge forms the upper border of the jaw, and, starting directly behind the dentary, projects at right angles over the upper and hinder border of the inner portion of the angular. This projecting part of the surangular is broadest under the articulation surface. This wedge-shaped part is situated between the articular on the inside and the angular on the outside, behind the end of the inner opening of the vacuity in the jaw. It wedges so far in between these bones as to nearly reach their suture on the lower border of the jaw. This height diminishes further backwards.

The suture with the articular runs from the upper, hinder corner of the inner opening of the vacuity in the jaw upwards and backwards until it reaches the edge between the inner and upper surfaces of the ramus (fig. 6). The upper surface here, in front of the articulation surface, is concave, and the suture passes through this concavity and backwards to its outer edge. The outer border of the ramus is much thicker from this point backwards than forwards, the latter part consisting of a single sharp edge formed by the surangular and the former of two sharp edges separated by a parallel groove. These two are situated the one above the other, and are formed respectively by the articular and the surangular (fig. 5). The suture between surangular and articular runs through the groove, though not through its deepest part, but more on the side of the lower ridge. The surangular is here only a thin plate which lies against the lower surface of the articular (figs. 11 and 12). There was no suture to mark the end of the surangular here.

The Articular and the Prearticular.—The hinder border of the inner opening of the vacuity in the jaw is formed by the articular.

It is still free here, but only a very small distance backwards it coalesces with the prearticular, and then the two bones cannot be separated any more (figs. 8, 10). The suture of this coalesced bone with the angular can be traced till the end of the last. The hinder portion of this suture is very complicated (figs. 11, 12). Here two ridges are developed by both elements. The outer ridge of the coalesced prearticular is situated between the two ridges of the angular, while the inner ridge of the angular fits in between the two of the coalesced bone. These ridges become less prominent forwards, except the outer ridge of the angular, which passes into the high vertical side of the inner portion of this bone.

The articulation surface of the coalesced articular has a high front margin, which passes into the uppermost of the already mentioned two ridges on the outer border (fig. 5). This upper ridge passes in its turn into a high back margin, which crosses the upper surface of the coalesced bone from the outer border inwards and backwards (fig. 7). This margin is still visible on the inner surface till just below the inner process (fig. 6).

There is a process from the inner surface of the bone at about equal distances from the upper and lower border. Its longest dimension is parallel with the larger articulation surface. Its upper surface is convex, and forms part of the articulation surface. The lower surface of this process is slightly concave at the back, and its free edge is sharp (figs. 2, 6, 11, 12).

The coalesced bone forms another process downwards, being the extreme end of the ramus. This process has a triangular section, of which the outer angle is the most acute (figs. 5, 6, 7).

The articulation surface consists of three parts: an upper surface, a vertical surface, and the upper surface of the inner process (figs. 7, 11, 12). The upper and vertical surfaces meet in a ridge, which is convex upwards and inwards. The angle between the upper and vertical surfaces is acute; the one between the vertical surface and the upper surface of the inner process is right.

The upper surface is convex in a backwards-forwards direction, and concave from the outer to the inner edge. The vertical surface is convex inwards.

The prearticular continues forwards from the hinder border of the inner opening of the vacuity in the jaw, forming the whole lower border of this opening, and then disappearing behind the opercular (figs. 2, 10, 13, 14, 15, 16). It has been followed behind this element till above the place where the angular disappears between the opercular and the dentary. Before reaching the opercular it is in touch with that part of the dentary which might be allocated to the lower end of the complementary.

A ridge runs near and parallel to the lower border of the bone on its outer surface (in the Meckelian cavity, fig. 10). The height of this ridge increases towards the back, and it also rests there on a ridge of the angular, which on this element runs parallel with and a little above the lower border. The suture of the angular with the coalesced part of the prearticular has already been described (figs. 11, 12).

The articular is still a separate bone directly behind the inner opening of the vacuity of the jaw. Just a few millimetres further backwards it coalesces with the prearticular. The exact relation of the two parts is thereby totally obliterated, but it is still possible to

identify certain portions of the coalesced bone with the composing parts. It seems to me, for example, that the downward process of the coalesced bone is part of the prearticular, and this for the following two reasons: The ridges of the separate part of the prearticular increase in height backwards, and it is therefore very probable that the bone forming the intricate suture behind also belongs to the prearticular. The high margin of the articulation surface behind gives the impression that this is the end of the articular. I therefore presume the original boundaries of the bones to have been as indicated in figs. 5, 6, and 7.

The Opercular.—The opercular elements are situated in the distal part of the jaw. They are coalesced in the symphysis (figs. 2, 16, 17). Directly behind the symphysis they occupy about two-thirds of the height of the jaw (fig. 14), but they gradually diminish in height towards the back till near the inner opening of the vacuity in the jaw. Here the end is divided into two unequal parts by a longitudinal notch. The upper part covers a small portion of the inner surface of the prearticular, and then breaks off abruptly. The lower part, which ends in a point, is situated below and a little to the outside of the prearticular. The opercular is thinnest behind, and becomes gradually thicker forwards, the angular at the same time thinning out. There is a groove in the upper border of the opercular towards the symphysis, accommodating the lower border of the inner wall of the dentary (figs. 14, 16). The narrow pit on the border of the opercularia and the dentaries in the symphysis continues forwards through two-thirds of the symphysis, and then bends sharply upwards, parallel with the front surface of the symphysis (fig. 1). A triangular surface of the coalesced opercularia is visible in front at the lower end of the symphysis (fig. 3).

The Complementary.—There is no separate bone which can be taken to be the complementary. It appears to me, however, that the bone has coalesced with the hinder end of the inner wall of the dentary (fig. 2). There is a separation in this region in one specimen between a thin plate which clearly belongs to the dentary and a broad inner part which bears the continuation of the groove on the dentary (fig. 9). It could not be made out whether this separation is a suture or a fracture. The other ramus does not show this separation. An examination of many other specimens on this point gave no result. This investigation, however, rose the presumption that the complementary could very well have coalesced with the inner wall of the dentary, the hinder part of which forms a very obtuse angle with the fore part. Definite proof of the presence of a complementary has, however, not been obtained.

Dimensions.—The following dimensions were taken from Pal. Cat. No. 3099 (figured in figs. 1-4, and 9):—

| | |
|--|---------|
| Length of the left ramus | 105 mm. |
| Height of the symphysis | 45 mm. |
| Height of the left ramus over the centre of the outer opening of the vacuity | 36 mm. |
| Length of the left dentary | 73 mm. |
| Length of the left outer opening of the vacuity ... | 34 mm. |
| Length of the left inner opening of the vacuity ... | 41 mm. |
| Length of the visible outer portion of the angular | 60 mm. |
| Length of the visible surface of the opercularia on the outer surface of the symphysis | 14 mm. |

EXPLANATION OF PLATES.

(Figures all of natural size.)

Lower Jaw of *Lystrosaurus*.

- Fig. 1. Outside view of the left ramus. Pal. Cat. No. 3099.
 Fig. 2. Inside view of the left ramus. Pal. Cat. No. 3099.
 Fig. 3. The symphysis seen from in front and below. Pal. Cat. No. 3099.
 Fig. 4. Undamaged hinder end of the outer portion of the angular. Pal. Cat. No. 3099.
 Fig. 5. Outside view of an undamaged left hinder end of a jaw. Pal. Cat. No. 3098.
 Fig. 6. Inside view of the same specimen.
 Fig. 7. Back view of the same specimen.
 Fig. 8. Section of the left ramus of a jaw behind the inner opening of the vacuity. Same specimen.
 Fig. 9. Section of the left ramus of a jaw just in front of the hinder end of the dentary. Pal. Cat. No. 3099.
 Fig. 10. Series of sections of a left ramus. Pal. Cat. No. 3097. Going backwards from left to right. The distances of every two sections are put between them.
 Fig. 11. Section of an articulation part of a right ramus. Pal. Cat. No. 3096.
 Fig. 12. Section of the same specimen a little further backwards.
 Fig. 13. Section of the left angular across the connections of the two parts. Pal. Cat. No. 3095.
 Fig. 14. Section of a jaw near the symphysis. Pal. Cat. No. 3095.
 Fig. 15. Section of the left ramus of the jaw of the same specimen a little further backwards, showing the intricate suture of the angular and the opercular at this point.
 Fig. 16. Section of a jaw showing the united opercularia. The angularia are still present. Pal. Cat. No. 3094.
 Fig. 17. Section of the same specimen a little further forwards.

| | |
|--------------------------|---|
| An. = angular. | Pa. = prearticular. |
| Ar. = articular. | Qa. = quadrate. |
| C. = complementary. | Sa. = surangular. |
| D. = dentary | x. = a saw cut. |
| M.C. = Meckelian cavity. | i.o. = inner opening of the vacuity in the jaw. |
| Op. = opercular. | |

After the above was written and ready for the printer, I, for the last time, looked up the available literature and found a paper by Mr. D. M. S. WATSON, "On some *Reptilian* Lower Jaws," in the Ann. and Mag. of Nat. Hist. London, Ser. 8, Vol. 10, No. 60, Dec. 1912, which for reasons outside my power had escaped my notice. To my great astonishment I saw that the description of the lower jaw of the *Anomodontia* did not agree with my observations on the *Lystrosaurus* jaw. The most marked difference between the two descriptions is that WATSON finds a separate coronoidal element between the dentary and the complementary, a bone which the closest scrutiny of my *Lystrosaurus* jaws did not reveal. Further, WATSON'S specimen did not show the inner opening of the vacuity in the jaw nor the canal in the symphysis. Also the arrangement of the bones around the much

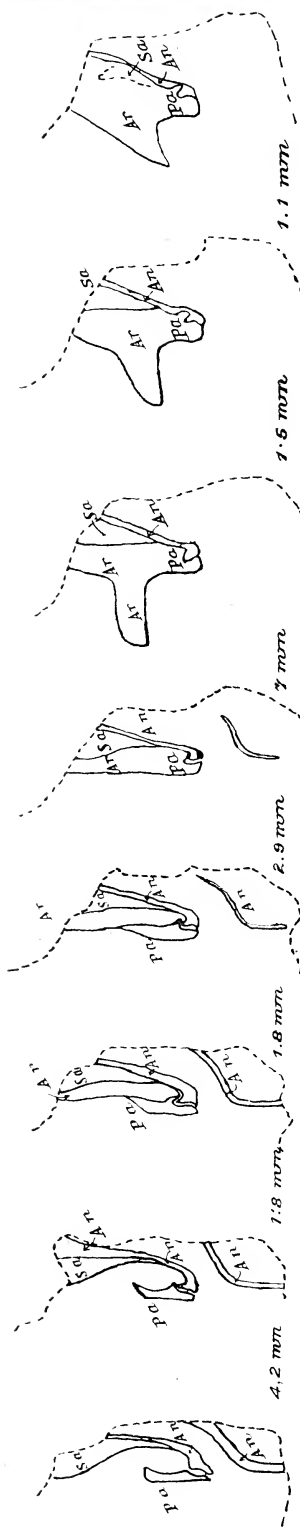
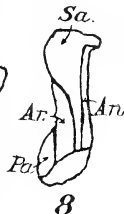
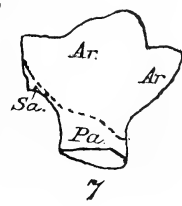
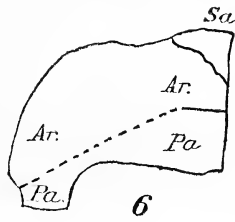
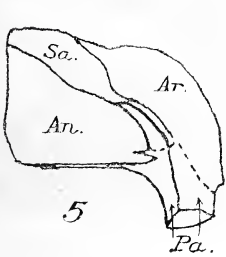
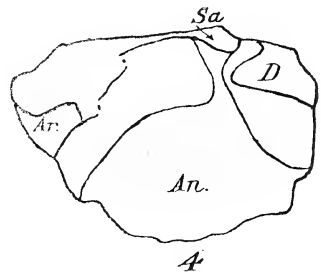
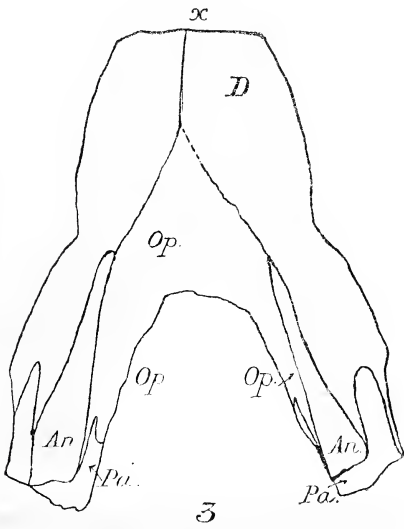
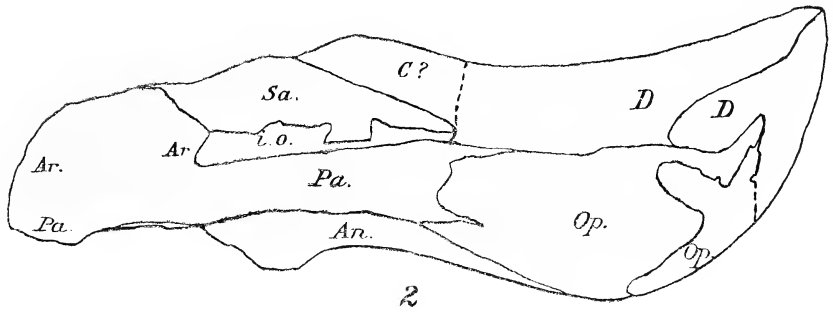
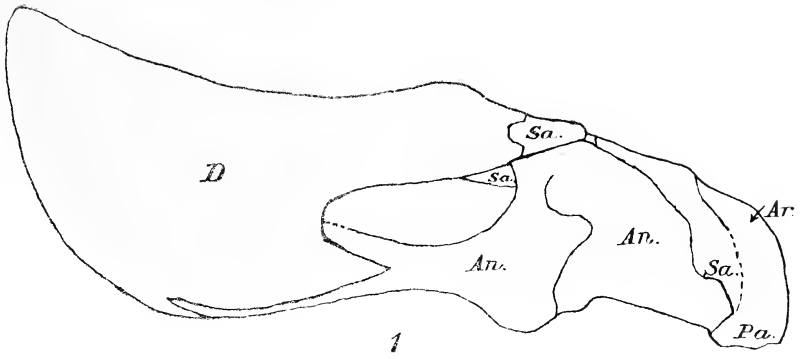
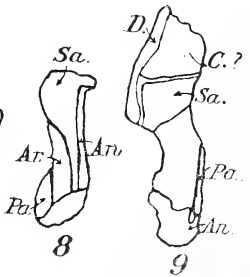
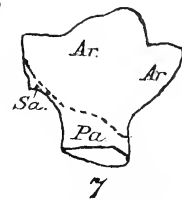
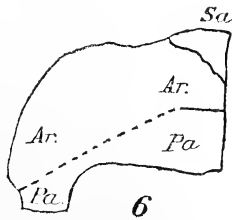
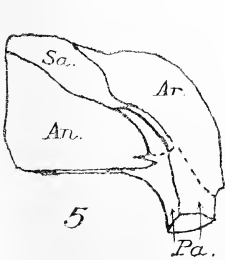
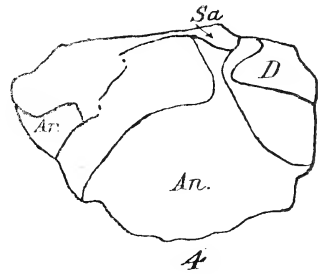
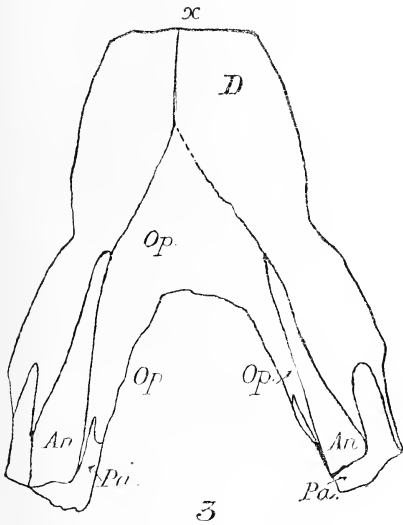
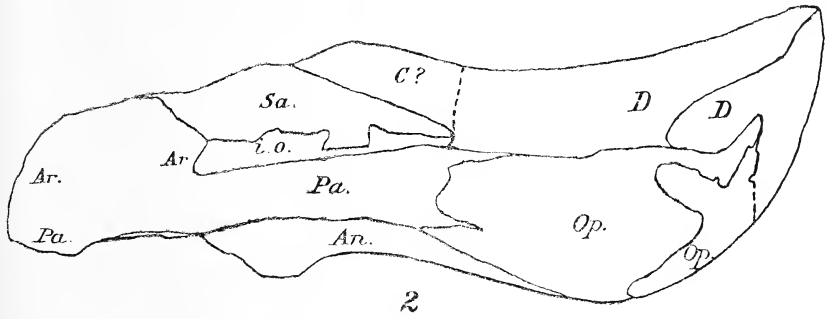
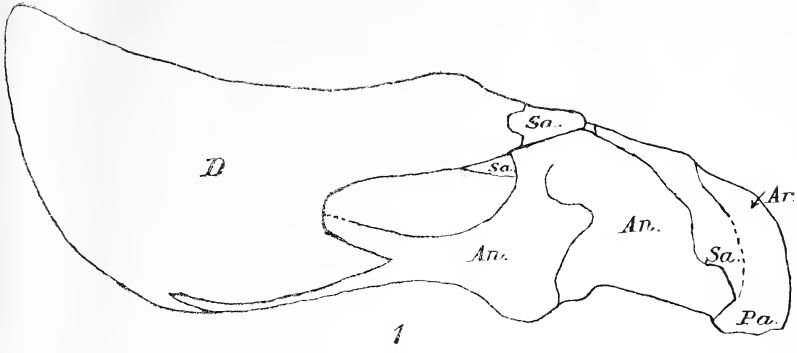


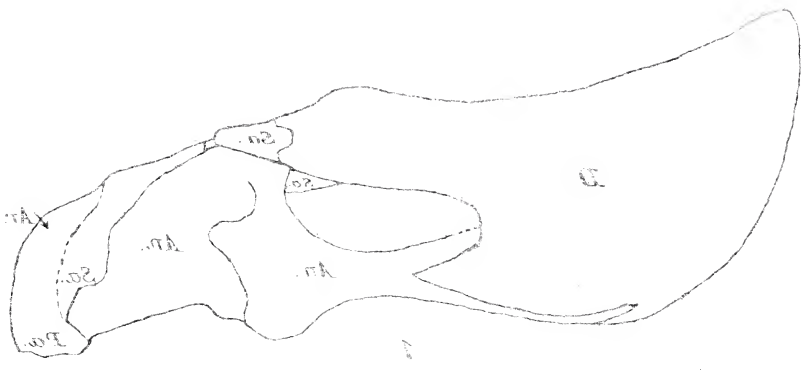
Fig. 10

smaller opening of the vacuity was different to what I had found around a much bigger opening. It occurred to me that the above-mentioned differences might have to be attributed to the fact that we had described the jaws of different genera. A lower jaw of a *Dicynodon* was thereupon developed to see whether this explanation would hold good. It appeared, however, to be in detail exactly like the jaw of *Lystrosaurus* described above. I can therefore definitely state that the alleged coronoidal element between the dentary and the complementary **does not exist** in *Lystrosaurus* nor in *Dicynodon*. My other observations which differ from WATSON'S description are also sufficiently supported by proof in the above, and further discussion would only mean repetition. I would only further draw the attention to the differences in the description of the dentary, the complementary, the surangular, the angular, and the articular.*

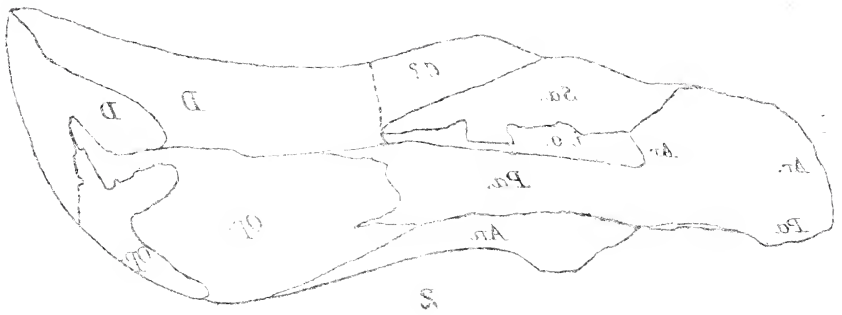
* The mail just brings the latest issue of the "Ann. and Mag. of Nat. Hist.," London, ser. 8, vol. 14, No. 79, July, 1914, which contains a paper by D. M. S. WATSON, "*Dicynodon Halli*, sp. n., an *Anomodont Reptile* from South Africa." It is herein stated on p. 97, that the lower jaw of this specimen served for the description of the lower jaw of the *Anomodontia*, mentioned above. Also that the apparent suture between the dentary and the coronoid, although clear as a very fine dark line in this specimen and several others, is perhaps something else. I would here like to refer back to my remarks on p. 2.



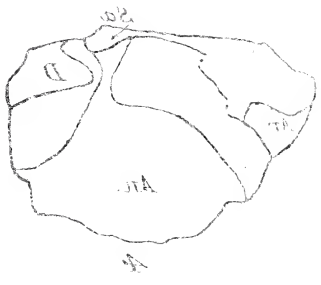




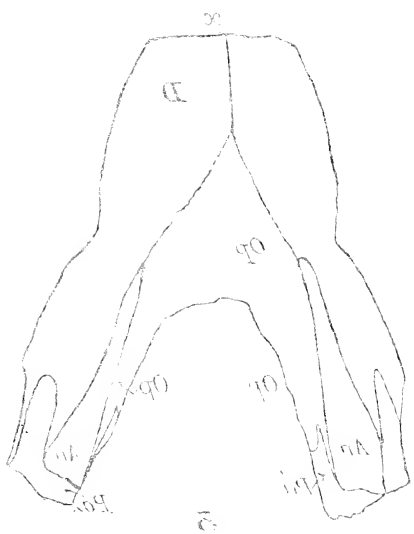
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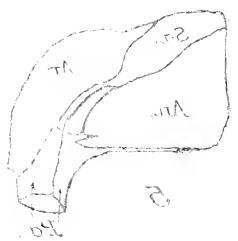
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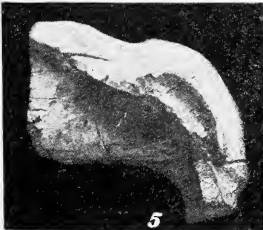
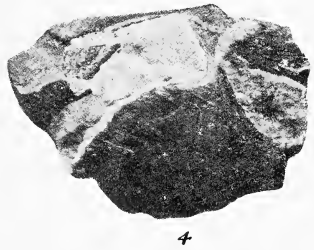
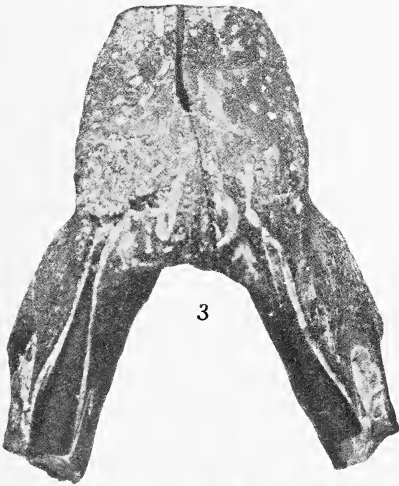
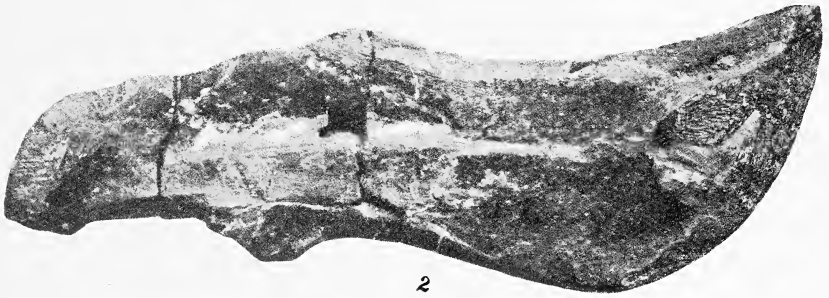
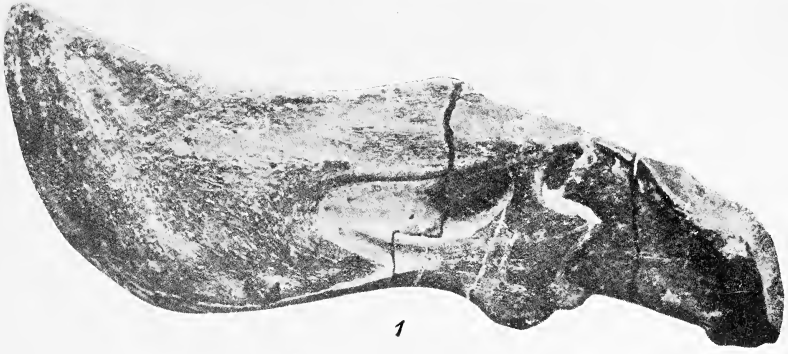
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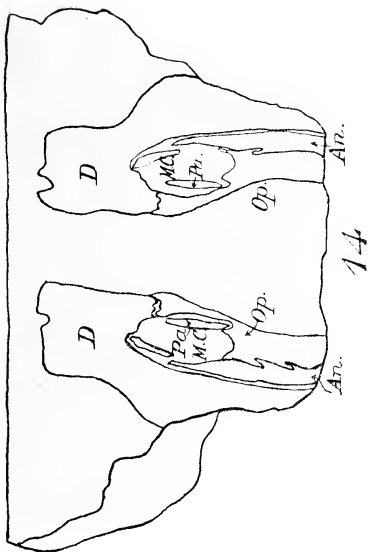
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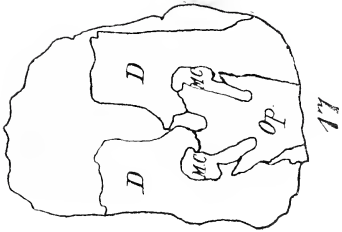
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LOWER JAW OF LYSTROSAURUS.



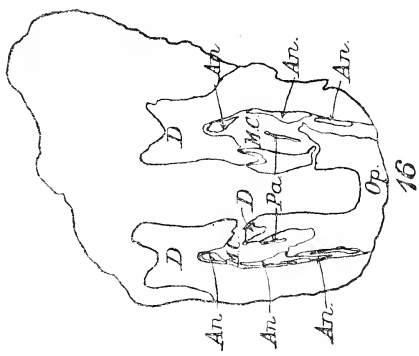
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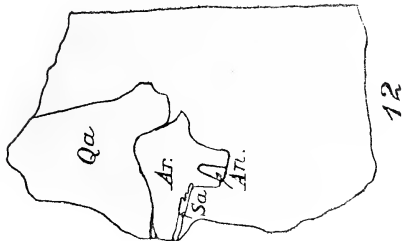
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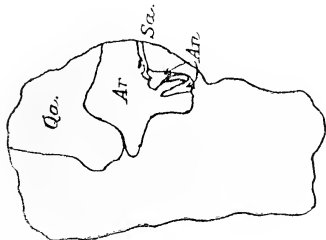
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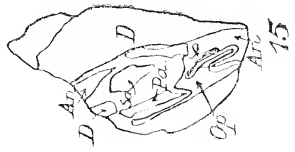
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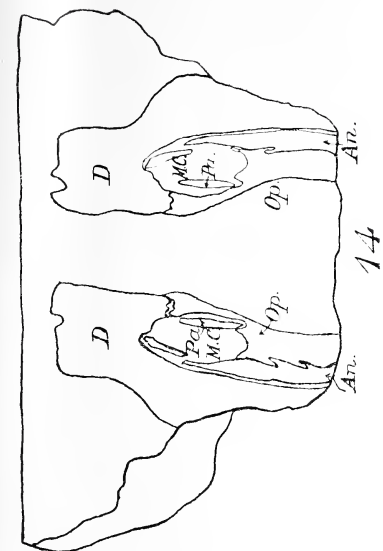
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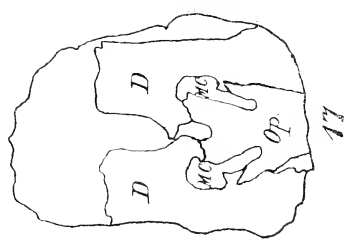
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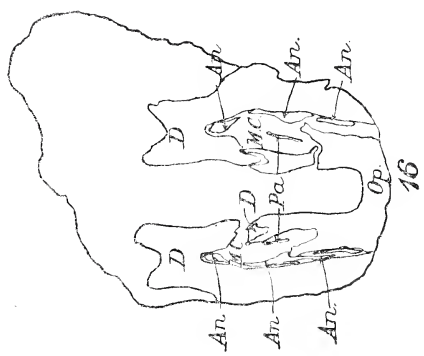
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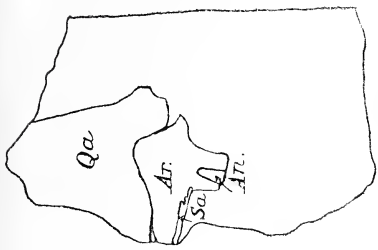
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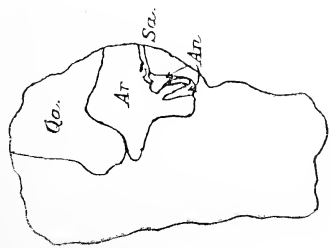
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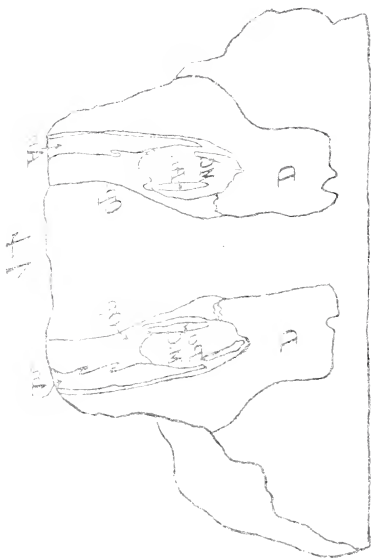
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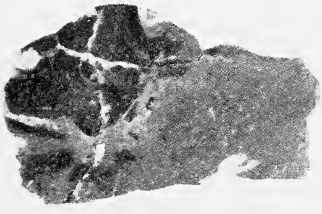
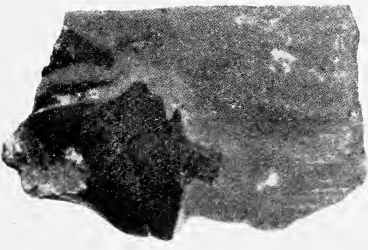
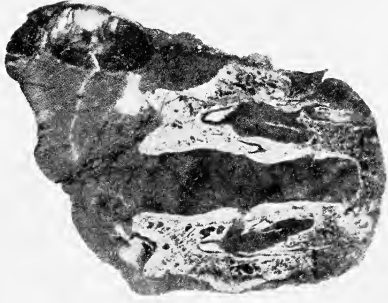
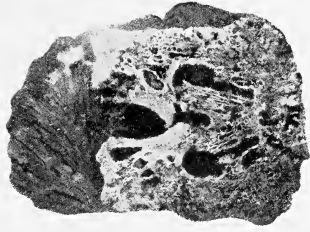


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ANNALS

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VOLUME V.



PART 1, containing:—

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Lymantriadae.* By A. J. T. JANSE, F.E.S.L.

Two New South African Species of Striphnopterygidae.
By A. J. T. JANSE, F.E.S.L.

*Contributions to the Knowledge of the Reptiles of the Karroc
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CONTRIBUTION TOWARDS OUR KNOWLEDGE OF THE SOUTH AFRICAN LYMANTRIADAE.

By A. J. T. JANSE, F.E.S.L.

THIS contribution is the result of my study of all the material belonging to this family from the collections of the Transvaal Museum, Natal and Durban Museums, Messrs. E. L. Clark and E. E. Platt (Durban), and my own. In many cases fine series were at my disposal, and these gave me a fair idea of the variability of some species.

Most of my attention has been given, however, to the structural characters, especially those useful for the definition of the genera.

I do not think that up to now much study has been made of the genera of this family, and, as will be seen from this paper, the most peculiar mistakes have been made in the generic identification.

It is also peculiar that, as far as I know, very little, if any, attention has been given to the process of the fore tibia, which processes are in all cases peculiar to the genus and often give clues to the affinity of some genera. I therefore figure this process in all genera, where necessary and possible of both sexes. The process is sometimes somewhat hidden in a groove of the tibia, and in such cases it has been drawn as if pulled out of the groove.

The study of the palpi also has been neglected, and I often found the third joint missing in certain groups of genera. This was noticed in *Orgyia antiqua* by Alfred Walter in 1885, but it seems that subsequent authors have made no use of this character.

The literature on the classification of the family is not very large; the most important are the following:—

Prof. Chr. Aurivillius: "Beitraege zur Kenntniss der Insektenfauna von Kamerun, Lepidoptera Heterocera," Arkiv för Zoologi, K. Svenska Vetenskap Akademien Bnd., II, No. 4, 1904. (This is perhaps the best attempt made to fix the limits of the different genera; the "key" to the genera, pp. 62-68, has been prepared with great care and was very useful to me in drawing up the "key" to the South African genera.)

Dr. A. Jefferis Turner: "A Classification of the Australian *Lymantriadae*," Trans. Ent. Soc., Lond., 1904, Part III. (This work has also been useful to me, but only six of the Australian genera occur also in South Africa.)

Sir G. F. Hampson: "The Fauna of British India," Vol. I, pp. 432-494, 1892; "The Moths of South Africa," Part III, Ann. S.A. Mus., pp. 390-412, 1905.

Col. Charles Swinhoe: "A Revision of the Old World *Lymantriadae* in the Nat. Coll.," Trans. Ent. Soc., Lond., 1903, Part III, pp. 375-498. (This paper, though useful for specific work, is useless for generic identification, as the author did not define the genera enumerated, and therefore makes it impossible for other workers to follow up his classification.)

For the study of genera represented in Europe a careful study has been made of the European genera representatives, as far as they were present in my collection.

Unless where otherwise stated, the descriptions of the genera are made of the type of each genus.

In the description of new species Ridgway's "Color Standards and Color Nomenclature," 1912, has been used, and the figure behind the colour indicates the plate of this most useful work. I think it a pity that so very little use is made by Lepidopterists of standard colours, which enable one to identify colours with certainty.

All measurements given in the specific description include the cilia, and are measured from tip to tip of the fore wings with the specimens set in the Continental way.

I also venture to give a phylogenetic table, showing the affinity of the South African genera, as I understand them.

I distinguish three distinct branches, of which *Bazisa* and *Redoa* are the most primitive, while the third form, from which the *Dasychira*- and *Lymantria*-branches have come, together with the ancestor of these three branches, are unknown to me.

The *Bazisa*-branch has the palpi with two joints only, but all its genera are very primitive in neuration; *Cimola* must have given rise to *Lepidopalpus* and *Olapa*—the former also has the process of the fore tibia two-jointed;* *Olapa* gave rise to *Pirga* and *Bracharoa*.

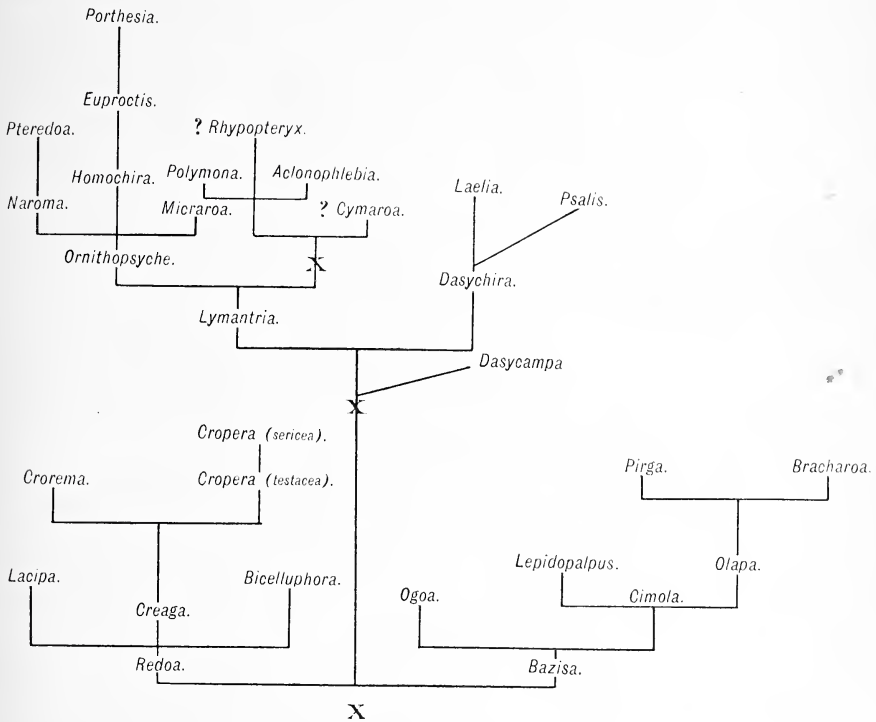
Redoa has three-jointed palpi, which become reduced in *Creaga* and all genera originating from this genus; the two branches, *Lacipa* and *Bicelluphora*, are most peculiar for their vein II of fore wing, which is free and from the upper median in all other genera of the South African *Lymantriadae*. The branches from *Creaga* come very close to each other.

The third branch is most developed specifically, many genera being very large.

The *Lymantria*-branch is best developed generically and contains genera of the highest development. It splits into two branches, the *Polymona-Aclonophlebia*-branch (near which come perhaps the two genera that I have not been able to study) and the *Ornithopsyche*-branch. From

* I cannot account for *Bazisa* having the process without this second joint.

this comes directly the peculiar genus *Micraroa*, and the *Homochira*- and *Naroma*-branches. *Pteredoa* develops from *Naroma*, while *Homochira* gives rise to *Euproctis*, from which comes the genus *Porthesia*.



KEY TO THE SOUTH AFRICAN GENERA.

1. a. Fore wing without an areole..... 2.
- b. Fore wing with an areole*..... 13.
2. a. Fore wing with vein 10 free out of upper median..... 3.
- b. Fore wing with vein 10 out of stalk of 8 and 9..... 4.
3. a. Hind wing with vein 6 and 7 stalked; 3 as far from 4 as 4 is from 5; vein 8 anastomosing with upper median; fore wing with stalk of 7 nearly half the vein in length..... 27. *Pteredoa*, p. 65.
- b. Hind wing with vein 6 and 7 from a point; vein 3 nearly twice as far from 4 as 4 is from 5; 8 touching upper median, but not anastomosing with it; fore wing with stalk of 7 over half..... 26. *Naroma*, p. 64.

* In *O. flabellaria* the areole may be absent; in *Bazisa* the areole is not quite closed.

4. a. Hind legs with four spurs..... 5.
 b. Hind legs with only two spurs..... 11.
5. a. Fore wing with vein 10 from stalk of
 7.8.9 before vein 7 6.
 b. Fore wing with 10 from stalk of 8.9
 beyond 7..... 7.
6. a. Hind wing with vein 6 and 7 separate,
 5 from well above lower angle; fore
 wing with 6 free, 11 anastomosing
 with 12..... 18. *Lymantria*, p. 44.
 b. Hind wing with 6 and 7 from a point,
 5 and 4 from lower angle; fore wing
 with 6 stalked with 7.8.9.10, 11
 free (?)...... 18. a. (?) *Cymaroo*,* p. 67.
7. a. Hind wing with vein 5 absent..... 25. *Porthesia*, p. 61.
 b. Hind wing with vein 5 present..... 8.
8. a. Hind wing with vein 4 and 5 from a
 point; fore wing with 6 stalked with
 7.8.9.10..... (?) 18. a. *Cymaroo*, p. 67.
 b. Hind wing with vein 5 well above the
 angle; fore wing with 6 not stalked
 with 7.8.9.10..... 9.
9. a. Fore wing with 10 from before half of 9;
 7 from near angle; 6 from far below
 the angle..... 21. *Ornithopsyche*, p. 48.
 b. Fore wing with 10 from well beyond
 half of 9; 7 on a long stalk with
 8.9.10; 6 from near angle..... 10.
10. a. Fore wing with vein 5 well above the
 angle; hind wing with 3 and 4 from
 angle or very shortly stalked..... 23. *Homochira*, p. 53.
 b. Fore wing with 5 from angle; hind
 wing with 3 and 4 on a stalk of $\frac{1}{6}$... 24. *Euproctis*, p. 54.
11. a. Cells of both wings open; fore wing
 with vein 7 absent; hind wing with
 3 absent; palpi with two joints only 22. *Micraroo*, p. 52.
 b. Cells well closed by discocellular; all
 veins present; palpi with three joints. 12.
12. a. Hind wing with vein 8 not quite touch-
 ing the upper median; 3, 4, 5 from
 nearly equal distances; fore wing
 with the stalk of 7 and 10 short;
 3rd joint of the palpi very thin.... 20. *Aclonophlebia*, p. 47.

§ 1. * I am not certain that this genus is placed correctly, as Hampson does not mention the position of vein 10 in fore wing; he places it near *Lymantria*, though, from the description, I think it may come near or between *Euproctis* and *Porthesia*.

- b. Hind wing with vein 8 touching the upper median at beyond $\frac{1}{2}$; vein 5 from well above the angle; 3 and 4 from the angle; 3rd joint of palpi thick. 19. *Polymona*, p. 46.
13. a. Fore wing with vein 11 originating free from the upper median. 15.
 b. Fore wing with 11 stalked with 10.9. 14.
14. a. Fore wing with 11 shortly stalked; areole short; hind wing with 3 and 4 stalked; 8 approaching, but not touching, the upper median at beyond $\frac{1}{2}$ 10. *Lacipa*, p. 17.
 b. Fore wing with vein 11 on a long stalk; areole very long; hind wing with 3 and 4 apart; 8 touching upper median at before $\frac{1}{2}$ 4. *Lepidopalpus*, p. 9.
15. a. Hind tibia with two spurs. 16.
 b. Hind tibia with four spurs. 21.
16. a. Hind wing with vein 6 and 7 on a stalk. 18.
 b. Hind wing with vein 6 and 7 not stalked. 17.
17. a. Hind wing with vein 3 and 4 from, and vein 5 from near, the lower angle; 6 and 7 from the upper angle; 8 touching the upper median; palpi three jointed. 14. *Dasycampa*, p. 25.
 b. Hind wing with vein 3 and 4 far apart; 5 from near 6; 6 and 7 far apart; 8 anastomosing with the upper median; palpi two jointed. 3. *Cimola*, p. 8.
18. a. Hind wing with 4 and 5 from the lower angle. 5. *Pirga*, p. 12.
 b. Hind wing with vein 5 from well above the angle. 19.
19. a. Fore wing with vein 11 anastomosing with 12; 4 and 5 stalked. 7. *Bracharoa*, p. 13.
 b. Fore wing with vein 11 free; 4 and 5 separate. 20.
20. a. Areole of fore wing very long; 10 from the areole a little beyond $\frac{1}{2}$; 8 of hind wing running along the upper median for a great length. 2. *Ogoa*, p. 8.
 b. The areole of the fore wing is short; 10 from areole near its end; hind wing with 8 just touching the upper median or connected with it by a bar (*O. flabellaria*). 6. *Olapa*, p. 11.

21. a. Hind wing with vein 6 and 7 apart.... 22.
 b. Hind wing with vein 6 and 7 from a point or stalked..... 23.
22. a. Areole rather short; 8 and 9 of fore wing anastomosing for a great length; bar of hind wing well before middle of upper median..... 12. *Cropera*, p. 21.
 b. Areole rather long; 8 and 9 not quite touching each other; bar of hind wing near middle of upper median... 1. *Bazisa*, p. 7.
23. a. Hind wing with vein 3 nearer to 4 than 4 is from 5, or even 3 and 4 from a point or stalked *..... 24.
 b. Hind wing with vein 3 as near to 4, or even farther away from 4, than 4 is from 5..... 27.
24. a. Vein 11 of fore wing anastomosing with the stalk of 9 and 10 to form a second areole..... 9. *Bicelluphora*, p. 16.
 b. Vein 11 of fore wing remains free..... 25.
25. a. Hind wing with vein 3 and 4 stalked; palpi with two joints only..... 17. *Psalis*, p. 43.
 b. Hind wing with vein 3 and 4 from a point; palpi with three joints..... 26.
26. a. Third joint of palpi long, visible without removing the hairs; process of fore tibia long and curved outwards.... 16. *Laelia*, p. 35.
 b. Palpi with the third joint very short and hidden in the hairs of the second joint; process of fore tibia short and not curved outwards..... 15. *Dasychira*, p. 27.
27. a. Hind wing with 6 and 7 from a point; 8 does not touch the upper median.. 12. a. *Cropera*, p. 21.
 b. Hind wing with 6 and 7 well stalked; 8 is touching the upper median or is connected with it by a bar..... 28.
28. a. Fore wing with vein 7 from before the end of the areole; areole long; palpi three jointed..... 8. *Redoa*, p. 15.
 b. Fore wing with vein 7 from the end of the areole, which is rather short; palpi two jointed..... 29.
29. a. Fore wing with vein 6 remote from the areole; hind wing with 5 from near the lower angle; 8 connected to the upper median by a bar..... 13. *Crorema*, p. 23.

* An exception to this makes the female of *Laelia figlina*.

- b. Fore wing with vein 6 from the areole ;
hind wing with 5 from well above the
lower angle ; 8 just touching the
upper median..... 11. *Creaga*, p. 20.

Genus BAZISA (pl. I, fig. 1).

Bazisa Wlk., Cat. XXXII, p. 398 (1865); type *detecta*.

Bazisa, Hmps., Ann. S.A. Mus. (1905), p. 393; type *melaxantha* (?).

Description from *perculata*.

♂. Proboscis absent; palpi short, a little beyond frons, about as long as eye, porrect, two jointed, covered with woolly hair; eye round, covered for nearly $\frac{1}{2}$ its width by a tuft of long hair, small, a little over $\frac{1}{2}$ the width of frons; antennæ bipectinate, shaft curved, branches 8 times thickness of shaft, ending in 2 bristles and forming on inner side a straight line, except at tip, where it is curved a little inwards, basal joint with a short hair-tuft; fore tibia with a process as long as the tibia and ending in a curved point; mid tibia with 1 pair of spurs; hind tibia with 2 pairs, which are quite close together; tarsae of all legs with very short hair; abdomen just beyond the hind wings.

Fore wing semicircular; costa nearly straight; termen, inner margin, apex, and tornus very much rounded; vein *1b* simple at base; 2 from $\frac{2}{3}$ lower median; 3 from beyond $\frac{5}{6}$; 4 from lower angle; 5 from well above the angle; discocellular between 5 and 6 indistinct, angled inwards; 6 from well below upper angle; 7 and 8 from upper angle on a stalk of nearly $\frac{1}{3}$; 9 and 10 on a little longer stalk and from before $\frac{2}{6}$ upper median; 9 curved so as to approach 8, but in none of the seven specimens I examined do they touch and form an areole; 11 free from $\frac{2}{3}$ upper median; 12 nearly straight.

Hind wing sub-triangular; large; with the costa, termen, and inner margin somewhat rounded; the apex and tornus much rounded; a distinct rounded lobe at vein *1b*; vein *1a* long; *1c* represented by a short vein; 2 from $\frac{2}{3}$ lower median; 3 from beyond $\frac{5}{6}$; 4 from lower angle; 5 almost the same distance from 4 as 4 is from 3; discocellular between 5 and 6 faint and angled inwards; 6 from well below upper angle; 7 from angle; 8 bent at before $\frac{1}{2}$ upper median and both veins producing a prominence that suggests a bar, to connect the two veins.

The only species known to me is *perculata* Dist., which is placed by Sir Hampson in this genus, though he sinks this genus as a synonym of *Aroa* in his "Moths of India," p. 439. The type of this genus as described by Walker is *detecta*, which Hampson sinks as a synonym of *pyrrhochroma*, and not *melaxantha* as stated by Hampson in his "Moths of South Africa," p. 393. Aurivillius, *l.c.* p. 67, places *perculata* in *Cropera*, from which it differs, however, in the imperfectness of the areole, and, as this character seems to be constant and is a very primitive character, I think it sufficient to keep this genus distinct from any others. Moreover, it differs also in the palpi and the process of the fore tibia. I also find that Walker wrote the name *Bazisa*, and not *Baziza* as given by Hampson.

Bazisa perculata, Dist., A. M. N. H. (6), XX, p. 201 (1897).

I have seen this species from—

Pietpotgietersrust (XI, Burn).

Waterval (Zoutpansberg District) (XI, Janse).

Pretoria (II, Janse).

Rietfontein No. 57 (XII, Janse).

Genus OGOA (pl. I, fig. 2).

Ogoa Wlk., Cat. VII, p. 1764 (1856); type *simplex*.

♂. Proboscis very short; palpi short, two jointed, porrect, just reaching frons; eyes $\frac{1}{2}$ width of frons; antennæ bipectinate; the branches 6 to 7 times the base of the shaft and gradually getting shorter towards apex, each ending in 2 to 4 bristles; in ♀ the branches are only $\frac{1}{2}$ the length of those of the ♂; fore tibia in both sexes with a process on inner side, nearly as long as the tibia, covered with long hair and ending in a long tuft of hair; mid and hind tibiae with 2 short spurs only; tarsae with short smooth hairs; abdomens as long as hind wings.

Fore wing long, triangular; costa arched; outer margin slightly hollowed out; inner margin somewhat rounded; apex and tornus well rounded; 1*b* simple at base; 1*c* faintly represented; 2 from just beyond $\frac{1}{2}$ of lower median; 3 from middle of 2 to 4; 4 from lower angle; 5 from well above the angle; 6 from a little below upper angle; discocellular faint; cell nearly $\frac{2}{3}$ of wing; 7 and 8 on a stalk of $\frac{1}{2}$ 7 and from upper angle; 9 and 10 on a stalk of $\frac{1}{2}$ 9 from over $\frac{7}{8}$ of upper median; 9 bent towards 8 and anastomosing with it to form an areole about 5 times longer than broad; 11 from $\frac{3}{4}$ of upper median; 12 nearly straight.

Hind wing triangular; costa nearly straight; outer and inner margin rounded; apex rounded; tornus forming a rounded lobe at 1*b*; 2 from a little beyond $\frac{1}{2}$ of lower median; 3 from $\frac{3}{4}$; 4 from the lower angle; 5 from $\frac{1}{3}$ of discocellular, which is angled at middle; 6 and 7 on a stalk of $\frac{1}{4}$ 6 and from upper angle; 8 approaching and touching beyond $\frac{1}{2}$ the upper median for a great length, but not anastomosing with it.

Ogoa simplex Wlk., Cat. VII, p. 1764 (1856).

Hmps., Ann. S.A. Mus., p. 391 (1905).

Hab. Durban (II, X, Leigh).

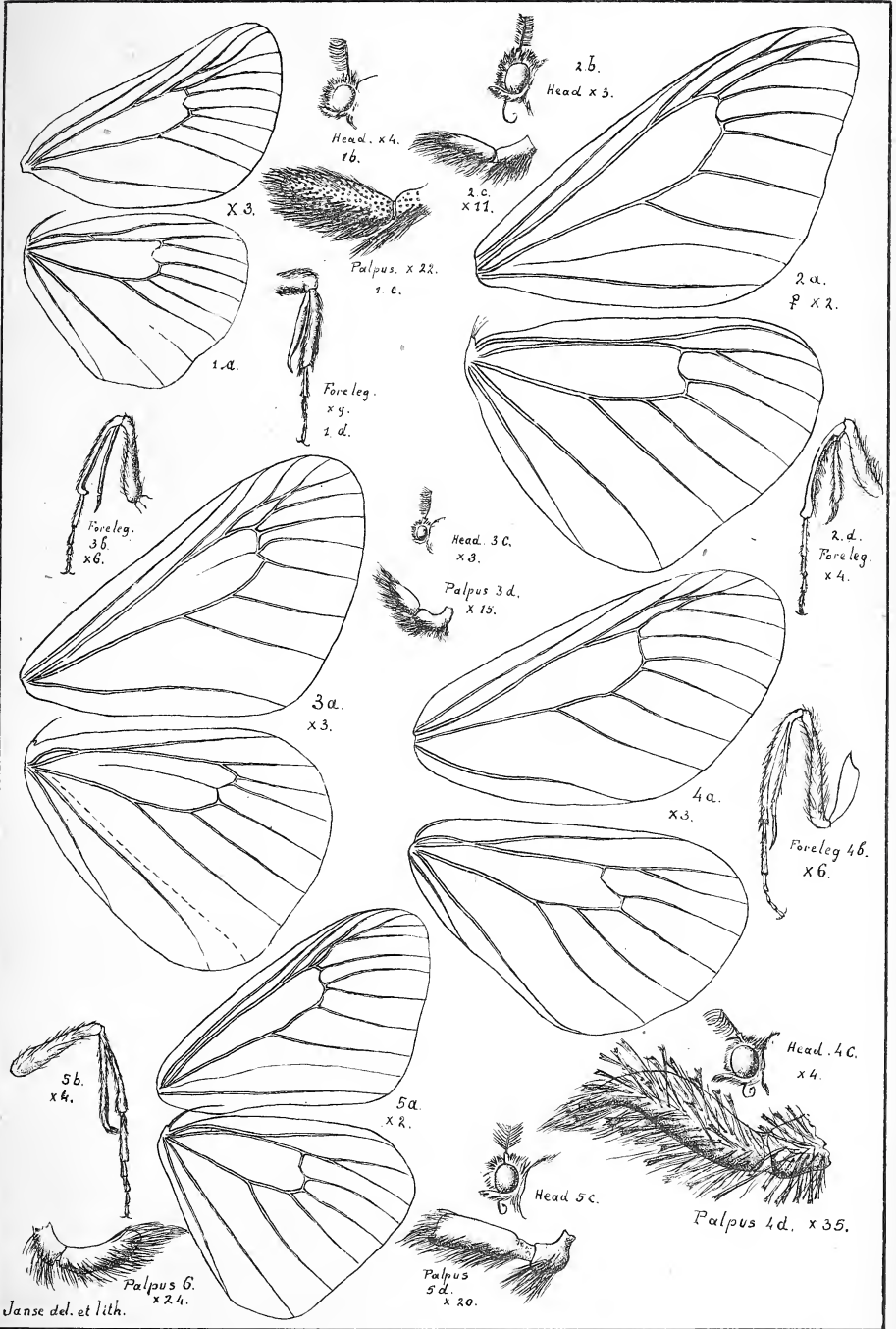
Ngqeleni, Pondoland (I, Swinny).

Estcourt.

Genus CIMOLA (pl. I, fig. 3).

Cimola Wlk., Cat. IV, p. 817 (1855); type *opalina*.

♂. Proboscis absent; palpi just to frons, porrect or even drooping; eyes small, about $\frac{1}{4}$ width of head; antennæ bipectinate, curved; branches about 10 times base of shaft, shorter towards base and apex and each ending in 2 bristles; fore tibia with a process on inner side which is a little longer than the tibia and apparently two jointed, a little curved at



1. *Bazisa perculata*, Dist.; 2. *Ogoa simplex*, wik ♀; 3. *Cimola opalina*, wik ♂; 4. *Lepidopalpus hyalina*, nov spec. ♂; 5. *Olapa furva*, Hmpsn. ♂; 6. Palpus of *O. nigricosta*, Hmpsn. ♂.

the end; mid tibia without spurs; hind tibia with 2 spurs only; tarsae with smooth, rather long hair; abdomen of ♂ about $\frac{2}{3}$ of hind wing.

Fore wing triangular, with costa straight; inner and outer margin evenly, but slightly, arched; apex and tornus much rounded; vein *1b* simple at base; 2 from a little beyond $\frac{1}{2}$ of lower median; 3 from middle of 2 and 4; 4 from lower angle; 5 from a little below middle of discocellular, where also a short veinlet is given off into the cell; discocellular a little angled at vein 5; cell over $\frac{2}{3}$ of wing; 6 from below upper angle; 7 and 8 on a stalk of $\frac{1}{4}$ of 7 and from upper angle; 9 and 10 on a stalk of nearly $\frac{1}{2}$ 9 and from upper median at $\frac{5}{6}$; 9 much curved towards 8 and anastomosing with 8 for a short distance just above free part of 8 and 9, thus forming a large areole, which is 3 times longer than broad; 11 from $\frac{2}{3}$ upper median and parallel to 12; 12 straight.

Hind wing ample, triangular; costa and outer margin nearly straight; inner margin a little arched; apex well rounded; tornus forming a rounded lobe from *1b* to 2; *1a* straight, moderate; *1b* curved; a trace of *1c*; 2 from a little beyond $\frac{1}{2}$ lower median; 3 a little beyond $\frac{2}{3}$; 4 from angle; discocellular sharply angled at middle of 4 and 5 and emitting a distinct veinlet into the cell; cell $\frac{2}{3}$ of wing; 5 from near 6; 6 from upper angle; 7 from upper median at $\frac{9}{10}$; 8 anastomosing at $\frac{1}{4}$ with upper median for a short distance, then straight and diverging.

***Cimola opalina* Wlk., Cat. IV, p. 817 (1855).**

I have seen this species from—

Durban (IV, Ross) (I).

Pinetown (III, Leigh).

Tongaat.

Ngqeleni (VIII, I, Swinny).

Genus *LEPIDOPALPUS*, nov. (pl. I, fig. 4).

Type *hyalina*, nov. spec.

♂. Proboscis very short, but visible; palpi short, just beyond frons and about as long as the eye, porrect; second joint about 4 times longer than first joint; third joint minute; first joint covered with bi-lobate scales; second joint with tri-lobate scales and some hairs; eyes large, about width of frons, round; frons thinly covered with hairs; antennæ curved, bipectinate; branches long in middle, about 8 times shaft and ending in 2 bristles, they gradually get shorter towards both ends so as to form a straight line on inner side; basal joint with a rather long tuft of hair; fore tibia with a process longer than the tibia and *apparently* made of two joints, the last joint $\frac{1}{4}$ of the first and curved, so as to project well beyond the tibia on outer side; mid and hind tibia with 2 moderate spurs of equal length; tarsae covered with short hairs; abdomen as long as hind wing.

Fore wing sub-triangular; costa gently arched; termen and inner margin well rounded; apex and tornus much rounded; *1b* simple at base; 2 from a little beyond $\frac{1}{2}$ of lower median; 3 from $\frac{1}{2}$ the distance 2 to 4;

4 from lower angle; 5 from well above angle; discocellular rounded; cell less than $\frac{2}{3}$ of wing; 6 from a little below upper angle; 7 and 8 on a stalk of $\frac{1}{3}$ of 7, and originating from upper angle; 9, 10, and 11 stalked and from $\frac{3}{4}$ upper median; 11 given off at $\frac{1}{3}$ of 9; 10 from before $\frac{2}{3}$; 9 anastomosing with 8 at $\frac{2}{3}$ of 9 to form a long areole, which is about 6 times longer than broad; 12 parallel to upper median.

Hind wing sub-triangular; costa almost straight; termen, apex, and tornus much rounded; inner margin slightly hollowed out at lower half; vein *1a* very short and straight; *1b* somewhat curved; 2 from before $\frac{2}{3}$ lower median; 3 from middle of 2 and 4; 4 from lower angle; 5 from $\frac{1}{3}$ discocellular, which is angled inwards and oblique; 6 and 7 on a stalk of $\frac{1}{3}$ of 7 and from upper angle; 8 slightly anastomosing with upper median or just touching it quite near base, then straight; frenulum absent in the four specimens I have seen, but in the wing preparation there is a short, but distinct, vein at the base near costa, which suggests an undeveloped frenulum, retinaculum absent in the ♂♂.

I do not know any African genus to which this one comes near, though it differs least from *Olapa*. From this genus it is distinct in having 11 and 10 stalked, in the hind wing having the connection of 8 with the upper median near base, by its two-jointed process on the fore tibia and the absence of the frenulum, while the palpi have three joints, though the last joint is very minute. Sir Hampson mentions in "Moths of India," Vol. I, p. 489, that the South American species of the genus *Caviria* has the veins 9, 10, and 11 of fore wing as in *Lepidopalpus*, but there the frenulum is present, and the fore wing has 6 and 7 from angle and the hind wing has 4 and 5 from the lower angle.

The species *hyalina* is very much like *Redoa melanocraspis*, from which it differs, however, in the stalked veins 9, 10, and 11 and in the absence of the frenulum. It is also very much like *Olapa nigricosta*, but is distinguished at once from that species by its 4 spurs and the other characters by which it differs from *melanocraspis*.

I hardly think this genus a direct development of *Cimola*.

Lepidopalpus hyalina, nov. spec. (pl. III, fig. 15).

♂. Head, frons, branches of antennæ, thorax, and abdomen whitish; shaft of antennæ white; palpi white with a black tip and some black scales mixed with the white hairs at first and second joints above and at the sides; fore legs white with black hairs on femora above and on tibiæ on inner sides and a black streak on inner side of tarsæ; mid and hind legs white; fore and hind wings pure white, semi-transparent; fore wing with thick black scales and hairs at costa, forming a streak from base to $\frac{1}{4}$ of costa; cilia white; under side of wings white, more hyaline than above.

Exp. 32.4 mill. in type; 30–34.6 mill. in co-types.

Hab. Ngqeleni (21.3.04, Swinny), in coll., Janse, type.

Ngqeleni (11.1.04, Swinny), co-type in coll., Transv. Mus.

Durban (15.2.09, E. L. Clark), co-type in coll., Janse.

Durban, one specimen partly used for preparation.

Genus OLAPA (pl. I, fig. 5; pl. II, fig. 1).

Olapa, Wlk., Cat. IV, p. 823 (1855). type *flabellaria*.

Antiphella, Wlk., Cat. VII, p. 1743 (1856). . . . type *flabellaria*.

Hampson, Ann. S.A. Mus., p. 391 (1905).

My specimens of *flabellaria* (teste Hmpsn.) has no areola, but vein 10 from upper median. Out of ten specimens nine had no areole, and the areole formed in the remaining specimen is not quite the same as in other species of *Olapa*, as it is formed by a bar between vein 10 and the stalk of 9 and 8, while in all other species it is formed by the anastomosing of 10 with stalk of 7, 8, 9 at $\frac{1}{2}$. *O. flabellaria* differs also in several other respects; the second joint of the palpus is much smaller and bluntly pointed; the process of the fore tibia is short; vein 3 of hind wing is from $\frac{1}{2}$ the distance of 2 to 4; while 5 is from closer to the lower angle and the discocellular is longer and more oblique; 8 is connected with the upper median by a bar and not touching it, as in the typical *Olapa*.

It may be that *flabellaria* is the highest development of the genus and has to be separated from the others; provisionally I leave in the genus.

In describing the genus *Olapa*, I use *furca* as a type, which I consider most typical to the genus.

Proboscis very short; palpi short, porrect, not reaching beyond frons, two jointed, of which the second joint is obtuse, cylindrical, and about 2 times as large as the first joint; eyes not quite $\frac{1}{2}$ width of head, rounded; antennæ bipectinate, branches about 10 times thickness of base of shaft and gradually getting shorter towards apex, ending in 2 or 3 bristles; at base a tuft of hairs; branches in ♀ only 2 times base of shaft; fore tibia in ♂ with a long process, curved towards the outside beyond the length of the tibia; in ♀ simple (except in *O. flabellaria*, where the ♀ has a thin short process); mid and hind tibiae with 2 moderate spurs; tarsae with short, smooth hairs; abdomen in ♂ not quite as long, in ♀ just as long as hind wings.

Fore wing shortly triangular; costa and outer margin a very little arched; inner margin nearly straight; apex and tornus well rounded; vein 1*b* simple at base; 1*c* faintly represented; 2 from before $\frac{2}{3}$ lower median; 3 from $\frac{2}{3}$ vein 2 and angle; 4 from lower angle; 5 from well above the angle; discocellular between 5 and 6, faint and curved inwards; cell nearly $\frac{2}{3}$ of wing; 6 from a little below upper angle; 7 and 8 on a stalk of $\frac{1}{3}$ 7, and from upper angle; 9 and 10 on a stalk of $\frac{1}{3}$ 10 and from beyond $\frac{7}{8}$ upper median; 9 just as it leaves 10, anastomosing with stalk of 7 and 8 at $\frac{1}{2}$, till nearly $\frac{1}{2}$ length of 8, so as to form the areole; at first sight it looks as if 10 anastomoses with stalk of 7, 8, 9 in forming the areole; 11 from $\frac{5}{6}$ upper median and parallel to 10; 12 parallel to costa for a great length.

Hind wing broad, triangular; costa, outer and inner margins almost straight; apex and tornus well rounded; a very small rounded lobe at 1*b*; 1*a* long and straight; 1*b* straight; 2 from before $\frac{2}{3}$ lower median; 3 from $\frac{2}{3}$ distance 2 to 4; 4* from lower angle; 5 from $\frac{1}{3}$ discocellular, which is oblique and angled inwards at $\frac{2}{3}$; cell over $\frac{1}{2}$ the wing; 6 and 7

from upper angle and on a stalk of $\frac{1}{3}$ of 6; 8 touching upper median at $\frac{1}{2}$, but not anastomosing with it.

In one specimen of *O. nuda* I find that the right fore wing has 10 free, and thus forms no areole, while the other wing is quite normal; its hind wing has vein 5 nearer to 4 than 4 is to 3, and the stalk of 6 and 7 is not quite as long as normally. In *O. nigricosta* the free part of 7 and 10 comes from $\frac{3}{4}$ of the areole, and thus places it near the genus *Pirga*, from which it differs, however, in the shorter stalk of 6 and 7 of the hind wing.

- | | | |
|-------|---|----------------------|
| 1. a. | Both wings white..... | <i>nigricosta</i> . |
| | b. Wings not white..... | 2. |
| 2. a. | Veins of fore wings dark..... | 3. |
| | b. Veins of fore wing of ground colour..... | <i>flabellaria</i> . |
| 3. a. | Fore wing with scaling rather dense; ground colour of both wings maize yellow (IV); hind wing with the veins rather light..... | <i>furva</i> . |
| | b. Fore wing with the scaling rather thin; ground colour of both wings cream colour (XVI); veins of hind wing almost as dark as in fore wing..... | <i>nuda</i> . |

Olapa furva, Hmpsn., Ann. S.A. Mus., p. 391 (1905).

Hab. Krabbefontein (Dr. H. G. Breyer).

Chilovane (Rev. Junod).

Olapa nigricosta, Hmpsn., Ann. S.A. Mus., p. 392 (1905).

Hab. Port St. Johns (4.3.08, 27.8.08, Swinny).

Ngqeleni, Pondoland (10.3.04).

Eshowe, Zululand (II).

Olapa nuda, Holl., "Don. Smith's Travels," p. 409, pl. fig. 5 (1897).

Hmpsn., Ann. S.A. Mus., p. 391 (1905).

Hab. Waterberg (27.12.08, A. T. Cooke).

Olapa flabellaria, Fab., Mant. Ins., II, p. 188 (1787).

Liparis crocicollis, Herr., Schäff, Aussereur. Schmett., f. 110 (1854).

Olapa temporata, Wlk., Cat. IV, p. 823 (1855).

Antiphella vecontia, Druce, A. M. N. H. (7), III, p. 469 (1899).

Hmpsn., Ann. S.A. Mus., p. 391 (1905).

Hab. Barberton (Jan., 1911, Janse) (II, J. F. Jeffery).

Durban (III, A. Ross).

Estcourt.

Genus PIRGA (pl. II, fig. 2).

Pirga, Auriv., Entomologisk Tidskrift, p. 192 (1892)... type *mirabilis*, Auriv.
Description made from *Pirga transvalensis*, nov. spec.

♂. Proboscis short; palpi short, porrect, two jointed; second joint 2 times longer than first joint, rather thin and bluntly pointed, covered with some hair underneath and at tip; eyes round, large, of width of

frons; frons rounded, with few hairs; antennæ less than $\frac{1}{2}$ of costa, bipectinate, curved; basal joint with a slight tuft; branches about 8 times shaft, ending in 1 long and 1 short bristle; fore legs missing in my specimen; mid and hind tibiae with terminal spurs only; legs with thin hairs; thorax and abdomen thinly covered with hair; abdomen about $\frac{2}{3}$ of inner margin of hind wing.

Fore wing sub-triangular; costa slightly arched; termen rounded; inner margin straight; apex and tornus rounded; 2 from beyond $\frac{1}{2}$ lower median; 3 from beyond $\frac{1}{2}$ of 2 to 4; 4 from lower angle; 5 from a little above the angle; discocellular faint; cell over $\frac{1}{2}$ length of wing; 6 from below upper angle; 7 and 8 on a stalk of $\frac{1}{3}$ 7 and from upper angle; 9 and 10 on a stalk of $\frac{1}{2}$ 10 and from beyond $\frac{1}{6}$ of upper median; stalk of 9 and 10 and vein 9 for $\frac{1}{2}$ its free length anastomosing with upper part of stalk of 7 and 8, and with 8 for nearly $\frac{1}{2}$, so as to form an areole which is shorter than the length of each of the two stalks; 11 from $\frac{3}{4}$ upper median and nearly parallel to 12; 12 parallel to costa for over $\frac{3}{4}$.

Hind wing sub-triangular; costa and inner margin slightly hollowed out; termen well rounded; apex and tornus much rounded; a small lobe at vein 1b; vein 1a very long and a little curved; 1b straight; 1c faintly represented; 2 from well beyond $\frac{1}{2}$ lower median; 3 from beyond $\frac{1}{2}$ 2 to 4; 4 and 5 from lower angle; discocellular oblique, faint and angled at $\frac{3}{4}$; 6 and 7 on a stalk of $\frac{1}{2}$ 6 and from upper angle; 8 touching upper median at before $\frac{1}{2}$, where the latter is bent, but not anastomosing with it.

Though I have not seen any other species of this genus, the description given by Prof. Aurivillius is sufficiently minute to guarantee the correctness of the generic identification. Only one species is known to me, and that appears to be undescribed.

Pirga transvalensis, nov. spec. (pl. III, fig. 1).

Hairs of head, palpi, thorax and abdomen above and underneath, and legs cream buff (XXX); shaft and branches of antennæ black; wings hyaline, sparsely covered with cream-buff hairs, that stand thickest and are longest near base and inner margin of hind wing; all veins, termen and apex of both wings, costa of fore wing, and tornus and inner margin of hind wing mummy brown (XV); hind wing with the hairy covering a little thicker than on fore wing; cilia cream buff.

Under side as above.

Exp. 32.8 mill.

Hab. Kalkbank (Zoutpansberg District) (II, Mr. P. Kat). Only one specimen in coll., Janse.

Genus BRACHAROA (pl. II, fig. 3).

Bracharoa Hmpsn., Ann. S.A. Mus., p. 392 (1905).

Type *quadripunctata*, Willgrn.

♂. Proboscis absent; palpi a little beyond frons, two jointed; second joint short and broad, about as long as first joint, somewhat pointed and covered above, on under side, and at sides with rather long hair; eyes $\frac{1}{3}$ width of frons; antennæ bipectinate; branches about 8 times base of

shaft, which is curved; branches gradually shorter towards base and apex, so as to form a straight line on under side; each branch usually ends in 2 bristles; fore leg with a hairy process on inner side, as long as the tibia; tibia with a short claw on outer side; mid and hind tibiae with 2 short spurs only; tarsae hairy; abdomen shorter than hind wings, without any tuft and, like the thorax, clothed with long hair.

Fore wing broad, triangular, with a nearly straight costa; inner margin slightly arched at termen; apex rounded; tornus a little rounded; 2 from $\frac{2}{3}$ lower median; 3 from a little before lower angle; 4 and 5 stalked for nearly $\frac{1}{2}$ 4, stalk from lower angle; discocellular angled at middle and with a short veinlet from the angle into the cell; cell over $\frac{1}{2}$ the wing; 6 from well below upper angle; 7 and 8 stalked till beyond $\frac{1}{4}$ of 7, stalk from upper angle; 9 and 10 stalked for about the same length and from upper median at $\frac{7}{8}$; 9 bending to stalk of 7-8 and anastomosing with the free part of 8 for about $\frac{1}{2}$ length of 8, so as to form an areole about 3 times longer than broad; 11 from upper median at $\frac{2}{3}$ and anastomosing at $\frac{1}{3}$ for its whole length with 12, which otherwise runs parallel to the costa.

Hind wing triangular and large; costa straight; termen rounded and with a small lobe at 2 to 3, and 1b to 1c; inner margin much rounded at middle; apex and tornus well rounded; 1a long and curved; 1b straight; 1c faintly represented; 2 from beyond $\frac{1}{2}$ the lower median; 3 from beyond $\frac{3}{4}$ 2 to 4; 4 from lower angle; 5 as far from 4 as 4 is from 3; discocellular only represented as a veinlet into the cell for $\frac{1}{2}$ its length, beginning at vein 5; 6 and 7 on a stalk of about $\frac{1}{2}$; 8 anastomosing with the upper median at before $\frac{1}{2}$ for a short distance. Aurivillius, in his "Key," *l.c.* p. 67, states that the two species, *quadripuncta* and *dregei*, have to come in the genus *Orgyia* Ochs., but after examining *O. antiqua*, the type of the genus, I found that *Bracharoa* differs from *Orgyia* in many respects. *Bracharoa* has no abdominal tuft; *Orgyia* has vein 11 quite free, while 7 and 8 of same wing are on a very short stalk and veins 4 and 5 are quite separate and rather far apart at origin. The hind wing of *Orgyia* is distinctly closed by a transverse vein, originating from about $\frac{2}{3}$ of the veinlet in the cell.

It is true, however, that *B. dregei* is not quite a typical *Bracharoa*, as it has also vein 11 of fore wing free and veins 7 and 8 on a shorter stalk, but otherwise it agrees with the structural characters of *quadripuncta*, and is more a *Bracharoa* than an *Orgyia*.

I consider *Bracharoa* as a development of *Orgyia*. *Orgyia* has no representatives in South Africa as far as I know.

1. a. Ground colour of fore wing light orange-yellow (III);

hind wing with terminal area fuscous..... *quadripuncta*.

b. Ground colour of fore wing cinnamon-buff (XXIX);

hind wing entirely suffused with fuscous..... *dregei*.

Bracharoa quadripuncta, Wilgrn., Öfv. Vet. Ak. Förh., p. 99 (1875).

Aroa bistigmigera, Butl., P. Z. S., p. 847 (pl. CLII, fig. 7) (1896).

Hmps., Ann. S.A. Mus., p. 392 (1905).

Hab. Pretoria (IX, II, Janse; III, Swierstra; Dr. Breyer).

Potchefstroom (X, Miss Lion-Cachet).

Barberton (IV, Miss De Beer).
 Three Sisters (X, Miss V. Snooke).
 Pietersburg (XI, Janse).
 Waterval, *Zoutpansberg District* (XI, Janse).
 Shilouvane, *Zoutpansberg District* (X, Rev. Junod).
 Stanger, Natal (IV).
 Eshowe (XI).
 Estcourt.

Bracharoa dregei, Herr Schöff., Aussereur. Schmett. (fig. 114) (1854).

Hmpsn., Ann. S.A. Mus., p. 392 (1905).

Hab. Caledon District (X, Lightfoot).

Capetown (III, IV, Lord Gladstone).

Genus REDOÄ (pl. II, fig. 4).

Redoä Wlk., Cat. IV, p. 826 (1855) type *submarginata*.

Hmpsn., Ann. S.A. Mus., p. 393 (1905).

Description made from *melanocraspis*.

♂. Proboscis very rudimentary; palpi just to frons, oblique; third joint almost porrect; second joint about 2 times first joint; eyes moderate, a little less than greatest width of frons; frons with a slightly rounded prominence and covered with short hair; antennæ somewhat curved, bipectinate; branches long, about 8 times shaft and ending in 2 bristles; basal joint large and with a short tuft of hair; fore tibia with a process on inner side, a little longer than the tibia and apparently made of two joints, first joint nearly as long as tibia and the second joint curved, so as to point outwardly; mid tibia with 2 terminal spurs of nearly the same length; hind tibia with 2 pairs of spurs, of which the first pair is usually shorter; tarsae covered with short smooth hair; abdomen shorter than hind wing.

Fore wing triangular; costa and inner margin slightly rounded; termen, apex, and tornus much rounded; *1b* simple at base and curved; 2 from beyond $\frac{2}{3}$ lower median; 3 from beyond $\frac{1}{2}$ 2 to 4; 4 and 5 from lower angle; discocellular sharply angled inwards at $\frac{1}{2}$ and with a trace of a veinlet in cell; cell more than $\frac{1}{2}$ of wing; 6 from well below upper angle; 7 and 8 on a stalk of nearly $\frac{1}{3}$ of 7, and from upper angle; 9 and 10 on a stalk of over $\frac{1}{2}$ of whole length of 9, and from beyond $\frac{3}{4}$ upper median; 9 anastomosing with 8 shortly after it comes from the stalk* for about $\frac{1}{2}$ the remainder length, so as to form a very long areole, about 7 times longer than broad; 11 from upper median at $\frac{2}{3}$ and parallel to 12; 12 straight.

Hind wing sub-triangular; costa and inner margin nearly straight; termen with a large rounded lobe at from vein 2 to 5; apex and tornus much rounded; *1a* long, slightly curved; *1b* long; *1c* faintly represented; 2 from $\frac{2}{3}$ lower median; 3 from beyond $\frac{1}{2}$ 2 to 4; 4 from the angle; 5 from $\frac{1}{3}$ discocellular, which is oblique and much angled inwards

* In one specimen 9 anastomoses at once as it comes from 10.

at $\frac{2}{3}$, where it also emits a veinlet into the cell; 6 and 7 on a stalk of $\frac{1}{4}$ 7 and from upper angle; 8 much curved towards upper median at $\frac{1}{3}$ and anastomosing with it for a very short distance; cell nearly $\frac{2}{3}$ of wing.

Redoa melanocraspis Hmps., Ann. S.A. Mus., p. 393 (1905).

I have seen this species from—

Port St. Johns (III, IV, XII, Swinny).

Ngqeleni (V, Swinny).

Zululand (XI, XII, Wichgraf).

Eshowe, Zululand (II).

Durban (II, E. L. Clark).

Pinetown (I, Leigh).

Tongaat.

Estcourt.

Pietermaritzburg (XII).

Genus **BICELLUPHORA**, nov. (pl. II, fig. 5).

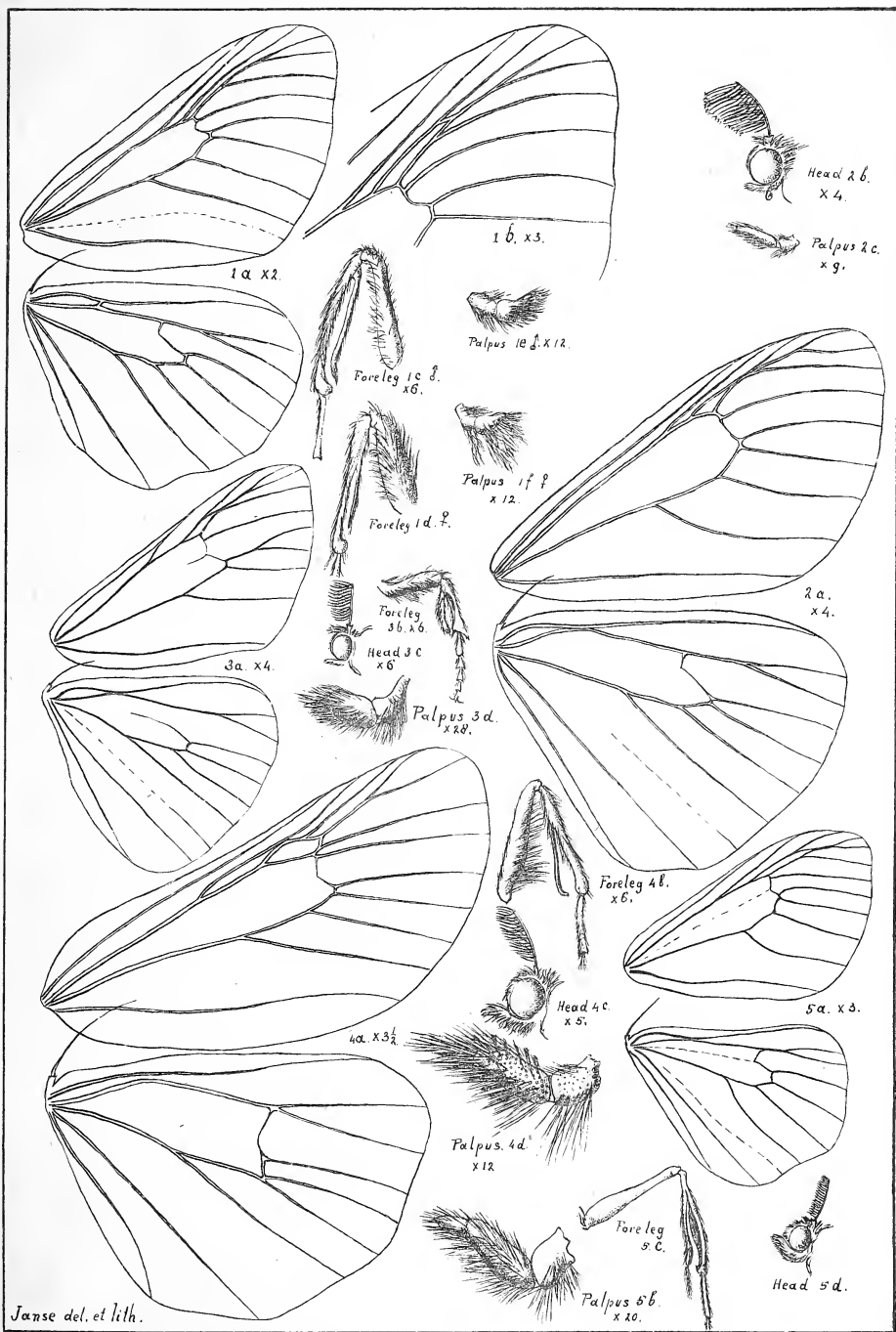
Type *argentea*, nov. spec.

♂. Proboscis absent; palpi short, just beyond frons, slightly ascending, two jointed; second joint about $\frac{1}{2}$ as long as first, cylindrical and ending in a contracted point that suggest, or even may be, the third joint; both joints covered with long hair, which in second joint underneath and at tip also above are mixed with scales; eyes large, of width of frons, round; frons flat; antennæ about $\frac{1}{2}$ the costa of fore wing, bipectinate; basal joint with a small tuft of hair; shaft curved; branches 4 times shaft, not ending in spines; thorax clothed with hair; abdomen covered with short hair and (probably) * without tufts; legs covered with scales and long hair; fore leg with a thin process, somewhat curved terminally; mid tibia with 2 spurs; hind tibia with 4 spurs.

Fore wing elongated; costa slightly hollow at middle; termen very oblique and as much rounded as the inner margin; apex and tornus much rounded; 1*b* simple at base; 2 from $\frac{2}{3}$ lower median; 3 from well beyond $\frac{1}{2}$ the distance of 2 to 4; 4 from lower angle; 5 from a little above the angle; discocellular angled at middle; cell nearly $\frac{2}{3}$ of wing; 6 from below upper angle; 7 and 8 on a very short stalk and from upper angle; 9 and 10 on a stalk of $\frac{1}{3}$; 10 originating from a little beyond $\frac{3}{4}$ upper median; 9 shortly after coming from 10 anastomoses at a little above 7 with 8 for about $\frac{1}{2}$ its free length, thus forming the areole; 11 from beyond $\frac{1}{2}$ upper median, curved and anastomosing with stalk of 9-10 at $\frac{1}{2}$ where that stalk is well bent, then running parallel to 10, thus a second areole is formed; 12 nearly straight.

Hind wing broad; costa gently arched; termen lobed at 2 to 5; inner margin lobed at 1*a*; apex rounded; tornus slightly lobed; 1*a* curved; 1*b* straight; 2 from beyond $\frac{1}{2}$ lower median; 3 and 4 from angle; 5 from nearly $\frac{1}{3}$ discocellular and rather faint; discocellular faint; cell over $\frac{1}{2}$ of wing; 6 and 7 very shortly stalked and from the upper angle; 8 curved

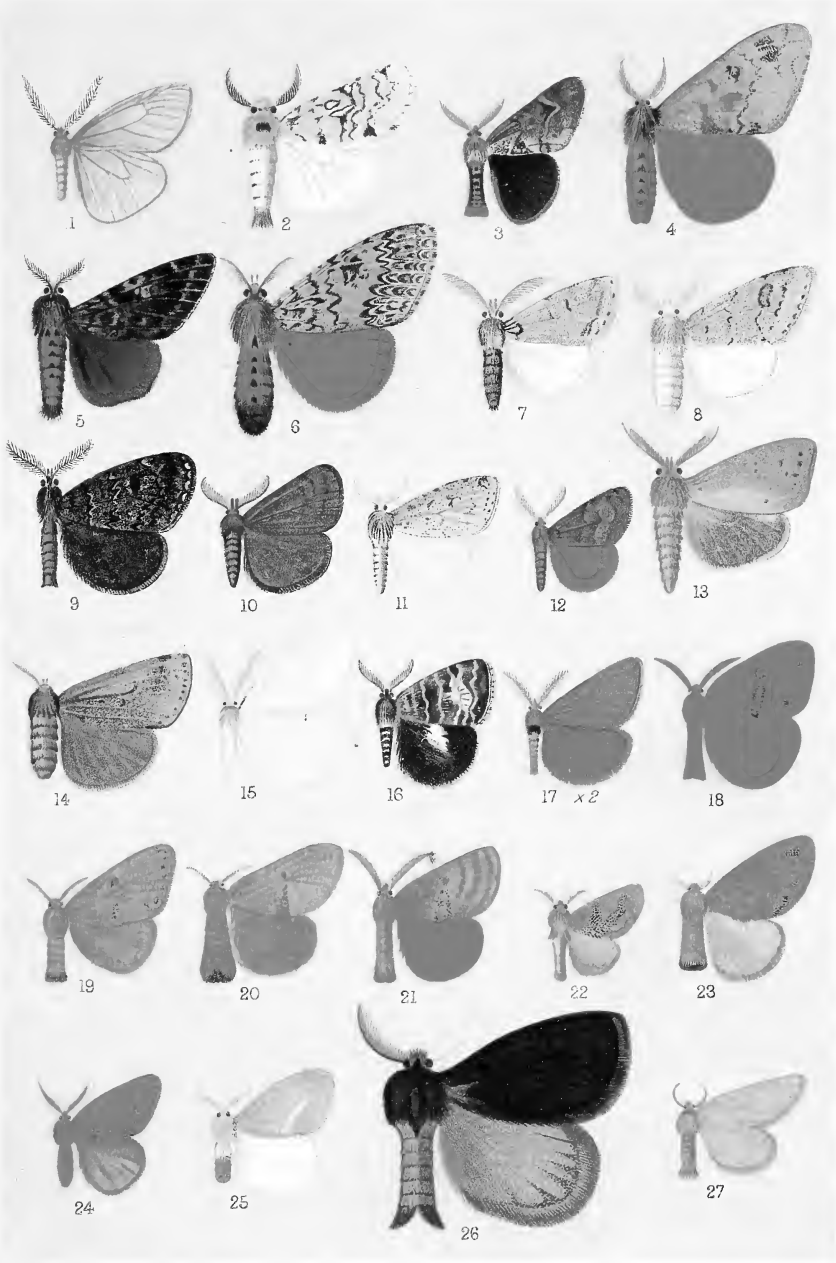
* The abdomen is somewhat rubbed in the only specimen I have seen.



Janse del. et lith.

1. *Olapa fiabellaria*, Fabr. ♂; 2. *Pirga transvalensis*, nov. spec. ♂;
 3. *Bracharoa quadripunctata*, Willgrn ♂; 4. *Bicelluphora argentea*, nov. spec. ♂;
 5. *Redoa melanocraspis*, Hmps. ♂.

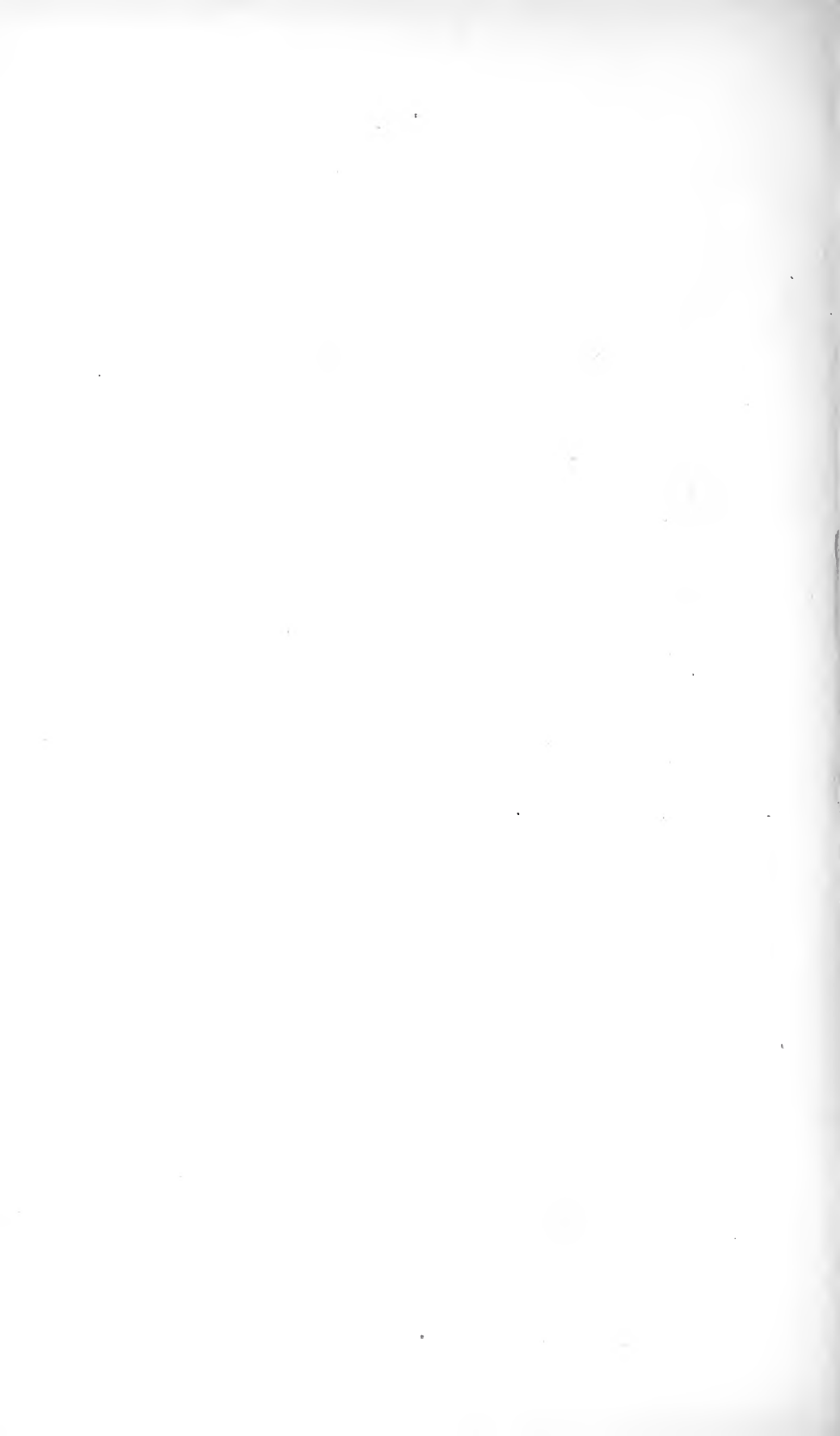
Annals of the Transvaal Museum Plate III.

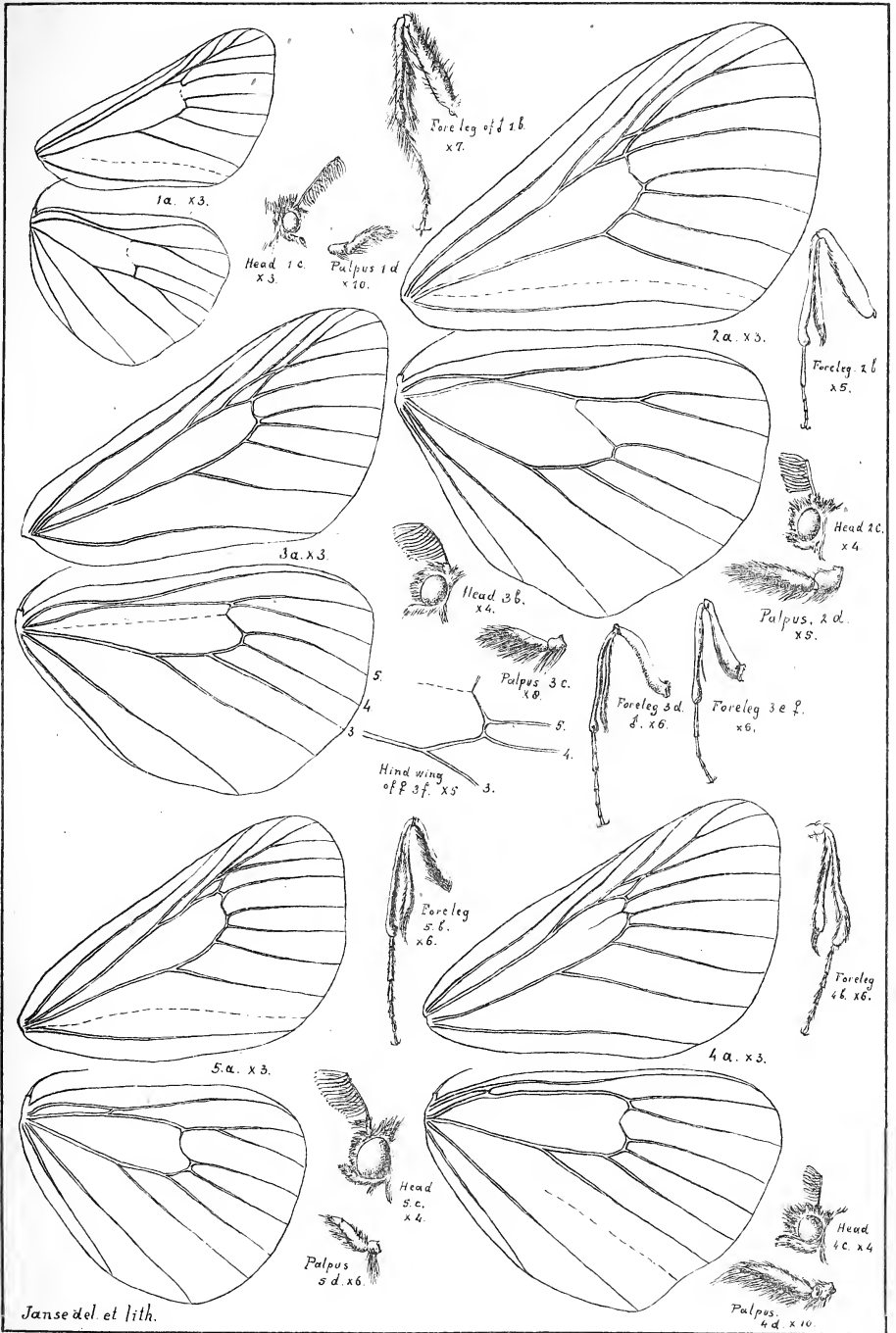


Janse del. ad. nat.

West, Newman chr.







Janse del et lith.

1. *Lacipa picta*, Boisd. ♂; 2. *Creaga dealbata*, H.S. ♂; 3. *Cropera sericea* Hmsn. ♂; 4. *Cropera testacea*, Wik. ♂; 5. *Crorema adspersa*, H.S. ♂;

towards upper median and approaching to, but not anastomosing with, it at $\frac{1}{2}$, where upper median is bent.

Only one species is known to me of this peculiar genus. Its position is rather uncertain; it may be a side development of *Redoa*, parallel to *Lacipa*.

Bicelluphora argentea, nov. spec. (pl. III, fig. 2).

Head, thorax above, and fore wing silvery white, tinged with cream colour (XV); palpi, hairs on fore legs, abdomen underneath hair brown (XLVI); branches of antennæ fuscous (XLVI); abdomen and legs with whitish hairs; hind tibiae and all tarsae with a black band on outer side; a black elongated mark on pro-thorax between the tegulae; 2 black marks on meta-thorax near end of tegulae; all lines on fore wing blackish; sub-basal well defined, angled at upper median and extended till *1b*; anti-medial double, extending from costa to inner margin; orbicular pear-shaped, clearly defined; medial strong and from costa to inner part of reniform, then inwards along lower median for nearly $\frac{1}{3}$ of its length, then broadly to inner margin; postmedial thin, but sharply defined, from costa to inner margin, bordering the outer side of reniform, bent inwards at vein 2, outwards at median fold and inwards again at *1b*; a black streak from postmedial near costa to medial at upper angle and one from the same lines nearly parallel to medial at lower median from vein 3 to vein 2; sub-terminal line double, but inner line best defined, roundly curved outwards at veins 6 and 7, sharp at 4 to 5, then curved inwards and forming a macula at between 2 and *1b*; terminal faintly indicated between the veins; cilia silvery white with fuscous black (XLVI) at between veins 7-6, 6-5, 5-4, and above *1b*.

Hind wing silvery white, without any markings. Under side silvery white, with the fore wing thickly, and the hind wing thinly, irrorated with hair, brown.

Exp. 39, mill.

Hab. Barberton (Jeffery).

This species very much resembles a *Cerura* of the *Notodontidae* family, but its structure is clearly like a *Lymantriadae*. Only one specimen is known to me, belonging to the Transvaal Museum, which is unfortunately somewhat rubbed on one upper wing, but otherwise in good preservation. Type in coll., Tvl. Mus.

Genus LACIPA (pl. IV, fig. 1).

Lacipa, Wlk., Cat. IV, p. 790 (1855); type *picta*.

Microgymna, Willgrn., K. Vet. Akad. Handl. (2), V, p. 38 (1865); type *picta*.

Hmpsn., Ann. S.A. Mus., p. 403 (1905).

Proboscis absent; palpi short, porrect, somewhat drooping; first joint about 2 times longer than thick, with little hair underneath; second joint 2 times first joint, nearly straight, porrect, and with rather long hair underneath; third joint drooping, a little smaller than first joint, bluntly pointed, and with rather long hair underneath and at tip; eye nearly

round, large, over width of frons; frons evenly rounded; antennæ bipectinate, short, a little less than $\frac{1}{2}$ of costa of fore wing; first joint of shaft with a long tuft of hair; shaft curved; pecten in ♂ 8 times shaft, getting suddenly shorter towards apex and ending in 2 long bristles; in ♀ the antennæ are only $\frac{1}{4}$ of costa and the pecten are about 2 times shaft, but also ending in 2 long bristles; frons and tegulae covered with moderate hair; thorax with scales; abdomen about length of hind wing and covered with scales and hairs; fore tibia with a process nearly as long as the tibia, thin, slightly curved and bluntly pointed, covered on the outer side with long hair; hind tibia with 4 spurs; femora, tibiae, and tarsae of all legs with long hair.

Fore wing sub-triangular; costa slightly hollowed out; termen evenly rounded from veins 2 to 6; inner margin nearly straight; apex and tornus rounded; 1*b* simple at base; a trace of 1*c*; 2 from well beyond $\frac{1}{2}$ lower median; 3 from $\frac{1}{3}$ 2 to 4; 4 from lower angle; 5 from $\frac{1}{2}$ distance 3 to 4; discocellular only faintly represented; 6 from below upper angle; 7 and 8 on a stalk of $\frac{1}{6}$ whole length of 7, from upper angle; 9 and 10 on a stalk of over $\frac{1}{3}$ 9, originating from about $\frac{2}{3}$ of upper median; upper $\frac{1}{2}$ of stalk 9 and 10 and 9 as far as $\frac{2}{3}$ anastomosing with 8 from end of stalk 7 and 8 for about $\frac{1}{2}$ free part of 8, so as to form a small areole; 11 stalked with stalk of 9-10, so as to come out of $\frac{1}{2}$ of areole; 12 almost parallel to upper median and vein 11.

Hind wing nearly semicircular; costa almost straight; outer margin well rounded and with a slight lobe at veins 2 to 5; inner margin, apex, and tornus well rounded; 1*a* rather long; 1*b* somewhat curved; 2 from about $\frac{2}{3}$ lower median; 3 and 4 on a stalk of $\frac{1}{4}$ 3 and from lower angle; 5 from near middle of discocellular, the upper part of discocellular faint and oblique; cell a little over $\frac{1}{2}$ of wing; 6 and 7 from upper angle and on a stalk of $\frac{1}{3}$ of 6; 8 approaching upper median at beyond $\frac{1}{2}$, but not touching it, then curved upwards and again downwards towards tip.

The venation varies a little in the different species. In *pulverea* 11 comes from beyond $\frac{1}{2}$ the areole; in *quadripunctata* 11 comes from nearly the end of the areole and the stalk of 6 and 7 in the hind wing is longer, up to $\frac{1}{3}$ of 6; in *gemmata* 11 comes from the upper median, the areole is very small, 10 comes from $\frac{2}{3}$ stalk of 8 and 9, 7 comes from $\frac{1}{3}$ of stalk 8-9-10, while the hind wing has the stalk of 3 and 4 much longer ($\frac{1}{2}$), 5 comes from $\frac{1}{3}$ discocellular, which is more oblique, stalk of 6 and 7 is longer ($\frac{1}{2}$), 8 touches the upper median, though it does not anastomose with it; moreover, the process of the fore tibia is as long as the tibia.

It may be necessary to create a new genus for *gemmata*, but as it certainly comes very close to *Lacipa*, I leave it provisionally where it is.

Species marked with an * are only known to me from description.

1. *a.* Fore wing with the ground colour light orange-yellow (III)..... *sarcistis*.
- b.* Fore wing with the ground colour more whitish or pure white..... 2.
2. *a.* Fore wing and hind wing pure white; terminal spots yellow..... 3.

- b. Fore wing with ground colour whitish ; hind wing yellowish or suffused with fuscous ; terminal spots black..... 4.
3. a. Postmedial line with a few black spots at medial part only..... *gemmata*.
 b. Postmedial line with a complete series of black spots on inner side..... **nobilis*.
4. a. Fore wing with medial and postmedial lines defined by black..... *picta*.
 b. Fore wing with the medial and postmedial lines not defined by black..... 5.
5. a. Postmedial line angled at from vein 5 to 8..... 6.
 b. Postmedial line straight, oblique, and directed to near apex..... *quadripunctata*.
6. a. Fore wing with the ground colour whitish..... *pulverea*.
 b. Fore wing with the ground colour pale greyish-vinaceous (XXIX)..... *pulverea*, var.
 c. Fore wing with the ground colour pure white ; bands broader than in *pulverea* and more orange..... 7.
7. a. Hind wing normal [light orange-yellow (III)]..... *picta*, var. a.
 b. Hind wing thickly suffused with fuscous..... *picta*, var. b.

Lacipa sarcistis, Hmps., Ann. S.A. Mus., p. 403 (1905).

Hab. Durban (E. E. Platt, XII).
 Pinetown (I, G. F. Leigh).
 Stanger (XII).

Lacipa pulverea, Dist., A. M. N. H. (7), I, p. 117 (1898).

Euproctis pubescens, Swinh, Trans. E. S., Lond., p. 404 (1903).

Hab. Pretoria (I, II, IX, XII, Janse).
 Van der Merwe Station (XII, Janse).
 Rietfontein No. 57 (I, Janse).
 Donkerhoek (X, Janse).
 Rustenburg (I).
 Moorddrift (X, Swierstra).
 Noerdkaap (I, Jeffery).

Lacipa pulverea, var.—Ground colour of fore wing pale greyish vinaceous (XXXIX) instead of whitish ; hind wing light orange-yellow (III) and usually less, if at all, suffused with fuscous, as is generally the case in the typical *pulverea*.

Hab. Sarnia (X, Mr. Williamson).
 Durban (XII, A. Ross).
 New Hanover (X, C. B. Hardenberg).
 Gilletts (V).

Lacipa picta, Boisd., Delegorgue Voy. Afric. Austral., II, p. 599 (1847).

Herr Schöff., Ausser. eur. Schmett., fig. 113.

Hmps., Ann. S.A. Mus., p. 404 (1905).

Hab. Diep River (Cape Division) (II).
 Capetown (II).

Lacipa picta, var. a.—The orange bands with no black edging.

Hab. Port St. Johns (II, Swinny).

Lacipa picta, var. b.—Hind wing thickly suffused with fuscous.

Hab. Ngqeleni, Pondoland (I, Swinny).

Lacipa quadripunctata, Dew., Verh. L. C. Akad., XLIII, p. 67 (pl. III, fig. 4), (1881).

Lacipa sexpunctata, Dist., A. M. N. H. (6), XX, p. 201 (1897).

Lacipa quinquepunctata, Dist., A. M. N. H. (7), I, p. 117 (1898).

Hmpsn., Ann. S.A. Mus., p. 404 (1905).

Hab. Pretoria (I, II, X, IX, Janse).

Bandolierskop (X, Dr. L. Gough).

Potchefstroom (X, Miss Lion-Cachet).

White River (XI, XII, A. T. Cooke).

Haenertsburg (XII, Swierstra).

Warmberg (XII, Janse).

Pinetown (I, G. F. Leigh).

Lacipa gemmata, Dist., A. M. N. H. (6), XX, p. 200 (1897).

Hmpsn., Ann. S.A. Mus., p. 404 (1905).

Hab. Pretoria (II, III, XII, Dr. H. G. Breyer; K. Munio; Janse).

Bultfontein (I, Janse).

White River (I, A. T. Cooke).

Stanger.

Estcourt.

Barberton (XII, Janse).

Camperdown (IV, G. F. Leigh).

Ngqeleni (I, Swinny).

Spec. auctorum.

Lacipa nobilis, Herr Schöff., Aussereur. Schmett. (fig. 388) (1855).

Hmpsn., Ann. S.A. Mus., p. 404 (1905).

Genus CREAGA (pl. IV, fig. 2).

Creaga, Wllgrn., K. Vet. Akad. Handl. (2), V (4), p. 38 (1865); type *dealbata*.

Hmpsn., Ann. S.A. Mus., p. 393 (1905).

Proboscis absent; palpi hardly reaching frons, slightly ascending, two jointed; second joint nearly 3 times first joint and gradually tapering into a point, covered above and underneath with moderate hair; eyes large, fully width of frons; frons with a tuft of long hair; antennæ well curved, bipectinate; branches on inner side nearly forming a straight line; the longest branch 6 times the width of the shaft, and all ending in 2 long bristles; basal joint long, thick, and with a long hairy tuft in front; fore tibia in both sexes with a process on inner side almost as long as the tibia; mid tibia with 2 terminal spurs, of which the inner one is $\frac{2}{3}$ of the outer spur; hind tibia with 4 spurs of the same length; all tarsae,

covered with smooth short hair; abdomen in ♂ as long as hind wing, in ♀ a little shorter.

Fore wing triangular; termen much and evenly rounded; apex and tornus well rounded; *1b* simple at base; *1c* faintly represented; 2 from $\frac{3}{4}$ lower median; 3 from a little nearer to 4 than to 2; 4 from lower angle of cell; 5 from well above the angle; discocellular faint and somewhat curved inwards; cell over $\frac{1}{2}$ of wing; 6 from upper angle; 7 and 8 stalked for $\frac{1}{7}$ of 7 and from upper angle; 9 and 10 on a stalk of nearly $\frac{1}{4}$ of 10 and from $\frac{5}{6}$ of upper median; 9 anastomosing with 8, just as it comes from the stalk, for over $\frac{1}{2}$ free length of 8, so as to form the areole, which is over 2 times longer than broad; 11 from $\frac{2}{3}$ upper median and nearly parallel to 12; 12 parallel to costa for a great length.

Hind wing semicircular; costa and inner margin arched; termen much rounded; at *1b* a rounded lobe; apex well rounded; 2 from well beyond $\frac{1}{2}$ lower median; 3 from middle of 2 and 4; 4 from lower angle; 5 from well above the angle; discocellular very oblique, slightly angled at beyond $\frac{3}{4}$; cell a little over $\frac{1}{2}$ of wing; 6 and 7 on a stalk of $\frac{1}{4}$ and from upper median; 8 approximated to upper median at before $\frac{1}{2}$, then just touching it and a little curved at tip.

Creaga dealbata Herr Schäff., Aussereur. Schmett. (fig. 111) (1854).

Lalía aliena, Wllgrn., Wien. Ent. Mon., IV, p. 162 (1860).

Hmpsn., Ann. S.A. Mus., p. 393 (1905).

- Hab. Chilovane (Rev. Junod).
 Johannesburg (A. Ross).
 Three Sisters (III, Janse).
 Barberton (I, XII, Janse; Gould).
 Sarnia (XI, Mrs. Curry).
 Durban (X, G. F. Leigh) (XII, III).
 Umkomaas (I, Janse).
 Ngqeleni (III, Swinny).
 East London.

Genus CROPERA (pl. IV, fig. 3).

Cropera, Wlk., Cat. IV, p. 825 (1855); type . . . *testacea*.

Aurivil., *l.c.* p. 67.

Proboscis absent; palpi reaching just beyond frons, porrect, two jointed; second joint 3 times longer than the first, cylindrical and somewhat pointed, covered with rather long hairs; antennæ curved bipectinate, with the branches about 8 times the shaft and suddenly getting shorter towards base and apex, each ending in 2 or 3 bristles; first joint of shaft with a tuft of hair; fore tibia of ♂ with a process on inner side, nearly as long as the tibia and bluntly rounded at tip; ♀ with the tibia simple; mid tibia with 2 long spurs; hind tibia with 4 long spurs; tarsae of all legs with short smooth hairs; abdomen of ♂ as long as hind wing, of ♀ just a little longer.

Fore wing sub-triangular; costa a little arched at $\frac{1}{3}$ and slightly hollowed at $\frac{2}{3}$; termen much and inner margin a little arched; apex and tornus well rounded; 1b simple at base; 2 from before $\frac{2}{3}$ lower median; 3 from beyond $\frac{1}{2}$ of 2 to 4; 4 from lower angle; 5 from $\frac{1}{3}$ discocellular, which is angled into the cell at $\frac{2}{3}$ and giving off a faint vein into the cell; cell a little over $\frac{1}{2}$; 6 from well below the upper angle; 7 and 8 on a stalk of $\frac{1}{5}$ of 7 and from upper angle; 8, 9, and 10 stalked for nearly $\frac{1}{3}$ of 10, originating from beyond $\frac{3}{4}$ upper median; 9 anastomosing with 8 as soon as 8 comes from the stalk for nearly $\frac{1}{2}$ of 9, so as to form an areole about 3 times longer than broad; 10 comes from $\frac{2}{3}$ of areole; 11 from before $\frac{2}{3}$ of upper median; 12 oblique.

Hind wing broad, sub-triangular; costa, termen, and inner margin rounded; apex and tornus well rounded; tornus forming a rounded lobe at 1b; 1a and 1b straight; 1c faintly represented; 2 from before $\frac{2}{3}$ lower median; 3 from $\frac{2}{3}$ 2 to 4; 4 from lower angle; 5 from $\frac{1}{4}$ discocellular, which is angled at middle; 6 from a little below upper angle; 7 from the angle; 8 connected with the upper median by a very short bar at $\frac{1}{3}$.

In *Cropera sericea* the palpi are more drooping; 5 is nearer to 4; there is no trace of a veinlet in the cell; 6 is from upper angle; 11 is from $\frac{2}{3}$. The hind wing has no trace of 1c; discocellular is oblique and angled at $\frac{2}{3}$, where it emits a trace of a vein into the cell; 6 and 7 are from a point; 8 approaches upper median at $\frac{1}{2}$, but does not anastomose with it and is not connected with it by a bar. In the fore leg of the ♀ there is also a very short, thin process.

Aurivill. states (*l.c.* p. 67) that *perculta* belongs to this genus, but, as stated under *Bazisa*, this species is much more primitive and requires a genus of its own.

Only two species are known to me that fall under this genus.

- I. a. Ground colour of wings buff-yellow (IV); fore wing with a dark spot at discocellular..... *testacea*.
- b. Ground colour of wings cream colour (XVI); no dark spot on fore wing..... *sericea*.

Cropera testacea, Wlk., Cat. IV, p. 826 (1855) (pl. IV, fig. 4).

Laelia testacea, Hmps., Ann. S.A. Mus., p. 394 (1905).

This and the following species was placed under the genus *Laelia*, but it can be seen that this is certainly wrong, as *Laelia* has the palpi three jointed, the process of the fore leg is much longer and curved at the end outwards; 3 and 4 of hind wing are closer to each other than 2 and 3 in *Laelia*, while 6 and 7 are in that genus on a rather long stalk.

Hab. Krabbefontein (Dr. H. G. Breyer).

Shilovane (XI, Rev. Junod).

New Hanover (X, C. B. Hardenberg).

Sarnia (I, Janse; II, X, Mr. Williamson).

Durban (II, Clark; E. E. Platt) (VII, G. F. Leigh).

Umkomaas (I, Janse).

Ngqeleni (I, II, Swinny).

Cropera sericea, Hmpsn., A. M. N. H. (8), V, p. 441 (1910).

Hab. Pretoria (II, III, IX, Kapt. Paget; Miss Gunning; Mr. Swierstra; Janse).

Potchefstroom (III, Miss Lion-Cachet).

Warmberg (not Warmbath as Hmpsn. states) (XII, Janse).

Waterval Onder (II, Mr. Bonnekamp).

White River (XII, A. T. Cooke).

Barberton (IV, XII, Miss De Beer; Janse).

Durban (XII, A. T. Cooke).

Genus **CROREMA** (pl. IV, fig. 5).

Crorema, Wlk., Cat. IV, p. 811 (1855); type *mentiens*.

Aurivill., *l.c.* p. 67.

Description made from (?) *adpersa*, H-S.

Proboscis absent; palpi till just beyond frons, ascending; first joint almost circular, and with long hair underneath; second joint about 3 times first joint in length, and with long hair in front and above; third joint indistinctly marked off, as long as first joint, bluntly pointed, and with long hair in front and above; eye nearly round, large, of width of frons; antennæ bipectinate; shaft $\frac{1}{2}$ length of costa, somewhat curved; in ♂ the branches are about 8 times the shaft, getting shorter towards base and apex, so as to form a straight line, each ending in 2 bristles and most branches with a similar bristle pointing forwards at $\frac{1}{3}$ to $\frac{2}{3}$ of the branches;* in the ♀ the shaft is only $\frac{1}{3}$ of the costa, less curved, and the branches are only 2 times the shaft, but they have the terminal as well as the median bristles; vertex, frons, and thorax covered with long hair; abdomen in ♂ a little longer, in ♀ a little shorter, than the hind wing, and covered with moderate long hair; fore tibia with an abruptly pointed process, nearly as long as the tibia; in ♀ without a process; mid tibia with end spurs; hind tibia with 4 spurs; tarsae with short depressed hairs.

Fore wing of ♂ triangular; costa somewhat rounded; termen straight and rounded at 1b to vein 4; inner margin arched; apex and tornus well rounded; vein 1b simple at base; 1c faintly represented; 2 from $\frac{2}{3}$ lower median; 3 from before $\frac{2}{3}$ vein 2 to 4; 4 from the angle; 5 from well above the angle; discocellular faint and curved at middle; cell over $\frac{1}{2}$ of wing; 6 from well below upper angle; 7 and 8 on a stalk of $\frac{1}{3}$ 7, and from upper angle; 9 and 10 on a stalk of nearly $\frac{1}{2}$ of 10 and from upper median at beyond $\frac{3}{4}$; 9 anastomosing with 8 shortly after it gets free and just as 7 comes out of 8, for $\frac{1}{2}$ the length of 8, so as to form a rather long areole (in one ♂ specimen the left wing has 7 free from upper angle and 8, 9, 10 stalked, the other wing has 7 coming from the areole and not typically from end of areole; in one ♀ 7 comes from the stalk of 8, 9, 10, and 10 comes from the end of the areole; in six ♂♂ no areole is formed at all, but 7 and 8, 9 and 10 are stalked; 8 and 9 are more or less approximate to each other, but never anastomosing to form the areole; this is thus a most interesting example of atavism); 11 from

* Such bristles I have not found in any other genus of this family.

$\frac{1}{4}$ upper median; 12 curved at end and running parallel for nearly $\frac{2}{3}$ of its length with the costa.

Hind wing semicircular; costa nearly straight; termen and inner margin well rounded; apex and tornus much rounded; 1a straight, rather long; 1b slightly bent; 2 from beyond $\frac{1}{2}$ of lower median; 3 from $\frac{2}{3}$ distance 2 to 4; 4 from and 5 from close to lower angle; discocellular somewhat oblique; cell over $\frac{1}{2}$ of wing; 6 and 7 on a stalk of nearly $\frac{1}{3}$ of 7 and from upper angle; 8 connected with upper median by a distinct bar at $\frac{1}{2}$. (The venation of hind wing is fairly constant, though the distance of vein 3-4 and 4-5 varies a little, but these distances are never equal, or less between 3-4 than the distance between 4 and 5.)

I am sure that *adspersa* is wrongly placed in the genus *Laelia*, from which genus it differs in the palpi, the process of the fore tibia, the position of vein 6 in fore wing and of vein 3 in hind wing, and the connection of vein 8 to the upper median.

Aurivill. also places *fulvinozata* in this genus, but I have not been able to examine this species, though I have no doubt that this able observer is correct. Aurivill. also states that this genus is the same as *Olapa*, l.c. p. 67, but he rectifies this in his "Lep. Mad. and Comoro Islands," p. 337, thus leaving *Olapa* distinct.

Crorema adspersa, Herr Schäff., Aussereur. Schmett., fig. 109 (1854).

Laelia prolixa, Wllgrn., Wien. Ent. Mon., IV, p. 162 (1860).

Hmpsn., Ann. S.A. Mus., p. 395 (1905).

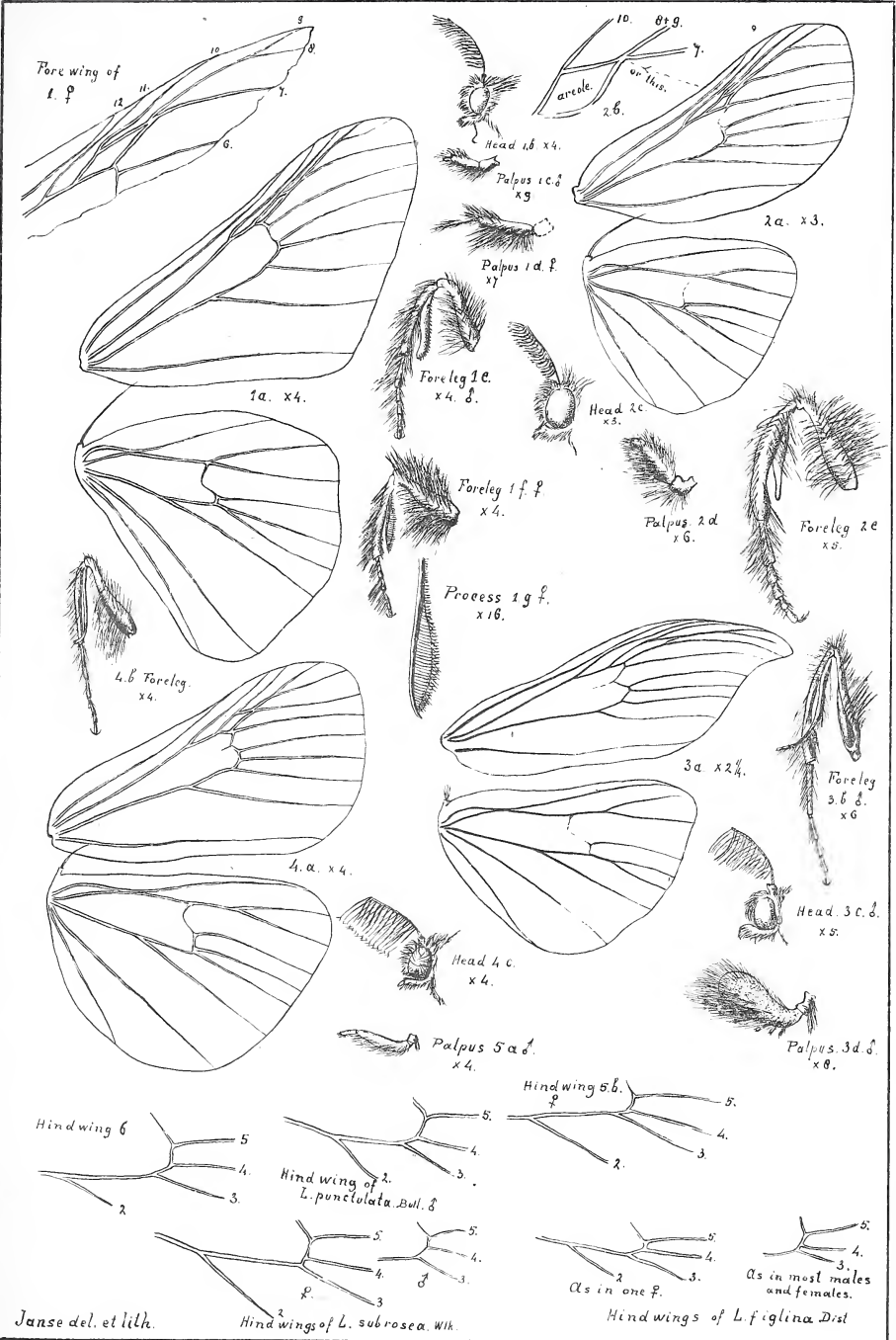
I have little doubt that the specimens I used for the description of this genus are correctly identified specifically, though I have not been able to get a reliable description and the fig. of Herr Schäff. is unknown to me. There is only a possibility that the species used is Holland's *setinoides*, which is entirely unknown to me. Sir Hampson gives as distinction between the two species, that *adspersa* is ochreous-yellow and *setinoides* is pale lemon-yellow; as no standard is mentioned, however, this distinction is far from certain.

The colour of my specimens varies a little, according to the amount of scaling, from baryta-yellow (IV) to pinard-yellow (IV), but even the darkest I could not call ochreous-yellow.

The differences in size are also no indication, as the specimens I have seen range in the ♂ from 26 to 40 mill. and in the ♀ from 42 to 51 mill.

All the specimens of the different *Musea* were also labelled as *adspersa*.

- Hab. Pretoria (III, Miss Gunning; III, J. v. Niekerk).
 Plat River (Jutrzencka).
 Waterberg District (Jutrzencka).
 Woodbush Village (XII, C. J. Swierstra).
 Krabbefontein (Dr. H. C. Breyer).
 Kourulene (XI, Mr. Robson).
 Shilouvane (XI, Rev. Junod).
 Rietfontein No. 57 (I, Janse).
 Waterval Onder (II, XI, Mr. Bonnekamp; Janse).
 Nelspruit (I, A. T. Cooke).



1. *Dasycampa*, nov gen ♂; 2. *Dasychira pudibunda*, Lin ♂; 3. *Psalis securis*, Hubn ♀.
 4. *Laelia bifascia*, Hmps. ♂; 5. *L. diascia*, Hmps. ♂, ♀; 6. *L. xyleutis*, Hmps. ♂.

Three Sisters (II, Janse).

Barberton (XII, Janse; III, IV, Miss De Beer).

New Hanover (X, XI, C. B. Hardenberg).

Sarnia (XI, Mrs. Curry; I, Janse).

Pinetown (I, XI, G. F. Leigh).

Umkomaas (I, Janse).

Duff's Road (Natal).

Tongaat (Natal)

Species *auctorum*: *fulvinotata*, Butl., P. Z. S., p. 678 (1893).

Hmpsn., Ann. S.A. Mus., p. 394 (1905).

Aurivill., *l.c.* p. 67.

Genus *DASYCAMPA*, nov. (pl. V, fig. 1).

Type *ianthina*, nov. spec.

Proboscis very short; palpi in the ♂ short, just reaching frons, somewhat drooping; second joint nearly as long as first joint, hairy underneath, at tip, and also above; in the ♀ the palpi are long, second joint 2 times longer than in ♂, third joint very long ($\frac{2}{3}$ of second joint), thin, and pointed, second joint with long hair underneath and with tri-lobate scales at the sides, third joint not hidden; eye elliptic, moderate, less than frons; frons with a tuft of hair; antennæ very short, only $\frac{1}{3}$ of costa, bipectinate; branches about 8 times the shaft, without bristles at the end, but much ciliated; in ♀ the branches are about 6 times the shaft and are getting suddenly shorter towards apex; thorax covered with long straight hairs and with 2 dorsal scale tufts near abdomen; abdomen short in ♂, about $\frac{2}{3}$ of hind wing; in ♀ longer, a little over hind wing, in both sexes moderately hairy above and with longer hair ventrally; a dorsal tuft of hairs and scales; hairs of anal segment long in ♂, moderate in ♀; legs over their whole length, including the tarsae on the outer side, with very long hair; fore legs in the ♂ with a broad roundly pointed process, as long as tibia and with short hair on the outer side; process in ♀ broader, but thinner and slightly shorter, apparently broadened to a thin lamella at least $\frac{2}{3}$ of its length and covered with a large number of stiff bristles, overlapping the lamella, giving it the appearance of being a striated lamella, between the bristles some thinner hairs; mid and hind tibiae each with 2 spurs only.

Fore wing of ♂ triangular; costa slightly hollowed out; termen oblique and with the inner margin straight; apex rounded; tornus slightly rounded; 1b simple at base; 2 from before $\frac{2}{3}$ lower median; 3 from $\frac{2}{3}$ 2 to 4; 4 from lower angle; 5 from just above the angle; discocellular thin and hollowed out; cell over $\frac{1}{2}$ of wing; 6 from well below the upper angle; stalk of 7 and 8 from upper angle; 7 from 8 before $\frac{1}{2}$ of 8; stalk of 9 and 10 from upper median close to the angle; 9 from 10 at $\frac{1}{3}$ of 10; 9 anastomoses at $\frac{1}{2}$ stalk of 7 and 8 for about $\frac{1}{2}$ of free part of 8, so as to form a long and narrow areole; 11 from beyond $\frac{3}{4}$ upper median, and parallel to 12; 12 parallel to costa for a great length.

In ♀ the areole is broader, as the stalk of 9 and 10 comes from upper median about 2 times further from the angle than in the ♂; the areole

is also shorter as stalk of 7 and 8 is shorter and 9 anastomoses with the stalk just there where 7 comes out of it.

Hind wing of ♂ broad, triangular; costa much arched; termen roundly lobed at vein 2 to 5; inner margin straight; apex and tornus rounded; *1a* long, curved; *1b* curved; 2 from $\frac{2}{3}$ lower median; 3 and 4 very shortly stalked or from lower angle; 5 from just above the angle; 6 and 7 from upper angle; discocellular slightly oblique; cell $\frac{1}{2}$ of wing; 8 much curved towards upper median at $\frac{1}{3}$, then touching it, and after that parallel to 7.

Fore wing of ♀ has the costa arched; vein 11 is given off at before $\frac{1}{2}$ the areole, and not as in ♂ beyond $\frac{1}{2}$ of areole; hind wing more semi-circular; vein 3 and 4 on a longer stalk; 6 and 7 on a short stalk.

This genus comes, I think, quite close to *Orgyia*, from which it differs in having vein 5 much farther away from 4, and vein 6 from the upper angle in the fore wing; the hind wing has 3, 4, and 5 far apart and nearly from equal distances, and 6 and 7 are on a long stalk; the process of the fore leg of the ♂ is also quite different, more as in *Euproctis*; the third joint of the palpi is absent and the ♀ is wingless.

This genus also resembles *Dasychira* very much, the neuration being very similar, except for the longer stalk of vein 7 of fore wing and the slightly longer stalk of 6 and 7 in hind wing and the difference in wing shape of both sexes; palpi and process of fore tibia are also different, and the hind legs have also 4 spurs and not 2 as in *Dasyampa*. It may be, however, that these two genera had the same ancestor.

***Dasyampa ianthina*, nov. spec.** (pl. III, figs. 3, 4).

♂. Hairs on head, thorax on under side, and hairs on fore tibia whitish, mixed with fuscous-black (XLVI) and deep chrome (III) hairs; palpi, tarsae of fore legs and the whole mid and hind legs deep chrome; thorax above and tegulae with whitish hairs mixed with fuscous-black and orange (III) scales; scale tuft of thorax orange; abdomen black, broadly ringed with deep chrome; hairs of anal tuft and abdomen on ventral side deep chrome; a basal dorsal tuft of black scales; antennæ brussels brown (III).

Fore wing with the ground colour cinnamon-brown (XV); from inner margin to median fold pale purplish-vinaceous (XXXIX), becoming nearly white beyond postmedian line; scattered pale purplish-vinaceous scales at basal and terminal area; near base a fuscous black triangular patch with the point towards inner margin and with some pale purplish-vinaceous scales in it; antimedial line of russet (XV) and fuscous scales, angled at lower median; a triangular fuscous-black patch beyond it, with its base touching inner margin and with a few capucine yellow (III) scales in it; reniform only represented by some fuscous-black scales, which extend towards costa and fill the angle of vein 3 and 4; postmedial line bordered with a light shade on outer side, near costa with a cream-coloured (XVI) patch; from median fold to inner margin with a whitish streak, angled at vein 5 to 4, then roundly curved inwards and waved at the veins; sub-terminal line indicated by some pale purplish-vinaceous scales, beginning at costa with a small dark patch; cilia of ground colour, mixed with whitish.

Hind wing fuscous-black, with some light orange-yellow (III) hairs at basal and inner marginal part; cilia light orange-yellow.

Under side: fore wing fuscous-black, except a white postmedial elliptical patch from vein 5 to inner margin; veins in patch and lower part of patch from above vein 1b to inner margin pale orange-yellow; costa edged with pale orange-yellow, broadly at basal and postmedial part; hind wing as on upper side, but with no light orange-yellow hairs from median fold, but with some light orange-yellow scales at tornus.

♀. Abdomen more pale orange-yellow; dorsal tufts very large and consisting of black scales; fore wing cream colour (XVI); basal patch between median fold and inner margin larger and somewhat extended along inner margin to postmedian line; antimedial line ochraceous-orange (XV), mixed with fuscous scales, angled at cell and rounded between vein 2 and 1b; reniform more distinct, consisting of fuscous-black scales; medial line ochraceous-orange, diffused and extended over reniform, angled at 5; postmedial double, less angled than in ♂, made of russet scales and waved at veins, outer line less distinct from discal to medial fold, but extended at costal area till near sub-terminal line to an irroration of fuscous-black and becoming more amber brown (III) between vein 4 and 6 and with a blackish irroration near inner margin; sub-terminal as in ♂, but less distinct; cilia of ground colour and with fuscous scales at between veins 2 to 6. Hind wing light orange-yellow; an indication of a medial line by a dark irroration;* cilia of ground colour.

Under side: both wings light orange-yellow, except postmedial part of fore wing, which is pale orange-yellow (III); a fuscous irroration at medial part, from areole to inner margin along which it is extended towards base and tornus; a thin postmedial irroration from vein 2 to 5 or 6; hind wing with medial line represented by a broad fuscous-black irroration.

Exp. ♂, 27·3 mill.; ♀, 44·4 mill.

It is possible that the ♂ is abnormally small, as I bred at the same time an abnormally small ♀ of 31·1 mill., but the ♂ specimen seems quite normally developed, while the ♀ specimen is clearly crippled.

One ♂ type from Barberton (I, Janse) in coll., Janse.

One ♀ type from Woodbush Village (XII, Swierstra) in coll., Tvl. Mus.

2 ♀♀ co-types from Barberton (XI) in coll., Tvl. Mus. and Janse; another small ♀ from Barberton (I, Janse).

Genus DASYCHIRA (pl. V, fig. 2).

Dasychira, Steph., Ill. Brit. Ent. Haust., II, p. 58 (1829); type *pudibunda*.
Boreconia, Wlk., Cat. XXXII, p. 459 (1865); type *fusca*.

Hmps. n., "S.A. Moths," Ann. S.A. Mus., p. 396 (1905).

The following description is made from *D. pudibunda* :—

Proboscis very short, almost absent; palpi porrect, short, just reaching beyond frons; first joint pear-shaped; second joint thick, oval, 2 times first joint; third joint shorter than first joint, blunt, thin, and hidden by

* In one ♀ there is no dark irroration in fore wing and hind wing, except the basal patch near inner margin; the sub-terminal line is thin, brownish, distinct, and angled inwards at vein 5; under side with no markings.

the hairs of the second joint, with which it is covered very thickly in front; eyes large, rounded, of width of frons; antennæ bipectinate, about $\frac{1}{3}$ of costa in length and curved; in ♂ the branches are about 5 times thickness of shaft, getting shorter towards base and apex, ending each in a bristle; in ♀ the antennæ are $\frac{1}{4}$ of costa and the branches are about as long as thickness of shaft, ending in 2 bristles; vertex, frons, and thorax clothed with rather long hair in ♂, in ♀ the hair is more smooth; abdomen in ♂ a little longer than hind wing and covered with woolly hair, in ♀ the abdomen is much longer than hind wing and the hairs are shorter; some species of this genus have dorsal tufts. Fore tibia with a somewhat pointed, slightly curved process in ♂, about $\frac{3}{4}$ length of tibia, in ♀ no process; tarsae with long spreading hair on outer side; mid tibia with 2 spurs; hind tibia with 4 spurs, and all tibiae with long hair; tarsae of mid and hind legs with the hairs not spreading.

Fore wing of ♂ sub-triangular, in ♀ much more elongate; costa slightly hollowed out at $\frac{1}{2}$; termen and inner margin rounded; apex and tornus rounded; 1b simple at base; 2 from $\frac{3}{4}$ lower median; 3 from $\frac{2}{3}$ distance 2 to 4; 4 from lower angle; 5 from above the angle; discocellular oblique, faint; cell about $\frac{1}{2}$ of wing; 6 from upper angle; 7 and 8 stalked for $\frac{1}{3}$ of 7 and from the angle; 10 and 9 on a stalk of $\frac{1}{3}$ of 10 and from $\frac{5}{6}$ upper median; 9 anastomosing with stalk of 7 and 8 at $\frac{1}{2}$ and further with vein 8 for $\frac{1}{3}$ the free length of this vein, in order to form the areole; 10 approximated to stalk of 8 and 9 at $\frac{1}{3}$; 11 from $\frac{2}{3}$ upper median, first bent to approximate 12 and then bent to approach 10 just beyond origin; 12 parallel to costa for $\frac{3}{4}$, then suddenly bent to costa.

Hind wing semicircular; costa arched at $\frac{1}{3}$; termen, inner margin, apex, and tornus well rounded; 1a rather long; 1b straight towards tornus; 2 from $\frac{2}{3}$ lower median; 3 and 4 from lower angle; 5 from well above the angle; discocellular curved inwards and faint; cell a little over $\frac{1}{2}$ of wing; 6 and 7 on a very short stalk and from the upper angle; 8 just touching the upper median at before $\frac{1}{2}$, then towards apex, where it is well curved.

Range: Europe, Africa, Madagascar, Japan, China, British India, Ceylon, Burmah, Java, Australia.

It seems to be very difficult to separate this genus from the closely allied genus *Laelia*, and a number of mistakes have been made and insufficient characters given by various authors.

Prof. A. Spuler, in his "Schmetterlingen Eur. Bnd.," I, p. 128, states that *Dasychira* has only end spurs on the hind tibiae, but the type species, *D. pudibunda*, of which I examined two ♂♂ and two ♀♀, and all South African species brought by other authors in this genus, have distinctly 4 spurs in both sexes.

Sir Hampson, in "South African Moths" (Ann. S.A. Mus., p. 390, 1905), gives as a distinction that *Dasychira* has a more oblique termen, which in *Laelia* should be more erect, but there are many graduations between the two. In his "Fauna of British India," Vol. I, p. 440, he mentions the long third joint of the palpi in *Laelia*, this being short in *Dasychira*, but in his key, *l.c.* p. 433, the lateral tufts on the fore tarsae are taken as distinctive for *Dasychira*.

E. Meyrick, B.A., states in his "Handbook of British Lepidoptera," that the posterior tibiae have no middle spurs in *Dasychira*, and he also mentions the concealed third joint of the palpi, which I believe to be the most reliable character.

Prof. Aurivillius, in "Ark. för Zool. Bnd," II, No. 4, p. 68, takes the spreading hairs of the fore tarsae as distinctive for *Dasychira*.

Dr. A. J. Turner, in his "Australian *Lymantriadae*," p. 473, takes the dense hairs on the abdomen as characteristic for *Dasychira*, but, though this may hold good for the Australian species, it certainly does not hold for the South African species. The dense hairs of the fore tarsae he takes as being peculiar to *Psalis*.

Perhaps it is hardly possible to draw a distinct line between the species of the genera *Dasychira* and *Laelia*, but I think that the third joint of the palpi and the process of the fore tibia are most reliable when taken together; next to these come the spreading hairs of the fore tarsae of *Dasychira*, which are, as a rule, short and depressed in *Laelia*.

The shape of the fore wing is very misleading, especially the oblique termen, which is often as erect as in *Laelia* in an otherwise distinct *Dasychira*, e.g. *fusca*, ♂ of *municipalis*, ♂ of *extorta*.

The venation of the wing is very similar in both genera, only the stalk of 8 and 9 of fore wing is $\frac{1}{2}$ or over $\frac{1}{2}$ in *Dasychira* and usually less in *Laelia*. *L. subrosea* and *L. diascia* have that stalk, over $\frac{1}{2}$, however; 12 is as a rule approximate to 11 in *Dasychira*, but sometimes this vein is parallel, which is always the case in *Laelia*. In *Dasychira* the stalk of 6 and 7 of hind wing is not more than $\frac{1}{6}$, except in *D. octophora*, where the two veins come from a point, and in *D. georgiana*, where the stalk is rather long; in *Laelia* the stalk is about $\frac{1}{3}$, in *L. subrosea* even $\frac{1}{2}$; vein 8 is approximated to upper median before $\frac{1}{2}$ in *Dasychira*, except in *D. municipalis* and *D. extorta*, where it is at $\frac{1}{2}$; in *Laelia* 8 approximates the upper median just beyond $\frac{1}{2}$, except in *L. diascia*, where it is at $\frac{1}{3}$.

The process of the fore tibia of *Dasychira* is short, a little less than the tibia, thick and bluntly pointed, nearly straight or gently curved, but never projecting over the tibia towards the outer side (in *fusca*, *municipalis*, *lunensis*, and *vilis* it is long and thin, but not curved). In *Laelia* this process is a little longer than the tibia, thin and pointed, and at the end well curved outwards, sometimes even projecting well over the tibia.

The fore tarsae of *Dasychira* have, as a rule, long spreading hairs, especially the first joint, but in *D. vilis*, *D. lunensis*, and *D. octophora* the hairs may be very short and do not spread.

The palpi of *Dasychira* have the second joint elliptical, about 2 times longer than broad and in front covered with very dense long hair; the third joint is short (about $\frac{1}{3}$ of second joint), and as a rule hidden in the hairs of the second joint and a little oblique; in *D. fusca*, however, the third joint is a little longer and somewhat exposed; while *D. municipalis* has the palpi as in *Laelia*, and *D. whitei* almost so.

The palpi of *Laelia* have the second joint more elongate, about 3 times longer than broad or even more; the third joint is about half the length of the second joint, thin and porrect, and with a pointed tuft of hair.

In this key I had largely to follow Sir Hampson's key, *l.c.* p. 397, as

too many species are unknown to me; such species are here marked with an *:—

1. *a.* Abdomen without dorsal crests..... 2.
- b.* Abdomen with dorsal crests..... 6.
2. *a.* Fore wing with basal and medial areas tinged with greenish..... 3.
- b.* Fore wing with these areas not tinged with greenish.. 4.
3. *a.* Fore wing with a sub-terminal series of dark lunules.. *fusca.*
- b.* Fore wing without sub-terminal dark lunules..... **herbida.*
4. *a.* Fore wing with postmedial line angled inwards at discal fold..... 5.
- b.* Fore wing with postmedial line not angled at discal fold..... *municipalis.*
5. *a.* Hind wing white, the apical area tinged with fuscous (XLVI)..... **postpura.*
- b.* Hind wing fuscous, basal and medial areas olive-brown (XL)..... *vilis.*
6. *a.* Fore wing with the ground colour brownish..... 7.
- b.* Fore wing with the ground colour grey..... 14.
- c.* Fore wing with the ground colour white..... 16.
7. *a.* Fore wing with whitish spots on costa and in end of cell..... **proleprota.*
- b.* Fore wing without white spots..... 8.
8. *a.* Fore wing with whitish patches on inner and apical areas..... *whitei.*
- b.* Fore wing without whitish patches on inner and apical areas..... 9.
9. *a.* Hind wing white or fuscous..... 10.
- b.* Hind wing bright rufous..... **metathermes.*
- c.* Hind wing black in ♂, orange in ♀..... **libyra.*
- d.* Hind wing auburn in ♂, deep chrome in ♀..... *greeni.*
10. *a.* Fore wing with the postmedial line placed on an oblique rufous band..... *curvivirgata.*
- b.* Fore wing with the postmedial line not placed on an oblique rufous band..... 11.
11. *a.* Fore wing with the lines rufous..... **rubrifilata.*
- b.* Fore wing with the lines dark..... 12.
12. *a.* Fore wing with the postmedian line outwardly oblique towards costa..... **escota.*
- b.* Fore wing with the postmedian line incurved to costa. 13.
13. *a.* Fore wing with the sub-terminal line dark..... *extorta.*
- b.* Fore wing with the sub-terminal line pinkish-buff (XX), defined by dentate dark marks on inner side. *lunensis.*
14. *a.* Fore wing with median line present..... **atrifilata.*
- b.* Fore wing with median line absent..... 15.
15. *a.* Fore wing with postmedian line not angled inwards in discal fold..... **extatura.*
- b.* Fore wing with postmedian line angled inwards in discal fold..... **gwelila.*

16. *a.* Fore wing suffused with green (sometimes slightly)... 17.
b. Fore wing not suffused with green..... 18.
17. *a.* Hind wing pure white in ♂..... *rocana*.
b. Hind wing greyish-brown in ♂; in ♀ white with a sub-
 median patch..... **mascarena*.
18. *a.* Fore wing white, tinged and thickly irrorated with
 brown veins..... **poliotis*.
b. Fore wing pure white; veins not coloured brown.. 19.
19. *a.* Fore wing with the lines dark..... 21.
b. Fore wing with the lines yellowish, slight..... 20.
20. *a.* Legs pure white; abdomen without black segmental
 markings; apex of abdomen white..... *pyrosoma*.
b. Legs with indeterminate black markings; abdomen
 with posterior margins of three basal segments
 black; apex of abdomen ochraceous..... **confinis*.
21. *a.* Fore wing with ground colour greyish-white; veins
 yellowish..... **cangia*.
b. Fore wing with the ground colour pure white; veins
 of the same colour or irrorated with dark scales... 22.
22. *a.* Fore wing with the dark lines indistinct..... *georgiana*.
b. Fore wing with the lines distinct..... 23.
23. *a.* Fore wing with a black patch on inner margin con-
 joining antimedial and postmedial lines..... **bryophilina*.
b. Fore wing without such a black patch..... *octophora*.

Species in South Africa:—

Dasychira fusca, Wlk., Cat. IV, p. 918 (1855).

Orgyia tephra, Herr Schäff., Aussereur. Schmett., fig. 387 (1855).

Boreconia subviridis, Wlk., Cat. XXXII, p. 460 (1865).

Hmps., Ann. S.A. Mus., p. 397 (1905).

Hab. Kalk Bay (VI).

Capetown (IV, V, Lord Gladstone).

I have only seen ♂♂ of this species.

Dasychira municipalis, Dist., A. M. N. H. (6), XX, p. 200 (1897).

Lacipa diffusa, Dist., A. M. N. H. (6), XX, p. 200 (1897).

Hmps., Ann. S.A. Mus., p. 397 (1905).

Hab. Pretoria (XII, Janse).

Waterval, Zoutpansberg (XI, Janse).

Woodbush Village (VIII, XII, Swierstra).

Shilovane (XI, Rev. Junod).

Rooiplaat (III, Swierstra).

Van der Merwe Station (XII, Janse).

Waterval Onder (XI, XII, Janse).

Three Sisters (III, Janse; IV, Mrs. Snooke).

Barberton (I, II, Janse).

Sarnia (II, Williams).

Durban (Green; Clark).

Umkomaas (I, Janse).

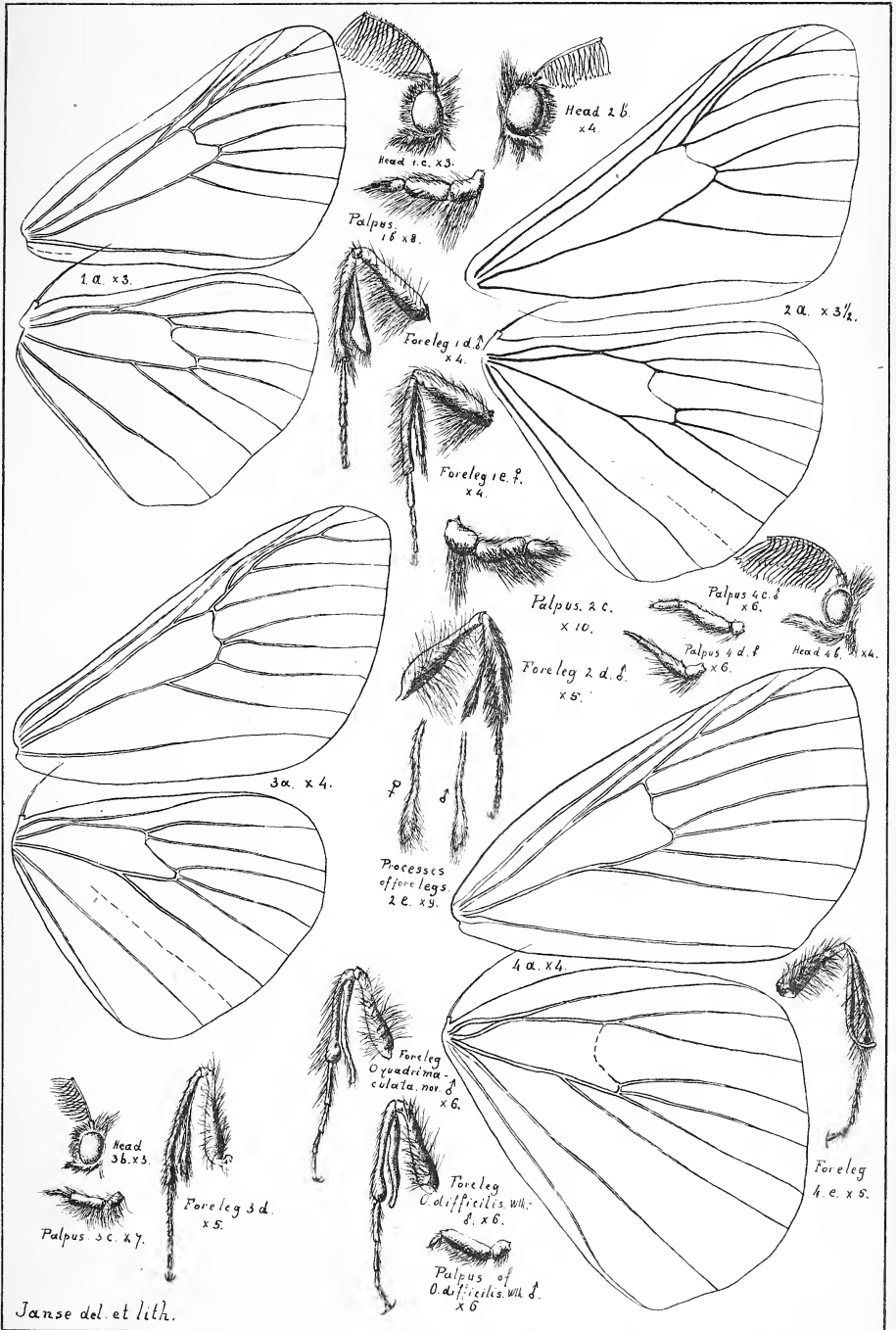
Ngqeleni (II, III, VIII, Swinny).

Port St. Johns (VIII, Swinny).

Stanger (Natal).

- Dasychira vilis**, Feld., Reis. Nov. (pl. 100, fig. 7) (1874).
- Dasychira postfusca**, Hmps., Ann. S.A. Mus., p. 397 (1905).
Hab. Durban (E. L. Clark).
- Dasychira curviringata**, Karsch., Ent. Nachr., 1895, p. 373 (pl. IV, fig. 3).
Hmps., Ann. S.A. Mus., p. 399 (1905).
Hab. Durban (VIII, Leigh).
Port St. Johns (I, Swinny).
- Dasychira extorta**, Dist., A. M. N. H. (6), XX, p. 203 (1897).
Lymantria hera, Druce, A. M. N. H. (7), I, p. 209 (1898).
Hmps., Ann. S.A. Mus., p. 400 (1905).
Hab. Pretoria (I, X, Janse).
Rietfontein No. 57 (I, Janse).
Johannesburg (III, IV, XII, Ross).
White River (III, Cooke).
Three Sisters (II, III, IV, Janse).
Durban (IV, Clark; V, X, Leigh) (III, XI, XII).
Umkomaas (I, Janse).
- Dasychira lunensis**, Hmps., Ann. S.A. Mus., p. 400 (1905).
Hab. Durban (II, Cooke; IV, VIII, X, XI, Leigh).
Nggeleni (III, Swinny).
- Dasychira whitei**, Druce, A. M. N. H. (7), I, p. 209 (1898).
Hmps., Ann. S.A. Mus., p. 401 (1905).
Hab. Durban (III, Clark; E. E. Platt).
- Dasychira georgiana**, Fawcett, Tr. Zool. Soc., XV, p. 314 (pl. xlix, figs. 19, 20, 21) (1900).
Hmps., Ann. S.A. Mus., p. 402 (1905).
Hab. Durban (I, II, VI, VII, VIII, IX, XI, XII, Leigh).
- Dasychira octophora**, Hmps., Ann. S.A. Mus., p. 402 (1905).
Hab. Durban (Clark; Green).
- Dasychira rocana**, Swinh., A. M. N. H., 7 (XVII), p. 545 (1906).
Hab. Durban (III, Clark).
Lydenburg (in Tvl. Mus.).

The two ♂♂ I have examined differed somewhat in colouring, though I have no doubt that they were identical. This species was described by Col. Swinhoe from one Coomasie specimen only, which, as Mr. A. T. Cooke informs me, is larger than the Durban specimen, which he carefully compared with the type. This Durban specimen, which is in Mr. E. L. Clark's collection, has the anti-medial area, the costal medial part, and half the terminal area



1. *Lymantria modesta*, wik. ♂; 2. *Polymona ruffemur*, wik. ♂;
 3. *Aclonophlebia rhodalipha*, Feld ♂; 4. *Ornithopsyche discalis*, wik. ♂.

white, suffused with lettuce green (V); the pategia and posterior part of thorax also lettuce green, mixed with black scales; in the Lydenburg specimen, also a ♂ and in the Tvl. Mus. coll., the whole fore wing is hair brown (XLVI), though a little lighter at sub-basal and costal areas; the lines are the same in the two specimens, except the antimedial, which is straight in the Durban specimen and somewhat curved near costa and dentate inwardly at lower median and *1b* in the Lydenburg specimen.

Dasychira pyrosoma, Hmps. n., A. M. N. H. (8), Vol. V, p. 450 (1910).

Hab. Durban (II, III, Leigh); ♂ and ♀.

Barberton (I, G. W. Jeffery).

The ♀♀ I have examined have the lines on the fore wing much more pronounced than the ♂♂, and the hairs on head, thorax, and fore legs are more tinged with yellow. The ♀ in my collection has the markings as follows:—Sub-basal line buff-yellow (IV) and extended till *1b*; antimedial line double, of which the inner one is maize-yellow (IV) and the outer line buff-yellow, more pronounced, evenly curved outwards, and ending at *1b*; medial line broad, diffused, beginning just below costa, evenly curved inwards at cell, between lower median and *1b*, maize-yellow; reniform well defined by buff-yellow, filled with and on outer side with diffusion of maize-yellow; postmedial double, oblique, nearly straight till 3 and slightly curved inwards at 2 and *1b*, somewhat dentated outwards at the other veins; inner line well defined, buff-yellow; outer line more diffused, broader, and maize-yellow; sub-terminal somewhat diffused, broad, maize-yellow, and parallel to postmedial; a faint terminal diffused line of pale maize-yellow; cilia silvery white.

Dasychira greeni, nov. spec. (pl. III, figs. 5, 6).

♂. Fore wing very long, triangular; hind wing rather small, somewhat circular; hairs on vertex, thorax, palpi above, shaft of antennæ, and legs hair-brown (XLVI), mixed with fuscous (XLVI); palpi and thorax underneath, fore legs on inner side, and frons with warm buff (XV) hairs, mixed with ochraceous-tawny (XV) hairs; tibiae and tarsae of all legs ringed with fuscous; branches of antennæ fuscous-black (XLVI); abdomen somewhat greasy, but hairs probably ochraceous-orange (XV), three tufts of black scales and hairs on first three abdominal segments; some black scales on end of metathorax; anal tuft of long hairs. Fore wing with ground colour light buff (XV), but thickly covered with fuscous scales, except at before and beyond antimedial line, a medial triangular patch near costa, costal part of postmedial line and the sub-terminal line between the veins; sub-basal line indistinct; antimedial fuscous-black, much dentated at upper median, below lower median and *1b*; median line indistinct, double, waved, fuscous-black; reniform almost square, of ground colour, and slightly irrorated with sayal brown (XXIX) scales; at costa a patch of ground colour, divided into two by medial line; post-medial indistinct, dentated at the veins and near costa, on outer side with a patch of ground colour; sub-terminal consisting of an indistinct series

of lunules between the veins and of ground colour, suffused on inner side with fuscous-black; terminal line consists of some small fuscous-black lunules only; cilia fuscous-black with light buff scales at end of veins.

Hind wing very greasy, but probably auburn (II) in colour, without any markings; cilia as in fore wing.

Under side of fore wing with the ground colour at discal area ochraceous-orange (XV) and of a Prout's brown colour (XV) at costal area from below lower median to inner margin, from discoceitular to termen, and from before $\frac{1}{2}$ vein 2-4 till termen. Hind wing ochraceous-orange.

Exp. 36 mill.

♀. Head, thorax, and legs as in ♂; palpi with the third joint long and thin, as in *Lalua*; second and third joints pale ochraceous-buff (XV) with fuscous-black hairs; abdomen in type badly rubbed, in co-types deep chrome above and pale yellow-orange (II) underneath; last two segments with pale yellow-orange hairs above; three large blackish scale tufts on abdomen.

Fore wing with ground colour light buff [in some specimens well irrorated over whole wing with light cinnamon-drab (XLVI), in one specimen with light purple-drab (XLV)]; basal and sub-basal lines somewhat diffused, fuscous; antimedial line diffused, fuscous, waved at upper and lower median, median fold and 1b; medial line more defined from upper median to inner margin and waved in cell, median fold and at 1b; orbicular ill-defined by fuscous scales; above it till costa a dark suffusion; postmedial fuscous, well defined, and dentated at all veins and median fold; space between postmedial and sub-terminal lines filled with a more or less dense irroration, consisting of scales from hair-brown to brownish-drab (XLV); sub-terminal only indicated by fuscous lunules between the veins; terminal line consisting of well-defined but smaller lunules between the veins; cilia of ground colour, except between the veins, where they are fuscous-black.

Hind wing deep chrome (III) with a thin sepia (XXIX) irroration at terminal area; cilia pale orange-yellow (III), except between the veins, where they are sepia.

Under side light orange-yellow; fore wing irrorated at terminal half with saccardo's umber (XXIX) scales; hind wing irrorated with the same colour, but less thickly at costal half near apex. Exp. 47 mill.

Hab. ♂ type.—Durban (11.8.09, bred by Green); in coll., Janse.

Another ♂, very greasy.—Durban (19.7.10, bred by E. L. Clark); in coll., Green.

♀ type.—Durban (14.7.08, Leigh); in coll., Tvl. Mus.

♀ co-types, four specimens.—Durban (I, VII, VIII); in coll., Tvl. Mus., Janse, Green, Clark.

According to a note from Mr. Clark, the larva of this species feeds on "milkweed."

I named this species after Mr. H. A. Green, Durban, who bred several specimens and provided me with ♂ and ♀.

Species *auctororum* :—

Dasychira herbida, Wlk., Cat. VII, p. 1740 (1856).

Dasychira postpura, Hmps., Ann. S.A. Mus., p. 397 (1905).

- Dasychira rubrifilata*, Hmps. n., Ann. S.A. Mus., p. 399 (1905).
Dasychira escota, Hmps. n., Ann. S.A. Mus., p. 399 (1905).
Dasychira libyra, Druce, A. M. N. H. (6), XVII, p. 352 (1896).
Dasychira metathermes, Hmps. n., Ann. S.A. Mus., p. 400 (1905).
Dasychira proleprota, Hmps. n., Ann. S.A. Mus., p. 401 (1905).
Dasychira atrifilata, Hmps. n., Ann. S.A. Mus., p. 401 (1905).
Dasychira extatura, Dist., A. M. N. H. (6), XX, p. 202 (1897).
Dasychira gwelila, Swinh., Trans. Ent. Soc., p. 469 (1903).
Dasychira mascarena, Butl., A. M. N. H. (5), II, p. 294 (1878).
Dasychira bryophilina, Hmps. n., A. M. N. H. (8), V, p. 450 (1910).
Dasychira confinis, Dist., A. M. N. H. (7), IV, p. 360 (1899).
Dasychira poliotis, Hmps. n., A. M. N. H. (8), V, p. 449 (1910).
Dasychira cangia, Druce, Proc. Zool. Soc., Lond., p. 674 (1887).

Genus LÆLIA (pl. V, fig. 3).

Lælia, Steph., Syst. Cat. Brit. II, p. 52 (1829); type *canosa*.

Anthora, Wlk., IV, p. 801 (1855); type *subrosea*

Hmps. n., Ann. S.A. Mus., p. 394 (1905).

Description made from *Lælia bifascia*.

Proboscis very short; palpi just beyond frons, of about length of eye, porrect, with last joint slightly drooping; first joint very small; second joint long and thin; third joint nearly half of second joint and very thin; second joint on under side with rather long hair, but on upper side the hairs are short, leaving the third joint well exposed; third joint with moderate hair only; eye elliptical and less than width of frons, covered on under side by some very long hairs; antennæ bipectinate; shaft well curved; branches in ♂ nearly 8 times as long as thickness of shaft, forming nearly a straight line on under side and ending in 2 bristles; frons, vertex, and thorax covered with long hair; abdomen as long as hind wings; legs covered with long hair; fore tibia with the process only present in ♂, which is long, pointed, and curved over end of tibia outwardly;* mid tibia with 2 spurs; hind tibia with 4 moderate spurs; tarsae with smooth hair.

Fore wing sub-triangular; costa arched near base and apex, but in the middle hollowed out; termen, inner margin, apex, and tornus well rounded; vein 1b simple at base; 2 from about $\frac{2}{3}$ lower median; 3 from $\frac{2}{3}$ the distance between 2 and 4; 4 from lower angle; 5 from well above the angle; discocellular faintly visible, but present; cell over $\frac{1}{2}$ of wing; 6 from upper angle (in *figlina*, however, it originates from about $\frac{3}{4}$ of discocellular; 7 and 8 from a stalk of $\frac{1}{4}$ of 7 and coming from the upper angle; 9 and 10 on an equally long stalk and originating from upper median at $\frac{7}{8}$; 9 at about $\frac{1}{2}$ length of stalk anastomosing with 8 just above its stalk for about $\frac{1}{3}$ free part of 8, so as to form an areole about 2 times longer than broad; 11 from $\frac{6}{8}$ upper median and nearly parallel to 10 and 12; 12 free and somewhat curved.

* In the ♀ of *subrosea* and *diascia* there is a thin process of $\frac{3}{4}$ of tibia, just fitting in the hollow; in the ♂ of *punctulata* the process is only a little longer than the tibia and not curved outwards, while in its ♀ the process is thin and $\frac{2}{3}$ of tibia; in *figlina* it is about as long as the tibia in ♂ and well curved, in its ♀ only as long as half the tibia and very thin.

Hind wing triangular, with the costa gently and the termen and inner margin well rounded; apex and tornus well rounded; *1a* rather long and straight; *1b* straight; 2 from $\frac{2}{3}$ lower median; 3 and 4 from lower angle, stalked or from a point or somewhat apart (in some species rather far apart, but never farther from 4 than 4 is from 5),* and in that case 4 always from lower angle; 5 from about $\frac{1}{3}$ discocellular, which is somewhat angled at $\frac{2}{3}$, and rather faint; cell about $\frac{1}{2}$ of wing; 6 and 7 on a stalk of $\frac{1}{4}$ of 6 and from upper angle; 8 curved to upper median at $\frac{1}{2}$, but not anastomosing with it.

Prof. A. Spuler, in "Schmett. Eur. Bnd.," I, p. 129, states that in *Lalia* vein 10 of fore wing comes from the upper median and is free, while 9 should then come from the upper part of the areole. This is certainly not the case in any South African species, and I have no specimens of the type of the genus to investigate this point. Sir Hampson and E. Meyrick, however, state that vein 10 is as in *Dasychira*, and this agrees with my own observation.

For further comparison of this genus with *Dasychira*, see under that genus.

The following species I removed from this genus: *testatia* and *sericea*, which I bring in *Cropera*, as they both have vein 3 of hind wing farther from 4 than 4 is from 5; moreover, 6 and 7 are on a very short stalk and 8 does not touch the upper median, but just approaches it at $\frac{1}{3}$; *adpersa* I bring in *Crorema* (see there).

Species in South Africa:—

- | | |
|---|--------------------------|
| 1. <i>a.</i> Fore wing without postmedial series of spots..... | * <i>phlebitis</i> . |
| <i>b.</i> Fore wing with more or less distinct postmedial series of spots..... | 2. |
| 2. <i>a.</i> Fore wing with the series of spots incurved below vein 4..... | 3. |
| <i>b.</i> Fore wing with the series of spots excurved below vein 4..... | 4. |
| 3. <i>a.</i> Postmedial spots of fore wing red..... | * <i>fulvinotata</i> . |
| <i>b.</i> Postmedial spots of fore wing dark; ground colour of wings pale lemon-yellow..... | *(?) <i>setinoides</i> . |
| 4. <i>a.</i> Ground colour of fore wing greenish..... | <i>subviridis</i> . |
| <i>b.</i> Ground colour of fore wing not greenish..... | 5. |
| 5. <i>a.</i> Ground colour of both wings light orange-yellow (III) | 6. |
| <i>b.</i> Colour of both wings not light orange-yellow..... | 7. |
| 6. <i>a.</i> Fore wing irrorated with fuscous; of rather small size..... | <i>aureus</i> . |
| <i>b.</i> Fore wing not irrorated with fuscous; size larger.. | <i>punctulata</i> . |
| 7. <i>a.</i> Fore wing sub-hyaline..... | 8. |
| <i>b.</i> Fore wing not sub-hyaline..... | 9. |
| 8. <i>a.</i> Fore wing pale cinnamon-pink (XXIX)..... | <i>subrosea</i> . |
| <i>b.</i> Fore wing light cinnamon-drab (XLVI)..... | <i>xyleutis</i> . |

* In the ♀ of *subrosea* 3 is from 4 almost farther than 4 is from 5; one ♀ of *figlina* has 3 nearly 2 times as far from 4 as 4 is from 5; all other species have 3 and 4 nearly from a point.

9. *a.* Hind wing of ♂ fuscous (XLVI) or thickly irrorated with fuscous..... 12.
b. Hind wing always of a light colour..... 10.
10. *a.* Fore wing with a dark fascia along lower median.. 11.
b. Fore wing without a dark fascia along lower median. 14.
11. *a.* Fore wing with a second fascia near inner margin... *bifascia.*
b. Fore wing without a second fascia; ground colour of fore wing reddish..... *figlina.*
12. *a.* Fore wing of ♂ clay colour (XXIX)..... *swinnyi.* ♂.
b. Fore wing lighter and sprinkled with darker scales.. 13.
13. *a.* Termen of fore wing straight, and surface sprinkled thinly; basal part of hind wing not suffused with fuscous..... *robusta.*
b. Fore wing with the termen rounded; sprinkling thick; whole hind wing suffused with fuscous... *nigripulverea.*
14. *a.* Patagia crimson; fore wing yellow, suffused with crimson..... **haematica.*
b. Patagia of same colour as thorax, never crimson... 15.
15. *a.* Termen of fore wing straight..... *diascia.*
b. Termen well rounded..... 16.
16. *a.* Fore wing of both sexes greyish-white..... *clarki.*
b. Fore wing yellowish-white; rather more sprinkled with dark scales than ♀ of *clarki*, and much smaller. *swinnyi.* ♀.

Note.—I have not had sufficient data to place *amabilis* in this key.

Lælia punctulata, Butl., A. M. N. H. (4), XVI, p. 400 (1875) (pl. V, fig. 6).

Hmpsn., Ann. S.A. Mus., p. 395 (1905).

Hab. White River (Cooke).
 Pinetown (III, Leigh).
 Durban (XI, Leigh).
 Umkomaas (I, Janse).
 Umgeni (IV).
 Ngqeleni (I-IV, XI, Swinny).
 Port St. Johns (IV, IX, XI, Swinny).
 Uitenhage (XII, Munro).

In the Tvl. Mus. are two ♀♀. This sex seems to be seldom captured; they are much lighter than the ♂ [buff-yellow (IV)] and a little bigger (36 mill.).

Lælia subrosea Wlk., Cat. IV, p. 801 (1855) (pl. V, figs. 7, 7a).

Lælia subrufa, Snell., Tijds. v. Ent., XV, p. 39 (1872), and XXII, p. 105 (pl. VIII, fig. 6) (1879).

Lælia rosea, Schaus., S. Leone Lep., p. 26 (pl. I, fig. 3) (1893).

Hmpsn., Ann. S.A. Mus., p. 395 (1905).

Hab. Waterval (Zoutpansberg District) (IV, Janse).
 White River (I, Cooke).
 Durban (IX, Clark).

The hind wings of the ♂ are tinged with orange-pink (II), and are not, as in the ♀, quite white.

Lælia diascia, Hmpsn., Ann. S.A. Mus., p. 395 (1905) (pl. V, fig. 5).

- Hab. Shilovane (XI, Rev. Junod).
 Pretoria (II, Miss Gunning).
 Three Sisters (III, Janse).
 Barberton (XII, Janse).
 New Hanover (II, VII, VIII, Hardenberg).
 Sarnia (VIII, Janse).
 Durban (IV, Leigh) (XI).
 Umkomaas (I, Janse).

Lælia bifascia, Hmpsn., Ann. S.A. Mus., p. 396 (1905) (pl. V, fig. 3).

- Hab. Rietfontein No. 57, Pretoria District (IX, Janse).
 New Hanover (III, VIII, IX, Hardenberg).
 Pinetown (I, Leigh).
 Umkomaas (I, Janse).
 Ngqeleni (III, Swinny).

Lælia figlina, Dist., A. M. N. H. (7), IV, p. 361 (1899) (pl. V, figs. 8, 8a).

- Hmpsn., Ann. S.A. Mus., p. 396 (1905).
 Hab. Pretoria (Dr. H. G. Breyer).
 Lydenburg District (Krantz).
 New Hanover (VII, Hardenberg).
 Stanger, Natal (XII).
 Tongaat.
 Pinetown (I, Leigh).
 Durban (Clark).
 Ngqeleni (I, Swinny).

Lælia xyleutis, Hmpsn., Ann. S.A. Mus., p. 396 (1905) (pl. V, fig. 4).

- Hab. Pretoria (X, Dr. Breyer ; Dr. Gunning ; VIII, XI, XII,
 Lord Gladstone ; XII, Hardenberg ; IX, Janse).

Lælia clarki, nov. spec. (pl. III, figs. 7, 8).

♂. Head, tegulae, patagia, thorax, and front legs pale smoke-grey (XLVI), mixed with blackish scales ; palpi cinnamon-buff (XXIX) ; the second joint with some blackish hairs above ; palpi porrect with the third joint well exposed ; proboscis absent ; mid and hind legs whitish, mixed with some blackish hairs ; antennæ greyish-olive (XLVI) ; abdomen pale smoke-grey (XLVI) above and cartridge-buff (XXX) underneath ; a small tuft of black hairs on second segment of abdomen ; fore wing whitish, thickly sprinkled with light drab (XLVI) scales ; sub-basal well defined till 1b ; antimedial, medial, and postmedial lines indicated by some ochraceous-orange (XV) scales tipped with black ; reniform diffused, edged on inner and outer side with ochraceous-orange, black-tipped scales ; a costal sub-triangular diffused light drab mark at postmedial area ; sub-terminal diffused, light drab, parallel to outer margin till vein 3, then curved inwards and ending at tornus, somewhat dentate at the veins and here and there sprinkled with blackish scales ; terminal represented by

blackish lunules between the veins; cilia light drab. Hind wing pure white.

Under side of fore wing evenly suffused with light drab (XLVI), especially at the veins and at apical and costal area; hind wing white, suffused with cartridge-buff (XXX).

♀. Head, thorax, and abdomen lighter than in ♂; palpi light orange-yellow (III) and with less black hairs than in ♂; shaft of antennæ whitish; branches black at base and further on maize-yellow (IV); fore wing white, sprinkled with light drab scales, but more sparingly than in ♂; lunules and costal mark more distinct than in ♂; hind wing white, but suffused with light drab, especially towards outer margin; under side of fore wing lighter, of hind wing darker, than in ♂.

Exp. ♂ 33·5 mill.; ♀ 38 mill.

Hab. ♂ type from Barberton (14.1.09, G. W. Jeffery), in coll., Janse; co-type, Warmberg (18.2.04, Janse); only 28·5 mill.

♀ type from Umkomaas (30.1.14, Janse).

I studied two more ♀♀ from Durban (16.11.08, XII, Leigh) and one ♀ from Barberton (25.12.10, Janse).

I received one ♀ from Mr. Clark, caught at Durban, which was identified by Mr. A. T. Cooke as *D. diffusa*, but *diffusa* is distinctly the ♀ of *D. municipalis*, as Hampson rightly states in Ann. S.A. Mus., p. 397. Distant's description of *diffusa* does not fit the ♀ of *L. clarki* at all, and the ♂ of this species is different to the ♂ of *municipalis*, though not so much as the ♀. Moreover, this is not a *Dasychira*, but a *Laelia*, as the palpi, the process of the fore legs, and the venation clearly indicate, they only differ from the typical *Laelia* in having vein 3 and 4 stalked in all the specimens I examined.

***Laelia subviridis*, nov. spec. (pl. III, fig. 9).**

♂. Hair of head and thorax vinaceous-buff (XL), mixed with many yellowish-oil-green (V) and blackish hairs; palpi avellaneous (XL), mixed at sides and thickly at base of third joint with fuscous (XLVI) hairs; patagia yellowish-oil-green, tipped with blackish hairs; antennæ with shaft black, scaled so as to leave black rings with yellowish-oil-green scales; branches black; thorax on under side and legs pinkish-buff (XXIX); tibiae and tarsae ringed with fuscous-black hairs; abdomen somewhat greasy, but showing in many parts pinkish-buff scales and hairs.

Fore wing ground colour pale olive-buff (XL), thickly irrorated with deep grape-green (XLI) and fuscous scales; sub-basal line represented by black scales from costa till *1b*; antimedial black, double near costa, outer line becoming indistinct beyond cell and inner line angled at all veins and folds, edged on outer side by diffused ground colour; medial line distinct, black and on inner side with dark olive-buff (XL) irroration and on outer side by ground colour, sharply angled outwards at upper median and discal fold, and inwards at lower median, median fold, and below *1b*; reniform of fuscous-black scales, partly edged on outer and inner sides by ground colour; postmedial fuscous-black, partly edged on outer side by ground colour, from costa straight to stalk of 9, 10, then

along stalk, then angled at 5, 4, and turned inwards at 3 and still more at 2, and somewhat angled at median fold and 1b; sub-terminal indistinct, broad, fuscous-black; terminal sharply defined and consisting of a black line angled at each vein; cilia fuscous and of ground colour at end of veins.

Hind wing avellaneous, suffused with fuscous-black, thinly at basal $\frac{1}{2}$ and thickly at terminal $\frac{1}{2}$; cilia fuscous.

Under side of both wings avellaneous, thickly irrorated with fuscous; reniform in both wings distinct, fuscous; postmedial of both wings fuscous, diffused on edges and rather broad.

Exp. 36.2 mill. One specimen only.

Hab. Type, ♂ from Waterval Onder (Feb., 1912, Bonnekamp); in coll., Janse.

Lælia swinnyi, nov. spec. (pl. III, figs. 10, 11).

♂. Head, shaft of antennæ, thorax above and ground colour of fore wing clay colour (XXIX); palpi cinnamon-buff (XXIX), with base of third joint fuscous (XLVI); branches of antennæ blackish; thorax on under side, legs, and abdomen Saccardo's umber (XXIX). Fore wing thinly sprinkled with Saccardo's umber; sub-basal, medial, postmedial, and sub-terminal lines indicated by some fuscous scales, the first three originating from near costa and ending at median fold; terminal represented by a series of fuscous dots between the vein; cilia of ground colour. Hind wing with ground colour chamois (XXX), thickly irrorated with fuscous; cilia chamois, well mixed with fuscous.

Under side ground colour chamois; fore wing thickly, and hind wing much less, irrorated with fuscous; hind wing with a glittering appearance; cilia as on upper side.

♀. Head, palpi, shaft of antennæ, thorax, legs, patagia, and abdomen whitish, tinged with light buff (XV) and sprinkled with some fuscous; fore wing whitish, sprinkled with some fuscous scales; sub-basal only represented by some fuscous-black (XLVI) scales; antimedial line also indicated by such scales from upper median till inner margin; medial very indistinct; reniform only consisting of some fuscous-black scales; postmedial and sub-terminal faint and beginning at costa as a dark irroration; terminal represented by a series of dots, as in ♂; cilia whitish, mixed with fuscous. Hind wing white, with slight irroration at terminal area; medial line faintly represented; cilia more white than on fore wing.

Under side with ground colour white; fore wing sprinkled at costal and terminal area with fuscous; a fuscous irroration at postmedial area, continued but getting narrower over hind wing and fainter towards tornus of hind wing; on hind wing sprinkling more sparingly; cilia as on upper side.

Exp. ♂ type, 29.2 mill.; ♀ type, 31.2 mill.

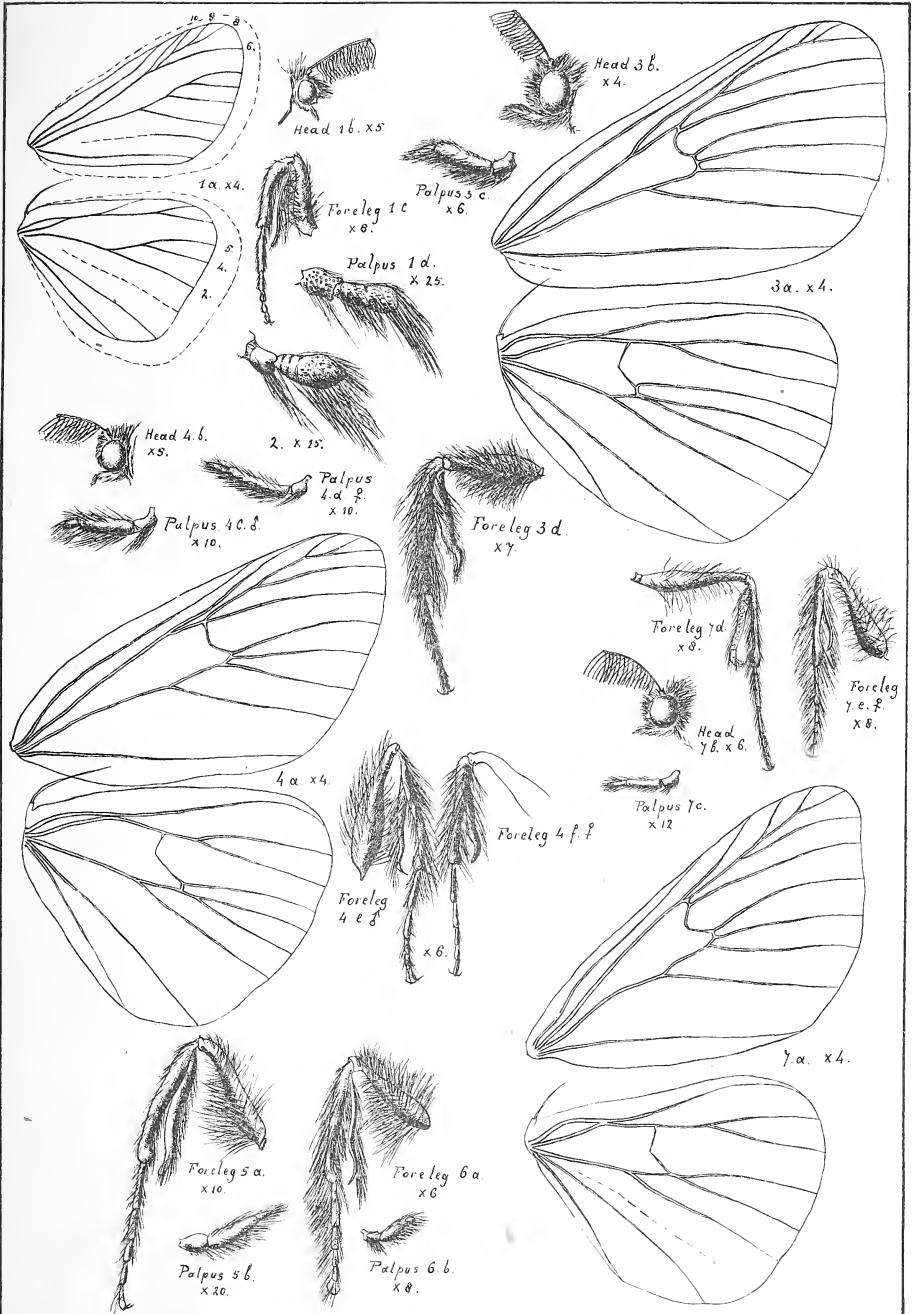
Hab. ♂ type, Port St. Johns (29.8.08, H. H. Swinny).

♀ type, Port St. Johns (29.8.08, H. H. Swinny).

Four ♂♂ co-types from Port St. Johns (29.8.08, 4.4.08;

Ngqeleni, 13.1.07, 1.8.08, H. H. Swinny).

One ♀ co-type from Moorddrift (7-19.10.07, C. J. Swierstra).



Jansedel. et lith.

1. *Micraroa fulvescens*, Hmps n ♂ ; 2. *M. minima*, nov. spec. ♂ ; 3. *Homochira rendalli*, Dist. ♂ ;
4. *Euproctis fasciata*, wik. ♂ ; 5. *E. bicolor*, nov. spec. ♂ ; 6. *E. iridescens*, nov. spec. ♂ ;
7. *Porthesia natalensis*, nov. spec. ♂ .

Types in coll., Tvl. Mus.; co-types in coll., Tvl. Mus., and coll., Janse.

♂ and ♀ have the hind wing with vein 3 and 4 on a stalk of $\frac{1}{4}$ or $\frac{1}{3}$, and the stalk of 8 and 9 of fore wing is longer than usually.

I have little doubt that the ♀ belongs to the ♂, though in general appearance they do not resemble each other much; the structure, however, is very much the same, and the ♂ and ♀ types were caught on the same day and in the same locality.

I do not know any *Lælia* to which this species comes near.

Lælia aureus, nov. spec. (pl. III, fig. 12).

♂. Head, palpi, tegulae, thorax on under side, abdomen, ground colour of fore wing and hind wing light orange-yellow (III); on vertex those hairs are mixed with hairs of an ochraceous-tawny (XV) colour; thorax above covered with ochraceous-tawny hairs; shaft of antennæ ochraceous-tawny; branches blackish; fore wing thickly irrorated with ochraceous-tawny scales, but less thickly on inner margin; sub-basal line indicated by some blackish tipped scales, by which also the orbicular and reniform are represented, while above the orbicular near costa a fuscous irroration indicates the medial line; postmedial line faint and of blackish tipped scales, oblique, well rounded from costa till vein 3, then curved inwards at vein 2; sub-terminal faint and made of blackish tipped scales, parallel to apex and termen as far as vein 3, then slightly curved inwards; terminal represented by a few blackish scales only; cilia ochraceous-tawny; hind wing and cilia of ground colour, without the irroration or any marking, but slightly lighter at basal area.

Under side light orange-yellow; fore wing somewhat irrorated with ochraceous-tawny, except a costal streak, and more thickly at apical and terminal area.

Hind wing has vein 3 and 4 on a stalk of $\frac{1}{3}$.

Exp. 23·5 mill.

Hab. Only one specimen, from Umkomaas (10.1.14, Janse).

This species comes close to *L. punctulata*, from which it may be distinguished by the irrorated fore wing, its much smaller size, and the differently running sub-terminal line.

Lælia robusta, nov. spec. (pl. III, fig. 13).

♂. Head, palpi, shaft and branches of antennæ, thorax, ground colour of fore wing, tibiae and tarsae of legs pinkish-buff (XXIX); palpi with some fuscous (XLVI) scales at side; at base of antennæ a few fuscous scales; thorax below, femora of all legs, and the abdomen dorsally at base, the sides, and the under side, whitish; further part of abdomen above pinkish-buff, mixed with some fuscous hairs.

Fore wing with the inner marginal area somewhat lighter than the ground colour; whole wing, except inner marginal area, evenly sprinkled with fuscous; a few dark scales at place of sub-basal line; reniform only represented by some fuscous scales; postmedial indicated by a series of fuscous-black (XLVI) scales, in the shape of a lunule at between veins 6-5 and 5-4, then of small spots between 4-3 and 3-2 and a larger rounded

spot between 2-1b; sub-terminal represented by some diffused fuscous maculae, obliquely placed between veins 7-5, angled inwards at 5-4, nearer to termen at 4-3 and indistinctly at between 3-2; cilia light pinkish-cinnamon (XXIX), mixed with some fuscous.

Hind wing whitish, thickly irrorated with fuscous scales, except at basal, costal, and part of inner marginal area; on the veins the irroration is also much thinner; cilia whitish, mixed with pinkish-buff.

Under side whitish; fore wing well sprinkled and hind wing only thinly sprinkled with fuscous; fore wing with some diffused postmedial maculae from veins 2-7; cilia as on upper side.

Exp. 37.9 mill. One ♂ specimen only.

Hab. Durban (Green); type in coll., Janse.

In shape of fore wing this species is very much like *L. diascia*, and may be separated from this species by the ground colour of the fore wing, the postmedial series of spots, the maculae on sub-terminal line, and its suffused hind wing; besides it is much larger than *L. diascia*.

***Lælia nigri-pulverea*, nov. spec.** (pl. III, fig. 14).

♀. Head, palpi, antennæ, thorax, and legs light pinkish-cinnamon (XXIX), mixed with tawny-olive (XXIX) and fuscous (XLVI) hairs; abdomen above pinkish-buff (XXIX), on under side vinaceous-cinnamon (XXIX); fore wing with ground colour light pinkish-cinnamon, thickly sprinkled over whole wing, except last $\frac{1}{3}$ of cell, with black and sayal brown (XXIX); at place of reniform a black streak along lower median and a black point near upper angle; a blackish sub-terminal irroration from costa till vein 6, and six black spots between the veins from 1b till 7, indicating the subterminal line; termen represented by rather large black spots between the veins; cilia of ground colour, mixed with fuscous.

Hind wing pinkish-buff (XXIX), well suffused with fuscous, except at basal part; cilia light drab (XLVI).

Under side whitish; fore wing and hind wing, except basal part, thickly sprinkled with fuscous; cilia as on upper side.

Exp. 37.6 mill. One ♀ specimen only.

Hab. Pretoria (21.9.11, Janse).

This species is very much like ♀ of *L. swinnyi*, but the fore wing is much more thickly sprinkled and the hind wing is also darker; the body is more robust and darker on upper and under side, the legs have also a quite different colour.

Species *auctorum* :—

Lælia phlebitis, Hmps., Ann. S.A. Mus., p. 394 (1905).

Lælia setinoides, Holl., Psyche, VI, p. 431 (1893).

Hmps., Ann. S.A. Mus., p. 395 (1905).

Lælia fulvinotata, Butl., P. Z. S. L., p. 678 (1893).

Lælia haematica, Hmps., Ann. S.A. Mus., p. 395 (1905).

Lælia amabilis, Auriv., Öfv. Vet. Akad. Förh., XXXVI (7), p. 58 (1879).

Hmps., Ann. S.A. Mus., p. 396 (1905).

Genus *PSALIS* (pl. V, fig. 9).

Psalis, Hübn., Zütr., 2, p. 19 (1827); non-descr.

Moore, Lep. Ceyl., II, p. 94 (1882); type *securis*.

Hmps., Ann. S.A. Mus., p. 393 (1905).

Proboscis absent; palpi just beyond frons, about of length of eye, slightly drooping, and thickly covered with long hair; first joint very small; second joint very large and thick towards end, somewhat pear-shaped and bent at beginning; third joint absent; eye elliptical, about $\frac{3}{4}$ of frons; antennæ of ♂ very much curved, bipectinate; longest branches about 8 to 10 times thickness of shaft, ending in 2 long bristles and on inner side also curved, especially towards apex; basal joint of shaft thick; in ♀ the antennæ are a little shorter, slightly pectinated, and pecten getting gradually shorter and ending in 2 short bristles; vertex covered with woolly hair; frons with a well developed pointed tuft; thorax covered with long woolly hair; abdomen a little longer than hind wing, in ♂ often with more or less developed woolly crests; fore tibia with a long pointed outwardly curved process (even longer than in any *Laelia*); femora, tibiae, processes, and tarsae with long spreading hairs; in the ♀ the process is absent, but the hairs are much longer; mid and hind legs with long spreading hairs; mid tibia with 2 spurs; hind tibia with 4 spurs.

Fore wing in ♂ sub-triangular; costa very much arched; termen very oblique, straight; inner margin somewhat rounded; apex well rounded; tornus rounded (in ♀ the wing is more elongate; costa more arched, especially towards apex; termen very oblique and hollowed out near apex; inner margin as in ♂; apex very much produced; tornus well rounded); vein 1*b* simple at base; 2 from $\frac{3}{4}$ of lower median; 3 from $\frac{7}{8}$ of lower median; 4 from angle; 5 from just above the angle; discocellular present and angled inwards; cell about $\frac{1}{2}$ of wing; 6 from just below upper angle; 7 stalked with 8 for $\frac{1}{4}$ of vein 7, stalk from upper angle; 9 stalked with 10 for $\frac{2}{3}$ of 9 and from $\frac{1}{5}$ upper median; 9 approaching 8 a little beyond the stalk and anastomosing for $\frac{1}{2}$ the free length of 8, so as to form a rather long areole; 11 from $\frac{2}{3}$ upper median; 12 nearly parallel to costa.

Hind wing triangular; costa slightly hollowed out at middle; termen a little lobate at vein 2-5; inner margin evenly rounded; apex and tornus well rounded; 1*a* long and straight; 1*b* at middle of 1*a* and 2; 2 from $\frac{2}{3}$ of lower median; 3 and 4 on a short stalk or from a point at lower angle, or sometimes a little apart; 5 from well above the angle; discocellular faintly represented, oblique, and angled at about $\frac{2}{3}$; cell over $\frac{1}{2}$ of wing; 6 and 7 on a stalk of $\frac{1}{4}$ and from upper angle; 8 bent towards upper median at $\frac{1}{2}$ and slightly touching it.

I think that this genus has developed from *Dasychira* almost parallel to *Laelia*, from which it differs in its two-jointed palpi. This character also separates *Psalis* from *Dasychira*, and I therefore do not see how this genus can be taken as a sub-genus of *Dasychira*. It is true that the neuration is very much alike in the three genera, but the process of the fore tibia and the missing third joint of the palpi is, I think, sufficient to keep it separate. There is less difference between *Dasychira* and *Laelia* than there is between *Dasychira* and *Psalis*.

Only one species is known of this genus, but that species has a wide distribution, as it is found all over British India, Ceylon, Burmah, Java, Australia, South Africa, and British East Africa.

Psalis securis, Hübn., Zütr., 2, p. 19 (figs. 291, 292) (1827).

Hmpsn., Ann. S.A. Mus., p. 393 (1905).

- Hab. Preteria (XI, Janse ; I, Swierstra).
 Pietersburg (XI, Janse).
 Modderfontein (III, Buckle).
 Rietfontein No. 57 (XII, Janse).
 Carolina (XI, Radermacher).
 White River (VIII, Cooke).
 Camperdown (III, IV, Leigh).
 Sarnia (I, Janse).
 Durban (XII, Leigh).
 Umkomaas (I, Janse).
 Ngqeleni (XII, Swinny).

LYMANTRIA (pl. VI, fig. 1).

Lymantria, Hübn., Verz., p. 160 (1827) ; type *monacha*.

Morasa, Wlk., IV, p. 859 (1855) ; type *modesta*.

Sarothropyga, Feld., Reis. Nov., p. 8 (1875) ; non-descr. ; type *modesta*.

Hmpsn., Ann. S.A. Mus., p. 410 (1905).

Range : Europe, Japan, India, Ceylon, Burmah, Java, Amboina, Celebes, Australia, South Africa.

♂. Proboscis absent ; palpi moderate, reaching well beyond frons, slightly ascending, very hairy on under side ; first joint a little longer than broad ; second joint almost as long as first, cylindrical ; third joint thinner than second joint and about $\frac{2}{3}$ of its length ; first and second joints with long hair on under side ; eyes large, about width of frons, rounded ; frons rounded and with long hair ; antennæ as long as $\frac{1}{2}$ the costa, bipectinate ; branches at middle 8 times the shaft (in ♀ only 3 times shaft), suddenly getting shorter towards apex and ending in one bristle ; basal joint of shaft large and with a long hairy tuft in front ; thorax covered with long woolly hair ; abdomen with rather long hair above, especially at first segment ; anal tuft of long spreading hairs ; in ♀ there is an ovipositor, as there is in *Lymantria monacha*, but some European species may have the anal part woolly ; legs with rather thick hair on femora and tibiae, especially in the fore legs ; fore tibia with a process as long as tibia, getting very broad towards end and there obliquely rounded and ending in a hairy tuft ; in ♀ the process is much shorter and of even thickness over whole length ; mid tibia with terminal spurs ; hind tibia with 4 spurs.

Fore wing sub-triangular ; costa and inner margin slightly hollowed out ; apex, termen, and tornus rounded ; a trace of *1a* ; 3 from $\frac{3}{4}$ to $\frac{4}{5}$ of ower median ; 3 from $\frac{2}{3}$ the distance 2 to 4 ; 4 from lower angle ; 5 from

a little above the angle; discocellular oblique; cell of about $\frac{1}{2}$ of wing; 6 from $\frac{3}{4}$ discocellular; stalk of 7, 8, 9, 10 from upper angle; 7 from stalk beyond 10, at from nearly $\frac{1}{3}$ of 8; 9 from 8 at $\frac{2}{3}$; 10 from beyond $\frac{1}{2}$ stalk of 7, 8, 9; 11 from upper median at beyond $\frac{3}{4}$, bent upwards at $\frac{1}{6}$ and well touching 12, then parallel to 10; 12 parallel to costa, till where it touches 11. In ♀ 10 comes from before $\frac{1}{2}$ stalk of 7, 8, 9, and 11 quite anastomoses with 12. (Turner, *l.c.* p. 471, mentions that *Axiologa*, Turner, has vein 11 anastomosing with 12, but this genus has also an areole. It may be found necessary to create a new genus for *modesta*, as the process of the fore tibia is also quite peculiar.)

Hind wing triangular; costa and inner margin well hollowed out; apex, termen, and tornus much rounded; at tornus a slightly rounded lobe from 1a to 2; 1a very long and near inner margin; 2 from $\frac{2}{3}$ lower median; 3 from close to lower angle; 4 from the angle; 5 from above angle about 2 times as far as 3; cell over $\frac{1}{2}$ of wing; discocellular very oblique, sharply angled at $\frac{2}{3}$ of distance 5 to 6; 6 from below upper angle; 7 from angle; upper median angled at $\frac{1}{2}$, so as to meet 8, which is hollowed out there and connected with upper median beyond $\frac{1}{2}$ by a short oblique bar; in ♀ this bar is less distinct and the veins touch each other; also 3 and 4 are there from lower angle; 6 and 7 from upper angle.

The touching of vein 11 and 12 in fore wing is rather peculiar and was found in all specimens I examined (sixteen specimens), though about 50 per cent. only touch and the remainder *actually anastomose*.

In the ♀ of *L. monacha* (I possessed no ♂) from Europe these veins come close to each other, but do not touch; this is also the case in *L. albimacula*, Wlgrn.

In *albimacula* vein 3 is 2 times farther from 4 in the fore wing than in *modesta* and the palpi are much less hairy, while the process of the fore tibia is of even width and not dilated at end; in the ♀ the process is longer than in the ♀ of *modesta*.

1. a. Hind wing tinged with geranium-pink (I) in ♂; in ♀ the hind wing is more tinged with pink and thinly suffused on terminal area with fuscous..... *modesta*.
- b. Hind wing in both sexes cartridge-buff (XXX), tinged with Naples yellow (XVI)..... *albimacula*.

Species in South Africa:—

Lymantria modesta, Wlk., IV, p. 859 (1855).

Sarothopyga rhodopepla, Feld., Reis. Nov. (pl. 100, fig. 23) (1875).

Hmpsn., Ann. S.A. Mus., p. 410 (1905).

Hab. Waterval, Zoutpansberg District (XI, Janse).

Barberton (XII, I, Janse; V, Munroe).

Sarnia (VIII, Janse).

Pinetown (Janse).

Durban (XII, Leigh; X, Ross). IV.

Estcourt (Natal).

Umkomaas (I, Janse).

Lymantria albimacula, Wilgrn., Lep. Het. Caffr. Köngl. Svens. Vet. Akad. Handl., Bd. V, No. 4, p. 35 (1865).

Aclonophlebia mosera, Druce, A. M. N. H. (7), I, p. 208 (1898).

Hmpsn., Ann. S.A. Mus., p. 405 (1905).

This species is not an *Aclonophlebia* as Hampson states, *l.c.* p. 405, as it has 4 spurs on the hind legs and not 2 as is the case in *Aclonophlebia*.

Hab. Warmberg, Zoutpansberg District (II, Janse).
Durban (Clark).
Umkomaas (I, Janse).

Genus POLYMONA (pl. VI, fig. 2).

Polymona, Wlk., III, p. 768 (1855); type *rufifemur*.

Hmpsn., Ann. S.A. Mus., p. 410 (1905).

♂. Proboscis absent; palpi short, not quite reaching frons, drooping a little; first joint a little longer than thick, with long hair on under side; second joint $1\frac{1}{2}$ times first joint, with long hair on under side pointing forward; third joint as long as first, with some hair and somewhat hidden in the hair of the second joint; eyes large, elliptical, about width of frons; frons rounded, covered with woolly hair; vertex with long hair; antennæ $\frac{1}{3}$ of costa, bipectinate; shaft much curved; pecten about 8 times shaft, in ♀ about 4 times; pecten ciliated and ending in a long bristle; thorax clothed with long hair; abdomen a little longer than hind wing, covered with woolly hair and a moderate tuft of spreading hair at first segment; tibiae with very long hair; fore leg with tibia in both sexes with a process, which in the ♂ is about as long as the tibia, thick and with long hair on outer side, in ♀ thinner and apparently with a short second joint, also covered with long hair; mid and hind tibiae each with 2 terminal spurs only.

Fore wing triangular; costa, inner and outer margin nearly straight; apex and tornus well rounded; 1*b* simple at base; 2 from beyond $\frac{2}{3}$ lower median; 3 from a little farther from 4 than 4 is from 5; 4 from lower angle; 5 from a little above angle; discocellular very oblique and hollowed at middle; cell over $\frac{1}{2}$ of wing; 6 from a little below upper angle; stalk of 7, 8, 9, 10 from upper angle; 7 from before $\frac{1}{4}$ of 9; 8 from $\frac{3}{4}$ of 9; 10 from $\frac{1}{3}$ of stalk 7, 8, 9; 10 a little curved and for some distance parallel to stalk 7, 8, 9; 11 from $\frac{2}{5}$ of upper median, nearly straight; 12 nearly parallel to costa.

Hind wing triangular; costa and inner margin nearly straight; outer margin well curved from vein 1*b* till 7; apex and tornus well rounded; 1*a* long, straight; 1*b* a little curved; 1*c* faintly indicated; 2 from $\frac{2}{3}$ lower median; 3 and 4 from close to lower angle; 5 from well above the angle (about 3 times the distance of 3 to 4); discocellular very oblique, directed inward, angled beyond $\frac{1}{2}$; cell a little over $\frac{1}{2}$ of wing; 6 from below upper angle; 7 from angle; 8 curved towards upper median at beyond $\frac{1}{2}$, where also upper median is angled, and just touching it, then parallel to costa.

Hampson, *l.c.* p. 410, treats this genus as a synonym of *Lymantria*, but I think it is sufficiently distinct to keep it separate. The process of the fore leg is much as in *Dasychira* and the palpi are quite different; 12

shows no tendency to approach II, while the hind legs have only 2 spurs. I look upon this genus as a development from *Lymantria* parallel to *Aclonophlebia*, from which it differs in position of vein 5, 7, and 10 in fore wing and of 3, 5, 7, and 8 of hind wing; the third joint of the palpi and the process of fore legs; moreover, this process is absent in the ♀ of *Aclonophlebia*.

Only one species is known to me:—

Polymona ruffemur, Wik., Cat. III, p. 768 (1855).

Dist., A. M. N. H. (6), XX, p. 200.

Hab. Pretoria (II, XII, Janse).

Van der Merwe Station (XII, Janse).

Waterval Onder (XII, Bonnekamp).

Barberton (V, Jeffery).

New Hanover (VIII, IX, Hardenberg).

ACLONOPHLEBIA (pl. VI, fig. 3).

Aclonophlebia, Butl., P. Z. S., p. 428 (1898); type *flavinotata*.

Hmps., Ann. S.A. Mus., p. 405 (1905).

Description made from *rhodalipha*, Feld.

Proboscis absent; palpi just projecting beyond frons; third joint slightly drooping; first joint cylindrical, a little longer than broad; second joint over 2 times first joint, but of same thickness; third joint about $\frac{1}{2}$ the length of second joint, very thin; first and second joints with long woolly hair, moderately dense; third joint less hairy; eyes large, of width of frons; frons smooth, covered with woolly hair; antennæ short, about $\frac{1}{4}$ of costa, much curved, bipectinate; basal joint of shaft with a hair tuft; branches in ♂ 6 times shaft, longest at $\frac{1}{3}$; branches ciliated; in ♀ the branches are shorter, about 2 times shaft, less ciliated, and ending in some bristles; thorax and abdomen covered with long hair; abdomen less than hind wing in length; legs moderately clothed with hair on tibiae; tarsae with short hair; fore tibia with a pointed, thin process as long as the tibia; mid and hind tibiae with 2 short conical terminal spurs.

Fore wing sub-triangular; costa and inner margin straight; outer margin slightly rounded at vein 2 to 6; apex and tornus well rounded; 1b simple at base; 2 from beyond $\frac{2}{3}$ lower median; 3 from $\frac{2}{3}$ distance 2 to 4; 4 from lower angle; 5 from just above the angle; discocellular somewhat angled at $\frac{1}{3}$, rather erect; cell a little over $\frac{1}{2}$ of wing; 6 from below upper angle; stalk of 7, 8, 9, 10 from angle; 7 from about $\frac{1}{3}$ of 9; 8 from $\frac{2}{3}$ of 9; 10 from before $\frac{1}{2}$ of stalk 7, 8, 9, much curved; 11 from $\frac{3}{4}$ upper median, curved to approach 10; 12 straight.

Hind wing triangular; costa and inner margin slightly and outer margin much rounded; apex and tornus well rounded; 1a long and straight; 1b straight; 1c faintly represented; 2 from $\frac{2}{3}$ lower median; 3 from close to angle; 4 from angle and 5 from a little above it; discocellular very oblique and somewhat angled near vein 6; 6 from just below

upper angle; 7 from the angle; 8 approaching upper median at $\frac{1}{2}$, but not touching it.

1. *a.* Hind wing yellow..... **lugardi*.
- b.* Hind wing pale crimson..... **rhodea*.
- c.* Hind wing white..... *rhodalipha*.

Aclonophlebia rhodalipha, Feld., Re's Nov. (pl. 100, fig. 25) (1874).

Aclonophlebia tessellata, Dist., A. M. N. H. (6), XX, p. 201 (1897).

Hmpsn., Ann. S.A. Mus., p. 406 (1905).

Hab. Durban (Leigh; XII, Clark).

Green Point (Natal) (I).

This is the only species known to me by specimens. As explained under the genus *Lymantria*, *albimaculata* (*mosera*) has to come out of the genus *Aclonophlebia*, as that species has 4 spurs on the hind legs.

Species auctorum:—

Aclonophlebia lugardi, Swinh., Trans. Ent. Soc., p. 493 (1903).

Aclonophlebia rhodea, Hmpsn., Ann. S.A. Mus., p. 405 (1905).

ORNITHOPSYCHE (pl. VI, fig. 4).

Ornithopsyche, Wilgrn., Het. Kaff. Kongl. Svenska Vet. Aka. Handl.

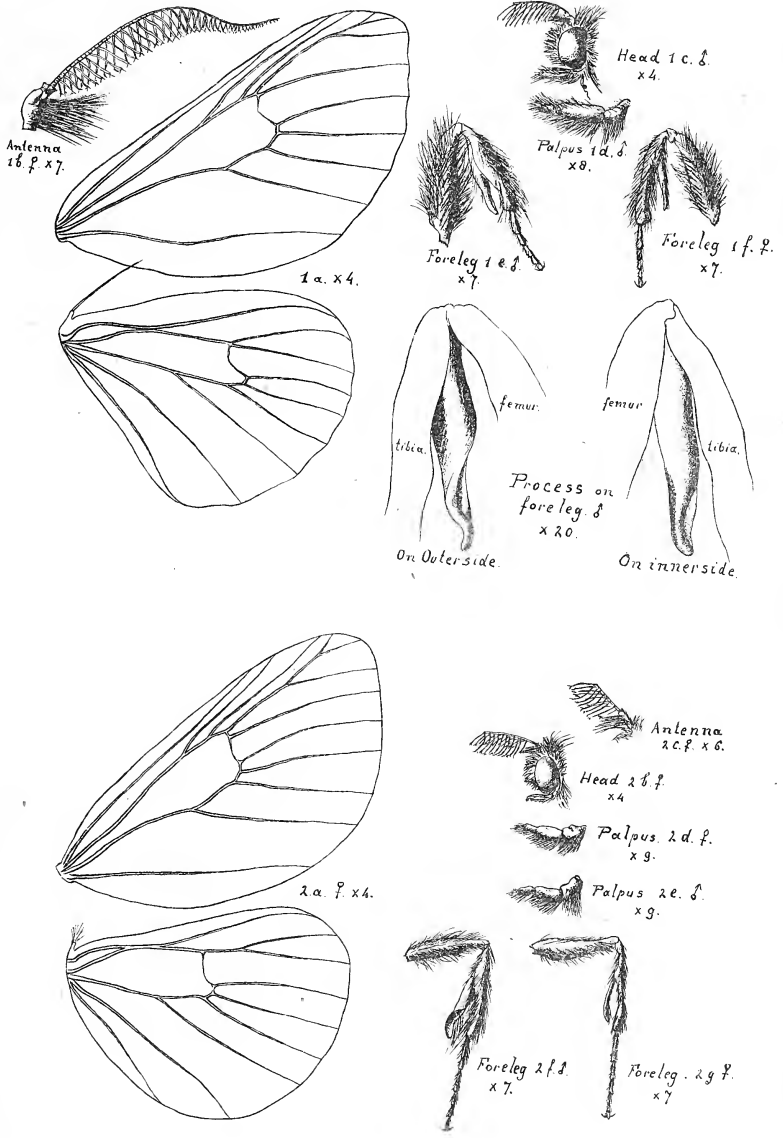
Bnd. V, No. 4, p. 35 (1865); type *discalis*.

Hmpsn., Ann. S.A. Mus., p. 408 (1905).

♂. Proboscis absent; palpi slightly ascending, long, about 2 times the eye, thickly hairy underneath; first joint small, as long as broad; second joint of same thickness, but 4 times length of first joint, slightly rostrate; third joint nearly 2 times first joint, thin, porrect, and somewhat hidden in hairs of first joint; in ♀ second joint more straight, more ascending; third joint in line with second joint; * eyes moderate, not as large as width of frons, elliptical; frons rounded, covered with short hair; antennæ bipectinate, about as long as $\frac{1}{2}$ length of costa; shaft curved; basal joint rather large and with a hair tuft; branches 6 times shaft, ending in two bristles; in ♀ the antennæ are $\frac{1}{3}$ of costa and the branches, are only 2 times shaft; thorax covered with moderate hairs; abdomen shorter than hind wings, with no crests; fore tibia with a long process, curved outwards over tibia (in *O. difficilis* the process is much shorter and is not bent over the tibia; in *O. quadrimaculata* the process is normal, but does not curve over the tibia); mid tibia with 2, hind tibia with 4, long spurs; in ♀ the abdomen is pointed and without a woolly tuft.

Fore wing short and broad; costa somewhat rounded; termen erect, rounded at veins 2-6; inner margin nearly straight; apex and tornus well rounded; 1*b* simple at base; 2 from beyond $\frac{1}{2}$ lower median; 3 from $\frac{3}{4}$ distance between 2-4; 4 from lower angle; 5 from a little above the angle; discocellular indistinct, from vein 5 to 6 somewhat curved; cell only $\frac{1}{2}$ length of wing; 6 from $\frac{2}{3}$ discocellular; 7 a very little stalked with stalk of 8, 9, 10, which comes from the upper angle; 8 from a little beyond

* In *O. difficilis* the second joint is shorter and not rostrate; third joint is much shorter and drooping.



Janse del. et lith.

1. *Naroma signifera*, Wlk. ♂; 2. *Pteredoa monosticta*, Butl. ♀.

$\frac{1}{2}$ of the whole of vein 9; 10 from before $\frac{1}{2}$ of stalk 8-9; 11 parallel to stalk and vein 10 and originating just opposite vein 2 from upper median; 12 parallel to costa for a long distance.

Hind wing large, wider from costa to tornus than from base to termen; costa and outer margin from *1b* to 6 much rounded; inner margin straight; apex and tornus rounded; *1a* very long, somewhat curved; *1b* straight; 2 from $\frac{2}{3}$ lower median; 3 and 4 from lower angle; 5 from a little above the angle; discocellular faint, rounded; cell less than $\frac{1}{2}$ of wing; 6 and 7 on a short stalk and from upper angle; 8 curved towards upper median at bend, touching it and then nearly straight towards apex; upper median bent at $\frac{1}{3}$.

As Prof. Aurivillius pointed out (*l.c.* p. 65), the type species (*discalis*) of the genus *Aroa* does not fit in with Walker's *Aroa* at all, as Walker states that the palpi are short, third joint very small, and that the ♀ has the abdomen woolly at the end; this is certainly not so in *discalis*. He also states that veins 3, 4, and 5 of hind wing are at equal distance and that 2 is 2 times further from 3 than 3 is from 4. This is not so in *O. discalis* and also not in the genus *Euproctis*, to which genus the description applies mostly, and of which *Aroa* is a synonym. Moreover, all other species placed by Walker in *Aroa* are clearly members of the genus *Euproctis*, except *adspersa*, which Walker queries himself.

The genus *Aroa*, described by Sir Hampson in "Moths of India," Vol. I, p. 433, does certainly not fit *discalis*, nor does fig. 304, as *discalis* has no areole, 6 is from far below 7, 3 is nearer to 4, and *1b* is simple at base in the fore wing; 3 and 4 are not apart and 8 has no bar to upper median in the hind wing. Besides he gives *Bazisa* as a synonym of *Aroa*, a genus quite distinct, as seen in this paper and as admitted by Hampson in his "South African Moths" (1905). He also places *Aroa* near the genus *Orgyia*, but *discalis* is certainly not related to this genus. Swinhoe places species of most different genera in *Aroa*, e.g. all species of *Lacipa*.

I therefore think that Wailengren's name has to be used, as there is no doubt that his *hypoxantha* is the same as Walker's *discalis*.

Species in South Africa:—

1. *a.* Hind wing black or fuscous-black (XLVI)..... 2.
b. Hind wing deep chrome with broad streaks of fuscous-black..... 3.
2. *a.* Fore wing with the ground colour black..... *melanoleuca*.
b. Fore wing with the ground colour mahogany red (II) *quadrimaculata*.
3. *a.* Fore wing with an oblique deep chrome band in ♂;
in ♀ with a nearly oblique postmedial line..... *discalis*.
b. Fore wing without any deep chrome in ♂; ♀ with postmedial line much angled..... *difficilis*.

Ornithopsyche discalis, Wlk., Cat. IV, p. 792 (1855).

Ornithopsyche ochraceata, Wlk., XXXII, p. 327 (1865).

Hampson., Ann. S.A. Mus., p. 409 (1905).

Ornithopsyche signata, Wlk., XXXII, p. 328 (1865).

Ornithopsyche hypoxantha, Willgrn., K. Vet. Akad. Handl. (2) V (4), p. 35 (1865).

Feld, Reis. Nov. (pl. 100, fig. 4).

- Hab. Woodbush Village (XII, Swierstra).
 Waterval Onder (II, Bonnekamp).
 White River (X, Cooke).
 Three Sisters (II, Janse).
 Barberton (I, Janse).
 New Hanover (IX, Hardenberg).
 Malalane (II, Gould).
 Sarnia (X, I, VIII, Janse).
 Durban (I, V, IX, XI, Leigh).
 Tongaat (Natal).
 Umkomaas (I, Janse).
 Ngqeleni (I, VIII, Swinny).
 Port St. Johns (I, VIII, Swinny).
 Que-que (Rhodesia).

Ornithopsyche difficilis, Wlk., XXXII, p. 328 (1865) (pl. VI, figs. 5, 5a).
 Hmps., Ann. S.A. Mus., p. 410 (1905).

- Hab. Natal (? Durban, Clark).
 Durban (VI, XII, Leigh).

This species is placed by Hampson in the genus *Homochira* on account of its crests. In the five specimens I have seen, only one crest is present, and this crest is very small and much less distinct than the smallest crest in *H. rendalli*. The fore wing of *difficilis* is nearly as in *discalis*, the stalk of vein 7 is a little longer and 6 is about $\frac{1}{2}$ way nearer to 7; the hind wing has 3 and 4 almost stalked and the stalk of 6 and 7 is 2 times longer, while 8 touches the upper median at $\frac{1}{2}$. The stalks of 3-4 and 6-7 seem to vary in both genera. The biggest difference is in the process of the fore tibia, which is shorter and less curved; the palpi are also shorter and the third joint is more drooping. Taking further the peculiar marking of the hind wings in consideration, there can be little doubt that it is better placed in the genus *Ornithopsyche* and may be looked upon as a connecting link between that genus and *Homochira*.

Ornithopsyche quadrimaculata, nov. spec. (pl. VI, fig. 6; pl. III, fig. 16).

♂. Head, thorax, and palpi above and the whole of the third joint fuscous (XLVI), mixed with whitish hairs; palpi at the sides, thorax and abdomen on under side, coxae of legs and hairs on tibiae of fore legs, femora and tibiae of mid and hind legs white; shaft of antennæ fuscous, mixed with whitish scales; branches sudan brown (III); abdomen fuscous-black (XLVI), narrowly ringed with white scales; anal tuft with fuscous and white hairs.

Fore wing: the greater part of the wing, but especially the anti-medial, medial, and beyond postmedial area thickly irrorated with mahogany-red (II) scales, mixed with whitish scales at basal and fuscous scales at terminal area; an elongate, rounded, white patch beyond the reniform, obliquely situated in the direction of a line from tornus to $\frac{1}{2}$ costa and extending in length from stalk of 8, 9, 10 to vein 2 and as broad, as from reniform to $\frac{1}{2}$ the distance of postmedial and sub-terminal lines; basal part with many whitish scales; sub-basal line broad, whitish, and from costa to vein 1b, angled at upper median; antimedial line thin,

whitish, waved inwards at cell and between lower median and vein 1*b*; medial line whitish, broad near costa, fainter beyond upper median, and parallel to antimedial, except at median fold, where it is more waved inwards; reniform fuscous, ringed with black; costa between medial and postmedial with many whitish-yellow scales; postmedial whitish-yellow, edged on outer side with mahogany-red, waved outwardly between vein 3 and 11, then a little inwardly at 2; in the whitish patch the veins are streaked with mahogany-red beyond postmedial line; a whitish-yellow streak from both ends of the patch towards costa and inner margin and parallel to postmedial line; sub-terminal line distinct, whitish-yellow, erect, and much waved inwardly at vein 2-3, 5, 7-8, and outwardly at veins 3-4, and 6 (in co-type, which is a little greasy, this line is less distinct); terminal line waved outwards at the veins, so as to leave fuscous lunules between the veins; cilia with a basal fawn-coloured (XL) line, checkered with fuscous and whitish.

Hind wing: ground colour sepia (XXIX), thickly irrorated with fuscous scales and covered on inner marginal area with long whitish hairs; an elongate whitish patch beyond cell, from vein 6 to a little beyond vein 3; this patch is sub-elliptical and indented on outer side at vein 5; cilia fuscous at first $\frac{1}{2}$, then fawn and whitish mixed.

Under side of both wings fuscous, with the patches clearly defined and on a pure white colour; fore wing with costa broadly scaled with maize-yellow (IV); basal area with white scales and hairs; hind wing with the inner marginal $\frac{1}{2}$ from costa to beyond tornus with white scales and hairs; a fuscous reniform at end of cell; outer marginal $\frac{1}{2}$ with some few white scales, giving it a white irroration; cilia of both wings as on upper side, except that they have a thin basal whitish line.

Exp. 27.4 mill.

Hab. Que-que, Rhodesia (Miss V. D. Crowder).

One ♂ type in coll., Tvl. Mus.

One ♂ co-type in coll., Janse.

This species is closely allied to *O. melanoleuca*, Hmps., from which it differs in the mahogany-red irroration, the distinctness of the lines in the fore wing (not mentioned at all by Hampson), and the hind wing being fuscous and not black. It may be, of course, that Hampson's specimen was very greasy, and that therefore the hind wings appeared black, as is the case with the hind wing of my co-type, and that the lines of the fore wings were for that reason also invisible, which certainly have a tendency to disappear with greasiness, but I hardly think that an observer like Hampson would have been thus misled.

My species also comes close to Hampson's *A. achrodisa*, from Katanga (Congo), but from this species it differs in the white patch of the hind wings.

Species *auctorum* :—

***Ornithopsyche melanoleuca*.**

Aroa melanoleuca, Hmps., Ann. S.A. Mus., p. 408 (1905).

I have no doubt that this species has to come in the genus *Ornithopsyche*.

MICRAROA (pl. VII, figs. 1, 2).

Micraroa, Hmps. n., Ann. S.A. Mus., p. 404 (1905); type *rufescens*.

Proboscis absent; palpi very short, drooping, and consisting of two joints only; first joint sub-conical, at base of second joint somewhat hollowed out, with long hair on under side (in *minima* this joint is more globular); second joint cylindrical, towards end thickened end obtusely rounded; length $1\frac{1}{2}$ length of first joint (in *minima* the second joint is more pear-shaped and somewhat pointed); second joint on under side and at end fringed with very long hair; eyes nearly rounded, rather small, less than width of frons; frons rounded and with a pointed tuft of hair; antennæ bipectinate, about $\frac{1}{2}$ length of costa and very much curved; basal joint of shaft with a pointed hair tuft; branches about 6 times thickness of shaft and ending in 2 long bristles; thorax and abdomen clothed with hair; abdomen $\frac{2}{3}$ of hind wing; fore legs with a thin, somewhat curved process, longer than the tibia; a long tuft of hair and a number of very short hairs on inner side of process; mid and hind tibiae with terminal spurs only; femora of all legs and tibiae of hind legs with rather long hair; the other tibiae and the tarsae of all legs with moderate hair.

Fore wing broadly triangular; costa and inner margin straight; termen, apex, and tornus much rounded; cilia rather long; *1b* simple at base; *1c* faintly represented at basal $\frac{1}{2}$, then stronger; 2 from $\frac{2}{3}$ lower median; 3 from beyond $\frac{2}{3}$ distance 2-4; 4 and 5 from lower angle; discocellular absent; 6 from upper angle; 7 absent (Hampson states that 9 is absent, but, judging by the position, I think it is 7 and not 9 that is absent); stalk of 8, 9, and 10 from upper angle; 8 ending at apex; 9 from $\frac{1}{2}$ of 8; 10 from $\frac{1}{4}$ of 9; 11 from upper median at $\frac{7}{8}$; 12 parallel to upper median and vein 11.

Hind wing broadly sub-triangular; costa somewhat and inner margin well rounded; termen slightly hollowed out from *1c* to vein 4; apex and tornus well rounded; *1a* long; *1b* to tornus; *1c* faintly represented; 2 from $\frac{2}{3}$ lower median; 4 and 5 from lower angle (Hampson states in his key that vein 3 is absent and in the description that $\bar{5}$ is absent; the latter, I think, is wrong); 6 and 7 on a long stalk (about $\frac{1}{3}$ of 6); 8 curved to upper median at $\frac{1}{3}$, then anastomosing with it for $\frac{1}{3}$, then to beyond $\frac{1}{2}$ of costa; cilia very long for this family; transverse vein absent.

Hampson mentions a recurrent vein in cell, but in both species this is very indistinct; I take it to be the median fold.

Using Prof. Aurivillius's "Key," one comes to the genus *Homoeomeria*, Wllgrn., but I am not certain whether these two genera are synonymic or not, as I do not know the type of *Homoeomeria*.

Species in South Africa:—

Micraroa rufescens, Hmps. n., Ann. S.A. Mus., p. 405 (1905).

Hab. Groenvlei, Transvaal (X, Janse).

New Hanover (IX, X, III, Hardenberg).

Durban (IX, Leigh).

Tongaat (Natal).

The specimens I take to belong to this species are smaller than 22 mill. My largest specimen is 19·5 mill. and the smallest 17 mill. The description

however, is too imperfect and the colour mentioned is too vaguely indicated to be certain about the correct specific identification; but I have little doubt that my identification is correct. My specimens are from cinnamon to clay colour (XXIX), with the costa, the outer margin, and most veins snuff-brown (XXIX).

Micraroa minima, nov. spec. (pl. VII, fig. 2; pl. III, fig. 17).

♂. Fore wing, palpi, head, shaft of antennæ, thorax and abdomen above and on under side, and legs ochraceous-buff (XV); branches of antennæ black; hind wing ochraceous-orange (XV); fore wing and hind wing covered with very long hair; cilia as long as in *rufescens*.

Exp. 13.3 mill.

Hab. Colenso (Natal) (8.3.02, Janse); two specimens.

Type and co-type in coll., Janse.

The colour and size, and even the shape of the palpi differentiate this species at once from *M. rufescens*.

HOMOCHIRA (pl. VII, fig. 2).

Homochira, Hmps., Ann. S.A. Mus., p. 409 (1905); type *rendalli*.

♂. Proboscis absent; palpi moderate, well beyond frons, clothed with thick hair beneath; first joint a little longer than broad; second joint $2\frac{1}{2}$ times longer than first joint, a little thicker towards end and there rounded; third joint as long as first joint, drooping; eyes rounded, large, about width of frons; frons rounded and covered with thick moderate hair; antennæ as long as $\frac{1}{2}$ costa of wing, bipectinate; branches 6 times shaft, ending in 2 bristles (not in *one* bristle, as stated in the original description); thorax clothed with rather long hair; abdomen with a tuft on first three segments, first tuft smaller than the others or even absent; legs covered with thick hair; fore legs very hairy, even on the tarsæ; process a little shorter than the tibiae, thick, and somewhat curved at tip, as in *Euproctis*; mid tibiae with 2, hind tibiae with 4, spurs.

Fore wings rather short and broad; costa gently arched; termen erect, evenly rounded; inner margin slightly arched; apex and tornus much rounded; *1a* faintly present; 2 from $\frac{3}{4}$ lower median; 3 from $\frac{4}{5}$ 2 to 4; 4 from lower angle; 5 at same distance from 4 as 3 to 4; discocellular well represented, rounded inwards; cell very short, about $\frac{1}{2}$ of wing; 6 at the same distance from 7 as 5 is from 4; stalk of 7, 8, 9, 10 from the upper angle; 7 from stalk at nearly $\frac{1}{3}$ of 8; 9 from 8 a little beyond $\frac{2}{3}$ of 8; 10 from a little before $\frac{2}{3}$ of 8; 11 from $\frac{3}{4}$ upper median, parallel to 12; 12 for a long distance parallel to costa.

Hind wing semicircular; costa slightly arched; termen and inner margin much rounded; apex rounded; tornus with a slight lobe at *1b*; *1a* moderate; 2 from beyond $\frac{3}{4}$ lower median; 3 and 4 slightly stalked and from lower angle; 5 from well above the angle; discocellular rather faint, angled inwards at middle; cell much less than $\frac{1}{2}$ of wing; 6 and 7 from upper angle and on a stalk of $\frac{1}{6}$ of 6; 8 approximating and just touching upper median at $\frac{1}{2}$, but not anastomosing with it.

This genus is so close to the genus *Euproctis* that it may not be quite distinct. The tufts on the dorsum, the more stout process of fore legs, and the more hairiness generally seem to be the only distinctive characters. I take it that this genus is intermediate to *Ornithopsyche* and *Euproctis*.

Species in South Africa :—

Homochira rendalli, Dist., A. M. N. H. (6), XX, p. 203 (1897).
Hmps., Ann. S.A. Mus., p. 410 (1905).

Hab. Waterval (Zoutpansberg District) (XII, Janse).
Rooiplaat (III, Swierstra).
Pretoria (I, Janse).
Bultfontein (I, Janse).
Waterval Onder (XI, Janse).
Three Sisters (II, III, Janse).
Durban (X, Clark).
Umkomaas (I, Janse).

Only ♂♂ of this species are known to me.

EUPROCTIS (pl. VII, figs. 3, 5, 6).

Euproctis, Hübn., Verz., p. 159 (1827); type *chryssorrhæa*.

Dulichia, Wlk., IV, p. 809 (1855).

Lopera, Wlk., IV, p. 919 (1855).

Hmps., Ann. S.A. Mus., p. 406 (1905).

Description made from *E. fasciata*.

♂. Proboscis absent or very rudimentary; palpi porrect, just reaching frons; first joint conical with the point curved upwards, nearly 2 times longer than thick; second joint cylindrical, as thick as first joint, but 3 times longer than thick; third joint a little shorter than first joint, thin and bluntly pointed, hidden in hair; all joints with a little hair above and much long hair on under side (in ♀ the palpi are a little ascending; second joint longer and thinner, about 3 times first joint; third joint as long as $\frac{1}{2}$ second joint and thinner; the whole palpus less hairy); eyes rather large, over width of frons, rounded; frons rounded and with short hair; antennæ nearly $\frac{1}{2}$ of costa (in ♀ only $\frac{1}{4}$ of costa), curved, bipectinate; in ♂ the pecten are 6 to 8 times shaft, ending in a long bristle; in ♀ only 3 times shaft; vertex and thorax covered with moderately long hair; abdomen longer than hind wings, covered dorsally with short hairs and ventrally with longer hairs, ending in a long hairy tuft in ♂ and becoming truncate in ♀; on dorsum a tuft of hair on first and second segments; legs very hairy on femora, tibiae, and tarsae; fore legs with a process as long as or a little longer than tibiae, curved somewhat like an S terminally, and pointed; in ♀ a little shorter and thicker; mid tibiae with 2 spurs; hind tibiae with 4 spurs.

Fore wing long, sub-triangular; costa and outer margin somewhat rounded; inner margin well rounded; apex and tornus rounded; 1b simple at base; 2 from beyond $\frac{2}{3}$ lower median; 3 from well before angle; 4 and 5 from lower median; 6 from just beyond upper angle; stalk of 7, 8, 9, 10 from upper angle; 7 from beyond $\frac{1}{4}$ of vein 8; 9 from $\frac{2}{3}$ of 8; 10 from $\frac{1}{2}$ of vein 8; 11 from $\frac{4}{5}$ upper median; 12 somewhat parallel to upper median.

Hind wing triangular; costa, outer and inner margin somewhat rounded; apex and tornus well rounded; *1a* long, straight; *1b* nearly straight; 2 from $\frac{3}{4}$ lower median; 3 and 4 on a short stalk from lower angle; 5 from above this angle; 6 and 7 on a stalk of $\frac{1}{6}$ of vein 6 and from upper angle; 8 bent to beyond $\frac{1}{2}$ upper median, where that vein is angled upwards, so as just to touch it, but not anastomosing with it, then curved at end.

The venation, the palpi, and the process of the fore legs vary a little in the different species and will be mentioned under each respective species.

Key to South African species:—

1. *a.* Fore wing with the anti- and post-medial lines darker than the ground colour..... 2.
- b.* Fore wing with the anti- and post-medial lines lighter than the ground colour or absent..... 6.
2. *a.* Fore wing pale brown (grey ?); costal area suffused with white..... **aspersa*.
- b.* Fore wing orange to white..... 3.
3. *a.* Fore wing with a red discoidal spot..... **sanquigutta*.
- b.* Fore wing without a red discoidal spot..... 4.
4. *a.* Fore wing with the basal area irrorated with rough black scales..... **squamosa*.
- b.* Fore wing with the basal area not irrorated with black scales..... 5.
5. *a.* Fore wing with the anti- and post-medial lines orange-buff (III); ground colour of fore wing baryta-yellow (IV)..... *fasciata*.
- b.* Fore wing with ground colour white; anti- and post-medial lines pinard-yellow (IV) and interrupted or absent; red marks near apex and tornus.... *rufopunctata*.
6. *a.* Fore wing with the anti- and post-medial lines lighter than the ground colour, but present.... 7.
- b.* Fore wing with the anti- and post-medial lines absent..... 10.
7. *a.* Fore wing ochraceous-orange (XV); black scales in end of cell and from lower angle to inner margin between the antimedial and postmedial lines.... *punctifera*.
- b.* Fore wing more yellow..... 8.
8. *a.* Fore wing with some red scales at the end of the cell to represent the reniform..... 9.
- b.* No red scales in fore wing at end of cell..... **mesozona*.
9. *a.* Fore wing colonial buff (XXX); hind wing straw-yellow (XVI); fascia from reniform to inner margin usually faintly developed or not at all.... *pallida*.
- b.* Fore wing baryta-yellow; hind wing orange-buff (III); fascia well developed..... *bicolor*.
10. *a.* Abdomen with the last segments darkly coloured.. *terminalis*.
- b.* Abdomen with the last segments not darker..... 11.

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|--|-----------------------|
| 11. a. Fore wing with orange-red scales at end of cell..... | 12. |
| b. Fore wing without orange-red scales at end of cell; wings cartridge-buff (XXX)..... | <i>flavicincta.</i> |
| 12. a. Ground colour of fore wing white or yellowish-white. | 13. |
| b. Fore wing yellow or orange-yellow..... | 14. |
| 13. a. Fore wing with red marks near tornus only..... | <i>haemodetes.</i> |
| b. Fore wing with red marks near apex and tornus... | <i>rufopunctata.</i> |
| 14. a. Fore wing light cadmium (IV); hind wing deep chrome (III)..... | <i>iridescens.</i> |
| b. Fore wing and hind wing apricot-yellow (IV); fore wing with two small sub-terminal patches of dark scales..... | <i>crocata.</i> |
| c. Fore wing baryta-yellow..... | 15. |
| 15. a. Some sub-terminal dark scales in fore wing..... | 16. |
| b. Fore wing without dark sub-terminal scales..... | <i>straminicolor.</i> |
| 16. a. The dark scales are well defined and found between all the veins of the fore wing; median fascia con- sisting of black scales only..... | <i>nigripuncta.</i> |
| b. The dark scales are ill-defined and a few only in each patch; median fascia made of red scales, mixed with a few black scales..... | <i>stellata.</i> |

Species in South Africa :—

Euproctis terminalis, Wlk., IV, p. 794 (1855).

Hmps., Ann. S.A. Mus., p. 407 (1905).

Hab. Cape Colony.

In this species the palpi have the second joint only 2 times as long as the first joint and the process is more slender and a little longer than in *E. fasciata*.

Euproctis punctifera, Wlk., IV, p. 792 (1855).

Hypogymna melanura, Wlgrn., Wien. Ent. Mon., IV, p. 163 (1860).

Laupera gaudens, Wlk., XXXII, p. 357 (1865).

Hmps., Ann. S.A. Mus., p. 407 (1905).

Hab. Durban (XII, I, Leigh).

Sarnia (I, Janse).

Umkomaas (I, Janse).

Duff's Road, Natal (XII).

Tongaat (Natal).

In this species the fore wing has 11 from $\frac{3}{4}$; the hind wing has the stalk of 3 and 4 longer, as much as $\frac{1}{3}$; in the palpi the second joint is only 2 times first joint; the process of the fore legs is a little thicker.

Euproctis iridescens, nov. spec. (pl. III, fig. 18; pl. VII, fig. 6).

♂. Head and thorax above and ground colour of fore wing light cadmium (IV); hairs of frons, antennæ, palpi, thorax on under side, abdomen, hind wing, and both wings on under side deep chrome (III);

long hairs of legs and cilia of hind wings light cadmium; medial and post-medial lines very indistinctly represented by apricot-yellow (IV), or totally absent; reniform orange-chrome (II), edged on inner and outer side by some black scales; from reniform towards $\frac{1}{2}$ of inner margin a band of same width over the whole length, but interrupted between reniform and vein 3, faint at space between 2 and 3, broken at vein 2 and consisting of orange-chrome scales, edged on both sides and mixed all over with black scales (in ♂ co-type this band is narrower and mainly consists of black scales, mixed with a few orange-chrome scales); a sub-terminal line represented by a few black or sometimes also by a few orange-chrome scales at between veins 8-7, 7-6, 6-5, and before vein 2.

Hind wing and under side without markings.

♀ like ♂, but anal tuft with tawny-olive (XXIX) hairs.

Exp. ♂ type, 31·8 mill.; ♀ type, 36·3 mill.

Hab. ♂ ♀ types and ♂ co-type from Waterval Onder (15.12.10, Janse), bred from larva No. 9 feeding on *Combretum* spec.

Also one ♂ in fair preservation from Estcourt (Natal) by J. M. Hutchinson (in 1894-95), which is in the Pietermaritzburg Mus.

Types and co-type in coll., Janse.

This species is closely allied to *E. crocata*, but differs from it in several characters; the process of the fore leg is in the ♂ of *iridescens* less curved (my ♀ *iridescens* has the fore legs lost, so I cannot compare these with *crocata*); the palpi differ in having the second joint a little shorter and thicker and the third joint is only of $\frac{1}{2}$ the length of that of *crocata*; the fore and hind wings have not the same colour as is the case in all *crocata* I have seen; the under side is much darker and the medial band is absent.

Euproctis crocata, Boisd., Voy. Delegorgue, II, p. 599 (1847).

Herr Schäff., Aussereur. Schmett. (fig. 112).

Hypogymna cateja, Wllgrn., Wien. Ent. Mon., IV, p. 163 (1860).

Hmps., Ann. S.A. Mus., p. 407 (1905).

Hab. Woodbush Village (XII, Swierstra).

Barberton (I, Janse).

New Hanover (XII, Hardenberg).

Durban (III, Leigh; Clark).

Umkomaas (I, Janse).

Capetown (IV, Lord Gladstone).

The palpi of this species are as in *fasciata*, but the second joint is a little thinner; the process of the ♂ fore tibia is a little longer and the curved end is larger and more rounded; in the ♀ this process is very thin and short.

Euproctis fasciata, Wlk., IV, p. 809 (1855).

Artaxa squamiplaga, Wlk., Proc. Nat. Hist. Soc., Glasg., I, p. 338 (1869).

Euproctis susanna, Stgr., Iris., VII, p. 258 (pl. IX, fig. 9) (1894).

Euproctis torrida, Dist., A. M. N. H. (6), XX, p. 202 (1897).

Hmps. n., Ann. S.A. Mus., p. 407 (1905).

- Hab. Shilouvane (X, Rev. Junod).
 Pretoria (I, Swierstra).
 White River (I, Cooke).
 Three Sisters (II, Mrs. Snooke).
 Barberton (I, II, Janse).
 New Hanover (II, Hardeberg).
 Pietermaritzburg (IX).
 Sarnia (I, II, Janse).
 Tongaat (Natal).
 Durban (X, XII, Janse).
 Umkomaas (I, Janse).
 Ngqeleni (I, XI, Swinny).

Euproctis nigripuncta, nov. spec. (pl. III, fig. 19).

♀. Head, shaft and branches of antennæ, thorax, base of abdomen, the long hair on legs, anterior and posterior wings above and on under side baryta-yellow (IV); palpi, short hairs of legs and abdomen buff-yellow (IV); anal tuft Prout's brown (XV); anterior wing with capucine-yellow (III) rounded reniform, surrounded by some blackish scales, mostly on inner side (in the co-type the reniform is much reduced); a black fascia just under reniform, consisting of black scales and interrupted at vein 2, 1b, and at medial fold, so as to form four groups; a sub-terminal series of black spots from 1b to 9; spots between 7 and 8 placed nearer to termen and the next spot more inwards, to form an angle; from there all spots form an evenly curved line inwards, except the spot between 2 and 1b, which is directed towards tornus and broken into two by the medial fold; no markings on under side. The ♀ co-type is a rather bleached specimen and has only the spots between 5 and 6 and between medial fold and 2 present; the fascia is also much less developed.

Hind wing on upper and under sides without any markings.

Exp. Type, 32.2 mill.; co-type, 29.1 mill.

Hab. Type from Pretoria (3.12.13, Janse); in coll., Janse.

Co-type from Pretoria (Munro); in coll., Tvl. Mus.

This species comes close to *straminicolor*, but can easily be distinguished from it by fore and hind wings being of the same colour, by the stronger developed fascia, the sub-terminal series of black spots, and the reniform being surrounded by black scales.

Euproctis haemodetes, Hmps. n., Ann. S.A. Mus., p. 408 (1905).

Hab. Ngqeleni (II, Swinny); in coll., Tvl. Mus.

Euproctis rufopuncta, Wlk., Trans. Ent. Soc. (3), p. 265 (1862).

Hab. Noordkaap (Barberton District) (Jeffery).

Durban (IX, XI, Leigh; Quekett) (XII).

Fore wing with vein 10 more close to 9; hind wing with 3 and 4, 6 and 7 from a point; 8 not quite touching upper median, but connected

with it by a bar ; process of fore legs in ♂ shorter, thicker, and a little less curved at base ; in ♀ the process is as in the ♂ ; palpi in ♂ and ♀ with third joint a little longer than in *fasciata*.

Euproctis straminicolor, nov. spec. (pl. III, fig. 20).

♀. Head, palpi, shaft of antennæ, thorax, legs and ground colour of fore wing straw-yellow (XVI) ; branches of antennæ ochraceous-orange (XV) ; abdomen, hind wings above, and both wings on under side amber-yellow (XVI) ; anal tuft cinnamon-brown (XV) ; fore wing with very faint indistinct light medial, postmedial, and sub-terminal lines ; a cadmium-orange (III) rounded orbicular, with an indication of dark scales on inner side ; a faint fascia of scattered amber-brown (III) scales, mixed with a few orange (III) scales (the co-type from Pretoria has three or four darker coloured scales between vein 5 and 6, forming a rudimentary sub-terminal spot, such as is fully developed in *nigripuncta*) ; hind wings without any markings ; cilia of both wings straw-yellow ; under side of both wings without any marking.

Exp. 33.6 mill.

Hab. Type and one co-type from Waterval, Zoutpansberg District (27-29.12.99, bred by Janse ; larva feeding on a species of acacia).

One co-type in coll., Tvl. Mus., from Pretoria (Jan., 1898, Swierstra).

Palpi as in *bicolor* ; process of fore tibia very short ($\frac{1}{2}$ of tibia), thin, straight, and pointed ; venation as in *fasciata*, except that the fore wing has 3, 4, and 5 more apart ; hind wing with 3, 4 from a point or on a very short stalk ; 5 more apart from 4 than in *fasciata*.

It is possible that this is the ♀ of *Euproctis bicolor*, but the colour is so different that I think it better to look for the present upon it as a distinct species till later on more breeding gives better views.

I consider this species to be closely allied to *crocata* (judging from the meagre description), but it is much smaller and has no fascia.

Euproctis bicolor, nov. spec. (pl. III, fig. 21 ; pl. VII, fig. 5).

♂. Palpi, frons, thorax, abdomen on under side, hairs on legs, and ground colour of fore wings maize-yellow (IV) ; head, thorax, basal part of abdomen above, and shaft of antennæ buff-yellow (III) ; branches of antennæ raw sienna (III) ; further part of abdomen above light orange-yellow (III) ; ground colour of hind wing deep chrome (III).

Fore wing with the antimedial part tinged with apricot-yellow (IV) ; medial, postmedial, sub-terminal, and terminal lines apricot-yellow ; medial line evenly rounded ; postmedial broad near costa, rounded at veins 3, 4, 5, then slightly incurved ; sub-terminal broad at costal $\frac{1}{2}$ and parallel to postmedial ; terminal angled inwards at veins ; space between medial and postmedial lines filled with black and orange-chrome (II) scales from lower median till inner margin, so as to form a fascia ; orbicular rounded, orange-chrome, and with a few black scales ; cilia apricot-yellow.

Hind wings without markings ; cilia light orange-yellow.

Under side of both wings deep chrome, except cilia, which are as on upper side.

Exp. ♂ type, 29·2 mill (in coll., Janse).

♂ co-type, 25·2 mill. (in coll., Tvl. Mus.).

Hab. Tweefontein (13.1.07, Janse).

Zandfontein (Dec., 1911, J. v. Niekerk).

This species comes close to *sanguigutta*, Hmps., I think, but can be distinguished from it by the colour of both wings and the fascia of the fore wing.

The process of fore leg is less curved, much thicker, and more bluntly rounded than in *fasciata*. The palpi are smaller than in the other species; the second joint has the same proportion as in *fasciata*, but is more conical; the third joint is in a line with the second joint and slightly shorter.

Euproctis pallida, Kirby, A. M. N. H. (6), XVIII, p. 384 (pl. XIX, fig. 6), (1896).

Swinhoe, Trans. Ent. Soc., Lond., p. 410 (1903).

Hab. Waterval Onder (XII, Ross).

White River (XII, Cooke).

Barberton (I, Janse).

Sarnia (I, II, III, VIII, XII, Janse; Leigh).

Durban (IX, XII, Clark; Janse).

Umkomaas (I, Janse).

Tongaat (Natal).

Eshowe (Zululand) (XI).

Estcourt (Natal).

This species was omitted by Hampson in his "South African Moths," and following the key in that work my specimens would have to be identified as *stellata*, Dist. Distant's description fits my specimens fairly well, but is too vague to give certainty. My largest specimen, however (a ♀), is only 34·7 mill., and the majority are much smaller. I doubt that this rather small moth will ever be as big as 44 mill., as Hampson gives in his list for *stellata*. Swinhoe, *l.c.* p. 410, places *stellata* as a synonym of *fasciata*, which I think is wrong in any case. At any rate, all specimens I have seen are distinct from *fasciata*, though they occur in the same locality. Kirby's description and figure of *pallida* fit my specimens very well, and I have little doubt that my identification is correct, and that *stellata* is another distinct species.

The fore wing has vein 11 from $\frac{2}{3}$ upper median and 3, 4, 5 a little farther apart than in *fasciata*; the hind wing has 6 and 7 on a little longer stalk and 5 is rather farther apart from the stalk of 3 and 4; the palpi of the ♂ have the third joint shorter and in a line with joint 2; in the ♀ the palpi are shorter, especially the third joint; in ♀ the process of fore tibia is absent.

Euproctis stellata, Dist., A. M. N. H. (6), XX, p. 202 (1897).

Hmps., Ann. S.A. Mus., p. 408 (1905).

I have seen a ♂ belonging to Mr. Clark and identified by A. T. Cooke in the British Museum as *E. stellata*, and I have a specimen in my own

collection identical to it. These two specimens correspond well to the description of Distant, but he does not mention that the fascia is mainly composed of orange scales with a few black scales in it; this is very distinct in the two specimens mentioned, though the fascia is made of black scales with a few orange scales in it in a specimen somewhat discoloured, but that I think to be identical to the other two.

Hab. Durban (Clark).

Pietermaritzburg (Jan., 1909).

Euproctis flavicincta, nov. spec. (pl. III, fig. 27).

♀. Vertex of head, shaft of antennæ, patagia, hairs on thorax above and below, ground colour of wings above, mid and hind legs, and abdomen on under side cartridge-buff (XXX); branches of antennæ ochraceous-tawny (XV); frons, palpi, costa of fore wing on upper and under side, and hairs on fore tibia buff-yellow (IV); teguæ light orange-yellow (III); abdomen buff-yellow, mixed with antimony-yellow (XV) hairs; anal tuft of antimony-yellow hairs on outer side and cinnamon-brown (XV) hairs towards outer side.

Fore wing thinly irrorated on the veins, near costa, on inner and outer margin with maize-yellow (IV) scales; from near lower angle of cell towards apex, as far as vein 6, a faint line made of avellaneous (XI) tipped scales; cilia of ground colour.

Hind wing very thinly irrorated towards outer margin with maize-yellow scales; cilia of same colour.

Under side of fore wing cartridge-buff, thickly irrorated with light drab (XLVI) scales; cilia maize-yellow; hind wing whitish, thinly suffused on costa and outer margin with maize-yellow; cilia maize-yellow.

Exp. 30·2 mill.; one specimen only.

Hab. Pretoria (Dr. H. G. Breyer); in coll., Tvl. Mus.

Hind wing with stalk of 6 and 7 very long, about $\frac{1}{2}$ length of 6; the shape of the fore wing is very peculiar for a *Euproctis* and resembles more the ♀ of a *Lacipa*, being very long and narrow and with the termen very oblique, but it undoubtedly comes in *Euproctis*.

Species auctorum:—

Euproctis aspersa, Feld.

Euproctis squamosa, Wlk.

Euproctis mesozona, Hmps.

Euproctis sanguigutta, Hmps.

Euproctis crocosticta, Hmps.

Euproctis haemodetes, Hmps.

Species omitted:—

Euproctis monosticta, Butl., as it is a *Pterodoa* and not an *Euproctis*.

PORTHESIA (pl. VII, fig. 4).

Porthesia, Steph., Brit. Ent. Haust., II, p. 65 (1829); type *auriflua*, Hübn. Hmps., "Moths of India," Vol. I, p. 484.

Description made from *P. natalensis*, nov. spec. ↓

Proboscis absent; palpi porrect, rather long, reaching well beyond frons and covered with short hairs; in ♂ first joint a little longer than

broad; second joint 2 times first joint in length and a little thinner; third joint over $\frac{1}{2}$ of second joint, pointed and not hidden in the hairs; in ♀ the second joint is 3 times length of first joint; third joint nearly $\frac{2}{3}$ of second joint; eyes almost rounded, as large as width of frons; frons rounded and covered with short hairs; antennæ nearly $\frac{1}{2}$ length of costa, curved, bipectinate, branches forming on under side nearly a straight line; branches short, only 4 times thickness of shaft and ending in 2 bristles; thorax clothed with long woolly hair; abdomen with two crests on basal segment and a crest on second and third segments, crests composed of rather long woolly hair; legs moderately clothed with long hair; fore tibia of ♂ with a much curved process, as long as tibia; in ♀ the process is much thinner and nearly straight; mid leg with 2 and hind leg with 4 long spurs.

Fore wing sub-triangular; costa and inner margin straight; termen much rounded; 1*b* simple at base; 2 from $\frac{2}{3}$ lower median; 3 from just beyond $\frac{3}{4}$ the distance 2 to 4; 4 from lower angle; 5 from just above the angle; discocellular angled beyond middle; cell about $\frac{1}{2}$ of wing; 6 from below upper angle; stalk of 7, 8, 9, 10 from angle; stalk of 7, 8 as long as $\frac{2}{3}$ of 7; 9 from nearly $\frac{2}{3}$ of 8; 10 from before $\frac{1}{3}$ of 8; 11 from near upper angle; 12 parallel to costa.

Hind wing semicircular; costa and inner margin straight; termen much rounded; apex much rounded; tornus with a rounded lobe at from before 1*b* till 2; 1*a* short, straight; 1*b* somewhat curved; 1*c* faintly represented; 2 from $\frac{1}{5}$ lower median; 3 and 5 from lower angle; 4 absent (Aurivillius and Hampson state that 5 is absent; Meyrick takes 4 to be the absent vein, and judging from the position of the two other veins I think the latter is correct; most probably 4 and 5 have united so as to form one vein only); discocellular rounded inwards; cell less than $\frac{1}{2}$ of wing; 6 and 7 on a stalk of $\frac{1}{4}$ of 6 and from the upper angle; 8 much curved near base, then anastomosing with the upper median at $\frac{2}{3}$, where upper median is much curved, then to costa and for a little distance parallel with it.

This genus is most certainly allied to *Euproctis*, from which it has most probably developed.

1. *a.* Hind wing white..... *sub-alba.*
- b.* Hind wing yellow..... 2.
2. *a.* Fore wing of ♂ with the space between antimedial and postmedial lines partly filled with dark scales; hind wing cream colour (XVI)..... *natalensis.*
- b.* Fore wing of the ♂ with the antimedial and postmedial lines represented only by some dark scales; hind wings pale orange-yellow (III)..... *hardenbergia.*

Species in South Africa :—

Porthesia natalensis, nov. spec. (pl. III, 22, 23).

♂. Head, palpi, antennæ, tegulae and fore legs apricot yellow (IV); thorax above with sorghum brown (XXXIX) hairs; abdomen with the dorsal crests and hairs of anal segment of apricot yellow hairs; abdomen

clothed above and on underside with shorter hairs of same colour; mid and hind legs with long cream coloured (XVI) hairs; wings of cream colour (XVI) above and on underside, fore wing on upper side thickly irrorated with apricot yellow scales, especially at costa, on the veins and at inner margin; hind wing above slightly coloured near inner margin with warm buff (XV).

Fore wing at medial space a fascia from upper median till inner margin, and somewhat narrower towards costa; a broad postmedial band of same colour from near costa, parallel to outer margin and joining medial fascia at vein 2 and extended till inner margin; this fascia is angled outwards between vein 1*b* and 2, 3 and 4, 6 and 7, and inwards between vein 5 and 6, 2 and 3; the scales of these fascia are at some parts entirely pale vinaceous-fawn (XL), at other parts tipped with fawn colour (XL), and many scales are tipped with army brown (XL) or even black, so that the fascia look to the naked eye fawn coloured sprinkled with black.

Hind wing without any markings; cilia of ground colour in both wings.

Under side cream colour, tinged with buff-yellow; in fore wing the costa has a sorghum-brown edge for its first half and the fascia are indicated by a darker shading than the ground colour.

♀. Head, palpi, antennæ, teguiae, patagia, thorax, hairs on legs apricot-yellow; anterior $\frac{1}{2}$ of abdomen light buff (XV), clothed with long apricot-yellow hairs; posterior $\frac{1}{2}$ and under side covered with light orange-yellow (III) hairs; anal tuft with raw umber (III) hairs.

Wings as in ♂, but without the fasciae; fore wing with three black markings at sub-terminal area (the remains of the postmedial fascia of ♂), consisting of large black scales dotted over the area and mixed with some orange-buff (III) scales; first mark between vein 6 and 7; second mark triangular and between vein 3 and 4; third mark above and below vein 1*b*; some long orange-buff scales and hairs on inner margin, mixed with a few black scales near last terminal mark (in one wing a few black scales just above 1*b* antimedially).

Hind wing without any markings; cilia cream coloured.

Under side of a cream colour, tinged with buff-yellow (IV) near margins in fore wing and inner marginal area of hind wing.

The palpi in this species are oblique, with the terminal joint correct, longer in the ♀ than in the ♂.

Exp. ♂ type, 21.5 mill.; ♂ co-types, 23.7 mill.; two large ♂♂ (badly worn), 28.2 mill.

♀ type, 31 mill.; co-types, 28.2-34.3 mill.

Ten specimens.

Hab. ♂ type, Durban (24.2.09, Leigh); in coll., Tvl. Mus. ^z
Co-types, Durban (14.9.07, 12.8.07, Leigh); in coll., Tvl. Mus. and my own.

Also two ♂♂ (badly worn) from Estcourt, Natal (Hutchinson); in coll., Maritzburg Mus. and my own.

♀ type, Umkomaas (15.1.14, Janse); in my own coll.

Co-types, Durban (26.2.09, 11.1.11, Leigh)

Pinetown (14.2.10, Leigh); in coll., Tvl. Mus.

Porthesia hardenbergia, nov. spec. (pl. III, fig. 24).

♂. Head, palpi, tegulae, patagia, crest on abdomen, anal tuft, and inner s. side of fore legs cadmium-yellow (III); shaft of antennæ, ground colour of hind wings, thorax and abdomen on under side, fore legs on outer side, and hairs on the other legs pale orange-yellow (III); branches of antennæ warm buff (XV).

Fore wing with ground colour apricot-yellow (IV), here and there irrorated with cadmium-yellow hairs and scales; an antimedial fascia from inner margin to lower median and pointed towards that vein, it consists of orange (III) scales, of which some are tipped with blackish; a sub-terminal fascia beginning near tornus and there rather broad, parallel to medial fascia as far as vein 3, where it is narrow and indistinct, then as a faint line directed towards apex, but stopping at vein 5; this fascia is also made of orange and blackish scales, which get fewer beyond vein 2; cilia of ground colour.

Hind wing without any markings, but thickly covered with light orange-yellow (III) hairs and scales; cilia of ground colour.

Under side of both wings pale orange-yellow, with the fore wing on costa for $\frac{1}{2}$ its length broadly streaked with blackish hairs and scales.

Exp. 25 mill. One specimen only, which is in coll., Janse.

Hab. Clan Syndicate, Natal (27.9.13, Hardenberg; bred from wattle).

In this species the veins 3 and 5 of hind wing are on a stalk of $\frac{1}{4}$ 3.

Porthesia sub-alba, nov. spec. (pl. III, fig. 25).

♀. Head, palpi, shaft of antennæ, hairs on thorax, and ground colour of fore wings marquerite-yellow (XXX); branches of antennæ light ochraceous-buff (XV); hairs on first three segments above and on under side, hind wings above, thorax and both wings on under side and hairs on legs pure white; hairs on other segment of abdomen pale orange-yellow (III); anal tuft light drab (XLVI).

Fore wing with a faint indication of a white antimedial line as far as lower median vein; a more distinct postmedial white line from inner margin to vein 4, fringed on outer side by a few apricot-yellow (IV) scales; cilia of both wings of the ground colour of its wing.

Hind wing without any markings.

Exp. 29.5 mill.

Hab. ♀ type from New Hanover (March, 1913, Hardenberg); in coll., Janse.

Co-type, Port St. Johns (May, 1909, Swinny); in coll., Tvl. Mus.

This species is structurally typical, except that vein 11 is farther away from the stalk of 7, 8, 9, 10.

NAROMA (pl. VIII, fig. 1).

Naroma, Wlk., Cat. VII, p. 1744 (1856); type *signifera*.

Hysibada, Wlk., XXXII, p. 497 (1865); type *signifera*.

Zarfa, Wlk., Proc. Nat. Hist. Soc., Glasg., I, p. 338 (1869); type *signifera*.

Woerdenia, Snell., Tijd. v. Ent. (2), VII, p. 40 (1872); type *signifera*.
Hmps. n., Ann. S.A. Mus., p. 411 (1905).

♂. Proboscis very short; palpi a little beyond frons, moderately hairy, slightly ascending; first joint rather large; second joint less than 2 times first joint; third joint less than $\frac{1}{2}$ first joint and a little hairy above; eyes rather large, almost width of frons, round; frons rounded and with short thick hair; antennæ short, less than $\frac{1}{2}$ of costa, bipectinate, curved downwards and at tip again upwards; branches about 6 times shaft, getting suddenly shorter at apex, ending each in 2 long bristles, except last $\frac{1}{2}$, which ends in 1 long and 1 very short bristle; basal joint of shaft with a long thick tuft of hairs; in ♀ the branches are shorter, especially beyond $\frac{2}{3}$, and all branches have 1 long and 1 short bristle.

Thorax and abdomen with very thick hair; no distinct crests; legs very hairy on femora and tibiae, especially the hind legs; fore tibia with the process nearly as long as the tibia, not flat (as is the case in all other *Lymantriadae* I have studied), but peculiarly twisted, especially towards the outside; mid and hind tibiae with 2 spurs only.

Fore wing semicircular; costa straight; ternea and inner margin well rounded; termen somewhat crenulate; apex and tornus much rounded; 1*b* much curved; 2 from $\frac{2}{3}$ of lower median; 3 from beyond $\frac{1}{2}$ distance 2 to 4; 4 from lower angle; 5 from near lower angle; cell over $\frac{1}{2}$ of wing; discocellular distinct, angled at middle; 6 from upper angle; stalk of 7, 8, 9 from near upper angle; 7 from beyond $\frac{1}{2}$ stalk of 8 and 9; 9 from $\frac{1}{2}$ free part of 8; 10 from upper median beyond $\frac{1}{2}$ distance of 11 to stalk of 7, 8, 9, and parallel to this stalk; 11 from $\frac{3}{4}$ upper median, parallel to 10; 12 very near to costa.

Hind wing sub-triangular; costa and termen rounded; inner margin straight; termen somewhat crenulate; apex and tornus much rounded; 1*a* long; 1*b* curved; 2 from $\frac{2}{3}$ lower median; 3 from beyond $\frac{2}{3}$ distance 2 to 4; 4 from lower angle; 5 from a little above the angle; cell over $\frac{1}{2}$ of wing; discocellular somewhat oblique, angled at beyond $\frac{1}{2}$; 6 and 7 from upper angle; 8 much curved to beyond $\frac{1}{3}$ upper median, which it touches for some distance, but without a bar, then it becomes parallel to 7.

Only one species is known in this genus, distributed all over Africa. I have seen specimens from:—

- Noordkaap (I, Janse).
- Groenvlei (I, Janse).
- Barberton (I, Janse).
- White River (II, Cooke).
- Durban (VIII, Leigh).
- Port St. Johns (II, Swinny).

This species I only found in places with dense vegetation, where it rests exposed on the upper side of leaves, with the wings only partly closed. In that position it resembles a white feather very much.

PTEREOA (pl. VIII, fig. 2).

Pteredoa, Hmps. n., Ann. S.A. Mus., p. 411 (1905); type *plumosa*.

Description made from *monosticta*, Butl.

♂. Proboscis minute; palpi short, hardly till frons, porrect, fringed with hair on under side; first and second joints of equal length; third

joint only $\frac{1}{2}$ of second joint; eyes large, over width of frons, rounded; frons rounded and covered with moderate hair; antennæ less than $\frac{1}{2}$ of costa, curved evenly downwards and then upwards at tip, bipectinate; branches moderate, about 6 times shaft, each ending in a long bristle; the branches get suddenly shorter towards tip; in ♀ the antennæ are only $\frac{1}{3}$ of costa, the branches are 3-4 times shaft, and the bristle is very short; in both sexes the basal joint of the antennæ has a moderate tuft of hair; abdomen moderately covered with hair and without crests; legs with scales and hairs; fore legs with the process a little longer than the tibia, somewhat twisted, broad, and with a curved point; in the ♀ the process is shorter and very thin; mid and hind tibiae with the 2 terminal spurs only, which are of equal length.

Fore wing sub-triangular, in ♀ semicircular; costa slightly arched; termen and inner margin well rounded; tornus much rounded; 1*b* simple at base; 2 from $\frac{2}{3}$ lower median; 3 from $\frac{3}{4}$ 2 to 4; 4 from lower angle; 5 from 4 as far as 4 from 3; discocellular faint; cell a little longer than $\frac{1}{2}$ the wing; 6 from below upper angle; stalk of 7, 8, 9 from the angle; 7 from $\frac{1}{2}$ of 8; 9 from $\frac{3}{4}$ of 8; 10 from upper median as far from the stalk as 6, parallel to stalk and 9; 11 from lower median at $\frac{3}{4}$, parallel to 12; 12 parallel to costa for $\frac{3}{4}$ of its length.

Hind wing semicircular; costa nearly straight; termen, inner margin, apex, and tornus much rounded; 1*a* rather long; 1*b* somewhat curved; 2 from a little beyond $\frac{1}{2}$ lower median; 3 from $\frac{3}{4}$ 2 to 4; 4 from lower angle; 5 from 4 as far as 4 is from 3; discocellular indistinct; cell as long as $\frac{1}{2}$ of wing; 6 and 7 stalked for $\frac{1}{3}$ and from upper angle; 8 anastomosing with upper median for nearly $\frac{1}{3}$.

Species in South Africa:—

1. *a.* Fore wing with an orange rounded spot at end of cell. *monosticta.*
b. Fore wing with no spot in cell. 2.
2. *a.* Vertex of head white; fore wing with vein 6 from angle of cell; hind wing with vein 5 from just above the angle. *usebria.*
b. Vertex of head orange; fore wing with vein 6 from below angle of cell; hind wing with vein 5 from well above the angle. *plumosa.*

Pteredoa monosticta, Butl., P. Z. S. L., p. 428, pl. XXXII, fig. 7 (1898).

Euproctis monosticta, Hmps. n., Ann. S. A. Mus., p. 408 (1905).

Hab. Pretoria (II, Munro; bred).

Johannesburg (II, Platt).

Waterval Onder (XI, Janse).

Pinetown (I, Leigh).

Durban (I, II, IV, Leigh).

I have not seen *usebria* nor *plumosa*, but I have no doubt that *monosticta* is rightly placed in this genus, though Hampson places it in *Euproctis*. The ten specimens I examined show great constancy in the running of vein 10 of fore wing and none have a tendency to form an areole. The only characters in which *monosticta* does not fit with the

description by Hampson are that the branches of the antennæ are not *extremely* long, and that 5 of fore wing is from well above the angle and not *near* the angle.

It would have to come in Hampson's Section II, though the process of the fore leg is not long and arises from about $\frac{1}{5}$ of tibia and not from base.

Species *auctorum* :—

Pteredoa usebria, Swinh., Trans. Ent. Soc., p. 382 (1903).

Hmpsn., Ann. S.A. Mus., p. 412 (1905).

Pteredoa plumosa, Hmpsn., Ann. S.A. Mus., p. 412 (1905).

Genera *auctorum* :—

Cymaroa leptopepla, Hmpsn., Ann. S.A. Mus., p. 410 (1905).

Rhyopteryx sordida, Auriv., Öfv. Ak. Förh., XXXVI (7), p. 57 (1879).

Homceomeria flavicapilla, Wllgrn., Wien. Ent. Mon., IV, p. 163 (1860).

Wllgrn., K. Vet. Akad. Handl. (2), V (4),
p. 36 (1865).

Cataphractes boldingii, Feld., Reis. Nov. pl. XCIX, fig. 8 (1874).

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(1865).

TWO NEW SOUTH AFRICAN SPECIES OF STRIPHNOPTERYGIDAE.

By A. J. T. JANSE.

Jana nigristriata, nov. spec. (pl. IX).

♂. Head (except vertex), palpi, tegulae, patagia, thorax, and legs glossy fuscous-black (XLVI); vertex and antennæ cinnamon-buff (XXXIX); antennæ bipectinate; abdomen cinnamon (XXXIX), the last two segments suffused with fuscous (XLVI), ventral side argus-brown (III) and edged with a sub-lateral band of auburn (III).

Fore wing light pinkish-cinnamon (XXXIX), broadly suffused, especially on basal and costal area, with glossy fuscous-black; reniform distinct, in- and out-wardly confined by a sub-triangular black suffusion; medial line fuscous, curved outwards from costa to vein 7, then straight till vein 2, then slightly bent inwards to vein 1*b*, then indistinct to inner margin; postmedial line double, fuscous, nearly straight, waved inwards on veins 1*b* to 9; sub-terminal line less defined and of ground colour, waved inwards on veins, curved from costa to vein 5, then nearly straight to tornus; space between postmedial and sub-terminal lines and also beyond the sub-terminal line thickly suffused with fuscous; cilia fuscous; vein 1*b* for terminal $\frac{1}{2}$, veins 2, 3, 4 till sub-terminal line, veins 5, 6, 7 from medial to sub-terminal line, and the whole of vein 8 marked with fuscous-black.

Hind wing light pinkish-cinnamon; medial line very indistinct; sub-terminal line broad, fuscous, slightly dentate on inner side, more dentate inwards on outer side at all veins; terminal line broad, fuscous, slightly dentate outwards on the veins; cilia fuscous.

Under side of both wings cinnamon (XXIX), suffused at costa with fuscous; all lines fuscous.

Fore wing with the medial line nearly even; postmedial line single, waved; sub-terminal indistinct; terminal represented by a fuscous suffusion.

Hind wing with the medial line well defined, nearly even; postmedial line curved, waved inwardly on veins; sub-terminal and terminal as on upper side, but more diffused.

♀ like ♂, but pecten of antennæ shorter, and under side with the lines more diffused.

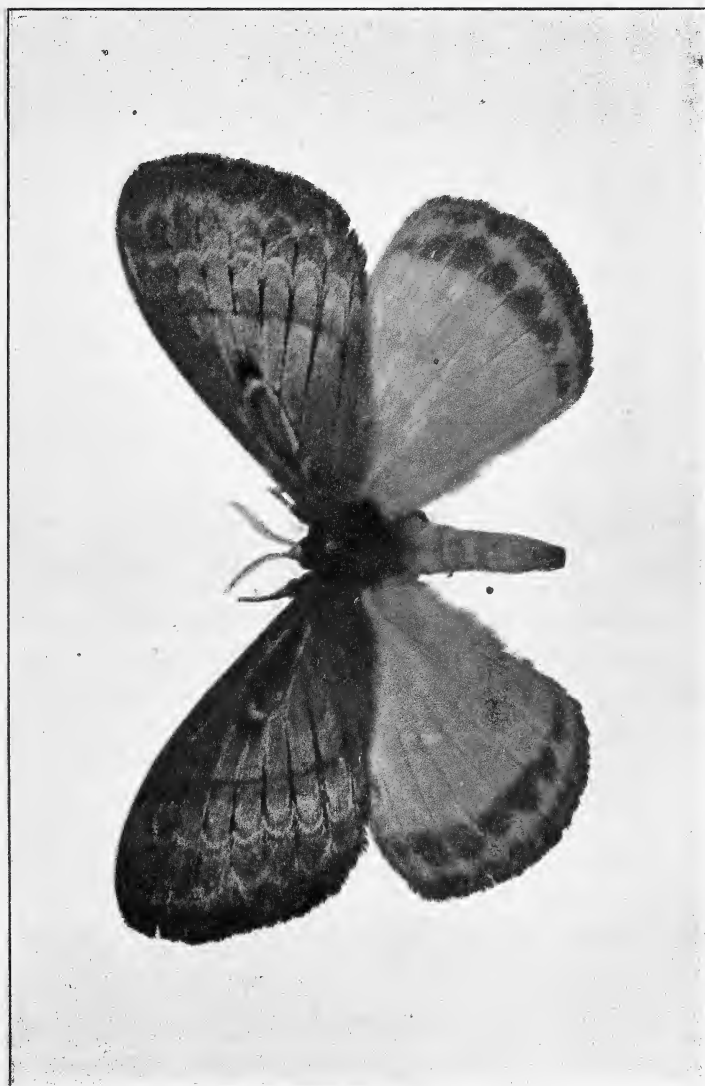
Exp. 102 mill.

Hab. One ♂ type and one ♀ type from Waterval Onder (Bonnekamp, Feb., 1912).

One ♂ from One-tree Hill, Natal (Miss De Carry).

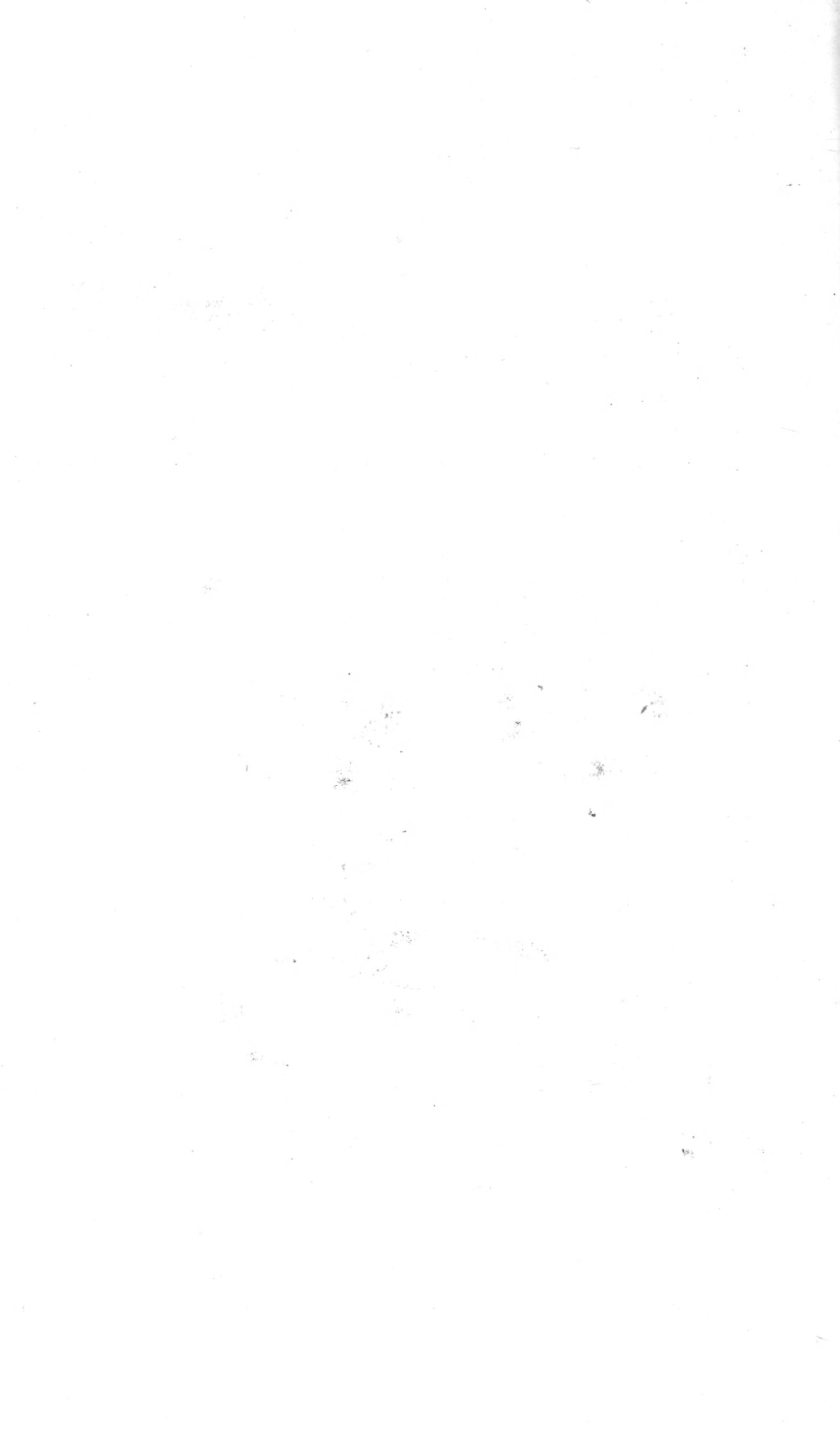
One ♂ from New Hanover, Natal (Hardenberg, 3.3.13).

This species comes very near to *J. tantalus*, but has the medial and postmedial lines of fore wing more oblique and the medial and postmedial lines of hind wings better developed. Moreover, *tantalus* is much smaller.



Tana nigrivirida ♂ nov. spec.





Marmaroplegma unicolor, nov. spec. (pl. III, fig. 26).

♂. Head and palpi of a hazel (XIV) colour; tegulae, patagia, and thorax chestnut-brown (XIV); thorax on ventral side, tibiae, and tarsae tawny (XV); antennae bipectinate and of a clay colour (XXIX); abdomen of a clay colour, but towards base the anal tuft and the ventral sides tawny (XV).

Fore wing chestnut-brown, without any markings, except that the costa near base and the hairs at base of inner margin are more of a clay colour, while the veins are marked by a slightly darker irroration; cilia light chestnut-brown.

Hind wing cinnamon-buff (XXIX), sparingly irrorated on terminal area and more thickly on terminal $\frac{1}{3}$ of veins with chestnut-brown; cilia russet (XV).

Under side pinkish-buff (XXIX), irrorated with chestnut-brown over terminal $\frac{1}{2}$ of fore wing and more thickly over the whole of the hind wing, especially along the costa of both wings; cilia cinnamon (XXIX), but in fore wing darker towards termen.

Exp. 56 mill.

Hab. One ♂ type from Pretoria (Rev. N. Roberts, Feb., 1912); in coll., Janse.

One ♂ co-type, Germiston (3.11.10, Mrs. Munro); in coll., Janse.

Also a specimen in Tvl. Mus. from Ulundi (Jeffery).

This species has the veins 5 and 6 stalked in the fore wing and not from a point, as is the case in *M. paragarda*, the type of the genus.

CONTRIBUTIONS TO THE KNOWLEDGE OF THE REPTILES OF THE KARROO FORMATION.

By Dr. E. C. N. VAN HOEPEN, M.I.

3. The Skull and Other Remains of *Lystrosaurus Putterilli* n. sp.

SOME time ago our collector at Harrismith, Orange Free State, found the remains of a giant *Lystrosaurus*. The remains proved to consist of the skull, of which the lower jaw was badly damaged, and of different bones of the fore- and hind-legs, the shoulder girdle and the pelvis with some ribs and vertebrae. All these bones are greatly displaced, and were really scattered through the matrix. It was, therefore, not impossible that the missing parts had not been observed by the discoverer and that they might be found by a closer investigation. Moreover, the fossil having been found in situ, some definite information might be obtained about the strata, its mode of deposition with regard to the conditions under which our fossil lived, its contemporaneous life, etc. The Director and Committee of this Institution therefore decided that a closer examination of the locality should take place. Circumstances, however, have not permitted us to follow up this decision as yet. This will be done as soon as possible and the results published here.

GENERAL REMARKS.

As already mentioned above, the different parts of the fossil do not occupy their original position with regard to each other. The front half of the lower jaw lies against the upper side of the right maxillary. The hinder portion of its right ramus is situated crossways in front of the right quadrate and squamosum. The position of the left scapula is exactly behind the middle of the skull. The left humerus is situated at right angles to the axis of the skull, while the right humerus lies parallel with this axis. The right coracoid and procoracoid are at the proximal end of the right humerus and completely under the skull; the corresponding bones of the left side have not been found. The right (?) clavicle is also situated under the skull and parallel with its axis. The left (?) ulna is situated above and behind the right squamosum. Ribs and vertebrae are scattered among the other remains. The sacrum covers part of the right squamosum and the left ulna. The left ilium is situated at some distance behind the skull with the outside up and the longest dimension at right angles to that of the skull. The right ilium turns the inside up and has the largest dimension parallel to that of the skull. Pubis and ischium have not been found. The right femur is situated with the proximal end away from the skull.

How are we to explain this chaotic condition? What causes have thrown all the bones of this fossil in a heap, and why is it that the bones of others occur all in their original relative position? It is my intention to try and find an answer to these and other questions relative to this

subject, on a future occasion. I will avail myself, however, of the present opportunity to give an outline explanation of the condition of *L. Putterilli*. I do this especially, because another explanation of the condition of certain fossils has recently been given by WATSON (5), with which I cannot agree.

The bones of *Putterilli* have been displaced in all directions and this has most probably not taken place after their enclosure in matrix. In that case the bones must have been loosened from each other before or while they were covered up by sediment. The disintegration of the connective tissue may have taken place while the carcass was lying in water, but also while lying on dry land. In either case the sedimentation must have been so slow that the disintegration had removed all connection between the bones before they were finally fixed in sediment.

Now, if *L. Putterilli* died on the bank of a river at low tide or in those parts outside the normal bed of a river, which are occasionally covered by floods, the bones of the animal could have been disconnected long before the arrival of the next flood. The rising water will in this case not only cover the bones with sediment, but will also displace them in all directions.

WATSON mentions several skeletons of *Pareiasaurus* and one of *Procolophon* in all of which the bones still articulated or nearly so. The condition of these fossils is part of his argument to prove that the Beaufort beds have been laid down largely by wind-action. The skeletons must then have been covered chiefly by aeolian sediment. It seems to me, however, that skeletons, of which the bones are practically still articulating, must have been covered up very quickly, so that the disintegration had not time enough to loosen the joints. This can easily happen when an animal drowns in a flood, but is certainly not normal with aeolian sedimentation in areas of abundant life.

THE SKULL.

The general circumference of the skull is the same as that of *L. latirostris*. There is, however, a slight difference in the slope of the preorbital portion. In *latirostris* the angle between the preorbital portion and the top surface of the frontals and the parietals is in the vicinity of sixty degrees and in *Putterilli* this angle is nearer to forty-five degrees (see Pl. X).

General dimensions :

| | |
|---|---------|
| Distance between the front edge of the jaw to the hinder end of the mutual suture of the parietals | 283 mm. |
| Distance from the hinder end of the left squamosum to the middle of the upper edge of the jaw | 344 mm. |
| Greatest breadth over the squamosa | 283 mm. |
| The height of the skull could not be ascertained, because the ventral as well as the occipital side are still covered with matrix. The height of the occipital plate, however, could be found : | |
| Distance from a line connecting the articulation surfaces of the quadrata to the front end of the mutual suture of the parietals on the top surface | 154 mm. |

In the skull of *latirostris* described some time ago (4) these dimensions are respectively: 180, 224, 169, and 115 mm., from which may be seen that the present skull is 10 cm. longer, 11 cm. broader, and 4 cm. higher.

The longest *Lystrosaurus* skull, *L. Mccaigi* SEELY, was described by BROOM in 1903 (2). A sketch of a side view was added, but neither sketch nor description can be used for accurate comparison. My own observations on this skull gave the following:

The distance between the front edge of the jaw and the
hinder end of the mutual suture of the parietals is 387 mm.
Breadth of the skull across the lower ends of the post-
orbitals..... 178 mm.
Height of the occipital plate, taken from the lower ends
of the paroccipital processes to the front end of the
mutual suture of the parietals on the upper surface 197 mm.

The occipital plate is hollow and the upper surface of the skull is turned into a narrow furrow all through lateral compression. The pre-orbital portion has also been compressed laterally.

Breadth of the skull between the upper and hinder corners
of the orbital cavities..... 75 mm.

Length of the preorbital portion measured from the upper
edge of the jaw along the central ridge of the pre-
maxillary to the pair of protuberances on the pre-
frontals—
to the beginning of the protuberances..... 230 mm.
to the end of the protuberances..... 280 mm.
to the middle of the protuberances..... 255 mm.

Breadth of the premaxillary above the exterior nares.. 48 mm.

Length of the upper surface of the premaxillary..... 165 mm.

The length of the septomaxillary measured along the
suture with the maxillary is at least 75 mm. and
may even be 100 mm.

The distance from the hinder end of the septomaxillary
to the place where the suture between the nasal
and the premaxillary disappears in the nose..... 64 mm.

Length of the nasals..... 122 mm.

Breadth of the preparietal..... 16 mm.

(The preparietal may have been as broad as that of *Putterilli*.)

Diameter of the orbital cavity antero-posteriorly..... 70 mm.

If these dimensions are compared with those of *Putterilli* it will be seen that the skull of *Mccaigi* is much longer and higher than that of *Putterilli*. On the other hand the skull of *Putterilli* is absolutely broader between the upper and hinder corners of the postorbital cavities than the skull of *Mccaigi* (see under Frontals). Even if some allowance is made for compression the skull of *Mccaigi* still remains relatively narrower. I have therefore concluded that the two specimens belong to different species. Other differences will be considered in discussing the bones composing the skull of *Putterilli*.

THE PREMAXILLARY.

This bone has the same general shape as that of *latirostris*, but in detail it shows many peculiar differences. As in *latirostris* it is in contact with the nasals, the septomaxillaries, and the maxillaries. The sutures with these bones are, however, not clear.

In *latirostris* the side-surfaces of the premaxillary make nearly a right angle with the upper surface. For comparison I have now ascertained that this angle is somewhat larger than sixty degrees. In *Putterilli* this angle is only thirty degrees. Thereby the skull of *Putterilli* acquires a much broader appearance, and this breadth is heightened by the relatively broader maxillaries. The proportion of the breadth across the maxillaries near the oral edge in *latirostris* to that of *Putterilli* is as 9,5 to 15,5. The proportion of the length of a perpendicular from the middle of the oral edge on a line which connects the front ends of the maxillaries behind the teeth in *latirostris* to that of *Putterilli* is as 5 to 6,7. Compared with *latirostris* the breadth of *Putterilli* has augmented with 6 cm. and the length of the mentioned perpendicular only with about 2 cm. The proportion in *latirostris* of the cited dimensions is as 9,5 to 5 or nearly as 2 to 1. The proportion of their increase in *Putterilli* is as 3 to 1. We therefore see that in the skull of *Putterilli*, compared with that of *latirostris*, the breadth of the oral portion increases relatively more than the already mentioned perpendicular, which might be called the height of the snout.

The central ridge on the premaxillary is very clear. The lateral ridges, however, are not so clear through the small angle between the upper surface and the lateral surfaces. This is especially the case near the oral opening where the upper surface curves without definite demarcation into the lateral surfaces. The lateral ridges are prominent above the external nares.

There is a transverse ridge between the nares, where the sutures with the nasals appear on the upper surface (Pl. XI). This ridge divides the grooves between the lateral and central ridges in two. An analogous feature has not been observed in *latirostris* nor in *Mccaigi*.

As in *latirostris* the lateral surfaces bend sharply inwards at the nostrils.

The general shape of the palatal surface (Pl. XII) is the same as that of *latirostris*. The acute angle which is formed by the front part of the palatal surface with the upper surface is, however, much more acute in *Putterilli*. In *latirostris* this is an angle of forty-five degrees and in *Putterilli* it is one of only fifteen degrees; it is nearly forty-five degrees in *Mccaigi*.

Dimensions :

| | |
|--|----------|
| Length of the upper surface..... | ±135 mm. |
| Breadth of the bone where the suture with the nasals enters the nostrils..... | 39 5 mm. |
| Mutual distance of the points where the sutures between premaxillary, maxillary, and septomaxillary meet under the nostrils..... | ±56 mm. |
| Distance of these points to the oral edge, measured along the suture with the maxillary..... | 70 mm. |

| | |
|---|--------|
| Distance of these points to the central ridge on the upper surface..... | 33 mm. |
| Breadth of the bone at the oral edge, where the sutures appear on the palate..... | 70 mm. |
| Length of the parallel ridges on the palatal surface, about | 36 mm. |
| Axial distance of these ridges, about..... | 20 mm. |

From this we see further that, while most of the dimensions are proportionately much larger, the breadth of the premaxillary is just as large as in *latirostris* (see 4). The mutual distance of the points under the nostrils mentioned above is in *Putterilli* 12 mm. larger than in *latirostris*, but the distance of these points to the central ridge is in both species the same. The mutual distance of the central ridge and the line connecting the mentioned points is therefore absolutely smaller in *Putterilli* than in *latirostris*.

THE MAXILLARIES.

These elements have also the same general shape as in *latirostris*. They even seem to be in touch with the same bones as in that species. However, the suture between the prefrontal and the lacrymal is very indistinct, and it could therefore not be made out whether the maxillary and the prefrontal touch each other or not.

The facial surface is not divided in two as in *latirostris*. As in that species the upper part is covered with fine striae, but on the other hand it does not form an angle with the lower part. There are broad and deep hollows between the nostrils and the orbital cavities, which are probably the result of severe pressure (Pl. X). The front part of the maxillaries is concave in a direction transverse to its length. As in *latirostris* there is a ridge, running near and parallel to the suture with the premaxillary. This ridge terminates at the hinder end of the nostril; it is high, narrow, and acute below the nostril, becomes flatter further forward and disappears before nearing the oral cavity. The ridge, which forms the outer edge of the maxillary, is thin and relatively acute.

Dimensions :

| | |
|---|---------------|
| Distance between the point where the suture with the premaxillary disappears in the oral cavity and the hinder end of the jugal process (for so far visible)..... | ± 170 mm. |
| Greatest breadth near the orbital cavity..... | ± 80 mm. |
| Average breadth of the lower part..... | 45 mm. |

The last dimension is in *latirostris* 42 mm. and therefore nearly as large as in *Putterilli*. The length of the bone in *latirostris* is, however, much less than in *Putterilli*. The maxillaries of these forms give therefore totally different proportions.

THE NASALS.

These are proportionately longer than those of *latirostris*. They are bounded by the premaxillary, the septomaxillaries, the maxillaries, the prefrontals, and perhaps the lacrymals and the frontals. The sutures are, however, too obscure in the vicinity of these bones to be able to decide with some certainty about it.

The nasals form a deep groove between the protuberances of the prefrontals. This groove is parted in two at the premaxillary by the central ridge of this bone. The nasals form broad ridges, which do not lie in the prolongation of the side ridges of the premaxillary as in *latirostris*, but which lie parallel along the outside of this prolongation. These ridges disappear towards the prefrontalia. The nasals direct a broad process towards the lacrymals.

Dimensions :

Distance from the lower end of the bone on the side ridges of the premaxillary to the upper end of the mutual suture, between87 mm. and 115 mm.

Breadth of both bones together between the protuberances of the prefrontals..... 25 mm.

Breadth of both bones together over the processes towards the lacrymalia..... 116 mm.

The breadth of both bones between the protuberances on the prefrontals in *latirostris* is 28 mm., which is an absolute greater breadth than in *Putterilli*. The breadth across the already mentioned processes is in *latirostris* only 81 mm. No comparison can be made with the length of the nasals of *Mecaigi*, which has been given above, because that of *Putterilli* could not be made out with any certainty.

THE SEPTOMAXILLARIES.

The septomaxillaries are very large. They form a broad base for the exterior nares. Their broad hinder portion, which stands high up against the front margin of the nasals, makes a right angle with the front portion. It is bounded by the same bones as in *latirostris*.

Dimensions :

Length along the suture with the maxillary between 50 mm. and 55 mm.

THE LACRYMALS.

The boundaries of the lacrymal cannot be made out. The sutures with the jugal and the maxillary are clear enough, but there is no sign of a suture with the prefrontal. It cannot therefore be made out whether the lacrymal is in touch with the nasal.

The facial surface of the lacrymal between the maxillary and the edge of the orbital cavity is very narrow. The smallest dimension of this surface is about 6 mm.

THE JUGALS.

As these bones do not deviate from the usual, nothing of interest can be communicated about them.

Length of the facial surface..... 47 mm.

THE PREFRONTALS.

The prefrontals are broad, flat and thick. The sutures with the other facial bones have already been mentioned. The sutures with the frontals are totally different from those in *latirostris*. In this form they make an angle of ninety degrees with each other, while in *Putterilli* this

angle is 180 degrees (Pl. XI). In the middle they are only very slightly convex towards the face, while they bend broadly with the concavity forwards, towards the orbital cavity. This same bend occurs in *latirostris*, but there it is very small.

The outer surface is rough and convex. There are deep pits near the frontal edges of the bones, while the broad thick ridges, which divide the upper surface of the skull from the preorbital part, are situated nearer to the middle. The orbital surface has not been developed, because there were chances of breaking the fossil. The outer edge of the bone projects far over the orbital cavity.

Dimensions :

| | |
|--|---------|
| Greatest breadth..... | 58 mm. |
| Greatest distance between the orbital edges of the bones | 138 mm. |
| Greatest distance between the points where the sutures with the frontals pass over the orbital edges..... | 93 mm. |

As already mentioned on a former occasion, the latter distance in *latirostris* is 81 mm., and we therefore see that *latirostris* is only slightly narrower in this region.

THE FRONTALS.

The whole upper surface of the skull is concave, except that part which is formed by the prefrontals behind the prefrontal ridges (Pl. XI).

The edges of the frontals rise up high against the prefrontals and towards the borders of the orbital cavities. All along the mutual suture they show a broad but low thickening.

Dimensions :

| | |
|---|--------|
| Length of the mutual suture on the upper surface..... | 37 mm. |
| Distance between the upper and hinder corners of the orbital cavities..... | 95 mm. |

If these and some of the dimensions given under the prefrontals are compared with those of *latirostris*, it will be seen that the orbital edges of the frontals in *latirostris* converge strongly backwards, while those of *Putterilli* converge forwards. At the most these may be taken to be parallel.

The lateral surfaces of the bones along the upper part of the orbital cavity, which have been found so perfect in *latirostris* (4, p. 17, 19, 21), are also present in this form. Those of the prefrontals stand vertical, but the lateral surfaces of the frontals incline towards the orbital edge, making a small angle with the orbital surface. The greatest breadth of the prefrontal ones is 17 mm. and of those of the frontals 18 mm.

Compared with *Mccaigi* it will be seen that *Putterilli* is 20 mm. broader between the upper and hinder corners of the orbital cavities.

THE POSTFRONTALS.

The sutures with the adjoining bones cannot be made out, and therefore all that can be said of the postfrontals is that they must be very broad at the edge of the orbital cavity.

THE POSTORBITALS.

The general shape of these bones is the same as in *latirostris*. In the larger form they are of course more strongly built. The bone possesses a large and nearly vertical hinder surface (Pl. X), which corresponds with the much more inclined hinder surface and the upper end of the lower surface of this bone in *latirostris*. In *latirostris* the upper and outer surface is separated from the hinder surface by a protuberance; in *Putterilli*, however, the upper and outer surface forms acute ridges with the orbital surface and the hinder surface. The upper and outer surface continues till near the postfrontal. The orbital surface and the hinder surface converge downwards, giving the bone the shape of a thin wedge. The postorbitals form high ridges along the parietals.

Dimensions :

| | |
|--|---------|
| Distance between the two ends of the postorbital..... | 151 mm. |
| Greatest height of the orbital surface..... | 33 mm. |
| Breadth of the upper and outer surface..... | 17 mm. |
| Mutual distance of the front ends of the postorbitals... | 222 mm. |
| Mutual distance of the hinder ends of the postorbitals.. | 112 mm. |

(This is double the distance between the hinder end of the left postorbital to the hinder end of the mutual suture of the parietals; the hinder end of the right postorbital is still covered by matrix.)

The proportion of the two last dimensions is in *Putterilli* as 2 to 1 and in *latirostris* as 2,7 to 1. In *Putterilli* therefore, the distance between the hinder ends of the postorbitals is not only absolutely but also relatively larger than in *latirostris*.

It will be seen that the skull of *Mccaigi* is much narrower across the lower ends of the postorbitals than *Putterilli*.

THE PREPARIETAL.

The sutures around the preparietal are not clearly visible, and consequently the dimensions cannot be given accurately (Pl. XI). The upper surface, which is the only one visible, is strongly concave antero-posteriorly and less so in any other direction. The suture with the frontals is marked by a broad, thick ridge. This ridge does not protrude above the level of the parietal foramen and the hinder end of the mutual suture of the frontals. As in *latirostris* the preparietal is situated wholly behind a line which connects the upper and hinder corners in the edges of the orbital cavity.

The parietal foramen is oval-shaped.

| | |
|--|--------|
| Length of the preparietal, probably | 40 mm. |
| Breadth of the preparietal, probably | 35 mm. |

THE PARIETALS.

Only the upper surfaces of the parietals are visible, and their delimitation is not clear. The smallest breadth of the upper surface of both parietals is 44 mm., which is much more than twice that breadth in *latirostris*.

THE SQUAMOSALS.

These bones do not deviate from the already known shape.

THE LOWER JAW.

The lower jaw has been sadly damaged. It has broken in three parts. The right ramus is broken just behind the outer portion of the angular and the left ramus across the hinder end of the surangular. The upper part of the dentary is also broken off. The hinder end of the left ramus has not been found. The front part of the jaw has been displaced and is now situated to the right of the skull with the hinder end of the right angular on the right maxillary and the hinder end of the left angular in front of the alveolar border (Pls. XI, XII). The hinder part of the right ramus is lying upside down across the front of the right quadrate (Pl. XI).

The described parts show the same general features as the lower jaw described in 6. Everything is of course much larger and more massive. The two grooves on the front surface of the symphysis are broad and run right down to the opercular. The ridge on the dentary, parallel to the alveolar border and starting behind the middle of the depression for the tooth, is in this instance really to be taken as a thickened upper and front border of the outer opening of the vacuity in the jaw. The grooves on the upper border of the dentary are deep and broad. The upper connection of the two parts of the angular is beautifully shown in the right ramus and also the sutural ridges of the inner portion which support the prearticular. The prearticular is broad in front and becomes narrower backwards. The articulation part shows the usual shape. The prearticular forms a large lower process to the hinder extremity of the jaw.

Dimensions :

| | |
|--|-----------|
| Greatest breadth of the jaw across the symphysis..... | 65 mm. |
| Height of the remaining part of the symphysis..... | 83 mm. |
| The height of the complete symphysis must have been about | 100 mm. |
| Length of the jaw approximately..... | 210 mm. |
| Height of the hinder end of the outer portion of the angular..... | 50 mm. |
| Breadth of the articulation part (with inner process).... | 40 mm. |
| Thickness of ramus over the outer ridge on the dentary | 37-40 mm. |

THE VERTEBRAL COLUMN.

There is not much left of the vertebral column and the ribs. Only a few of the vertebrae have been found and these are scattered among the other bones. A few ribs are packed together directly behind the skull and a few others are lying to the left of the left ilium. This material is not in a condition to add anything further to our knowledge.

One part of the fossil gives the impression of being the sacrum, but it is so badly preserved that nothing further can be said about it (Pl. XI).

THE SHOULDER GIRDLE.

The distal part of the left scapula and the proximal part of the right one are visible. The shoulder girdle is further represented by the

sternum, the right coracoid and precoracoid, and the left clavicle. Excepting the scapulae, all these parts are well preserved and exposed (Pl. XII).

The Scapula.—Judging from the exposed proximal end of the right scapula, this must have been a bone of great size. The articulation surface has been damaged. The acromion is also broken, but still projects 12 mm. from the bone. The breadth of this proximal end has exceeded 78 mm. It is still in contact with the right humerus and nearly so with the right coracoid.

The Coracoid and Precoracoid.—These two bones are firmly in contact with each other. They both show their outer surface. The precoracoid has more or less the shape of a quadrangle, while the coracoid has the shape of a quadrangle with a triangle attached to one of its long sides, the other long side forming the connection with the precoracoid. The hinder end of the coracoid, the triangle part, is bent inwards. The outer edge of the precoracoid is deeply notched. The front and inner edges of the bone are fairly straight.

The Sternum.—This is a large, broad, and relatively thin bone. In front it is bordered by a straight edge, which is sided by two edges at an angle of about 120 degrees. Laterally these round off into the hinder lateral edges, which converge backwards, enclosing an angle of about sixty degrees. The hinder end of the sternum is slightly notched.

The outer surface of the sternum is not flat. A ridge extends from the notch in the hinder end towards the middle of the bone, where it terminates, the surface between this point and the front edge being slightly transversely hollow. The remaining parts of the front half of the bone, those lying behind the front lateral edges, are slightly convex, the axes of these convexities meeting the front end of the central ridge in the middle of the bone. Behind these convexities the surface of the bone is sharply concave, becoming almost flat further backwards. All these features have also been noticed, although much less conspicuous, in a smaller sternum of another species, probably of *Lystrosaurus*.

The Clavicle.—This is a long slender bone. The median end is broad and flat. There is a slight curve in the bone, near to this end, directing the lateral end more forwards. The lateral end is missing.

Dimensions :

| | |
|---|---------|
| Length of the coracoid..... | 72 mm. |
| Breadth of the coracoid..... | 68 mm. |
| Length of the precoracoid..... | 57 mm. |
| Breadth of the precoracoid | 72 mm. |
| Length of the sternum..... | 140 mm. |
| Breadth of the sternum..... | 140 mm. |
| Length of the remaining part of the clavicle..... | 200 mm. |
| Breadth of the median end..... | 38 mm. |
| Breadth at the curve..... | 13 mm. |

THE FORE-LIMBS.

Both the humeri are present, but it is doubtful whether any other bones of the fore-limbs are preserved. There is a bone half buried under

the questionable sacral mass, which might be an ulna, but which is so disfigured through fossilization that it cannot be identified.

The Humerus.—I have nothing to add from the present specimens to the description of the humerus of *Dicynodon pardiceps* in 1, p. 43, Pl. XLI and XLII. Fossilization has coalesced some other bones, probably ribs, to the distal part of the right humerus.

Dimensions :

| | |
|---|---------|
| Length of right humerus..... | 195 mm. |
| Breadth of distal end of left humerus, more than..... | 115 mm. |
| (Part of the radial side is broken off.) | |
| Breadth of the proximal end of the right humerus..... | 80 mm. |

THE PELVIS.

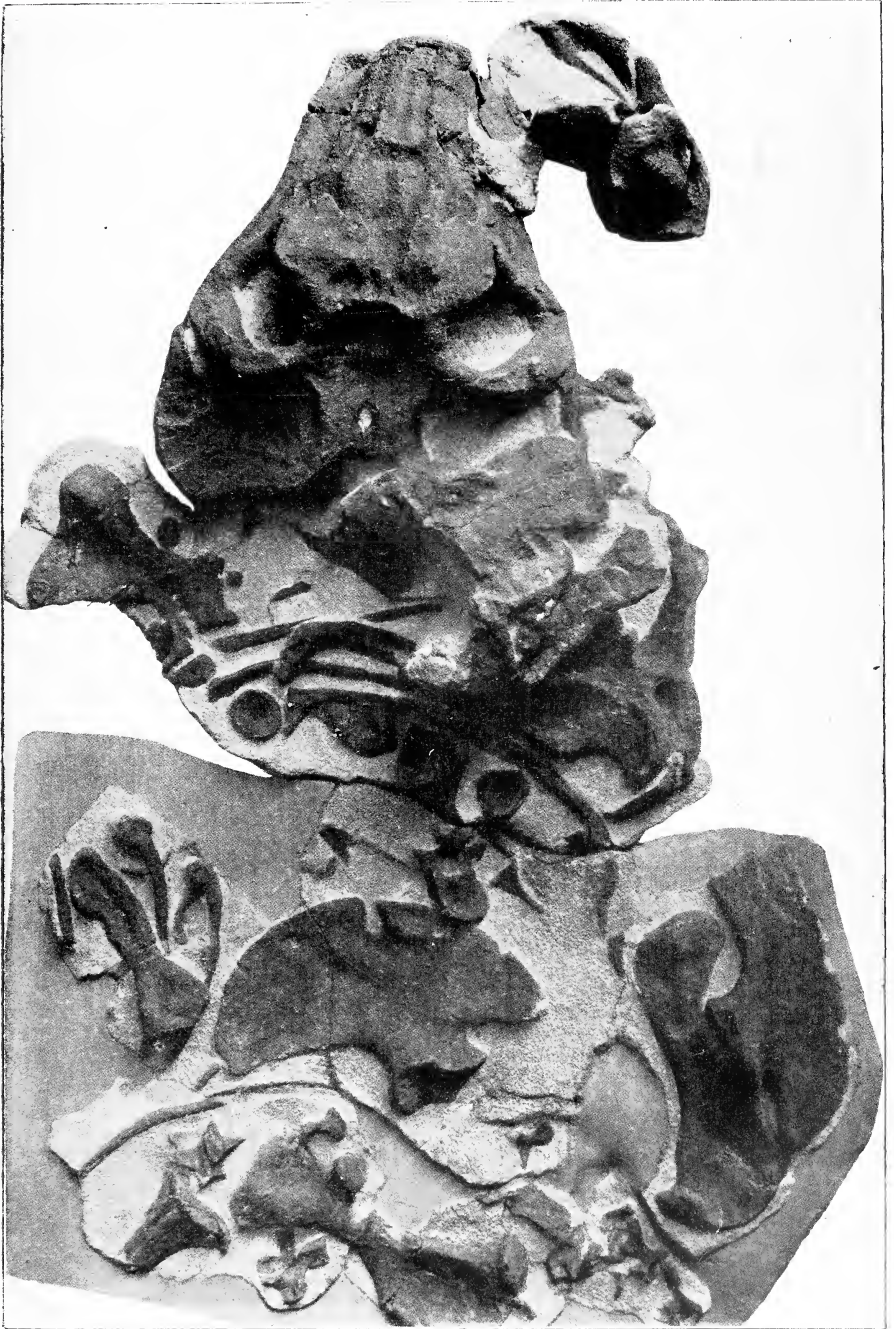
Only the two ilia have been found. The left ilium is lying with its outside up, while the right shows its inner surface (Pl. XI). The outer surface is slightly concave and the inner surface slightly convex. The bone consists of two parts, the acetabular portion being small and thick, the other large and flat. The flat part has the shape of an oblique segment of an ellipse, the acetabular portion uniting with it mainly behind the middle of the straight line. The angle between the lower edge of the flat portion and the front surface of the acetabular connection is obtuse, the angle between this edge and the hinder surface being acute. The upper edge of the bone is notched in different places, but I am not sure about the number of notches. WATSON mentions three notches in the ilium of *latirostris* (3, p. 291), but the present species seems to have five notches in the upper edge of the bone. The left ilium is the only one to give evidence on this point, as the fore-end of the right one is broken off. As in *latirostris*, there are two deep notches opposite the acetabulum. There is a much smaller notch about half-way between the hindmost of the two large ones and the hinder end of the bone. There is probably another notch a little further than the distance between the two large notches forward. This part of the right ilium is damaged and the left one shows at this spot a hole at a small distance from the edge. This hole must be the inner end of a notch, of which the outer end has been covered by substance of some other bone. This kind of deformation is present in more parts of the fossil. As already stated, ribs have coalesced with the right humerus in such a way as to make the distal part of this bone practically unrecognisable. There is still another small notch a little further forwards.

The inner surface of the ilium shows two depressions, situated near the front part of the junction of the acetabular with the flat portion. These depressions are divided by a short narrow ridge, while the hinder border of the hindmost of the two is formed by an identical ridge. Downwards they are bordered by the vertical edge of the general surface; upwards they are not demarcated from this surface. Behind these two there are two other depressions, which are much shallower and much less conspicuous. The distal ends of the sacral ribs were lodged in these cavities and it is clear that two of them, presumably the first two, formed a much firmer connection with the ilium than the rest.

The acetabular portion is a little longer than broad, while its height



Lystrosaurus putterilli. Side view of Skull. $\times \frac{6}{10}$.



Lystrosaurus Putterilli. Upper view of remains. $\times 0.2$.



Lystrosaurus Putterilli. Lower view of remains. $\times 0,3$.

is about the same as its breadth. It shows three facets, a large one for articulation with the femur, a very much smaller one for articulation with the ischium and a still smaller one for the pubis. All these facets are concave.

THE HIND-LIMBS.

Two femurs, the proximal end of a tibia, a bone which might be a fibula, and two tarsals, are the only bones recognised as belonging to the hind-limbs (Pl. XI).

The Femur.—This a long bone with a broad proximal and distal end, the shaft being very narrow. The proximal articulation surface is broad and rounded on the inner side of the bone, becoming narrower towards the middle and gradually rounding down into a powerful ridge, running down the outer side of the bone for more than a third of its length. The front surface of the proximal end is hollow. The distal end is broad and seems to be thick.

Dimensions :

| | |
|---|---------|
| Length..... | 212 mm. |
| Great st breadth of the proximal end..... | 94 mm. |
| Greatest breadth of the distal end..... | 72 mm |
| Narrowest part of the shaft..... | 30 mm. |

The Tibia.—The proximal end of the tibia is nearly as broad as the distal end of the femur, the breadth being 66 mm. Distally it rapidly contracts to a breadth of 22 mm., where the distal end is broken off.

The Fibula.—This bone is broad and flat proximally, while the distal end, which seems to be somewhat distorted, is thicker and not so broad. The shaft is slightly narrower than the distal end. The length of the bone is 137 mm., the breadth of the proximal end 52 mm., its thickness 14 mm., and the breadth of the shaft 27 mm.

I have much pleasure in naming this new form after its discoverer, Mr. A. W. PUTTERILL of Harrismith, Orange Free State. My thanks are due to the Director of the Albany Museum for the permission to examine the skull of *L. Mccaigi*.

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EXPLANATION OF PLATES.

Plate X.

Side view of the skull of *Lystrosaurus Putterilli*.

Plate XI.

Upper view of the remains of *Lystrosaurus Putterilli*. The frontoparietal plane is not parallel with the paper.

Plate XII.

Lower view of the remains of *Lystrosaurus Putterilli*, showing sternum, coracoid, precoracoid, clavicle, and the palatal surface of the premaxillary.

CONTRIBUTIONS TO THE KNOWLEDGE OF THE REPTILES OF THE KARROO FORMATION.

By Dr. E. C. N. VAN HOEPEN, M.I.

4. A New *Pseudosuchian* from the Orange Free State.

THE fossil under description is in the Bloemfontein Museum, and was found in a quarry near Rosendal, Orange Free State. It consists of a nearly complete individual on two slabs of matrix which unfortunately do not fit together. The fossil is mostly an impression of the right side of the skull and limbs, and besides this, consists of some vertebrae, a few ribs, a great part of the tail and of dermal ossifications. Some of the impressions are filled with a thin layer of ochre.

Through the bad way of preservation sutures are obliterated.

THE SKULL.

The preorbital part of the skull, the jugal and the postorbital with the mandible, are present as impressions of the right side. The postorbital part is very puzzling. The external nares are placed right in front and they are practically round. The preorbital cavities are small. They are a little larger than the external nares and have the shape of a triangle of which the base is parallel with the edge of the maxillary and the top and front angles are blunted off. The orbit is a little longer than broad and its lower and hinder rims form a nearly right angle. The temporal openings are indistinct. The lower temporal opening is large, broad at the bottom, and reaches nearly as high as the orbit. I am in doubt with regard to the supratemporal opening and the hinder part of the skull.

The premaxillary forms the lower border of the external nares. It supports three small pointed thecodont teeth. The two large ones behind these are probably already on the maxillary; they are separated from the front teeth by a small gap. These teeth must naturally have passed along the outside of the dentary. Behind them a part of the upper jaw is missing. A large tooth of the lower jaw has penetrated in this gap. Its impression stands a little further out from the matrix than the adjoining parts of the upper jaw, and I therefore conclude that the upper jaw was slightly bent inwards to allow this big tooth to pass along its outer side. The following maxillary teeth, numbering fourteen, are all small and diminish gradually in size going backwards. They occur till nearly below the middle of the orbit and are clearly thecodont. All that can be said of the maxillary is that it forms the lower border of the antorbital vacuity.

A narrow bridge separates the orbit from the preorbital opening, but it cannot be made out to what extent the jugal and the lacrymal participate in it.

The postorbital bar is directed upward and slightly forward, whereas in all the known allied forms this bar is directed upward and backward.

No sutures are visible in the lower jaw. It is highest across the Meckelian aperture, diminishes in height towards the symphysis, where a nearly equal height is attained. Two small teeth are visible at the symphyseal end. Behind these there is a large tooth, which must have reached above the upper border of the maxillary. Between this large one and the next, there is a little gap. Then follow some ten uniform small teeth, diminishing in size backwards.

At the hinder end of the skull there is a small, thin, curved bone, which is a portion of the hyoid.

Dimensions of the skull:

| | |
|---|-----------------|
| Length..... | 91 mm. |
| From snout end to front of orbit..... | 41 mm. |
| From hinder margin of nostril to hinder margin of pre-orbital cavity..... | 32 mm. |
| Length of preorbital cavity..... | 8 mm. |
| Height of preorbital cavity..... | 6 mm. |
| Length of orbital cavity..... | 18 mm. |
| Height of orbital cavity..... | 15 mm. |
| Greatest height of dentary..... | 12 mm. |
| Height across its narrowest portion..... | 6,5 mm. |
| Greatest length of ordinary maxillary teeth..... | 5 mm. |
| Length of large teeth in upper jaw..... | more than 8 mm. |
| Length of large tooth in lower jaw..... | 10 mm. |

THE VERTEBRAL COLUMN.

Only five presacral vertebrae, belonging to the lumbar region, have been preserved. They are amphicoelous, their neural spines are very broad, and there are distinct pre- and postzygapophyses.

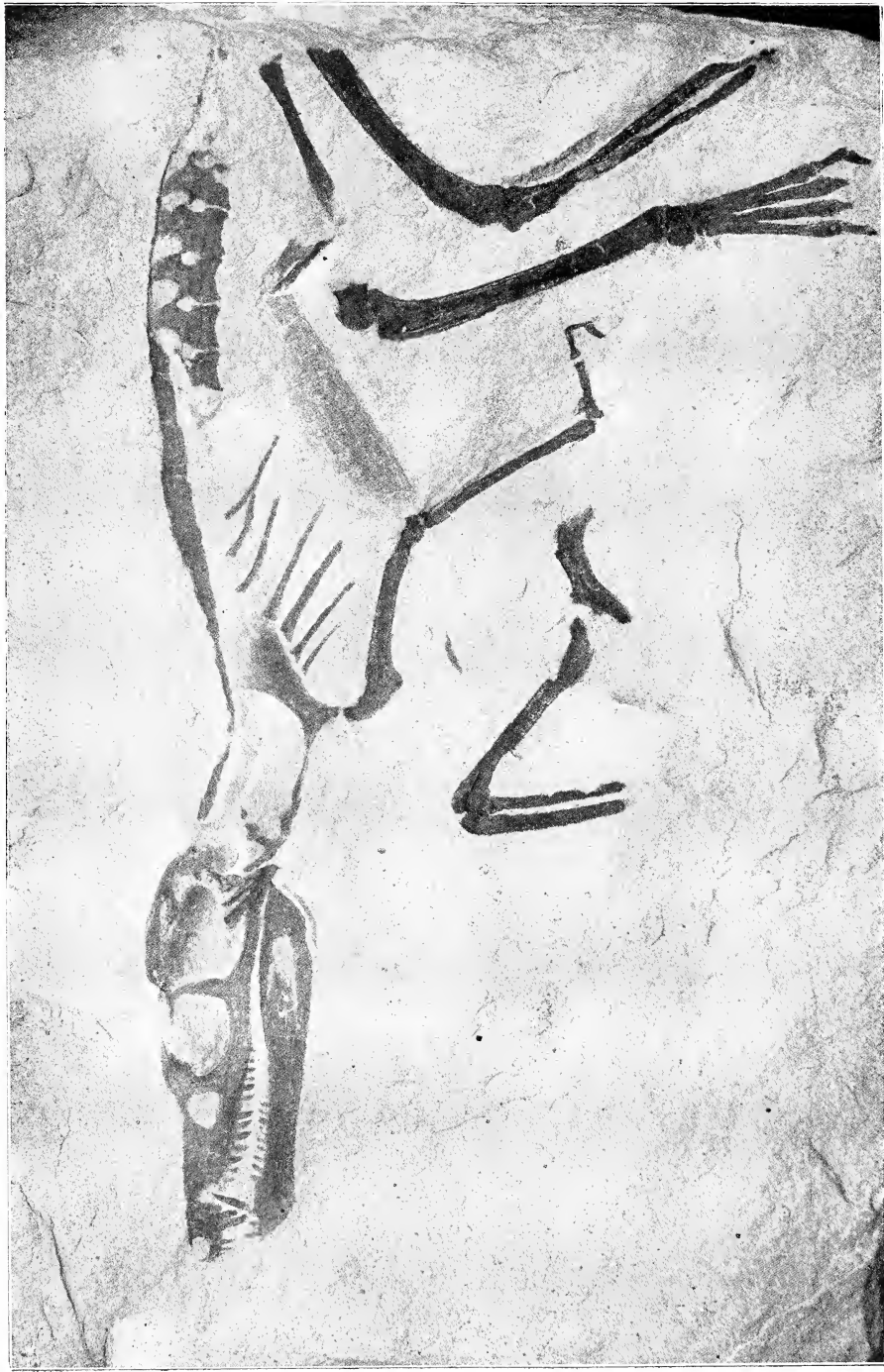
| | |
|------------------------------------|---------|
| Breadth of the spines..... | 5,5 mm. |
| Total height of the vertebrae..... | 15 mm. |
| Length of the centra..... | 9 mm. |

Of the tail 29 vertebrae are still present. The connection with the sacral portion is missing as well as the sacrals themselves, and this connection might account for quite a good number of caudals. The extreme end also is missing and we may therefore conclude to a very long tail, which was probably longer than the body with the skull.

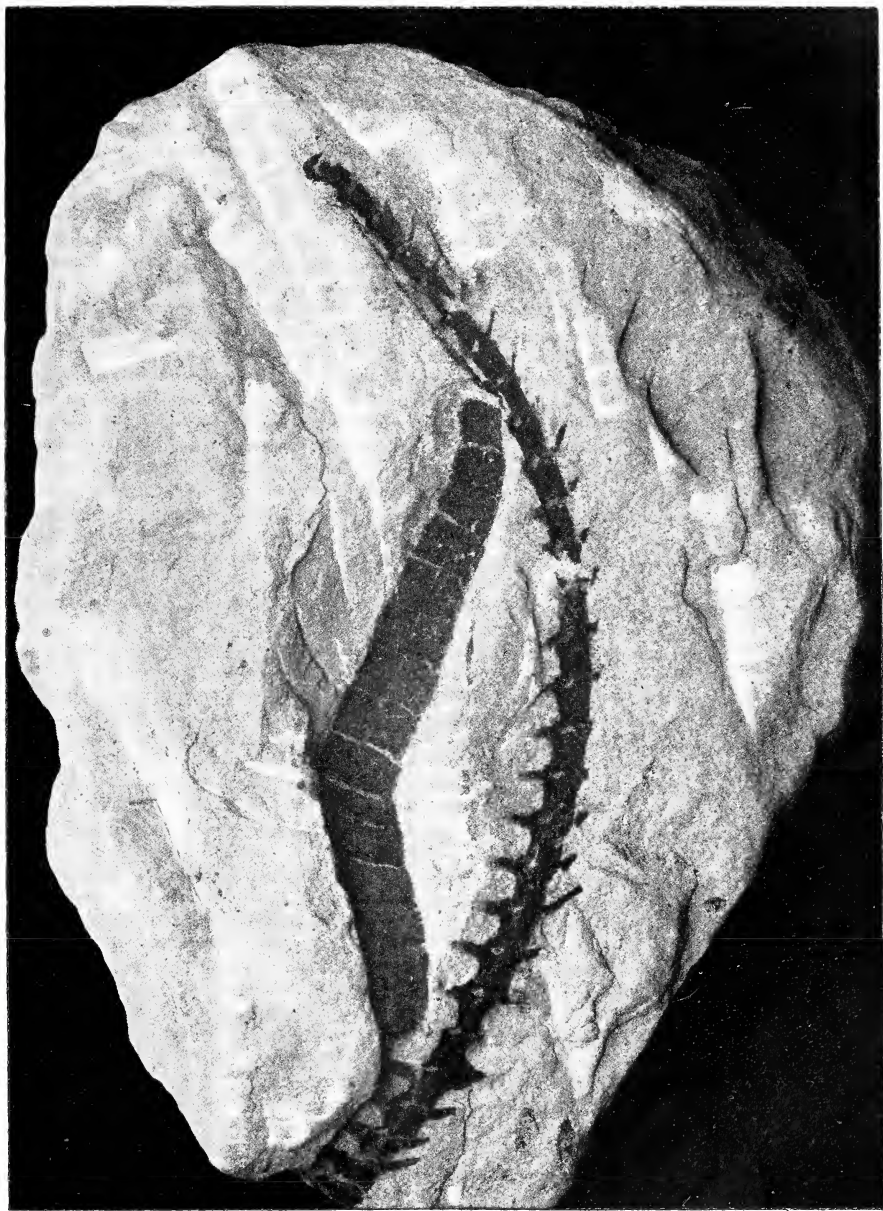
Eight dorsal ribs have been preserved, but the distal ends of all are missing. They are very slender and are clearly double-headed.

Of the shoulder girdle the two scapulae only are present. One of these is well preserved. Its distal end is very broad, measuring 19 mm., the shaft attaining a third of this breadth, while the proximal end has a breadth of 12-14 mm. The length of the bone is 28 mm. There is no evidence of an acromion.

The humerus is slender and is slightly bent. At the proximal end it is very broad through the formation of a processus lateralis. Between the upper articulation surface and this process the edge of the impression is convex. The length of the bone is 50 mm. The distance from the upper inner end of the bone to the end of the processus lateralis is 16 mm. The smallest transverse dimension of the bone is 4 mm.



Pedeticosaurus Leisneri. X 0,6.



Pedeticiscurus Leriseuri. Tail with dermal armour. $\times 0.68$.

The radius and ulna are very slender straight bones. Of the right fore-limb only an impression of the radius is preserved. Of the left the proximal portions of both bones are still in the matrix as impressions. The ulna is proximally thicker than the radius and has a well-developed olecranon process. The length of the radius is 43 mm.

Of the hand only one digit of the right extremity is preserved. Its total length is 28 mm. The metacarpal has a length of 10 mm. There are three phalanges. The carpus seems to have been very small.

Of the pelvis only the distal portion of the right pubis is preserved. This is long and very slender, its length as preserved being about 40 mm., and its narrowest portion being 3 mm. broad.

In the right hinder extremity only the distal half of the femur is present and in the left only the distal articulation portion. It is a strong bone which shows one curve and which may have had another. The length of the preserved portion is 56 mm.; the femur may have been some 10 mm. longer. Breadth at the distal end: 10 mm.

The tibia and fibula are long, straight, and slender bones. In both extremities one of the bones covers the other, but in the right leg they are still to be seen separately. They are both broad proximally and their length is 67 mm. The proximal end of the tibia has a breadth of 6 mm. The breadth of both shafts is 3 mm.

The foot is only represented fragmentarily in the left limb and seen from below. There are two large proximal elements in the tarsus and there may be four small distal ones. The impression of the astragalus is flat and square though slightly longer than broad, the greatest length being parallel to the axis of the limb. Its length is 7 mm. and its breadth 4.5 mm. The impression of the calcaneum is deep, which might indicate that this was a stronger bone than the astragalus. Length 6 mm., breadth 4 mm.

Four metatarsals have been preserved. These belong to the first four digits and are all nearly equally long. The third and fourth have nearly the same length. The second is just slightly shorter than the third and the first is slightly shorter than the second. Their lengths are: First 26 mm., second 28 mm., third 28.5 mm., fourth 28 mm. The first digit shows two phalanges, but the other three only show the proximal ends of the first. The first phalange has a length of 8.5 mm. and the second a length of 5 mm. The proximal breadth of the third metatarsal is 3.5 mm. The distal breadth of the first and fourth is 3.5 mm. and of the second and third 4 mm.

Dermal ossifications are present all along the back from the skull till far down the tail. There is also a dermal covering on the ventral side of the body. The dorsal ossifications are arranged in two rows, one row on each side of the dorsal spines with which they are in touch. These scutes have a rectangular shape and are mostly 10 mm. square. Some scutes of the tail which are not so well preserved as the others, are slightly shorter than broad. Those at the tail end are smaller than those of the body and each pair seems to associate with a vertebra. In view of this fact we might assume that there had at least been 22 presacral vertebrae.

The ventral scutes, which are much smaller, are arranged in longitudinal and transverse rows. They are strongest near the ventral middle and disappear towards the side. Four longitudinal rows were counted on one side in the scanty remains of this ossification in the present fossil. The length of some good specimens is from 4,5 mm. in the forward ones to 4 mm. in the more caudal ones and their breadth from 3,5 to 3 mm.

Apparently the present form is not closely allied to any of the known exotic *pseudosuchian* genera. This cannot be said off-hand of the South African forms, because these are only known from badly preserved specimens. It will therefore be necessary to compare our form with all those South African reptiles which show a sufficient resemblance.

Euparkeria BROOM.—A comparison with *Euparkeria* shows that in this genus the skull is much higher with regard to the length than in our fossil. In other words, the skull of *Euparkeria* is blunt compared with the new form.

The preorbital cavity in *Euparkeria* is much larger and has a quite different shape. The distance between the nostril and the preorbital cavity is much smaller in *Euparkeria*. There is further a marked difference in the dentition. The scapulae also show marked differences. A comparison of the feet gives the same result. The first metatarsal in the foot of *Euparkeria* is slightly longer than half the third metatarsal. In the present form they are nearly equally long. In *Euparkeria* the dermal scutes along the back are twice as long as those of the present form.

Mesosuchus WATSON.—Although *Mesosuchus* is probably a *Rhynchocephalian*, it is not out of place to mention it here, because it was originally taken to be a *pseudosuchian*. WATSON, and BROOM after him, both state that the teeth of *Mesosuchus* are acrodont. In the present form they are thecodont. The side view of the preserved part of the skull is quite different to that of the corresponding part of the Bloemfontein reptile.

“*Eosuchus*” WATSON.—VON HUENE pointed out that the name “*Eosuchus*” was preoccupied and WATSON’S type will therefore have to be renamed. The only possible comparison with our type is with the metatarsals. In “*Eosuchus*” the fourth is the longest. In our form the third metatarsal is the longest. The foot of “*Eosuchus*” is much nearer to the *Protorosaurus* foot than that of our form. The lengths of metatarsals I–V in “*Eosuchus*” are : 7,5 mm., 20 mm., 27 mm., 32,5 mm., and 14 mm.

Howesia BROOM possesses rather *Rhynchocephalian* properties.

Proterosuchus BROOM is more than twice as large as our form.

Erythrosuchus BROOM is still larger.

Apparently the above leads us to accept the present form as new and belonging to a new genus. I propose to call it *Pedeticosaurus Levisiuri* in honour of Mr. M. LEVISEUR, the enthusiastic Hon. Secretary of the Bloemfontein Museum.

Pedeticosaurus is only closely allied to one of the four known families of the *Pseudosuchians* i.e. the *Ornithosuchidae*. V. HUENE places *Ornithosuchus* and *Euparkeria* in this family. Both these genera have broadly identical relations in the preorbital portion of the skull and as already stated above, these are entirely different to the conditions existing in

Pedeticosaurus. The new genus may, therefore, be regarded as the type of a new family, which may be called the *Pedeticosauridae*.

I am indebted to the Committee of the Bloemfontein Museum, who most kindly put this fossil at my disposal and also to the Director and Committee of the Transvaal Museum, who allowed me to visit Bloemfontein for the description. My thanks are also due to the Director of the Albany Museum, who kindly sent me a sketch of the hind-leg of "*Eosuchus*" and the measurements of its metatarsals.

Plates XIII and XIV.

The remains of *Pedeticosaurus Leviseuri*.

Plate XIII × 0,6.

Plate XIV × 0,68.



ANNALS MEDEDELINGEN
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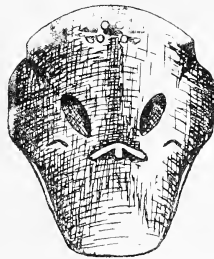
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AUGUST, 1915.

No. 2.
DL.DESCRIPTIONS OF SEVERAL NEW OR RARE SPECIES OF
ARANEAE FROM THE TRANSSVAAL AND NEIGHBOURHOOD.

By JOHN HEWITT.

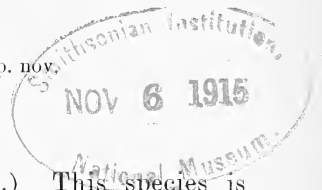
THE material described in this short paper was collected during the past few months by several members of the Transvaal Museum staff, and for the opportunity of examining it I am greatly indebted to Dr. H. G. Breyer, the Director of that institution. Hitherto, the Terricolous spiders of the Transvaal have been almost completely ignored by collectors, yet the fauna is evidently a rich one. The family Migidae is now recorded from the Transvaal for the first time (*Moggridgea breyeri*, sp. nov.), yet no less than fifteen species of this family are known from the Cape Province, and one may safely predict that the genus *Moggridgea* will prove to be well represented in the Transvaal.

Text fig. 1. Carapace of *Moggridgea breyeri* sp. nov.

Family MIGIDAE.

Moggridgea breyeri, sp. nov. (Text fig. 1.) This species is related to *M. crudeni*, mihi, from Alicedale, C.P. (Annals, Transvaal Museum, iv, pt. 1) in the character of the fovea and in the spinulation of the coxae: it differs from that species in the ocular characters, and from all species of *Moggridgea* known to me in the presence of a small tubercle on the surface of the carapace on each side, about in the same transverse line as the anterior angle of the fovea.

Types.—A series of five female specimens from Gravelotte, near Leydsdorp, collected by Dr. H. G. Breyer and Mr. G. van Dam for the Transvaal Museum. There are no previous records of this genus from the Transvaal.



Colour.—Carapace and appendages olivaceous: the lateral portions of the cephalic area and the posterior portion of the carapace pale. Abdomen pale with a purplish tinge above.

Carapace.—A little longer than broad, as long as the tibia, metatarsus, and half of the tarsus of the fourth leg. Fovea with an angulated transverse portion and usually a broad but short median prolongation behind: this median posterior portion varies considerably in degree of development and in one specimen is absent altogether. A small tubercle on each side between the fovea and the lateral margin of the carapace. Anterior row of eyes with its front margins forming a moderately procurved line, the laterals rather large, their clear areas quite three or four times, sometimes five or six times, as large as the area of a median eye, the distance between an anterior median and its lateral about equal to the diameter of the former: anterior median a little less than a diameter apart. Posterior row in a very slightly recurved line or practically straight.

Legs.—Metatarsus IV with 3, 2, or 4 spiniform setae in the apical tuft inferiorly. Patella III with only a few (about 12) spiniform setae on its anterior side, and with one very strong spinule on the distal edge: patella IV with a number of stout spinules on its anterior surface basally, but in the distal half of the segment the anterior band is composed only of short stiffish setae. Coxae I, II, and III each with a large posterior basal patch of short stout spinules: the patch of each coxa is a little diffuse distally, but the spinules do not extend into the distal half of the segment.

Pedipalp with numerous (18-30) spinules on the coxa inferiorly, occupying three or four irregular rows. *Labium* with 11-14 teeth.

Total length 13.5 mm.

As a number of new species of *Moggridgea* have been described during the last few years I append a key to the species of the family, and thus the inter-relationships of new and old forms can be seen at a glance.

Moggridgea microps, sp. nov.

Type.—A single adult female example from Malelane collected by Mr. A. Roberts (24th February, 1915). It was taken from an arboreal nest on the trunk of a large tree. Many abandoned nests were also found on large trees in a gorge at Malelane, but only one tenanted nest was discovered: however, a juvenile spider of this species was taken in a crack on the bark of a tree.

This species was first known to me through an immature example collected by Dr. E. Warren in East Zululand. It is closely related to *M. quercina*, E. Sim. (Ann. Soc. Ent. Belgique, XLVII, p. 22, 1903), being distinguished therefrom mainly in the small size of the anterolateral eyes, and eventually it may prove to be only a variety of that species.

M. quercina is the species so common on oak trees in the Cape Peninsula, but is unknown in the eastern parts of the Cape Province: a very closely related form, *M. intermedia* mihi, is known from Knysna however.

Colour.—Carapace and appendages chestnut brown: abdomen dark purplish above and at the sides.

Carapace longer than broad. Fovea curved, with a distinct but rather superficial narrow median furrow behind. The width of the

ocular area is equal to the length of the first metatarsus. Anterior row of eyes with its front margins practically in a straight line, its hind margins in a very slightly procurved line: lateral eyes small, not quite so large as the medians; distance between median and lateral about equal to $1\frac{2}{3}$ times the diameter of the former, the medians about $\frac{2}{3}$ of a diameter apart. Hind margins of posterior row of eyes in a strongly recurved line: medians a little smaller than the laterals.

Distance of anterior lateral eye from anterior margin of carapace about equal to $1\frac{1}{4}$ times the long diameter of the former.

Legs.—Coxae without spinules or stout setae below. Patella IV without spines on any part of its surface and without spinules in its basal portion anteriorly, but with a superoanterior band of spiniform setae. The band along the anterior surface of the patella III is composed of stout spiniform setae, only one row being well developed and there are no spines.

Pedipalp with about 45 spinules on the coxa inferiorly, extending the whole length of the segment. *Labium* with 23 teeth. *Measurements.*—Total length 18 mm., length of carapace 7, breadth of carapace 6.2

Key to the Species of South African Migidae based on the characters of Adult Females.

A.—Metatarsus IV without apical infero-posterior tuft of spiniform setae: femur II armed only with fine hairs inferiorly: patellae I and II without an oblique patch of peculiar stiff hairs arranged in one or several rows inferiorly.

(Eastern Cape Province to Natal.) **Poecilomigas abrahami*, O. P. Camb.

B.—Metatarsus IV with an apical infero-posterior tuft of 3-5 spiniform setae regularly arranged in a transverse row: femur II with 1-2 rows of stout spiniform setae below: patellae I and II with an oblique patch of peculiar stiff hairs arranged in one or several rows inferiorly. †*Moggridgea*, O. P. Camb.

(a) *Coru* III without a basal patch of spinules inferiorly, sometimes, however, with a group of fairly short setae.

1. Anterior of eyes (seen from above) with its front margin forming a straight or even very slightly recurved line, the laterals comparatively small, their area only about twice that of the posterior laterals. (Cape Peninsula.)

M. quercina, E. Sim.

* The position of the four apparent species described by the Rev. O. P. Cambridge from the Cape Peninsula (Annals South African Museum, III, p. 144) under the generic name of *Caedmon* is not known to me. The genotype of *Caedmon* is *Poecilomigas abrahami*, but Mr. Cambridge distinguishes it from *Moggridgea* only in the arrangement of the eyes: it is not clear therefore whether his Cape Peninsula species are referable to *Poecilomigas* or to *Moggridgea* as now distinguished. Three of those species are based on single adult male specimens: the species *C. dubia*, based on a female, has ocular characters distinct from those of *Poecilomigas abrahami* and may perhaps prove to belong to *Moggridgea*.

The Durban species *Moggridgea stauntoni* Poc. (= *P. pulchripes* Sim) is not specifically distinct from *Poecilomigas abrahami* O.P. Camb.

† Besides the South African species only two others are known, viz., *M. occidua* E. Sim. from Ile Principe, off the west coast of Africa, and *M. whitei* Poc. from the Nyika plateau.

2. Like *M. quercina* but anterior row of eyes with its front margin forming a procurved line. (Knysna.)
M. intermedia, Hewitt.
3. The lateral eyes of the anterior row not quite so large as the medians. (Malelane.)
M. microps, sp. nov.
4. Anterior row of eyes with its front margin forming a strongly procurved line, the laterals being very large and convex, their area many times larger than that of the posterior lateral eyes.
- (a¹) *Coxa II* with a distinct posterobasal group of shorter and more densely crowded (often spiniform) setae inferiorly.
5. Ocular area narrower, its width less than the length of metatarsus I. (Hanover, De Aar, Rooispruit, near Rosmead.)
M. seticoxa, Purc.
6. Ocular area broader, its width greater than the length of metatarsus I: width of carapace almost twice that of the ocular area. (Uitenhage Division, Alicedale.)
* *M. coegensis*, Purc.
7. Similar to *coegensis* but width of carapace not more than one and threequarter times that of the ocular area. (Ashton, Robertson Division.)
M. nigra, Purc.
- (a²) *Coxa muticous inferiorly*.
8. Posteromedian and posterolateral eyes separated by a distance equal to twice the diameter of the latter; anteromedians much nearer together than to the anterolaterals. (Matjiesfontein, Worcester.)
M. peringueyi, E. Sim.
9. Posteromedian and posterolateral eyes separated by a distance equal to about half the diameter of the latter; distance between anteromedian eyes very slightly greater than that between anteromedians and anterolaterals. (Kraikluft, G.S.W.A.)
M. pallida, Hewitt.
- (b) *Coxa III*, only with a basal patch of spinules inferiorly.
10. Posterior median eyes narrow elongate, the anterior laterals very large and convex. (Clanwilliam or Van Rhynsdorp Division.)
M. leipoldti, Purc.
11. Posterior median eyes broadly oval or nearly rounded, the anterior laterals moderately large. (Cape Peninsula.)
M. terricola, E. Sim.
- (c) *Coxae II and III* with a basal patch of spinules inferiorly. *Coxa I* without spinules, but sometimes with a few short spinuliform setae.
- (c¹) *Fovea* without distinct backward prolongation in the midline.
12. Anterior median eyes less than a diameter apart and nearly twice a diameter or more distant from the anterior laterals which are very large. Patella III with a broad anterior band of spines and setiform spines above. (Montagu.)
M. mordax, Purc.

* This seems to be a variety of *seticoxa*.

13. Anterior median eyes about a diameter apart and three or more diameters distant from the anterior laterals which are of moderate size. The patch on Coxa III includes 12-16 spinules. (Alicedale.) *M. rupicola*, Hewitt.
14. Anterior median eyes about half a diameter apart, and about two diameters distant from the anterolaterals, which are small being hardly twice the area of the anteromedians. Patella III with several rows of stout spiniform setae anteriorly, and with 1-3 short spines on the distal edge. Patch on Coxa III including about 30 spinules. (Grahamstown.) *M. rupicoloides*, Hewitt.
15. Anterior median eyes about a diameter apart and about two diameters or a trifle more distant from the anterior laterals, which are of moderate size, their area 3 or 4 times that of an anterior median. Patch on Coxa III including about 7 or 8 spinules. Patella III with a band of 8 or 9 spines along its anterior surface. (From 50 miles south of Umtali.) This species differs from the type of *M. whitei*, Poc., from the Nyika plateau as follows: anterior lateral eyes in *whitei* distant about 2 diameters from anterior margin of carapace or very nearly so, in *pymi* rather less than a diameter distant from that margin. In *whitei* there are only about 10 spinules in the cluster on Coxa III, that of II including about 14 spinules: the labium has many strong spinules.

M. pyimi, Hewitt.

(c²) Fovea with a very distinct broad but short backward prolongation in the midline.

16. Anterior median eyes slightly more than half a diameter apart and distant about 1½ diameters from the anterior laterals, which are small, being about twice the area of a median. The patches of spinules on Coxae II and III are large. Patella III with a broad anterior band of spines and short spiniform setae. (Alicedale.) *M. terrestris*, Hewitt.

(d) Coxae I, II, and III each with a basal patch of spinules inferiorly.

(d¹) Fovea without a backward prolongation in the midline.

17. Patch of spinules on Coxa III including only about 5-10 spinules. (Grahamstown, Uitenhage, Somerset East.)

M. dyeri, O. P. Camb.

(d²) Fovea with a very distinct broad but short backward prolongation in the midline (sometimes wanting, however, in *breyeri*.)

18. Carapace with a distinct protuberance on each side in a line with the anterior bend of the fovea and a little near to the side of the carapace than to the fovea. Distance between anteromedian and anterolateral eyes about equal to diameter of former, the laterals very large. (Gravelotte, near Leydsdorp.) *M. breyeri*, sp. nov.

19. Carapace without a protuberance on each side lateral to the fovea. Distance between anteromedian and anterolateral eyes about equal to three times the diameter of the former, the laterals comparatively small. (Alicedale.)

M. crudeni, Hewitt.

Family CTENIZIDAE.

Galeosoma Pallidum, sp. nov.

Types.—Three adult female examples in the collection of the Transvaal Museum, taken at Saltpan, Pretoria District, by the members of the Transvaal Museum Expedition, 6 X, 1914. The species is closely related to *G. schreineri*, mihi, from De Aar (Records Albany Museum, Vol LI, p. 421), differing therefrom chiefly in the form of the shield.

Colour.—Carapace palps and legs pale, yellowish; chelicerae brown; abdominal shield black.

Carapace subequal in length to the patella, tibia and metatarsus of the first leg. Ocular area as wide as long. Hind margins of posterior row of eyes in a straight or slightly procurved line: distance between the posterior medians about $1\frac{1}{2}$ times the distance between posterior median and posterior lateral (in *schreineri* the posterior laterals are almost as far from the posterior median as the latter are from each other).

Legs.—Tibia II with 5 or 6 spines on its anterior surface, III with 5-9 spines on its posterior surface.

Abdomen.—In its hinder portion the dorsal shield presents the appearance of a thick disk with sharply defined flat upper and fairly deep marginal inclined at right angles to each other, the junction between the two being a slightly upturned ridge: in its anterior half, however, the upper and marginal surfaces become more and more obtusely inclined to each other and their junction ill-defined, being marked by no ridge (in *schreineri* there is a continuous ridge quite devoid of pits all round): moreover, the marginal surface anteriorly is a curved one and is considerably extended, much more so than in *schreineri*. The flat upper surface is approximately circular in outline. Dorsally the soft skin immediately anterior to the shield is finely hairy, whereas in *schreineri* it presents 4 or 5 fairly regularly arranged transverse rows of closely approximated setae: these rows are visible to the naked eye as fine striae: in *schreineri* this arrangement is continued downwards along the lateral surface of the abdomen close to the shield and ends at the elongated ventral sigillum, but on the lateral surface the lines of setae are much more numerous and obliquely arranged, whilst the setae being much longer than those on the dorsal surface impart to the area a bearded appearance: nothing of this kind is found in *pallidum*.

The first described species of this genus, *G. scutatum*, Purcell, taken at Krugersdorp, differs from *pallidum* as follows: posteromedian eyes nearer to each other than to the posterolaterals, the shield is strongly convex and nowhere flattened, being merely the hardened integument covering a portion of an abdomen of normal rounded proportions, but posteriorly it presents a slightly upturned thin edge, whilst elsewhere, except to a slight extent anteriorly, there is no indication of a marginal surface as distinct from an upper surface: lines of setae immediately adjacent to the shield on the upper and lateral surfaces are present, but not so strongly developed as in *schreineri*.

Measurements.—Total length 21 mm., length of carapace 7.4, breadth of same 5.8, greatest of shield 11 (measured from posterior

upper edge to anterior lower edge), greatest breadth of shield 8 (measured between lower edge from side to side), breadth across upper surface of shield 7.5.

Galeosoma vandami, sp. nov.

Types.—Two female examples from Griffin Mine, Leydsdorp, collected by Mr. G. van Dam (14/1/1915), a series of six smaller specimens were also taken at Gravelotte, near Leydsdorp, by the same collector (28/1/1915).

Abdominal shield.—The upper surface is almost regularly oval in outline: it is rather lightly convex behind, more strongly so in front, and is marked off throughout from the marginal surface, being separated therefrom by a distinct ridge which in the posterior third at least is sharp and slightly upturned, but in the anterior half is less prominent, and immediately in front may be practically obsolete, although even there the upper and marginal surfaces are angularly inclined to each other. The marginal surface anteriorly is not deeper than at the sides, sometimes, indeed, being less deep. The upper surface carries only a few long hairs, but they are numerous on the marginal surface. Dorsally, the soft skin immediately anterior to the shield presents several transverse rows of closely approximated short setae, and ventrolaterally in the immediate neighbourhood of the shield there are numerous obliquely arranged lines of setae, which serve to mark out that area from the rest of the ventral surface in naked eye view on account of its darker colour. These setae are, however, finer than those found in *schreineri*.

Ocular area.—Distance between the two posterior median eyes about $1\frac{1}{2}$ times the distance between a posterior median and posterior lateral. The frontal eyes are variable in size and the cleft between them may be shallow or deep.

Measurements of largest specimens—

| | |
|---|----------|
| Total length | 18.5 mm. |
| Length of carapace | 7 mm. |
| Breadth of carapace | 5 mm. |
| Length of shield measured along upper surface | 9 mm. |
| Breadth of shield measured across upper surface | 7.5 mm. |

The Gravelotte specimens are not quite identical with the types from Griffin Mine: they are smaller, and the depth of the shield is on the average slightly less relatively to its length.

Galeosoma coronatum, sp. nov.

Type.—A single specimen from Kroonstad presented to the Albany Museum by Miss D. Chennells (Feb. 1915).

Abdominal shield.—The upper surface does not present any flattened portion, but is strongly convex throughout and passes gradually without interruption into the sides, except in the posterior half, where a distinct but not prominent ridge marks the boundary between upper and lateral surfaces. The shield is beset with long hairs almost throughout its surface. Lines of setae immediately adjacent to the shield on the upper and lateral surface of the abdomen are present, somewhat as in *schreineri*.

Ocular area.—Posterior row of eyes subequally spaced. Quadrangle formed by frontal and anterior, median eyes broader in front, the frontals being much larger than the anteromedians and about half a diameter apart.

Measurements.—

| | | |
|---|------|-----|
| Total length | 17 | mm. |
| Length of carapace | 7.3 | mm. |
| Breadth of carapace | 5.5 | mm. |
| Greatest length of shield (measured between anterior and posterior lower edges) | 9.8 | mm. |
| Greatest breadth of shield | 7.8 | mm. |
| Depth of shield measured posteromesially ... | 1.75 | mm. |

In the form of the shield this species resembles *G. scutatum*, Purc., from Krugersdorp, rather than any of the other known species: it differs therefrom in the occurrence of more definite lateral surfaces in the posterior third of the shield, in the hairiness of the shield and in the arrangement of the eyes of the posterior row.

Heligmomerus Caffer, Purcell. (Novitates Zoologicae X, p. 305, 1903).

Only two species of the genus *Heligmomerus* are recorded from South Africa, viz.: *H. deserti*, Pocock, described from the Kalahari (Ann. Mag. Nat. Hist. 7, 7, 286) and *H. caffer*, Purcell, from Shilowane. I believe that both are founded on juvenile examples, and although the two species will probably prove to be distinct it cannot be said that the distinguishing characters are yet known, for the ocular characters, on which specific distinctions are mainly based, differ greatly in juvenile and adult examples of the same species. The Transvaal Museum has three fine female examples, including two quite adult, from Moorddrift, Waterberg District (coll. C. J. Swierstra and A. Roberts), which I suppose should be referred to *caffer*, but are possibly a distinct species. The striking characters of these specimens as distinct from an *Idiops* are: the great breadth of the fovea and the shortness of the ocular area. The frontal eyes are about a diameter or a trifle more apart, comparatively small, being not much larger than the other eyes: anteromedians 1-1 $\frac{1}{4}$ diameters apart: the quadrangle formed by the frontal and anterior median eyes decidedly longer than broad, the anterior width only a little greater than, or subequal to, the posterior width: distance between the proteromedian eyes about 1 $\frac{1}{2}$ times their distance from the posterolaterals. The ventral surfaces of both pairs of spinners is beset with scattered small spines, whereas in *Idiops* such spines are chiefly formed on the penultimate segment of the superior spinners, and the inferior spinners are either devoid of spines or carry only 1 or 2.

| | | |
|----------------------------|------|-----|
| Total length | 33 | mm. |
| Length of carapace | 12 | mm. |
| Breadth of carapace | 10.7 | mm. |

Idiops pretoriae (Poc.) (Acanthodon p., Pocock in Ann. Mag. Nat. History, 7, 1, p. 319).

The Transvaal Museum has a very fine male example found in a trapdoor nest at Saltpan, Pretoria District (6/10/1914). It differs from the type only in a few minor points. The dentition of the chelicerae is 6.5, that of the type being 7.4. The bank of spinules on the anterior surface of patella IV stretches the whole length of the segment on the side: in the type it stretches 5/6ths of the length of the segment and includes about 30 short spines. Patella III in both specimens has 13 spinules on its anterior surface, and in addition 4 on the anterior distal edge. Mr. Pocock says:—"All the tarsi scopulate

below, the scopula increasing in thickness from the first to the fourth": in the Saltpan specimen, tarsus I has numerous short and fairly stout spines inferiorly, scopular hairs being limited to a narrow lateral patch on each side in the distal third of the segment, II without distinct spines below, but with a narrow mesial strip of spiniform setae completely dividing the scopula, which is present in the distal 2 to 3/5ths of the length of the segment, III and IV with large undivided scopulae extending almost to the base. The area formed by the frontal and anterior median eyes is much broader behind than in front: frontals very slightly more than $\frac{1}{4}$ of a diameter apart.

Idiops Gunningi, Hewitt, var. nov. *elongatus*. (Records Albany Museum II, p. 417).

This new variety is founded on 6 specimens, of which 4 are adult females, from Moorddrift, Waterberg District (C. J. Swierstra and A. Roberts). It differs from the typical form of *Gunningi*, as known to me from the single type specimen, in the following respects: Carapace a little longer than the tibia and metatarsus of the fourth leg (a little shorter than the tibia and metatarsus of the fourth leg in the type): ocular area narrower, its width being very slightly less than the length of tibia II measured along the dorsal midline (very slightly exceeding the length of tibia II in the type: the spines on the anterior side of patella IV more numerous, those in the distal half arranged in 3 or 4 rows (arranged in a double row in the type). Other characters are as follows:—Frontal eyes about $\frac{1}{3}$ of a diameter apart, but in one specimen $\frac{2}{3}$ of a diameter apart: quadrangle formed by the frontal and anterior median eyes broader behind and quite twice as long as the posterior width: quadrangle formed by the four median eyes either a trifle broader in front or subequal before and behind, or a trifle broader behind: distance between post median and post lateral eyes about $1\frac{1}{4}$ to $1\frac{1}{2}$ times the distance between the post medians: posterior margins of posterior row of eyes about in the same transverse line. Anterior surface of patella IV spined over its whole length. Tibia IV usually without spines on its anterior surface, excluding those inferiorly situated, but one specimen has 2 spines on one side and 1 on the other, and another specimen has 1 spine on one side only. Tibia II with 11-13 spines on its anterior side, but only 8 in a specimen which is apparently not quite mature.

Measurements.—

| | | |
|---------------------------|------|-----|
| Total length | 33 | mm. |
| Length of carapace | 13.9 | mm. |
| Breadth of carapace... .. | 11 | mm. |

Colour.—Carapace pale brown, appendages reddish brown.

The following species of *Idiops** have been described from South Africa:—

1. *Pretoriae* (Poc.), said to have come from Pretoria (A.M.N.H. 7, 1, p. 319).—Male. The supposed female of this species, found in Pretoria, was described by me (Ann. Transvaal Museum II, p. 74), but subsequently females belonging

* The first species recorded from South Africa under this generic name is *I. thorelli*, O.P. Carb. (P.Z.S. 1870 p. 156). In P.Z.S. 1897, p. 731, Mr. Pocock refers this species to the genus *Acanthodon*, but subsequently (A.M.N.H. VII. 1, p. 320) he includes with it in that genus a species, which we now refer to as *Idiops*, and evidently regarded the two genera as synonymous. I have examined the type of *thorelli* and find it to be a true *Acanthodon*.

to a second series of Idiops were taken in the Pretoria neighbourhood at Zwartspruit and described by me under the name of *I. gunningi* (Records Albany Museum II, p. 417). It is, however, uncertain which, if either, of these two species is co-specific with *pretoriae*. The recent discovery of an undoubted male of *pretoriae* at Saltpan enables us to fix a precise locality for the species.

- I. Fryi* (Purc.), from Johannesburg (Ann. S. Af. Mus. III, p. 91).—Female.
- I. versicolor* (Purc.), from Umtali (Ann. S. Af. Mus. III, p. 90).—Female. An important character of the species not mentioned in the description, but found in Dr. Purcell's key (Trans. S. A. Phil. Soc. XV, p. 118), is the presence of short spinules on the anterior surface of the coxae of the first two pairs of legs.
- I. pungwensis*, Purc., from Pungwe Riv. (Trans. S. A. Phil. Soc. XV, p. 116).—Male.
- I. pallidipes*, Purc., from S. Herereland, and *I. striatipes*, Purc., from Sekgoma, in the Kalahari (Jena. Denkschrift XIII, pp. 206-207), are based on specimens which are in all probability very immature, and the characters of the species will not be fully known until adult material is obtained.
- I. pulcher*, Hewitt from Tsessebe, Tati (Records Albany Museum III, p. 23).—Female.
- I. arnoldi*, Hewitt, from Bulawayo (Rec. Alb. Mus. III, p. 21).—Male.
- I. astutus*, Hewitt, from Bulawayo (Ann. Natal Mus. III, pt. 2).—Male.
- I. gunningi*, Hewitt, *vide supra*.
- I. gerhardti*, Hewitt, from Doornkop, near Belfast (Rec. Alb. Mus. II, p. 420).—Female. The type is perhaps not quite mature. Its most striking character is the longitudinal elongation of the posterior eyes.
- I. parvus*, Hewitt, from Holfontein, O.F.S. (Rec. Alb. Mus. III, pt. 2).—Female.
- I. castaneus*, Hewitt, from Newington (Rec. Alb. Mus. II, p. 420), is based on a young example and should not have been described.

Acanthodon transvaalensis (Mihl) var. nov. *paucispinulosus*.

Types.—Two adult female examples and several juveniles from Gravelotte, near Leydsdorp, collected for the Transvaal Museum by Mr. G. van Dam. This form is at once distinguished from the type of the species (Records Albany Museum II, p. 412) in the complete absence of spinules on the coxa of the second leg: the inferior surface of that coxa is largely covered by stiffish setae. The coxa of the third leg has a patch of stout spinules extending along the whole length of the segment posteroventrally: these spinules are stouter than, but not so numerous as, those in the type of the species. There are also minor differences in the ocular arrangement: the cleft between the frontal eyes is decidedly deeper in this new variety than in the types, and the distance between the posterior median eyes is about $1\frac{3}{4}$ times that between the posterior median and posterior lateral eyes, whereas in the type the proportion is scarcely as much as $1\frac{1}{2}$ times. Viewed

from in front the distance between the frontal eyes is $\frac{2}{3}$ to $\frac{3}{5}$ ths of the diameter of an eye.

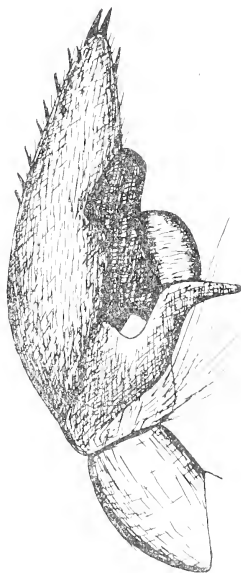
As in the types there are 3 pairs of sternal sigilla. The dentition is noteworthy as affording what may fairly be described as an intermediate condition between the dentitions of typical *Acanthodon* and of *Idiops*: the teeth of the outer row are much larger than those of a typical *Acanthodon*, but the row does not extend the whole length of the fang groove.

Total length 15.5 mm.

Family ZODARIIDAE.



Text fig. 2a. *Capheris transvaalicus* sp. nov. Adult male seen from above.



Text fig. 2b. Distal portion male palp of *Capheris transvaalicus* sp. nov.

Capheris Transvaalicus sp. nov. (Text fig. 2 a-b).

Type.—A single adult male example from Moorddrift, Waterberg District (C. J. Swierstra and XA Roberts), in the collection of the Transvaal Museum. Only two species of this genus have been hitherto described, viz.: *C. Crassimana* (E. Sim.) (Ann. Soc. Ent. France, 1887, p. 371), from the *Kalahari*, and *C. haematilis*, E. Sim. (jenaische Denkschr. XVI, p. 181), from Hereroland, and both are stated to be

founded on immature specimens. The species now described differs from either of the above in the granulation of the Carapace and in the ornamentation of the upper surface of the abdomen.

Carapace closely and rather coarsely granulated throughout. Posterior row of eyes slightly recurved, the distance between posterior median and posterior lateral scarcely $1\frac{1}{2}$ times the long diameter of the latter. The surface blackish, sparsely provided throughout with rather short white hairs.

Abdomen blackish, ornamented above with a golden band shaped like an elongated ellipse, which posteriorly is acutely pointed (see fig.). The yellow band is made up of short, stout, fleshy looking adpressed hairs, and the black areas on the upper surface are also covered with thick hairs, though these are not quite so thick as the yellow hairs: on the ventral surface all the hairs are long and slender.

Sternum brown, the surface clothed with long, slender dark hairs, amongst which are a few white ones. The surface is roughened owing to the presence of the numerous raised hair pits.

Legs.—First and fourth subequal, third shortest. Tarsi slender, the unpaired claw obsolete, though the protuberance, relating to this claw, is large and well developed. Tarsi I and II without spines or spinules, III and IV with spines laterally. Tarsi I and II rather strongly scopulate. Distal $\frac{2}{5}$ ths of metatarsus I also scopulate, but at the distal end of metatarsus II, and to a less extent also of III and IV, there is a dense tuft of long hairs. The appendages are all dark brown, the chelicerae, palps, femora of legs and metatarsi III and IV being sparsely clothed with white hairs.

Palp short and stout. External apophysis of tibia projects outwards and is strongly bent distally: viewed from the side its lower margin has a sigmoid curve. Tarsus armed with a double row of short but strong spines along its inner margin, and several along the external margin distally: the apex is forked into two strong spiniform processes.

Total length 9.5 mm.

The presence of scopulae and the absence of spines or spinules on the anterior tarsi are noteworthy characters, as in the allied genus *Cydrela*, the front tarsi are spined but not scopulate.

EXPLANATION OF PLATE XV.

Galeosoma coronatum, sp. nov., from Kroonstad.

Fig. 1. Dorsal view, somewhat enlarged. ♀.

Galeosoma pallidum, sp. nov., from Saltpan.

Fig. 2. Dorsal view, somewhat enlarged. ♀.

Fig. 3. Dorsal view, about natural size, showing the great depth of the marginal surface of the shield anteriorly. ♀.

Fig. 4. Ventral view, about natural size. ♀.

Galeosoma schreineri, Hewitt, from De Aar.

Fig. 5. Ventral view, about natural size. ♀.

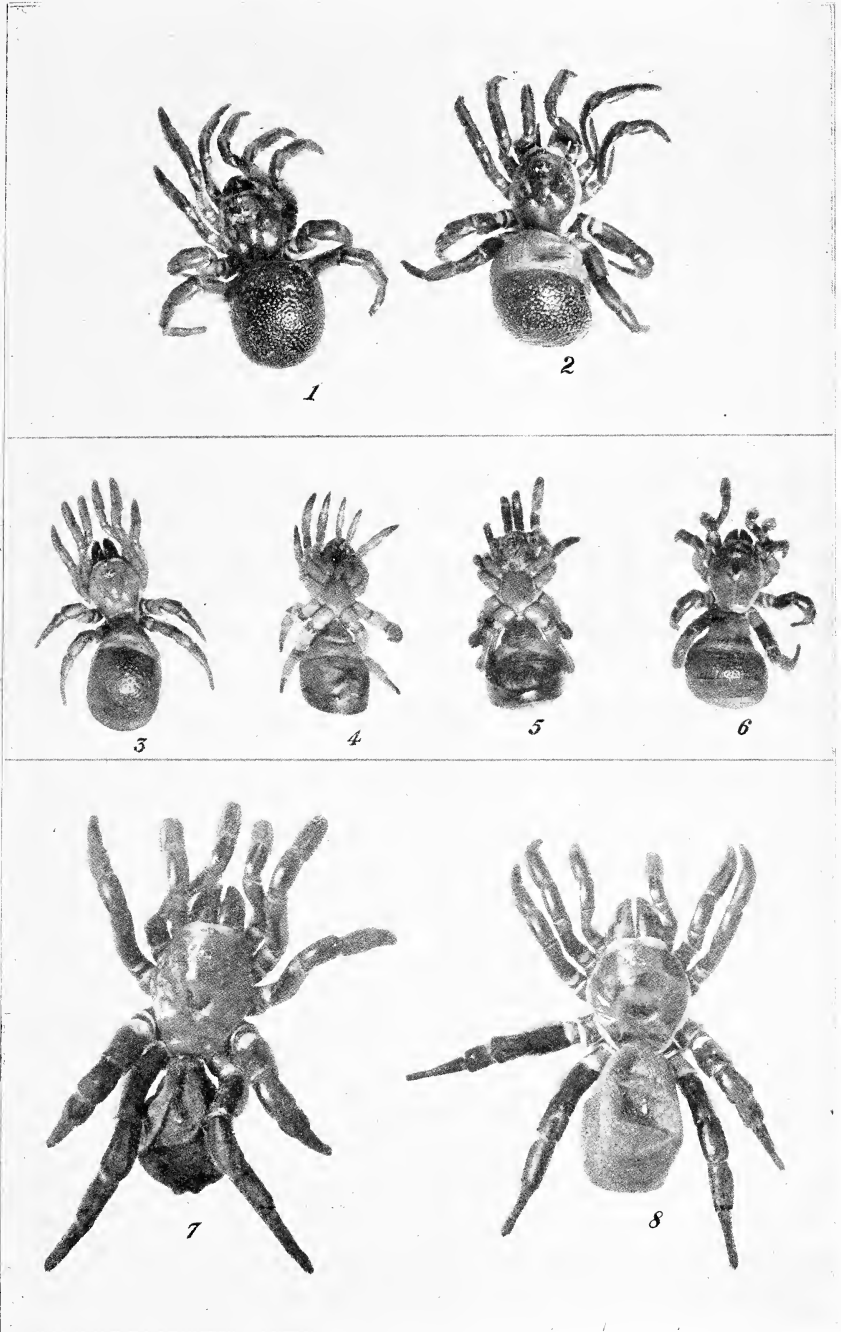
Fig. 6. Dorsal view, about natural size. ♀.

Idrops gunningi, Hewitt, var. nov., *elongatus*, from Moorddrift.

Fig. 7. Dorsal view, about natural size. ♀.

Heligmomerus caffer, Purcell, ? sp., from Moorddrift.

Fig. 8. Dorsal view, about natural size. ♀.



Idiopine trap-door spiders.

DESCRIPTIONS OF TWO NEW SOUTH AFRICAN LIZARDS, *TETRADACTYLUS LAEVICAUDA* AND *T. FITZSIMONSI*.

By JOHN HEWITT.

Tetradactylus laevicauda, sp. nov.

Body elongate: limbs short but fully developed and pentadactyle: the length of the hind limb slightly exceeds the distance between the end of the snout and the base of the forelimbs. Dorsal shields fairly strongly striated over the greater part of the body, but those on the neck are only very feebly striated and none are keeled, the posterior dorsal and anterior caudal shields being quite devoid of a median keel. The head shields are quite smooth with trace of ribbing. The caudal shields over the greater portion of the tail are quite smooth, but at its base they are carinate like the posterior dorsal shields, a condition which rapidly gives place to feeble ribbing a short distance behind the base of the tail: the ventral and lateral caudal scales are quite smooth, except in the terminal third of the length of the tail, where they are keeled: in the terminal fourth all the caudal scales, including the dorsals, are strongly keeled. Dorsal shields in 13 longitudinal and 62 transverse series: ventrals in 8 longitudinal series. Femoral pores 7 on each side. General colour olive, with a pale dorsolateral band commencing as a narrow streak near the nostril, passing along the supraciliary scales and the outer margin of the parietals to the neck, then continuing along the body and gradually broadening, being broadest about the middle of the body, where it is about two scales broad, then gradually narrowing and ending on the basal portion of the tail. Sides of head, neck, and body and upper surfaces of the limbs brownish black: upper lip with pale spots: smaller pale spots also occur on the sides of the neck inferiorly and on the anterior part of the flanks. Ventral surfaces, except the tail, pale: the scales immediately bordering the lateral fold spotted with black on the neck and body. Tail brownish olive.

Total length 185 mm. (tip of tail lost), length of head measured laterally 10.5, breadth of same 7.25, length of forelimb 12.75, hind-limb 20.75, of tail (minus tip) 122.

This description is based on a single specimen from Tabamhlope, Natal, number 2524 in the collection of the Transvaal Museum.

This species is closely related to *T. seps*, Linn, from which it differs chiefly in the nature of the carination of the dorsal scales and also in the number of femoral pores. *T. seps* is at present known only from the western parts of Cape Colony, the most eastern records being Knysna.

Tetradactylus Fitzsimonsi, sp. nov.

Serpentiform: Forelimbs completely absent, hindlimbs minute, undivided, with a single terminal claw and with two or three femoral pores. Dorsal shields in 14 longitudinal and 69 or 70 transverse series: ventrals in 6 longitudinal series. Head shields smooth, interparietal elongated about twice as long as broad or even more. All

the dorsal shields of the neck and body are striated: those on the body are also strongly keeled, most pronouncedly so on the two mesial rows of scales, which moreover are broader than any of the other dorsal or lateral scales. The dorsal shields of the neck are not keeled: most of the lateral scales of the neck are striated, but several of those most anteriorly situated are entirely smooth or only feebly ribbed. All the lateral scales of the body are striated and keeled. The caudal scales are strongly keeled throughout, and the dorsal and dorsolateral scales are also striated. The lateral fold is slightly curved in the neck region, but straight along the body. The general colour is olive with small darker spots on the upper surface of the head. Dark brown spots also occur on the posterior borders of the scales of the neck superiorly. The temple and side of the neck have dark brown vertical bars, which occur on the posterior borders of the scales and extend to the scales of the lateral row of the ventral region on each side.

Subocular shield with dark spots, and dark markings also occur along the upper and lateral borders of the upper labials. Ventral surfaces pale.

Measurements of larger specimens:—

| | |
|---------------------------------|----------|
| Length of head | 11 mm. |
| Breadth of same | 6.2 mm. |
| Length of hindlimb | 5 mm. |
| Distance from snout to vent ... | 78.5 mm. |

The tail is reproduced at a point 97 mm. distant from the vent. A somewhat smaller specimen with original tail intact has the following proportions:—Distance from snout to vent 72 mm., length of tail 237 mm.

The two examples show the following differences in head scaling: The large specimen has the two frontoparietals meeting in the midline and forming a long suture, whereas in the other specimen the two frontoparietals are completely separated by a backward prolongation of the frontal meeting the interparietal. Description based on two specimens kindly lent to me by Mr. F. W. Fitzsimons, the Director of the Port Elizabeth Museum. The larger one came from Schoemachers Kop, near Port Elizabeth; the other is labelled as from Kroonstad (this locality record is, I think, doubtful).

Tetradactylus Fitzsimonsi is the most serpentiform species of the genus, and, indeed, of the family. It is closely related to *T. africanus*, Gray, but may be distinguished from that species by the complete absence of the forelimbs, at any rate as external structures.

I may here remark that the description of *T. africanus* given in the British Museum catalogue of lizards, Vol. III, p. 125, is apparently incorrect in respect to the dorsal scaling, these cited as in 60 to 62 transverse series: in the only specimen of this species which I have been able to examine (from Witzies Hoek, near Harrismith, coll. Natal Museum) the number of transverse series is the same as in *Fitzsimonsi*, and all the forms referable to the *africanus* group, including *breyneri* Roux and *Eastwoodae* Hewitt and Methuen, seem to be characterized by a greater number of transverse series than occurs in *Seps* L. *tetradactylus* Lacép or *laevicauda* sp. nov. The above-mentioned specimen of *Africanus* differs from *Fitzsimonsi* in possessing a broader interparietal scute and in the absence of dark spots on the head as well as in the limb character,

KEY TO THE SPECIES OF TETRADACTYLUS.

- A.—*Limbs pentadactyle.*
 (a) Dorsal scales of head ribbed, of tail keeled, 9-12 femoral pores.
T. seps, Linn.
 (b) Dorsal scales of head and of greater portion of tail, except near the tip, quite smooth: 7 femoral pores.
T. laevicauda, sp. nov.
- B.—*Limbs tetradactyle.*
 (c) 4 or 5 femoral pores *T. tetradactylus*, Lacép.
- C.—*Anterior limb with 3 clawed digits, hindlimb with 2 clawed digits.*
 (d) 3 femoral pores. *T. eastwoodae*, Hewitt and Methuen.
- D.—*Anterior limb with 2 clawed digits, hindlimb undivided and without claws.*
 (e) 2 femoral pores. *T. breyeri*, Roux.
- E.—*Anterior limb minute, posterior limb small and undivided.*
 (f) 2 or 3 femoral pores. *T. africanus*, Gray.
- F.—*Anterior limb quite absent, posterior limb small and undivided.*
 (g) 2 or 3 femoral pores. *T. fitzsimonsi*, sp. nov.
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ON A COLLECTION OF BUTTERFLIES MADE IN THE MAPUTA DISTRICT, PORT. S.E. AFRICA, BY Dr. H. G. BREYER, DIRECTOR OF THE TRANSVAAL MUSEUM, DURING THE MONTH OF JUNE, 1914.

By C. J. SWIERSTRA, F.E.S., etc., First Assistant.

THE butterflies enumerated in this list were procured by Dr. H. G. Breyer whilst on a conjoint expedition of the Transvaal Museum, Pretoria, and the Provincial Museum, Lourenco Marques. Although the chief object of this expedition was large game, Dr. Breyer succeeded in obtaining a fair number of several species of Lepidoptera—Rhopalocera.

The weather had been dry, no rain was experienced, and the ordinary winter conditions had already set in. The last rains must have occurred about ten days or so before the arrival of the expedition, which explains the fact that a large number of the species captured are represented by summer-intermediate- and dry-phase forms. In a few cases, *T. auxo*, f.i., the winter form only was met with. That the summer forms were speedily disappearing is evident by the worn condition of some of the specimens, although in some cases the same worn condition is a feature of the specimens of the dry phase. This might be attributed to the very bushy nature of the country; one may at least assume that specimens living in such country are more apt to damage themselves than in the case of specimens frequenting perfect open country. In a few instances, amongst others, *T. wallengrenii* Butl., two of the specimens, which are in a perfect condition, are distinct forms of the wet phase, but already show, in a few minor points, the influence of the dry season. None of the specimens, however, show the very bright colouration, as is usually met with in specimens caught during the height of and at the end of a favourable summer season with plenty of rain and bright sunny days, and, for one acquainted with the influence the amount of rain during a season exercises on the production of the several forms of a species, and especially so in the *Acraeinae* and *Teracoli*, it is not difficult to conclude from this series that the summer rains have not been too plentiful, and more particularly so one and perhaps two months before those specimens were caught.

RHOPALOCERA.

Family DANAIDIDAE.

Genus DANAIDA Latreille.

D. chrysippus, L..... Practically met with everywhere, but not in large numbers.

Family SATYRIDAE.

Genus MELANITIS Fabricius.

M. leda (Linn.)..... 4 ♂♂, 2 ♀♀.

Family NYMPHALIDAE.

Sub-Family ACRAEINAE.

Genus ACRAEA Fabricius.

- A. acrita* Hew..... 1 ♀. An unusually dark and brightly coloured female with the abdominal spots orange-rufous instead of white.
- A. nohara* Hew..... 1 ♀. This specimen is smaller than usual, with a colouration approaching that of the male; the ground colour of the under wing being scarlet and gradually becoming brighter towards the base.
- A. aglaonice* Westw... 1 ♀. This is a very richly coloured specimen, with the basal half of fore wing and the greater part of hind wing bright scarlet. The black borders are very much reduced, especially so in hind wing, in which it is also very strongly divided. The under side of the wings agrees exactly with the figure in Oates' "Matabeleland," which, however, represents a male.
- A. oncaea* Hopff..... 13 ♂♂, 5 ♀♀. Two of the male specimens agree in every respect with the figure in Peter's "Reise nach Mocambique," whereas the others are all more brightly coloured, and one especially so, in which the ground colour of the under wing shows the same bright scarlet as is noted in *A. nohara* and *A. aglaonice*.
The four females are darker than any of the specimens in the Museum collection. One specimen has the white band also much more developed than usual, and exhibits, which is also the case in another specimen, the same scarlet colouring as referred to above.
- A. rahira* Bsd..... 2 ♂♂, 1 ♀. These specimens are much lighter coloured than any in the Museum collection; the black spots are very much reduced in size and the black borders of both wings much narrower.
- A. terpsichore* var. 11 ♂♂, 7 ♀♀. The males all agree with the series
rouyeti Quin. in the Museum from Transvaal and Natal and the females show the same variation, not one being like the other.
- A. encedon* (Linn.)... 15 ♂♂, 1 ♀. There is no difference between the specimens of this series and that in the Museum from Transvaal, Natal, and Eastern Cape Colony. A slight variation in the size of the spots of the under wing occurs, which is also noted in the Museum series.

- A. encedon ab. sganzini* 12 ♂♂, 2 ♀♀. Four of the males have the primaries suffused with black. This suffusion also occurs in specimens from Natal and elsewhere, and seems to be a common feature of the species. The other males and the two females are typical *sganzini* Bsd.

Sub-Family NYMPHALIDAE.

Tribus VANESSIDI.

Genus PRECIS Hübner.

- P. clelia* (Cram.)..... 3 ♂♂, 2 ♀♀.

Tribus EURYTELIDI.

Genus EURYTELA Bsd.

- E. dryope* (Cram.).... 6 ♂♂, 1 ♀.

Genus BYBLIA Hübner.

- B. ilityia* Drury..... 2 ♂♂, 1 ♀. These specimens are intermediate between the wet and dry phase.

Tribus EUNICIDI.

Genus CRENIS Bsd.

- C. natalensis* Bsd..... 2 ♀♀.

Tribus NYMPHALIDI.

Genus HAMANUMIDA Hübner.

- H. daedalus* var. *meleagris* (Cram.) 2 ♂♂.

Tribus CHARAXIDI.

Genus CHARAXES Ochsenheimer.

- Ch. brutus* var. *natalensis* Staud. 2 ♂♂.

- Ch. jahlusa* Trimen... 1 ♀. A very strongly marked specimen. The spots on fore wing very much enlarged and the black borders in both wings intensively black. The specimen is also smaller than any one in the Museum collection.

Family LYCAENIDAE.

Sub-Family LYCAENINAE.

Genus LACHNOCNEMA Trimen.

- L. bibulus* (Fabr.)..... 1 ♀.

Genus HYPOLYCAENA Felder.

- H. philippus* (Fabr.).. 1 ♂.

Genus IOLAUS Hübner.

- I. silas* Westw..... 1 ♂.

Genus SPINDASIS Wallgren.

- S. natalensis* Doubl. 1 ♂, 1 ♀.
and Hew.
S. mozambica (Berto- 1 ♂.
loni)

Genus CUPIDO Schrank.

- C. telicanus* Lang..... 1 ♂.
C. baetica (Linn.)..... 1 ♂.
C. mahallokoaena..... 1 ♂, 1 ♀.

Family PIERIDAE.

Genus HERPAENIA Butler.

- H. eriphia* (Godart)... 2 ♂♂, 1 ♀. These three specimens belong to the wet phase.

Genus PIERIS Schrank.

- P. severina* (Cram.)... 2 ♂♂, 1 ♀.
P. mesentina (Cram.). 1 ♂.
P. spilleri Stand..... 11 ♂♂, 7 ♀♀. Five of the females belong to the dull white form, whilst the other two to the yellow form of female.

Genus TERACOLUS Swainson.

- T. vesta* var. *mutans* 5 ♂♂, 4 ♀♀. Four males of the wet phase and one male with the under side of both wings typical dry phase; in size and brightness of colour above, however, it cannot be distinguished from the wet phase.

Of the four females one specimen exhibits the distinctive colouring of the wet phase, while the other three specimens can be considered to be intermediate forms.

- T. eris* Klug..... 8 ♂♂, 10 ♀♀. Four of the males can be considered to represent the wet phase, while the other four are intermediate between the wet and dry phase, lacking the discoidal spot at end of cell. There is a slight variation in size and brightness of the "old gold" markings on the fore wings, which variation also occurs in series the Museum possesses from Natal and Transvaal.

Four females represent intermediate phases, with the general colour of wings white, the apical markings of fore wings much reduced and slightly tinted with orange, and a spot between discoidal nervures. Five females represent the "char-treuse-yellow" coloured dry phase, with the apical patch shading into buff; two of these specimens have the apical markings of fore wings tinted with yellow-brown and in two other specimens these markings are tinted with orange; the

spot between discoidal nervures is in all four specimens white, whereas one, a perfect specimen, has the apical patch a little broader, the dark markings very bright, and the apical spots, including the spot between discoidal nervures, of the same chartreuse-yellow ground colour. Another female seems to represent the extreme dry phase; the general colour of both wings above is white, but the hind wings, owing to the dark sandy colour of the under side shining through, have a slight sandy appearance; the dark markings are very much reduced in size and intensity of colour, the apical patch of the fore wings lighter buff with the spots tinted with orange, and the spot between discoidal nervures white.

Aurivillius, Rhop. Aeth., p. 427, in my opinion, is perfectly correct in treating *T. maimuma*, *Johnstoni*, and *opalescens* as synonyms of *T. eris*. The variations in size, etc., which occur in this species being attributable to climatic influences, and in a lesser degree dependent on geographical distribution. It would not be surprising that in favourable seasons the larger form, *T. opalescens* Butl., which so far has its southern limit at Lourenco Marques (Delagoa Bay), will turn up, and perhaps even in numbers further south, and, in fact, some specimens in the Museum series, from Natal and Transvaal very nearly approach in size *T. opalescens* Butl., but are in no other way to be distinguished from *T. eris* Klug.

- T. ione* (Go. 14 ♂♂, 5 ♀♀. Four males are referable to the variety *jalone* Butl.; the other ten all belong to the variety *phlegyas* Butl. The five females represent the typical form, with the apical patch of fore wings "orange-chrome."
- T. regina* (Trim.) T... 12 ♂♂, 3 ♀♀. All the males can be considered to be intermediate forms between the wet and dry phase, with the exception of one which approaches the typical dry phase, but for parts of some of the nervures of the hind wings still being black. The females are also intermediate forms, but show a greater tendency towards the dry phase than towards the wet phase.
- T. annae* (Wallengr.).. 13 ♂♂, 7 ♀♀. Ten males, more or less worn specimens, belong to the wet phase, but show already the influence of the dryness of the season. One is a distinct intermediate form, while the other

two, perfect specimens, are referable to the dry phase, *T. wallengrenii* Butl., although the black borders of fore wings and the hind marginal spot of hind wings are intenser black than is the case in typical *T. wallengrenii*.

One female, a very much worn specimen, belongs to the same intermediate form as the ten males mentioned above; three females, two of which are perfect specimens, are intermediate and three other perfect specimens would be typical *T. wallengrenii* Butl. but for the black markings on the upper side of the wings which are very much pronounced. One of the latter specimens has the apical marking orange and very much reduced on the inner side of the intersecting row of black spots.

- T. omphala* (Godt.)... 2 ♂♂, 5 ♀♀. Two females, worn specimens, are true *omphala*, whereas the two males and the remaining three females, all perfect specimens, belong to the dry phase, *T. theogone* Bsd. There are no intermediate forms, *T. omphaloides* Butl., in the series.
- T. achine* (Cram.).... 4 ♂♂, 4 ♀♀. One male and one female are intermediate between the wet and dry phase of the species; the others all belong to the normal dry phase, *T. ithonus* Butl.
- T. antigone* (Bsd.)... 18 ♂♂, 7 ♀♀. All these are intermediate between the wet phase, *T. phlegetonia* Bsd., and the dry phase, *T. antigone*.
- T. auxo* (Lucas)..... 2 ♂♂, 9 ♀♀. The whole series belongs to the dry phase, *T. topha* (Wlgr.): some of the specimens, however, are not quite typical *topha*, but cannot be considered intermediate forms.
- T. subfasciatus* Swains. 4 ♂♂, 3 ♀♀. All intermediate between wet and dry phase.

Genus *ERONIA* Bsd.

- E. cleodora* Hübner... 6 ♂♂, 1 ♀. Intermediate between wet phase, *E. erxia* Hew., and dry phase, *E. cleodora* Hübner.

Genus *CATOPSILIA* Hübner.

- C. florella* (Fabr.)..... 3 ♂♂, 4 ♀♀.

Genus *TERIAS* Swainson.

- T. senegalensis* Bsd... 1 ♀.
- T. brigitta* (Cram.)... 3 ♂♂.
- T. brigitta zoe* Hopffer. 3 ♂♂, 1 ♀. This female differs to a large extent from the ordinary form met with. It altogether lacks the black suffusion and is much larger than usual and in colouring resembles the male.

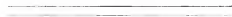
Family PAPILIONIDAE.

Genus PAPILIO Linn.

P. porthaon Hewitson 1 ♂. A very bad specimen.

Family HESPERIDAE.

Genus PYRGUS.

Pyrgus vindex (Cramer).

NOTES ON THE MAPUTALAND EXPEDITION.

(27th May to 3rd July, 1914.)

By Dr. H. G. BREIJER.

THE primary object of the expedition was to get specimens for the Transvaal Museum, Pretoria, and the Provincial Museum, Lourenço Marques, the second to investigate which animals were infected with trypanosomiasis parasites, and the third to get as much information as possible about bloodsucking Diptera, especially about Tabanidae and Stomoxyidae.

The results in connection with blood parasites were negative. None of the animals of which bloodsmears were taken showed signs of trypanosomiasis parasites, and none of the rabbits which were injected with blood from game animals showed infection.

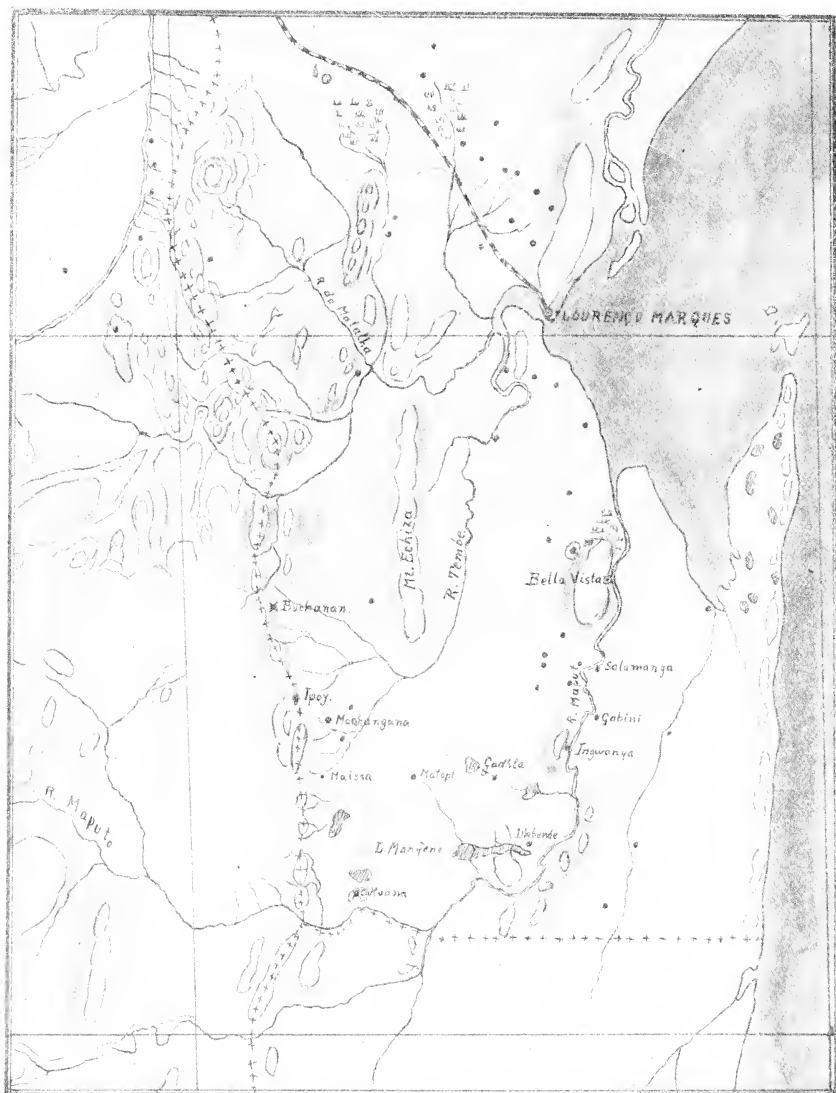
No Tabanids were found. All the Diptera collected belonged to the Muscidae, Trypetidae, and Culicidae.

It was highly remarkable to find the game in general free from parasites. Whilst in the Transvaal most buck have a great number of intestinal worms, all the buck shot at this expedition were free from them and from external parasites. Mallophaga were absent as well. Even the game birds were not infested with them. Ticks were only found on elephant, rhinoceros, and hippopotamus. The elephant was host to a very great number of them, the rhinoceros had them only round the anus and in the inguinal region, whilst the hippopotamus only had a few on the ears. Unfortunately the ticks collected on the elephant and hippopotamus were lost during a heavy storm which blew the tent away. They looked very much the same as those found on the rhinoceros, i.e. *Rhipicephalus simus* (C. L. Koch), *Dermacentor rhinocerotis*, and *Amblyomma petersi* (Karsch). On a black mamba, *Dendraspis angusticeps*, a tick belonging to the Ixodes genus was found, which has not been identified and will probably be a new species.

Another remarkable point was the apparent absence of small carnivorous animals and rodents. During our journey large numbers of traps of various designs were set, but the result was always *nil*. Not even footprints of small cats, etc., were found, and one is almost forced to think that they are really absent in this part of Maputaland. Hyaenas and lions were never heard or seen; no traces of wild dogs or other big carnivora were found; and dead bodies of buck could be left in the bush or in the open veld without covering either during the night or day without any fear that carnivorous animals would spoil the skin. Even the practically ubiquitous vultures were absent—at least we saw none and never found our game attacked by them.

The only plausible reason for this scarcity in carnivorous life must be found, in my opinion, in the paucity of animals on which they could prey. In fact the parts visited by our party were not at all rich in game. There were elephants (perhaps fifty), several rhinoceroses, but, besides a few kudus, waterbucks, inyala's reed-buck (which were mostly met with in the vicinity of Motope, near

the eastern slopes of the Lebombo mountains), there were only duikers, steenbuck, ehlangaan (*Nesotragus livingstonianus*, Kirk), and umzumbi (*Cephalophus natalensis*, A. Sm.). It was said by the natives that warthogs (*Phacochoerus aethiopicus*) were plentiful, but our party saw only one solitary female—which was secured—during the expedition. Large herds of impala (*Aepyceros melampus*) were



Sketch Map of the Maputa District.

not observed, wildebeest (*Connochoetes taurinus*) were never seen, hares were not met with, and the absence of large numbers of herbivora may account for the deficiency in carnivora. There may, however, be another reason. The water of the Maputa up to Gabene is salt or brackish. Most of the holes in dry rivers gave very salt, bitter

water, which is quite undrinkable for man and beast. At the few places where sweet water is obtainable Kaffirs have settled down for years and years, and it is not at all improbable that their presence near the only sweet-water pools chased the animals away. Lake Manyene was reported to have salt water; to our pleasant surprise we found it sweet.

Birds of prey were equally rare. The only ones seen by me were a couple of *Helotarsus ecaudatus* in the vicinity of Inguenha's kraal and a pair of owls (*Glaucidium capense*), male and female, which were killed at Dhlebende. Their stomachs were full of caterpillars. Our boys caught two young *Melierax canorus*, which died during the journey. In general, there was little bird life. In the neighbourhood of Salamanga one *Otis ludwigi* was shot near Inguenha; the ordinary *Numida coronata* was abundant, and the crested guinea fowl (*Guttera cristata*) was also fairly plentiful, but Francolins were very scarce.

On the pans near this kraal we found numerous ducks (*Anas erythrorhyncha*) and also many *Jacanas* (*Actophilus africanus*.) A single *Plotus* was perched on the branch of a dead tree, a few cormorants were on the wing, and these were all I noticed in water birds. At the Lake Manyene only a few cormorants were seen by me personally. The taxidermist, who arrived at the lake earlier than I, said that the southern shore of the lake was swarming with birds, apparently mostly pelicans.

In my diary there is not a single note about Passerine birds. Evidently they were not conspicuous. The only remark made was that at Dhlebende we heard for the first time the clamorous call of Jardine's babbler (*Crateropus jardinii*), and saw a few specimens of the long-tailed Shrike (*Urolestes melanolenca*).

Generally, the landscape was flat; here and there a small rise broke the monotony of the river. Fortunately the vegetation was rather varied. On the road from Inguenha to Gadhla one comes at first across a very sandy patch of ground, covered with long grass and small trees, whilst every now and then gigantic mahogany trees (*Azelia quanensis*) made their appearance. But after having passed Begabe's kraal one crosses patches of the Likuani Forest, a long stretch of very dense vegetation. The trees here are not at all high, and with the exception of a few really large trees I should prefer to call this forest a dense bush. In many places large lichens, very much like Usnas, are hanging from the branches and give the idea of a sub-tropical rain forest, or give at least the impression that the atmosphere is generally wet. But during our visit, which lasted about six weeks, no rain fell and the soil was absolutely dry. Still it must not be forgotten that the sea is not far off (20 miles at the utmost), and at Inguenha we felt its effects in the atmosphere and the guns had to be cleansed from rust every day. In these patches of high shrub Lories (*Gallinex porphyreolopha*) were found, and two of them were captured by our natives. As there was no proper food for them at hand they died in a few days.

Once at Inguenha our camp was visited by a small swarm of hornbills (*Lophoceros nasutus*). They made a great noise and soon disappeared in a northerly direction.

Reptiles were rare. Near Inguenha at one of the pans a *Python sebae* 10 feet 6 inches in length, but very thick, was shot (not preserved), as well as a *Thelothornis kirtlandi*.

On the road to Begabe's kraal a *Naja haje* was captured, and a *Tarbophis semiannulatus*. In the vicinity of Gadhla I shot a black mamba (*Dendraspis angusticeps*), but damaged it so much that only the head and neck were preserved. It was a large specimen, 12 feet 3 inches in length.

The only further catches in reptiles were two *Homopholis wahlbergi*. Undoubtedly snakes will be plentiful in summer time, but, in my opinion, this country will be poor in lizards all the year round. The soil is too sandy and there are no stony kopjes.

Amphibians and fishes were not caught.

Fishing is very difficult in Maputa River so near its mouth, as the tidal motion is very strong and the banks are not easily accessible. Lake Manyene should prove a good fishing ground. The pans at Inguenha and near Gabene contained a good many Kurpers belonging to the genus *Tilapia*.

My attention was chiefly directed towards the insects. Of these the Lepidoptera were better represented than any other order. A detailed description of the species caught is given by Mr. Swierstra in the preceding article.

At Inguenha most of the collecting was done in the old mealie lands. These were excellent places for small Teracoli and Acraeids.

In June only one species of tree was in flower, i.e. the *Brachylaena discolor*, belonging to the Compositae, and the specimens of this tree were swarming with acraeas, nearly all *A. encedon* and *A. buxtoni*. *Callidryas florella* was common, *Eronia leda* rather rare, *Melanites leda* rare, *Eurytela dryope* rather rare, *Mycalesis perspicua* common.

At our first visit *Pieris spilleri* began to appear. *Teracolus auxo* and *topha* were absent. On our return in the beginning of July these two species were very common, whilst nearly all the other species had disappeared.

During our stay at Gadhla the majority of *Eronia cleodora*, a good many *Teracolus regina*, *T. annae*, *Acraea oncaea*, and *Charaxes brutus* were captured.

At Lake Manyene the majority of the butterflies were caught.

On the northern shore of this lake are high banks, thickly wooded. On the margin of the forest were three trees absolutely covered with the Asclepiad creeper (*Sarcostemma viminalis*), which was in full flower, and these thousands of flowers—clustered together in a small space, free from thorns—offered the best collecting spot imaginable.

Pieris mesentina, *P. severina*, *Teracolus eris*, *T. mutans*, *T. regina*, *T. ione*, *T. auxo*, *T. topha*, *Callidryas florella*, *Precis clelia* were swarming, a few *Papilio demoleus*, *Herpaenia eriphia* came accidentally, and once a fine *Amauris* was seen. The orange-tipped Teracoli did not settle on the flowers, but were plentiful in the vicinity and mostly alighted on the ground. Quite near to this place three *Melanites leda* and a *Charaxes jahlnusa* were captured. Contrary to my expectations this *Charaxes* settled on the dead flower head of a Composite, and the *Melanites* showed themselves much more in open spaces than they generally do.

Another good collecting ground was found in the lands at Gadhla in the neighbourhood of the water holes. A few Pedaliaceae (*Sesamum alatum* and *indicum*), some Cucurbitaceae, and several Hibiscus were flowering, and more specially these last ones attracted butterflies, beetles belonging to the Mylabrinae (*Ceroctis marshalli*),

and large numbers of Tripetidae. Occasionally Vernonias were flowering, but they did not attract insects; the Lippias were the favourite resort of the few Lycaenids which I caught.

Quite near the water holes, in the reeds, was a large vegetation of a Melastomacea (*Dissotis incana*, Triana) in full blossom. It was avoided by insects.

A good many *Charaxes brutus* and *Ch. aethalion* were on the wing practically at every camping place, and also in the middle of June *Crenis natalensis* was fairly common, but very difficult to catch.

ADDITIONS TO THE COLLECTION OF MAMMALS IN THE TRANSVAAL MUSEUM.

By AUSTIN ROBERTS.

CATALOGUES of the collection of African Mammals have already been published in the preceding Volume of the Annals (Vol. IV, pp. 65-109 and pp. 180-186), and in view of so little having been recorded of South African Mammals, I propose to continue to publish annual lists of acquisitions. During the year ending 31st December, 1914, as much time as could be put into the service was devoted to field work by the writer. Six weeks was spent between Carolina, Barberton, and Nelspruit, in the Eastern Transvaal, in May and June, when forty-three mammals, besides double the number of birds, were preserved; four days were spent at Zoutpan in the "Bushveld" of Pretoria District in October, in company with the director, Dr. H. G. Breyer, and Messrs. H. L. Hare, J. Breyer and J. Jorissen, when twelve mammals besides twenty birds (kindly skinned by Mr. Hare) and other specimens were collected. In December eight days were spent at Moorddrift, a siding on the Pretoria-Pietersburg Railway line, and some ten miles south of Pietpotgietersrust, when thirty-six small mammals and eleven clutches of birds' eggs were taken; and finally a week was spent at Woodbush, when about a dozen more mammals and six birds were secured. Besides these collections, a few specimens were captured in the vicinity of Pretoria and a few were collected and donated by gentlemen interested in the study.

An expedition was also made by the director, Dr. Breyer, to the Maputa River in Portuguese South-east Africa, and then by the first assistant, Mr. C. J. Swierstra, to Northern Zululand, when, on both occasions, the taxidermist, Mr. Noome, was able to obtain and prepare for mounting a good set of specimens of large mammals, a separate list of which is given.

At some future date an account of the habits and distribution of most of the smaller species will be published.

The following is a systematic list of additions in mammals to the collection during the year:—

Galago moholi A. Smith.

1 ♂, Moorddrift, Waterberg District.

Epomophorus wahlbergi haldemani Hallowell.

1 old ♀, Barberton.

This specimen was found hanging to creepers in a gully in the town of Barberton; there seemed to be no others about, though I searched assiduously, as from my previous experience I had always found these fruit-bats congregated in parties in the trees. It is strange that this smaller race, which has not previously been recorded south of the Zambesi, should occur in the same region as the larger typical race; but I have no doubt as to its identification, the skull indicating the age of the specimen, while all the measurements are those of the smaller race. Both the typical and this smaller race are said to occur side by side in East Africa (see Andersen, "Megachiroptera," p. 525). Jameson [Ann.

Mag. N.H. (8), Vol. 4, p. 469] suggests that these bats are more or less migratory, which may account for their occurrence side by side in some places. The following are measurements of this specimen:—External measurements: head and body, taken in the flesh, 130 mm.: forearm, 78; pollex, total length, *c. u.*, 35, metacarpal 13·7, first phalanx 16·5; second digit, metacarpal, 40·5, first phalanx 7·8, second and third phalanx, *c. u.*, 10; third digit, metacarpal, 57·5, first phalanx 35·3, second phalanx 50; fourth digit, metacarpal, 55, first phalanx 28, second phalanx 28·5; fifth digit, metacarpal, 53, first phalanx 27, second phalanx 25. Skull: total length 44·5, mandible 35, C-M³ (crowns) 15·8, M¹ length 3·6, M¹ length 3·3, front of orbit to tip of nasals 16·5, width of brain case at zygomatic 16·3, zygomatic width 25·5, across crowns of M¹ 13·4, across crowns of canines 8·9, postorbital width 10·2, interorbital width 9·1, width mesopterygoid fossa 6·7, width between p¹, internally 7·8, width between cingula of canines 4·7, orbital diameter 10, coronoid height of mandible 15·5.

Elephantulus rupestris Jamesoni Chubb.

1 ♂ (without a tail), 2 ♀♀, Warmbath, Carolina District.
1 ♀, Gladdespruit, Carolina-Barberton road.

Nasilio brachyrhynchus A. Smith.

3 ♂♂, Zoutpan, Pretoria District.

These specimens are apparently typical; two are evidently young, the tail measuring 86 mm. as against 103 in the third, though the length of the head and body is the same in all three, namely about 100 mm.; the skull of the longer tailed specimen is broken, but is a little broader across the zygomatic arches than the other two.

Crocidura cinnamomea (Licht).

1 ♂, Gladdespruit, Carolina-Barberton road.

Crocidura mariquensis A. Smith.

1 ♂, and skull of larger ♀ with measurements, Moorddrift.

The skin agrees with Smith's short description of the species. Measurements of the two specimens are as follows:—

| | H. and B. | Tail. | Hd. ft. | Ear. | Skull, greatest length. | width. | Dental series. |
|---|-----------|-------|---------|------|-------------------------|--------|----------------|
| ♂ | 72 | 41 | 11·5 | 9 | 22·1 | 9·6 | 9·6 |
| ♀ | 96 | 43 | 13 | 9 | 22·9 | 10·3 | 9·9 |

The female had three inguinal pairs of mammae.

Crocidura silacea Thos.

1 ♀, Woodbush Village.

This specimen had only one, inguinal, pair of mammae.

Myosorex tenuis Thos. and Schw.

1 ♀, Sterkloop forest, Woodbush.

Graphiurus murinus tzaencensis Rbts.

1 ♂, Sterkloop forest, Woodbush.

By mistake the tail of this subspecies was described as having a white tip: the tip of the tail is white in the Waynek specimen, which should

apparently be referred to *G. nanus*; but in the type of *tzaneensis* the tip of the tail is the same colour as the rest; the end of the tail is missing in the cotype; the Woodbush specimen is identical with that of the type. The smaller teeth distinguish this form from the typical one.

Tatera lobengulæ bechuanæ Wr.

- 1 ♂, 1 ♀, ad., 1 ♂, 1 ♀, juv., Worcester Mine, Barberton District.
 2 ♂♂, 2 ♀♀, Zoutpan, Pretoria District.
 3 ♀♀, Moorddrift, Waterberg District.

Tatera Brantsi (A. Smith).

- 1 ♀, Vijgeboomsport, Waterberg District (G. van Dam).

Mus chrysophilus tzaneensis Jmsn.

- 1 ♂, 1 ♀, Woodbush Village.
 1 ♂, 1 ♀, 1 juv. ♂, Theespruit, Carolina District.
 1 ♀, Devils Knuckles, Barberton.
 1 ♂, 1 ♀, Worcester Mine, Barberton.
 1 ♀, Nelspruit Station, Barberton.
 3 ♀♀, Moorddrift, Waterberg.

Mus chrysophilus pretoriæ Rbts.

- 1 ♂, 2 ♀♀, Waterkloof, Pretoria (topo-typical specimens).
 1 ♂, Wonderboom, Pretoria.
 5 ♂♂, 1 ♀, ad. and old, 1 ♂, juv., Moorddrift, Waterberg.

In all the old specimens of *tzaneensis* the tail measures over 160, usually about 170 mm., whereas in equally old specimens of either sex of *pretoriæ* it seldom reaches 160, usually measuring 150 to 155 mm. These series of skins with skulls, together with those previously recorded (Ann. Tvl. Mus., Vol. IV, No. 2, p. 85), seem to indicate that *pretoriæ* is a distinct species characterized by having a shorter tail than *chrysophilus*. Specimens from Zoutpan and Moorddrift are brighter yellowish than the typical ones from the hills above Pretoria and should perhaps be referred to another race, especially if *pretoriæ* proves to be a distinct species.

The number of mammae is six, that is, one pair pectoral and two pairs inguinal; but the pectoral pair does not appear ever to be fully developed or brought into use.

Mus namaquensis Grahami subsp. nov.

Mr. Hewitt, curator of the Albany Museum, has sent me three specimens of this species for identification; they were collected by Master R. Graham at Godwin's Kloof, Grahamstown, and as they are referable to a remarkably long-tailed race, I am naming it after him in recognition of the assistance he has rendered the Albany Museum in collecting a number of interesting small mammals.

This subspecies is larger in all respects than any other form of the species previously described: in fact, it approaches *Mus chrysophilus* in this respect, though it is obvious from the narrowness of the skull and the teeth that it is a larger race of *M. namaquensis*. In colour it resembles a specimen we have of the typical form from Klipfontein. The measurements of the length of head and body and tail seem to have been wrongly taken, the former having been taken to the base of the scaled portion of the tail, and the latter thence to the tip without the hair;

for this difference I have made allowance and give in brackets what I take to be the correct measurements :—

| | Type ♂ ad. | ♂ ad. | ♂ ad. (younger). |
|-----------------------------|------------|------------|------------------|
| Head and body | 125 (118) | 130 (123) | 130 (124) |
| Tail | 175 (182) | 170 (177) | 160 (166) |
| Hind foot | 27 | 27 | 27 |
| Skull, greatest length ... | 33·2 | 33 | 31·8 |
| Basilar length | 25 | 24·8 | 24 |
| Zygomatic width | 15·5 | 15·2 | 15·2 |
| Molar series | 5·2 | 5 | 5 |
| Diastema | 8 | 8 | 8 |
| Bullæ | 5 | 5·1 | 4·9 |
| Interorbital constriction.. | 4·7 | 4·7 | 4·6 |
| Width Brain case | 14 | 14 | 13·5 |
| Nasals | 13·3 × 3·6 | 13·3 × 3·6 | 13·5 × 3·4 |

Colour: the whole of the upper surface of the head and body is clothed with long, fairly soft hair, measuring about 10 mm. in length, with which, especially on the back, are intermingled longer bristles measuring about 15 mm.; the general dorsal appearance is a mingled tawny-buff and black, the individual hairs being dark grey at the base, then tawny-buff and finally glossy blue-black at the tips. On the flanks the black hairs disappear, producing a more uniform buffish. The cheeks are more buffy than the forehead, and show only a sprinkling of blackish tipped hairs. The ears are dark coloured, sparingly covered with short buffish coloured hair. The legs are coloured like the flanks, and the feet pure white. The under surface is white, with a tinge of buffish in the type, with the base of the hair grey. The tail is buffish below, brown above, clothed with a fair sprinkling of correspondingly coloured hairs which become more numerous towards and at the tip.

The type is in the Albany Museum, and the other two specimens have been kindly presented to the Transvaal Museum.

Mus namaquensis monticularis Jmsn.

- 1 ♂, Waterkloof, Pretoria.
 1 ♂, 1 ♀, Warmbath, Carolina.
 1 ♂, Theespruit, Carolina.
 2 ♂♂, Worcester Mine, Barberton.

Mus namaquensis auricomys De Wint.

1 old ♀, with young one found clinging to it, Moorddrift, Waterberg.

The number of mammae is similar to that of *M. chrysophilus*, the pectoral pair being rudimentary.

Mus Moggi Rbts.

- 3 ♀♀, 1 ♂, Zoutpan, Pretoria.

In the original description the hind foot and ear are given as 18 and 20 mm. respectively; but with this new material, I think that a mistake was made in recording the measurements originally, and that the figures should be reversed. The species seem to be most closely allied to *Mus damarensis*, from which it differs in having smaller teeth. The following figures will give a better idea of the proportions of this rat than

those given in the original description, and will also serve for comparison with a larger form found farther north :—

| | Old ♀. | Ad. ♀. | Ad. ♂. |
|----------------------------------|------------|------------|------------|
| Head and body | 120 | 117 | 114 |
| Tail | 130 | 128 | 136 |
| Hind foot | 21 | 21 | 22 |
| Ear | 19 | 18 | 19 |
| Skull, greatest length | 31·8 | 30·5 | 30·8 |
| Basilar length | 26·1 | 24·6 | 24·8 |
| Zygomatic width | 16·2 | 15·1 | 14·7 |
| Molar series | 4·4 | 4·3 | 4·6 |
| Diastema | 8·5 | 7·7 | 7·5 |
| Interorbital constriction | 4·7 | 4·2 | 4·5 |
| Nasals... .. | 11·5 × 3·6 | 11·2 × 3·2 | 11·1 × 2·9 |
| Width Brain case | 12·8 | 12·9 | 12·7 |
| Bullæ | 6·8 | 6·6 | 6·3 |

Mus Moggi acaciae subsp. nov.

1 ♂, 3 ♀♀, 1 juv. ♂, Woodbush.

3 ♀♀, Moorddrift, Waterberg.

This subspecies differs from the typical one in being larger, though the size of the teeth remains the same. The following measurements will illustrate the difference in size :—

| | Type, old ♀. | Ad. ♂. | Younger ad. ♀. | Immature ♀. |
|-------------------------------|--------------|--------|----------------|-------------|
| Head and body | 139 | 138 | 132 | 109 |
| Tail... .. | 155 | 160 | 153 | 135 |
| Hind foot | 24 | 24 | 24 | 23 |
| Ear | 21 | 21 | 19 | 18 |
| Skull, greatest length | 34·4 | 32·7 | 31·5 | 29 |
| Basilar length | 28 | 25·9 | 25·5 | 23·2 |
| Zygomatic width | 16·6 | 17·7 | 16·4 | 14 |
| Molar series | 4·4 | 4·4 | 4·2 | 4·5 |

The first three of these specimens and a young one were taken from the same tree; the young one, although only half the size of the adults, is coloured exactly like them. In all these specimens from Woodbush there is a tinge of pink on the chest or forearms, apparently due to some staining matter in their food. In fully adult specimens the mammae are six in number, that is, one pair pectoral and two pairs inguinal.

Mus Breyeri spec. nov.

This species, unlike any other with which I am acquainted in South Africa, has only five pads on the hind feet; it much resembles the multimammate mice in general appearance, but is rather larger and has a broader skull.

Description:—Whole of the upper surface of head and body dull yellowish mixed with an equal proportion of blackish, the individual hairs being very dark slate grey at the base, then yellowish, and finally the tips glossy blackish. On the flanks and cheeks the black tipped hairs disappear, so that a lateral yellowish mark extends along them, separating the paler under surface from the darker upper surface of the head and body. The chin and anal areas are almost pure white, a patch across the lower throat yellowish like the flanks, and the rest of the under surface

whitish, the individual hairs being of a lighter grey at the base than those on the upper surface, and tipped with white. The feet are white. The tail is sparingly clothed with dark brown bristles above and white ones below; the rings are about 35 to the inch. The shorter matted hairs measure about 10 mm., and the longer bristles about 15; they are all soft in texture.

The type is an old male from Moorddrift, with the teeth much worn down, and gives the following measurements: "Head and body 130, tail 125, hind foot 25, ear 19·5": skull, greatest length 31·7, basilar length 26·5, zygomatic width 16·3, width brain case 12·4, interorbital constriction 4·2, molar series 4·7, diastema 8·8, bullæ 5, nasals 12·5 × 3·3.

Last year I trapped a similarly coloured mouse in some thorn scrub near Messina in the Northern Transvaal; but as I was unable to look at the trap for some days owing to my being busy in preparing a lion skin, the specimen was too much decomposed to skin when I found it. Noticing that it was of a species I had not previously met with, I measured the specimen as well as I could and kept the skull, which is still in the collection. It proves to be larger in all respects than the type from Moorddrift. I have no doubt that this species is one which is peculiar to the bushveld scrub and varies geographically like *Mus Moggi*.

I have named the species in honour of Dr. H. G. Breyer, to whom is due the facilities given me to carry out this all important field work.

Mus, spec.?

- 1 ad. ♀, Gladdespruit, Carolina. Mammæ 18.
1 old ♀, Devils Knuckles, Barberton. Mammæ 18.
1 old ♂, Barberton.

Mus, spec.?

- 4 ♂♂, Worcester Mine, Barberton.

Mus, spec.?

- 2 ♂♂, Worcester Mine, Barberton.

Mus, spec.?

- 1 ♂, 1 ♀, in spirits (both old), Onderstepoort, Pretoria (pres. G. A. H. Bedford).
1 ♂, 1 ♀, in spirits (both old), Rooiplaat, Pretoria (pres. Dr. H. G. Breyer).
Mammæ in both old ♀♀, 16 in number.

Mus, spec.?

- 1 ad. ♀, 2 older ♂♂, Moorddrift, Waterberg District.
1 ad. ♂, Zoutpan, Pretoria District.
Mammæ in an adult ♀ not preserved, 20 in number.

Mus, spec.?

- 1 old ♀, Woodbush Village. Mammæ 20.

All the above-mentioned specimens apparently belong to the multi-mammate group; but until I have more material, no good purpose would be served by naming them. Those from the same localities show very little variation amongst those of the same age.

Dasymys incomptus Sund.

- 1 ♂, Gladdespruit, Carolina.
2 old ♂♂, in spirits, Onderstepoort, Pretoria (pres. G. A. H. Bedford).

Saccostomus Streeteri Roberts.

2 ♂♂, 1 ♀, Moorddrift, Waterberg.

These specimens have the characteristics of the species in regard to colour, but are a little larger than the type series. The mammae are ten, three pairs pectoral and two pairs inguinal.

Georychus Jorisseni Jameson.

1 old ♂, 1 juv. (3 molars), Moorddrift, Waterberg.

Measurements of the old male are : Head and body 115, tail 14, hind foot 21 ; of the skull : Condylar-incisive length 34·2, occipito-nasal length 31·1, basilar length 27·5, zygomatic width 22·1, width brain-case behind squamosals 13·2, interorbital constriction 6·8, breadth premaxilla 5·7, nasals 12·5 × 3·6, molar series 5·1, diastema 10·8, breadth of incisors at entry into premaxilla 3·5, greatest diameter of bullae 7·5. The colour of both specimens is like that of the cotype. The old ♂ was trapped in burrows amongst some small aloes, fragments of the leaves of which were found in the burrows.

Georychus, spec.? (No. 207 in my first list).

2 ♀♀, Woodbush.

These specimens are precisely like those mentioned in my first list of mammals in the Transvaal Museum, from Pirie, Malvern, Hector Spruit and Tzaneen. The mammary formula is like that of *G. natalensis*, *arenarius* and *Jamesoni*.

Georychus arenarius Rbts.

1 old ♂, Krantzview, Carolina.

1 old ♀, 1 ad. and 1 juv. ♀♀, Warmbath, Carolina.

Georychus Jamesoni Rbts.

1 old ♀, Krantzview, Carolina.

This specimen was trapped in dry ground, whereas those of *G. arenarius* were trapped in moister sandy soil where the vegetation was different. It is somewhat smaller than typical specimens.

Lepus zuluensis Thos. and Schw.

1 ♀, Worcester Mine, Barberton.

1 ♀, Moorddrift, Waterberg.

Pronolagus Ruddi Thos. and Schw.

1 ♀, Barberton.

Pedetes caffer salinae Wr.

1 ♂, 1 ♀, 1 juv., Moorddrift, Waterberg.

The following are flat skins, prepared for mounting, of specimens collected by the Maputa River-Zululand expedition, some of which are already mounted and others in the course of preparation for the same purpose:—

Galago crassicaudatus E. Geoff.

1 ♂, Maputa River, Portuguese South-east Africa.

G. Garnetti, *G. zuluensis* and *G. agisymbanus* are apparently all referable to the same species and good grounds have not so far been

advanced for separating them even into geographical races (=subspecies); the species appear to have been founded on individuals of different age or sex, for which the proper allowance does not seem to have been made. *G. kirki* may however still prove to be a good subspecies of *crassicaudatus*.

Papio porcarius (Bodd.).

1 ♂, Ubombo District, N. Zululand.

Hyaena crocuta Erxl.

1 ♀, 1 ♂, Ubombo District, N. Zululand.

Felis pardus Linn.

2 ♀♀, Ubombo District, N. Zululand.

Elephas africanus Blum.

1 ♂, Maputa River, Portuguese South-east Africa.

Hippotigris Chapmani Wahlbergi Poc.

1 ♂, 1 ♀, Ubombo District.

Potamochoerus choeropotamus (Desm.).

1 ♂, Ubombo District.

Phacochoerus aethiopicus Linn.

2 ♂♂, Ubombo District.

1 ♀, Maputa River.

Connochaetes taurinus (Burch.).

2 ♂♂, 2 ♀♀, Ubombo District.

Cephalophus natalensis amacnus Wr.?

2 ♂♂, 1 ♀, Maputa River.

1 ♂, Ubombo District.

Cephalophus grimmi Linn.

3 ♂♂, 2 ♀♀, Maputa River.

Rhaphiceros campestris natalensis Rothsch.

1 ♀, Theespruit, Carolina District.

Rhaphiceros campestris capricornis Thos. and Schw.

1 ♂, 2 ♀♀, Maputa River.

Nesotragus Livingstonianus zuluensis Thos.

2 ♂♂, 1 ♀, Ubombo District.

Cobus ellipsiprymnus (Ogilby).

1 ♂, 1 ♀, Maputa River.

2 ♂♂, Ubombo District.

Redunca arundinum (Bodd.).

2 ♀♀, Maputa River.

Aepyceros melampus Leht.

2 ♂♂, 2 ♀♀, Maputa River.

2 ♂♂, 1 ♀, Ubombo River.

Tragelaphus sylvaticus (Sparrm.).

1 ♂, 1 ♀, Maputa River.

1 ♂, 1 ♀, Ubombo District.

Strepsiceros Angasi Ang.

1 ♂, 1 ♀, Maputa River.

1 ♂, 1 ♀, Ubombo District.

Strepsiceros strepsiceros Pall.

1 ♂, 1 ♀, Maputa River.

1 ♂, Ubombo District.

STEGOCEPHALIA OF SENEKAL, O.F.S.

By Dr. E. C. N. VAN HOEPEN, M.I.

(With nine plates and one text figure.)

THE remains, which are being described in the following pages, were discovered accidentally by some children in a quarry near Senekal, Orange Free State. The father of one of them heard of a stone which they had found and which contained black markings, quite resembling teeth. The next morning he searched the quarry and started excavations, with the result, that a large mass of fossil remains was found. These remains were eventually bought by this institution : a few parts had, however, previously found their way to the Museum of the University College at Johannesburg. While still at Senekal, I found that many parts of the fossils were missing. Several fragments were thereupon discovered among the debris of the quarry. A caudal vertebra was also seen in the solid rock, and this led to the excavation of a large part of the tail of one of the fossils. Many houses in Senekal having been built of stone from this quarry, it was not impossible that fragments of the fossils had been distributed all over the village. A search was therefore made at likely places and a good many fragments were actually found in contractor's debris near a store, which had been recently built. Some time afterwards a large skull, of which the skull top and front end were missing, was bought from a resident of Senekal. A few months ago the Bloemfontein Museum acquired a nearly complete fossil from the same quarry ; this belongs to the same species as our fossils.

The remains in our possession belong to three individuals of the same species. The skeletons are at touching distance from each other and fairly parallel. The vertebral column does not cover the median line of the ventral dermal ossifications, but is displaced to the right of this line in all three specimens. All the bones are still articulating. The position of some of the legs suggests that the animals had been doing their utmost to remain in their places. Most of the remains have been fitted together in two large masses. The smaller of these masses is the covering portion of the larger one. As we have only got fragmentary parts of the skulls, these could not be fitted to any of the skeletons. The skull fragment, which has been chiefly used in the preliminary description (2), belongs to the specimen to the left in the large mass. It was taken out of the matrix by its discoverer.

Myriodon senekalensis, v. HOEPEN.

- Myriodon senekalensis* ... E. C. N. VAN HOEPEN, Ann. Transvaal Mus., Vol. III, No. 2, pp. 102-106, Pl. I, II. Iss. 26th Oct., 1911.
- Rhinesuchus major* ... R. BROOM, Trans. Geol. Soc., South Africa, Vol. XIV, pp. 79-81, Pl. XIII, fig. 1, 2. Iss. April, 1912.

THE SKULL.

The following portions of the skull are present :

One skull of which the total roof is broken away and of which the front part with the outer nares and the quadrato-jugal portions are missing. A piece of the outer impression of the right hinder portion of this skull is also present. This fragment shows a portion of the border of the right orbital cavity. For convenience the fragments belonging to this skull will be called "skull No. 1" in the following pages.

Another skull is represented by two adjoining parts, which show the right orbit, the right auditory notch, and the foramen magnum. The roof-bones of this portion have become detached and now show their inner surface. This skull will be called "skull No. 2."

There is a large fragment of a right mandibular ramus, with parts of a right maxillary, palatine, and pterygoid. All these pieces belong together and were chiefly used in the preliminary description. It is not impossible that they belong to skull No. 2.

From these fragments the following has been established :

The skull has the shape of a trapezium with the corners rounded off. It is longer than broad and very flat. The quadrato-jugal portions projected further backwards than the condyles. There is a slight longitudinal depression right along the middle of the skull, reaching from the dermo-supraoccipitals to the premaxillaries. Immediately in front of each orbit the skull surface is heightened into a broad, low thickening. The orbits are situated at the front end of the hinder third part of the skull. The nostrils are far in front. As far as can be made out from remnants, the whole of the outer surface of the skull and the lower jaw was covered by pits and their dividing ridges.

The orbital cavities are somewhat longer than broad, and it seems that their circumference was not very regular.

The nostrils are smaller than the orbital cavities and just about as far apart as these.

Judging by the broken off matrix the skull had a fairly large parietal foramen.

In this general description of the skull I may mention the otic notches. A small part of the right otic notch is visible in the outer impression of skull No. 1. In skull No. 2 the otic notch is better preserved. From these specimens can be gathered, that the otic notch in the skull surface is long and narrow, and that its edges converge slightly towards the inner end. The otic notches converge strongly towards the front. The length of the notch is at least 65 mm. and its general breadth less than 10 mm. It is bordered on the inside by the tabular and supra-temporal and on the outside by the squamosum. The otic notch becomes broader from below upwards.

With regard to the composing bones of the skull roof little can be said. It has been a very difficult matter to follow up the defective impressions of would-be sutures, and some of them still remain doubtful. The following seems to me all that can be gathered from our specimens in this respect :

The frontals are very long and narrow, extending from the parietals far forward towards the nasals, between which they wedge in. Their length is about a third of that of the whole skull. The suture with the parietals could not be found.

The parietals together seem to be broader than long ; the posterior half is broader than the anterior.

The postfrontals separate the frontals from the orbits. They are very narrow in front where they are in touch with the prefrontals and they gradually broaden posteriorly. They terminate at about the middle of the hinder rim of the orbit against the postorbitals and their posterior end nearest to the parietals is in touch with the supratemporals.

The prefrontals are very large and broad. They form the whole front rim of the orbit. The position of the lacrymal could not be ascertained, but I take the lacrymal to be at the front and outer end of the prefrontal. The combined bones reach further forward than the frontals. At their anterior end they are separated from the anterior end of the frontals by a posterior process of the nasals.

The jugal is a large bone, which is very broad at the orbit. It forms the greater part of the outer side of the orbital rim. Its boundary with the maxillary could not be found. Posteriorly it is bordered by the postorbital and the quadrato-jugal; possibly also by the squamosum.

The postorbital is a relatively small bone, which forms the hinder and outer part of the orbital rim. Its transverse dimension is slightly greater than its longitudinal.

No sutures could be found between the squamosum and the quadrato-jugal. The tabular is a small triangular bone, which does not reach up to the anterior end of the otic notch. The dermosupraoccipitals are very broad bones.

The ossification centrum of the supratemporal lies at the inside of the anterior end of the otic notch. The sutures of this bone with the squamosum and the dermosupraoccipital could not be made out.

Excepting the prevomer portion and the hinder process of the pterygoids, the bones of the skull base are well preserved (Pl. XVIII, XXIV, fig. 8).

The basioccipital is not visible from below, its whole lower surface being covered by the basisphenoid. While trying to develop the occipital condyles of skull No. 1, the hinder right end of the basisphenoid broke away, thus showing another bone, separated from the basisphenoid by a sutural surface. This other bone is the basioccipital and can be followed to the left side of the basisphenoid all along its hinder end, beyond which it projects slightly. This specimen shows the basioccipital is very broad. In skull No. 2 the basioccipital and the basisphenoid have been broken longitudinally along their middle. The sutural surface between the two bones is clearly visible and the basioccipital is found to be a short and very thick bone. Its upper part terminates abruptly in front, but its lower part continues a short distance as a very thin, broad and flat process. The breadth of the bone in skull No. 1 is about 38 mm. and in skull No. 2 it is 28 mm. (here it has suffered from side compression). Its length in skull No. 2 is 31 mm.

The basisphenoid is a broad, flat bone. Its lower surface is slightly hollow. In skull No. 2, where the right side of the bone is well preserved, the surface is seen to be slightly raised at the inner end of the lateral posterior process (Pl. XXIV, fig. 3). The lower surface of the portion of the bone between these convexities, i.e. the middle part of the hinder end of the basisphenoid, is concave from side to side and convex longitudinally. In the middle behind, the bone forms a slight process, which reaches to the hinder end of the basioccipital. On either side behind, the basisphenoid forms a flat and broad horizontal process, which is directed towards the corresponding condyle. Between this process and a higher portion of the bone there is a transversely elongated cavity. Similar

processes occur in *Cacops* and *Trematops* and according to CASE (3, p. 132) they correspond with the hypapophyses of the *reptilian* basisphenoid. There is a groove on either side behind these processes. This groove bends upwards and forwards between the pterygoid and the corresponding condyle.

No suture has been found between the basisphenoid and the parasphenoid. The sutures between the basisphenoid and the pterygoids are clear.

The greater part of the lower surface of the basisphenoid is covered with minute teeth (Pl. XVIII.) Its hinder portion, however, is smooth and bare. The boundary between the smooth and teeth-covered surface has the shape of a hyperbole, with the apex near the middle of the lower surface of the bone.

The parasphenoid is long and slender, connecting the prevomer with the basisphenoid. Broad in front, it gradually narrows down to where it joins the rhinencephalic chamber. Thence it broadens towards the basisphenoid. Its lower surface is smooth, except at the junction with the basisphenoid. Here a tongue-shaped surface, connected with the teeth-covered surface of the basisphenoid, is also covered with minute teeth.

The pterygoid, from the articulation with the basisphenoid, sends out a transversely horizontal process, which soon bends forward to join the palatine. It also sends a horizontal process towards the quadrate. This process, from its point of origin, forms a thin, internally concave, upright plate, which is sutured connected with the edge of the bones forming the outer border and inner end of the otic notch. The upper front end of this plate is connected with the supratemporal.

Of the palatal surface of the pterygoids only that of the process towards the palatines is known. This is largely covered with numerous small teeth. The pterygoids of skull No. 1 show a bare strip of palatal surface directly behind the palatines. Only a short portion of the bone along the palatines is known. This is also covered with small teeth. Further forward only the outer border of the right pterygoidal vacuity has been developed. This border shows small teeth right up to the prevomer.

The palatines are long slender bones, which probably form the anterior borders of the infratemporal fossae. Their anterior ends are unknown. Near the middle of the lower surface there is a narrow, longitudinal ridge, which supports a series of large teeth. These teeth are clearly pleurodont, the ridge on which they stand projecting up to a third of their height along their outer side. The ridge starts near the hinder end of the palatine, but it is unknown how far it extends forward. The teeth on this ridge show the same dimensions as those on the maxillary and diminish in size backwards (figured in 2). On both sides of the ridge the palatine, for so far present, shows a smooth surface.

Only a small strip of the hinder border of the prevomers is present. Near or at the junction of prevomer and palatine there are small teeth. This is the only part of the lower surface of the prevomer preserved.

The occipital surface of the skull is badly preserved. In skull No. 1 only the outline of the foramen magnum is visible, which is triangular. The height of this triangle is 20 mm., and the length of its base 25 mm. The right occipital condyle is well preserved in skull No. 2 (Pl. XXIV, fig. 3). The articular surface is slightly concave from above downwards

and slightly convex from the inner side outwards. It is surrounded by a narrow ridge on the upper, outer, and lower sides. The whole surface looks slightly inwards. This condyle is separated from the basioccipital and the central hinder process of the basisphenoid by a deep notch, which terminates on the lower surface below the middle of the hinder lateral process; on the upper surface (in the brain cavity) it reaches nearly as far forward as the basioccipital. A portion of the left condyle is present, but very much distorted and pressed on to the left side of the upper surface of the basioccipital. The matrix between the condyle and that bone, however, shows that an identical notch existed also on this side. The medullary surfaces of the exoccipitals, or rather the upper surfaces of the condyles, show on each side two foramina, one behind the other.

There is a suture between the exoccipital and the basisphenoid just below the outer edge of the hinder lateral process of the last-mentioned bone. The exoccipital processes extend towards the tabularia, which they join at the under side. In the middle of this process there are markings, which convey the impression of once having belonged to a suture. The outer half of this process would then be the opisthoticum.

The occurrence of two foramina on the upper surface of the condyles is very remarkable. They occur just there, where one expects to find the passage for the vagus nerves. One of them must indeed have served this purpose. If the other is taken to be the exit of the hypoglossus the results of a recent study of v. HUENE'S are contradicted (4, p. 103). The same difficulty was encountered by SCHROEDER in his description of *Capitosaurus helgolandiae*. SCHROEDER draws the attention to some foramina on the outside of the condyle. One of these foramina, a small one, is situated above the rounded, hinder edge of the exoccipital; another, much larger one, just below this edge. In *Myriodon* there are two foramina in the same relative position as those just mentioned in *Capitosaurus*. The lower one is slightly larger than the upper one and is situated there, where one would look for the exit of the vagus group (Pl. XXIV, fig. 3). SCHROEDER assumes that the upper one might be the exit of the hypoglossus. The upper foramen in *Myriodon* is double, i.e. the foramen is really a depression, at the bottom of which there are two foramina. On the lower surface of the condyle in *Myriodon* there are two other foramina. The one is very small and situated at the lower end of the base of the exoccipital process, in front and slightly to the inside of the foramen for the vagus group. This foramen apparently corresponds with the small one which SCHROEDER found in the same position in *Capitosaurus* (6, p. 254). The other is larger and situated near the lower inner border of the condyle. What the relation of all these outer foramina is to the two inner ones could not be established with certainty. Our material is too scanty (there is only one perfect condyle and just a fragment of another present) to go further into the question. The notches which separate the condyles from the basioccipital and basisphenoid seem to correspond to the opening in the floor of the foramen magnum in *Capitosaurus helgolandiae*, and must as this have been filled with cartilage.

In both skulls a large epipterygoid is seen to be present. It is a broad flat bone behind, resting against the outer front end of the upward process of the pterygoid. It nearly reaches the skull roof in this region. The lower border of this bone is in touch with the pterygoid up to about half its length forward. The upper border is strongly concave, thus leaving a large opening between the skull roof and this bone. The front

end of the bone is thicker and narrower and bends strongly upwards to unite with the corresponding parietal.

Only a small portion of the brain case could be laid bare. All that is known about the hinder end of the brain case is mentioned in the discussion of the exoccipitals. In skull No. 1 a portion of the front end of the brain case is exposed to view. The wall of the brain case in this part is very thick and the inner surface seems to be rough. It is sometimes difficult to make out whether a certain portion is matrix or bone. The top of the brain case is covered by a very thin plate of bone extending from a little distance in front of the parietal foramen to the extreme front end of the brain case. This is situated in front of a line connecting the middle of the orbits. In the front end of this thin plate there is a deep notch. The plate seems to be a portion of the bone forming the walls of the brain case. Its upper surface is smooth and it was apparently separated from the portion of the parietal in the skull roof immediately above it by a very thin layer of matrix.*

The lower jaw is represented by three fragments, which, fitted together, form about two-thirds of the right ramus (Pl. XIX, fig. 1).

The dentary is a long slender bone. At the front end, where the ramus is broken off, the angular still surpasses it in height. Towards the back its height diminishes. Its hinder end is broken away, but from impressions of the bones on the matrix in this region may be gathered that the dentary was in touch with the surangular. It could not be made out whether any overlapping took place. The outside of the dentary forms a high ridge along the outer side of the teeth. The outer surface of the dentary is covered with coarse, longitudinal striae behind; more forward these striae become shorter and thicker.

The angular forms the greater portion of the outer surface of the ramus. The bone is highest in the vicinity of its thickened ossification centrum, which lies near its hinder end. The outer surface of the hinder part of the bone is covered with thick ridges, which radiate from the ossification centrum. The outer surface of the front part is unknown. From the front backwards the angular becomes gradually higher, until it meets the surangular. From this point it quickly subsides to end perhaps in the vicinity of the articular. How far it really goes cannot be ascertained, because the hinder part of the ramus is still intact and as usual the rough bones do not show sutures. The angular only shows a small surface at the ossification centrum on the inside of the ramus. This surface lies at the hinder end of an infra-Meckelian vacuity. In front of this vacuity another small surface of the angular is visible.

The surangular forms the hinder half of the upper border of the supra-Meckelian vacuity. The bone is relatively thin and bent in an S shape, its upper part being convex inwards and its lower part convex outwards. The upper part of its outer surface is smooth; this portion was apparently covered, in a closed mouth, by the quadrato-jugal. The lower part of the outer surface is covered by deep pits and ridges. The sutures with the angular and the articular could not be made out.

* The bone which surrounds the front end of the brain case could only be identified with the "rhinencephalic chamber" of American *Stegocephali*. In our specimen it was impossible to find its limits. In a recent comparative study ("On the Skull of a Pariasaurian Reptile, and on the Relationship of that Type," P.Z.S. 1914, Pt. 1, p. 155) WATSON, however, succeeded in identifying this bone with the sphenethmoid of the frog. This valuable work only reached us a few weeks ago, after the MS. of this paper had been sent to the printer, and therefore no full use could be made of it.

The articular is broad behind. It apparently fits into a hollow of the quadrate. Nothing can be said of the articulation surface as the quadrate is still in position on the articular. The quadrate passes a short distance down along the outside of the articular.

The connection between the prearticular and the articular is not quite clear, because this region is somewhat crushed. Apparently these bones meet on the inside of the articulation surface. From there forwards the prearticular rapidly becomes a very high bone, reaching its highest point behind the middle between the ossification centrum of the angular and the hinder end of the mandible. The upper edge of the hinder part of the bone, up to its highest point is covered by a bone of the skull roof, apparently the quadrate. From its highest point forwards the bone very rapidly decreases in height and becomes narrowest above the ossification centrum of the angular. Further forwards it becomes higher again until the front end of the infra-Meckelian vacuity is reached, whence it gradually diminishes forwards. The hinder portion of the bone up to its highest point looks inwards and downwards and the portion in front of its highest point inwards and upwards. The whole of the inner surface of the bone is covered with striae, which seem to radiate from a point somewhere below its highest elevation.

There is no indication of an opercular in the parts preserved. If present it was situated further forwards.

The complementary is a very long, slender bone. Unfortunately both ends are missing. It may have been in touch with the surangular, the hinder end of the preserved portion of the complementary, which is situated a little in front of the junction of the dentary and the surangular lies on the upper edge of the dentary. Forwards it passes directly downwards on the inside of the upper edge of the dentary. Opposite the last tooth in the dentary it is already lower than this edge. Further forwards, continuing along the inside of the dentary, its position becomes gradually lower. It is apparently wedged in between the dentary and the prearticular. The upper inner surface of this bone, from a short distance in front of the hinder tooth of the dentary up to its front end as far as preserved, is covered with numerous minute teeth. As far as I am aware, this is the first time that these teeth are regarded to be on the complementary. In the preliminary description of these fossils this bone could not be identified with certainty and the prearticular was then regarded to be the splenial. A comparison, however, with the recently described lower jaw of *Lystrosaurus* (?) led me to the above identification of the bones.

The supra-Meckelian vacuity is very long and broad. It reaches from below the last tooth on the dentary probably up to the articular. Its front end looks inwards and its hinder end upwards. The inner border behind and the lower border in front is formed by the prearticular. Its upper border in front is formed by the complementary and its outer border behind by the surangular. Perhaps a hinder border is formed by the articular.

The infra-Meckelian vacuity is much smaller. Its hinder end lies a little further back than the front end of the supra-Meckelian vacuity. It is very long and narrow and bordered by the angular below and the prearticular above.

While developing skull No. 1 some remains of the hyo-branchial skeleton were found. These consist of a large row of small bones, which are nearly in a straight line and another smaller row of bones which form a bent line. The straight row consists of ten elements; in the bent row there are four. If the ten elements of the straight row are numbered from one end, we get Nos. 1-4 in a continuous line; No. 5 lies parallel against No. 3; No. 6 lies parallel against No. 4; Nos. 5-10 also form a continuous line, parallel to that of Nos. 1-4. Nos. 1 and 2 are of about equal size and larger than the others; these are also of about equal size. The two first elements bear a series of tooth-like processes on one edge. These teeth are very long, slender, sharp-pointed cones. As they have been noticed on some of the other elements it is probable that they occurred on all. I must mention here that most of the elements are broken and some of them are only represented by their impression on the matrix. Also, in the course of development, other elements of the same kind have been met in isolated positions in the matrix, and owing to their very delicate nature, were unfortunately destroyed. The length of elements 1 and 2 was about 17 mm., their height about 4 mm. and their thickness may have been 2 mm.

The other elements have a length of 13 mm. and less. The length of the teeth is less than 3 mm.

It is impossible to say which arches are represented. It is not improbable, however, that there are both hyoidean and branchial arches. In the first place there seem to be three distinct series of elements, which could be taken as the remains of three arches. Secondly, the number of elements is sufficient for three arches. Whether these branchial arches bore gills only during the earlier lifetime of *Myriodon* is a question which cannot be answered from the present material.

THE TEETH (Pl. XVIII). There is a row of large teeth on each maxillary, palatine and dentary. These teeth diminish in height backwards. Further, the palatal surface of the pterygoids and partly also of the basisphenoid is covered with multitudes of small teeth. Similar small teeth occur near the junction of the palatine with the prevomer and are probably situated on the latter. The upper and inner surface of the complementary also bears small teeth. Somewhere near the junction of the palatine and the prevomer there is a large tooth, visible on either side. On the right the tooth itself is still preserved, on the left there is only an impression in the matrix. The exact position of this tooth is not clear, but it seems that it is situated at the front end of the row of teeth on the palatine and directly behind the hinder end of the choana. In front and to the inside of this large tooth there are some smaller ones, which have about the size of the lesser ones on the palatines. The rows of teeth on the maxillary, palatine, and dentary are pleurodont.

The teeth on the dentary are best displayed on the fragmentary right ramus of the mandible already mentioned above (Pl. XIX, fig 1). Parts of the mandible and of the maxillaries of skull No. 1 have been preserved, but the rows of teeth are in a very poor condition. On the portion of the right ramus of the mandible there are 29 large teeth, which project beyond the outer edge of the dentary. These teeth are sharp-pointed and conical and direct their top inwards and backwards. A transverse section has the shape of a laterally compressed oval. The long axis of this oval makes an acute angle with the hinder end of the dentary in most teeth.

Also the longitudinal axis of most teeth is slightly inclined backwards. It could not be ascertained whether this double oblique condition is original.

The second tooth from the front end of our fragment has a length of 24,5 mm. measured along the middle of the flat side. The thirteenth tooth from the hinder end has still a length of 16,5 mm. while the last tooth on the dentary cannot have been longer than 7 or 8 mm. (only the lower half of this tooth is preserved). The mutual distance of the teeth is not the same. Mostly they stand so closely to each other that there is not sufficient room left for another tooth. This is the normal condition. Sometimes, however, they are further apart. This is the case with the three first teeth on our fragment. The space between these teeth has been partly cleared of matrix. In each space was found a small tooth, lying against the inner side of the high outer ridge of the dentary and not projecting above it. The base of these teeth is very thin and broke away during development; it is situated much higher than the base of the large teeth. The length of the small teeth was about 12 mm. Their shape was not quite clear, but is probably the same as that of the new dentition on the palatine.

The extreme end of each tooth is smooth. Below this the surface is covered with very fine ridges, running parallel with the tooth-axis. The lower two-thirds of the tooth-surface is covered with deep grooves also parallel to the tooth-axis. These grooves apparently indicate a labyrinthodont structure of the teeth. The pulp-cavity is filled with calcite. The upper end of this calcite cone is smooth, but further downwards its surface is covered with grooves, parallel to its axis. These grooves owe their existence to the penetration of plications of the outer tooth-substance into the pulp-cavity. The labyrinthodont structure hereby becomes a certainty.

The corresponding teeth on the maxillary are smaller than those on the dentary. There are 31 teeth projecting beyond the outer edge of the preserved part of the maxillary mentioned in the preliminary description. Their mutual distance is also irregular; they mostly stand closely against each other, but sometimes they are separated by a distance of more than the thickness of a tooth. The position of the preserved maxillary teeth is variable. Mostly the long axis of the oval-shaped section stands perpendicular on the line of teeth but sometimes it makes an acute angle with the front end and sometimes with the hinder end of this line. The largest preserved maxillary tooth has a length of 14,7 mm. and the smallest of 5,1 mm. The structure of the maxillary teeth is the same as that of the dentary teeth.

The row of teeth on the palatine is parallel to that on the maxillary. The twentieth tooth from behind has a length of 14,5 mm.; the fifteenth, the tenth, and the eighth, and the first from behind have respectively a length of 11 mm., 10,4 mm., 9,4 mm., and slightly more than 7 mm. This row of teeth starts at about 2,5 cm. from the hinder border of the palatine; the ridge on which they stand starts somewhat earlier. The first tooth from behind corresponds in position with the ninth or tenth tooth from behind on the maxillary. Some small teeth of peculiar shape have been found on the inside of some of the palatine teeth. These teeth are not oval shaped as the ordinary palatine teeth or round as the small teeth on the pterygoid, but they are flattened and show a sharp edge in front and

behind. They apparently represent a new dentition and are ready to take the place of the adjoining large tooth.

The large tooth near the hinder end of the choana has also a labyrinthodont structure.

The small teeth on the complementary, the prevomer, the pterygoid, and the basisphenoid are all of the same kind. They have a sharp-pointed conical shape and in horizontal section they are circular. On the pterygoid their size seems to vary with the place of occurrence, but this does not seem to be the case on the basisphenoid or the complementary. The largest teeth visible on the pterygoid occur near the outer border of the pterygoidal vacuities and near the front end of the infra-temporal fossa. Between these patches of larger teeth there are numerous smaller ones, which continue backwards and also cover the basisphenoid. Excepting the extreme border of the pterygoidal vacuities, the teeth on the front end of the pterygoids are unknown. Those near the junction of the palatine and the prevomer are of the larger type. The zone of larger teeth on the pterygoid shown in fig. 1 of the preliminary description is not so strongly marked as may be inferred from the drawing.

The structure of these small teeth bears a labyrinthodont character. The extreme end of the tooth is smooth; below this the outer surface is covered with very fine ridges, parallel to the axis of the tooth; the lower half of the outer surface is covered with grooves parallel to the tooth-axis. The pulp-cavity of these small teeth is also filled with calcite. The calcite cone is much shorter than the tooth. When the tooth has broken off very near to its base, plications of the surrounding tooth-substance are seen to enter the calcite cone. These plications, however, do not penetrate very far into the calcite.

There still remains to be described a very remarkable feature of the skull of *Myriodon*. Both skulls show a mosaic of small, irregular, and flat ossifications in the pterygoidal vacuities. This mosaic forms a tolerably flat layer, which however, is not situated in the plane of the pterygoidal edges. At its hinder end its position is higher than the lower surface of the pterygoids immediately on the outer side of the sutures with the basisphenoid. This is due to the fact that the pterygoids, in passing outwards from the suture with the basisphenoid, bend slightly downwards until they reach the middle of the hinder end of the pterygoidal vacuities. From this point they turn slightly upwards. The middle of the hinder end of the flat layer of ossifications passes below the hinder end of the parasphenoid and is therefore lower than the palatal surface of the basisphenoid. The sides and front end of the layer of ossifications are situated much lower than the inner borders of the pterygoids and the hinder borders of the prevomers. The distance from the lower surface of the parasphenoid in front to the upper surface of the bony layer is 12 mm. The distance from the hinder border of the right prevomer to the same surface of the ossifications is 9 mm.

The hinder border of the layer of ossifications is notched. The notch is very broad and short. Through this notch the hinder end of the layer consists of two processes, which project into the hinder ends of the pterygoidal vacuities. There is still some distance between the hinder border of the layer and the front edge of the pterygoids. The right side of the layer is clearly visible. It lies at a uniform distance of about one centimetre from the concave inner border of the pterygoid and prevomer,

i.e. the right border of the layer is parallel with the inwardly concave outer border of the pterygoidal vacuity. The left side has been pressed against the left pterygoid, the different elements have thereby become disconnected and scattered through the matrix. Some of them have suffered a vertical displacement of 15 mm. The front border is rather fragmentary, but still it can be seen that the front end narrows down considerably; it fully conveys the impression that it terminates at the front end of the pterygoidal vacuities.

Most of the elements of the layer are small, polygonal, thin bones. Near the front end of the parasphenoid, however, there are some bones which are from three to four times the ordinary size. These have suffered some displacement.

The great majority of these bones have their lower surface covered with small teeth of about the same size as those on the pterygoids. Teeth were not found on those bones in the hinder processes, which were near the extremities of these parts and open to observation. These teeth present the same general appearance as those on the pterygoids. They are mostly broken off and then generally show a pulp-cavity, which with the great majority is not filled with calcite. Probably all these teeth were once filled with calcite, which subsequently became dissolved. A few teeth have been found, however, which still possessed a calcite filling. The outer surface of the teeth shows in some cases a series of fine striæ near the top; mostly, however, these could not be discerned. The great majority of sections of the teeth do not show any plications whatever of the outer tooth substance. The same applies to the small teeth on the pterygoids, where only a portion of those with calcite filling show this structure. Some of the teeth with calcite filling on the small bones also show very plainly plications of the outer tooth substance. These small teeth may therefore be regarded to have the same structure as those on the pterygoids.

The original position of this layer of bones cannot be made out with certainty. Its present position seems to suggest that it originated in the epidermis of the pterygoidal vacuities. It is, however, not impossible that this layer has been pressed into its present position during the process of fossilization and therefore that it may have originated in the epidermis of the ventral surface of the lower jaw. In the last case there would be no apparent functional difference between these ossifications and the dermal skeleton of other parts of the body. The latter, however, are plain dermal scales, while the former are for the great majority covered with teeth. These teeth do not possess the simple structure which may be expected in protective organs of the epidermis, but they show identically the same differentiation as the teeth in the oral cavity. The latter, however, have acquired the present structure through functional adaptation. This again supports the probability that the teeth and ossifications in the pterygoidal vacuities originated for the performance of the same functions as the other teeth in the oral cavity. As far as I am aware small polygonal ossifications in this position have only been found once before in *Stegoccephalia*. This is in *Micropholis Stowi* HUXLEY; they were originally described as dermal scutes and recently WATSON has again described them as such. I am not in a position to state, however, whether the ossifications in *Micropholis* are of the same kind as in *Myriodon* or not. To conclude, I may contrast the arguments for and against the above-mentioned views in a table.

For the original position between the pterygoids :

1. The present position of the layer.
2. The presence of the teeth.
3. The layer apparently does not occupy a greater surface than the pterygoidal vacuities, i.e. no elements of the layer have been found on the pterygoids or the basisphenoid.
4. The right side of the layer is parallel to the concave inner side of the right pterygoid and prevomer.
5. The elements do not occur in rows, which is usual in dermal armour.
6. The probability that the layer formed part of the palatal surface is strengthened by the fact that the hyo-branchial skeleton, the dentary, the complementary and all the bones of the skull-base and palate, except the parasphenoid, were covered with teeth.
7. That the parasphenoid is not covered with teeth may be explained by the presence of the layer of ossifications, which passed over its lower surface.

For dermal armour :

1. Dermal armour is already known between the rami of the jaw, but teeth without real skeletal support have never yet been found in the *Stegocephalia*, although they are known in *Teleostei* and in *Selachii*.
2. The left side of the layer is very irregular and elements occur far below the general surface of the ossifications. If the layer was pressed into its present position, these were left behind through meeting greater resistance.

THE VERTEBRAL COLUMN.

The vertebrae are typically temnospondylous and of the rhachitomous type. The exact number of presacral vertebrae could not be ascertained in our specimens. Twenty-six were counted, but there is still room for at least a few more between the last lumbar and the sacral vertebra; also the connection between the last cervical vertebra and the skull is missing, so that the total number of presacral vertebrae will at least be thirty.

The hypocentrum is a latero-symmetrical bone of horse-shoe shape, resembling very much the same element figured of *Actinodon* and *Trimerorhachis*. Seen from the side, its hinder border is more slanting than the front one. Its inner surface is rough, and has probably been covered by cartilage. The outer surface of the hypocentrum is not so prominently keeled as that of *Trimerorhachis*. Many of the hypocentra, especially those near the pelvis (Pl. XVII and XIX, fig. 2), show a series of longitudinal ridges of which generally one on either side of the middle line are more conspicuous. There is also a middle ridge, which at most attains the height of the lateral ones. These ridges are separated by narrow grooves of the same breadth as the ridges. In some hypocentra it could be shown that the surface in the grooves, as in *Trimerorhachis*, shows a more conspicuous net-like structure than on the ridges. Whereas

the three ridges on the hypocentrum of *Trimerorhachis* occupy practically the whole of its lower surface, excepting the sides, they only occupy its central half in *Myriodon*. Both ends of the hypocentrum project slightly below its outer surface. The sides of the hypocentrum rise upwards, terminating in a point. The outer surface of these parts is concave and their hinder border shows a concavity, which has most probably served as articulation surface for the rib.

For so far present the presacral vertebrae have all got pleurocentra, one on each side. These elements are bent, so as to partly envelope the chorda. Their outer surface is hollow and shining and covered with a coarse net-like structure. The other surfaces are rough and were probably covered by cartilage. Most of the pleurocentra are out of their original position and have suffered through fossilization. Only a few are still near their natural position and have retained a normal shape. From these it is seen that their hinder border is slightly convex, whilst the front border is formed by two sides meeting at a very obtuse angle at the middle. The upper side stands convexly outwards, while the lower is concave outwards at its upper end. It could not be made out whether the rib articulated with the upper front part of this bone. The transverse dimension of the pleurocentra is greater than the longitudinal.

The neural arch consists of a coalesced bone with a neural spine. *The coalescing has taken place above the neural canal, but not below.* Between the neural canal and the chorda the sides of the neural arch just meet, but they do not coalesce. In the centre of this "suture" there is a round opening, uniting the neural canal with the chorda. The sides of the neural arch, enclosing the neural canal, first form two parallel, perpendicular walls and then suddenly expand into a broad flat basis. The lower surface of this basis is rough, indicating that it was covered with cartilage. The neural canal is very narrow, having a diameter of about 1 mm. The neural spine hangs slightly backwards out of the perpendicular. It is a broad, flattish bone, broader at the top than at its base and with a longitudinal ridge along its middle on either side. The condition at the lower end of this ridge is not quite clear. In some instances it seems to flatten down to the common surface of the spine, in others it seems to split into two ridges directed towards the zygapophyses. The free end of the spine is thicker than the rest and ends with a flat and smooth surface. The lower anterior zygapophyses project outwards without seeming to deviate from the horizontal. They meet the lower and outer side of the higher posterior zygapophyses of the foregoing vertebra. The anterior zygapophyses are larger than the posterior ones.

The dorsal vertebrae have developed strong diapophyses (shown clearly in three vertebrae of Pl. XVII), which diminish in length towards the sacrum where they cannot be identified from the basal plate of the neural arch. The articulation surface of these diapophyses lies all along their front and outer margins.

The single sacral vertebra (Pl. XVII and XIX, fig. 2) differs slightly from the adjoining ones. The articulation surface of the hypocentrum for the rib is larger than in the others and the base of the neural arch forms strong diapophyses.

The exact number of caudal vertebrae cannot be ascertained either. There is one caudal piece (Pl. XX) with 28 vertebrae, but the end is missing, and this can easily have had another ten. The proximal end of this piece is not in connection with the sacral vertebra and its first vertebra has distally completely coalesced chevron bones. In another

piece of the same specimen a small portion of the tail, adjoining the sacral vertebra, is preserved (Pl. XVII). This shows four caudals without chevron bones. Another specimen (Pl. XIX, fig. 2) shows a good many caudals, seven of which do not have chevron bones. The seventh, however, has already got two knoblike processes, which further backwards develop into chevrons. Whether the eighth had distally coalesced chevrons cannot be definitely made out, as they are broken off near the hypocentrum. In the ninth, tenth and eleventh vertebra they are also broken off, but their base is so well developed that I presume they were distally united. Their base also reaches from the front to the hinder border, therefore over the whole length of the hypocentrum; this is not the case in the seventh and eighth vertebra. In the seventh the knoblike processes are situated near the hinder border of the hypocentrum, and in the eighth the base of the processes only nearly reaches its front border. Probably, therefore, the eighth caudal did not have distally coalesced chevrons. The tail of *Myriodon* did then have at least thirty-six caudal vertebrae, and may have had forty-six.

The longitudinal ridges on the lower surface of the first six hypocentra are better developed than in the presacrals; otherwise they show no marked differences. The angle of the chevron bones as also of the neural spines becomes less towards the end of the tail. Pleurocentra are still present in the thirteenth caudal of the large piece and up to the ninth in the other. In this specimen (Pl. XIX, fig. 2) the left pleurocentra of the eighth and ninth consist of two small elements instead of one. There is only one large right pleurocentrum in the eighth while that of the ninth is missing.

The neural spines of the caudal vertebrae are each thicker in front than behind. Proximally they are, like those of the presacrals, narrower at the base, but further distally they acquire a more uniform breadth. As the chevron bones, the spines grow gradually smaller towards the end. The anterior and posterior zygapophyses are still normal and in touch with each other in the 26th caudal. Further towards the end they do not reach each other any more. The two bony elements of each vertebra in this region are far apart from each other and from those of the next vertebra, the whole indicating the presence of a great amount of cartilage.

RIBS.

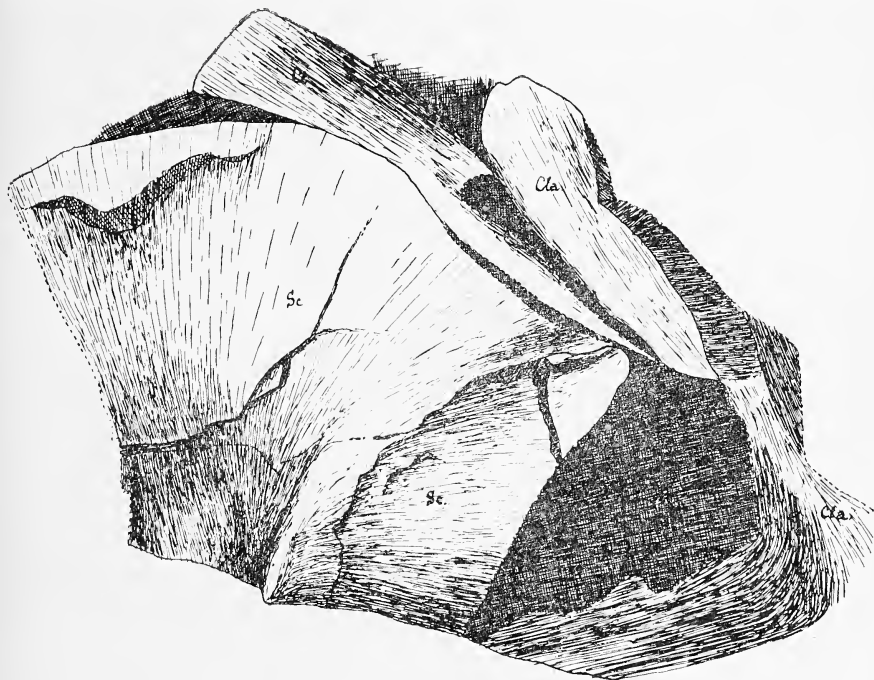
All the presacrals, as far as present, have ribs. They are present on the caudals up to the ninth vertebra. They are all single-headed, that is to say, although there is really only one proximal end, two articulation facets can easily be distinguished. These facets make an obtuse angle with each other, their adjoining border protruding slightly from the bone. The tubercular portion is thick and rounded, while the capitular portion is flatter and thinner. The lower surface of the rib between the tubercular and capitular portions is strongly concave. The shape of the ribs has been greatly changed through fossilization. From some it can be seen that they were bent, thin in the middle, and that their distal ends were broad and flat. There are indications that the more forward ribs produced a processus uncinatus from the proximal part of this flat portion.

The single sacral rib is large, and its head, though much stronger, is formed in exactly the same way as the other ribs. The two large facets are still in contact with the diapophysis and the large articulation surface of the hypocentrum on either side. The rib is slightly constricted near

its middle and its distal end is flattened. This flat portion shows an articulation surface over the whole of its lower (or hinder?) surface. This articulation surface looks mostly backwards and outwards and slightly downwards. It is not flat or smooth but bordered by ridges and covered with tuberosities. Near the upper ridge there is a fairly deep parallel groove. It seems that there must have been some cartilage between this surface and the corresponding one of the ilium.

THE SHOULDER GIRDLE.

The episternum is only represented in one specimen (Pl. XVI and XXI). Its front edge is broken off and also its right side, but this has left an impression. The left front side is also damaged. The outer surface of the bone is covered with ridges and dividing furrows, radiating from the centre. If the sides of the bone were straight it would be of rhomboid shape. The hinder angle of this rhomboid, however, is cut off and a short straight line substituted for it. The two hinder sides are slightly concave



Myriodon senekalensis. The relation of scapula, cleithrum, and clavicle.
Sc. = scapula; Cl. = cleithrum; Cla. = clavicle. $\times 0,68$

and as far as could be made out the front sides are convex. The dorsal surface is flat and shows a broad flat ridge running transversely over the middle of the bone. Another broad and flat ridge starts at the end and vanishes towards the middle. The bone seems to be broader than long.

The clavicle overlaps the episternum to a considerable extent. The lower end of the clavicles is flat and very broad medially, ending here in a fairly straight line. Towards the upper part they narrow down briskly with probably straight sides to about a fourth of its greatest breadth, thus forming a triangle. The outer surface of this triangular portion is also

covered with ridges, radiating from the narrow end; the inner surface is smooth but not flat. The relation of this part to the scapula is not quite clear, although it seems to touch the front edge of the scapula. There may have been an opening between the anterior superior angle of the scapula and the bend of the clavicle. The upper portion of the bone, which is preserved in one specimen only, forms an angle of some 130 degrees with the lower portion. It is long and slender, much broader than thick and about as long as the triangular portion. The outer surface of this part is smooth. There is only one specimen showing the relation of clavicle, cleithrum, and scapula. This shows the clavicle and scapula separated by the cleithrum. It seems to me that this is the natural relation of these bones. According to CASE (3) the same relation occurs for example in *Dissorophus* (p. 118), but it seems to be different in *Eryops* (p. 100).

The cleithrum is a long slender bone, which covers nearly the whole top of the scapula but is not suturally united with it. The anterior end of this bone lies slightly in front of the superior anterior angle of the scapula. There it lies against the hinder part of the outer surface of the cleithral end of the clavicle. Higher up the cleithrum bends behind this bone. Clavicle and cleithrum are not suturally united.

The scapula-coracoid is a large bone with no indication of a suture between the composing parts. The upper part is broad and thin and slightly bent inwards. The inner surface of this portion is transversely convex, while its outer may have been correspondingly concave. Its upper border is convex behind and slightly concave in front. As these properties are only concluded from impressions, nothing can be said of this border with regard to cartilage. If this has been present it can only have been a small quantity, as the cleithrum fits nicely into the slight concavity and over part of the convex border. The anterior border is thin, and still represented by small fragments. The posterior border is thick and its lower part is still present together with the whole lower portion of the bone in a left scapula-coracoid.

The posterior border divides in its lower half to include the supraglenoid fossa (Pl. XXIV, fig. 2). The outer portion of this border does not extend so far backwards as the inner; it is much thinner than this and continuing downwards, curves backwards to terminate at the upper and outer end of the glenoid facet. The inner and much thicker portion of the hinder border makes a much stronger curve downwards, inwards, and backwards, towards the inner end of the glenoid facet. This facet is very long and comparatively narrow, mostly so beneath the lower end of the supraglenoid fossa. The position of the facet is from outward to inward and backward looking slightly downward. Its edges project from the general surface, thereby denoting that the facet has been covered by cartilage. The connection between the humerus and the scapula-coracoid was through the medium of cartilage, as the proximal end of the humerus is built on the same principle. The outer end of the glenoid facet marks two different portions of the bone in as much as the upper part is bent along a line running from this end horizontally forward. These portions enclose an angle of about 90 degrees. The lower portion is thin, long, and moderately broad (Pl. XXIV, fig. 1). Its inner border is elliptical, while its hinder-outer border is only slightly convex and curves concavely into the lower margin of the glenoid facet where this is narrowest. The extreme front of the part where the two portions meet is lost. The lower portion contains two foramina: the one is situated near the outer

edge, in front of the glenoid facet and slightly nearer to the hinder margin than to the front; the other is situated near the middle line of the flat portion and opposite the termination of the hinder-outer border on the lower margin of the glenoid facet. The first mentioned is the supracoracoid foramen, the last is the glenoid foramen. The glenoid foramen pierces the bone upwards and opens on the inner surface behind the lower end of the subscapular fossa. The supracoracoid foramen opens on the outer surface to continue for a short distance as a slight impression on the flat lower portion of the bone. It pierces through to the other side in a direction parallel with this flat portion outwards and slightly forwards and opening on the inside in the lower end of the subscapular fossa. This fossa extends in the same direction upwards. It is also nearly parallel with the corresponding front border of the bone. At its upper end it broadens to receive the inner opening of the supraglenoid foramen, which pierces the bone from the upper end of the margin of the outer supraglenoid foramen in a backwards-forwards direction. The supracoracoid foramen is larger than the glenoid foramen and the supraglenoid foramen is the largest of all.

THE FORE-LIMBS.

There are three fairly complete fore-limbs, two right ones and a left one and fragments of another left one (Pl. XVI and XXI).

The humerus. There is one humerus of which only a distal portion is broken off. Another is only represented by its distal portion and the impression of the proximal end. The other two are badly broken. From these bad specimens one would conclude that the two ends of the bone make an angle with each other as in *Eryops* for example; but the better specimens show that the ends expanded in the same plane. This of course would be a peculiar difference from the other large *Temnospondyls* as *Actinodon*, *Eryops*, *Cacops*, etc. I am, however, not quite sure of this position although it seems very probable.

The indifferent position of the humerus in life must have been from the glenoid facet slightly downwards and backwards. The articular face on the proximal end forms a large cavity, the edges protruding far from the general surface. If the bone lies flat in its natural position, it is the upper edge which projects farthest. This cavity must have been filled with a large amount of cartilage. The upper surface of the proximal end is convex, the lower slightly concave. Towards the shaft the hinder border bends further downwards than the body of the bone. There were two slight projections in the centre of the upper surface.

The distal end is broader than the proximal one. The articulation part is strongly convex. On the lower side the bones show a small ridge, visible as an impression in the matrix and running transversely over the bone. This ridge is distally stronger concave and defines the lower and inner border of the articulation facet for the radius. There is a thick, broad and high ridge on the upper surface extending from the distal end above the already mentioned articulation surface for the radius up to the lowest tuberosity on the proximal end, gradually diminishing in height in that direction and vanishing there. The distal end of this ridge formed part of the articulation surface for the radius.

The shaft is slightly narrower than the proximal end and shows no typical features.

There are two processes on the anterior border. One is just above the slightly constricted middle and has the shape of a short, truncated

cone. This may be the same process as the characteristic one of *Eryops*. The other is situated near the lower end of the anterior border and seems to be rather flat.

The *radius* is a short bone with a square shaft of which the lateral sides are slightly concave, while the anterior side is flat; there is a longitudinal groove on the distal half of the posterior side. The proximal end is thick and nearly square, the articulation surface being flat and standing at right angles to the axis of the bone. The distal end is not so thick as the proximal and is not square, the different angles being rounded off. The articulation surface, which is hollow, does not make right angles with the axis of the bone, the inner side of the shaft being longer than the outer.

The *ulna* has the shaft bent with the concavity inwards. Its distal end is broad and flat and the articulation surface is strongly convex. The bone thickens towards the proximal end, which is broad and thick, the articulation surface being larger than that of the radius. This surface looks towards the radius, the concave inner side of the shaft being much shorter than the convex outer one. There is no olecranon process.

The *carpus* is only represented by two small bones, which are mainly situated between the radius and the first or second metacarpal. As the fore-foot is present in three complete specimens and as all three have only two carpals, I can only conclude that the others were not ossified. The proximal bone is most probably the radiale, while the other might be the first carpal.

There are four *metacarpals*, of which the first is broadest and shortest, the others being longer and narrower. The four fingers were short, and the hand gives a much weaker impression than the foot. The first and second fingers have two phalanges each, while the third and fourth have each three. In one specimen there is an irregularity with the third finger, which has only two phalanges. It seems that the end phalange is lost.

THE PELVIS.

One pelvis is nearly completely preserved, while the two others are only represented by fragments and their outside cast in the matrix (Pl. XVI and XXII). In all these cases the iliac portion of the right side has been pressed into the plane of the ischio-pubis. The left side in the two impressions with fragments is bent and generally distorted. Of the preserved specimen of the left side a large part of the ischio-pubis, bordering on the symphysis, is missing. The iliac portion stands at an angle of 45 degrees upwards and outwards. This seems to me to be about its normal position.

The ischio-pubis portion is flat and joined to its fellow by a broad symphysis which is broader dorsally than ventrally. It seems that the two innominates joined each other without forming an angle. The hinder border of the ischium is convex, so that the two united bones are separated distally for a short distance by a notch. The outer border is slightly concave until the ilium is reached, where a small convexity marks the beginning of this bone. The suture between the ilium and the pubis is further marked by a ridge on the dorsal surface, starting from this convexity and crossing the bone in a straight line inwards and forwards.

The front border of the ischio-pubis is broader than the posterior border and slightly concave. There is an angular projection where the ilium meets the bone and the suture between the ilium and the innominate is marked by a slight ridge, which unites with the ridge starting on the

lateral border near the symphysis. The anterior border of the innominate is thicker than the lateral or the posterior border. There is probably a slight notch at the anterior end of the symphysis.

The acetabulum is deep and large and moderately concave. It has a distinct border all along its lower edge, while its upper border is only represented by a slight ridge on the middle of the lower end of the ilium, the anterior and posterior portions of the upper border not being clearly defined. The shape of the acetabulum indicates a horizontal femur, which may have been directed very slightly forward from the articulation surface. The foramen obturatum opened on the ventral surface slightly inward of the middle of the front half of the acetabular border. It is visible as a small process on the impression of three innominates.

The ilium is fixed broadly to the ischio-pubis and the axis of its lower end rises abruptly upwards. The shaft, however, bends more outwards, while the upper end again resumes the original direction of the lower end. Excepting the broad base of the bone it is long and slender with a distinctly narrower shaft. Its hinder border is strongly concave, while its front border is nearly straight, up to the base of the bone. The inner surface of the upper end, i.e. the articulation surface for the sacral rib, is rough. In front it is bordered by a thick ridge. Behind this ridge is a deep groove. It is in this groove that the ridge on the hinder border of the sacral rib fits. Behind this groove is a low ridge, which fits into the groove on the sacral rib. The surface behind this ridge, more than half of the whole articulation surface, is slightly hollow to accommodate the slightly convex part of the articulation surface of the sacral rib.

THE HIND-LIMB.

The FEMUR (Pl. XXII) is a long slender bone, which very much resembles that of *Eryops*. We have it represented in four specimens with some fragments. There are no real articulation heads, as the ends were covered with cartilage and are now rough surfaces. Both ends are broad and flat. The proximal end shows a broad and flat upper or front surface, which narrows down quickly towards the middle of the shaft. The front or inner edge of the proximal end is thin, the bone becoming thicker backwards or outwards. The hinder or outer border of this end is divided into two thin parallel ridges by a narrow groove. Towards the middle of the bone these ridges unite to form a thin ridge, which extends far from the bone along its hinder or outer side and which continues till near its distal extremity. This same ridge occurs on the femur of *Eryops* and as in that genus it gives the shaft of the bone a triangular section, the apex of which is turned backwards or outwards.

The distal end is divided into two parts by a deep and broad groove on the front or inner surface. The upper portion of the articulation surface is smaller than the lower. The central portion between the articulation surfaces, which lies at the distal end of the large groove, projects furthest, so that the articulation surfaces fall away from each other from this point. The lower surface provided articulation with the large proximal end of the tibia, while a part of the upper served for connection with the fibula. Therefore, in normal position the proximal end of the fibula would be above the proximal end of the tibia. The hinder border of the distal end shows a short ridge, which broadens out considerably at its distal end. There it unites the two articulation surfaces, lying in fact exactly opposite the broad front groove. Above this ridge the upper or front surface shows a cavity, which borders the side ridge of this surface

on the distal end. The broad central ridge terminates at about one-third of the length of the bone, above the hinder or lateral ridge of the shaft.

The tibia has little more than half the length of the femur. Its proximal end is thick, the ventral-dorsal dimension being much larger than the transverse one. Along the anterior surface of the proximal end there is a groove, which corresponds with the intercondylar groove of the femur. The greater part of the rough articulation surface articulated with the lower condyle of the femur, but a small part found itself opposite the upper condyle. The shaft is thin and has a squarish section. The distal end is only slightly thicker than the shaft. The posterior surface is flat, while the upper and lower and the anterior surface are slightly concave.

The FIBULA is a flat bone of the same length as the tibia. The proximal and distal ends are both broad and of the same thickness as the shaft. The anterior border is strongly concave, while the posterior border is nearly straight. The articulation surface of the proximal end looks obliquely downwards. The distal articulation surface makes a long curve, the inner and outer ends of which are thickened.

The TARSUS is only partially ossified. Mostly five bones are present, three proximal bones and two tarsals. The three proximal bones are an intermedium, a fibulare and a centrale or tibiale, while the tarsals may be the first and the fourth. A sixth bone may be present between the first tarsal and the large centrale, being also a centrale. The intermedium is large, with a thickened articulation-face for the fibula, a slightly shorter face opposite the tibia and a thickened distal face for articulation with the large centrale. Externally it slightly touches the fibulare. The fibulare is transversely elongate with thickened sides. Proximally it articulates with the outer thickening of the distal end of the fibula, internally and proximally slightly with the intermedium, distally with the fourth tarsale and between this and the intermedium with the large centrale. Its distal surface opposite the fifth digit must have articulated with the cartilagenous fifth tarsal. The large centrale is the largest bone in the tarsus. There was still some doubt whether this could not be a tibiale, but its central position, occupying the whole distal border of the intermedium, together with its being in touch with the fibulare, compelled me to take it as a centrale. This centrale is transversely elongate, its inner end being at the same time much broader than its outer end. It articulates proximally with the intermedium, externally with the fibulare and distally on the inner side through the second centrale with the first tarsal. The tibiale and the first, third and fifth tarsals appear to have not been ossified. It could not be made out whether there might have been more than two centralia.

The digits give an impression of more strength than those of the fore-limb. They are thicker and slightly longer and the whole foot generally is broader. The first metatarsal is very short and broad, especially the ends attaining great breadth. Its first phalanx is also short and broad and the same can be said of the second phalanx, which is the stoutest end-phalanx of the lot. The second metatarsal is much longer than the first and its extremities are less expanded. The first phalanx of the second digit is longer than that of the first and it is but slightly constricted in the middle. The second phalanx is longer than that of the first digit though not so broad. The third metatarsal is just as long as or slightly longer than the second, but it is less constricted in the middle. The first phalanx is longer and stouter than that of the second digit. The second phalanx is much smaller than the first, its breadth being about

equal to half its length. The third phalanx is as long as the second of the second digit, but it is not so broad. The fourth metatarsal is slightly shorter than the third and more constricted in the middle. Its first phalanx is also slightly shorter than that of the third digit and its second phalanx has about the same length as that of this toe, but it is somewhat broader. The third phalanx is much shorter and narrower than the second. The fourth phalanx is much smaller than the third of the third digit. The fifth metatarsal is shorter than the fourth and also more slender. Its first and second phalanges are slightly shorter and more slender than those of the fourth digit. The third phalanx has the same size as the fourth of the fourth toe. All the end-phalanges show a terminal thickening. Does this give an indication of the presence of claws? From the above it will be seen that the phalangeal formula of the foot is 2, 2, 3, 4, 3.

THE DERMAL COVERING.

Large parts of the ventral and dorsal dermal covering have been preserved (Pl. XVI, XVII, and XXIII). The ventral portion is known from the thoracic girdle to the pelvis. It consists of long, acicular, bony scutes, which have a ridge running obliquely across them ventrally. Dorsally their posterior margin forms a slight ridge. These scutes are arranged in parallel rows, which diverge backwards on both sides of a median line (Pl. XXIII). Every proximal scute overlaps the proximal end of the next distal one in such a way that the distal end of the proximal scute passes behind the ridge on the proximal end of the distal one. The median line is formed by a row of flat scales. These are the end scales of each side series, which broaden out considerably proximally and overlap each other alternately.

Towards the sides of the animal the shape of the scales changes. They become shorter and their ridges disappear, so that there only remains a small flat bone. Further dorsally they become round and they gradually lose their bony composition (Pl. XVII). The scales of the side and back of *Myriodon* were not bony but horny. These horny scales are round and they may have had a slightly raised centre (Pl. XVII). They show on the matrix as a brown colouring with an uncoloured centre. The scales near the middle of the back were larger than those near the sides. It could not be made out whether these scales also occur in rows as the ventral ones.

Near the pelvis the large ventral scales change into the same small horny ones as on the back. The change takes place on a line transversely across the median line in front of the pelvis (Pl. XVI). They are still visible at the hinder end of the pelvis, but then they disappear, leaving the matrix covered with a general brownish film. The tail was apparently naked.

The hind limbs were covered with small horny scales of the same kind as those on the back. The same was probably the case with the fore-limbs, but no definite evidence could be obtained.

Since the appearance of the preliminary description an article has been published by R. BROOM on portions of *Myriodon* in the Johannesburg Museum (5). BROOM refers the fossils to his genus *Rhinesuchus* and gives them a new specific name. This of course must be regarded as a synonym, since the fossils had already been named. It is also impossible to refer them to *Rhinesuchus* since the differences are too great between

the two genera. These differences have been specified in the preliminary description, but for the sake of completeness they will be recalled here.

BROOM writes about *Rhinesuchus* (5, p. 375): “. . . and inside the maxilla lay the palatine with a large number of small teeth irregularly arranged, but roughly in three or four rows. The palatine teeth are considerably larger than those on the pterygoids and parasphenoid, but are only about one-third the size of those on the maxilla.” On p. 376, in his diagnosis of the genus *Rhinesuchus*: “Inside of the maxillary teeth are large numbers of very small teeth, probably borne by the palatines, and covering much of the pterygoids, and continued across the back part of the parasphenoid.”

From these two extracts we may conclude that the palatines of *Rhinesuchus* are covered with numerous small teeth roughly arranged in three or four rows. If this result is compared with the foregoing description it will be seen that *Myriodon* differs from *Rhinesuchus* in the following facts:—

Firstly, *Myriodon* has no small teeth on its palatines like *Rhinesuchus*.

Secondly, *Myriodon* has one row of large teeth along the middle of its palatines, which row is absent in *Rhinesuchus*.

As the knowledge of the teeth arrangements of the members of this group is sufficient for identification it will not be necessary to go further into the question.

MEASUREMENTS OF *Myriodon Senekalensis*.

Skull.

| | |
|--|---------|
| Length of preserved portion | 320 mm. |
| Probable length of complete skull | 500 mm. |
| Length of right interpterygoidal cavity | 239 mm. |
| Breadth of right interpterygoidal cavity | 100 mm. |
| Breadth of preserved portion of skull | 332 mm. |

Vertebral column.

| | |
|--|---------|
| Length of largest preserved portion | 235 cm. |
| Length of presacral portion of same individual measured from front end of ischio-pubis..... | 100 cm. |
| Length of same in another individual..... | 128 cm. |
| The length of the largest individual is estimated at..... | 375 cm. |

Sacral rib.

| | |
|-------------------------------|--------|
| Length | 97 mm. |
| Breadth of proximal end | 40 mm. |
| Breadth of distal end..... | 30 mm. |

Episternum.

| | |
|-----------------------------|---------|
| Length as preserved..... | 215 mm. |
| Breadth may have been | 260 mm. |

Clavicle.

| | |
|--------------------------------------|---------|
| Length of cleithral end..... | 100 mm. |
| Breadth of ventral end at least..... | 135 mm. |

Cleithrum.

| | |
|--------------------------------|---------|
| Length of preserved part | 128 mm. |
|--------------------------------|---------|

Scapula-coracoid.

| | |
|-----------------------------------|---------|
| Length of coracoidal portion..... | 92 mm. |
| Breadth of upper end..... | 125 mm. |

| | |
|---|---------|
| Humerus. | |
| Length | 145 mm. |
| Breadth of the proximal end..... | 70 mm. |
| Breadth of the distal end..... | 95 mm. |
| Radius. | |
| Length | 75 mm. |
| Maximum breadth of the distal end..... | 26 mm. |
| Ulna. | |
| Length | 89 mm. |
| Width of the proximal face..... | 30 mm. |
| Width of the distal end..... | 25 mm. |
| Thickness of the distal end..... | 3 mm. |
| Ilium. | |
| Length about..... | 130 mm. |
| Width of upper end..... | 55 mm. |
| Ischio-pubis. | |
| Length | 185 mm. |
| Maximum breadth..... | 88 mm. |
| Femur. | |
| Maximum length..... | 171 mm. |
| Breadth of the proximal end..... | 57 mm. |
| Breadth of the distal end..... | 47 mm. |
| Thickness of the proximal end about | 10 mm. |
| Thickness of the distal end about..... | 30 mm. |
| Tibia. | |
| Length | 93 mm. |
| Width of head..... | 33 mm. |
| Depth of head..... | 45 mm. |
| Width of distal end | 29 mm. |
| Fibula. | |
| Length..... | 100 mm. |
| Width proximal end..... | 37 mm. |
| Width distal end..... | 46 mm. |
| Thickness of proximal end about | 8 mm. |

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EXPLANATION OF PLATES.

Myriodon Senekalensis Van Hoepen.

- Plate XVI. The large mass of the remains. Three individuals are lying near to each other. Large portions of the ventral armour are still preserved. Parts of the vertebral columns, the hind and front legs and the shoulder girdle are shown in this plate. About 1 : 16 natural size.
- Plate XVII. The smaller slab of the remains. This slab fits on to the large one in such a way that the vertebral column shown to the left lies in front of the large tail, shown in Pl. XVI. Attention must be drawn to the fine pieces of dermal armour. Near the middle a quantity of ventral scutes are seen to gradually pass over in round ones. At the extreme right a portion of the dorsal armour is visible. About 1 : 11 natural size.
- Plate XVIII. Lower view of the palate. The basisphenoid, the parasphenoid and the greater part of the pterygoids are shown. In the inter-pterygoidal vacuities lies the mosaic of teeth bearing ossifications. 0,6 natural size.
- Plate XIX. Fig. 1.—Right ramus of the lower jaw, probably of skull No. 2, and belonging to the upper individual of Pl. XVI. Nearly 0,8 natural size.
Fig. 2.—Part of the vertebral column of the middle individual of Pl. XVI. About 0,2 natural size.
- Plate XX. The tail of the lower individual of Plate XVI. About 1 : 3 natural size.
- Plate XXI. Sternum and clavicles with complete front leg. About 1 : 3 natural size.
- Plate XXII. The hind legs and pelvis of the middle individual of Pl. XVI. About 23 : 100 natural size.
- Plate XXIII. A portion of the ventral armour near the sternal apparatus of the lower individual of Plate XVI. About 0,9 natural size.

- Plate XXIV. Fig. 1.—The scapula-coracoid seen from below.
 Fig. 2.—The scapula-coracoid seen from sideways, behind and below. About 0,8 natural size.
 Fig. 3.—Lower view of the right occipital condyle and adjacent bones. The lateral posterior process is distinctly visible. The outer opening for the vagus group is the highest to the right. Approximately natural size. :

EXPLANATION OF PLATE XV.

Galeosoma coronatum, sp. nov., from Kroonstad.

Fig. 1. Dorsal view, somewhat enlarged. ♀.

Galeosoma pallidum, sp. nov., from Saltpan.

Fig. 2. Dorsal view, somewhat enlarged. ♀.

Fig. 3. Dorsal view, about natural size, showing the great depth of the marginal surface of the shield anteriorly. ♀.

Fig. 4. Ventral view, about natural size. ♀.

Galeosoma schreineri, Hewitt, from De Aar.

Fig. 5. Ventral view, about natural size. ♀.

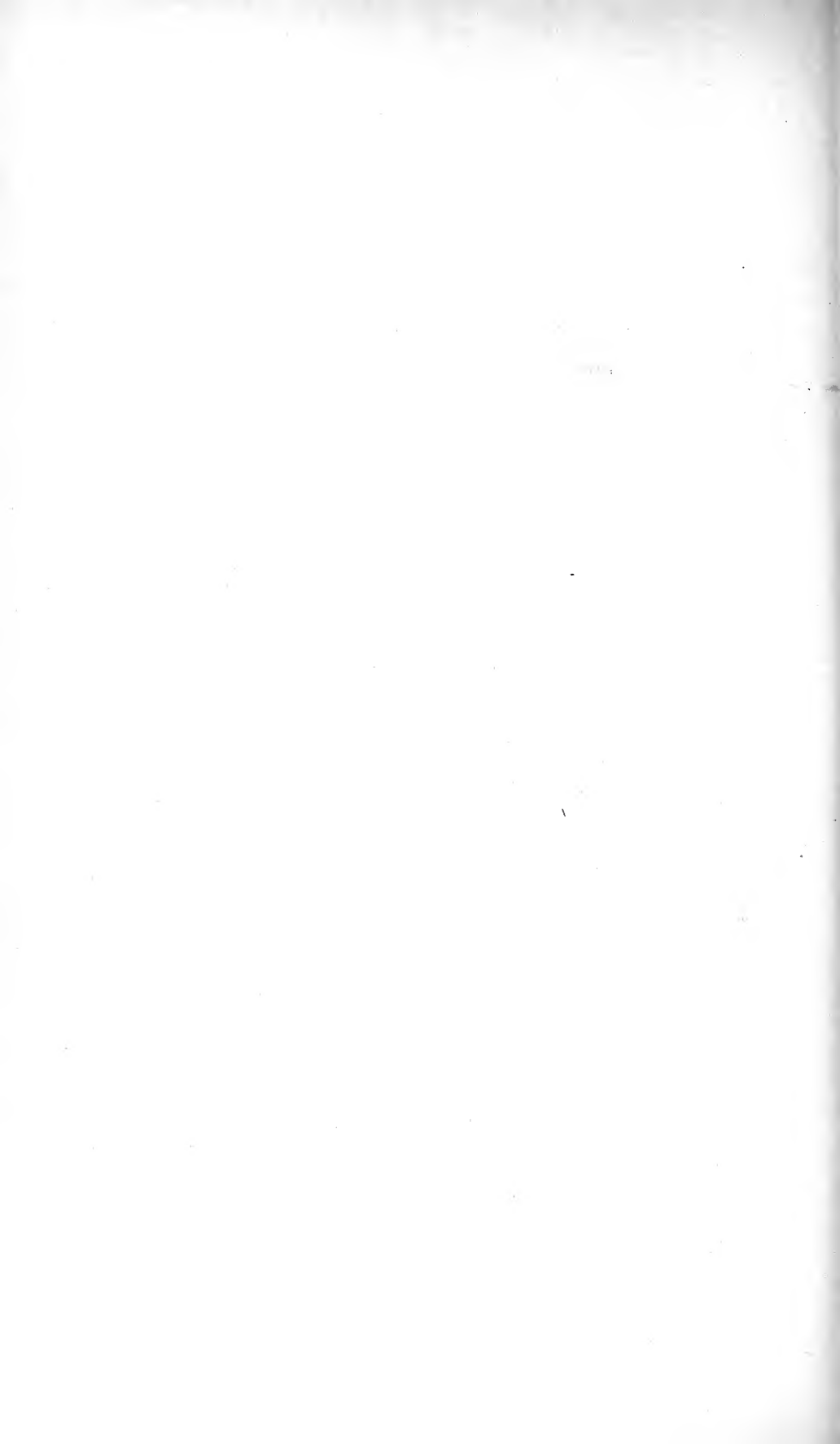
Fig. 6. Dorsal view, about natural size. ♀.

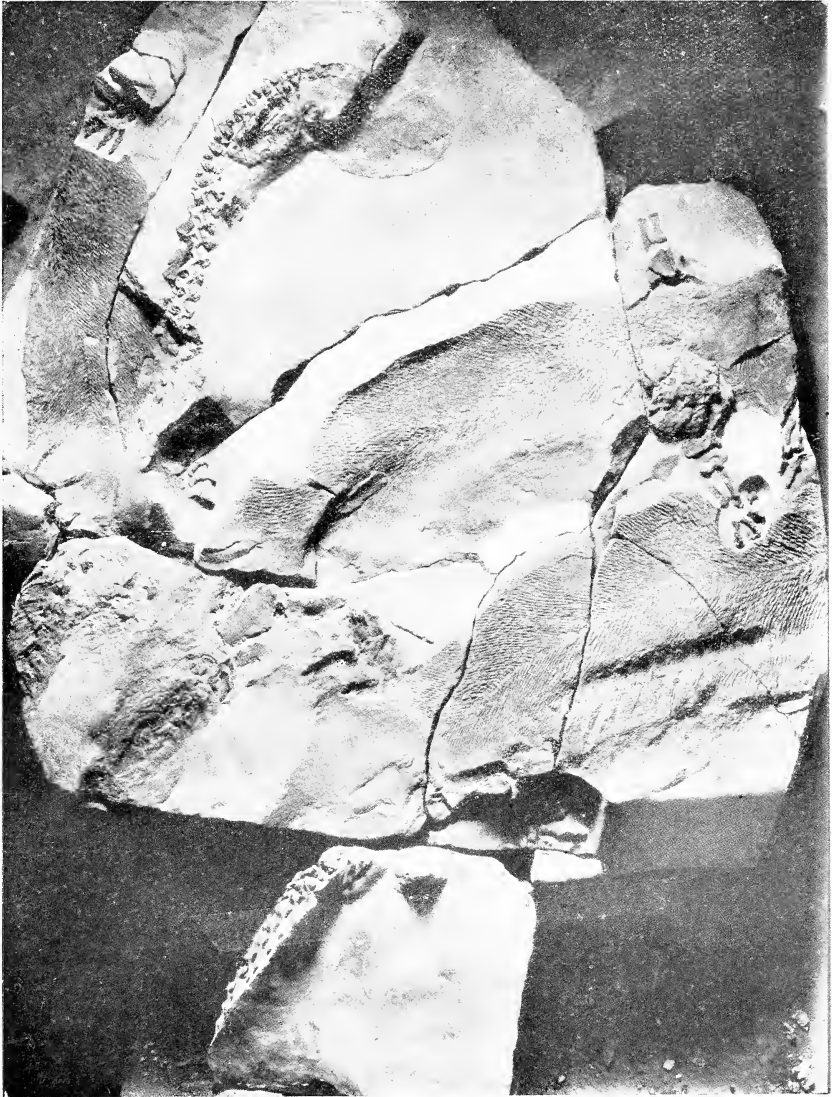
Idiops gunningi, Hewitt, var. nov., *elongatus*, from Moorddrift.

Fig. 7. Dorsal view, about natural size. ♀.

Heligmomerus caffer, Purcell, ? sp., from Moorddrift.

Fig. 8. Dorsal view, about natural size. ♀.





Myriodon senekalensis. The large block of the remains. About 1 : 16.



Myriodon senekalensis. The smaller block of the remains. About 1 : 11.





Myriodon senekalensis. View of the palate. $\times 0,6$.



Myriodon senekalensis. Fig. 1. Right ramus of lower jaw. Nearly 0.8. Fig. 2. Vertebral column with sacral vertebra and ribs. About 0.2.



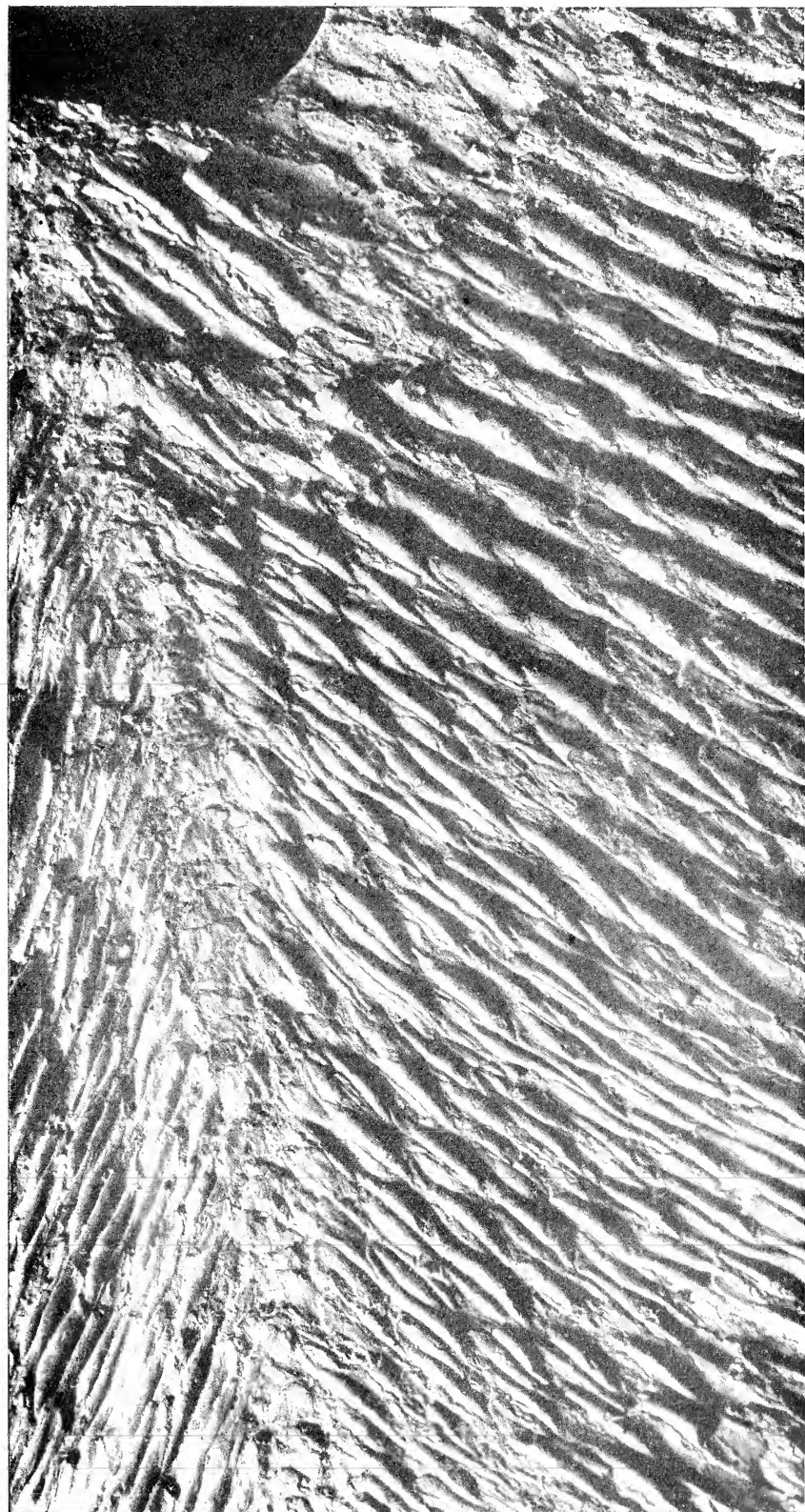
Myriodon senekalensis. A large portion of the skeleton of the tail. About 1 : 3.



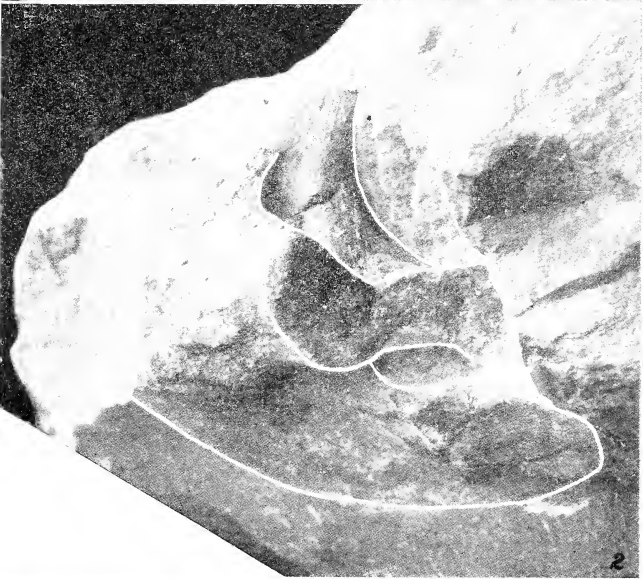
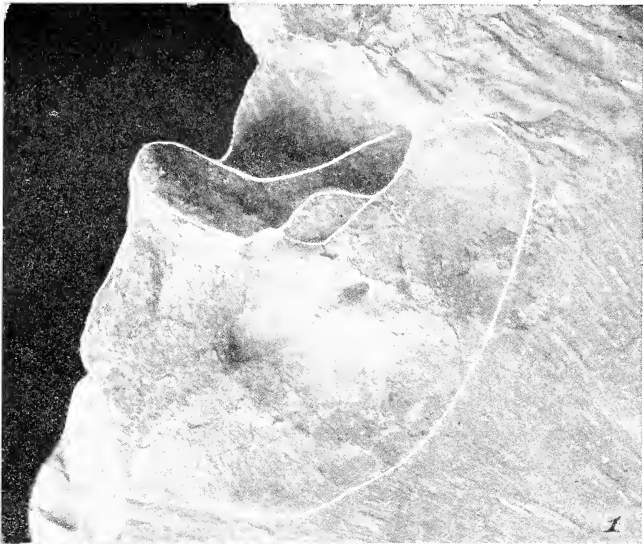
Myriodon senekalensis. Shoulder-girdle and front leg. About 1 : 3.



Myriodon senekalensis. Pelvis and hind legs. About 23 : 100.



Myrionon senekalensis. A portion of the dermal armour. About 0.9.



Myriodon senekalensis. Fig. 1. 2. Scapula-coracoid. About 0.8. Fig. 3. Right occipital condyle. Approx. nat. size.



ANNALS MEDEDELINGEN

OF THE VAN HET

TRANSVAAL MUSEUM

VOLUME



PART 3, containing:—

New South African Geometridae. By LOUIS B. PROUT,
F.E.S.

Descriptions of New South African Spiders. By JOHN
HEWITT.

Preliminary Description of some New Lystrosauri. By
Dr. E. C. N. VAN HOEPEN, M.I.

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NEW SOUTH AFRICAN GEOMETRIDAE.

By LOUIS B. PROUT, F.E.S.

THE following descriptions have been prepared almost exclusively from material in the collection of Mr. A. J. T. Janse, to whose zeal and success in collecting we owe so much of our knowledge of the *Geometridae* of South Africa, and in particular of the Transvaal. Where not otherwise indicated, the types and cotypes are in his possession.

One or two additions and corrections to my former paper (*Ann., Transvaal Mus.*, III, 194-225) will not be out of place here.

SUBFAM. HEMITHEINAE.

Oedimetopia, n. gen.

Frons protuberant, with dense projecting hair. Palpus with first and second joints densely haired, third joint in ♀ long, smooth, slightly fusiform. Tongue present. [Antennae lost.] Pectus and femora densely hairy; hindtibia with four spurs; tarsi spinose. Abdomen robust, not crested, not impossibly a little abraded. Basal area of wings hairy beneath. Frenulum fully developed. Forewing rather broad, with costa straight to beyond one-half, then gently curved, apex moderate, termen somewhat oblique, anteriorly straight, posteriorly gently curved; cell rather short, DC inbent; SC¹ free, SC²⁻⁵ stalked, SC² arising considerably beyond SC⁵; R¹ from apex of cell, R² from slightly before middle, M¹ separate from, though approximated, to R³. Hindwing with apex pronounced, termen strongly crenate, its general outline straight from apex to R³, then convex; cell very short (only one-third), DC³ curved, becoming very oblique; C¹ well separated from cell near base and moderately rapidly diverging; SC² not stalked, R² from before middle of discocellulars, M¹ approximated to R³.

Type of the genus: *Oedimetopia jansei*, n. sp.

By the robust build, protuberant frons, densely hairy clothing, thick scaling, etc., this genus certainly belongs to my Group II, but it differs from all known genera of that group, except *Gnophosema*, in the joint of origin of SC^2 of the forewing; from *Gnophosema* in the frons, tibial armature and other characters. In my key (Gen. Ins., fasc. 129, p. 10) it can be introduced as follows:—

5. Forewing with SC^2 arising after SC^5 *Oedimetopia*.

Forewing with SC^2 arising before SC^5 5a.

5a. Hindwing with slight basal expansion (etc.).

Oedimetopia jansei, n. sp. (Pl. XXV, Fig. 1).

♀, 56 mm. Forewing ochreous whitish, irregularly irrorated with light blue-grey and blackish and mixed here and there with brighter ochreous; a large irregularly rounded (or almost diamond-shaped) pale discal spot, enclosed by thick velvety black and shortly followed by a pale patch from costa to R^3 ; a number of thick velvety black marks from costa to SC (about 14, but a few weaker than the rest), mostly continued by vague, interrupted lunulate-dentate lines across the wing, some becoming conspicuous and thick again at inner margin; a salmon-pink spot between R^2 and R^3 near the termen; fringe alternately pale ochreous and fuscous proximally, nearly white distally. Hindwing about from cell to termen and from R^2 to inner margin (i.e. manifestly the exposed part in the resting attitude) coloured like forewing, cell and base of inner margin mostly fuscous, with the discal spot darker fuscous, a pale blotch between discal spot and a strongly curved postdiscal line, the rest of the wing (from postdiscal line to termen and from costa about to R^3) forming a single large dark fuscous blotch. Under surface in basal one-third mixed with yellow ochreous, in middle third whitish with two dentate fuscous bands which are confluent in centre of wing, distal third fuscous, on hindwing enclosing a narrow whitish distal margin from apex to R^3 , this latter containing three fuscous crescentic marks in the cellules between SC^2 and R^3 ; both wings with large fuscous cell-spot, that of forewing almost absorbed in the first fuscous band, that of the hindwing far proximal.

Barberton, Transvaal, 1 ♀. Altogether a remarkably distinct species.

Neromia Stgr.

To this genus, which is at present made to cover all the *Chlorissa*-like forms in which the ♀ hindtibia lacks the median spurs, I now believe we must transfer the whole of the African group which I will call the *malescripta* group. Very few undamaged ♀♀ have as yet been available for study, but Warren's "type" ♀ of *malescripta* and a few of *articulicornis*, described below, have certainly only two spurs on the hindtibia, and it is virtually certain that such a close ally as *unilinea* Warr. will not differ in essential structure. On the other hand, a similar species from the Cape, which I take to be *attenuata* Walk.,* has a fully spurred ♀. The *malescripta* group is exceedingly difficult. During the past year or two I have repeatedly given very close attention to it, and in this I was greatly

* Walker's type is in the Oxford Museum and the identification awaits confirmation, but according to my earlier notes seems reasonably safe.

aided by Mr. Janse, who lent me for study the whole of his fine series and permitted me to retain duplicates of several of the forms. I worked out—apart from *dorsicristata* Warr., which is well distinct, though probably a *Neromia*—eight potentially differentiable forms, according to the venation, abdominal crests, ♂ antennal and hindtibial structure, etc.; but I suspected that some of the differences would prove inconstant, and therefore postponed publication of results. I am now satisfied that venation, crests, and strength and position of the white lines on the wings are all variable, though all show general *tendencies* that are helpful in conjunction with other characters. We are therefore left at present with only ♂ structural characters as absolute, but on the basis of these, with slight assistance from others, less stable, I have been able to establish a provisional scheme, which will be serviceable. I subjoin a brief analysis and shall then proceed to describe the new forms:—

1. Hindtibia of ♂ dilated, with hair-pencil; antenna distally mixed with reddish..... *unilinea* Warr.
Hindtibia of ♂ not dilated; antenna distally whitish..... 2.
2. Antenna of ♂ with the joints projecting; SC¹ of forewing generally beyond R¹..... *articulicornis*, n. sp.
Antenna of ♂ with the joints not projecting; SC¹ of forewing before R¹..... *malescripta* Warr.

It should be added that Warren's type of *approximans* has lost the hindlegs, but it is probably a mere aberration of *unilinea* (or possibly of *malescripta*), the lines approximated, as is not very infrequent in the group, and indeed in the *Geometridae* in general.

Neromia articulicornis, n. sp. (Pl. XXV, Fig. 41).

♂, 19–21 mm.; ♀, 22–25 mm. Face and palpus green, the latter in ♂ slightly longer than diameter of eye, in ♀ fully $1\frac{1}{2}$ or perhaps slightly over, the terminal joint about twice as long as in the ♂. Tongue well developed. Antennal joints in ♂ projecting, ciliation about as long as diameter of shaft; scaled surface white, purer white at base. Snow-white fillet rather narrower than green crown. Thorax green. Abdomen dorsally pale green, the crests concolorous, inconspicuous. Legs mostly pale green, foreleg partly reddish in front; hindtibia in ♂ not dilated, hindtarsus about 2 mm. in length. Forewing with SC¹ stalked; pale green (green powdered or somewhat strigulated with whitish-green); costal edge yellowish-white, at extreme base green; lines white, slender, antemedian generally weak, not very strongly bent, postmedian variable in position, rather straight or slightly curved; discal streak or lunule weak (green) or obsolete; a vaguely pale terminal line; fringe pale green. Hindwing with termen rather full, but not angled nor even noticeably bent at R³; discal mark and postmedian line as on forewing, the line sometimes curved nearly parallel with termen. Under surface much paler (whitish) green, the postmedian line faintly discernible.

Barborton, Transvaal, 26th December, 1910 (♂ type); other examples (both sexes), December, 1910–January, 1911.

As var. (?) *RUFICRISTATA*, n. var., I describe a form with two red dorsal crests, the white lines sometimes thick, the antemedian often distinct, postmedian generally almost straight, hindwing beneath perhaps less whitish. Pretoria, 28th November, 1907 (type ♂); 14th December, 1912 (cotype ♂, in my collection). These measure 22–23 mm. A small ♂ (18 mm.) from Durban, November, 1908 (coll. Janse), and an old Natal ♂ (also small) in the British Museum collection are likewise referable here.

Neromia unilinea Warr., ab. *inornate*, n. ab.

In typical *unilinea* the crests are red, sometimes topped with some black scales, especially the posterior one. Transvaal (Barberton, Three Sisters, Waterval Onder) should be added to the known localities. Together with it (Barberton, Three Sisters, Sarnia [Natal]) occur small specimens which I name ab. *inornata*, in which the crests are green, only with a few scattered red or black scales discoverable with the microscope.

Neromia cohaerens, n. sp. (Pl. XXV, Fig. 2).

♂, 23 mm.; ♀, 30 mm. Face red. Palpus very short, red above, yellowish-white beneath. Tongue rather short and slender. Crown pale green, narrowly white between antennae. ♂ antenna simple, closely lamellate; base of antenna white. Thorax and abdomen pale green above, white beneath. Foreleg, and to a less extent middle leg, red on upper and inner sides; hindleg of ♂ rather short and strong, but not dilated. Forewing pointed, termen very little curved, rather markedly oblique, the wing therefore slightly narrower than in *rubripunctilla* Prout; SC¹ anastomosing shortly with C; costal edge narrowly whitish-yellow; the rest uniform delicate pale green (a shade lighter than in *Chloëres citrolimbaria* Guen., otherwise similar), only in one ♀ with a faint pale postmedian line at about 3 mm. from termen; fringe very pale green in proximal half, white in distal. Hindwing with apex well rounded; M¹ quite shortly stalked; like forewing, except costa. Under surface rather paler green, costal edge of forewing about as above.

Pretoria, 2 ♂♂ (A. J. T. Janse), type, 7th December, 1907; cotype, 8th January, 1909, the latter in coll. British Museum. Waterval Onder, 2 ♀♀, 21st and 26th November, 1910 (A. J. T. Janse), one in coll. L. B. Prout. Natal (W. H. Heale), 1 ♂, without more exact data, in coll. British Museum.

Lophorrhachia, n. gen.

Palpus in ♂ rather short, but with the third joint distinct, relatively well developed (in the unknown ♀ therefore probably elongate). Tongue well developed. Antenna in ♂ pectinate with tolerably long branches, apical part simple. Pectus slightly hairy. Femora glabrous. Hindtibia in ♂ thickened in its distal third, apparently with only one median spur,* the terminals moderate, the tibial sheath extending slightly beyond them along proximal part of tarsus. Thorax smooth. Abdomen with well-developed crests. Frenulum in ♂ short, in ♀ no doubt wanting. Forewing broad, apex not acute, termen gently curved, tornus well expressed;

* In the unique example both hindlegs are too closely oppressed to the body to allow of absolute certainty without injury.

DC moderately incurved (rather strongly just behind R^2), SC^1 free, SC^2 arising before SC^5 , R^1 separate, R^2 normal, M^1 separate (approximated to R^3). Hindwing with inner margin long, tornus rounded-prominent, termen straight or very slightly sinuate inwards from tornus to R^3 , here bluntly angled, thence more convex than in *Thalassodes*, approaching the shape of *Cheroscelis rubricorpus* Warr.; cell short, DC little curved, C touching SC at a point near base, rapidly diverging, SC^2 short-stalked, R^2 normal, M^1 very shortly stalked.

Type of the genus: *Lophorrhachia niveicristata*, n. sp.

May be placed between *Cheroscelis* and *Heterocrita*, showing more the build and texture of the latter, but with no sign of excision between the radials of the hindwing, stronger crests, etc. In my Key (Gen. Ins., fasc. 129) it separates off on p. 17, at 64, and if the tibial armature is as indicated above it must be further mentioned in footnote 3 on p. 14.

Lophorrhachia niveicristata, n. sp. (Pl. XXV, Fig. 3).

♂, 32 mm. Face blood-red, lower extremity white. Palpus dark red above, dirty white beneath. Vertex and antennal shaft white; occiput green. Thorax and abdomen green above, white beneath and at anal extremity; second to fourth abdominals each with a snow-white crest, the first two almost surrounded at their bases with bright red, the last only with a little red at its posterior extremity. Wings green, almost as bright as in *Heterocrita koranata* Feld., but rather thinly and smoothly scaled, costal edge of forewing white; both wings with small red discal dot and fine red terminal line, the latter extending round apex and extremity of costa of forewing; lines extremely fine and faint, being only slightly darker or greyer green, lunulate, the antemedian outward (present on forewing only), the postmedian inward, marked with small dark grey dots on R^1 , R^3 , M^1 , M^2 , and SM^2 (forewing also, still more minutely, on R^2); fringes white. Under surface whitish-green, unmarked, costal edge of forewing dirty white.

Umkomaas, Natal, 6th January, 1914.

Heterorachis despoliata, n. sp. (Pl. XXV, Fig. 4).

♀, 28 mm. Closely related to *devocata* Walk., structure the same. Forewing with costa slightly more rounded, termen somewhat straighter, at least posteriorly, tornus in consequence more squared; costal edge red and only narrowly, not fuscous (only a little spotted with fuscous); marginal yellow line exceedingly fine and not crenulate, the red line distally to it being also exceedingly fine and not thickened between the veins; tornal blotch wanting; fringe much paler than in *devocata*. Hindwing with termen less convex than in *devocata* and scarcely showing even the very weak crenulations which (especially about the radials) are observable in that species; terminal line and fringe as on forewing. Under surface also with the paler fringes. Abdomen dorsally strongly infuscated, as in some forms of *devocata*, but with the crests white or whitish, not (or only at their bases) fuscous.

Pretoria, 2nd December, 1911 (type). Other examples in coll. Brit. Mus. and coll. L. B. Prout.

But for the differences in wing-shape, I should have been inclined to regard this as a form of *devocata*. The Transvaal form of the last-named has the costal margin red, not fuscous, but it is widened and markedly underlined with pale yellow, the fringe also bright red, the ground-colour more vivid green than in typical *devocata* and in *despoliata*, the abdomen dorsally paler, with the crests red.

Heterorachis disconotata, n. sp. (Pl. XXV, Fig. 6).

♀, 29–30 mm. Face and palpus red. Vertex rather narrowly white; occiput green. Antennal shaft whitish, pectinations not quite as long as in *devocata*. Forecoxa, femur, and tibia bright red above and on inner side, middle femur and tibia similarly but not quite so deeply coloured, hindleg whitish. Abdomen rather narrowly green dorsally, tip, sides, and venter white; crests extremely minute, green, scarcely appreciable. Forewing with apex pointed, termen rather straight, moderately oblique, tornus rather pronounced; SC¹ anastomosing rather strongly with C, SC²⁻⁵ long-stalked from well before R¹, R² from very near R¹ (more extreme than on hindwing), M¹ well separate; rather duller, bluer (or greyer) green than *devocata*, the colour formed of coarser and slightly less dense green irroration on whitish-green ground; costal edge very narrowly ochreous-whitish; very faint indications of a cell-spot at origin of R²; fringe concolorous or very little paler. Hindwing with C anastomosing at a point with SC, SC² short-stalked, M¹ separate; concolorous with forewing, a rather conspicuous, darkened green cell-spot on DC³. Under surface whitish-green, costal area of forewing slightly suffused with reddish (or reddish-grey) basally, at the costal margin more strongly reddish.

Barberton, 6th and 17th January, 1911, collected by Mr. Janse, the former example kindly presented to me.

Bluer green than *asyllaria* Swinh., less *vermiculata*-like in scaling, spots less marked, shape slightly more that of *Omphax*; evidently very near *simplicissima* Prout, which in its turn may have to sink to *simplex* Warr. (*haploa* Prout). The characters in this group (antennal structure, abdominal crests, stalking or separation of M¹ of hindwing) seem all unreliable or difficult to utilize so as to bring about a natural grouping; for the present I continue to call all its constituents in which the ♀ antenna is pectinate *Heterorachis*. It is curious that almost throughout the group, but especially in *Heterorachis*, the ♀♀ are more frequently taken than the ♂♂; I have no information as to their habits.

Comostolopsis germana, n. sp.

♂ ♀, 14–18 mm. Face and palpus bright orange-ochreous, the latter white beneath; third joint in ♂ rather short, in ♀ moderately elongate. Vertex and base of antenna white; antenna in ♀ subserrate. Thorax and abdomen green above, becoming white anally; white beneath. Forewing slightly less pointed at apex than in *simplex* Warr., slightly less yellowish-green; costal margin white or whitish-green, rather broadly at base, the extreme edge in fresh specimens ochreous; the lines silvery white, rather less fine than in the allies, strongly waved or lunulate-dentate; first line near base, vertical from hind margin, inbent at fold, becoming

very indistinct; second from two-thirds costa or slightly beyond, approximately parallel with termen, but slightly curved basewards at costa and between M^2 and SM^2 ; discal dot orange or orange-reddish, rather larger but less sharply marked than in *simplex* (where it is fuscous); fringe green, no red terminal markings. Hindwing concolorous, without first line, second more markedly sinuous. Under surface whitish-green, often with slight traces of reddish or orange suffusion costally in basal area of forewing.

Natal: Durban, Pinetown, and Sarnia; type (Sarnia, 12th January, 1912, A. J. T. Janse) in my collection. An aberration with the discal spots green, scarcely differentiated from the ground-colour, was bred by my friend Mr. Percy Richards in Durban, in July, 1899, and is mentioned in Gen. Ins., fasc. 129, p. 238, as an aberration of *simplex*.

Smaller than *simplex*, with which it has heretofore been confused, differing in the green, not yellow fringes, white costal margin, lack of fuscous discal dots and of red apical marking, less fuscous basal suffusion beneath, etc. I have now seen Warren's type of *capensis* and a good ♀ of the same from Estcourt, Natal; it is a distant species, larger, much bluer, with red face, ochreous costa, etc.

Allochrostes (?) *imperfecta*, n. sp. (Pl. XXV, Fig. 7).

♂, 14 mm. Face green; vertex broadly white; occiput green. Palpus slender but somewhat rough-scaled beneath, scarcely as long as the diameter of the eye. Tongue slight. Antennal shaft white proximally; pectinations long. Forewing with costa scarcely arched, apex rather sharp, termen straight, tornus moderately pronounced; SC^1 from cell, running into C, SC^{2-5} rather long-stalked, M^1 just separate; green, nearly as in *saliata* Feld., but not quite so bright, extreme costal edge white; lines greenish-white, very fine; first from rather beyond one-third hind margin, parallel with termen, obsolescent anteriorly to M; second from two-thirds costa to three-fourths hind margin, nearly straight, very faintly sinuate outwards anteriorly and inwards posteriorly; no terminal line; fringe concolorous. Hindwing with apex and anterior part of termen strongly rounded, termen almost straight from R^3 to beyond submedian fold, giving a slight impression of a bend at R^3 , tornus rounded—prominent; cell fully one-half, C anastomosing to nearly three-fourths cell, SC^2 long-stalked, M^1 stalked; concolorous with forewing, a fine postmedian line, slightly bent about R^3 . Under surface paler green, unmarked.

Warmberg, Transvaal, 25th November, 1903.

Unfortunately the sole example of this tiny species has lost both hindlegs, so that its generic position is in a measure conjectural. The minute palpus makes it unlikely that it is an *Omphacodes*.

Xenochlorodes *xina*, n. sp. (Pl. XXV, Fig. 5).

♀, 27 mm. Face red; vertex white; occiput green. Palpus exceedingly minute, red. Tongue apparently wanting. Antenna nearly simple, weakly subserrate; white at base, becoming somewhat tinged with ochreous. Thorax above green, beneath white. Foreleg red above and on inner side, the tarsus paler; hindleg whitish, with a pair of strong

spurs. Abdomen pale green above, white beneath. Forewing ample, costal margin slightly more arched than in the type species; C remote from SC, SC¹ from cell, strongly divergent, so as to anastomose with C, SC²⁻⁵ from just before R¹, DC¹ becoming moderately oblique, M¹ remote from R³; green, less vivid and more bluish than in *beryllaria*, extreme costal edge whitish-ochreous; first line obsolescent, faintly traceable (in posterior half only), apparently a little curved, to hind margin at nearly two-fifths; postmedian whitish, parallel with termen, at 3.5 mm. therefrom, distinct from hind margin to R³, then gradually fading out; fringe slightly paler green. Hindwing with C anastomosing to one-half cell, SC² very short-stalked, M¹ remote from R³; only the postmedian line continued, here median, very slightly curved. Underside paler green, unmarked, costal edge of forewing whitish-ochreous.

Barberton, Transvaal, 6th January, 1911. Since drawing up this description I have seen a ♂ from Umkomaas, Natal, 22nd January, 1914, also collected by Mr. Janse; smaller than the ♀, otherwise quite agreeing.

Differs from typical (Palearctic) *Xenochlorodes* in the still more minute palpus, apparent absence of tongue, shorter anastomosis of C of hindwing, and wide separation of M¹ of both wings.

Acidaliastis bicurvifera, n. sp. (Pl. XXV, Fig. 8).

♀, 21 mm. Face light brown. Vertex whitish-brown. Thorax and abdomen whitish, the former more brown anteriorly. Foreleg brown, with the coxa more reddish. Forewing with apex acute, termen oblique, straight anteriorly, curved posteriorly; light brown, more ochreous along the costal margin; two broad, curved, very oblique white lines, the distal from close to apex to before two-thirds hind margin, the proximal commencing near the distal, almost parallel with it, but slightly more oblique still, edged with slightly darker (more reddish) brown on their approximated sides; a terminal line of this same slightly reddish brown; fringe white. Hindwing white, with a brown terminal line. Forewing beneath brown anteriorly, whitish posteriorly, the distal line of upperside indicated.

Pretoria, 19th February, 1914.

Evidently akin to *curvilinea* Prout, which—on the discovery that the hindtibia had terminal spurs only—I removed to *Allochrotes* (Lep. Cat., xiv, 167), but which, I suppose, should be regarded as a comparatively broad-winged green *Acidaliastis*. Besides the quite different colour, the presence of a second line on the forewing distinguishes *bicurvifera*.

Acidalia straminea Feld.

I find that *melliflua* Warr. (Nov. Zool. IV, 52, *Craspedia*) is an aberration of *straminea* Feld. (Reise Novara, Lep. Het. t. 128, f. 33) with the discal blotches wanting and that my ab. *sumpta* (Ann. Transv. Mus., III, 198) and ab. *discata* (Ann. S. Afric. Mus., X, 484) are virtually synonyms of name-typical *straminea*, although these forms vary among themselves as to the exact extent and distribution of the blotches.

Acidalia pertinax, n. sp. (Pl. XXV, Fig. 9).

♂ ♀, 20–21 mm. Face brownish-black, with lower extremity white. Palpus dark above, whitish beneath. Antennal ciliation in ♂ rather longer

than diameter of shaft. Vertex white. Collar light ochreous. Foreleg fuscous in front. Thorax, abdomen, and legs otherwise white, with a few scattered blackish specks, which accumulate on mid-dorsum into a row of ill-defined spots (large dots). Hindtibia of ♂ moderately long and thick, tarsus scarcely more than one-half the length of tibia. Wings coloured as the least yellow ♂♂ of *A. immutata* L., the black dusting about as in that species, the shape of hindwing more as in *corrivalaria* Kretschm., there being a weak bend at R³. Forewing with first line from beyond one-third, oblique outwards, strongly bent in cell, then oblique inwards; median line slightly thicker, from hind margin opposite discal spot of hindwing, oblique to R¹, then slightly curved, becoming indistinct; postmedian slender, accentuated by black dots on veins, that on R² slightly displaced proximally, that on R¹ distally, a slight proximal curve towards costa; between the black dots the line is very faintly lunulate inwards; subterminal indicated by two rather straight lines which edge it; discal dot small, black, midway between first and median lines; termen with conspicuous black dots. Hindwing without antemedian line, the median very slightly curved just proximally to the cell-dot, which is here large; postmedian running rather straight across the wing; subterminal nearly parallel with termen, curving a little outwards towards tornus; terminal dots as on forewing. Forewing beneath slightly less white anteriorly, the dusting rather strong in cell, posterior area and hindwing cleaner white; both wings with discal dot, postmedian line and rather weak terminal dots.

Natal: Umkomaas, 14th January, 1914, type ♂; 3rd January, 1914, a ♀ in coll. L. B. Prout. Port Natal (J. V. Gooch), a ♂ in coll. British Museum, presented by C. O. Waterhouse in 1874.

Acidalia quintaria, n. sp. (Pl. XXV, Fig. 10).

♀, 20–22 mm. Face black above, mixed with white below. Vertex greyish. Collar ochreous. Smaller than *A. tricommata* Warr., Nov. Zool., VI, 294, rather less pure white, forewing with the costa slightly more arched, hindwing with termen more weakly crenulate, only with a rather prominent tooth at R³. Forewing without black spots at costa and virtually without the characteristic dark markings of *ricommata* and the *ornata* group generally, only the discal spot, the terminal dots, and some very minute, inconspicuous vein-dots on the distal teeth of the postmedian line being black; antemedian and median lines nearly as in *tricommata*, postmedian finely and pretty regularly denticulate, a little further from termen between the radials and slightly approaching it at hind margin; white subterminal line broad, at radials receding somewhat from termen and at the same time doubling in thickness, thus here reaching the postmedian line; five grey-brown spots proximally to the subterminal, the first two separated by SC⁵ and nearly confluent, the third and fourth separated by M¹, the fifth at hind margin; terminal dots relatively very large; some black dots at base of fringe, the strongest close to tornus. Hindwing without the first line, median angled on SC, strongly incurved proximally to cell; cell-dot rather larger than on forewing; postmedian line with the curves stronger than on forewing; the rest like forewing. Under surface white, unmarked.

Sarnia, Natal, 10th February, 1912 (Williamson). Cotypes in coll. L. B. Prout.

It is unfortunate that the ♂ is still unknown, but the species will be easy to recognize.

Ptychopoda fortificata, n. sp. (Pl. XXV, Fig. 11).

♀, 16 mm. Face and most of upper and outer sides of palpus blackish; head, body, and legs otherwise concolorous with wings. Wings glossy bone-colour, sparsely sprinkled with fuscous atoms, ground-colour more strongly tinged with brownish-ochreous than in *associata* Warr., Nov. Zool., IV, 62, no doubt belonging to the same group; the markings distinct, deep purplish-fuscous. Forewing with costal margin rather broadly fuscous from base to first line; first line from costa at 1.5 mm., bent on M, then slightly incurved; median line rather thick, not quite so sharply expressed as the others, blackest at costa, weakly sinuous, nearer the termen at its posterior end than at its anterior, containing on its proximal edge a minute black discal dot; postmedian nearly black, similarly sinuous, or rather more conspicuously so posteriorly, swelling into distal blotches near costa, at hind margin, and especially from R³ to M²; some less intense fuscous shading at termen, hardly thicker than a line in posterior part of wing but widening anteriorly; some minute dark dots (scarcely visible to the naked eye) on the fringe close to its base. Hindwing with termen straight from R¹ to the rounded bend at R³-M¹, then again straight or faintly concave; SC² moderately long-stalked; first line wanting, the others more strongly sinuous, the median therefore containing the discal dot at its *distal* edge, postmedian weaker than on forewing, double, its two parts confluent at costa and close to tornus; terminal shade and fringe as on forewing. Forewing beneath without first line, but with some fuscous suffusion distally and in cell; median and postmedian very strongly expressed, the latter not widening into distal blotches, terminal shade and fringe as above. Hindwing beneath with the median line, terminal shade and fringe as above, postmedian single, corresponding to the distal of the upperside pair.

Barberton, 31st December, 1910.

Larger and more sharply lined than *associata* Warr. and *squamulata* Warr., the lines and distal blotches differently arranged, etc., perhaps intermediate in breadth of wing.

Ptychopoda echo, n. sp. (Pl. XXV, Fig. 12).

♂, 13 mm. Face, palpus, and upper and inner side of foreleg blackish. Vertex and antenna pale. Collar and front of thorax darkened, as costal region of forewing; body otherwise coloured like ground-colour of wings. Similar in colour and facies to *associata* Warr., of which I at first supposed it might be merely a weakly marked form; ♂ antennal joints, however, with strong angular projections as in *squamulata* Warr., which is not conspicuously the case with *associata*. Hindlegs unfortunately lost. Wings slightly broader than in *associata*; second costal spot of forewing further from termen (about midway between termen and first spot), the postmedian which arises from it therefore also further from termen, rather less in bent posteriorly, rather weak and fine, a band shortly beyond it.

somewhat more conspicuous (except at costa); dark ternal shade of forewing not, of hindwing not greatly, developed (the latter rather more pronounced beneath); discal dot distinct, black, as in *associata*; dots on fringe almost obsolete. Hindwing with distinct discal dot, otherwise quite weakly marked, traces of three curved lines or narrow bands between discal dot and termen. Forewing beneath more suffused, especially in basal half along costa and behind cell; both wings with distinct black discal dot and three moderately distinct but not sharply defined lines or shades distally to it, forewing in addition with a blackish costal spot at origin of postmedian.

Barberton, 16th January, 1911 (type); 25th January, 1911 (cotype), the latter in coll. L. B. Prout.

A much narrower-winged ♀ (Barberton, 21st January, 1911), expanding 14 mm., is perhaps a handsome aberration of this species—scarcely its normal ♀ form. The postmedian costal spot is placed somewhat nearer to the apex, the postmedian line itself is lost, the distal area from here to the termen, excepting a moderately thick subterminal line, being occupied with a fuscous bordering; hindwing above and both wings beneath with a similar fuscous bordering, though slightly less dark beneath; fringe of both wings with better developed dots. This pretty form bears the same relation to the name-type as *Pt. biselata* Hafn., ab. *fimbriolata* to ab. *extincta*.

Ptychopoda paraplesia, n. sp. (Pl. XXV, Fig. 14).

♀, 21 mm. Face deep fuscous. Palpus marked with fuscous on outer side. Vertex and antenna whitish; collar more brownish. Thorax and abdomen concolorous with wings. Forewing moderately elongate; shining whitish bone-colour, with a minute grey dusting; lines grey, not very sharp; first line very weak, gently curved, strongly oblique, from costa at about 3 mm. to hind margin at scarcely 2 mm.; discal dot small, rather distinct; median line distinct, well beyond discal dot, parallel with termen, only very feebly sinuate inwards in posterior part; postmedian finer, minutely crenulate, parallel with median, the sinuosity perhaps slightly more observable; a pale subterminal, extremely faintly indicated by the absence of the grey dusting, in some lights seen to be bounded by slight dark shades (increase of dusting); termen with some very weak interneural spots; fringe unspotted. Hindwing with termen scarcely sinuous; SC² and R¹ stalked to half-way beyond cell; without first line; median making a bend to pass proximally to the small but distinct black discal dot, otherwise parallel with termen; postmedian rather more crenulate than on forewing; vague lines or shades accompanying the subterminal proximally and distally, the proximal in particular tending to break into spots, the distal almost reaching the termen; terminal line and fringe as on forewing. Under surface rather whiter, forewing with vague smoky suffusion in proximal half, except towards hind margin; lines (except first of forewing) present, but fine and weak; discal dots present; terminal dots somewhat more conspicuous than above.

Waterval Onder, Transvaal, 23rd November, 1910. Type in coll. A. J. T. Janse.

May possibly prove to be a form of *nitescens* Warr., Nov. Zool., IX, 502; rather lighter, the median shade of forewing *following* the cell-dot, the dots in the fringe wanting. Rather longer-winged than *consericeata* Prout, rather less dusted, discal dot of forewing much smaller and free from accompanying grey clouding.

A rather smaller, rather shorter-winged ♂ from Selukwe, Southern Rhodesia, October, 1911 (F. W. Short), and a more typical ♀ from the same source, August, 1913, both in coll. L. B. Prout, seem referable here; also two worn ♂♂ from Salisbury, Mashonaland, August and October, 1900 (G. A. K. Marshall), in coll. British Museum; ♂ antennal ciliation not much longer than diameter of shaft, hindtibia little longer than femur, dilated, with light brownish hair-pencil reaching nearly its entire length, tarsus quite short (less than one-half tibia), strongly bent.

Ptychopoda nasifera, n. sp. (Pl. XXV, Fig. 13).

♀, 19 mm. Face and upper side of palpus black. Head and body concolorous with wings. Forewing long and narrow, less glossy than in the preceding groups, dirty whitish with coarse fuscous dusting, rather recalling the Palaearctic *Pt. seriata* Schrank or *longaria* H.-Sch., but with an appreciably more fleshy tinge; lines formed of accumulations of the fuscous atoms, the postmedian best expressed, antemedian from costa at 3 mm. angled on subcostal vein, then wavy, almost parallel with the very oblique termen; median similarly formed, slightly more distinct, passing just distally to the black cell-dot; postmedian from costa nearly 3 mm. from apex, rather oblique inwards, nearly meeting the angle of median line, then (at SC⁵) shapely bent outwards, acutely angled on R¹, thence somewhat sinuous, nearly parallel with termen; extremely faint indications of a sinuous pale subterminal between darker shades; fringe somewhat dark-dotted. Hindwing relatively rather short, termen slightly sinuate inwards between M¹ and tornus; no antemedian line; median and postmedian strongly sinuous, the former passing just proximally to the black cell-dot; a thick dark line distally and parallel to the postmedian. Wings beneath without distinct markings, except the rather large discal dots; forewing somewhat more suffused than above, hindwing somewhat whiter.

Warmberg, Transvaal, 9th October, 1903.

Ptychopoda subculta, n. sp. (Pl. XXV, Fig. 15).

♀, 16 mm. Face and palpus blackish; head and body otherwise concolorous with wings; forefemur and tibia partly fuscous. Wings shaped as in the Palaearctic *Pt. bisclata* or *invalida*, to the latter of which in its small second-brood forms (as I have it from Shanghai) it bears a rather near resemblance. Bone-colour, but with a more brownish hue than the species named, rather more strongly dark-dusted. Forewing with antemedian line from costa just beyond 2 mm., weakly sinuous ("S-shaped"), reaching hind margin at 1.5 mm.; median shade rather diffuse, not very strong, crossing the small distinct black cell-dot, then incurved parallel with antemedian; postmedian finer, gently sinuous, with a slight tendency to form small distal teeth on the veins, arising

from a black costal dot just over 2 mm. before apex, following a similar course to that of *biselata*, though rather less crenulate; pale subterminal line as in *invalida*, i.e. thickening and bending proximal between the radials, nearer the termen and more interrupted in posterior half of wing, the fuscous shades, which (as in *invalida*) accompany it proximally, moderately pronounced, though not so strong as in *squamulata*, etc.; dark dots on base of fringe pronounced. Hindwing with SC^2-R^1 moderately stalked; median shade almost as near base as antemedian of forewing, thus well proximal to the black cell-dot; postmedian rather strongly sinuous and dentate, but in places not very distinct—a conspicuous tooth on R^1 , a rather deep curve inwards between R^1 and R^3 , containing a slight tooth on R^2 ; distal area and fringe as on forewing, but perhaps with rather more dark shading *distally* to the subterminal line in addition to its proximal dark shading. Under surface similar, but forewing with suffusion in its whole basal area instead of first line, i.e. quite like a moderately well-marked *biselata*, a clear band of the ground-colour, as in that species, showing between the median and postmedian.

Barborton, 26th December, 1910.

Ptychopoda purpurascens, n. sp. (Pl. XXV, Fig. 16).

♂, 13 mm. Rather smaller than *Pt. lacteipennis* Btlr. (Ill. Het., VII, 107) from Dharmasala, antennal ciliation somewhat shorter, hindwing elbowed in middle, with R^3-M^1 shortly stalked. Thorax and forewing dull purplish with dark irroration and a slight admixture of reddish scales, a yellowish spot on fold just behind middle; a dark line from tornus, less oblique than the wing-margin, curving strongly basewards after crossing M^1 , losing itself in the radial area before reaching the cell; distally to this line, and broadening towards apex, the ground-colour is appreciably paler, with slight yellowish admixture; fringe yellow. Hindwing reddish in proximal half, dull purple in distal, a zigzag whitish-yellow line in middle quite as in *lacteipennis*; just distally to this line the purple colour is irrorated with reddish; fringe yellow. Under surface similar but rather duller, the band of hindwing broader, less whitish, the line from tornus of forewing not distinguishable.

Umkomaas, Natal, 30th–31st January, 1914 (A. J. T. Janse); the cotype kindly presented to my collection.

Ptychopoda umbricosta Prout.

In describing this species (Ann. Transv. Mus., III, 201), I overlooked an interesting and very rare abnormality in its venation, the complete loss of the distal wall of the areole, leaving the five subcostals on a common stalk, SC^1 arising first. The three or four species of *Ptychopoda* in which this occurs might possibly be formed into a new genus, but they do not seem otherwise congruous and the phenomenon has probably arisen independently.

The East African race which I described (*loc. cit.*) as *minimaria* Warr. shows the same structure, strengthening my idea that it might prove conspecific, though the point cannot yet be regarded as absolutely established. But I find the insect in question is one of the—unfortunately

numerous—misidentifications in Swinhoe's otherwise useful paper (Trans. Ent. Soc., Lond., 1904, pp. 497-590) and requires a new name: ***Ptychopoda umbricosta depleticosta***, n. subsp. (= *minimaria* Swinh., Trans. Ent. Soc., Lond., 1904, 559, indescr.; Prout, *loc. cit. supra*), slightly greyer, perhaps less strongly glossy, vertex less white, forewing with costa concolorous, fringe with strong dots at base. Founded on three ♀♀ (not "two ♂♂, one ♀," as given by Swinhoe) in coll. British Museum, from Tana River, British East Africa. Warren's *minimaria* is, as its author says, a close ally of *associata* Warr. (= *exilinata* Warr.).

Ptychopoda (Cacorista) rufimixta rufifascia, n. subsp. (Pl. XXV, Fig. 17).

Differs from typical *rufimixta* Warr. (Nov. Zool., VIII, 207), from the Lower Niger, in having the red (in one example more purple) lines much better expressed, the median and postmedian distinct across the wing, the latter forming a moderate band, proximally blackish-edged in at least its anterior half. Hindwing with traces of a red postmedian band at least at inner margin, where it terminates in a darkened spot. Both wings beneath with conspicuous purple postmedian band, as well as strong suffusion costally on forewing and in cell of both wings.

Umkomaas, Natal, 2nd January, 1914 (type), 6th January (cotypes in coll. L. B. Prout). The British Museum has very worn examples from Tonga, British East Africa (wrongly identified by Swinhoe as *macrostyla* Warr.), which seem referable here.

Zygophyxia, n. gen.

Face flat, smooth. Palpus short (about as long as diameter of eye), shortly rough-scaled. Tongue slender. Antenna in ♂ ciliated, in ♀ simple. Pectus and femora glabrous. Hindleg not aborted, tibia in both sexes with terminal spurs only. Forewing very long and narrow, costa *very slightly* arched, apex round-pointed, termen smooth, almost straight, strongly oblique, about as long as hind margin; cell well over one-half, C free, a single areole far before end of cell, SC¹, SC²⁻⁴, and SC⁵ arising almost together at its apex, or SC⁵ from stalk of SC²⁻⁴; M¹ separate (not remote), M² rather near M¹. Hindwing elongate, costa long, straight, apex rather rounded, termen smooth, almost straight from near apex to R³, then very gently curved, more strongly about M¹, thence straight or faintly subconcave (about parallel with costa), tornus very weak; cell fully one-half; C anastomosing at a point or rather more, then gradually diverging, SC² separate, R² central, medians as in forewing.

Type of the genus: *Zygophyxia relicatata* Walk. (*Acidalia*?).

Differs from *Ptychopoda* and *Limeria* in the non-stalking of SC² of the hindwing; *conscensa* Swinh., Proc. Zool. Soc., Lond., 1885, p. 863, though less extremely narrow-winged, also belongs to this genus.

Zygophyxia stenoptila, n. sp. (Pl. XXV, Fig. 18).

♀, 19-20 mm. Face blackish fuscous; palpus marked with the same above; vertex and base of antenna pale; collar somewhat fuscous. Thorax and abdomen concolorous with wings. Light sandy-brown, sometimes with a tinge of reddish, hindwing very slightly paler than forewing; markings fuscous, rather vague. Forewing with first line obsolete; median

very oblique (even more so than *termen*), very ill-defined, apparently angled on SC⁵, crossing the small but sharply black cell-dot (in one example slightly proximal thereto), connected in middle (especially in one cotype) with a slight, narrow fuscous shade in distal half of cell, lying along the median vein; postmedian line rather better defined, at least on the veins, oblique from three-fifths posterior margin towards apex, followed distally by a slightly less oblique, ill-defined shade or band, the two meeting about R³, the shade or band running on almost to apex (the scheme therefore about as in the *defamataria* group of *Lycauges*); *termen* with a series of small dark interneural dots or dashes; fringe somewhat infuscated, unspotted. Hindwing with weak median shade, crossing the distinct black discal dot and sharply bent about R¹ (but almost obsolete costally); subterminal line (or vein-dots) and shade extremely ill-defined, apparently reversing the arrangement of forewing, i.e. meeting in tornus; terminal dots nearly as on forewing, fringe somewhat less infuscated. Under surface more suffused, at least in proximal half of both wings, usually leaving only a clear band proximally to the postmedian line and a narrower, less complete terminal one.

Pretoria, 14th October, 1911 (type), 12th November, 1909, and 27th January, 1912, collected by A. J. T. Janse, the cotypes in my collection. More glossy and less strongly marked than *Z. relictata* Walk.

Rhodometra satura, n. sp. (Pl. XXV. Fig. 19).

♂, 22-24 mm. Closely similar to *rosearia* Tr., differing as follows: antennal pectinations not quite so long and leaving a slightly longer apical part simple; forewing with rosy costal edge broader; rosy band slightly more oblique, running to costa almost at apex, here meeting the terminal rosy band, which is rather broader than in *rosearia*. the intervening yellow area thus forming a narrow, wedge-shaped band, with sharp anterior point directed towards (but not quite reaching) apex or anterior end of *termen*; fringe rosy; hindwing practically uniform dark smoky, without the pale base, cell-spot or postmedian band of *rosearia*, its fringes also dark smoky; under surface of forewing less strongly, of hindwing hardly at all, flushed with rosy.

Delagoa Bay, 1890 (Junod), type; White River, E. Transvaal, December, 1907 (A. T. Cooke); Durban, Natal, April, 1902 (G. F. Leigh); all in coll., British Museum. Also in coll. Janse, from Durban.

Conchyliia lapsicolumna, n. sp. (Pl. XXV, Fig. 20).

♀, 22 mm. Face white, mixed with brown, but less strongly than in the other *Conchyliia* species. Palpus brown. Head and body white. Forewing white, less strongly shining than in the other species, costal margin not brown; bands bright light brown, but much less golden than in *pactolaria* Wllgrn., slightly edged (as in that species) with more fuscous brown; the proximal from posterior margin at 2-3 mm. (being almost 1 mm. in width), not extended along the margin basewards, strongly oblique, constricted in middle, terminating abruptly (broadened rather than narrowed) at the cell-fold, near the distal end of the cell; distal band slightly crenulate at its margins (much less deeply than in *pactolaria*),

arising on posterior margin near tornus (not curving basewards) and running straight across the wing to *costal margin 1-2 mm. before apex*; termen dusted with brown to a width of 1 mm.; the margin itself with dark spots between the veins. Hindwing less pure white, being very finely and vaguely dusted with brown. Under surface very like that of *pactolaria*; forewing suffused with brownish, the bands very feebly showing through in a greyer tone, hindwing white.

Waterval (Zoutpansberg District), Transvaal, 9th December, 1903.

Eupithecia festiva, n. sp. (Pl. XXV, Fig. 21).

♂, 15 mm. Head and thorax light ochreous-brown, somewhat mixed with white. Antennal ciliation minute. Abdomen rather long and pointed, very varied, its base, a narrow mediodorsal stripe to beyond middle and a lateral one from before middle to anal end, concolorous with thorax; a bright ferruginous patch laterally on 2nd-3rd abdominal (recalling *Melanthia ustiplaga* Warr., Nov., Zool., VI, p. 298), and some ferruginous ventrally in posterior part; the rest predominantly dark grey; dorsal crests scarcely developed. Forewing with termen not so oblique as in many of the genus; light ochreous brown, a good deal mixed with bright ferruginous; basal patch dark grey costally, its boundary indicated by a curved, strongly oblique whitish line; a broad median band, mostly dark grey, especially at costa, in the middle and posteriorly somewhat mixed with the ground-colour, and with an irregular patch of the ground-colour around the large black discal spot; boundary-lines of this band fine, white, the proximal oblique outwards from nearly two-fifths costa, acutely angled at SC, then parallel with termen, but with a curve inwards in submedian area; the distal from nearly two-thirds costa, forming a gentle outward curve from SC⁵, posteriorly about parallel with termen; subterminal line white, distinct, nearly straight from near tornus to near costa, then slightly inbent; termen with dark spots between the veins; fringe with a pale line at base. Hindwing grey, paler in cell and traversed by pale waved lines, the proximal ones only indicated at the inner margin. Forewing beneath more greyish-suffused from base to postmedian and with greyish bands proximally to the subterminal and to the termen; subterminal line indistinctly pale; a dull ferruginous tinge in the rest of the distal area. Hindwing beneath grey, traversed by whitish lines.

Barberton, 29th January, 1911.

The coloration somewhat recalls that of the European *E. gueneata* Mill., though slightly darker, duller, and less rufescent.

Eupithecia gradatilinea, n. sp. (Pl. XXV, Fig. 22).

♀, 20 mm. Face and palpus fuscous. Thorax above concolorous with forewing, abdomen much darker than hindwing, both beneath pale. Forewing pale ochreous-grey dusted with dark-grey (colour of *E. castigata* Hbn.; both wings very slightly narrower than in that species); cell-mark black, elongate (length of DC²⁻³); costal margin with some dark dots and spots, especially at the beginnings of the lines; some dark spots at base; lines rather indistinct; subbasal fine, bluntly angled subcostally; an intermediate line and the antemedian scarcely discernible, apparently

formed somewhat like the postmedian; median discernible from cell-spot to hind margin, parallel with postmedian; postmedian falling nearly perpendicularly from costa just proximally to two-thirds, thick and somewhat indented (and followed distally by a slightly pale space) between costa and R^3 , afterwards finer and indistinct, forming a point distad between R^3 and M^1 , then running to posterior margin staircase-wise, being bent alternately inwards and outwards, the inward angles placed on M^2 and SM^2 , the outward on the fold; subterminal line whitish, dentate from costa to R^3 , more irregular (and in parts indistinct) behind, but with a purer white spot between R^3 and M^1 and a second behind M^2 ; terminal line black, rather thick, interrupted at the vein-ends; fringe greyish, weakly dark-spotted opposite the veins, a pale yellow-grey line at its base. Hindwing whitish, the inner margin and distal margin to a width of 1 mm. concolorous with forewing; cell-mark as on forewing; postmedian line (continuing the median of forewing) running perpendicularly from costa to R^3 , rather thick but shadowy, only darkened into dashes on the veins, nearly parallel with termen posteriorly but incurved in submedian area; the pale band which follows very feebly bisected by a grey line; subterminal and terminal lines and fringe as on forewing. Forewing beneath paler, becoming white posteriorly; costal spots, cell-mark and costal half of postmedian line nearly as above, terminal area somewhat darkened except at tornus, the subterminal therefore indicated through most of its course. Hindwing beneath nearly as above, postmedian line rather stronger, subterminal line thicker and more ill-defined, diffused nearly to termen in tornal half.

Pretoria, 13th December, 1909. Barberton, 4th January, 1911 (A. J. T. Janse), kindly presented to my collection. A worn ♂ from White River, May, 1908 (A. T. Cooke), probably also belongs here; antennal ciliation minute. The Barberton specimen is a little darker than the type, but not in quite such perfect condition.

Eupithecia rubidimixta, n. sp. (Pl. XXV, Fig. 23).

♀, 21–22 mm. Related to the preceding, possibly even a remarkable local form of it, differing as follows: termen of hindwing slightly more inclining to crenulate, between the radials straight or feebly subconcave; both wings with a strong reddish admixture, especially along the posterior margin and in distal area, on the forewing prominently, also in the pale parts which (more than in *gradatilinea*) bound the median area; a reddish patch between the radials posterior to the median band in particular noticeable; the dark colouring intensified, especially in the median area of the forewing, a distinct dark bar (narrow band) present between the basal and median areas which is scarcely at all suggested in the type specimen of *gradatilinea*, but is traceable (though not conspicuous) in the Barberton example; cell-spots thickened; subterminal line mostly weaker, but with the white dots (especially that behind M^2) more prominent. The under surface is quite alike in both forms, except for the larger cell-spots, and gives, with the form of the postmedian line of the upper surface, the chief clue to the possible specific identity.

Waterval Onder, 22nd to 25th November, 1910 (A. J. T. Janse), the latter (cotype) in coll. L. B. Prout.

Eupithecia polylibades, n. sp. (Pl. XXV, Fig. 27).

♀, 23 mm. Head and thorax whitish-grey, coarsely peppered with blackish. Palpus nearly twice as long as diameter of eye, second joint stout, roughly scaled above, more strongly dark-mixed, pale at tip. Abdomen dorsally belted with ferruginous, except at tip; a pair of black spots on the second belt, another on the last (seventh); crests very small. Wings normally shaped. Forewing whitish-grey with a slight bluish tinge, dark dusted and traversed by numerous (perhaps about 15) darker, somewhat wavy lines, composed of accumulated coarse dark speckles, all pretty uniform in intensity, though with a slight suggestion of a darkened band of just over 1 mm. breadth proximally to the rather large oval cell-spot; the succeeding lines more angulated behind R^1 ; postmedian line just differentiable by a slightly darker spot and dark, proximally directed tooth on the veins, the succeeding lines somewhat similarly toothed; distal area more densely irrorated and with a brown admixture, the whitish subterminal somewhat interrupted, thus chiefly indicated as a row of short lunules, a whitish spot behind R^3 and a second behind M^2 also noticeable; terminal line black, somewhat thickened anteriorly, interrupted throughout by small pale dots at the veins; fringe long, its proximal half with large oval dark spots opposite the veins, its distal half more uniform. Hindwing slightly tinged with brownish, the lines proximally to the postmedian undeveloped except at inner margin, some not very conspicuous dark vein-streaks running proximad from the postmedian; distal part of wing and fringe as on forewing; a moderate cell-spot. Under surface rather lighter and more glossy; forewing with proximal part somewhat suffused, darkest along costa, without lines; cell-spot present, also the angulated lines beyond (not manifestly composed of dots); postmedian line rather thick, somewhat formed of spots, a divided pale band following; distal area with two pale lines, the second being the true subterminal; terminal line as above; fringe more weakly marked. Hindwing not suffused, first angulated line proximal to cell-spot, second crossing it, third between it and subterminal, distal part nearly as on forewing.

Pretoria, 20th March, 1914. A second example—a ♂, rather rubbed—from Machacha, Basutoland, 10,000 feet, 29th January, 1902 (R. Crawshay), in coll. British Museum; antennal ciliation quite short.

Eupithecia perizomoides, n. sp. (Pl. XXV, Fig. 24).

♀, 17 mm. Face mixed golden-brown and fuscous. Palpus the same, the fuscous rather preponderating, first and second joints beneath pale. Vertex pale grey. Thorax mixed golden-brown and fuscous above, dirty-white beneath. Foreleg fuscous above, spotted with white at the ends of the joints. Abdomen dorsally greyish fuscous, with belts of golden-brown (in part somewhat ferruginous) at the ends of the segments; ventrally dirty-white. Forewing not much elongated; basal patch greyish fuscous, becoming pale at posterior margin, and containing a large golden-brown spot subcostally; margined, at about 1 mm. from base, by a slightly curved, scarcely dentate, fine white line; intermediate area dirty-white, more or less dusted with fuscous and golden-brown and containing small

fuscous patches at costa and hind margin, accompanied proximally and distally by ill-defined golden-brown spots; median band rather narrow, only 1 mm. at costa, less at hind margin, not quite 2 mm. at widest part (from R^1 about to M^2), distally indented on the veins and fold, greyish fuscous, containing a large black cell-mark, which is partly surrounded with golden-brown, and a golden-brown streak along SC; a wavy but tolerably distinct white line bounds the median band proximally; a further white line bounds it distally; two golden-brown bands, separated by a fuscous line, follow the same contour distally; the area between the second of these and the pale subterminal is mostly filled in with fuscous; subterminal much broken into spots; terminal area fuscous, mixed with golden-brown; fringe weakly dark-spotted. Hindwing rather elongate, with termen strongly rounded; whitish grey, almost unmarked; fringe unspotted. Forewing beneath whitish grey, with very shadowy indications of some of the upper side markings. Hindwing beneath whitish, with very vague cell-dot and weak-bent grey bar just beyond.

Waterval Onder, 3rd November, 1910.

An eccentric species in the shape of the hindwing and its lack of colour, perhaps hardly a true *Eupithecia*, though the venation agrees (single areole, little oblique discocellulars, etc.). Rather recalls *Perizoma*. The dorsal crests become weak on posterior segments.

Chloroclystis gymnoscelides, n. sp. (Pl. XXV, Fig. 25).

♀, 13–16 mm. Head, body, legs, etc., mostly concolorous with wings, but with the following parts more or less infuscated: lower extremity of face, which ends in slight tuft; outer side of palpus; most of thorax dorsally, base of abdomen dorsally; front (upperside) of foreleg except at the extremities of the joints. Wings brownish-grey with a vinous tinge, about like *Gymnoscelis pumilata* Hbn., but both wings relatively shorter, termen of hindwing virtually smooth (straighter between the radials than the rest); markings not very sharp, the lines and shades of the proximal area of the forewing, however, more uniformly darkish, more oblique than in *pumilata*; medium area not lighter than distal, the pale lines which bound it less sharp than in most *pumilata*; postmedian line curved *proximad* at costa, indented, and with slight thickening between the radials, posteriorly less conspicuous; subterminal line discernible, somewhat dentate, no conspicuously vinous band proximally to it, the dark markings placed as in *pumilata*, but not intense. Hindwing with postmedian line slightly nearer to termen than in *pumilata*, nearly parallel therewith throughout, only with feeble inward curve between radials and very feeble inward curve between R^3 and inner margin. Under surface sharply marked, recalling the European species of *Chloroclystis*, but without distinct discal spots, the forewing somewhat more suffused from base to postmedian line, the thick postmedian of the hindwing less acutely angled at R^3 .

Umkomaas, 18th January, 1914 (type), 23rd January, 1914 (cotype, worn, in coll. L. B. Prout).

Xanthorhoe (?) *brunneitrames*, n. sp. (Pl. XXV, Fig. 26).

♀, 29–35 mm. Face brown in upper half, deep fuscous in lower. Palpus fuscous, basal part pale beneath. Vertex brown. Thorax above

mixed brown and deep fuscous; metathoracic tuft posteriorly black. Abdomen brownish, the sides dusted with black, the dorsal surface strongly mixed with black, leaving some brown belts, or at least an anterior one. Forewing light-brownish, the markings blackish mixed with ferruginous (in one example mainly ferruginous), the basal and median areas traversed by the usual wavy lines; basal patch with a small outward bend in front of SM^2 ; median band rather broad, more ferruginous at its edges, proximal edge slightly wavy, forming a very gentle and regular curve, distal with small indentations on SC^4 and SC^5 , a slight inward curve between the radials, a pointed or more rounded projection about R^3 , thence slightly retracted and creulated; a narrow, more or less interrupted white line between this band and the next black line, then a more ferruginous shade; distal area more or less strongly clouded with black on either side of the deeply lunulate-dentate pale subterminal, the most prominent markings being an oblique line from apex, a streak distally to, but partly interrupting, the subterminal between SC^5 and R^1 and a patch proximally to the subterminal between the radials; all the veins distally to subterminal thickly marked with ferruginous brown; the dark discal mark is enclosed in a distinct, elongate, ferruginous-brown mark; fringe brownish, chequered with fuscous. Hindwing of the same ground-colour, slightly shaded with fuscous as far as on ill-defined postmedian line, which is chiefly emphasized by large dark vein-spots in its posterior half and by being followed, as on forewing, by an interrupted pale line; subterminal line distinct only in posterior half of wing, where there is again some slight fuscous admixture. Under surface pale-brownish, both wings (especially forewing) more greyish from base to a fine, moderately distinct postmedian line and with a conspicuous black discal spot; forewing also with costal margin basally dark-marked, especially a spot about 4 mm. from base.

Barberton, 19th December, 1910 (type). Durban (Clark), much less fuscous-marked, in coll. L. B. Prout. Estcourt, Natal (J. M. Hutchinson), in coll. British Museum.

Larger than *saturata* Guen., with a more brownish hue in ground-colour, black apical line and other differences. Whether the ♂ antennal structure agrees with that group (*Ochyria* Warr., *nec* Hbn.), remains unknown.

Mauna ardescens, n. sp. (Pl. XXV, Fig. 29).

♂ ♀, 35–38 mm. Head with palpus and antenna orange-red irrorated with crimson; antenna in ♂ not pectinated, merely with short, very shortly ciliated teeth. Thorax above orange-red; beneath white or whitish, anteriorly mixed with crimson. Legs white or whitish, upper and inner sides of foreleg almost entirely crimson, of middle leg strongly mixed with crimson, of hindleg less strongly spotted with the same; ♂ hindtibia strongly and roundly swollen, with hair-pencil, hindtibia abbreviated, spinose. Abdomen orange-ochreous, slightly paler beneath except at anal end. Wings rather broader than in typical *Mauna*. Forewing with SC^2 connected with SC^{3-4} by a short bar (in the typical species this varies between a short bar and point-anastomosis); orange-red in the ♀ almost entirely covered over with crimson irrorating, giving

it a very warm red coloration; a blackish cell-spot feebly expressed in the type ♀, distinct in another ♀, obsolete in the other examples (which, however, are worn); an oblique ochreous or yellowish line from hind-margin at 7 or 8 mm., running almost straight towards apex but slightly incurved after passing R^1 , reaching costa at about 2 mm. from apex or becoming nearly obsolete; fringe more purplish, darker (in one example mostly blackish) distally. Hindwing bright orange-ochreous, unmarked, in some lights showing faint traces of a paler median line; fringe tinged with crimson, at least distally. Under surface ochreous, with costal and distal margins and apical regions more reddish-tinged; fringes as above.

Barberton, 19th December, 1910 (type ♀). A quite similar ♀ from White River, E. Transvaal, 20th September, 1910 (A. T. Cooke), two worn ♂♂ (Pretoria, November, 1894; Van der Merwe Station, 12th December, 1906), and a worn ♀ (Lydenburg District), all in coll. British Museum.

Forms a new section of the genus, according to the ♂ antenna.

Drepanogynis glaucichorda, n. sp. (Pl. XXV, Fig. 28).

♂ ♀, 29–32 mm. Head and palpus red-brown or purple-brown, the latter mixed with bright deep ochre. Antennal shaft reddish, pectinations in ♂ moderately long; ♀ antennal subserrate. Thorax and abdomen concolorous with wings. Legs light-brown, slightly dark-speckled, fore coxa and tibia mostly red-brown. Forewing with costa straight except at base and apex, termen in ♂ slightly, in ♀ more markedly bent in middle; red-brown or purple-brown (variable in colour), slightly sprinkled with grey or glaucous-grey speckles or strigulae; lines fine, pale glaucous-grey or whitish; antemedian from costa at slightly beyond one-fourth, outbent or curved at first, then about vertical to hind margin at one-third, rarely very distinct throughout; accompanied proximally (sometimes partly obscured) by a narrow grey shade, distally by a very fine line a little darker than the ground-colour; postmedian from costa 2 or 3 mm. before apex, parallel with termen about to M^1 , then slightly curved basewards; accompanied proximally by a very fine line rather darker than the ground-colour, or ill-defined shading, distally by elongate grey spots, separated by the veins (occasionally quite indistinct), the ones between M^2 and hind margin often enlarged; cell-spot rather large, oval, dark grey, sometimes slightly paler in middle; fringe, except a pale line at its base, concolorous with wing. Hindwing rather paler, with small discal dot and whitish postmedian line, broadest and most distinct on inner-marginal half, where it is faintly incurved and often accompanied by a grey line proximally and sometimes by a small grey blotch distally. Under surface always reddish, with coarse grey speckles, usually reddest towards margins (except hind margin of forewing); discal dots usually indicated, postmedian sometimes vaguely traceable.

White River, E. Transvaal, November, 1907, and March, 1908 (A. T. Cooke), type ♂ and cotype ♀ in coll. British Museum. Barberton, 13th–25th January, 1911 (A. J. T. Janse), two ♀♀. Sabie, February–April, 1912 (W. Grubb), a broad-winged ♀ aberration in coll. L. B. Prout. Pretoria (A. J. T. Janse), a ♀. Karkloof, Natal, 20th February, 1897

(G. A. K. Marshall). Lower Tugela, Zululand, 160 feet elevation, 21st September, 1902 (E. D. Reynolds). The last three (all ♀) in coll. British Museum. The Pretoria specimen is an aberration or local form, of a much less reddish colour and with the postmedian line of forewing only very slightly curved.

Rather more stoutly built than *chromatina* Prout (*Apleroneura*), deeper coloured, more dark-dusted, forewing with larger discal spot, lines less clean-cut, usually further apart on hind margin of forewing, postmedian on hindwing much less near the discal spot, under surface less marked, etc. But in the extraordinary variability of some South African "Ennoimids," it is not absolutely impossible, they may have to be merged. The generic name *Drepanogyvis* Guen. has priority over *Apleroneura* Warr., which—in ignorance of Guenee's species—I have hitherto used for this genus.

Sicyodes ocellata intuens, n. form.

♀, 39 mm. Structure as in *cambogiaria* Guen. (= ? *biviaria* Guen.), shape not very dissimilar, forewing with costal margin relatively longer, termen more strongly gibbous at radials, more strongly oblique behind, hindwing rather longer. Face dove-colour, somewhat mixed with ochreous. Palpus dotted with darker reddish, the minute terminal joint dark grey. Vertex, antenna, body, and legs dove-colour, the legs dark-spotted. Wings dove-colour with vague olive-grey cloudings (especially in median area of forewing) and indistinct darker blue-grey spots, the costal half of forewing as far as the first line ochreous, shading off into the ground-colour posteriorly. Forewing with the two lines fine, whitish-ochreous, edged, on their obverse sides, with small black dots on the veins; antemedian from costa at 6 mm., oblique outwards, very strongly bent behind SC, then straight to hind margin at nearly 5 mm.; postmedian from costa 2.5 mm. before apex to hind margin at beyond 7 mm., tolerably straight, but with an extremely slight angle at R³; fringe ochreous proximally, whitish distally and with dark spots opposite the veins; cell-spot large, grey, dotted with blackish (especially in its centre) and with a deep blackish-red circumscription. Hindwing with slight indications of a sinuous whitish postmedian line, a row of grey dots distally and parallel to it somewhat larger and more distinct than the rest of the dots; an ill-defined grey spot at tornus; fringe proximally paler than on forewing, opposite the tornal spot mixed with red; spots opposite veins as on forewing. Forewing beneath similarly but more vaguely marked, antemedian line wanting; hindwing beneath with a small black discal dot, the postmedian whitish line of upperside not reproduced, but the dots beyond stronger and accompanied by a pale line corresponding to the postmedian of the forewing.

Sarnia, Natal, 12th August, 1913.

Probably a ♀ form to *ocellata* Warr. (Nov. Zool., IV, 260), though so different in colour and aspect. A second ♀ is smaller (34 mm.) and may represent the normal ♀ of the species; ground-colour uniformly suffused with ochreous (paler on hindwing), the grey discal spot smaller, scarcely dark dotted, its circumscription indistinct, being merely darker ochreous. Durban (Colonel Bowker), in coll. British Museum.

Zamarada pandatilinea, n. sp. (Pl. XXV, Fig. 30).

♂ ♀, 22–24 mm. Structure normal, ♂ hindtibia not greatly dilated, forewing with termen (at least in the ♂) somewhat more oblique than in most *Zamarada*. Coloration as in rather dark-bordered examples of *secutaria* Guen. (= *pulverosa* Warr.). (Face abraded in both examples.) Palpus fuscous above, pale beneath. Vertex and antennal shaft pale whitish-brown, the latter dotted with fuscous; occiput fuscous. Thorax and abdomen whitish-brown mixed with fuscous, a fuscous belt at base of abdomen above. Legs pale, foreleg (especially femur) fuscous above and on inner side. Forewing with very small, ill-defined, oblique-edged fuscous patch at base; antemedian line oblique outwards from costa at or before one-third, strongly curved in cell, becoming parallel with termen; median rather less distinct, arising from a dark costal spot, strongly excurved distally to discal dot, approaching antemedian at posterior margin, both here thickened and blackened; postmedian somewhat wavy, in its middle part (from R¹ to M¹) parallel with and midway between antemedian and termen, anteriorly strongly bent proximad, posteriorly slightly so; traces of a pale, weakly lunulate-dentate subterminal line, especially in posterior half of wing, where it is accompanied by strong dark fuscous clouding proximally, in anterior half almost obscured by similar but more extended clouding or mottling, which reaches termen; cell-dot small, black; a dark terminal line; fringes strongly dark-chequered between the veins. Hindwing similarly marked, the lines wavy, all nearly parallel with termen; anterior part of terminal area less strongly clouded than on forewing. Under surface with costal margin of forewing mostly dark fuscous to about middle, both wings with discal dot and dark border, in the type ♂ separated from termen by a narrow pale band, except in anterior half of forewing, in the cotype (♀) reaching the termen throughout.

Three Sisters, Transvaal, 19th March, 1911, type (♂). Singerton, June, 1910 (Munro), cotype (♀) in coll. L. B. Prout, presented by Mr. Janse.

Discalma griseescens, n. sp. (Pl. XXV, Fig. 31).

♂ ♀, 26–28 mm. Face and palpus grey mixed with brown; palpus about one and a half times diameter of eye, terminal joint slender, slightly drooping; first joint beneath white. Vertex and shaft of antenna white; occiput, postorbital rim, and collar brown. Antennal joints in ♂ slightly projecting, the ciliation in pairs of slender fascicles, about as long as diameter of shaft. Hindtibia in ♂ not dilated. Thorax and abdomen colorous with wings. Fovea not strong. Forewing whitish-grey with moderate darker irroration—about as *johnstoni* Bthr., but with the lines and irroration less brown and without the definite brownish distal shades; discal mark conspicuous, somewhat elongate, vertical to costa; first line about as in the following species, sometimes obsolescent; median shade oblique (parallel with termen), somewhat curved basewards at costa, otherwise almost straight, usually placed well beyond the cell-spot, sometimes obsolescent; postmedian similarly formed, more distinct, closely followed distally by an additional, ill-defined line or narrow shade; distal area slightly darker than the rest; marginal line consisting of isolated,

somewhat elongate black dots or spots, not very intense; fringe rather pale, with a thick dark dividing line and more definitely dark-spotted opposite the veins. Hindwing with termen slightly waved and a very little more prominent at R^3 (about as in *johnstoni*); coloured and marked nearly like forewing, discal dot smaller, antemedian line wanting, median straight or very slightly sinuous, well beyond discal dot, postmedian feebly bent in middle, without the crenulations of *johnstoni*. Under surface rather paler, but strongly irrorated, costa and veins tinged with ochreous, discal dots and median and postmedian lines traceable but not strong, distal area slightly darkened.

Selukwe, Southern Rhodesia, May, 1913 (type ♂), January, 1913 (♂), February, 1913 (♂), October, 1913 (♂), November, 1911 (♀), all in my collection, presented by the discoverer, Mr. F. W. Short. Pretoria, 23rd August, 1913, a rather more glossy, weakly marked ♀, in coll. A. J. T. Janse.

As in *johnstoni*, the forewing has SC^{1-2} coincident, free. In both the ♀♀ the termen of the forewing is slightly less even and that of the hindwing shows a slightly more noticeable excision between the radials. Thus one of the intergrades which make it doubtful whether the genus should not sink to *Macaria*; if it be tenable, *Discalma* Meyr. must take precedence of *Jephrinopsis* Warr., which has been in general use; both are founded on the same type (*normata* Walk. = *parallelaria* Walk.).

Macaria hypoleuca, n. sp. (Pl. XXV, Fig. 32).

♂, 27-29 mm. Head and body concolorous with wings. Palpus about one and a half, more yellowish beneath than above. Antennal ciliation less than half. Abdomen rather long and slender. Hindtibia dilated with hair-pencil. Forewing with termen scarcely at all concave anteriorly, almost inappreciably bent in middle; fawn-colour, mixed with violet-grey, darker in distal area, the dark irroration not very intense; lines fine, brownish; antemedian from costa at one-fourth, forming an outward curve in its anterior half, angled inwards on M, then again excurved, though quite feebly; median shade from costa at one-half, angled at R^1 , crossing or touching the posterior extremity of the large black cell-dot, slightly curved inwards between M and SM^2 ; postmedian from costa at about two-thirds, angled or strongly bent at R^1 , then almost straight, without the second angle of *leighi* Warr.; distal area mostly occupied by a dark cloud (proximally more brown, especially just behind R^3), its anterior edge (not sharply defined) running obliquely from R^3 to termen near apex; terminal line fine and slight, brown, interrupted; fringe clouded with grey. Hindwing relatively large, its distal margin little crenulate, but produced in middle, with a well-marked angle or tooth at R^3 ; first line wanting, median making a curve round the proximal side of the conspicuous black cell-dot, postmedian not very distinct at costa, bluntly bent in middle, curving somewhat towards tornus at inner margin; a vague brown shade distally to the postmedian, limited by a still vaguer pale subterminal clouding. Under surface white, with coarse, in places confluent, olive-brown irroration, veins ochreous; forewing with costal margin ochreous; both wings with cell-spot, ill-defined olive-brown

median shade, traces of fine postmedian, broad ochreous-mixed band distally hereto, that of hindwing running to tornus, and shading at the radials between this band and termen.

New Hanover, Natal (Hardenberg), August, 1913 (type). North-Eastern Rhodesia : Niamadzi River, near Nawalia, 2,000 feet, 20th August, 1910, and Upper Luango River, between Luwumbu and Mwailesi Rivers, 9th August, 1910, two ♂♂ (S. A. Neave), in coll. British Museum.

An inconspicuous species, but apparently undescribed. About the shape of *leighi* Warr. (Nov. Zool., XI, 478) and *unicolor* Warr. (Nov. Zool., XII, 403), of which I can at present only compare the descriptions and figures ; distinguished from the former by the conspicuous black cell-spot of the forewing, etc., from the latter by its more varied colouring, different underside, etc.

Macaria tecnum, n. sp. (Pl. XXV, Fig. 33).

♂, 20 mm. Head with palpus and antenna mixed with brownish ; palpus rather short ; antennal joints slightly projecting, ciliation almost as long as diameter of shaft. Thorax and abdomen concolorous with wings. Hindtibia dilated. Forewing with termen smooth, rather strongly oblique ; SC^{1-2} coincident ; light violet-grey with dark irroration and slightly clouded with brownish, especially as a vague band distally to the postmedian ; discal mark somewhat elongate ; lines fine ; antemedian excurved in cell and more slightly at SM^2 ; median shade weak except at costa, approximated to antemedian, thus proximal to the cell-mark ; postmedian nearly right-angled at R^1 , then nearly parallel with termen ; a vague fuscous shade between the brown outer shade and the almost obsolete subterminal ; a still more vague dark terminal patch on radials. Hindwing rather bluntly elbowed at R^3 ; paler from base to postmedian ; antemedian obsolete ; median continuing the antemedian of forewing, almost straight, reaching inner margin near the postmedian ; discal dot small ; postmedian slightly sinuous ; distal area about as on forewing. Underside similarly but more weakly marked, costal margin of forewing slightly more ochreous-tinged.

Pretoria, 3rd December, 1913.

One of the smallest species of the genus. A worn ♂ from the same locality, 3rd November, 1911, seems to have been whiter and more sharply marked.

Macaria elata, n. sp. (Pl. XXV, Fig. 34).

♀, 39 mm. Shape and structure of *lataria* Walk., List Lep. Ins., XXIII, 921 (forewing with SC^1 out of C, not touching SC^2 , but—like *lataria*—will probably be found to vary ; in that species SC^1 sometimes anastomose with SC^2 , sometimes not). Colour nearly as in dark *lataria*, but with slightly more of a rust-coloured hue, especially on the lines and in a vague band distally to the postmedian (not appreciably denoted in *lataria*) ; the glaucous whitish ground-colour only discernible as a few irregular spots and dots between base and postmedian (especially of forewing), distal area (beyond the ferruginous-tinted band) quite as in dark *lataria* ; costal edge and first line of forewing as in *lataria* ; median shade

of forewing diffuse, nearly straight, of hindwing much less irregular than in *lataria*, only with a weak bend in cell in order to pass proximally to the cell-spot; postmedian of forewing with only a gentle subcostal curve, of hindwing almost straight. Under surface coloured as in *lataria*, but showing corresponding differences in the course of the lines; median shade on both wings thick; subapical white spot on both wings reduced in size.

Natal (Clark), without more exact data.

Alcis incauta, n. sp. (Pl. XXV, Fig. 35).

♂, 30 mm. Face fuscous, darkest in upper part. Vertex and antennal shaft whitish, the latter feebly darker-banded; pectinations very long, terminating in stiff, bristly, forward-directed single hairs which are much longer than the rest of the ciliation; apex of antenna simple (extreme tip lost). Thorax and abdomen above whitish, coarsely irrorated with fuscous and with large paired fuscous spots; tegula also with some rather large dark spots. Legs mostly fuscous, paler beneath and at ends of joints and with hindleg (especially the tarsus) paler than the others; hind-tibia not dilated. Shape, colour, and facies of the South American genus (or subgenus of *Boarmia*) *Stenalcidia* Warr., ochreous whitish irrorated with fuscous, about as in *S. mollearia* Walk., List Lep. Ins., XX, 357, etc. Forewing with fovea well developed, SC^{1-2} on a common stalk nearly 2 mm. in length, R^1 rather curved at its origin, arising much nearer to R^2 than to SC^{3-5} ; lines fuscous, spotted with black on the veins; antemedian from costa at two-sevenths to posterior margin near the base, curved in cell, then oblique, weak at the folds; proximally to it faint traces of another line, which would probably meet it at posterior margin as in many *Stenalcidia*, etc.; median line weak, not thickened except at the veins, about parallel with antemedian at 2 mm. distance; an ill-defined discal dot touching this line; postmedian from two-thirds costa, slender (the spots on the veins small, but distinct), very slightly incurved costally, bluntly angled outwards at R^2 and very slightly at SM^2 , forming a long but scarcely appreciable inward curve between, reaching posterior margin at almost two-thirds; subterminal lunulate-dentate, not very slender, rather indistinct and somewhat interrupted, the lunules weakly dark-filled proximally; terminal area also with weak, ill-defined dark clouding in places, chiefly between postmedian and subterminal lines from R^2 to M^1 and between subterminal and termen from R^2 to apex in the form of thick interneural streaks; termen with conspicuous dark interneural spots; fringe with weaker and smaller spots at vein-ends. Hindwing with the median line becoming antemedian, angled on R^3 ; a conspicuous oval cell-spot; postmedian rather near cell-spot, being over 3 mm. from termen, anteriorly curved parallel therewith, posteriorly a little incurved, bending outwards again from fold to inner margin; distal area and fringe as on forewing. Under surface with the dark lines distinct, similarly formed, only the antemedian rather obscured by some dark basal shading of forewing; on both wings somewhat enlarged costal spots at origin of lines; discal spot on both wings large; distal area almost without dark shading, subterminal therefore invisible.

Barborton, 1st January, 1911.

Alcis proximaria Walk.

This conspicuous species, described by Walker in the "List of Lepidopterous Insects," XXI, 365, as *Boarmia*, was unfortunately overlooked by me, on account of its being misplaced in the British Museum Collection, and I have therefore created a useless synonym—*sexorbata* Prout, Ann. Transv. Mus., III, 222. The figure, the structural information, and other data are, however, new and not unimportant.

Boarmia gonophora, n. sp. (Pl. XXV, Fig. 36).

♂, 25–28 mm. Body and wings pale wood-colour, head (with palpus and antennal shaft) and front of thorax strongly mixed with fuscous, dorsum of abdomen, except at base and anus, fuscous marked with black, venter irregularly black-spotted towards the sides. Antennal pectinations long, decreasing rather abruptly near apex, three or four segments serrate, extreme tip almost simple. Hindtibia rather stout, but apparently without hair-pencil. Forewing with SC^{1-2} coincident throughout, free from C, in the type apparently connected with SC^{3-4} by a very short bar, in other examples certainly free. Wings sprinkled with fuscous and in places somewhat clouded with ferruginous. Forewing with costa mostly marked with fuscous, leaving only in places spots or very short tracts of the ground-colour; lines arising from equidistant blackish costal spots at before one-third, just one-half and beyond two-thirds; antemedian sharply bent in cell, then oblique inwards; median much less sharply bent, thicker, crossing the elongate blackish cell-spot, then rather thick and parallel with antemedian, black, yet not very conspicuous on account of a strong fuscous sprinkling which gives to almost the entire central area the aspect of a dark band; postmedian somewhat incurved subcostally, otherwise nearly parallel with termen in anterior half, then moderately strongly incurved, throughout marked with black spots on the veins, especially on the radials and M^1 ; subterminal lunulate-dentate, parallel with termen, filled in proximally with dark spots, that between SM^1 and SM^2 much enlarged; distal area with dark interneural streaks from SC^5 to SM^2 , that between SM^1 and SM^2 much thickened; these streaks end in black terminal spots. Hindwing with antemedian line near the base, median rather straight, almost meeting postmedian on inner margin, postmedian from about mid-costa, almost right-angled at R^3 , but with a slight angle also at M^1 , then very slightly incurved; median band, cell-spot, and black spots on postmedian as on forewing; distal markings similarly developed to those of forewing, but less strongly, the proximal spots of subterminal large between the radials and at inner margin, otherwise obsolescent, distal streaks obsolescent (but the specimens are not in perfect condition); termen feebly subcrenulate, terminal spots enlarged into subcrenate marks, only separated by the veins. Under surface with first line obsolescent, both wings being fuscous-speckled to base; postmedian less sharply angled than above; entire distal area (except a narrow space immediately following postmedian) irregularly and not very distinctly dotted and blotched with fuscous.

Barberton, 6th January, 1911 (type). Three Sisters, April, 1911 (cotype in coll. L. B. Prout).

As ab. *albimacula*, n. ab. (Pl. XXV, Fig. 37), I describe a ♀ (27 mm.) from Three Sisters (20th February, 1911) in which the distal area above is more confusedly marked, but contains on forewing a large quadrate white marginal spot from before R^3 to behind M^1 and on the hindwing a smaller, vaguer one, both also reproduced beneath. As I have not seen any other ♀, it is just possible (though unlikely) that this will prove the normal form of that sex. This particular specimen also differs from the type in still blacker median band, postmedian of forewing more deeply incurved in posterior half, a more ferruginous shade proximally to the subterminal, more infuscated terminal area, etc.

Ectropis obliquilinea, n. sp. (Pl. XXV, Fig. 38).

♀, 38 mm. Face flat, dark fuscous. Palpus short, fuscous. Vertex and antenna concolorous with wings; occiput and collar more fuscous. Thorax dorsally a good deal mixed with fuscous, abdomen irregularly belted, in great measure corresponding to the markings of the hindwing. Forewing rather elongate, costa straight except at extreme base and apex, termen very slightly curved, rather strongly oblique; SC^{1-2} coincident; ground-colour whitish, with a very slight tinge of purple and strongly dusted with fuscous; lines nearly black; first from posterior margin 1.5 mm. from base, extremely oblique to cell-fold 7 mm. from base, here becoming obsolete; fairly direct, but minutely denticulate on the veins and with extremely shallow lunules between; almost the entire area proximally to this line, and extending to costa fuscous; discal mark present not conspicuous; median line weak, very near postmedian; postmedian parallel with antemedian and similarly formed, the teeth rather stronger; from hind margin almost at middle to SC^5 scarcely more than 2 mm. from termen; a second fuscous band (traversed proximally to its centre by a darker shade) between this line and the subterminal, continuing (narrowing) to termen between SC^5 and R^1 ; subterminal line white, rather distinct (except anteriorly), irregularly lunulate. Hindwing concolorous with forewing, no antemedian line; median more distinct than on forewing, from inner margin at two-fifths, slightly curved, losing itself about at SC ; discal mark a rather irregular, indistinct ocellus (pale with darker circumscription); postmedian from inner margin at about two-thirds, nearly straight (faintly curved and denticulate) to R^1 , here angled, then lunulate-dentate to costa 2 or 3 mm. from apex; succeeding band and subterminal line as on forewing, both reaching costa. Both wings beneath paler as far as postmedian (dark-spotted costally), with large, distinct, rounded black cell-spot; postmedian of forewing as above, of hindwing more curved towards tornus, both wings with almost uniform purplish-fuscous broad border from shortly after postmedian to termen.

Warmberg, Transvaal, 22nd December, 1903.

A worn ♂ in coll. British Museum is rather smaller (32 mm.), much less dark-suffused in terminal area above and beneath (though this is to some extent due to its condition), antenna with slender fascicles of cilia, hindtibia not dilated. "Cape" (W. H. Heale).

Pareclipsis punctata ab. *distolochorda*, n. ab. [(? bon. sp.),
(Pl. XXV, Fig. 39).

♀, 33 mm. Differs from typical *P. punctata* Warr. (Nov., Zool., VII, 97), as follows: Ground-colour above paler, with only a slight fleshy tinge; forewing with first line very indistinct, second, on the other hand, strongly developed, the black dots being connected throughout, except anteriorly to SC⁵, by shallow black lunules; a strong, nearly straight, rust-coloured line (partly overlaid with black) closely accompanying the postmedian proximally, from hind margin to R¹; the oblique subapical shade strong; cell-mark weak, obscurely outlined in grey, otherwise of the ground-colour. Hindwing with the proximal of the two lines also exaggerated. The forewing, moreover, is much more strongly convex at base of costa and middle of termen than in typical ♂, which alone I have before me; but Warren mentions a rounded-prominent termen in the "type" ♀.

Barberton, 8th January, 1911.

SC² of forewing is connected with SC³⁻⁴, as sometimes occurs in typical *punctata*.

Nassunia pretoria, n. sp. (Pl. XXV, Fig. 40).

♂ ♀, 36-45 mm. Face dove-colour, upper half with an orange spot on each side; crown bright orange. Antenna dark violet-grey. Thorax and abdomen concolorous with wings; an orange dorsal spot on thorax, pairs of very small orange, black-centred spots on abdomen. Forewing light pinkish-violet, with an orange spot at base of costa; antemedian line consisting of three orange, black-centred spots on the veins, the anterior one the largest, the median one slightly further from base; postmedian line formed of a similar curved row of vein-spots, all small. Hindwing with inner and distal margins and fringe concolorous with the forewing, the rest orange, becoming pale in the submedian area; a dark orange postmedian line, curved parallel with termen (less sinuous than the row of dots of *caffraria* L.). Forewing beneath orange, with costal and distal margins and a broader apical area light pinkish-violet, the lines of dots deeper orange, in addition a dark cell-dot. Hindwing beneath light pinkish-violet, with orange, dark-centred cell-dot and postmedian row of vein-dots.

Pretoria, 22nd November, 1913 (type ♀), 20th November, 1913 (cotype ♀ in coll. L. B. Prout), a ♂ (worn) and two ♀♀ in coll. British Museum, ex coll. Distant. Not at all variable. May conceivably be a remarkable recurrent colour-aberration of *caffraria*; the antennal pectinations appear very slightly longer, but the distance is so very trifling that without anatomical research I cannot be sure that my eyes do not deceive me. In any case it requires a name.

DESCRIPTIONS OF NEW SOUTH AFRICAN SPIDERS.

By JOHN HEWITT, Director of the Albany Museum, Grahamstown.

(With 9 text figures and plates XXVI and XXVII.)

THE material on which the following descriptions are founded is mainly contained in the collection of the Transvaal Museum and includes some particularly fine series of terricolous spiders obtained in the Pretoria District subsequent to the completion of my previous paper on this subject (*Annals Trans. Mus.*, Vol. V, Part 2). The fact that each species is usually represented by a great number of specimens, all carefully located, has enabled me to work out the range of variation within a species and to gauge with some degree of confidence the value of each character. Such work is, of course, essential to ensure accuracy, yet it is safe to say that the majority of workers on trapdoor spiders have been obliged to describe most of their species from single specimens. Although our knowledge of the Arachnid fauna of that neighbourhood has been greatly increased through the extensive collections brought together by Messrs. Austin Roberts and G. van Dam, yet their discoveries around Pretoria can only be regarded as a minor part of the wealthy but almost unexplored fauna of the Transvaal.

A few of the species here described are based on material in the Albany Museum, Grahamstown.

Family ATYPIDAE.

Calommata transvaalicus, sp. nov. (Plate XXVI, fig. 11 and text fig. 3.)

The *type* of this species is a single female specimen, probably immature, collected at Roodeplaat, seventeen miles north-east of Pretoria, by Mr. G. van Dam (3rd April, 1915). It was found in grass veld, occupying a nest about 9 inches deep, lined inside with thick web, but not protected by a lid.

The record is of considerable interest as hitherto no members of this family have been known from South Africa. The genus *Calommata*, however, for a long time known only from Japan, Burmah, Java, and Sumatra, was recorded some years ago from the Cameroons by Mr. Pocock. In describing* the species there found, *C. simoni*, Mr. Pocock merely compared it with *C. fulvipes* Lucas, the genotype, apparently regarding the other three species described from Eastern Asia as synonyms of *fulvipes*.

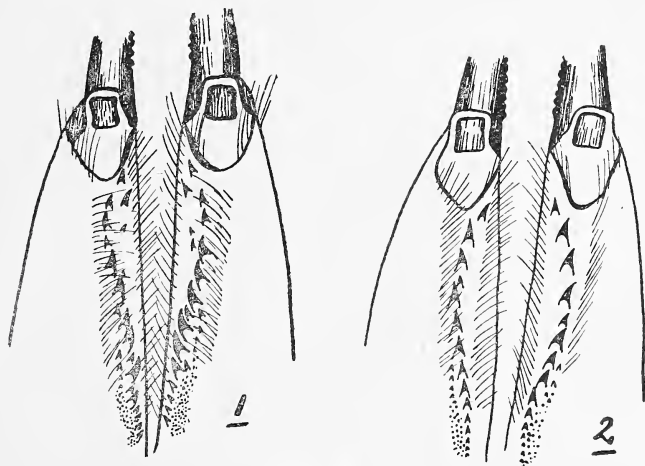
The description of the species is as follows:—

Dentition of chelicerae.—The distal row on one side is composed of two teeth, and on the other side of only one tooth; in the former case

* *Ann. Mag. Nat. Hist.*, 7, XI, p. 259.

the two rows are clearly quite distinct, but in the latter the single inner tooth although quite internally situated and considerably separated from the distal tooth of the main row may be included in the same curved line with the main row. The main row includes five or six larger teeth and a number of smaller ones. In distinguishing *simoni* from *fulvipes*, Mr. Pocock attached importance to the position of the distal internal row of teeth relative to the main row. In *simoni* these two rows form a continuous curved series whereas in *fulvipes* the two rows are distinct.

Legs.—First leg without spines or spinules. Second leg with spinules as follows: Patella with 4 or 5 on the anterior side near the apex above and 3 or none on the posterior side distally; tibia with 2 near the base anteriorly above, also numerous spinules in the distal half, especially dorsally and posteriorly, also on the upper portion of the anterior surface;



TEXT FIG. 3.

Calommata transvaalicus sp. nov. Dentition of chelicerae in specimen found between Villiera and Derdepoort, 1; in specimen from Hatfield, 2.

metatarsus with numerous spinules dorsally and some posteriorly; tarsus also spinulose above. On the anterior side of tibia IV there are about 27 spinules, including those near the distal margin.

Ocular area.—Frontal eyes a trifle more than two diameters apart.

Posterior sternal sigilla large, pearshaped, about two-thirds of a length apart, and about the same amount distant from the sternal margin.

Colour.—Carapace pallid, nearly white; between and around the frontal eyes is some dark pigmentation; a small sharply-defined, transverse, brown coloured area along the anterior margin of the carapace. Appendages pale yellowish-brown, above and below, and likewise the sternum. Abdomen pale above, with a fairly well-defined infuscated area posteriorly and some slight infuscation anteriorly immediately behind the pedicel. Apical segment of posterior spinners dark.

Measurements.—Total length 20 mm., length of carapace 5.5 mm., length of fang 3.3.

This species has a very pronounced and objectionable odour, recalling that of decomposing stable manure. The type is in bad condition, as it seems to have been moulting at the time of capture. Another example was subsequently taken by Messrs. Roberts and Van Dam between Villiera and Derdepoort, near Pretoria (12th April, 1915). It is smaller than the type, but otherwise agrees well therewith. In this specimen the maxillary processes are dark-brown: the dentition (text fig. 3, No. 2), is clearly referable to two main series, the inner distal one including only two teeth. On the other hand, in a specimen from Hatfield the teeth are in a single series.

I have little doubt but that this species is closely related to and perhaps even identical with *C. simoni* Poc., which, however, was founded on a very much larger specimen (length of fang 8, of carapace 10). The original description of that species merely states that the first and second legs are "as in *C. fulvipes* Lucas," and as Mr. Pocock's description of *fulvipes* in the "Fauna of British India: Arachnida" (p. 160) states that "the legs of the posterior pairs are furnished distally with a few spinules" and makes no reference to the occurrence of spinules on the anterior legs, one might reasonably infer that the first and second pairs of legs in *fulvipes* and in *simoni* are muticous. However, Mr. S. Hirst has very kindly supplied me with a description of the spinulation of the second leg in the type of *simoni*, as follows:—"Patella with a longitudinal series of fine long hairs on its upper surface and 3 or 4 short bristles or spinules at the apical end; a number of spinules at the distal end of the tibia forming a narrow transverse strip (the spinules being 2-3 deep), or only strongly developed in the middle, also in this segment there are a few lateral setae; there are numerous spinules distributed throughout the upper surface of the metatarsus, and others are present on the outer side of this segment, but are longer, weaker, and less numerous; tarsus with weak spinules." From this account it would appear that the spinulation of tibia II is more pronounced in *ransvaalicus* than in *simoni*, and in the latter species, apparently, there are no spinules at the base of that segment superiorly.

The large size of the posterior sternal sigilla will perhaps distinguish it from *fulvipes* as figured by Pocock, but the constancy of this character is doubtful: in the Hatfield specimen the sigilla are about a diameter apart, but only half a diameter from the margin of the sternum.

Family CTENIZIDAE.

Acanthodon transvaalensis (Hewitt). (Text fig. 4.)

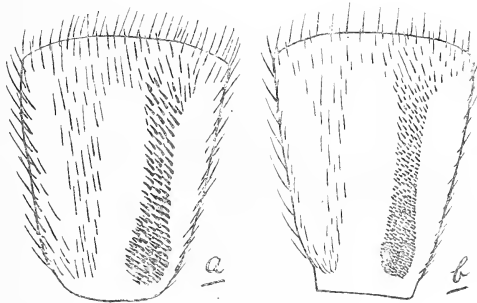
Female specimens of this species were collected by Messrs. A. Roberts and G. van Dam at the following localities in the Pretoria District during April, 1915: Mayville, Rietfontein (Pretoria), Witfontein, Skinner's Court, between Lyttelton Junction and Irene, Rietfontein (20 miles north-west of Pretoria), Schoemansrust, Roodeplaat, and Zeekoegat in the same neighbourhood.

The type of this species is evidently immature, and Mr. A. Roberts has taken very much larger specimens near Pan Station, Middelburg, and

also at Middelburg. It has also been taken at Wonderfontein Station, Middelburg, and at Steynsdorp; a small specimen was found at Rosslyn, Pretoria, by Mr. G. van Dam, and a larger one at Lyttelton Junction (1st March, 1916). The largest example has a total length of 22 mm., the carapace being 8 mm. long and 7 mm. broad.

The species was originally described (Records, Albany Museum, II, p. 412) as a *Ctenolophus*, Purc., and was afterwards referred to the genus *Gorgyrella* Purc., but I now regard both these proposed genera as synonyms of *Acanthodon* Guer.

This species is very closely related to *Gorgyrella schreineri* Purcell. The most obvious difference between *schreineri* and *transvaalensis* lies in the spinulation of coxa III: in *schreineri* those spinules are coarse and comparatively few, whereas in *transvaalensis* they are very numerous and much smaller than in *schreineri*. The first pair of sternal sigilla, though not marginal nor submarginal, are only a little internal to the edge of the sternum—a diameter or slightly more: in the small specimen from Rosslyn, however, they are practically marginal. Patella III has 9–21 spines on



TEXT FIG. 4.

Ventral surface of coxa of third leg to show spinous areas in (a) *Acanthodon schreineri* (Purcell) from Victoria West, (b) *Acanthodon transvaalensis* (Hewitt) from Middelburg, Transvaal.

its anterior surface, including those at the distal edge. The other species *Acanthodon schreineri* Purcell, is known to me from the following localities: Bloemfontein (Dr. T. F. Dreyer), De Aar (F. C. Cronwright-Schreiner), Victoria West (B. Marais), Whittlesea (Miss S. Chinn), Fort Brown (Miss M. Howarth), Grahamstown (Miss N. Webb), Schurffeberg, Somerset East District (Mr. B. Marais), Worcester (Mr. G. B. Townshend), Adelaide (Miss Van der Vyver), Kimberley (Bro. J. H. Power).

It will probably be possible to distinguish a number of local races in this species on the different ocular characters.

Acanthodon schreineri Purcell, var. nov. *minor*.

The types of this form are an adult male and female from Roodeplaat, Pretoria District, collected by Mr. G. van Dam (22nd February, 1916). They were found under the protection of stones on the top of a stony kopje. A female specimen was also collected by Mr. A. Roberts at Bon Accord, Pretoria District (13th June, 1915), and others more recently at New Muckleneuk.

The adult female is considerably smaller than that of typical *schreineri* (Ann. S. Af. Mus., III, p. 25), but otherwise seems to agree closely therewith. The length of the ocular area is a trifle less than one-third of the distance from the anterior margin of the carapace to the fovea: the posterior margins of the posterior row of eyes are in a distinctly procurved line, the distance between the posterior medians being nearly twice as great as the distance between a posterior median and posterior lateral: it may be noted that typical *schreineri* in the different parts of the Cape Province varies considerably in its ocular characters, especially in the arrangement of the eyes of the posterior row. The patch of spinules on the ventral surface of coxa III extends only about $\frac{2}{3}$ of the length of the segment, the distal fourth of the segment at any rate being entirely free of spinules. On the anterior surface of patella III there are about 20 spines, including those on the distal edge (but only 9-10 in the Bon Accord specimen).

Length of carapace 5.9; breadth of same 4.75.

A New Muckleneuk specimen is somewhat larger, the carapace measuring 6.4×4.75 .

Male.

Chelicerae with 5 teeth in the inner row and 2 basal teeth externally.

Palp.—Tibia about twice as long as deep, the excavation armed with a continuous strip of short spines, about 18 altogether, mostly in a single row except at each end. Tarsus with a pair of rather long and weak spines dorsally.

Legs.—Ventral surface of coxa III with a patch of sharp, rather weak spinules in its basal half posteriorly; II without distinct spinules, but with a patch of somewhat scattered spinuliform setae in a similar situation. Tibia I greatly swollen, considerably shorter than metatarsus I, the under surface with 6 spines on the outer side. Metatarsus I with a distinct bend at a point about $\frac{1}{3}$ of its length distant from the apex, inferiorly with about 6 spines on the outer side distributed over the whole length of the segment, but on the inner side there are only 4 spines and they are confined to the apical third. Tarsus I with 2 internal and 1 external spines. All the tarsi are scopulate, but I only very weakly so; IV without spiniform setae in the scopula.

Patella IV with about 10 spinules anteriorly, extending over the basal half of the segment; III with about 14 spinules on its anterior side, including those on the distal edge, but none on the dorsal surface.

Anterior tarsal claws carrying a comb of 5 or 6 teeth.

Ocular area.—Anterior median eyes very much larger than the frontals, which are about $\frac{2}{3}$ of a diameter apart. Hind margins of posterior row in a rather strongly procurved line, the medians being about 3 diameters apart and about $1\frac{1}{4}$ – $1\frac{1}{2}$ diameters distant from the posterior laterals. The ocular area occupies barely $\frac{1}{3}$ of the distance from the anterior margin of the carapace to the fovea.

Measurements.—Total length 8 mm., length of carapace 4, breadth of carapace 3.25, length of tibia I 2.5, of metatarsus I 3.25.

The modification of the metatarsus and tibia of the first leg is a distinguishing feature of this species.

Acanthodon monticola, sp. nov. (Text fig. 5.)

Types.—Three adult male specimens from Magaliesberg, Little Wonderboom, collected by Messrs. A. Roberts and G. van Dam (6th and 14th June, 1915). Female specimens were taken in the same locality, and also more recently at Daspoort by Mr. A. Roberts.

Chelicerae with 5 or 6 teeth in the inner row on the fang groove and 3 or 4 small ones in the outer row. Rastellum composed of 3 very stout short spines on the anterior margin of the basal joint.

Pedipalps.—Tarsus with 2 or 3 spines at its apex superiorly. The spines margining the excavation of the tibia on its outer side do not form a continuous semicircular band, the strip being interrupted in the middle (see fig.).

Legs.—Coxa III with some short stiffish setae on its post-ventral margin in the basal half especially, but these setae are not numerous nor the group, as a whole, very conspicuous. Tarsus I without spines or only



TEXT FIG. 5.

Acanthodon monticola, sp. nov. Pedipalp of male.

1 weak one on the anterior side. All the tarsi are scopulate, the scopula of IV without fine spiniform setae in its course. Claws of tarsus I with 2-5 moderate-sized teeth, of IV with 1-4 teeth, but when 3 or 4 teeth are present only 1 is of large size. Tibia I subequal to or only very slightly longer than metatarsus I. Metatarsus I only slightly bowed. Patella III with about 10-14 spines anteriorly, including those on the distal edge, also about 5 on the dorsal surface, including those at the apex. Patella IV with 9-13 spines on its anterior surface in the basal half of the segment.

Ocular area.—Posterior median eyes about $1\frac{1}{2}$ diameters or a trifle more apart, only $\frac{1}{2}$ a diameter or a trifle more distant from the posterior laterals. Anterior medians rather less than $\frac{1}{2}$ a diameter apart. Area formed by frontal and anterior median eyes quite as broad behind as in front. Viewed from in front the frontals are separated by a distance equal to about $\frac{1}{3}$ the diameter of an eye; in one example rather more than $\frac{1}{2}$ the diameter of an eye.

Sternum.—Three pairs of sigilla, the first pair marginal

Total length 9 mm.; length of carapace 3.

Female.

The more important characters of the female are as follows:—

Legs.—Coxa III with a post-ventral tuft of stiffish setae, which in the basal third or half of the segment take the form of sharp spinules. Coxa II without a trace of spinules. Metatarsus III with 2 long spines at the apex inferiorly, but none or only 1 or two weak ones on the lower surface. Band of spines on anterior surface of tibia II including 3, 4, or 5 spines or even only 1. Patella III with 5–8 spines along the anterior surface, including those on the distal edge; IV with a band of 9–14 stout but short spines, extending about half-way along the segment or less (in an immature specimen only 6 spines).

Chelicerae with an inner row of 5 fairly strong teeth and an outer row of 3 or 4 small ones.

Ocular area about as long as $\frac{1}{3}$ of the distance from the anterior margin of the carapace to the fovea. Posterior median eyes about $1\frac{1}{2}$ –2 diameters apart and about a diameter distant from the posterior laterals. Posterior margins of posterior row in a straight line. Posterior laterals elongated. Frontals about $\frac{1}{2}$ – $\frac{2}{3}$ of a diameter apart. There are three very long bristles on the cephalic area, one between the anterior medians and a pair situated midway between the point of origin of this single bristle and the fovea.

Labium with 2 apical teeth.

Sternal sigilla.—Three pairs, the first pair submarginal.

Colour.—Carapace and legs olive-brown, the palps and first two pairs of legs darker than the hind two pairs of legs.

Measurements.—Total length 11.5 mm., length of carapace 4, breadth of carapace 3.25.

This is an unusually small species. Mr. G. van Dam has recently taken male and female examples at Wolhuters Kop in the Rustenburg District.

Acanthodon paucispinulosus Hewitt.

This was described by me (Annals Trans. Mus., V, p. 98) as a variety of *transvaalensis*, to which it is undoubtedly closely related. The spinules on coxa III are somewhat stouter but less numerous than in *transvaalensis*. The first sternal sigilla are clearly separated from the margin of the sternum, but only very slightly so on one side in one of the types. Patella III with about 25–30 or even several more spines along the anterior surface, including those on the distal edge: IV with a group of about 40–50 short stout spines extending over $\frac{3}{5}$ – $\frac{4}{5}$ of the length of the segment anteriorly. Band of spines on anterior surface of tibia II, including about 4–7 spines. The pair of stouter spines posterior to the ocular area is much nearer to the anteromedian eyes than to the fovea.

Acanthodon ep. grandis Hewitt (Annals Natal Mus., III, pt. 2).

From Forbes Reef, Swaziland, and Lochiel, Ermelo District, Mr. A. Roberts took female examples which seem to be closely related to *grandis* and also to *abrahami*. There are three pairs of sternal sigilla, the first pair submarginal: there is a strip of stiff bristly hairs along the posterior border of coxa III inferiorly. The ocular arrangement is slightly different from

that of *grandis*, the posterolaterals being nearer to the medians than are the latter to each other. Band of spines on patella IV only reaching $\frac{1}{2}$ – $\frac{3}{4}$ of the distance along the segment; band of spines on anterior surface of tibia II, including 10–13 spines.

Acanthodon sp. *oomi* Hewitt (Records Albany Mus., II, p. 416).

Mr. A. Roberts took female examples very closely related to *oomi* at Lake Chrissie and Tevreden and a small example also at Oshoek, Carolina District. They differ from the type of *oomi* in the ocular arrangement: in the type, the pair of long spines behind the ocular area is situated just midway between the fovea and the anterior margin of the anterior median eyes, but in the above specimens is nearer to the anterior medians than to the fovea. The ocular area is in fact a trifle shorter relatively in these specimens than in the type. There is also a strong resemblance to *A. crudeni* from Alicedale, but the intervening spaces between the eyes of the posterior row, compared with the size of the posteromedian eyes, are distinctly greater in these examples than in *crudeni*.

Key to the South African Species of the genus Acanthodon, based on the characters of the Adult Females.

A.—A strip of rather slender setae on the post-ventral border of coxa III.

- (a) Ocular area short, its length less than or not exceeding $\frac{1}{3}$ of the distance from the anterior margin of the carapace to the centre of the fovea.
- (1) Frontal eyes about a diameter apart. Abdomen without setigerous tubercles superiorly. (Kentani.) *A. spiricola* Purc.
 - (2) Frontal eyes about a diameter apart. Abdomen with setigerous tubercles superiorly. (Kentani.) *A. kolbei* Purc.*
 - (3) Frontal eyes about $\frac{1}{5}$ – $\frac{1}{4}$ of a diameter apart and projecting strongly forwards from the front margin of the carapace. Distance between posterior medians about equal to twice the diameter of an eye. (Grahamstown.) *A. flaveolum* Poc.
- (b) Ocular area a trifle longer, just exceeding in length $\frac{1}{3}$ of the distance from the anterior margin of the carapace to the centre of the fovea.
- (4) Frontal eyes about $\frac{1}{4}$ – $\frac{1}{3}$ of a diameter apart, the distance between the posteromedians equal to $1\frac{2}{3}$ times the diameter of an eye. Posterior medians decidedly nearer to the posterior laterals than to each other. (Alicedale.) *A. crudeni* Hewitt.
- (c) Ocular area still longer, almost equalling in length $\frac{2}{3}$ of the distance from the anterior margin of the carapace to the fovea.
- (5) Frontal eyes about $\frac{1}{3}$ of a diameter apart: posterior row of eyes equally and rather widely spaced: patella IV strongly spined anteriorly to the apex: strip of setae on coxa III very weakly developed. (Lüneburg.) *A. oomi* Hewitt.
 - (6) Frontal eyes nearly $\frac{3}{4}$ of a diameter apart: strip of setae on coxa III strongly developed: patella IV spined anteriorly

* This species is not known to me.

only in its basal half: posterior lateral eyes rather nearer to the posterior medians than the latter are to each other. (Newington.) *A. jenoulheti* Hewitt.*

B.—The strip on coxa III composed of coarser setae, some of which may be even spiniform.

(a¹) Two pairs of sternal sigilla. Ocular area reaching backwards about $\frac{2}{5}$ of the distance from the anterior margin of the carapace to the fovea. Patella IV spined anteriorly to the apex.

(7) Posterior lateral eyes decidedly nearer to the posterior medians than are the latter to each other. Frontal eyes about $\frac{1}{4}$ of a diameter apart. (Kentani.) *A. kentanicus* Purc.†

(8) Posterior row of eyes subequally spaced: frontal eyes about $\frac{2}{5}-\frac{1}{2}$ of a diameter apart. (Grahamstown.) *A. microps* Hewitt.

(b¹) Three pairs of sternal sigilla.

(9) Frontal eyes about $\frac{1}{3}$ of a diameter apart: posterior row subequally spaced: ocular area reaching backwards about $\frac{2}{5}$ of the distance from the anterior margin of the carapace to the fovea. (Umfolosi.) *A. grandis* Hewitt.

(10) Frontal eyes about a diameter or slightly less apart: length of ocular area only slightly exceeding $\frac{1}{3}$ of the distance from the anterior margin of the carapace to the fovea: posterior median eyes nearer to the laterals than to one another. (Alicedale.) *A. abrahami* (Hewitt).

C.—With spines on the post-ventral border of coxa III and sometimes also on II or I. Usually three pairs of sternal sigilla.

(11) Coxa I with a large denticulate area which is almost as extensive as that on coxa II. (Giftberg, Van Rhynsdorp.) *A. namaquensis* Purc.

(12) Coxa I without denticulate area, or this area very much less extensive than that on coxa II. The spinules on coxa III strong and stout, extending nearly the whole length of the segment (Hanover.) *A. schreineri* Purc.

(12a) Similar to the typical form of *schreineri*, but the patch of spinules on coxa III extending only about $\frac{2}{3}$ of the length of the segment. *A. schreineri minor*, var. nov.

(13) Similar to *schreineri*, but spinules on coxa III much smaller and much more numerous. (Newington.)

A. transvaalensis Hewitt.

(14) Coxa II quite without spinules, III with a strip extending the whole length of the segment. (Gravelotte.)

A. paucispinulosus Hewitt.

(15) Similar to *paucispinulosus*, but the spines on coxa III restricted to the basal half or third of the segment. (Magaliesberg.) *A. monticola*, sp. nov.

* This species might be referred to section B.

† Based on several adult specimens from Ngqeleni (H. L. Bulcock). The original description was probably drawn up from a juvenile example, in which case the description does not correctly represent the characters of the species.

[*A. hamiltoni* Pocock, from Vredefort Road is based on a very young example: it belongs to my section A.]

Galeosoma robertsi, sp. nov. (Plate XXVI, figs. 3 and 4.)

Types.—This description is based on a large series of adult female examples collected during March and April, 1915, by Messrs. A. Roberts and G. van Dam from the following localities, all in the Pretoria District: Mayville, Wonderboom Poort, New Muckleneuk, Hatfield, Pretoria College, Brooklyn, Bon Accord Station, Garstfontein, Rietfontein (near Crocodile River Bridge), Elandsfontein No. 35, and Skinner's Court. It is noteworthy that another species, *pilosum*, is commonly found in the immediate neighbourhood of Pretoria, apparently occurring side by side with *robertsi*.

Abdominal shield.—The upper surface of the shield is very strongly curved from side to side, but less curved in a longitudinal line: on a transverse vertical section across the middle of the shield, the cut edge of the upper surface would show an almost semicircular outline. Viewed from above, the upper surface is broadly oval. Viewed from the side, the line of junction between the upper and marginal surfaces is not straight, but curved forwards considerably in the middle. The marginal surface is nowhere deep: it is deeper anteriorly than elsewhere and is usually most reduced laterally: throughout it is definitely marked off from the upper surface and, except immediately at the posterior end, its surface is free from the coarse punctuations which cover the whole of the upper surface. However, the line of junction between the two surfaces does not usually form a very strongly-defined continuous ridge. A definite ridge occurs posteriorly, yet its continuation forwards is not along the line of junction between the two surfaces, but for a short distance along the lateral portion of the dorsal surface on each side: this ridge is feebly developed and usually occurs only in the posterior half of the shield, but in one of the Rietfontein specimens extends well into the anterior half of the shield. In a small specimen from Elandsfontein, and in two immature examples from Skinner's Court, the line of junction between the two surfaces forms a sharp, slightly-upturned, continuous ridge all round. In two examples from Garstfontein the ridge, which in specimens from other localities occurs in the posterior half of the shield, is quite absent and the marginal surface posteriorly becomes almost completely reduced.

The upper surface is polished and has no long hairs nor setae. Immediately in front of the shield, on the dorsal surface of the abdomen, the soft skin presents several well-defined transverse rows of short setae, whilst ventrolaterally the oblique lines of setae are strongly developed.

Carapace without long bristly hairs on any part of its surface or with only one or two on the head region dorsolaterally or between the eyes.

Measurements.—Total length 18 mm., length of carapace 7, breadth of carapace 5·25, length of upper surface of shield 9·5, breadth of upper surface of shield 7·75.

This species is probably closely related to *G. scutatum*, Purc., from Krugersdorp. As already indicated in the description, a considerable variation exists in the development of the demarcation line between the upper and lateral surfaces, but in *scutatum* no such line occurs.

Galeosoma pilosum, sp. nov. (Plate XXVI, figs. 5, 6, and 7.)

Types.—A series of adult female specimens from Mayville, Wonderboom Poort, Pretoria College, Koedoespoort, Garstfontein, and Lyttelton Junction, localities all in the neighbourhood of Pretoria, collected by Messrs. G. van Dam and A. Roberts (March–April, 1915). This form is undoubtedly closely related to *pallidum* from Saltpan, and perhaps should be placed as a variety thereof: the forms *pallidum*, *pilosum*, *hirsutum*, and *coronatum*, constitute a gradational series, and though the two extremes differ greatly it would be difficult to separate them specifically without also assigning specific distinction to the intermediate forms which moreover are fairly sharply defined.

Abdominal shield resembling that of *pallidum* in shape, but covered with rather long hairs. Upper surface flattish and usually sub-rotund in outline: posterior edge broadly rounded, quite sharp, and a little upturned, anterior edge ill-defined or obsolete. Marginal surface posteriorly only faintly pitted, as a rule, but occasionally rather coarsely pitted. The skin on the upper surface of the abdomen immediately anterior to the shield carries no such rows of setae as occur in *schreineri*, but there are a number of long rather sparsely distributed setae, like the hairs on the shield: such setae do not occur in *pallidum*.

Carapace with a number of long bristly hairs on the raised head region dorsolaterally and also between the eyes of the posterior group, a specially long one projecting forwards between the anteromedian eyes.

Measurements.—Total length 19 mm., length of carapace 7·6, breadth of carapace 6, diameter of circular margin of upper surface of shield about 7·8, depth of marginal surface measured on mid-line anteriorly about 4·75.

In the newly-hatched young of this species there is no trace of an abdominal shield: the abdomen is purplish dorsally and shows indication of a number of white cross stripes.

It may be noted that four pairs of sternal sigilla are sometimes present in this species, the two posterior pairs being very small.

A small character, but a very constant one in this form, is the sharp posterior edge of the upper surface of the shield: the anterior edge of that surface is a very variable character, sometimes being carried forwards, so that the upper surface becomes a little elongated and the marginal surface anteriorly considerably reduced. In a young specimen from Garstfontein the edge of the upper surface is ovoid in shape, and very sharp and upturned throughout: the two surfaces are thus very strongly marked off. Two other examples in which the line of junction between the two surfaces is formed by a sharp continuous ridge were taken at Lyttelton Junction: in these specimens, which are considerably smaller than an average adult of *pilosum*, the upper surface is sub-rotund in outline.

Galeosoma hirsutum, sp. nov. (Plate XXVI, figs. 1 and 2).

Types.—A series of female examples from Roo-de-plaat and from Zeekoegat, near Pretoria, collected by Messrs. G. van Dam and A. Roberts (1st and 2nd April, 1915).

Abdominal shield.—The upper surface is decidedly convex and is oval in outline, the marginal surface in the mid-dorsal line anteriorly being

not so much drawn out as in *pilosum*. The posterior upper edge of the shield is fairly well-defined, but is not so strongly acute as in *pilosum*. The distinction between upper and marginal surfaces is well maintained all round, but the edge in front is not well marked. The marginal surface is deepest anteriorly, shallowest posteriorly: posteriorly, as well as elsewhere, it is coarsely pitted. The shield is densely bearded throughout, more strongly so than in *pilosum*. Its upper surfaces often present a roughened or corrugated appearance, the intervening spaces between the punctuations being rarely so flattened as in *pilosum*.

In the mid-dorsal region, just in front of the shield, the soft skin of the abdomen presents several fairly distinct transverse rows of longish setae, and amongst them some still longer and stiffer setae: ventrolaterally, the oblique rows of bristles give to the area a bearded appearance in naked eye view. This is a very constant character in the species.

Carapace with a number of long bristly hairs on the raised head region dorsolaterally and between the eyes of the posterior group.

Measurements.—Total length 20·5, length of carapace 7·8, breadth of carapace 5·8, length of upper surface of shield 10·25, breadth of upper surface of shield 8, depth of marginal surface measured anteriorly about 3 mm.

In very juvenile specimens the shield has the appearance of a very thick regular disk with polished surfaces. The smoothed marginal surface is sharply defined all round, the flat upper surface presenting a continuous subcircular edge which even in front is fairly acute.

This species differs from *pilosum* in the shape of the shield and in the stronger development of hairs thereon, and on the soft skin of the abdomen dorsally. The series exhibits a little variation in the form of the shield and in the convexity of its upper surface, one specimen from Zeekoegat approaching the *coronatum* condition: the latter species is, however, much less hairy. Some rather small specimens from Witfontein, near Pretoria North, have a subcircular upper surface and anteriorly the two surfaces almost merge indistinguishably. In juvenile specimens the posterior edge of the upper surface is quite sharp. A single specimen was taken at Rosslyn.

A series of specimens collected at Derdepoort is clearly referable to *hirsutum*, but presents minor differences in the form of the shield. They differ from the types in that the junctional line between the two surfaces of the shield is less closely defined: in this series, the posterior edge of the upper surface is often quite weak, its forward continuation being lost on the curved upper surface, whilst a new line of junction is formed between the two surfaces shaped somewhat like that of *robertsi*, being deepest anteriorly and curved forwards laterally. This line is often very weak or indefinite at the sides: anteriorly it may be weak, but is never so obsolete that the marginal and upper surfaces completely merge as often occurs in *pilosum*.

It may be noted that the ocular characters in this species vary considerably. The posterior median eyes may be a trifle nearer to each other than to the posterior laterals or vice versa.

Heligmomerus astutus (Hewitt).

This species, founded on an adult male example, was described as an Idiops (Annals Natal Museum, III, pt. 2).

A large female example in the Rhodesian Museum, presumably belonging to this species, was taken in June, 1915, at Bulawayo, by Mr. Ericsson. It is evidently very closely related to *H. caffer* Puccell, and may be specifically identical therewith or with *H. deserti* Pocock. It seems to differ very slightly from a Moorddrift specimen which is provisionally referred to *caffer* in the arrangement of the posterior row of eyes: in the Bulawayo example, the distance between the posterior medians is scarcely more than $1\frac{1}{4}$ times as great as the distance between a posterior median and posterior lateral, whilst in the Moorddrift example the distance between the posterior medians is quite $1\frac{1}{2}$ times as great as that between the posterior median and posterior lateral.

Pelmatorycter nudus, sp. nov.

Type.—A single adult male example found under a stone at Little Wonderboom, Magaliesberg, by Mr. A. Roberts (6th June, 1915). This species is at once distinguished from *pretoriae* in the general absence of long hairs on the surfaces of the body and appendages. There are no long hairs on the anterior surface of the chelicerae and none on the legs: the abdomen is clothed with short fine hairs superiorly, and on the mesial area above, there are three pairs of short slender spines and a group of such spines occurs on the anterior portion of the upper surface.

Other characters are as follows:—

Pedipalp.—At the distal end of the femur superiorly on each side is a short, dark-coloured, horny projection, and a short distance behind the apex the superior surface is slightly raised into two small, rather indistinct humps adjacent to each other. Tibia much shorter than that of *pretoriae*, but the style of the bulbal organ hardly reaches back half-way along the tibia. Pressed forwards, the palp only extends as far as the basal fifth of tibia I. Maxilla without denticles at the anterobasal angle inferiorly.

Legs.—Tarsus I with a single spine on the posterior side near the apex, II with 2 spines on the posterior side, III with 3 spines on each side distally, IV also with about 3 on each side distally. Metatarsus I with 3 spines at the apex inferiorly and in addition the lower surface has 2-6 spines, II with 3 at the apex and 4 on the lower surface, IV with about 5-6 spines on the lower surface besides those at the apex, and, in addition, 2 on the posterior surface. Tibia I inferiorly with 3 strong spines at the apex, 10 spines in 2 rows on the lower surface, also 5-10 on the anterior surface and 1 on the posterior surface near the base. Patella III with 12 or 13 spines on the anterior surface and 4 on the dorsal surface; IV without spines or only 1 inferiorly near the apex. Tarsal claws of first leg with 7 or 8 teeth in each row, of fourth leg with 6 or 7 teeth in the inner row, and 5 or 6 in the outer row.

Chelicerae.—The left jaw has 7 teeth in the inner row (dentition of right jaw abnormal).

Posterior spinners.—Apical segment apparently a trifle shorter than the middle segment.

Posterior sternal sigilla pear-shaped, above $1\frac{1}{2}$ diameters apart, but only half a diameter distant from the sternal margin.

Colour.—Carapace and chelicerae dull reddish-brown: legs and palps pale-brown: abdomen above pale-purple with a paler mesial stripe.

Total length 11 mm., length of carapace 4.25.

This very distinct species is perhaps identical with *Ancylotrypa bicornuta* Strand, a species quite insufficiently described and somewhat indefinitely located "Kap der guten Hoffnung" (Jahrb. Nassau. Verein Naturk., Wiesbaden No. 35, 1906).

Female.

The female of this species, collected in the same locality (14th June, 1915), by Messrs. Van Dam and Roberts, seems to be much like *pretoriae*, but very much smaller.

The more important characters are as follows:—

Coxa III without a conspicuous tuft of stiff hairs on its post-ventral margin: posterior sternal sigilla about a diameter distant from the sternal margin and about $1\frac{1}{2}$ diameters apart or more: chelicerae with 8 teeth in the inner row: maxillae with 1 or 2 small denticles at the anterobasal angle inferiorly, or none at all: there is rather a strong development of setae on the sternum, those anteriorly especially being almost spiniform: posterior spinners with the apical segment about as long as the middle segment: fourth tarsal claws with several teeth in each row: abdomen subcylindrical, but not much elongated.

Total length 15.5, length of carapace 4.4.

Two adult males and a series of females were taken by Mr. G. van Dam at Wonderboom Poort, Magaliesberg (2nd March, 1916). The males agree with the type except as follows:—

Chelicerae with 8 or 9 teeth, in which latter case one of the teeth near the base of the series is very small: tibia I with 8 spines in 2 rows inferiorly, excluding those at the apex and at the sides: patella III with 2 or 3 spines on the dorsal surface. Colour of carapace pale reddish-brown or dull purplish-brown.

The female is not easily distinguished from the young of *pretoriae*. It is, however, more deeply pigmented, the abdomen being dark-purplish above, and the margins of the carapace posteriorly and laterally are purplish.

The structural characters are as follows:—

Coxa III without a definite patch of coarse setae on the post-ventral border: maxillae with one or several denticles at the anterobasal corner: chelicerae with 7-9 teeth: posterior sternal sigilla large, about a diameter or a trifle more apart and about $\frac{1}{2}$ a diameter distant from the sternal margin: metatarsus I and II with 2 spines inferiorly apart from those at the apex: terminal segment of posterior spinners a trifle shorter than the middle segment, or subequal thereto: sternum and ventral surfaces of coxae with numerous scattered, long and stiff, black setae.

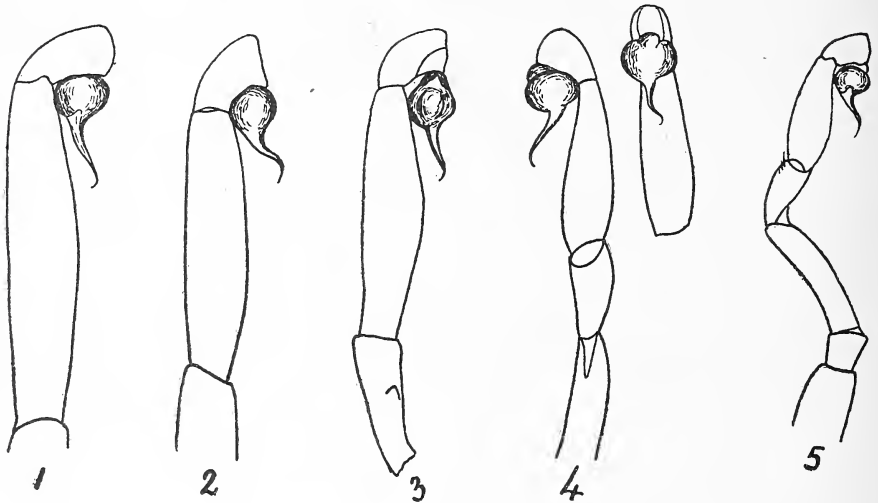
Total length 14.8, length of carapace 5.25, breadth of carapace 3.75.

Lastly, male and female examples of this species have recently been taken at Wolhuters Kop, Rustenburg District, by Mr. G. van Dam.

Pelmatorycter pretoriae, Hewitt. (Plate XXVI, fig. 9, and text fig. 6, No. 1.)
(Records Albany Museum, Vol. II, p. 427.)

The tibia of the male palp is considerably elongated in this species. Stretched forwards the apex of the palp reaches a point about $\frac{4}{5}$ of the distance along tibia I. The chelicera has 8 teeth, the maxilla is without denticles, and coxa III is devoid of a distinct patch of stiff setae on the post-ventral border. Metatarsus III is not scopulate inferiorly and presumably IV is likewise (but is absent from the specimen).

Females which I refer to this species have been taken in various parts of the Pretoria District, but none have been collected in the actual



TEXT FIG. 6.

Pelmatorycter spp.—Terminal segment of male palp, equally enlarged, in 1. *P. pretoriae* Hewitt; 2 *P. dreyeri*, sp. nov.; 3. *P. bulcocki*, sp. nov.; 4. *P. brevipalpis*, sp. nov.; 5. *P. parvus*, sp. nov.

locality from which the type male was obtained. Some very large specimens, indeed the largest specimens of this genus yet recorded, were taken between Lyttelton Junction and Irene. The chief characters of that series are:—

Chelicerae with 9–10 teeth: maxillae without cusps at the antero-ventral basal angle, but weak-pointed spinules may occur scattered about on the ventral surface generally: coxa III without a patch of strong setae on the posterior border below: metatarsus I thickly scopulate to the base over the ventral surface and on each side below: II likewise, but on the posterior side the scopula is weak near the base: claws of tarsus IV without teeth, or with one or two very weak ones near the base of the claw: posterior sternal sigilla subcircular or oval, about $\frac{1}{3}$ – $\frac{1}{2}$ of a diameter apart, and about 1 – $1\frac{1}{3}$ diameters distant from the sternal margin: apical segment

of posterior spinners a trifle shorter than the middle segment: anterior median eyes slightly raised on a tubercle, about $1\frac{1}{2}$ to nearly 2 diameters apart and about $1\frac{1}{2}$ diameter distant from the anterior laterals: posterior medians small, posterior laterals a trifle longer than the distance between the anterior and posterior laterals: abdomen elongate ovoid, rather than subcylindrical as in *P. brevipalpis*.

Specimens from the same locality, which I suppose to be merely half-grown examples of the same species, have the following characters:—

Chelicerae with 8 teeth: maxilla with 1 or 2 cusps at the anterior basal corner below, and, in addition, some small weak spinules scattered about on the ventral surface: the scopula on metatarsus II posteriorly is not continued to the base: claws of tarsus IV with distinct teeth, sometimes 4: posterior sternal sigilla elongated and pear-shaped.

Measurements of large specimen taken between Lyttelton Junction and Irene.—Total length 32 mm., length of carapace 11.25, breadth of carapace 9 mm.

Other examples of this species were taken by Messrs. A. Roberts and G. van Dam at Mayville, Pretoria North, Wonderboom Poort, Skinners Court, between Villieria and Derdepoort, Roodeplaat, Zeekoegat, near Roodeplaat, and from Schoemans Rust, near Crocodile River Bridge; the specimen from the last locality is young and has rather widely separated sigilla.

Pelmatorycter pretoriae, Hewitt, var. nov. *rufescens*.

Type.—An adult male from Roodeplaat, Pretoria District, collected by Mr. G. van Dam (22nd May, 1915). A second example was subsequently taken in the same locality.

This form is somewhat smaller than the type of *pretoriae* (Records Albany Museum, II, p. 427), which came from Garstfontein, but principally differs therefrom in the complete absence of a scopula at the apex of metatarsus II inferiorly. Other characters are:—Metatarsus I with only a very short scopula at the apex inferiorly: II with 2 spines (instead of 1) along the ventral surface: tibia II with 2 or 3 spines (instead of 4) on the lower surface: no spines on any of the tarsi, except in the second example, which has a single spine on the anterior side of tarsus IV: no denticles at the anterobasal angle of the maxillae: tibia of palp hardly so long as in *pretoriae*, relatively to the length of the palpal organ (this character not quite identical in the two examples): pressed forwards the palp extends to a point about $\frac{3}{4}$ of the distance along tibia I: apical segment of posterior spinners decidedly shorter than the penultimate segment (apparently subequal in *pretoriae*).

Colour.—Carapace and appendages pale reddish-brown, darker on the cephalic area.

Measurements.—Total length 14 mm., length of carapace 4.7.

Female.

A female example preserved in the same tube with the type presents the following characters:—9 teeth on the fang groove: maxillae with 4 or 5 small cusps at the anterobasal angle (only 1 or 2 in another example

from same locality): no stiff setae on the post-ventral border of coxa III: posterior sternal sigilla about $\frac{2}{3}$ of a long diameter apart, and about the same amount distant from the sternal margin. The distal segments of the palps and first two pairs of legs from the patella onwards are noticeably paler than the more basal segments.

Total length 20 mm.

At present I am unable to distinguish between the females of this variety and of the typical form.

Pelmatorycter brevipalpis, sp. nov. (Text fig. 6, No. 4.)

Type.—An adult male example from Roodeplaat (17 miles north-east of Pretoria), collected by Messrs. G. van Dam and A. Roberts (5th April, 1915).

Colour.—Carapace and appendages dull olive-brown throughout: abdomen dull-purplish above.

Chelicerae with 6 or 7 teeth in the inner row.

Pedipalps.—Pressed forwards, the apex of the palp reaches a point only a trifle beyond the apex of the patella of the first leg. Tibia comparatively short, the tip of the spine of the bulbal organ reaching back to a point about half-way along the length of the tibia. Maxilla with 2 denticles at the anterobasal corner.

Legs.—Tarsi completely without spines. Metatarsi quite without scopulae. Tibia I very slightly longer than metatarsus I. Metatarsus I with 1 spine at the apex inferiorly and 2 along the lower surface: II with 2 or 3 at the apex and 2 on the lower surface. Tibia I with 2 or 3 spines at the apex inferiorly and 2 on the lower surface, but none on the sides. Coxa III with a patch of bristles along the posteroventral border: this patch is not so dense as in the female. Patella IV without spines. Claws of tarsus IV (absent from one leg) with an inner row of 7-9 teeth and an outer row of about 3 or 4 teeth.

Posterior spinners with apical segment slightly shorter than the middle segment.

Posterior sternal sigilla about $\frac{1}{3}$ of a diameter distant from the sternal margin and nearly 2 diameters distant from each other.

Ocular area apparently not very distinctive. Distance between anterior and posterior lateral eyes scarcely equal to $\frac{1}{3}$ of the length of the posterior laterals (in *pretoriae* equal to quite $\frac{2}{3}$ or more of the length of the posterior laterals).

Abdomen with long bristles, but no spines at the base above.

Measurements.—Total length 11.75 mm., length of carapace 3.75 mm.

The weak development of spines on the tibia of the first leg is a marked feature of this species.

Female.

In the same tube as the type male there is a small female which no doubt belongs to the same species, but may not be quite mature. Its chief characters are as follows:—

Chelicerae with 6 teeth on the fang groove.

Maxilla with 1 or 2 denticles at the anterobasal angle inferiorly.

Legs.—Coxa III with a patch of stiff setae on the post-ventral border. Metatarsus I with 2 or 3 apical spines below, and 2 or 3 along the inferior surface: II with 3 apical spines below and 2 along the inferior surface: III with 6-8 spines dorsally on each side, 3 at the apex inferiorly, and 1 or 2 on the lower surface: IV with about 14 spines inferiorly on the anterior side, superiorly with only 2 or 3 weak spines on the posterior side.

Posterior spinners.—Apical segment a little shorter than the middle segment.

Posterior sternal sigilla about $1\frac{1}{3}$ diameter apart and about $\frac{1}{3}$ - $\frac{1}{2}$ of a diameter distant from the sternal margin.

Colour.—Cephalic region pale-yellowish: rest of carapace brown like the legs. Abdomen not strongly infuscated above, but with a dull-purplish tinge anteriorly.

Measurements.—Total length 13.5 mm., length of carapace 4.25 mm.

The Transvaal Museum has a larger specimen from the same locality, which I refer to this species. It has 7 teeth on the chelicerae, 4 or 5 denticles on the maxilla, posterior sternal sigilla about a diameter apart and $\frac{1}{3}$ - $\frac{1}{2}$ of a diameter distant from the sternal margin, metatarsi II and III with 4 spines along the inferior surface. The total length is 18.5 mm.

Mr. G. van Dam has recently taken an adult female example from a spot situated only a few inches away from the place where the type male was found. Some of its characters are:—7 cheliceral teeth on one side, 8 on the other side, one of them being very small: metatarsus I with 3-4 spines inferiorly apart from those at the apex, II with 3-6 spines inferiorly: the fovea is broadly curved. In the immediate neighbourhood some immature female examples of *P. pretoriae rufescens* were taken: these have the fovea more acutely curved, metatarsi I and II have only 2 spines inferiorly, and the coxa III character is very distinct.

From various localities in the Pretoria District female specimens have been taken, which seem to be referable to the same species, but this identification cannot be regarded as final until male examples from those localities become available.

Specimens resembling this form are known from Lyttelton Junction (G. van Dam and A. Roberts), where also several examples of *pretoriae* were taken.

At the Hogsback, near Lyttelton Junction, a large female with young was taken (20th April, 1915). Its total length is 20 mm., the carapace length 7 mm. There are 8 cheliceral teeth, 5 strong cusps on the maxilla, posterior sternal sigilla about a diameter apart and $\frac{3}{4}$ - $\frac{4}{5}$ of a diameter distant from the sternal margin, the terminal and middle segments of the posterior spinners subequal in length, metatarsus II with 3 apical spines inferiorly, and 3 on the lower surface, metatarsus III with 4 spines at the apex inferiorly, also 4 on the lower surface, and about 12-14 on each side dorsally.

In a large specimen from Koedoespoort, the posterior sternal sigilla are scarcely more than $\frac{2}{3}$ of a long diameter apart, and in one from Schoeman's Rust, near Crocodile River Bridge, they are a trifle less than a diameter apart.

The species has also been taken at Hatfield (G. van Dam).

Pelmatorycter barbertoni, Hewitt. (Records Albany Museum, II, p. 430.)

The type presents the following characters not mentioned in the original description:—On the post-ventral border of coxa III there is a distinct patch of stiffish setae: pressed forwards, the tip of the palp reaches about as far as the first third of tibia I: tibia of palp elongated, yet not quite so much as in *pretoriae* (type): 7 teeth on the fang groove: no denticles on the maxilla.

The female has the following characters:—Coxa III with a well-marked tuft of stiff setae along its post-ventral border: chelicerae with 7 teeth.

Pelmatorycter parvus, sp. nov. (Text fig. 6, No. 5.)

Type.—A single adult male from Alicedale, collected in May, 1915, by Mr. F. Cruden.

Three species of *Pelmatorycter* appear to exist at Alicedale, judging from Mr. Cruden's series of adult females. Two of them I have already described (Records Albany Museum, III, pp. 72 and 104): the third and smallest species I have previously referred with some doubt to *P. lateralis* Purc., but I now believe it to be distinct.

It is not clear from the structure of *parvus* to which of the three feminine species it should be attached, but Mr. Cruden suspects that it belongs to the smallest species, as the example was found in a locality where that species is known to occur and where the largest species, *crudeni*, at any rate, seems to be absent.

Probably *P. parvus* will prove to be nearly related to *Ancylotrypa cornuta* Purcell, from Dunbrody. The characters are as follows:—

Chelicerae with 6 teeth on the fang groove.

Pedipalps.—Pressed forwards, the palp extends to the apex of patella I. Tibia short, the spine of the bulbal organ extending back more than half-way along the length of the segment. At the apex of the tibia superiorly are 1 or 2 weak spines. No denticles on the maxillae.

Legs.—All the metatarsi are scopulate distally below. Tarsi I and II without spines, III with 1 or 2 weak spines on each side near the apex, IV with a row of 5 or 6 spines on the anterior side, but none posteriorly. Metatarsus I with 3 spines at the apex inferiorly and about 6 on the lower surface, II with 3 at the apex inferiorly and 4 or 5 on the lower surface. Tibia I a trifle longer than metatarsus I, with 3 spines at the apex inferiorly, about 8 on the lower surface, comprised in two rows of which the outer includes 4 long spines and the inner 4 shorter and weaker ones, besides which on the inner surface are 1 or 2 short spines and on the outer surface 2 or 3 short spines. Post-ventral border of coxa III without a distinct compact tuft of stiffish setae, but short scattered stiffish setae occur over a considerable portion of that area, as is not the case on coxa II. Femur IV with a rastellum at the apex superiorly, composed of short but strong spines. Claws of tarsus IV with about 6 teeth in each row.

Carapace.—Only very few spines on the hind portion and sides of the carapace and they are very short. Posterior lateral eyes distant from the anterior laterals about half the length of the former.

Abdomen.—Anteriorly the upper surface carries some short stout bristles.

Posterior spinners with apical segment only a trifle longer than the middle segment.

Posterior sternal sigilla submarginal, about 3 diameters apart.

Colour.—Dark olive-brown, the carapace nearly black, the abdomen dull-purple.

Measurements.—Total length 8 mm., length of carapace 3 mm.

This species is very lacking in hairs which often fringe the legs of male *Pelmatoryctes*. It is, on the other hand, more bristly than usual: the apical margins of the coxae and trochanters of the legs is fringed with stiff bristles or in places with actual spines.

The female, previously referred to by me under the name of *lateralis*, is also characterized by a rather strong development of stiffish setae on the sternum and appendages, but these are by no means so well developed as in the male. Its most striking character is the wide separation of the posterior sternal sigilla which are 2 diameters, more or less, apart, and about $\frac{1}{2}$ a diameter, or less, distant from the sternal margin: the chelicera carries 7 or 8 teeth. The tuft of setae on the post-ventral border of coxa III is not very dense. The abdomen is elongated, subcylindrical.

Pelmatorycter sororum, sp. nov.

Type.—A single adult male example from Bedford, Cape Province, collected for the Albany Museum by the Sisters of the Bedford Convent.

Colour.—Carapace and appendages pale yellowish-brown, the radial depressions of the carapace and the median line from the fovea forwards being darker than the remainder of the carapace: abdomen dark-purplish above with traces of about 5 or 6 pale cross stripes, the lateral and ventral regions pale.

Chelicerae with 7 teeth on the fang groove.

Pedipalps.—Pressed forwards, the apex reaches as far as the basal third of tibia I. Maxillae without denticles at the inferobasal angle. Tibia rather short, the spine of the palpal organ reaching backwards practically half-way along that segment.

Legs.—None of the metatarsi are scopulate below, though a few scattered scopular hairs may exist at the apex of metatarsus I. Tarsus I without spines, II with 2 spines on the posterior side, III with 2 or 3 dorsal spines, also 3 on the anterior side and 2 or 3 on the posterior side, IV with a row of 6 spines on the anterior side and 5 on the posterior side. Metatarsus I with 3 spines at the apex inferiorly and about 4 on the lower surface, II with 3 at the apex and 3 or 4 on the lower surface. Tibia I subequal in length to the metatarsus, with 3 spines at the apex inferiorly, also about 9–11 on the lower surfaces and 2 or 3 on the anterior surface. Coxa III without a distinct compact tuft of stiffish setae post-ventrally. Claws of fourth tarsus with about 5 teeth in each row.

Posterior spinners.—Terminal segment distinctly shorter than the middle segment.

Carapace.—The spines on the posterior portion well developed. Distance between the anterior and posterior lateral eyes about equal to half the length of the latter.

Posterior sternal sigilla about $2\frac{1}{2}$ –3 diameters apart and about $\frac{1}{2}$ a diameter distant from the sternal margin.

Measurements.—Total length 9.5 mm., length of carapace 3 mm.

Female.

The type male is accompanied by a small female example, the more important characters of which are as follows:—

Colour.—The abdomen superiorly is striped: anteriorly, the dark stripes tend to fuse, but in the posterior half three very distinct and rather broad stripes occur. Carapace and legs pale-brown.

Legs.—Coxa III without a post-ventral tuft of stiff setae. Metatarsi I and II with 2 or 3 spines at the apex inferiorly and 2 along the lower surface, III with 7 or 8 spines on each side superiorly and 2 in the mid-dorsal region, IV with 2 spines superiorly on the posterior side and about 10 spines inferiorly, including those at the apex.

Ocular area.—Posterior lateral eyes elongated, quite as long as the distance between anterior and posterior laterals. Posterior medians larger than the anterior medians and equidistant from anterior medians and posterior laterals.

Posterior spinners.—Apical segment a trifle shorter than the middle segment.

Chelicerae with 7 teeth on the fang groove.

Maxilla without denticles at the anterobasal angle inferiorly.

Posterior sternal sigilla large, pear-shaped, rather less than $\frac{1}{2}$ a diameter distant from the sternal margin and a trifle more than a diameter apart.

Length of carapace 4 mm.

Pelmatorycter bulcocki, sp. nov. (Plate XXVII, figs. 1 and 2, text fig. 6, No. 3.)

Type.—A single adult male, collected for the Albany Museum, at Ngqeleni, Cape Province, by Mr. H. L. Bulcock, B.A., during April, 1915.

Colour.—Carapace and upper portion of chelicerae bright red: legs and abdomen blackish.

Chelicerae with 8 teeth on the fang groove (on one side 9, including a very small denticle near the base of the row).

Pedipalps.—Pressed forwards, the apex reaches a point about $\frac{2}{3}$ of the distance along tibia I. Tibia not greatly elongated, the tip of the spine of the bulbal organ reaching backwards nearly half-way along the tibia. Maxillae without denticles.

Legs.—The metatarsi are all densely scopulated distally below. Tarsus I without distinct spines or with a very weak one on the posterior surface inferiorly near the apex, II with 2 spines inferiorly on the outer side, III with 2 spines on the anterior surface superiorly and 1 or 2 on the posterior surface, also 4 or 5 on each side of the inferior surface, IV with a strip of spines on each side in its lower half. Metatarsus I with 3 spines at the apex inferiorly and 2 on the lower surface, II with 3 at the apex

inferiorly and 2-4 on the lower surface. Tibia I with 3 spines at the apex inferiorly, and a series of long strong spines on the lower surface on its posterior side and about 6 or 7 long spines on the anterior side. Patella IV without spines. The rastellum at the apex of femur IV superiorly composed of short weak spines. Coxa III with stiffish setae post-ventrally, but the patch is not marked off from the setae on the rest of the surface. Claws of tarsus IV with an outer row of 3 or 4 teeth and an inner row of about 7 teeth.

Posterior sternal sigilla about 1 diameter apart and about $\frac{1}{2}$ a diameter distant from the sternal margin.

Abdomen with long bristles, but no spines at the base above.

Posterior spinners.—Apical segment a little longer than the middle segment.

Ocular area.—Anterior margin of anterior row of eyes in a rather strongly procurved line. Anterior laterals very much larger than any of the other eyes: anterior medians comparatively small. Posterior laterals small, their distance from the anterior laterals slightly greater than the long diameter of the posterior lateral.

Measurements.—Total length 13·3 mm., length of carapace 5·3.

Female.

The female of this species is very similar to that of *P. magnisigillata mihi*, described from Kokstad (Records Albany Museum, III, p. 33). The only apparent difference lies in the spinulation of the anterior surface of patella IV: in *bulcocki* the spinules occur only at the actual base of the segment, whereas in *magnisigillata* scattered spinules extend over the basal half of the segment intermingled with bristles. There are 8 teeth below the chelicerae. Coxa III without a post-ventral tuft of stiff setae. The apical segment of the posterior spinners is a trifle longer than the middle segment. The abdomen is infuscated throughout except on the genital sternite and over the lungs.

Total length 27·5, length of carapace 7·8.

This species is remarkable in the colouration of the adult male, for so far as is known its contrasted deep black and red colours are not found in the males of any other species. Such a combination is well known, however, in the genus *Stasimopus*.

The genus *Pelmatorycter* can be divided into two fairly distinct groups, according to the presence or absence of a conspicuous tuft of closely-aggregated stiffish setae on the post-ventral border of the third coxa.

This tuft is present in the following species: *crudeni*, *dreyeri*, *vryheidensis*, and *brevipalpis*.

It is absent from *magnisigillata*, *bulcocki*, *flavidofuscus*, *sorum*, *pretoriae*, and as no mention of this character is found in Dr. Purcell's descriptions I suppose that *dentatus*, *lateralis*, *o'neili*, and *schultzei* should be included here. The character is one which seems to be exhibited more distinctly in females than in males, so that it may not be possible in some cases to refer an undetermined male to either of the above sections, and we may anticipate also that females will be found which are more or less

intermediate. The males of the different species differ greatly in the development of long hairs or of short stout setae on the legs.

The following artificial key, based on the characters of adult males, is submitted as a rough guide to the species already known:—

1. Femur of pedipalp slightly produced at the apex superiorly into two short processes (Wonderboom, Pretoria). . * *P. nudus*, sp. nov.
With a single short "horn" at the apex of the palpal femur superiorly (Dunbrody).....*P. cornuta* (Purcell).
Femur of palp not produced at its apex superiorly into processes 2
2. All the metatarsi scopulate distally below..... 3
Some or all of the metatarsi not scopulate below..... 4
3. Palps and legs all very hairy (Ngqeleni).... *P. bulcocki*, sp. nov.
Palps and legs not hairy, but covered with short stiffish setae (Alicedale).....*P. parvus*, sp. nov.
4. Metatarsus I and usually also II distinctly scopulate inferiorly near the apex..... 5
Metatarsus I and II not scopulate below..... 8
5. Tarsus II with 4 small outer spines, IV with a distal group of small spines internally and a double series of longer spines externally (Johannesburg).....*P. nigriceps* Purcell.
Tarsus II without spines or with 2 on the outer side, IV with no external spines or 1-4 small ones and with none or only 1 or 2 internally situated..... 6
6. Coxa III with a tuft of stiff setae post-ventrally: abdomen without long hairs above..... 7
Coxa III without a tuft of stiff setae post-ventrally: abdomen clothed above with long hairs (Garstfontein, near Pretoria).
P. pretoriae mihi.
7. Patella of palp without spines (Bloemfontein).. *P. dreyeri* mihi.
Patella of palp with 2 spines anteriorly near the apex (Barberton).
P. barbertoni mihi.
- †8. Tibia of palp elongated..... 9
Tibia of palp rather short..... 10
9. Posterior sternal sigilla very large, pear-shaped, confluent in the mid-line (Steinkopf).....*P. namaquensis* Purcell.
Posterior sternal sigilla apparently about a long diameter apart (Matjesfontein).....*P. pallidipes* Purcell.
10. Coxa III with a tuft of stiff setae on its posterior ventral border (Roodeplaat, near Pretoria).....*P. brevipalpis*, sp. nov.
Coxa III without a tuft of stiff setae on its posterior ventral border (Bedford).....*P. sororum*, sp. nov.

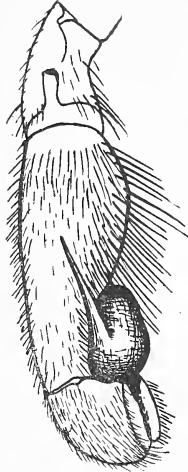
Spiroctenus (*Homostola*) *zebrina* Purcell. (Text fig. 7.)

Mr. A. Roberts has taken specimens of this species from the following localities:—Forbes Reef (Swaziland), Lake Chrissie, Steynsdorp, Lochiel (Ermelo District), from Elandspruit, Oshoek, and Tevreden (in the Carolina

* This may possibly prove to be the same as *Ancylotrypa bicornuta* Strand from Kap der guten Hoffnung."

† *Ancylotrypa pusilla* Purcell, from Hanover, seems to come in this section.

District), from Doornhoek (Komati River), and from Bon Accord (Pretoria District). In a male from Forbes Reef the fourth tarsus is scopulate to the base on each side. As no figures relating to this species have been hitherto published I take this opportunity of giving a drawing of the male palp.



TEXT FIG. 7.

Spiroctenus (Homostola) zebra Parcell.
Palp of adult male from Forbes Reef,
Swaziland.

Stasimopus suffuscus, sp. nov.

Type.—A single adult female example from Beerlaagte, Heidelberg District, collected by Mr. G. van Dam (10th March, 1915). Besides the type two other specimens were taken, one being sub-adult and the other about half-grown.

Ocular area.—The eyes (clear area) are all unusually small. Width of ocular area very slightly exceeding the length of metatarsus I. Distance between anterior and posterior lateral eyes equal to $2-2\frac{1}{2}$ times the long diameter of the former, but 3-4 times the long diameter of the latter. Distance between anterior lateral and anterior median eyes quite equal to twice the long diameter of the latter. Posterior medians rounded, their distance from the posterior laterals rather more than twice the long diameter of the former.

Pedipalp.—Tibia with a group of short spinules at apex above. Tarsus with a basal patch of spinules dorsally, extending about $\frac{1}{2}$ of the length of the segment. Band of spines on inner side of tarsus, extending to the base.

Legs.—Tibia I only slightly shorter than metatarsus I. Inner surface of tibia I with 10-15 short spines, the upper surface with a small apical patch of spinules extending over nearly $\frac{1}{6}$ of the length of the dorsal surface. Basal patch of spinules on metatarsus I above extending over

about $\frac{1}{4}$ of the length of the dorsal surface. Basal patch of spinules on metatarsus II above only a trifle longer than that at the apex of the tibia. Inner surface of tibia II with 7-9 spines. Anterior surface of metatarsus III with a band of about 34 spines. Patella III with about 9-12 short spines on its anterior surface: at the distal end above there are a few rather weak spines and some spiniform setae. Metatarsus III without an apical tuft of spines below. Inferoposterior apical tuft on metatarsus IV composed of 4-6 spiniform setae arranged in a transverse row.

Colour.—Carapace and appendages castaneous. Upper surface of abdomen rather strongly infuscated.

Measurements.—Total length 33 mm., length of carapace 13·3, breadth of carapace 12, length of metatarsus of first leg 4·9.

This species is closely related to *S. dreyeri* mihi, from Kroonstad (Records Albany Museum, III, p. 86). It differs therefrom chiefly in the ocular characters, the eyes of *dreyeri* being longer and more closely approximated than in the species now described. The difference between these two forms is therefore much the same as that between *S. schönlandi*, Poc., and *S. astutus*, Poc.

Stasimopus robertsi, mihi. (Pl. XXVII, figs. 3 and 4.)

Female examples of this species have been taken from the following localities in the Pretoria District by Messrs. G. van Dam and A. Roberts: Wonderboom Poort, Mayville, Pretoria North, Witfontein (near Pretoria North), Skinner's Court, Bon Accord Siding, Lyttelton Junction, Brooklyn, Hatfield, Garstfontein, between Villieria and Derdepoort, Roodeplaat, and Zeekoegat (near Roodeplaat).

The female of this species has not been fully described, but the more important characters, taken from specimens collected at Rosslyn (G. van Dam), are mentioned in my key to the genus (Records Albany Museum, III, p. 79). The length of the strip of spinules on the upper surface of the palpal tarsus now proves to be somewhat variable, and may occasionally be about as short as in the closely related species, *S. coronatus*, mihi, from Kroonstad (Records Albany Museum, III, p. 87): this latter species may therefore eventually be found to merge into *robertsi*, but the two forms seem separable through the spinulation at the apex of the palpal tibia, where the adults of *robertsi* have only an odd 1 or 2 spinules, whereas a group of spinules occurs in *coronatus*. The number of spines on the anterior surface of tibia I is a variable character: in one adult specimen there are 19. The species *S. dubius* (Records Albany Museum, II, p. 410), described by me from a single female specimen taken at Potchefstroom, is no doubt specifically identical with *robertsi*.

Two adult male specimens were taken at Wonderboom Poort (24th March, 1915), by Messrs. van Dam and Roberts, who found them in nests provided with quite a normal type of lid. Although males of this genus are sometimes taken on the open veld, yet it seems clear that, like the males of other trapdoor-making genera, they normally occupy nests which closely resemble, except in size, those of the adult females. The patella of the palp is about $1\frac{1}{2}$ times as long as that of the first leg, and only very slightly shorter than the tibia of that leg. All the tarsi are scopulate, but there is no trace of a scopula at the apex of metatarsus I.

Family MIGIDAE.

Moggridgea paucispina, sp. nov.

This species is allied to *M. seticoxa* Purc., *M. coegensis* Purc., and *M. nigra* Purc., but seems to differ from any of them in the ocular characters and in the comb of setae at the apex of metatarsus IV: in *paucispina* that comb includes only 2 or 3 setae, whereas there are 5 in its allies. The rather small size of the anterior lateral eyes also seems to be a distinctive character. When its characters are better known, *M. pyimi* mihi, the type of which seems to be only half-grown, may prove to be closely related to the species now described.

Type.—A single specimen from Wonderboom Poort, Pretoria, collected by Mr. A. Roberts (19th June, 1915).

Carapace a little longer than broad, about equal in length to the tibia, metatarsus, and $\frac{1}{3}$ of the tarsus of the fourth leg. Fovea without median prolongation behind. Anterior row of eyes with its front margins forming only a very slightly procurved line, the laterals comparatively small, each being about twice the area of an anterior median: the distance between an anterior median and anterior lateral equal to about 3 times the diameter of the former. Anterior medians about $1\frac{1}{4}$ diameters apart. Posterior medians subequal to the posterior laterals in size, the hind margins of the posterior row in a fairly strongly recurved line. Breadth of ocular area decidedly greater than the length of metatarsus I.

Legs.—Patella III on its anterior side with a single row or 2 incomplete rows, of stout spiniform setae superiorly, and with 2 or 3 similar stout bristles on the distal edge. Patella IV with numerous, rather short, stiff setae on the anterior side, occurring from base to apex, but none are spiniform except a few on or near the distal edge, which are only weakly so. Coxa III inferiorly with a cluster of 7–10 spines or spiniform bristles, II and I with 7 or 8 scattered bristles posteriorly below.

Pedipalp with 15 or 16 spinules on the coxa inferiorly, occupying 2 irregular rows.

Labium with 13 teeth.

Colour.—Carapace and appendages dark-chestnut. Abdomen purplish above, but somewhat paler below.

Total length 17.5, length of carapace 6.25.

There is in the Durban Museum a single specimen of a species of *Moggridgea* from Ngxwala Hill, North Zululand, which seems very closely allied to if not identical with *paucispina*. It differs therefrom in the somewhat larger size of the eyes of the anterior row, especially of the laterals—a character which must not be over-estimated as the specimen is quite probably immature—and the armature of coxa III inferiorly is composed of short spinules rather than spines.

Male.

An adult male collectēd by Mr. G. van Dam at Wonderboom Poort, Magaliesberg (2nd March, 1916), has the following noteworthy characters:

Carapace.—The surface is closely wrinkled throughout. Fovea without backward or forward median continuation. The cephalic area is somewhat elevated in front, and, further, the mesial portion just in front

of the anteromedian eyes projects forwards fairly strongly. Just in front of these eyes mesially is 1 stout bristle and 2 smaller ones: behind them is a pair of short weak spines.

Appendages.—Coxae and labium without spinules or spiniform setae. First leg with stout spines laterally on both tibia and metatarsus and an odd one may or may not occur on the anterior side of the tarsus: there are 1 or 2 on the ventral surface of the metatarsus and 2 or 3 at the apex of the patella inferiorly. Second pair of legs with weaker spines. Chelicera with 2 rows of teeth, an inner row of 4 or 3, and outer row comprising 1 large basal tooth and 3 or 4 small distal ones. Tarsus of palp with a prominent pointed subconical lobe at the apex superiorly.

Measurements.—Total length 9 mm., length of carapace 4.1, breadth of same 3.6, length of tibia of palp 2 mm.

General colouration.—Dark-brown.

In other respects this male resembles that of *rupicola* described by me (Records Albany Museum, II, p. 463). The anterior prominence of the carapace is specially characteristic of the species.

The male was accompanied by a female specimen which agrees closely with the type of *paucispina*, but differs in the absence of distinct spines or spiniform bristles on the ventral surfaces of coxae III and II: it is smaller than the type. This would seem to point to a relationship between *microps* and *paucispina*, as indeed is indicated by the ocular character.

Female examples have recently been taken at Wolhuters Kop, Rustenburg District, by Mr. G. van Dam: the cluster of spines or bristles on coxa III is lacking in these examples.

Family DIPLURIDAE.

Microstigma, gen. nov.

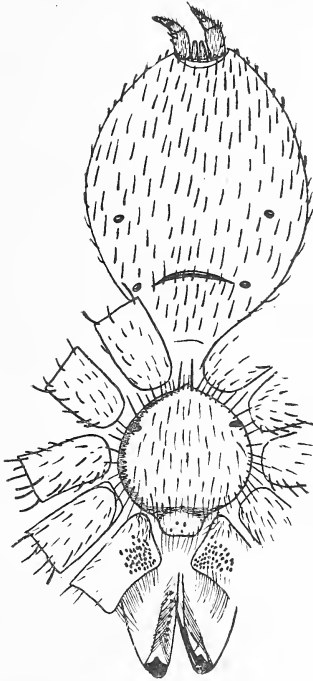
This new genus is founded for the reception of a species which cannot be included in any *Diplurid* or *Ctenizid* genus hitherto known from South Africa. It is assigned to the Dipluridae on account of the absence of the rastellum, but I am unable to discover definite indication of close relationship to any of the known genera of that family. But for the absence of scopulae it might perhaps be included in the group Brachytheleae (see Rainbow in Records Australian Museum, Vol. X, p. 259). Some light on its relationships may be disclosed on the discovery of the male, but for the present it can be considered as one of the connecting links between the two families Ctenizidae and Dipluridae. The characters of the species are as follows:—

Microstigma geophilum, sp. nov. (Text fig. 8.)

Types.—Several female specimens taken under stones in the damp bush which covers the hills on the south side of Grahamstown (J. Hewitt, March, 1915). The surfaces of the living animal are covered with extraneous siliceous matter, the tiny granules of which adhere closely to the integuments of the spider.

Colour.—Carapace dull-brownish: abdomen brown, with 4 or 5 pale transverse bands dorsally, the second and third bands being interrupted mesially: legs pale-brown.

Integuments.—The skin throughout is very finely roughened or shagreened, except at the articulations. There is an almost complete absence of fine hairs: none occur on the carapace nor on the abdomen, but on the tarsi, metatarsi, and tibiae of the legs, there are a few scattered very long and slender hairs which project outwards at right angles from the upper surfaces. The surfaces of the body and appendages bear some very characteristic spines: they are very stout and truncated or blunt at their tips: sometimes they are even enlarged at their apices. Examined under the low power of a compound microscope each truncated spine is seen to have the surface frayed into fine serrations near the apex.



TEXT FIG. 8.

Microstigma geophilum, sp. nov.

Ventral view of trunk and bases of appendages.

Carapace.—A little longer than broad, depressed, the cephalic region being scarcely raised above the thoracic portion, the radial depressions weakly developed. Fovea transverse. Ocular area hardly twice as broad as long. Ocular tubercle strongly raised. Anterior margins of anterior row of eyes practically in a straight line when viewed from above: anterior laterals largest of all the eyes: the anterior and posterior margins of the posterior row are both in strongly recurved lines. Distance between posterior medians slightly greater than twice the long diameter of an eye. Some strong spines fringe the lateral margin of the carapace in its posterior half and a few also occur in front of and upon the ocular tubercle: otherwise the spines on the surface of the carapace are weak and short and are not numerous.

Sternum about as long as broad and subcircular. Strongly fringed near its margin with spines, especially posteriorly, the spines anteriorly being longer, but more slender. The general surface is slightly curved and is beset with long slender scattered spines, which are longer than but not so stout as those on the ventral surface of the abdomen. Three pairs of sigilla, all marginal, the two anterior pairs situated outside the fringe, the third pair largest and forming a conspicuous depression.

Labium broader than long, inclined obliquely downwards. It carries four broadly expanded denticles.

Abdomen with truncated spines scattered about on all the surfaces: they are very strong anteriorly above, but comparatively weak over the greater portion of the mesial area dorsally.

The lung-book stigmata are unusually small, being oval pores rather than transversely elongated slits.

Anterior spinners comparatively slender and situated close together. Posterior spinners only a trifle more than $\frac{1}{2}$ the length of the sternum: basal joint longest, longer than the anterior spinners: terminal segment a little longer than the penultimate segment.

Chelicerae with a single inner row of 7 or 8 teeth inferiorly: outer row represented by 1 or 2 small teeth near the base of the series. A fringe of long hairs on the outer side of the fang groove. Rastellum absent. Scattered about, not very closely, on the anterior surface are a number of long stiffish bristles, the stoutest of which are situated superiorly: several rather longer bristles occur on the anterior apical edge, but they do not form in any sense a definite row.

Palp.—Tarsus with an internal row of 5 strong spines ventrally and an external row of 4 strong spines ventrally. Maxillae considerably longer than broad, with a basal patch of about 40 stout broadened denticles.

Legs.—Clothed with stiff setae and stout spines. Scopulae entirely wanting. Tarsi all without spines though short stiff setae are present. Median tarsal claw present, but rather small: paired tarsal claws with a double row of teeth, comprising 4 or 3 in each row and situated in the basal half of the claw. Metatarsus I with 4 strong spines anteroventrally and 3 posteroventrally: II with 2 ventral rows of 3 each, also 2 on the anterior surface: III and IV with several spines on the posterior surface as well as ventrally and anteriorly, but there are none on the mesial portion of the dorsal surface. Tibia I with 3 spines at apex inferiorly and 4 on the lower surface. Femora of palps and legs beset with a single row of strong truncated spines dorsally: on femur II the row is reduced to 2 distal spines, but on the other legs it comprises 4 or 5. On the patellae dorsally much shorter and weaker spines, also arranged in rows, occur, and rows of weak spines or stiffish bristles occur on the dorsal surfaces of the tibiae and metatarsi. There are nowhere any dense groups of spines or spinules on the legs. Fourth leg longest: legs II and III subequal. Tarsi all shorter than the metatarsi. Metatarsus IV longest, about $1\frac{3}{4}$ times as long as tarsus IV. Tibia I stouter than any of the other tibiae, a little longer than tibiae II and III, but shorter than tibia IV.

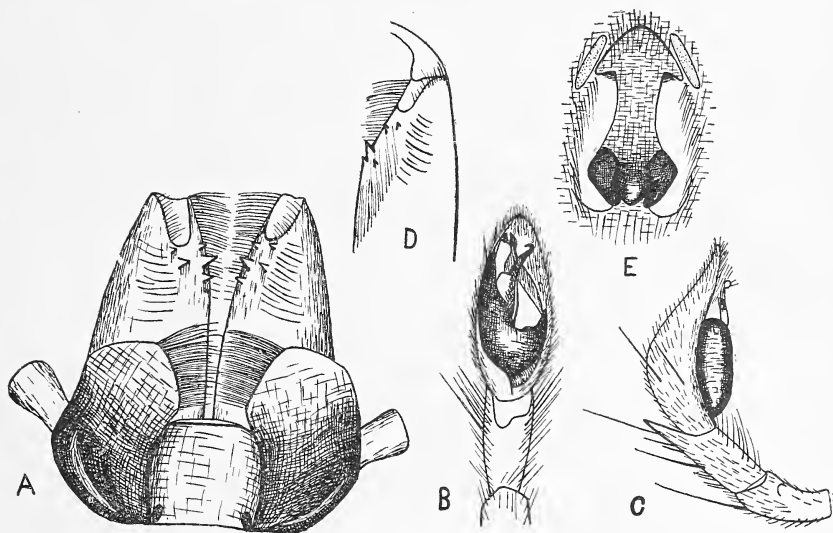
Measurements.—Total length 9 mm., length of carapace 3, breadth of same 2.5, length of first leg 9, of fourth leg 12.

Family DRASSIDAE.

Drassodella, gen. nov. (Text fig. 9—A-E.)

This name is proposed for the reception of a species which cannot be referred to any of the genera included by M. Simon in the family Drassidae, and, but for the fact that the maxillae are strongly impressed, the species might with some propriety be referred to the family Clubionidae. The labium is much shorter than that of other Drassidae known from South Africa (except the anomalous genus *Titus* O. P. Camb.), and the inferior spinners are not widely separated although not actually contiguous. The generic characters are as follows:—

Inferior spinners with hardened integument, not widely separated from each other, being not so far apart as the superior spinners, not greatly



TEXT FIG. 9.

Drassodella salisburyi, gen. et. sp. nov. A. Mouth parts of female. B and C. Palp of adult male. D. Chelicera showing dentition of adult male. E. Epigyne of adult female.

elongated, hardly reaching as far as the superior spinners: maxillae obliquely disposed and deeply impressed: trochanter of palp inserted about opposite the middle of the maxilla: labium about as broad as long, not much surpassing the basal half of the maxillae: carapace moderately convex, not flattened, fairly strongly attenuated in front, the radial markings indistinctly indicated, the median stria rather short, but not reduced to a mere punctuation: clypeus vertical, but very low: sternum subcircular, not produced nor attenuated in front: dentition of chelicerae 2.3: coxa I longer than II and III, but subequal to IV: tarsi of legs very slender, but straight not flexuose: lateral eyes of each side widely separated: area formed by the median eyes longer than wide: posterior row decidedly recurved, anterior row only very slightly recurved, the anteromedian eyes smaller than the anterolaterals: abdomen of male not scutate above.

D. salisburii, sp. nov.

The types are several adult male examples and one adult female collected at Grahamstown on the forested slopes above the Albany Hospital during February, 1915. The species is named after Mr. F. S. Salisbury, M.A., who has made important contributions to our knowledge of the flora of this portion of South Africa and has rendered great service to the Albany Museum on various occasions.

Colour.—Carapace and legs blackish, the former thinly margined with pale-yellow and with a thin yellow median stripe bifurcating behind at the fovea: pale-yellowish or white hairs are also found on the upper surfaces of the coxae, trochanters, and basal parts of the femora. The abdomen is bright-orange dorsally, the coloured area being sharply defined and broken only by a short median black streak anteriorly. Ventral surfaces blackish. The ventral and lateral surfaces of the abdomen are faintly tinged with yellow, owing to the presence of fine plumose hairs which occur along with the more conspicuous black simple hairs which are longer and stiffer.

Ocular area.—Anteromedians about half the size of the anterolaterals, a trifle more than a diameter apart, but only about $\frac{1}{2}$ a diameter distant from the anterolaterals. Posterior row broader than the anterior row, the medians only a mere trifle nearer to each other than to the laterals. Distance from anterior lateral to anterior margin of the carapace rather greater than the diameter of an eye.

Chelicerae.—In the female the basal joint is shorter and stouter than in the male, and the dentition accordingly is different, the distal tooth of each row being much more widely separated from its neighbour in the male than in the female. The strongest tooth is the middle one of the inner row.

Legs.—All the tarsi and the two anterior metatarsi are scopulate to the base. In the female there is a scopula in the distal half of tibia I on its anterior side, but such is not the case in the male. Tarsus IV is not so decidedly scopulate as I and II, the hairs being more setiform. Near the base of metatarsus I inferiorly is a pair of spines in the male, but not in the female. Metatarsus II with a pair of spines near the base inferiorly in both sexes. Tibia I with two pairs of spines inferiorly, II with only two unpaired spines below. Metatarsi III and IV and tibiae III and IV with a pair of spines at the apex inferiorly, and, in addition, two pairs of rather long and strong spines on the lower surface: besides, there are several similar spines on the lateral surfaces of each segment so that near to the apex of the metatarsi there are in all about 6 spines. Femora I and II have about 2 or 3 spines superiorly whilst III and IV have about 5 superior spines. None of the tarsi are spined. Fine plumose hairs occur on the legs as well as stiff black ones.

Male palp.—The tibia is produced distally into a stout straight process acuminate pointed at the end. What seems to be the spine of the bulbal organ arises from an expanded lamina, which is mostly not pigmented and suddenly contracts into a fairly slender dark-coloured process, which is strongly hooked near its apex. Besides this, the palpal

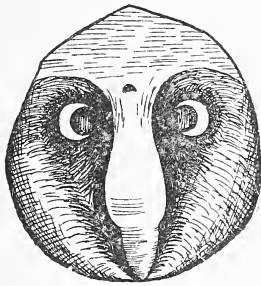
organ presents two other folded laminae, one of which is whitish and the other deeply pigmented.

Female epigyne.—There is a large excavation anteriorly and on either side of this the surface presents an elongated sigillum. The mesial area over the whole length of the epigyne is more or less excavated, except posteriorly, where there is a small rounded knob-like elevation: this latter is bounded on each side by a darkly pigmented area.

Measurements.—Male: total length 8.25 mm., length of carapace 3.8, breadth of same 3, length of first leg 12.2, of fourth leg 14.5. Female: total length 9 mm., length of carapace 3.4, breadth of same 2.5, length of fourth leg 12.5.

Xerophaeus anthropoides, sp. nov. (Text fig. 10.)

Type.—A single adult female specimen from Roodeplaat, Pretoria District, collected by Mr. G. van Dam (24th May, 1915).



TEXT FIG. 10.

Xerophaeus anthropoides, sp. nov.
Epigyne of female.

Ocular area.—Anterior row of eyes almost straight in dorsal view, posterior row fairly strongly procurved. Posterior medians about $\frac{1}{2}$ a long diameter apart and $1\frac{1}{2}$ diameters distant from the posterior laterals. Distance between anterior lateral eye and anterior margin of carapace about equal to the diameter of the eye.

Chelicera without an inferior tooth.

Legs.—Tibia I with 3 strong spines below, 1 at the apex, 1 at the base, and 1 about the middle of its length. Metatarsus I with 2 basal spines inferiorly.

Epigyne.—The central paler area is not grooved over any portion of its length, and the narrowed posterior portion is convexly raised. The anterior pocket is almost obsolete, being merely a small shallow pit on the general surface. The posterior lateral convexities are large: anteriorly, on each side of the central area immediately posterior to the rudimentary pocket, there is a large deep pit within which is situated a darkly pigmented circular area which appears to correspond with the anterior convexities found in such species as *X. poweri* mihi from Kimberley (Records Albany Museum, III, p. 94).

Total length 12 mm.

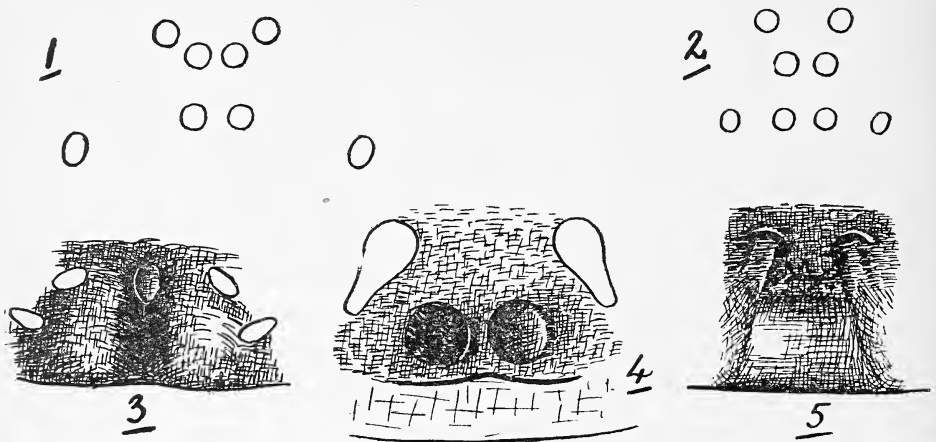
This species is at once distinguished from any of the previously described members of this genus in the rudimentary anterior pocket of the epigyne.

Family ZODARIIDAE.

Cydrela vandami, sp. nov. (Text fig. 11, 1 and 3.)

Type.—A single adult female from Roodeplaat, Pretoria District, collected by Mr. G. van Dam (24th May, 1915).

Colour.—Carapace and appendages dark chestnut-brown, almost black: abdomen dark with several small yellowish-white areas, all longitudinally elongated and situated in the mid-line, the most conspicuous one being situated anteriorly, a smaller one just above the anal papilla, and a third about midway between the two just mentioned. Sternum reddish-brown.



TEXT FIG. 11.

Ocular area of *Cydrela vandami*, sp. nov., 1; of *C. spinifrons* Hewitt, 2; Epigyne of *Cydrela vandami*, sp. nov., 3; of *C. spinifrons* Hewitt, 4; of *C. friedlanderai* Hewitt, 5.

Carapace.—The clypeus is completely devoid of bristles, spines, or even stiff hairs. The eyes are arranged in two rows, the anterior row being strongly procurved, the posterior row a little recurved. Antero-median eyes subequal to the posteromedians in size, about $\frac{1}{2}$ a diameter apart, and about the same distance from the anterolaterals, but about $1\frac{1}{2}$ diameters distant from the posteromedians. Anterolaterals about 3 diameters apart. Posteromedians about $\frac{3}{4}$ of a diameter apart and nearly 4 diameters distant from the posterior laterals.

Abdomen covered with slender hairs.

Epigyne.—The pair of pits or pockets which are often found on the epigyne in this genus seems to be quite absent. There is, however, a single rather ill-defined median depression anterior to and between the dark-coloured paired convexities: on the outer side of each convexity is a pair of sigilla devoid of hairs.

Legs.—Tarsus I without spines. Tarsi I and II distinctly, but not strongly, scopulate inferiorly, and setae similar to those which compose these scopulae occur also on III and IV, but are not so closely arranged. Metatarsi I, II, and III with dense tufts of long setae at the apex inferiorly. Tarsus IV about $\frac{2}{3}$ the length of the metatarsus. Patella IV with a single spine on each of the surfaces anteriorly, dorsally, and posteriorly. At or near the distal ends of femora III and IV superiorly there are only 1 or 2 weak spines.

Total length 9·5 mm., length of carapace 4 mm.

The very weak development of spines on the fourth and third patellae, and indeed on the legs as a whole, is a characteristic feature of this species. The complete absence of spines on tarsus I is shared also by *C. spinifrons* mihi (Records Albany Museum, III, p. 101), but the two species differ considerably in other respects: it may be added that in *spinifrons* the inferior spinners are long and subcylindrical, whereas in *vandami* they are shorter and more tapering from base to apex. The epigynal characters of these species and of *friedlanderæ* mihi is illustrated in the accompanying figure. It appears probable that this character is of considerable specific importance.

EXPLANATION OF PLATE XXVI.

Galeosoma hirsutum, sp. nov., from Roodeplaat.

Fig. 1. Dorsal view, slightly enlarged.

Fig. 2. Side view, slightly enlarged.

Galeosoma robertsi, sp. nov., from Pretoria.

Fig. 3. Dorsal view, slightly enlarged.

Fig. 4. Side view, slightly enlarged.

Galeosoma pilosum, sp. nov., from Pretoria.

Fig. 5. Dorsal view, slightly enlarged.

Figs. 6 and 7. Side view, slightly enlarged.

Spiroctenus (Homostola) zebrina Purcell, from Oshoek, Carolina District.

Fig. 8. Dorsal view, natural size.

Pelmatorycter pretoriae Hewitt, from Lyttelton Junction.

Fig. 9. Dorsal view, natural size.

Pelmatorycter, sp. near *brevipalpis*, sp. nov., from Carolina.

Fig. 10. Dorsal view, natural size.

Calommata transvaalicus, sp. nov., from the neighbourhood of Pretoria.

Fig. 11. Dorsal view, enlarged.

Idiops pretoriae Pocock, from Pretoria.

Fig. 12. Dorsal view, natural size.

EXPLANATION OF PLATE XXVII.

Pelmatorycter bulcocki, sp. nov., from Ngqeleni.

Fig. 1. Adult male, in dorsal view.

Fig. 2. Adult female, in dorsal view.

Stasimopus robertsi Hewitt, from Pretoria.

Fig. 3. Adult male, in dorsal view.

Fig. 4. Subadult female, in dorsal view.

All figures natural size.

PRELIMINARY DESCRIPTION OF SOME NEW *LYSTROSAURI*.

By Dr. E. C. N. VAN HOEPEN, M.I.

THE *Lystrosaurus* material in the Transvaal Museum has steadily increased of recent years, and its collections now contain some forty developed skulls of this genus. The peculiarities of many of these specimens and the new forms were not made known before, because it was thought better to acquire a good many specimens before giving any description. The collection has now grown to such an extent, however, that longer delay of discussion would not find justification in lack of material. On the other hand, the character of most of the descriptions of the known forms is such, that identification of *Lystrosaurus* material without the aid of the type specimens is nearly impossible. It seems that a revision of the genus is a pressing necessity. As this could not be undertaken by me at present only two other ways remained, namely, either to abandon the idea of describing our material or to do it with a great risk of producing synonyms. The latter way was chosen, and care was taken to reduce this risk to a minimum. A preliminary description is hereby given of new forms in the collection. A description in extenso may be expected in a short time.

Lystrosaurus Breyeri, n. sp.

Relatively much narrower between the outer edges of the prefrontals than *latirostris*. *Declivis* and *platyceps* are relatively broader and *Alfredi* narrower in the parietal region. *Murrayi* is relatively narrower and as in *verticalis* the distance of the septomaxillary from the oral edge is relatively much greater. In *loops*, on the other hand, this distance is much smaller compared with the breadth over the prefrontals. The breadth between the edges of the prefrontals in *frontosus* greatly exceeds the length of the premaxillary. In *Breyeri* the premaxillary is longer than the prefrontal breadth. *Andersoni* and *Mccaiqi* are much narrower between the hinder upper corners of the orbital rims. *Putterilli* is relatively broader between the upper corners of the orbital rims and much broader in the parietal region.

The above has been gathered from the following measurements:—

1. Length of the premaxillary..... 67 mm.
2. Distance from the front end of the septomaxillary to the oral edge..... 39 mm.
3. Greatest breadth between the outer edges of the prefrontals..... 64 mm.
4. Breadth between the hinder upper corners of the orbital rims..... 44 mm.
5. Breadth between the parietal ridges over the parietal foramen..... 15 mm.
6. Breadth of the snout at upper end of canine ridges. 58 mm.

Lystrosaurus Jorisseni, n. sp.

The specimen has suffered somewhat from lateral compression. The measurements of the breadth over the prefrontals and between the orbital rims have therefore been corrected as far as possible. The breadth over the prefrontals is much greater than the length of the premaxillary in *latirostris*, whereas in *Jorisseni* the reverse is the case. While the premaxillary of our form is much shorter, the parietal region appears to be absolutely broader than in *declivis*; moreover, this species is relatively broader between the orbital rims. *Alfredi* and *Breyeri* are broader over the prefrontals and much narrower over the parietals. *Murrayi* is relatively much narrower over the prefrontals. The snout of *verticalis* is relatively much longer, and compared with the breadth over the prefrontals, this is also the case with *boops*. *Frontosus*, *Andersoni*, *Mccaigi*, and *Putterilli* as with *Breyeri*. The snout of *platyceps* is relatively broader than in *Jorisseni*. Measurements (for the meaning of the figures see description of *Breyeri*): **1**, 73 mm.; **2**, 36 mm.; **3**, 62 mm.; **4**, 42 mm.; **5**, 25 mm.; **6**, 65 mm.

Lystrosaurus Jeppei, n. sp.

This is a remarkably broad and low skull. It has suffered from vertical crushing, and, as a consequence, the measurement of the length of the premaxillary had to be corrected. *Jeppei* has the same breadth in the parietal region as the much bigger *latirostris*, and is therefore relatively much broader. Although its premaxillary is much shorter, *Jeppei* is even absolutely broader in the parietal region than *declivis*. *Alfredi* and *frontosus* are broader over the prefrontals. *Alfredi* is, moreover, narrower between the parietal ridges, and *platyceps* is relatively broader. The orbital cavity of *platyceps* is also relatively much larger than that of *Jeppei*. The following forms are relatively narrower over the prefrontals than *Jeppei*: *Murrayi*, *boops*, *Putterilli*, *Breyeri*, and *Jorisseni*. The snout of *boops* and *verticalis* is longer. *Andersoni* and *Mccaigi* are relatively much narrower between the upper posterior corners of the orbital rims. *Breyeri* and *Jorisseni* have also a much longer snout.

Measurements: **1**, 57 mm.; **2** (not taken into consideration at present); **3**, 68 mm.; **4**, 48 mm.; **5**, 22 mm.; **6**, 78 mm.

Lystrosaurus Theileri, n. sp.

This skull is very much damaged, the premaxillary having been wrenched away from its original position and now being situated some 4 cm. in front of the maxillaries. The whole of the skull top, however, is very well preserved. The preparietal is seen to be a narrow elongated bone, unlike the shape of this bone in known *Lystrosauri*. The suture between the frontals and the nasals is bent sharply backwards along the median line, the nasals cutting deeply into the front edge of the frontals. This also is contrary to the condition of this suture in all other *Lystrosauri* where it is known. *Declivis*, *latirostris*, and *Alfredi* are all relatively much broader over the prefrontals. *Boops* is narrower over the parietals and has a much narrower snout. *Frontosus* is relatively narrower over the prefrontals. *Andersoni* is relatively broader between the upper posterior

corners of the rims of the orbital cavity. *Breyeri* is narrower over the parietals. *Jorisseni* and *platyceps* are broader over the parietals. *Platyceps* and *Jepepei* have a much broader snout. In *Putterilli* the pre-parietal is nearly round. A comparison with *Mccaigi* is nearly impossible. The exact length of the premaxillary of *Theileri* cannot be obtained as the bone is damaged. An estimate of its length gives 63 mm. This means that the premaxillary is as long as the skull is broad over the prefrontals. In *Mccaigi* the premaxillary is more than twice as long as the breadth of the skull over the prefrontals. Comparison with *Murrayi* and *verticalis* was quite impossible. The few measurements which are known of these skulls could not be compared with measurements in *Theileri*, and no specific peculiarities have been made known.

Measurements: 1, 63? mm.; 3, 65 mm.; 4, 44 mm.; 5, 22 mm.; 6, 66 mm.

Lystrosaurus Wagneri, n. sp.

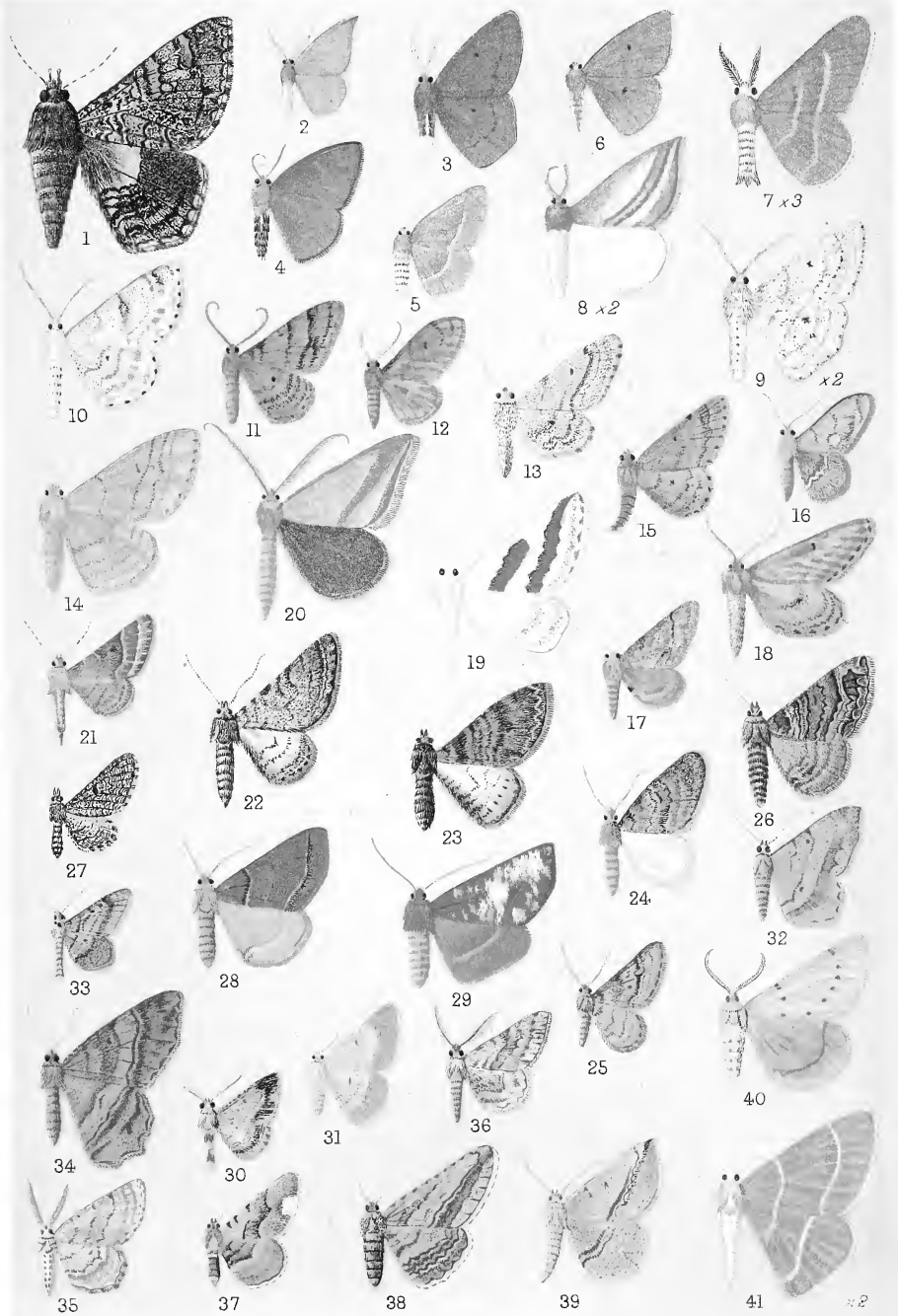
The specimen has suffered slightly from vertical pressure, and as a result the regions between the eyes and the nostrils and the squamosa are broken. *Wagneri* is relatively much narrower between the upper hinder corners of the orbital rims than *latirostris*, *declivis*, *Alfredi*, *depressus*, *Breyeri*, *Jepepei*, *Putterilli*, and *Theileri*. The snout of *Wagneri* is relatively much broader than that of *latirostris*, *declivis*, *Alfredi*, *boops*, and *Breyeri*. The premaxillary of *Murrayi* and *boops* is relatively much longer and that of *verticalis* much shorter than in *Wagneri*. *Frontosus* is much broader and *Jorisseni* and *Theileri* are narrower over the prefrontals. *Wagneri* is much narrower over the parietals than *platyceps*, *Putterilli*, *Jorisseni*, *Jepepei*, and *Theileri*. It is broader than *Andersoni* and *Mccaigi* between the upper hinder corners of the orbital rims.

Measurements: 1, 67 mm.; 2, 34 mm.; 3, 71 mm.; 4, 42 mm.; 5, 17 mm.; 6, 80 mm.

Lystrosaurus Wageri, n. sp.

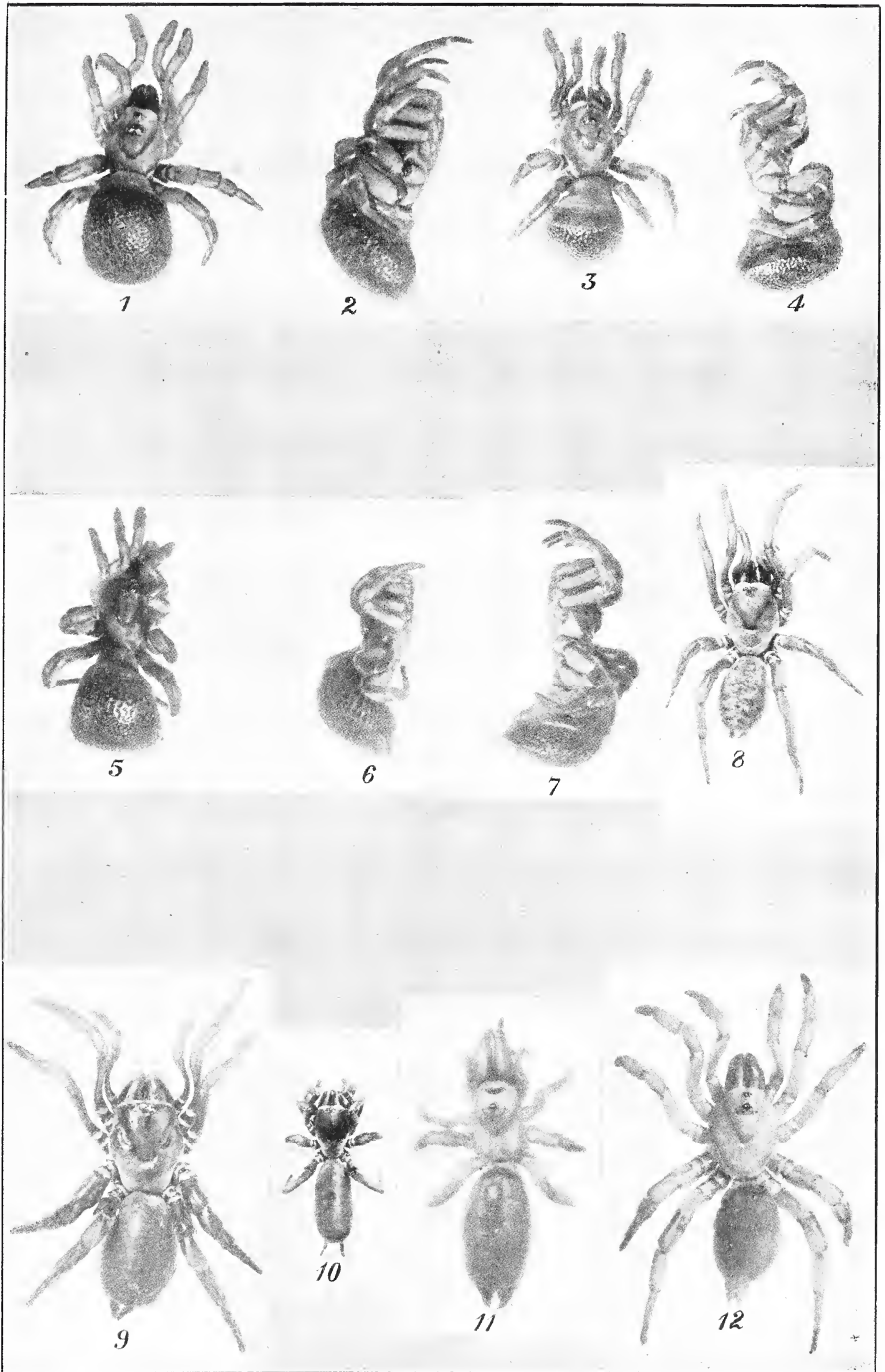
A small skull which has suffered much from vertical pressure. In the uncrushed specimen the parietal region should be broader and the frontal region narrower. *Wageri* is relatively much broader over the parietals than *latirostris*, *declivis*, *Alfredi*, *depressus*, *Murrayi*, *boops*, *Putterilli*, *Breyeri*, *Jepepei*, *Theileri*, and *Wagneri*. The nostrils of *Wageri* are much nearer to the oral edge than those of *verticalis*. The premaxillary of *Murrayi* is relatively much longer than that of *Wageri*. *Frontosus* is much broader over the prefrontals. The pre-parietal of *Wageri* is long and sharp-pointed in front, whereas that of *platyceps* is very broad in front. The snout of *Wageri* is relatively broader than that of *Andersoni*. *Wageri* is relatively broader than *Mccaigi* between the upper hinder corners of the orbital rims and narrower than *Jepepei*. It is also relatively broader than *Putterilli* and *Jorisseni* over the prefrontals.

Measurements: 1, 37 mm.; 2, 15 mm.; 3, 45 mm.; 4, 27 mm.; 5, 18 mm.; 6, 49 mm.

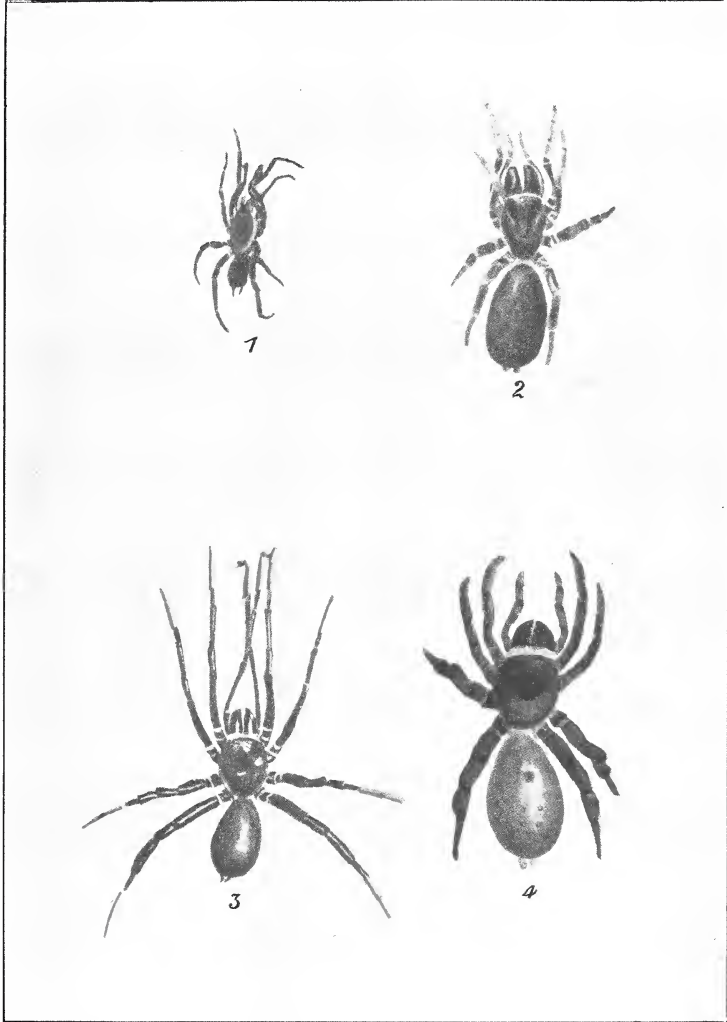


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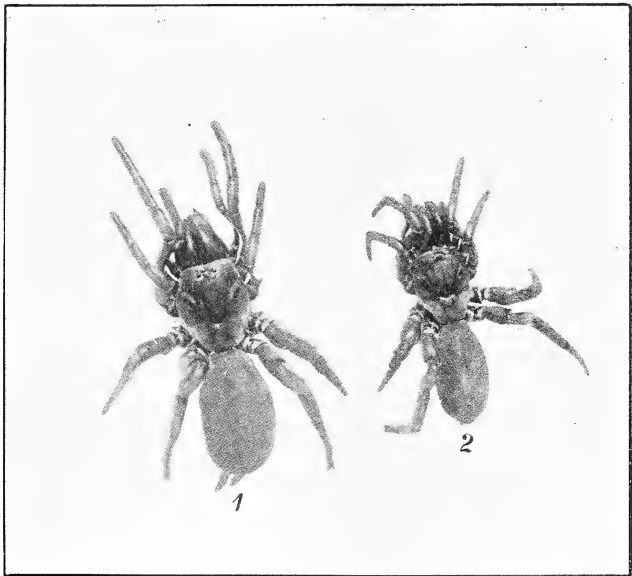
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FOUR-LUNGED SPIDERS FROM THE TRANSVAAL.



MALE AND FEMALE TRAP-DOOR SPIDERS.



TEXT FIG. 6a.

Females of the genus *Pelmatorycter* taken in the same vicinity at Roodleplaas, slightly enlarged. 1. *P. pretoriae rufescens*, var. nov.; 2. *P. brevipalpis*, sp. nov.



ANNALS MEDEDELINGEN
OF THE VAN HET
TRANSVAAL MUSEUM

VOLUME V.

PART 4, containing:—

Note on Myriodon and Platycranium. By Dr. E. C. N. VAN HOEPEN, M.I.

Notes on Nests of some Trapdoor Spiders and the Nest of Calommata Transvaalicus Hwtt. By G. VAN DAM and AUSTIN ROBERTS.

A Contribution to the knowledge of the Transvaal Passifloraceae. By Mrs. R. POTT, Botanist of the Transvaal Museum.

Notes and Synonymy of Hymenoptera in the Collection of the Transvaal Museum. By Dr. H. BRAUNS.

Ornithological Notes. By AUSTIN ROBERTS.

Fourth Supplementary List of Mammals in the Collection of the Transvaal Museum. By AUSTIN ROBERTS.

Notes on the Expedition to Komatipoort, 16th–28th June, 1916. By Dr. H. G. BREYER.

Notes on Expedition to Gazaland, along the Limpopo River, 29th June to 12th August, 1916. By Dr. H. G. BREYER.

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NOTE ON *MYRIODON* AND *PLATYCRANIUM*.

By Dr. E. C. N. VAN HOEPEN, M.I.

DR. BROOM kindly informed me some time ago that the name *Myriodon* was already given to a fish in 1847 and is not available for the Senekal *Stegocephalian*. The genus to which this fossil belongs must therefore be renamed and I propose the name: *Uranocentrodon*.* The type species is: *Uranocentrodon senekalensis* v. HOEPEN sp.

In verifying the above I found that the name *Platycranium*, which I proposed some time ago for a small *Cynodont*, is preoccupied twice in the form of *Platycranius*. I therefore wish to change the former into *Platycraniellus*† with the type species *Platycraniellus elegans* v. HOEPEN sp.

* Gr. οὐρανός = palate, κεντρον = point, prickle, ὀδούς = tooth.

† Gr. πλατυς = broad, κρανίον = skull.

NOTES ON NESTS OF SOME TRAPDOOR SPIDERS AND THE NEST OF *CALOMMATA TRANSVAALICUS* HWTT.

By G. VAN DAM and AUSTIN ROBERTS.

THE following notes relate to the nests of the various trapdoor spiders, which are recorded or described by Mr. John Hewitt in the foregoing article. We started studying these creatures at the instance of Mr. Hewitt. At first we discovered their abodes by mere chance, but experience taught us more successful modes of search which we briefly describe by way of introduction so that other workers may receive the benefits of our experience.

The first nests discovered were those of *Stasimopus robertsi* at Rosslyn. A single specimen was turned out when a moletrap was being set, and in a subsequent special excursion a great many nests were discovered. All of them were located by looking for faintly marked rings in more or less sandy patches between tufts of grass. To show how circumscribed was our knowledge at that time, we may state that we found no other species although several were subsequently found to occur there. Then we found a few nests at the Zoutpan, twenty-six miles north-north-west from Pretoria, representing *Galeosoma pallidum* and *Idiops pretoriae*, besides a species of Lycosid. Having discovered the *Galeosoma* type of nest, thus enlarging our experience of spider architecture, we renewed our search in the immediate neighbourhood of Pretoria. Then a number of nests of the two species (*Stasimopus* and *Galeosoma*) were discovered at Mayville, and during several expeditions to that place, careful search disclosed the fact, that there were more species there, than these two, for we discovered the peculiar nest of *Pelmatorycter pretoriae*, with the first part of the tube driven just below the surface, and carrying a wafer* lid, another *Pelmatorycter* (sp. *brevipalpis*) with its peculiar Y-shaped nest, and *Idiops gunningi*, with a short tube and thin cork lid. We subsequently extended these excursions to the whole of the flat areas in the neighbourhood of Pretoria, but beyond extending our knowledge of the nests of *Acanthodon transvaalensis* and the two species of *Idiops*, little new in method of search was adopted. So far we had searched for nests only by carefully scrutinizing the ground in open places. During an expedition to Roodeplaat, on the Pienaars River, we encountered considerable difficulty in finding nests, perhaps owing to recent heavy rains having obliterated all trace of them, and the spiders having apparently not troubled to come out in the meantime. For two days we searched without much success, only a few of the commoner species being found; but, quite accidentally,

* We are employing the terms used by Moggridge in his well-known work, etc.

a tuft of grass was kicked up disclosing some white webbing, on following which downwards, the type of *Calommata transvaalicus* was discovered. The idea then occurred to us, seeing there were so many old lids in certain places, that there must be living spiders there, and that by carefully digging away the surface soil with a spade, we might disclose hidden nests. This proved to be most successful, for in a few minutes we discovered a number of specimens, including the type of *Pelmatorycter brevivalpis*. In a subsequent use of the spade in the neighbourhood of Pretoria, at places where we had previously searched, we had varying success, and it became evident that this method was usefully applied only in places where we found old lids and no new ones; where we were successful, however, the results were usually very good, for we found males of *Stasimopus robertsi*, *Pelmatorycter pretoriae*, var. *rufescens*, and *P. brevivalpis* only by this method. While the use of the spade spoils the upper part of the nests, it still indicates what species may be looked for at those places, when weather conditions are more favourable.

During an expedition to Swaziland border a few nests were found by searching the bare ground and the higher banks on old disused roads between Middelburg, Carolina, Lake Chrissie and Lochiel. At Forbes Reef the greater part of our spare time for three days was spent in searching for trapdoor spiders in the usual way; but as no old lids were seen, the spade was not brought into use. Then on the fourth day a single *open* nest of a young *Pelmatorycter* was noticed under a stone, which had been turned over in a search for lower vertebrates. A careful scrutiny revealed the important fact that there were as many nests under the stone as it could very well accommodate, representing three species and genera. Subsequent search showed that nearly every rock or stone, which afforded shelter and did not harbour scorpions or centipedes, was the place to look for trapdoor spiders. The explanation of this seemed to be that the sloping ground and heavy rainfall, characteristic of the locality, militated against the existence of the spiders, which survived only where shelter was afforded. Upon our return to Pretoria, it was thought, that a careful examination of similarly sheltered situations might prove to be the abode of species other than those we had so far secured there. Accordingly we proceeded to the Magaliesburg and were fortunate enough to find several new species as we had anticipated. These were found not only in the soil under the rocks but also in the moss-covered banks.

At Komatipoort the patches of earth lodged between the roots of aloes, which grew here and there on flat rocks, were found to contain numerous nests of *Acanthodon* sp?. Some of these nests were effectively hidden by leaves having been attached to the lids. On the sides of the rocks some bare patches of earth were observed, which had probably been denuded of vegetation by the flooding of the adjacent river. Even here nests were discovered of *Pelmatorycter* sp?. It was thus seen, that one should search in all manner of unlikely looking places. Consequently we were led to search amongst heaps of dead leaves round the roots of large trees and were not surprised to find that these situations also harboured trapdoor spiders, for under the leaves and sometimes amongst them, the nests of several different species were discovered.

We also had some experience of the genus *Moggridgea*, which belongs to a family in which arboreal types abound : we found some of them in the ground, some in the crevices of rocks, and others in the bark of trees. It will thus be seen that there is hardly a single place where one or another species does not occur, and frequently three or four species representing different genera may be found side by side. One's eyesight must be good, and if search is to be made in that way alone, it is usually necessary to squat down on the ground and study it from close quarters. To the unpractised eye nothing unusual will be seen, but when the characters of the lids of the different species are known, their discovery becomes simpler. Even the most practised eye does not always "spot" the lid, and it frequently happens that in digging out a nest one brings to light a neighbouring abode with the lid so cleverly constructed and adjusted that detection was previously practically impossible. It is therefore advisable in looking for nests, to scrape the surface soil with a trowel, so as to disclose the webbing of the tube or the lid, and subsequent search can be made, when their presence is known, should one desire to study the complete nests. It is a common occurrence to find quite a cluster of nests together, usually a few adult females and the majority immature or juvenile specimens. This indicates that some localities are more suitable than others, a matter which must largely contribute to the welfare and the existence of the species concerned. It has been observed, that large bare or partly bare patches of ground are the common abode of a number of species, particularly when the soil is of a certain reddish clay. In such places heavy rains must frequently destroy quite a number, but it is remarkable how much inundation some species will survive. These bare patches are probably chosen because the food is there more accessible than in the grass. Stony ground in the open veld is not much favoured, and loose sandy soil still less so ; in the first places burrows are not easily made and in the second, the sand must interfere with the burrowing by constantly falling in.

The species are all more or less adaptive to the conditions of their environment, and we frequently find an individual species making a nest different from that of its kind ; but, as a rule, the species are remarkably constant in the making of certain types of nests. Some species have the habit of disguising the lid, for which purpose the spiders usually choose material found in the immediate surroundings. Sometimes a twig is stuck upright on the lid, but the commonest disguise is a bunch of short straws placed upright or across the lid. Some nests of *Galeosoma pilosum* have been found disguised with pebbles.

Very little has so far been noted on the food of these spiders ; elytra of insects are invariably found in old nests, but are so crushed up as to be unrecognizable. In the nests of *Stasimopus*, small ants were found from time to time, and in one case a large green mantis ; in a nest of a *Galeosoma pilosum*, a green caterpillar was found half consumed.

These spiders appear to have many enemies ; they were never found under rocks where there were traces of nocturnal mice ; nor were they found under rocks where scorpions or centipedes had taken up their abode. In the nests themselves the remains of spiders, and sometimes also their

enemies, are not uncommonly met with. Centipedes must rank amongst their enemies, for quite a number were found in the spiders' nests, and in two cases the centipede had got into the nest of a *Galeosoma* and apparently starved the spider, though it had not succeeded in dragging its victim out of the secure position into which it had wedged itself before its death. A large number of cocoons of fossorial wasps were found in the nests of various species, but we did not succeed in hatching any of them; a very fine specimen of *Pompilus* was taken from an empty nest of *Stasimopus robertsi*. On several occasions small ants were seen to be busy in trying to dig out small *Pelmatorycters* (cp. *brevipalpis*) which had young ones. *Idiops gunningi*, var. *elongatus* specimens were instantly attacked by swarms of large ants, when the nests were opened. Two specimens of a spider belonging to a totally different family, *Palpimanus* sp. ?, were taken from nests of *Galeosoma vandami* at Gravelotte, one from a nest of *G. pilosum* at Pretoria College and one from a nest of a young *Stasimopus robertsi* near Rosslyn; in one of the first two of these nests were the remains of the *Galeosoma*, and those from Rosslyn contained young of *Palpimanus* with the parents. Apparently this spider preys upon the trapdoor spiders, but definite evidence as to this is wanting. In many species the lower surface of the trapdoor presents distinct tooth or claw marks, and one might therefore expect these spiders to cling tightly to the lid at some time or other, yet not more than about 5 per cent. were found doing so in the case of *Stasimopus*, *Acanthodon*, *Idiops*, *Pelmatorycter*, and *Spiroctenus*. During daytime at any rate they normally reside in the lower parts of their retreats. On the other hand, *Moggridgea* makes an almost invariable practice of holding down the lid. *Galeosoma*, having the protection of a shield, never holds down the lid, but blocks up the passage with the shield.

Family ATYPIDAE.

Calommata transvaalicus Hewitt.

Localities: Roodeplaat, Hatfield, and between Villieria and Derdepoort.

The three nests above referred to were all found shortly after heavy rains had somewhat spoilt them, the entrance being obliterated and closed. The first one was discovered accidentally by a tuft of grass having been kicked up, but in all subsequent cases the nest was situated on bare ground. In two more found at Mayville in the middle of June, the entrance was open without a sign of a lid. The top of the nest was raised slightly above the ground, and, from the inner rim, neatly rounded off, sloping gradually outwards and downwards to the level of the ground, all this outer surface covered with earth resembling the surroundings. The interior of the tube was lined with loose, highly adhesive, silky webbing, which could only be seen when the nest was viewed from above; and in the case of the two complete nests described above, upon closer examination this webbing was found all but to close up the tube at a distance of about half an inch from the mouth, by pinching inwards. The adhesiveness of the webbing probably affords a protection against the intrusion of enemies. The nests are comparatively very deep (about 9 or 10 inches), and vertical for the greater part of their depth.

Family CTENIZIDAE.

Acanthodon transvaalensis (Hewitt).

Localities : Rietfontein (Pretoria), Mayville, Skinner's Court, near Lyttelton Junction, Rietfontein (20 miles north-west of Pretoria), Schoemansrust, Roodeplaat, and Zeekoegat. Also Middelburg, Pan Station, Wonderfontein Station, in Middelburg District, and Steynsdorp, Carolina District.

Nests of this species were found situated on bare ground, under tufts of grass, or even in banks of old roadsides. The lids are almost circular, smaller than those of *Stasimopus robertsi*, very thin, of the "wafer" type, broadly hinged at the back (disguised above to assimilate with the surroundings), and with 3-8 minute tooth or claw marks concentrated nearer the hinge than the centre; it usually lies slightly above the level of the surrounding surface of the ground. The tube below the lid is usually not quite vertical, but does not slant so conspicuously as in *Idiops pretoriae*, and is broader at the bottom. At Lyttelton Junction, in March, a female with young was taken in a nest of *Galeosoma pilosum*!

NOTE.—Five nests taken at Middelburg were situated on hard bare ground, the lids fitting neatly into the entrance and level with the ground. Another nest taken at Middelburg and the one taken near Pan Station differed only in being situated on ledges on the bank of old roads. All these nests, with the exception of that from Pan, were peculiar in slanting backward for an inch, then dropping vertically for two inches, and for the remaining two inches doubling back again and downwards to a point almost below the entrance, so that the tube described a curve with the points vertically opposite one another. The one from Pan was like typical ones from the neighbourhood of Pretoria.

The following measurements are from a typical nest found at Mayville:—

| | |
|---|----------------------|
| Depth of tube..... | 125 mm. |
| Width at the entrance (inside edge at the rim)..... | 16 × 13 mm. |
| Width at the bottom of the tube..... | 18 $\frac{1}{4}$ mm. |
| Breadth of lid..... | 16·65 mm. |
| Length of lid (front to back)..... | 13·5 mm. |
| Thickness of lid..... | 1 $\frac{3}{4}$ mm. |
| Breadth of hinge..... | 16 mm. |

Acanthodon Monticola Hewitt.

Locality : Little Wonderboom, Magaliesberg.

Nests of this species are numerous in moss-covered banks, under small stones on the Magaliesberg. The lids are covered with bits of moss and earth, so as exactly to assimilate with the surroundings; they are circular, fitting *into* the entrance, but very thin, and the edge slightly overlapping the rim of the tube; the tooth or claw marks are very minute, situated in the centre, where a slight bulge is produced. The nests are shallow as a rule, owing to the shallowness of the soil where they are situated, and

horizontal or slightly slanting downwards; they are of about even width throughout their length or very slightly broader at the back. The nests, from which the males were taken, were very narrow at the entrance, and much broader and flatter at the back.

The following are measurements of a typical nest of a female:—

| | |
|--|--------------------|
| Width at the entrance (inside edge)..... | 6 mm. |
| Width at the bottom of the tube..... | 7 mm. |
| Breadth of lid..... | $6\frac{1}{4}$ mm. |
| Length of lid (front to back)..... | $6\frac{1}{4}$ mm. |
| Thickness of lid..... | $\frac{1}{2}$ mm. |
| Breadth of hinge..... | 4 mm. |

Acanthodon paucispinulosus Hewitt.

Locality: Gravelotte.

Notes and measurements were not made at the time of discovery of this species; but the nests were very similar to those of *A. transvaalensis*.

Acanthodon, cp. *grandis* Hewitt.

Localities: Forbes Reef, Swaziland, and Lochiel, Carolina District.

The Forbes Reef specimens were taken from nests situated either in banks of red clay or under the shelter of rocks; some of those from the banks had an enormous number of young. They were cleverly disguised to assimilate with the red soil and sometimes with moss, according to where they were situated. The nests found under the rocks were smaller than those from the banks and the specimens seem to be adult; their nests were vertical, with the lids disguised to assimilate with the soft dry mixture of earth and old vegetable matter found under the rocks. Nests from Lochiel varied considerably; thus, one taken from the bank on the side of a road was very shallow, only about 2 inches deep and horizontal in position; whereas the others normally slanted downwards and were about 4 or 5 inches deep. In some cases the lid was hinged on the lower edge of the entrance, so that when opened it stood out like a platform below the entrance.

Acanthodon, cp. *oomi* Hewitt.

Localities: Lake Chrissie, Tevreden, and Oshoek, Carolina District.

Numerous nests were taken near Lake Chrissie, all of them situated on the upper face of the bank on an old road. Some of them contained young. The lids in every case were covered with bits of grass, the first part of the tube standing out from the bank, and the whole outward appearance reminding one very much of the nests of *Galeosoma pilosum* and *G. hirsutum*. The tube was never very deep, only about 3 inches.

Acanthodon schreineri, Purcell, var. *minor* Hewitt.

This new variety was first discovered amongst stones on a kopje at Roodeplaat, Pretoria District. The nests were distinct from any previously found in the district, being characterized by peculiar double lids. Part of the tube projected above the ground for about a quarter to half an inch;

the lid was more or less D-shaped externally, much larger than and overlapping the tube, the entrance to which was closed by a thin lid, for the greater part attached to the upper D-shaped lid. Upon gently lifting the external lid the true lid still remains covering the entrance. Thus it is easy to conceive of an enemy in trying to get into the nest by lifting the external lid, pushing its way between the two and thus by its own pressure still holding down the real lower lid. The lower lid is wafer-like and attached to the external lid on the hinder part in the middle only, up to about the centre, the front half and sides being thus free; the external lid is much thicker, as shown in the measurements. The rim of the tube is wider than the lower lid, which fits exactly into it; below the rim the entrance narrows slightly inwards to about the normal width not far from the entrance; thence the tube usually continues straight inwards for only about half an inch, then curving downwards more or less straight to the bottom. The nests were usually placed on the sides of small banks of earth, but sometimes also on level ground, always, however, in sheltered situations. When nests were situated in banks the tube, curved downwards a short way from the entrance, as described above, but those in level places only curved very slightly. A single male was taken from a shallow tube alongside of and attached to another separate, much deeper tube containing a female; this male had been dead for a day or two, but was still in good condition, only the abdominal part of its body being slightly shrivelled. Smaller nests of juvenile specimens sometimes had two distinct entrances with lids somewhat similar to some nests of *Homostola zebрина*; but all the larger nests had only one. Other nests were taken at Waterkloof, apparently of the same species, though males were not secured. These nests were all situated on the top of small banks, most usually well concealed under overhanging tufts of grass or aloes. These all penetrated the earth horizontally for about half an inch to an inch, the outer part of the tube projecting well away from the bank, and in some cases even tending to hang downwards.

The following measurements are of the types of the male and female found at Roodeplaats:—

Female.

| | |
|---|------------------------------------|
| Depth of tube..... | 98 mm. |
| Width at the entrance (inside edge of rim) | 13 × 9 mm. |
| Normal width of tube 10 mm. from inside edge of rim..... | 8 × 9 mm. |
| Width at the widest part of the tube near the bottom..... | 12 mm. |
| Breadth of external lid..... | 15 mm. |
| Length of external lid (front to back).... | 10 mm. |
| Breadth of inner lid..... | 12 ³ / ₄ mm. |
| Length of inner lid (front to back)..... | 8 ³ / ₄ mm. |
| Thickness of external lid..... | 2 ¹ / ₂ mm. |
| Thickness of inner lid..... | ³ / ₄ mm. |
| Breadth of external hinge..... | 14 mm. |
| Width of attachment of inner to external lid..... | 12 mm. |

Male.

| | |
|--|-----------------------------|
| Depth of tube..... | 45 mm. |
| Width at the entrance inside edge of rim | $8\frac{1}{2} \times 6$ mm. |
| Normal width of tube 8 mm. from inside edge of rim..... | $7 \times 4\frac{3}{4}$. |
| Width at the widest part near the bottom | 10 mm. |
| Breadth of external lid..... | 9 mm. |
| Length of external lid (front to back).... | $6\frac{1}{2}$ mm. |
| Breadth of inner lid..... | $8\frac{1}{4}$ mm. |
| Length of inner lid (front to back)..... | $5\frac{3}{4}$ mm. |
| Thickness of external lid..... | $1\frac{1}{4}$ mm. |
| Thickness of inner lid..... | $\frac{1}{2}$ mm. |
| Breadth of external hinge..... | 8 mm. |
| Width of attachment of inner to external lid..... | $6\frac{1}{4}$ mm. |

Galeosoma robertsi Hewitt.

Localities: Mayville, Wonderboompoort, New Muckleneuk, Pretoria College, Brooklyn, Garstfontein, Elandsfontein No. 35, Skinner's Court, Hatfield, Rietfontein, near Crocodile River Bridge, Bon Accord Station.

Nests of this species are always distinguishable from those of *G. pilosum*, side by side with which they are frequently found, by the lids being flattened and level with the ground, and never decorated with bits of grass. The tube at the entrance is of the same diameter as the shield of the spider, but soon widens out irregularly, sufficiently for the spider to turn. Sometimes the shield of the spider could be seen near the entrance, but more usually it could only be seen after the nest had been partly dug open; as the digging operations proceeded, the spider dropped lower down until tightly wedged in at the bottom of the nest. Measurements are given hereunder, by which it will best be seen how the tube widens out and contracts. Despite the protection which is presumably afforded by the shield, dead specimens were often discovered at the bottom of the nest and sometimes also their common enemies, live centipedes, which had probably encompassed their death. The widening of the tube is usually situated about half-way down, but varies considerably, being sometimes quite close to the top and in others near the bottom; usually the upper and the lower parts of the wider portion bulge outwards gradually and not in the form of a bulb. Nests were found containing crawling young in March and April.

The following measurements are taken from a typical nest from Mayville:—

| | |
|---|-------------------------------|
| Depth of tube..... | 115 mm. |
| Width at the entrance (inside edge of rim).. | $10\frac{1}{4} \times 10$ mm. |
| Width at the widest part of tube..... | 15 mm. |
| Width at the narrowest part of the tube (near the bottom)..... | 7 mm. |
| Breadth of the lid..... | 11 mm. |

| | |
|--|----------------------|
| Length of the lid (front to back)..... | 10 $\frac{1}{4}$ mm. |
| Thickness of the lid..... | 1 mm. |
| Breadth of hinge..... | 8 mm. |

Galeosoma pilosum Hewitt.

Locality: Mayville, Wonderboompoort, Pretoria College, Koedoespoort, Garstfontein, and Lyttelton Junction.

Also

Galeosoma hirsutum Hewitt.

Localities: Roodeplaat, Zeekoegat, Witfontein (near Pretoria North), and Rosslyn.

Nests of these two species are identical, being readily distinguishable from those of *G. robertsi* by the entrance being raised well above the surrounding level of the ground, often as much as half an inch, and decorated with a mass of bits of grass, particularly on the lid, which is usually concave above and fits on to the rim of the entrance and not into it as in *Stasimopus*; this decoration is a remarkable disguise, for it gives to the projecting portion of the tube an exact resemblance to a worn-off tuft of dead grass. Some nests were found at Mayville, which were decorated with small pebbles instead of grass. Nests of members of this genus are usually found on level ground, where there are bare patches interspersed with grass tufts and small shrubs. At Mayville there are hundreds of nests scattered over a flat, in many places being situated only a yard or two from one another in great numbers. The two species, *robertsi* and *pilosum*, occur here side by side, though the latter seems to be the most plentiful. Nests of both species were found with young.

The following are measurements of a typical nest of—

Galeosoma pilosum, from Mayville:

| | |
|---|----------------------------------|
| Depth of tube..... | 125 mm. |
| Width of entrance (inside edge of rim)... | 11 \times 10 $\frac{1}{4}$ mm. |
| Width at the widest part of tube..... | 16 mm. |
| Width at the narrowest part of the tube (at the bottom)..... | 7 mm. |
| Breadth of lid..... | 12 mm. |
| Length of lid (front to back)..... | 11 mm. |
| Thickness of lid, without straw..... | $\frac{3}{4}$ mm. |
| Breadth of hinge..... | 8 $\frac{1}{4}$ mm. |

Galeosoma hirsutum, from Roodeplaat:

| | |
|---|--------------------------------|
| Depth of tube..... | 124 mm. |
| Width of entrance (inside edge of rim)... | 9 \times 7 $\frac{1}{4}$ mm. |
| Width at the widest part of tube..... | 17 mm. |
| Width at the narrowest part of the tube (near the bottom)..... | 7 $\frac{1}{4}$ mm. |
| Breadth of lid..... | 10 mm. |
| Length of lid (front to back)..... | 8 mm. |
| Thickness of lid, without straw..... | .65 mm. |
| Breadth of hinge..... | 8 $\frac{1}{4}$ mm. |

Pelmatorycter nudus Hewitt.

Locality : Little Wonderboom, Magaliesberg.

The male was discovered on the under surface of a stone which was turned over in a search for nests on the dry northern slopes of the Magaliesberg. No nests were found under this stone, but a female was discovered a few days later, not far off, under another stone; the nest of this female was situated in soft earth, mixed with pebbles; the lid was in the form of a hood, without a distinct hinge, being joined to the rim of the tube on all sides but the front, over which it folded down; the nest when open looked like a curved pipe, the opening facing parallel to the ground and the curve representing the top of the real tube. From the surface of the ground, the tube was vertical to the bottom of the nest; but an inch or so from the entrance a second tube branched upwards, but had no outlet, the top part being closed up. The nest was, roughly, Y-shaped. This is the common shape of nest of numerous specimens taken in all parts of the country, but which could not be identified owing to males not having been secured. The nests taken at Wonderboompoort did not differ materially from the above, but were situated in banks amongst rocks in the "poort" itself, where the ground was moister.

Measurements of nests taken in Wonderboom, 2nd March, 1916:—

| | | |
|--|----------------|-----|
| Depth of tube..... | 120 | mm. |
| Width at the entrance (inside edge of rim) | $6\frac{1}{4}$ | mm. |
| Length of second tube..... | 20 | mm. |
| Distance of second tube from the entrance | 23 | mm. |
| Breadth of lid..... | $6\frac{1}{2}$ | mm. |
| Length of lid (front to back)..... | $8\frac{1}{4}$ | mm. |
| Thickness of lid..... | $\frac{1}{2}$ | mm. |

Pelmatorycter pretoriae Hewitt.

Localities : Between Lyttelton Junction and Irene, Mayville, Pretoria North, Wonderboompoort, Skinner's Court, between Villieria and Derdepoort, Roodeplaat, Zeekoegat, and Schoemansrust, Pretoria District.

Nests of this species were always readily recognized by the peculiarity of the entrance. The lids are of the "wafer" type, flat and thin, placed level with the ground; the first part of the tube penetrates the ground obliquely just below the surface for nearly 3 inches, and then drops down vertically to a depth of about 12 to 15 inches. The hinge of the lid is broad, occupying about a fourth of the edge and almost straight, so that only the free edge is circular. Sometimes a short chamber with a lid was found at the side near the bottom of the nest, and when this was present, the spider was found to have taken refuge in it. The nests were found mostly in hard open ground; but some were found in the grass, and probably this is a common situation, but the nests are then not easily located.

The following are measurements of a typical nest taken near Lyttelton Junction :—

| | | |
|--|------------------|-----|
| Depth of tube..... | 315 | mm. |
| Width at the entrance (inside edge of rim). | 17·65 | mm. |
| Length of upper, oblique, portion..... | 70 | mm. |
| Width at the narrowest part of tube..... | 15 | mm. |
| Width at the widest part of tube..... | 20 | mm. |
| Length of refuge chamber..... | 28 | mm. |
| Distance of refuge chamber from the bottom of tube..... | 20 | mm. |
| Breadth of external lid..... | 18 $\frac{1}{2}$ | mm. |
| Length of lid (front to back)..... | 15 | mm. |
| Thickness of lid..... | $\frac{3}{4}$ | mm. |
| Breadth of hinge..... | 15 | mm. |

Pelmatorycter pretoriae var. *rufescens*, Hewitt.

Locality : Roodeplaat.

The nests of this species did not differ appreciably from those of *P. pretoriae*, but were not so deep nor so large.

The following are measurements of a typical nest from Roodeplaat :—

| | | |
|---|-----------------|-----|
| Depth of tube..... | 210 | mm. |
| Width at the entrance (inside edge of rim). | 8 | mm. |
| Length of upper, oblique, portion..... | 51 | mm. |
| Width at narrowest part of tube..... | 6 $\frac{1}{2}$ | mm. |
| Greatest width of tube (no blind passage). | 11 | mm. |
| Breadth of lid..... | 8 $\frac{3}{4}$ | mm. |
| Length of lid (front to back)..... | 10·65 | mm. |
| Breadth of hinge..... | 11 | mm. |
| Thickness of lid..... | $\frac{1}{2}$ | mm. |

Pelmatorycter brevivalpis Hewitt.

Locality : Roodeplaat.

Pelmatorycter, cp. *brevivalpis*, Hewitt.

Locality : Wonderboompoort, Schoemansrust, Lyttelton Junction, Hatfield, and Koedoespoort, all in Pretoria District.

The nests from the locality where the type was taken had two distinct entrances, but subsequent observation showed that this was only a stage in the making of a new nest, one of the entrances being blocked up later. In the latter condition, the nests were somewhat like those of *P. nudus*, the entrance being covered by a hood and not a hinged lid. The lid is fixed on for about three-quarters of the circumference, the remaining quarter being free and folding over the lower lip. The hood protrudes in front, so that when folded down, the edges meet the lower anterior rim; there are minute tooth or claw marks scattered over the under-surface of the hood. Some nests were latterly discovered, which had a small side chamber, half an inch from the bottom and about half an inch deep, similar to those sometimes seen in the nests of *P. pretoriae*.

Numerous specimens temporarily assigned to this species were discovered wherever search was made, but males not having been found, they were not identified. Females with crawling young were frequently discovered, and as these appear to differ in different localities, there will probably prove to be a number of species; the nests of these unrecognizable forms were found in all manner of situations. It was frequently found that the hoods of nests situated in open ground had been drawn in and the entrance thus disfigured; in some cases ants were found trying to dig the spiders out, deep cone-like hollows having been excavated over the drawn-in tube, which when examined proved to contain females with young. It frequently happens that these delicate hooded entrances become spoilt by heavy rains when apparently the spiders may make a new entrance with a hood and leave the old entrance blocked up, thus leaving a blind passage, which is sometimes used as a place of refuge. Old nests may frequently be discovered by looking out for accumulations of the white webs of disused entrances, which show up conspicuously on hard ground, for by searching very carefully or by digging, one often finds either the new entrance or the tube to have been blocked up entirely and the spider still in occupation. It seems to be quite a common occurrence for most of the trapdoor spiders to remain closed in in the nests for considerable periods before they bestir themselves to open the nests again.

The following are measurements of a typical nest taken at Roodeplaat :

| | |
|--|--------------------|
| Depth of tube..... | 143 mm. |
| Width at the entrance (inside edge of rim). | $6\frac{1}{4}$ mm. |
| Length of upper, oblique, portion..... | 28 mm. |
| Width at the narrowest part of tube.... | 5 mm. |
| Greatest width of tube..... | 7 mm. |
| Distance of refuge chamber from bottom of tube..... | 13 mm. |
| Breadth of lid..... | $6\frac{1}{2}$ mm. |
| Length of lid (front to back)..... | 8.65 mm. |
| Thickness of lid..... | $\frac{1}{4}$ mm. |

Spiroctenus (Homostola) zebra Pure.

Localities : Lake Chrissie, Lochiel, Steynsdorp, Oshoek, Tevreden, Elandspruit, Doornhoek, Carolina District; Forbes Reef, Swaziland; Bon Accord Station, Pretoria District.

Of the large number of nests discovered between Carolina and Swaziland, three sizes of females with young crawling over them were taken. The largest was found between Carolina and Lake Chrissie. No more specimens were discovered until Lochiel was reached and thence to Forbes and Swaziland only smaller sized specimens were taken; while some 2500 feet lower, on the banks of the Komati River, a single very small female with young was taken. This is interesting, as it appears to be the rule that specimens of birds and mammals are always larger in the higher altitudes than members of the same species from the hotter and lower levels. All the nests that contained young, and a few that contained none, had only one entrance; but the majority of nests without young

had two very distinct entrances that appeared to be made use of. The nests with the single entrance were exactly like those of *Pelmatorycter pretoriae*, but those with two entrances had the oblique upper portions, converging to the vertical tube from opposite directions, something like a letter T with the entrances above the ends of the cross-piece. By far the greater number were discovered under rocks, especially in the rainy region between and at Lochiel and Forbes Reef. In fact, at Forbes Reef, three species of trapdoor spiders, belonging to distinct genera, were very frequently found under the same rock, and we concluded that those found in unsheltered situations were mostly drowned by the heavy rains, while those under the stones and rocks survived. The first rock under which they were discovered was one that must have afforded the best of shelter, for the soft soil underneath was literally packed with the nests of three species; at the side of this rock, on either side of a small tuft of grass, a fine male and a fine female were taken from nests that had the lid covered with bits of straw; these were the only nests discovered which were so disguised. The male was greenish coloured and the female reddish, but both had the characteristic network of lines over the dorsal part of the abdomen.

Stasimopus suffuscus Hewitt.

Locality: Beerlaagte, Heidelberg District.

The nests of this species were exactly like those of *Stasimopus robertsi*, but somewhat larger; they were situated on hard ground at the back door of a farm house, and so cleverly hidden that the occupants of the house had never noticed them and were horrified when they saw these spiders taken out.

Stasimopus robertsi Hewitt.

Localities: All flat places in the neighbourhood of Pretoria.

Nests of members of this genus are always readily distinguishable by the tooth or claw marks on the lid, which form a distinct ring on the under surface, and by the comparative thickness of the lids, which fit very tightly into the entrance; they are found on hard, bare ground, as a rule, though sometimes also amongst grass or under the shelter of bushes; we have even found them under rocks on hill sides. The tubes descend without exception, vertically, to a varying depth, according to the nature of the soil in which they are situated, such as 8 inches in soft and only 4 inches in hard or stony ground. The top of the tube is broadened obliquely to accommodate the lid.

The following are measurements of a nest taken at Rosslyn:—

| | | |
|--|------------------|-----|
| Depth of tube..... | 145 | mm. |
| Width at the top of the tube (inside edge) | 25 | mm. |
| Width at the narrowest part of the tube. | 20 | mm. |
| Width at the bottom of the tube..... | 28 | mm. |
| Breadth of lid..... | 25 $\frac{1}{4}$ | mm. |
| Length of lid (front to back)..... | 25 $\frac{1}{4}$ | mm. |
| Thickness of lid..... | 6 | mm. |
| Breadth of hinge..... | 11 | mm. |

Idiops pretoriae Poc.

Localities : Skinner's Court, Lyttelton Junction, Saltpan, and City of Pretoria.

This species is by no means common, only a single specimen being found here and there; but this may be due to their nests being situated amongst grass, under the tufts of which our few specimens were quite accidentally discovered, or sometimes the lid is disclosed by heavy rains which wash away the grass formerly hiding the nests. The lids most usually have pieces of straw attached to and covering them and also sometimes the rim of the tube; but in some cases the straw on the lids appeared to have been washed off though attached to the rim of the tube. On the under side of the lid there are minute tooth or claw marks, usually in the middle, but nearer to the hinge than the front. The hinge is very broad, almost equal to the breadth of the lid, which is D-shaped when seen from above. The tube is short, slanting downwards for the greater part, but at the bottom almost horizontal and much wider. This spider is more pugnacious than others, furiously attacking, by short rushes, when disturbed with a stick of some such object being thrust near to it. It has been observed that these spiders are seldom found in close proximity to others. They are reddish coloured and the majority are found in reddish soil; whereas *I. gunningi* is blackish coloured and is most usually found in blackish soil; but either species may, however, be found in opposite coloured soil.

The following are measurements of a typical nest taken at Skinner's Court :—

| | |
|--|-------------|
| Depth of tube..... | 134 mm. |
| Width inside at the top of the tube..... | 23 × 21 mm. |
| Width at the bottom of the tube..... | 27½ mm. |
| Breadth of lid..... | 23½ mm. |
| Length of lid (front to back)..... | 21¼ mm. |
| Thickness of lid (without straw)..... | 4¾ mm. |
| Breadth of hinge..... | 20 mm. |

Idiops gunningi Hewitt.

Localities : Moselekatsnek, near Zwartspruit, Zwartspruit, and Lyttelton Junction.

Nests of this species were not distinguishable from those of *Idiops pretoriae*, except by their size.

The following are measurements of a nest taken at Moselekatsnek :—

| | |
|--|-------------|
| Depth of tube..... | 160 mm. |
| Width inside at the top of the tube..... | 38 × 35 mm. |
| Width at the bottom of the tube..... | 44 mm. |
| Breadth of lid..... | 38¾ mm. |
| Length of lid (front to back)..... | 35¾ mm. |
| Thickness of lid (without straw)..... | 4½ mm. |
| Breadth of hinge..... | 27 mm. |

Idiops gunningi var. *elongatus* Hewitt.

Locality: Moorddrift, Waterberg District.

All the nests were found on hard ground amongst thorn scrub; they were about 6 inches deep, not quite perpendicular, and wider at the bottom than the top; the lids were level with the ground, but the edges fitted into the top of the tube, which widened to accommodate them. The lid was D-shaped when seen from above, as in other members of the genus, and showed on the under surface a circular patch corresponding with the lumen of the tube.

The following are measurements taken from a typical nest:—

| | |
|--|----------------------|
| Depth of tube..... | 155 mm. |
| Width inside at the top of the tube..... | 25 × 23 mm. |
| Width at the bottom of the tube..... | 28 $\frac{3}{4}$ mm. |
| Breadth of lid..... | 25 $\frac{3}{4}$ mm. |
| Length of lid (front to back)..... | 23 $\frac{1}{2}$ mm. |
| Thickness of lid..... | 4 mm. |
| Breadth of hinge..... | 22 mm. |

Family MIGIDAE.

Moggridgea paucispina Hewitt.

Locality: Wonderboompoort.

The nests of this species were found in crevices of rocks at Wonderboompoort; they were always short, rather flattened and pouch-like, about an inch and a quarter in length. The spiders themselves were always found clinging very tightly to the lids when attempts were made to open them, consequently claw or fang marks are conspicuous, but close together, and not as in *Stasiopus*, in the form of a ring. An empty nest was found in a small tree amongst the rocks at the same place, and another containing a female was found in the ground on the Pyramids Range.

A male and a female, besides some juvenile specimens, were subsequently taken in March, 1916, at Wonderboompoort, all from rocks.

The following measurements were taken of a nest at Wonderboompoort:—

Male.

| | |
|--|--|
| Depth of tube..... | 32 mm. |
| Width of the entrance (inside edge of rim) | 13 $\frac{1}{4}$ × 9 $\frac{1}{4}$ mm. |
| Width of the widest part of the pouch.. | 17 mm. |
| Breadth of lid..... | 13 $\frac{3}{4}$ mm. |
| Length of lid (front to back)..... | 9 $\frac{3}{4}$ mm. |
| Thickness of lid..... | 1 $\frac{1}{4}$ mm. |
| Breadth of hinge..... | 9 mm. |

Moggridgea microps Hewitt.

Locality: Malelane, Barberton District.

This species was found in trees in a wooded ravine at Malelane, and appeared to be fairly common, judging by the number of old nests that were seen. Sometimes a hollow in the bark had been chosen for the nest and

cleverly covered with bark so that it was extremely difficult to find. Sometimes, when the crack or hollow was deep enough, the nest had been neatly levelled with the surrounding bark; but in the majority of those discovered was slightly raised and resembled a natural bulge or knot in the bark. Internally the nests did not differ appreciably from those taken in the rocks at Wonderboom (*M. paucispina*).

The following are measurements of the nest from which the type was taken:—

| | |
|---|----------------------|
| Depth of tube..... | 34 mm. |
| Width of entrance (inside edge of rim)... | 14 × 12 mm. |
| Width of the widest part of the pouch... | 16 mm. |
| Breadth of lid..... | 14 $\frac{1}{4}$ mm. |
| Length of lid (front to back)..... | 13 $\frac{3}{4}$ mm. |
| Thickness of lid..... | 1 $\frac{1}{4}$ mm. |
| Breadth of hinge..... | 11 mm. |

A CONTRIBUTION TO THE KNOWLEDGE OF THE TRANSVAAL PASSIFLORACEAE.

By Mrs. R. POTT, Botanist of the Transvaal Museum.

Tryplostemma arenophilum Pott, sp. nov.
(*Tryplostemma*—*Basananthe*.)

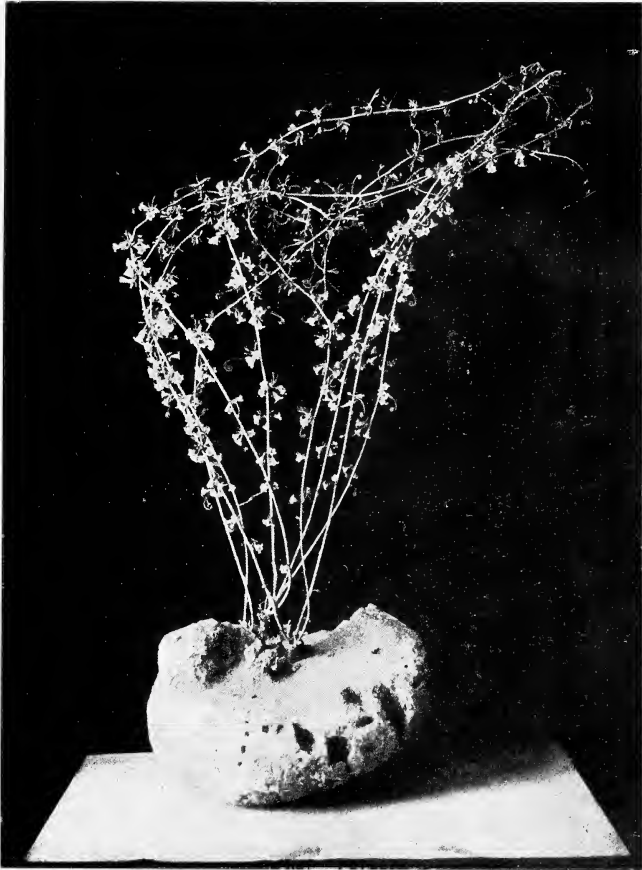
HERBA annua, humilis, erecta. Radix gracilis, longa. Caulis glaber, angulatus, basi ramosus. Folia alterna, petiolata, tripartita, glabra, margine serrato, serraturis apice glandulosis, subtus nervis prominentibus; lobus medius anguste lanceolatus, lobis lateralibus longior; lobi laterales bipartiti, lobulis lanceolatis. Stipulae filamentaceae, petiolo longiores. Pedunculi axillares, ecirrhosi, quam petioli duplo longiores, 2-floribus; bracteae foliosae, breviter petiolatae, bilobae, lobis ovatis, acuminatis; bracteoli 4, filamentacei, pedicellis longiores. Flores oppositi, minuti, pedicellati, virido-albi; sepala 5, glabra, oblonga, obtusa, alba, nervis tribus, crassis, viridibus; petala oblonga-lanceolata, sepalis \pm aequilonga, alba; corona exterior gamophylla, breviter cylindracea, ore longe fimbriata; corona interior hyalina; stamina 5, petalis breviores, filamentis linearibus, faciei interiori coronae interioris adnatis. Ovarium viride cum stylopodio flavo, crasso; styli 3, elongati; stigmata capitata. Fructus glaber, ovoideus, pericarpio chartaceo, flavo. Semen 1, testa luteo-alba, foveolata.

Dwarf annual herb, 4 in. high, branched at the base; branches spreading, 2 in. long. Root long, thin, unbranched. Stem erect, glabrous, angular; internodes very short, \pm 2 lin. long. Leaves alternate, petiolate, glabrous, tripartite; middle lobe simple, the side-lobes bipartite, all the lobes narrowly-lanceolate, sharply serrate, each tooth tipped with a gland; middle lobe longest, \pm 1½ in. long, 2 lin. broad in the middle; veins very prominent at the underside of the leaf; petiole short, 2 lin. long; stipules threadlike, longer than petiole. Peduncles in axils of leaves, twice as long as petiole, with 2 opposite, pedicellate flowers at the top, not ending in a tendril; bracts leaflike, shortly stalked, two-lobed, lobes oblong, long acuminate; bracteoles threadlike, longer than pedicels. Flowers minute \pm 1 lin. long, greenish-white; sepals oblong, whitish with 3 prominent green nerves; petals oblong-lanceolate, white, a little shorter than sepals; outer corona gamophyllous, short cylindrical, long fringed; inner corona hyalin, shorter than outer one; stamens included, the filaments attached to the inner face of the hyalin corona; ovary green with a yellowish stylopodium; styles longish, 3; stigmata capitate. Fruit ovate, 5 lin. long with a yellowish, papery pericarp, one-seeded. Seed kidney-shaped, 3 lin. long, whitish, pitted.

Grows in sandy soil; collected at Warmbaths, January, 1909. Miss R. Leendertz; No. 2062. The type is in the Herbarium of the Transvaal Museum, Pretoria.

Adenia multiflora Pott, sp. nov.

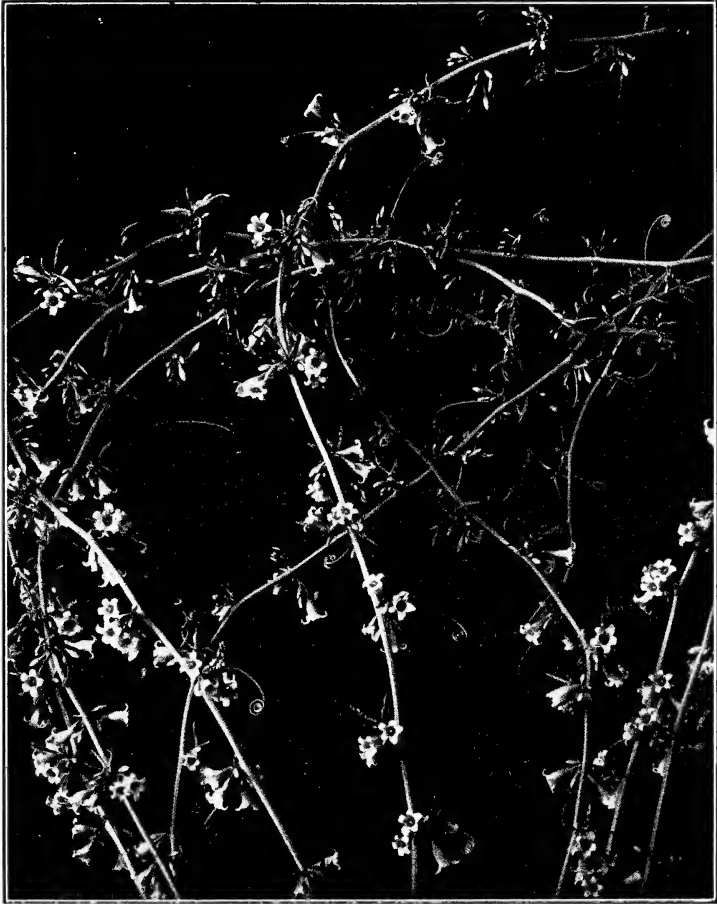
Planta perennis, glabra, scandens, multicaulis. Tuber napiformis, 61 cm. diam., 30 cm. alta. Caules ramosi, teretes, virides, striis purpureis picti, ± 1.5 m. longi, ± 7 cm. diam.; internodia ± 5 cm. longa. Folia alterna, petiolata; petiolus 8–11 mm. longus, sulcatus; lamina ± 4 cm. longa, digitato-partita, glabra, perviridis, lobis 5, nervo medio prominente, margine crasso, rubro; lobus medius longissimus, pinnato-lobatus,



lobulis 4; lobi laterales lobulis 2; lobi basales integri; glanduli 2, magni, ad basin laminae supra, glandulus 1 inter lobo ad basin laminae subtusi glanduli minores inter axilla lobulorum. Flores odoriferi, dioecii; inflorescentia foliis longior, in cirrhum simplicem exiens; cymae ramosae, prope sessiles, ± 20 floribus; bractae minutae, purpureae. Flores σ : receptaculum infundi-buliforme, basi attenuatum, virido-flavum, limbo albo, ± 2.5 cm. longum; segmenta calycis 5, ovata, repanda, apice recurvo, inaequaliter lata, 4–8 mm., tria margine fimbriata; petala 5, alba, versus basin receptaculi inserta, spatulata, acuminata, apice fimbriata, tubo

calycis exserta; coronae filamentis brevibus composita; effigurationes receptaculi 5, basi eius insertae, minutae, lingulatae, sepalis oppositae; stamina 5, inclusa, filamentis parte majore in tubum connatis; antherae oblongae, graciles, ad apice connatis; rudimentum ovarii in tubum filamentorum. Flores ♀ ignoti.

Perennial, glabrous plant, climbing with tendrils. Tuber large, napiform, 2 ft. in diameter and 1 ft. high. Stems many, branched, herbaceous, green, mottled with pale red, up to 5 ft. long, \pm 3 lines in diameter,



internodes; \pm 2 in. long. Leaves alternate, petiolate; petiole 3-4 lin. long, sulcate; lamina triangular in outline \pm 1½ in. long, digitately divided nearly to the base into 5 lobes, glabrous, dark-green, with prominent midrib and thickened, reddish margin; middle lobe longest, pinnatifid with 2 pairs of bluntish segments and roundish angles, the lateral lobes have one pair of segments and the basal ones are undivided; two big flat glands at base of lamina on the upper side, one gland between each lobe on the underside, smaller ones in the angles of each segment of lobes.

Flowers sweetly-scented, dioecious, in nearly sessile, many-flowered cymes in the axils of the leaves; inflorescence dense, up to twenty flowers in the cyme, ending in a simple tendril, much longer than the leaf; bracts minute, reddish. ♂ Flowers: calyx funnel-shaped, tapering at base, slightly irregular, greenish-yellow with cream-coloured limb, \pm 1 in. long, limb 5-cleft, segments ovate, spreading with reflexed tips, differently broad, $1\frac{1}{2}$ -3 lin., three of them fringed at the margin; petals cream-coloured, inserted low down in the calyx-tube, spatulate, much acuminate, fringed at the tip, longer than calyx-tube; corona composed of a fringe of short hairs, inserted at same height with petals; discus of 5 small, lingulate squamae, inserted in the calyx-tube beneath the petals and alternate with them; stamens 5, included, filaments connate into a tube for more than half their length, anthers oblong, slender, connate at their tips; rudimentary ovary concealed in the tube of the filaments. ♀ Flowers unknown.

The enormous tuber of the above-described new species of *Adenia* was found by Dr. J. M. Fehrson at Baviaanspoort near Pretoria in September, 1913, and presented to the Herbarium of the Transvaal Museum. The tuber grows partially above the ground between the rocks and looks with its grey, leathery skin like a piece of rock itself. It is very heavy, full of sap, and green beneath the skin. It was placed in a very sunny spot on the window-sill in the Herbarium and soon it started to grow, making long shoots and flowering for the first time in February, 1914. It never got a drop of water, and again in October of the same year it made long shoots and flowered profusely, as can be seen by the photo taken at that time. The flowers are very sweetly-scented, and hundreds being open at the same time the plant makes a fine show, but it only lasts for a few days.

The Kaffirs know that the tuber contains much sap for in case of thirst and absence of water they cut a piece out of the tuber and suck the sap.

The type is in the Herbarium of the Transvaal Museum.

NOTES AND SYNONYMY OF HYMENOPTERA IN THE COLLECTION OF THE TRANSVAAL MUSEUM.

By Dr. H. BRAUNS.

THE following paper deals with some types of the late Peter Cameron, collected mainly by Mr. Janse and described in the Annals of the Transvaal Museum. Only a part of the species described is at present in the Transvaal Museum. Descriptions by the same author on South African Hymenoptera are to be found in the Transactions of the Philosophical Society of South Africa (now Royal Society), the Annals of the South African Museum, and in the Records of the Albany Museum, Grahamstown. The large quantity of Hymenoptera from all parts of the world acquired by the late P. Cameron is now the property of the British Museum and contains some 2000 type specimens. The descriptions of these types are scattered over the whole world in various publications. Unluckily the majority of all these types are not valid, having been based on already known and described species. The late Geoffrey Meade Waldo, R. E. Turner, and Claude Morley have already studied a part of the type material deposited in the British Museum. The results of their study is to be found in the Annals and Magazine of Natural History, Ser. 8, Vols. XIV and XVI. I have myself published notes on synonymy of Cameron's types in the Deutsche Ent. Zeitschrift and in the Revue Zool. Africaine. The synonymy could not be established in all the species before me. It will be necessary to study such material again when monographs of difficult genera are available, which is at present not the case. Up to that time such types have to be considered as valid. The material before me is in a very bad state of preservation. The types of the very small *Braconidae*, *Ichneumonidae*, and *Chalcididae* cannot be recognized any more and should be discarded. They will be a ballast only in the literature. I have indicated such species with an asterisk.

1. *Plesia transvaalensis* Cam. ♂ Type. Annals of the Transvaal Museum, Nov., 1910, p. 119.

This is not a *Plesia*, but a ♂ of *Myzine*. Cameron could not distinguish between the ♂♂ of *Plesia* and *Myzine* and committed many errors in his descriptions as pointed out by Turner in his paper, "Notes on the Scoliidae"—Trans. Ent. Soc., London, Dec. 21, 1910, p. 392.

2. *Plesia pacificatrix* Cam. ♂ Type. *Ibidem*, p. 118.

As the preceding species, this is not a *Plesia* but *Myzine* ♂.

3. *Discolia pallidipilosella* Cam. ♂ Type. *Ibidem*, p. 120.

This specimen is the ♂ of *Discolia Wahlbergi* Sauss., and therefore synonymous with this species.

4. *Dielis transvaalensis* Cam. ♂ Type. *Ibidem*, p. 121.

This specimen is *Elis barbata* Sauss. ♀ and synonymous to the latter.

5. *Myzine immaculatus* Cam. (sic!). ♀ Type. *Ibidem*, p. 117.
Should be *immaculata*!
6. *Myzine erythrostomus* Cam. (sic!). ♀ Type. *Ibidem*, p. 117.
Should be *erythrostoma*! and is synonymous to *Myzine rufifrons*.
F. Vide Turner "Species of Fossorial Hymenoptera," in Trans.
Ent. Soc., London, 1912, pt. 4, p. 733.
7. *Tiphia transvaalensis* Cam. ♀ Type. *Ibidem*, p. 116.
8. *Cerceris armaticeps* Cam. ♀ Type. *Ibidem*, p. 149.
Cerceris Jansei Cam. ♂ Type. *Ibidem*, 149 p. ff.

Cameron, p. 150, marks his type "male," while the type specimen before me is a "female." The description of Cameron points to a ♀. He compares, p. 150, his *C. Jansei* with *C. melanospila* Cam. I have already, *loc. alius*, stated that *C. melanospila* is synonymous to *C. diodonta* Schletterer, so is *C. Jansei* Cam. The specimen represents the form of *diodonta* Schlett. as it occurs in the north of South Africa. The synonymy must therefore be read thus:—

Cerceris diodonta Schlett.

C. melanospila Cam.

C. Jansei Cam.

9. *Cerceris heterospila* Cam. ♀ Type. *Ibidem*, 150, p. 151.

There are three specimens, two of each labelled as "Type of *heterospila*." The third specimen is labelled as "Type of *heterospila* Cam. var." Two of them have the locality-label "Doornfontein," one only the number "4125." All three specimens are ♂♂, while Cameron marks his type of *heterospila* as a ♀. Two of the specimens, viz., the one No. 4125 and the one labelled "*heterospila* var.," agree well with the description though the sex is wrong. The third does not belong to the described species, but is a small ♂ of *Cerceris ventrilobata* m.i.l., as I have it in my collection. It is at present not quite certain whether this m.i.l. name will be stable or prove to be synonymous with a previously described species. The two ♂♂ above mentioned must therefore at present be considered as the type and type var. or the species described as *heterospila* Cam. and "female" has to be altered into "male" in Cameron's description.

10. *Cerceris spinicaudata* Cam. ♀ Type.

Cameron: "On Some New Genera and Species of Hymenoptera from Cape Colony and Transvaal"—Trans. S.A. Phil. Soc., 1905, Vol. XV, pt. 4, p. 216.

This specimen is not collected by Janse and therefore not described with the other material in the Transvaal Museum Annals.

Bearing the locality-label "Pearston" (Cape Colony) it is apparently a specimen collected by Dr. Broom at Pearston. Cameron described, *loc. cit.*, some Hymenoptera collected by Prof. Dr. Broom at Pearston. The specimen before me is apparently the type of the description as cited above. Cameron omits in his

description the yellow markings of the abdomen entirely. However, the type of *spinicaudata* Cam. before me agrees altogether with the type of *C. Whiteana* Cam. described in the same paper, p. 225. I have compared this type with my own material of this species. The two species are therefore identical and should have the same name, *spinicaudata* Cam., because this name precedes, in the paper, the name of *Whiteana* Cam.

11. *Palarus curvilineatus* Cam. ♂ Type.

Trans. S.A. Phil. Soc., 1905, p. 212.

This type is also no part of the Janse Collection, but the type to the description as cited. The name has no value, as this specimen is a ♂ of *Palarus latifrons* ^{Hohl} ~~Rose~~, described by me in the Annals of the K. K. Hofmuseum, Wien. Further, see Turner: Annals and Magazine of Natural History, Ser. 8, Vol. XVI, Oct., 1915, p. 336.

12. *Stizus Johannis* Cam. ♀ Type.

Records Albany Museum, 1905, Vol. I, No. 5, p. 323.

This specimen is also no part of the Janse Collection, but collected at Dunbrody (Cape Province) by Rev. Father O'Neil.

It is synonymous to the previously described *Stizus oxydorcus* Handl., which has precedence. The type of *St. oxydorcus* Handl. is in my collection.

13. *Stizus erythraspis* Cam. ♀ Type.

Annals Transvaal Museum, *loc. cit.*, p. 144.

This type is the ♀ of the somewhat variable *Stizus Dewitzi* Handl., which name has precedence.

14. *Ampulex Jansei* Cam. ♀ Type. *Ibidem*, p. 140.

This type falls into the synonymy of *A. nigrocoerulea* Sauss., 1892, a species widely distributed in the Orange Free State and Transvaal.

Saussure's name has precedence.

Further, see Turner: Annals and Magazine of Natural History, Ser. 8, Vol. XVI, Oct., 1915, p. 336.

15. *Dolichurus denticollis* Cam. ♀ Type. *Ibidem*, p. 141.

Is not a *Dolichurus*, but *Ampulex* (Rhinopsis), and must therefore be named *Ampulex denticollis* (Cam.).

The type specimen before me is a *male*, not a *female* as marked by Cameron.

This synonymy has been pointed out already by Turner; see Annals and Magazine of Natural History, Ser. 8, Vol. XVI, Oct., 1915, p. 335.

16. *Philanthus trichiocephalus* Cam. ♂ Type. *Ibidem*, p. 147.

This ♂ specimen belongs to *Philanthus histrio* F., a species widely distributed in Africa.

17. *Philanthus spilaspis* Cam. ♀ Type. *Ibidem*, pp. 145 and 146.

The specimen is a ♂, not a ♀ as indicated in Cameron's description.

18. *Philaranthus transversus* Cam. ♂ Type. *Ibidem*, pp. 147 and 148.
This specimen is a ♂ and dwarf specimen of the old *Ph. triangulum* F., var. *diadema* F., a form common through the whole of Africa.
19. *Bembex testaceicauda* Cam. ♀ Type. *Ibidem*, pp. 144 and 145.
This specimen is the ♀ of *B. Mobii* Handl. and synonymous to the latter.
The sex is not indicated in the description.
20. *Liris nigropilosellus* Cam. ♂ Type. *Ibidem*, p. 132.
Is the ♂ of *Tachytes natalensis* Sauss. and synonymous to the latter. See Turner : Annals and Magazine of Natural History, Ser. 8, Vol. XVI, Oct., 1910, p. 336.
21. *Ammophila maculifrons* Cam. ♂ Type. *Ibidem*, pp. 134-135.
Again the type is a ♀, not a ♂. It is the ♀ of the long established *Ammophila tenuis* Palisot.
22. *Ammophila coeruleornata* Cam. ♂ Type. *Ibidem*, p. 135.
The specimen is the male of *Ammophila tenuis* Palisot, both *maculifrons* and *coeruleornata* Cam., fall therefore under the synonymy of *A. tenuis* Pal.
23. *Ammophila pulchricollis* Cam. ♂ Type. *Ibidem*, p. 133.
Again this type specimen is a ♀ and not a ♂ as noted in Cameron's diagnosis.
24. *Ammophila dolichocephala* Cam. ♂ Type. *Ibidem*, pp. 135-136.
There are two specimens of this species, each having a type label of *A. dolichocephala* Cam.
25. *Ammophila lineatocollis* Cam. Type M.S. ?
This type is not a part of the Janse Collection described in the Annals of the Transvaal Museum.
Whether Nos. 23, 24, and 25 are valid species can only be decided after the South African species of *Ammophila* have been studied and monographed, which is not yet the case.
26. *Tachytes argenteovestita* Cam. ♀ Type. *Ibidem*, p. 130.
27. *Corytes transvaalensis* Cam. ♀ Type. *Ibidem*, p. 143.
28. *Crabro erythrotoma* Cam. ♀ Type.
Records of the Albany Museum, Vol. I, No. 4, p. 259.
This species, which belongs to the genus *Dasyproctus*, is not part of the Janse Collection. As it has the habitat-label "Dunbrody (Cape)" it is a specimen collected by Rev. Father O'Neil. The *Crabro* species of the northern hemisphere are replaced by the genus *Dasyproctus* in the south.
29. *Trypoxylon lissonotum* Cam. ♀ Type.
Annals of the Transvaal Museum, Vol. II, 1910, p. 152.
30. *Pison transvaalensis* Cam. ♂ var. Type. *Ibidem*, p. 152 ff.
This is apparently the specimen designated p. 153.
31. *Pison clypeatus* Cam. ♀ Type. *Ibidem*, pp. 153-154.

32. *Passalococcus striatifrons* Cam. ♀ Type. *Ibidem*, p. 151 ff.
The specimen has no locality-label.
33. *Heliocyrtus 4-dentatus* Cam. ♀ Type. *Ibidem*, p. 142 ff.
34. *Astata albopilosella* Cam. ♂ Type. *Ibidem*, p. 130.
35. *Sphex Jansei* Cam. ♂ Type. *Ibidem*, p. 139.
The species belongs to the Isodontia group.
36. *Notogonia rufosecapa* Cam. ♀ Type.
Records of the Albany Museum, Vol. I, No. 5, 1905, p. 321.
This specimen, collected by O'Neil at Dunbrody (Cape), is no part of the Janse collection. I know another specimen in the Albany Museum with Cameron's type-label.
37. *Notogonia brevicarinata* Cam. ♀ Type.
Annals of the Transvaal Museum, Vol. II, 1910, No. 3, p. 131.
38. *Notogonia transvaalensis* Cam. ♀ Type. *Ibidem*, p. 131.
39. *Notogonia pretoriaensis* Cam. ♀ Type. *Ibidem*, p. 132.
40. *Anoplius mimeticus* Cam. ♂ Type.
Records of the Albany Museum, Vol. I, No. 4, p. 263.
41. *Anoplius hirtiscapus* Cam. ♂ Type.
Records of the Albany Museum, Vol. I, No. 3, p. 132.
Both specimens, *A. mimeticus* and *A. hirtiscapus*, are collected by O'Neil at Dunbrody (Cape), having his locality-labels. The two specimens belong to two different genera, *hirtiscapus* being a ♂ of a *Clavelia* species as now designated by *Sustera*.
42. *Homonotus spilonotus* Cam. ♂ Type.
Records of the Albany Museum, Vol. I, No. 3, p. 134.
This specimen is no part of the Janse Collection. It is collected by O'Neil at Dunbrody (Cape). It is a ♀, not a ♂ as designated in the description. The specimen is identical with *H. Wasmanni* Brauns., of which the type is in my collection. The latter has precedence; my specimens come from the same locality as Cameron's type of *spilonotus*.
43. *Homonotus spoliatus* Cam. Type.
Annals of the Transvaal Museum, Vol. II, No. 3, 1910, p. 127.
44. *Pseudagenia viridipennis* Cam. ♀ Type.
Records of the Albany Museum, Vol. I, No. 3, p. 137.
This specimen is no part of the Janse Collection, being collected by O'Neil at Dunbrody (Cape). Cameron misplaced this species in the genus *Pseudagenia*. It is a species of ~~*Porrapompilus*~~ *Parapompilus*.
45. *Pompilus Jansei* Cam. ♀ Type.
Annals of the Transvaal Museum, Vol. II, Nov., 1910, p. 124.
There are two ♀♀ of this species, both labelled "type." The species is again misplaced and belongs to *Parapompilus* as the preceding species.

46. *Jansea longitarsis* Cam. ♂ Type. *Ibidem*, p. 129.
The specimen is a ♀, not a ♂ as designated in Cameron's description. Cameron created a new genus for the reception of this species, being unaware that Kohl had named the genus before him as *Eidopompilus*. The latter generic name has therefore priority.
47. *Agenia varipalpis* Cam. ♀ Type. *Ibidem*, p. 127.
The species belongs to the genus *Pseudagenia* Kohl. In the description, p. 128, 2nd line, "tibiae" is to be placed for "calcaria."
48. *Agenia ornaticollis* Cam. ♀ Type. *Ibidem*, p. 128.
The species belongs to the genus *Pseudagenia* Kohl.
49. *Aporus leucotrichius* Cam. ♂ Type. *Ibidem*, p. 128 ff.
In the description, p. 129, 8th line, "tibiae" is to be read for "calcaria."
50. *Pompilus longihirtus* Cam. ♀ Type. *Ibidem*, p. 125.
Two specimens are in the collection, both having a type-label.
51. *Pompilus leptacanthus* Cam. ♀ Type. *Ibidem*, p. 126.
52. *Pompilus desidiosus* Cam. ♀ Type. *Ibidem*, p. 124.
53. *Pompilus commodus* Cam. ♂ Type. *Ibidem*, p. 125.
The specimen is a ♀, not as designated a ♂.
54. *Pompilus acutiangulatus* Cam. ♀ Type. *Ibidem*, pp. 125-126.
55. *Salius irenensis* Cam. ♂ Type. *Ibidem*, p. 122.
Two specimens are in the collection, both having a type-label. The species must be placed in the genus *Cyphononyx* Dhlb.
56. *Salius lineaticollis* Cam. ♀ Type. *Ibidem*, p. 121.
Two specimens are in the collection, both having a type-label. The species must be placed in the genus *Mygnumia* Shuck. The badly damaged specimen of the two belongs to *Mygnumia Tamasieri* Guér. The description points to this specimen not agreeing with the other one. *S. lineaticollis* is therefore *Mygnumia Tamasieri* Guér.
57. *Salius hilaris* Sm. ♂ Type. *Ibidem*, p. 122.
The identification is doubtful.
58. *Rhynchohalcis niger* Cam. ♀ Type.
Trans. S.A. Phil. Soc., Vol. XV, pt. 4, p. 209, 1905.
This type is no part of the Janse Collection. It bears the locality "Stellenbosch," and is therefore most probably the type to the quoted description.
59. *Mesoagathis fuscipennis* Cam. ♂ Type.
Records of the Albany Museum, Vol. I, No. 3, p. 172.
This is no part of the Janse Collection, but the type to the description quoted above. It bears the locality-label "Grahamstown Col.," Miss Daly and Miss Sole.
60. *Xenolobus rufus* Cam. ♂ Type.
Annals of the Transvaal Museum, Vol. II, 1911, No. 4, p. 199.

61. *Rhogas erythrostomus* Cam. ♀ and ♂ Types. *Ibidem*, p. 196.
Two specimens have "type" labels, the third not.
62. *Rhogas melanospilus* Cam. ♂ Type. *Ibidem*, p. 197.
63. *Rhogas plurilineatus* Cam. ♂ Type. *Ibidem*, p. 197.
Two specimens, each with a "type" label. "*Plurilineatus*" is an error in print. The labels have the name "*pleurilineatus*" which is as well in the synoptical table, p. 196.
64. *Rhogas varicarinatus* Cam. ♂ Type. *Ibidem*, p. 198.
65. *Rhogas varinervis* Cam. ♂ Type. *Ibidem*, p. 198.
Two specimens with a "type" label each are in the collection.
66. *Rhogas pallidipalpis* Cam. ♂ Type. *Ibidem*, p. 198.
67. *Rhogas striatifrons* Cam. ♂ Type. *Ibidem*, p. 199.
There are two specimens, each bearing a "type" label.
68. *Rhogas transvaalensis* Cam. ♂ Type. *Ibidem*, p. 199.
69. *Macrocentrus luteus* Cam. ♂ Type. *Ibidem*, p. 210.
- *70. *Macrocentrus pallidistigma* Cam. ♂ Type. *Ibidem*, p. 210.
The specimen is without abdomen and unrecognizable!
71. *Macrocentrus latisulcatus* Cam. ♀ and ♂ Types. *Ibidem*, p. 210 ff.
Only the ♂ type is present in the collection.
72. *Macrocentrus nigro-ornatus* Cam. ♀ Type. *Ibidem*, p. 211.
- *73. *Macrocentrus annulicornis* Cam. ♀ Type. *Ibidem*, p. 211.
Not recognizable!
74. *Apanteles eurygaster* Cam. ♂ Type. *Ibidem*, p. 207.
- *75. *Apanteles africanus* Cam. ♂ Type. *Ibidem*, p. 207.
Not recognizable!
76. *Apanteles fuscinervis* Cam. ♂ Type. *Ibidem*, p. 207.
77. *Apanteles transvaalensis* Cam. ♀ Type. *Ibidem*, p. 208.
78. *Apanteles testaceolineatus* Cam. ♀ Type. *Ibidem*.
79. *Apanteles testaceiventris* Cam. ♂ Type. *Ibidem*, p. 208.
Misprinted! should read "*testaceiventris*," as it is on the type label and in the synoptical label.
80. *Phanerotoma curvimaculata* Cam. ♀ Type. *Ibidem*, p. 203.
81. *Phanerotoma pallidipes* Cam. ♂ and ♀ Types. *Ibidem*, pp. 203 and 204.
82. *Cyclocormus luteus* Cam. ♀ Type. *Ibidem*, p. 209.
- *83. *Hormius testaceus* Cam. ♀ Type. *Ibidem*, p. 195.
Not recognizable!
84. *Iphiaulax pretoriaensis* Cam. Type. *Ibidem*, p. 192.
It is a ♀. The description makes no mention of the sex.
85. *Eurytoma transvaalensis* Cam. ♀ Type. *Ibidem*, p. 215.
Three specimens with a type-label each. One of these belongs to the *Braconide* genus *Apanteles*.

86. *Eurytoma palliditarsis* Cam. ♀ Type. *Ibidem*, p. 216.

*87. *Enkoebelea testaceipes* Cam. ♀ Type. *Ibidem*, pp. 216-217.
Totally destroyed.

There are a few more types of Cameron in the box, of which I cannot find the descriptions. They follow here and perhaps some are only MS. names.

* *Eurytoma testacitarse* Cam. Type. Cape Colony. Not Janse Collection.

* *Eurytoma striatula* Cam. Type. Cape Colony. Not Janse Collection.

* *Euplectrus xanthostomus* Cam. Type. Two specimens of Janse Collection, each with type-label.

Pteromalus transvaalensis Cam. Type. Janse Collection.

Two specimens with type-label each.

* *Norna crassinerva* Cam. Type. Janse Collection.

* *Eucharis fuscicornis* Cam. Type. Janse Collection.

* *Curitapus fulvipes* Cam. Type. Janse Collection.

Charitopus fulvipes Cam. Type. Janse Collection.

* *Ceraphron erythrogaster* Cam. Type. Janse Collection.



Young *Anomalospiza* being fed by *Prinia flavicans* (see pp. 260-261).

ORNITHOLOGICAL NOTES.

By AUSTIN ROBERTS.

Classification of African Birds.

As adopted by Mr. C. H. B. GRANT in a series of papers published in the *Ibis*, 1915.

IN the course of a series of papers dealing with a collection of birds made by Captain G. P. Cosens in British East Africa and Uganda (*Ibis*, 1915), Mr. C. H. B. Grant has in many cases reviewed the races of species with which the collection is concerned. Since Grant has been largely identified with the study of South African species, which he collected during the Rudd Expedition, and as his present work has been carried out with the aid of the enormous series of skins in the National Collection in the British Museum, his expressions of opinion are likely to carry considerable weight. Nevertheless, I am sure by the facts in regard to the species with which I am here concerned, that his identification has not been conducted with that care and discrimination which should be correlated with his dogmatic assertions in regard to some subspecies and even species. Grant's work is characterized by many good features for which African ornithologists should be grateful, amongst which may be mentioned the first acknowledgment as well as careful scrutiny, from workers in the British Museum, of the older literature prior to 1766 in which African ornithology has been dealt with, and also the acceptance of the modern rules of nomenclature; these are particularly good features, as the inclination of many ornithologists

is to retain the out-of-date nomenclature to be found in the "Catalogue of Birds in the British Museum," or, of another school, in Reichenow's works on the ornithology of Africa. It is therefore a great pity that it becomes necessary to indicate that the same careful scrutiny has not been applied to all the races and even some species of African birds. I note also with regret that Grant has not touched upon the generic status of species, an important matter which it is to be hoped will soon be investigated.

In dealing with *Otus capensis*, Grant writes as follows (p. 253):— "There appears to be three phases of plumage of this bird: 1st, grey, that which might be designated the normal; 2nd, a rufous phase (cf. Selater, *Ibis*, 1912, p. 5); and 3rd, a slatey-grey phase.

"Messrs. Gunning and Roberts, in the *Annals of the Transvaal Museum*, Vol. III, 1911, p. 111, describe three new subspecies of this owl as follows:

Pisorhina capensis intermedia: Modderfontein,* Transvaal.

Pisorhina capensis grisea: Bethulie, Orange Free State.

Pisorhina capensis pusilla: Boror, Portuguese East Africa.

"The series in the National Collection shows that great individual variation occurs in this owl, and I cannot see any constant character sufficiently well marked to warrant separation into races, and therefore, without more convincing proof, I must place Gunning and Roberts' names as synonyms."

In the first place, I presume Grant means by "phase," shades of colour arising as stages in the age of adult individuals. If my interpretation of the phrase is correct, then Grant is decidedly wrong, for amongst those in the Transvaal Museum Collection the characters given in the diagnoses are constant and readily distinguishable; the differences are due neither to age nor season, but to the climatic conditions of the normal habitat of the species. A few specimens acquired since these subspecies were described in every case support my first conclusion, with one exception, that of the juvenile specimen from Matatiele. Lieut. C. G. Davies has kindly presented to the Museum an adult specimen from Matatiele, which proves to be that of "*grisea*"; but as the juvenile specimen still retains part of its downy plumage, and the young are naturally not necessarily coloured like the adults, this does not affect the status of the races. There are in the collection twenty specimens of this owl from the following localities:—

Otus capensis capensis.

2 Grahamstown.

Otus capensis intermedia.

13 Transvaal.

Otus capensis grisea.

1 Bethulie, O.F.S.; 1 ad., 1 juv., Matatiele, East Griqualand.

Otus capensis pusilla.

2 Boror; 1 Beira.

* The type is from Pretoria, as stated in the original description.—A.R.

Selater's remarks upon the size and plumage of the specimens Grant collected at Klein Letaba and Beira (to which Grant draws attention in support of his statement that the colour is merely a "phase") shows that those specimens were probably referable to "*intermedia*" and "*pusilla*" respectively. Every one to whom I have shown these specimens in the Transvaal Museum has concurred in my opinion that they should be recognized as well-marked races. Grant has not, moreover, indicated where the "series in the National Collection" were obtained; but it is natural to conclude from his free use of the term "British East Africa" in an ambiguous sense in several instances, and from his statement at p. 253 that the two specimens from the Nakwai Hills are both in good clean plumage and agree perfectly with specimens from "South Africa," that he has not found it convenient to take into account the different zoological zones found within such large tracts of country as "South Africa," "British East Africa," "German East Africa," etc. When classifying this and other birds with which I am here concerned, it is a pity that Grant did not bear in mind a rule which he himself acknowledges in regard to the classification of subspecies, for I find at p. 260 the following remarks in regard to *Poicephalus meyeri*: "Though these parrots vary to a considerable amount individually and no single character of a single specimen can be fixed down, yet when examined collectively and the series laid out geographically, average differences exist which preclude all these parrots being placed under one name. Therefore, six of the described races are recognizable, and (perhaps unfortunately) I have been compelled to describe a seventh." Exactly so; but it so happens that in the case of the owls it is possible to allocate a *single* specimen to a certain race, and a series is not required to justify the separation. It seems clear, however, that there is not a large series of these owls from South Africa in the National Collection, otherwise Grant would have done as he has done in other cases, given short diagnoses of the subspecies instead of merely mentioning their names and distribution. Under the circumstances, I think I am justified in taking exception to his unwarranted action in rejecting the names of the well-marked South African subspecies.

At p. 271, Grant makes the following statements in regard to *Lophoceros nasutus nasutus*:—"The range of this race appears to extend from Senegal to the Niger, eastwards to north-east Africa and south to British East Africa; its place in Damaraland and Nyasaland, southward to the Vaal River, is taken by *L. n. epirhinus* Sund."

"In the *Journ. für Orn.*, 1905, p. 440, Erlanger separates the Arabian and north Abyssinian bird under the name of *L. n. forskallii* Hempr. and Ehr. . . . and certainly two ♂ specimens before me from south Arabia have larger bills and are generally larger than specimens of true *L. n. nasutus*. However, one ♂ from Geragi, White Nile, is identical in every way with the Arabian birds: so until further material comes to hand it cannot be definitely settled as to how far this name can hold good.

"Since the above has been written, I have seen the description of *Lophoceros nasutus maraisi* Roberts . . . which is similar in size and colour to *L. n. nasutus*, but smaller,* having a wing in the ♂ of 202 mm.

* Though I am half Irish, I am not responsible for this "bull."—A. R.

There are no specimens in the British Museum from German East Africa, and Dr. Hartert has kindly informed me that the Tring Museum does not possess any either.

“As this race has been founded principally on size, I append for comparative purposes the wing measurements of all the adult ♂♂ in the British Museum Collection:—Gambia, 221; Portuguese Guinea, 221, 218; Gold Coast Colony, 229, 222, 219, 214; Nigeria, 222, 197; Welle River, 223; Bahr-el-Ghazal, 219, 216; Sudan, 250, 234, 230, 222, 223, 219; Abyssinia, 238, 227, 226, 221, 219; South Arabia, 251, 235; Uganda, 223, 222; British East Africa, 229, 228, 223, 222; Nyasaland, 209, 208, 206; Zambesi, 226, 221, 212, 200; Mashonaland, 234, 222, 214, 211, 208; Damaraland, 225, 222, 219; Bechuanaland, 237; Transvaal, 224, 218, 213, 211.

“It will be seen that considerable variation exists in size in birds from the same locality, as, for instance, the two from Nigeria, the six from Sudan, and the four from the Zambesi; specimens from the first and last localities overlapping Mr. Austin Roberts' measurements.”

At first sight these figures seem to be convincing; but upon closer scrutiny it becomes apparent that too much has been made again of political areas, and no definite localities are quoted. The question of exact localities is an important one, but not the only one to be considered. It will be observed that there is a mean around which the majority of figures are clustered, and it will be noted in the figures I shall give hereafter, that the South African males in the collection of the Transvaal Museum vary also; but in every case where the length falls short of the average, the bill, though black at the tip, still shows by the development of the casque that the specimen has not reached maturity. Grant's record of very large specimens from Mashonaland and Bechuanaland seems to show that a large race of “*epirhinus*” occurs there. Grant has quite overlooked the possibility of the existence of a large and a small species side by side, such as, for instance, *Cinnyris afer* and *C. chalybeus*, which species may again vary in size in different localities. I had this in mind after noting the peculiar distribution of these supposed races of *Lophoceros nasutus*, and particularly drew attention to this when describing “*maraisi*,” as, if their ranges are found to overlap, then the subspecies must be considered to be true species. The character on which “*nasutus*” is separated from “*epirhinus*,” the shape of the casque, appears to me to be of specific, if not indeed generic, value, and I was curious before, and am still more so now, to know whether intermediates between the two alleged races are known. Grant unfortunately makes no remark upon the shape of the casque, and we must therefore conclude that the Nyasaland birds, whose “locality” is not far removed from that of the types of “*maraisi*” and whose measurements come very near to those of “*maraisi*,” are referable to “*epirhinus*” on the shape of the casque. As “*maraisi*,” which has the casque shaped as in “*nasutus*,” occurs in the more southeasterly parts of German East Africa, there seems to be no reason why it should not also occur in the Zambesi valley, there being no obstacles to its extension so far south. It would therefore be well to examine specimens from the Zambesi valley more carefully to see if both forms do not occur

there side by side. I trust that if an answer is forthcoming to this problem of distribution, measurements of the bill and tail, if not also other parts, will be given, for those of the wing alone do not afford an altogether satisfactory guide. Mr. C. H. B. Grant is misleading in stating that the difference lay in the wing alone. The two specimens on which "*maraisi*" was described are both old ones, as is shown by the development of the bill, yet in every respect they are much smaller than the average "*nasutus*."

Measurements of *Lophoceros nasutus epirhinus*.

| Locality. | Sex. | Wing. | Tail. | Culmen. | Shape and Colour of Bill. |
|----------------------------------|------------|-------|-------|---------|--|
| Hectorspruit..... | ♂ | 218 | 184 | 83 | Casque developed, tip of bill black. |
| " | ♂ | 218 | 198 | 84 | " " |
| " | ♂ | 219 | 196 | 82.5 | " " |
| " | ♂ | 205 | 190 | 66 | Casque not developed, tip of bill red. |
| " | (♀ or juv) | 197 | 172+ | 70 | " " |
| Pretoria..... | ♂ | 228 | 208 | 88.5 | Casque developed, tip of bill black. |
| " | ♂ | 223 | 195 | 87 | " " |
| Rustenburg..... | ♂ (juv.) | 210 | 191 | 75 | Casque not developed, tip of bill black. |
| Zoutpansburg..... | ♂ | 225 | 197 | 88 | Casque developed, tip of bill black. |
| " | ♂ (juv.) | 212 | 192 | 71 | Casque not developed, tip of bill black. |
| Jabwielu, south-eastern Rhodesia | ♂ (juv.) | 203 | 182 | 69 | Casque not developed, tip of bill turning black. |
| Lusakas, north-western Rhodesia | ? | 205 | 188 | 70.5 | Casque not developed, tip of bill red. |

At p. 273, Grant places *Lophoceros damarensis* in the synonymy of *L. erythrorhynchus caffer*,* stating that, in his opinion, the types are albinistic individuals. This is not the case, for there are four specimens of this bird in the Transvaal Museum taken at Windhuk, Damaraland, which agree perfectly with Shelley's description. This bird is apparently not a subspecies of *L. erythrorhynchus*, but more likely a very distinct species, and it is surely the height of arbitrary procedure to reject it on no better grounds than conjecture.

At p. 283, Grant assumes, probably correctly, that the type of *Irrisor erythrorhynchus* was procured at Knysna and that *I. viridis* from east of the Sunday River is a synonym. The fauna of the two districts is seldom identical, owing to the great difference in climatic conditions, and I was therefore not surprised on examining the series in the collection of the Transvaal Museum to find that the sexed ♂♂ from Knysna were smaller than those from Grahamstown and elsewhere east of the Sunday River; but it is only fair to state that the only other specimens are one sexed as a ♀ and another not sexed, so that it is possible the two sexed as ♂♂ may

* The correct name is *L. erythrorhynchus rufirostris* Sund.

also have been ♀♀, though Marais, who collected these specimens, was always very careful in his sexing. It remains, therefore, to be seen whether this difference in size is constant. Grant doubts Shortridge's and Davies's records of "*viridis*" from Pondoland, stating that he would not be surprised to find that the specimens would turn out to be *I. e. marwitzi*. Shortridge's specimens I have not seen, but Davies's from Flagstaff are certainly referable to "*viridis*." A single specimen from Port St. Johns District, taken by Swinny, is much smaller than even juvenile specimens from Grahamstown; it is sexed as a ♂, and I have no doubt from a knowledge of the conscientious work of this naturalist, and the general smallness of birds from Pondoland, that this is correct. A small race may therefore be found near the coast in Pondoland.

At p. 285, Grant makes the following statement:—" *Irrisor erythrorhynchus marwitzi* Reichw., *Orn. Monatsb.*, 1906, p. 171: Makalama in the Wemberesteppe, German East Africa.

"Of this, *Irrisor erythrorhynchus brevirostris* Gunn. and Rob. (*Annals of the Transvaal Museum*, Vol. III, p. 113: Villa Pereira, Boror, Portuguese East Africa; see also *Journ. S.A. Orn. Union*, Vol. VIII, 1912, p. 26 becomes a synonym, as birds from Portuguese East Africa agree perfectly with specimens from the north and south, and the bill is *not* shorter."

The range he gives as: "Natal, Swaziland, Transvaal, Portuguese East Africa, Matabeleland, Mashonaland, Nyasaland, Northern Rhodesia, Belgian Congo (Dikulwe Valley), German East Africa (Mombasa to Rift Valley), Uganda up to the Turkwel River, island of Zanzibar."

At p. 281, he records a ♂ specimen from Amala River, 200 miles north from the type locality of "*marwitzi*," and a ♀ from Turkwel River, still another 200 miles further north; all three localities are on different river systems, an important detail where these birds are concerned, owing to their frequenting heavily wooded places such as are commonly distributed along river banks. I mention this because the measurements he records of these two specimens show that the ♂ has a long wing and a short bill and the ♀ a long bill and a short wing, and unless we take account of such differences we lose sight of the main object of trinomial classification. It is this want of appreciation of details which concern geographical distribution which has caused Grant to reject the name of "*brevirostris*." If it is possible to separate Meyer's parrot only by the study of *series* of specimens, why should not the same trouble be taken in regard to these Hoopoes, which present more clearly defined characters on which they can be separated? I am not aware on what grounds Grant states that the bill of "*brevirostris*" is *not* shorter; but the series in the Transvaal Museum Collection certainly shows this to be wrong. In the table of measurements given hereafter of the specimens in the collection before me, it will be seen that both the wing and tail, besides the bill, are shorter in specimens from the Zambesi valley than in those from the Transvaal, while they approximate to those of the eastern parts of the Cape Province. This I noted before and therefore compared the race with "*viridis*," stating that the bill was *stouter* and *straighter*. Specimens from the Transvaal appear to come nearer to *I. e. angolensis* than to *I. e. marwitzi*, to judge by Grant's short diagnoses. The prismatic colours of these birds are not easily

defined, and every naturalist probably has his own conception of what is meant by "violet colour" (Reichenow), "purple" (Grant), and "bronze violet" (mihi), colours which have been ascribed to the tail of this bird. I can, however, see a very distinct difference in the colour of the tail feathers of specimens from the Cape Province, from the Transvaal, and from the Zambesi valley, and as this is correlated with differences in size, I see no reason to consider those from the last two regions as synonymous merely because the extent of the white on the primary coverts is the same.

Table of Measurements of *Irrisor erythrorhynchus*.

| LOCALITY. | MALES. | | | FEMALES. | | |
|------------------------|---------------|---------|---------|-----------------|-------|---------|
| | Wing. | Tail. | Culmen. | Wing. | Tail. | Culmen. |
| Knysna..... | 131 | 159+ | 43 | 131 | 151+ | 41 |
| " | 132 | 133+(m) | 41 | (not sexed) 130 | 160 | 39 |
| Grahamstown..... | 135 | 187 | 55 | 132 | 164 | 47 |
| " | 137 | 153+ | 59 | 135 | 163 | 44 |
| " | 139 | 160+ | 52 | 137 | 169 | 44 |
| " | 140 | 162+ | 55 | (sex ?) 137 | 166 | 43 |
| " | (juv.) 129 | 156 | ? | (juv.) 131 | 157+ | 42 |
| Bedford, Cape Province | 134+(m) | ? | 57 | 136 | 164 | 47 |
| Flagstaff..... | 139 | 167 | 52 | 133 | 146+ | 48 |
| Port St. Johns..... | 125 | 146 | 47 | — | — | — |
| Redhill, Natal..... | 137+ | 171 | 59 | — | — | — |
| Louws Creek, Transvaal | 147 | 202+ | 61 | 141 | 196 | 44 |
| Hectorspruit..... | 145 | 227+ | 61 | 139 | 160+ | 47 |
| " | 153 | 232 | 62 | — | — | — |
| " | 146 | 227 | 56 | — | — | — |
| " | (sexed ♀) 150 | 220+ | 60 | — | — | — |
| " | (sexed ♀) 145 | 203+(m) | 56 | — | — | — |
| Thabina River..... | 156 | 238 | 58 | 142 | 170+ | 44 |
| Koedoes River..... | 150 | 213+ | 54 | — | — | — |
| Klein Letaba..... | 151 | 222 | 56 | — | — | — |
| " | 157 | 197+ | 52 | — | — | — |
| " | 151 | 227 | 52 | — | — | — |
| Goud River..... | 148 | 222+ | 55 | 142 | 170+ | 44 |
| " | — | — | — | 147 | 220+ | 45 |
| Rietspruit..... | — | — | — | 145 | 216 | 44 |
| Moorddrift..... | 159 | 235 | 59 | 149 | 220+ | ? |
| Rustenburg..... | 159 | 232+ | 57 | 139 | 221+ | 43 |
| " | 158 | 235 | 53 | — | — | — |
| " | (sexed ♀) 148 | 217+ | 56 | — | — | — |
| " | (juv.) 149 | 210+ | 50 | (juv.) 138 | ? | 40 |
| Warmbaths, Pretoria.. | 156 | 232 | 64 | — | — | — |
| " | 153 | 177+ | 44 | — | — | — |
| Beira..... | 137 | 225 | 49 | (not sexed) 134 | 214 | 36 |
| " | — | — | — | (not sexed) 132 | 204 | 37 |
| Boror..... | 142 | 200+ | 44 | 127 | 192+ | 38 |

NOTE.—The specimens marked juvenile all have the bill black. These long-tailed birds soon wear down the tips of the tail feathers, and when worn I have added a + sign. Some of the specimens are in moult, and in such cases I have indicated this by the sign +(m). Some of the specimens I have put into the column other than that in which they would have been placed had the labels been trusted to entirely; it is not unusual to observe errors in the sexing of specimens and to make allowance therefor, as, for instance, Grant has done so at pp. 239 and 242.

At p. 290, Grant rejects my name of *Rhinopomastus cyanomelas intermedius* in the following terms:—"Since writing the above I have seen Roberts' description in the *Annals of the Transvaal Museum*, Vol. IV, p. 171, of *Rhinopomastus cyanomelas intermedius*, the type locality being given as Koedoes River, Zoutpansberg District, north-eastern Transvaal. The characters on which it is founded are the length of the tail, i.e. ♂♂ 165-155, ♀♀ 146-136 mm., and 'less white on the tail feathers.'

"Another careful examination of the large series in the British Museum Collection shows that the white on the tail, though constantly greater in *R. c. schalowi* when compared with specimens of *R. c. cyanomelas*, varies quite considerably individually and, moreover, in series from the same districts, as is exemplified in British East African and Uganda specimens.

"The measurements of the tails gave the following results: Manda Island, ♂ 148 mm.; Uganda, ♂ 165-147, ♀ 171-151 mm.; British East Africa, ♂ 176-163, ♀ 156-137 mm.; German East Africa, ♂ 166, ♀ 151 mm.; North-Eastern Rhodesia, ♂ 175-174 mm.; Nyasaland, ♂ 185-172, ♀ 163 mm.; Portuguese East Africa, ♂ 183-168, ♀ 158-146 mm.; Lower Zambesi, ♂ 175-168, ♀ 167 mm.; Eastern Matabeleland, ♂ 167-146, ♀ 164-161 mm.; Mashonaland, ♂ 187-162, ♀ 167 mm.; Eastern Transvaal (low country), ♀ 144 mm.

"Neumann, *Journ. für Orn.* op. cit., gives the measurements of the tail of four specimens from German East Africa: ♂♂ 205 and 180, ♀♀ 175 and 168.

"The above list shows not only that great individual latitude must be allowed, but that Roberts' measurements are very closely matched in birds from German East Africa and are actually equalled by those from Uganda, thus compelling me to place his name as a synonym."

While I admit that a certain amount of latitude must be allowed, as indeed the figures I gave will show, yet there must be something wrong in the measurements quoted by Grant for specimens from Uganda and eastern Matabeleland, where it will be seen in the case of the former that the ♀♀ are on the average larger than the ♂♂ and in the latter approximately the same. He seems to have made no allowance for errors in sexing, for the condition of the tail feathers, nor for the exact localities from which the specimens were obtained. I have already pointed out the necessity for closely observing these points, and it is not necessary to repeat them. I may point out, however, that the female specimen from near the type locality of *R. c. intermedius* which he records, falls within the minimum and maximum figures for the sex which I gave. *Rhinopomastus cyanomelas intermedius*, it will be seen on consulting the table of measurements given hereafter, is a distinct link between the typical and East African races. Specimens we have from German East Africa and Boror agree with Neumann's figures, and for this reason, and on comparison of the series in the collection with these specimens, I came to the conclusion (which I still see no reason to alter) that the specimens from the low country of the eastern Transvaal should be named.

Table of Measurements of *Rhinopomastus cyanomelas*.

| LOCALITY. | MALES. | | | FEMALES. | | |
|--------------------------|---------------|-------|---------|------------|-------|---------|
| | Wing. | Tail. | Culmen. | Wing. | Tail. | Culmen. |
| Windhuk, Damaraland | 111 | 132 | 47 | 100 | 121 | 40 |
| Okahandja, " | 115 | 129 | 46.5 | — | — | — |
| " " " | (juv.) 110 | 128 | 34 | — | — | — |
| Barkly West, C.P. | 111 | ? | 45 | 107 | 121 | 40.5 |
| Brandfort, O.F.S. | 115 | 135 | 50 | 103 | 120 | 37 |
| Bloemfontein, O.F.S. ... | 110 | 131 | 47 | — | — | — |
| Rustenburg, Transvaal | 113 | 141 | 50 | — | — | — |
| " " " | (sexed ♀) 112 | 126 | 49 | — | — | — |
| Matlabas, Waterberg.. | — | — | — | 103 | 122 | 39 |
| Rietspruit, " .. | 118 | 145 | 46 | — | — | — |
| " " " | (sexed ♀) 112 | 126 | 46 | — | — | — |
| Pongola River..... | 112 | 130 | 48 | 103 | 116 | 37.5 |
| Moorddrift..... | — | — | — | 101 | 121 | 42 |
| Pienaars River..... | 111 | 132 | 49 | 105 | 121 | 42 |
| " | 119 | 135 | 52 | — | — | — |
| Marabastad..... | 111 | 145 | 42 | — | — | — |
| Blaauwberg..... | 115 | 134 | 48 | 104 | 120 | 36 |
| " | (juv.) 111 | 140 | 39 | 105 | 125 | 34 |
| Koedoes River..... | 114 | 165 | 50 | 105 | 136 | 40 |
| Thabina River..... | 114 | 155 | 47 | — | — | — |
| Mapagone..... | 118 | 151 | 49 | — | — | — |
| Hectorspruit..... | 114 | 157 | 45 | 106 | 146 | 37 |
| " | — | — | — | 104 | 135 | 39 |
| " | — | — | — | 103 | 138 | 37 |
| Louws Creek..... | 112 | 155 | 45 | (juv.) 105 | 105 | 29 |
| " | (sexed ♀) 113 | 164 | 46 | — | — | — |
| Weenen, Natal..... | — | — | — | (juv.) 100 | 137 | 39 |
| Beira, P.E.A..... | 117 | 176 | 46 | — | — | — |
| Boror, P.E.A..... | 113 | 182 | 42 | — | — | — |
| " | 111 | 185 | 45 | — | — | — |
| Bagamojo, G.E.A..... | — | — | — | (juv.) 101 | 150+ | 34.5 |
| Mero Forest, G.E.A.... | 117 | 180 | 45 | 106 | 152 | 32 |

At p. 303, Grant states that the typical *Caprimulgus natalensis* occurs only in Natal and Zululand, and I may therefore here record a specimen from Zoutpansberg, collected by the late J. v. O. Marais.

At p. 304, Grant retains the name of *C. natalensis chadensis*, not because there is a recognizable difference between the alleged races, but because a gap of 2000 miles separates the places where the types were obtained! Why then has he not given a new name to the short-tailed specimens of *Rhinopomastus cyanomelas* from Uganda?

At p. 440 Grant refers to *Tricholaema affinis* as a distinct species, having apparently overlooked the correction made by Neumann (*Journ. für Orn.*, 1910, p. 197), in which he pointed out that this supposed species represents the immature plumage of *T. leucomelan*.

At p. 428, Grant rejects the name of *Centropus pyimi*, mihi, on the assumption that it represents the young of *C. burchelli*; but as he has not

seen the specimens vindication is unnecessary. The fact that the two species are both found in Kaffraria counts for nothing, since *C. superciliosus* and *C. burchelli* are said to occur side by side north of the Zambesi.

At p. 421, Grant has indicated two errors on my part in the following terms:—"Attention must be drawn to the fact that Mr. Austin Roberts recently recorded a pair of *Centropus grilli caeruleiceps* from Sabi, eastern Transvaal (cf. *Annals of the Transvaal Museum*, Vol. IV, 1914, p. 175); considerable confusion is entailed by taking a name, and that only a subspecific (geographical) one, from north-east Africa and fixing it on to a South African bird, thus defeating the laws governing geographical forms, and creating unnecessary synonyms.

"Mr. Roberts has remarked that the ♀ differs from the ♂ in being *banded*; this is, of course, the character of the young and immature birds. When adult the sexes can only be distinguished by the female being slightly larger and not by the markings, as is shown by nine sexed birds in the British Museum Collection from Natal and Nyasaland in black and rufous plumage, six of which are ♀♀ and three ♂♂."

Perhaps it is as well that I stated the ♀ was banded, as we now know what is the difference between the sexes when adult, as Grant has carefully pointed out, a difference in size pointed out by me, which has apparently previously been missed; while Grant himself states that the type of *Centropus grilli caeruleiceps* is "very closely matched by a bird from Port Natal." Why then all this furore? As a matter of fact the paragraph reflects upon the work of Grant's colleague, for whom it was apparently not intended, as I find at p. 286, in dealing with the single specimen on which Grant founds his name of *Irrisor erythrorhynchus ruwenzorae*, he states that: "In the *Trans. Zool. Soc.*, Vol. XIX, 1910, p. 432, Mr. Ogilvie-Grant has recorded this specimen as *I. viridis* Licht." It cannot therefore be said that I am the only sinner in recording a race incorrectly, more especially having regard to the fact that Ogilvie-Grant himself stated nine years previously that *Irrisor viridis* is confined to the Cape Colony. It is surely a graver mistake to describe a new race of *Centropus grilli* on a single immature specimen, as he has done at p. 420, when, as he admits, adult specimens are not available from the type locality; would it not have been better to have recorded this specimen as *Centropus grilli caeruleiceps*, seeing that it so closely matches the type? What would he have said had I described the Sabi specimens as a new race? And had he rejected it, he would have been justified in doing so only on the grounds that the "phases" of plumage are not well known enough to warrant the separation of the species into races. Moreover, Grant is himself not above reproach in the "creation of unnecessary synonyms," as, for example, in his rejection of species, such as *Lophoceros damarensis* and subspecies of which he has not seen the specimens or series on which they were founded, or, if he has seen them, has neglected to examine them with proper care. I am puzzled as to what Grant means by "laws governing geographical forms." Has he discovered the laws by which forms vary geographically? If so, why has he not published his views thereon, for this important question has not yet been satisfactorily answered. But I fear, judging by his work, that he referred to some unwritten custom which he is now

attempting to make law, in the same way as a now passing school of binomialists has attempted to make binomialism law. Thinking systematists are not likely to accept a rule governing the geographical range of a subspecies, if that is the intention of Grant's expression, for the range must be defined only by the recognizability of the character on which the form is named. Herein Grant has taken advantage of the vagueness of the limits of the range of subspecies, to describe, retain or reject geographical races with a dogmatic bias that is neither scientific nor courteous. Doubtless Grant has his views as to what constitutes a genus, a species, or a subspecies; but it does not follow that his opinion is that of the majority. An examination of some of his work, which I have been able to undertake seems to show that at times he has compromised between the system of the binomialists and that of the modern trinomialists, for while he rejects some subspecies, in other cases, such as in dealing with Meyer's parrot, he has applied the finest degree of refinement in trinomial classification. Making due allowance for the variability or non-variability of species, a factor which should never be lost sight of in classification, no system will stand which is not consistently applied, and herein we have had much to contend with in all works on African ornithology. It seems almost as though the enormous series in the National Collection, where most of this work has been done, have been too large, for the examination of details has been greatly neglected and workers seem not to have had time to go carefully through the whole series.

In conclusion, I may state that any one is justified in correcting errors of judgment, which no human being can claim to be free from, and no unbiassed systematist will take offence thereat; but such corrections must be backed by facts and not subjected to the feeling influence of association. Sufficient has been said to indicate the principles which have prompted the penning of this paper.

New Records of Birds.

LIEUT. C. G. DAVIES, S.A. Mounted Riflemen, has recently kindly presented to the Transvaal Museum several specimens of birds collected at Otavifontein, Damaraland, during the recent military operations. These represent *Chelicutia chelicuti* (Stanl.), *Vinago calva* (Temm.), and *Francolinus hartlaubi* Boc. Special interest is attached to the two last species as they are new to the South African avifauna. The specimen of *Vinago calva* has a very short bill, the hardened apical portion measuring only 10.5 mm., and therefore shorter than Reichenow's minimum measurements. In coloration it agrees with Reichenow's description of *V. calva nudirostris*, which has been placed in the synonymy of *V. calva calva* by Grant and Bannerman (cf. *Ibis*, 1915, pp. 37 and 482). The specimens of *Francolinus* represent a ♂ and ♀. The former agrees with the description, except in having a somewhat longer wing; spurs are not present, but represented by two hard knobs on each leg, and it may therefore not be fully adult. The ♀ agrees with Reichenow's description of a young ♀; but Davies assures me that it was fully adult, and we may therefore conclude that Reichenow was in error in ascribing this plumage to the young ♀ only. Very little appears to be known of this bird.

New Species and Subspecies.

Spinus symonsi, spec. nov.*

♂. The whole top of the head and nape olive-yellow, with dark brown streaks down the centre of each feather; a broad line above the lores extending backwards over the fore part of the eye citron-yellow, this colour becoming lost gradually posteriorly towards the nape; sides and back of the neck like the top of the head, but less distinctly streaked; on the lower hind neck this colour merges into that of the back and scapulars, which are "walnut-brown"; feathers of the rump like the back, but the lower ones tipped with yellowish; upper tail-coverts dark grey, with the margins lighter grey; greater, median and lesser wing-coverts brown, with broad yellowish margins; primaries and their coverts brown, the former for the basal two-thirds, and the latter for the whole extent, narrowly margined externally with very light grey; secondaries and their coverts brown, with broad, light grey margins to and around the tips; tail feathers dark brown above, narrowly margined with light grey, the outermost with a broad white mark, broadest at the tip, extending along the centre of the inner web for the terminal third, the last part for about 10 mm. being white right across the inner web; the next tail feather also with a white mark, which is shorter, however, and does not extend to the outer margin except at the tip; chin greyish with a tinge of yellow; centre of throat uniform citron yellow, merging on the sides into the colour of the neck and below much tinged with olive-greenish, but retaining a more or less well defined tract of yellow in the middle line of the breast to the abdomen, where the yellow merges into white; the sides of the breast and flanks tinged with olive-brown; under tail-coverts brown at the base but otherwise white; thighs light-grey to white; under surface of the wings lighter than above, with pale inner margins; under wing-coverts olive-yellow.

Type: ♂, Sangebetsu Valley, Basutoland, presented by R. E. Symons, Esq. Length of wing 76 mm., tail 57, tarsus 15, culmen 11.

♀. Differs from the ♂ in having no yellow in the plumage, this being displaced by white, the throat with short streaks on the centre of the feathers, and the underparts, except the abdomen and under tail-coverts, drab-grey. Measurements the same as those of the ♂.

The Transvaal Museum is indebted to Mr. Symons for a series consisting of three pairs of this bird and a clutch of its eggs. It appears from Mr. Symons' account to be quite common on the Drakensberg. There is also a juvenile specimen of this bird in the collection, taken by Lieut. C. G. Davies at Matatiele in February, 1912, which I was previously unable to identify in the absence of adults; this specimen has the characteristic markings on the tail feathers, and the general coloration of the adult ♀♀, but is more streaked above and below.

Mr. Symons writes as follows in regard to this bird:—"Mr. Barnes, who is assisting me here on the Giant's Castle Game Reserve, first called my attention to the above birds during the winter of 1914, when they

* First described in a separate slip: supplement to Vol. V, No. 3, issued January, 1916.

came down here in large numbers from the Drakensberg. On my last trip to Basutoland I succeeded in shooting the two birds which I sent you. Mr. Barnes, who returned here yesterday from patrolling the Drakensberg on the Basutoland side, brought back three clutches of the eggs of the Siskin, and also a fine clutch of the orange-breasted Rock Jumper, and made the following notes on the nests and eggs:—1st November, 1915: Found nest in a tuft of grass on the edge of a krantz, in shape like that of the Cape Canary (*Serinus canicollis*), built of grass and lined with horsehair; it contained three eggs, white or very pale blue, sparingly spotted with reddish-brown. 2nd November: Found nest with three fairly fresh eggs; the nest was built like the previous one, in the shelter of a tuft of grass; the eggs are also of the same colour. On the same date another nest was found containing one egg, which was added to by one on each of the following two days; they were like the others, but rather different in shape.”

Mr. Symons adds:—“These birds are nesting in great numbers on the Drakensberg just now, and it would be easy to get ten or twelve clutches of their eggs. They are found at altitudes between 8,000 and 10,000 ft.; they are wonderful songsters and may be heard from sunrise to sunset.” The clutch sent to the Transvaal Museum may be described as being of a very pale bluish-white colour, sparingly spotted and slightly streaked, mainly at the thicker end, with varying shades of brown and purplish slate, and measure respectively $17 \cdot 3 \times 13 \cdot 3$, $17 \cdot 1 \times 13 \cdot 5$, and $17 \cdot 8 \times 13 \cdot 5$ mm.

Mirafra africanoides harei, subsp. nov. -

Differs from *M. africanoides africanoides* in being altogether paler and the streaks above narrower and less conspicuous.

Type: ♂, T.M. No. B 7505, Windhuk, Damaraland, March, 1910, *ex* collection C. Wilde. “Iris hazel; total length 157 mm.” Length of wing 91, tail 65, tarsus 21·5, culmen 13·5 mm. Also a ♀ from same locality taken in July of the same year: “total length 148 mm.”; wing 86, tail 60, tarsus 21, culmen 13.

A series of skins from the Transvaal seems to show that these are typical of the species; but Shelley has assigned the type locality to Hopetown, south of the Orange River, and a pair of birds collected by Mr. H. L. Hare at Barkly West may therefore be nearer the typical colour; they are much more richly coloured than those from the Transvaal, and it was my original intention to describe them as another race, but I have decided to leave the matter in abeyance for the present. The Damaraland birds are very readily distinguishable from those from both the Transvaal and Barkly West.

Phyllastrephus terrestris rhodesiae, subsp. nov.

A pale form, much paler than *P. terrestris suahelicus* from the lower Zambesi.

Type: ♂, T.M. No. B 3515, Machile River, North-Western Rhodesia, 12th September, 1907, *ex* collection C. Wilde. “Iris light-brown, bill and feet grey; total length 220 mm.” Wing 90, tail 100, tarsus 22, culmen 24.

The Transvaal Museum Collection contains a series of skins from the type locality as well as from various localities in northern Bechuanaland. Four races of this species are represented in the collection, namely:—

| | |
|---|------------------------|
| <i>Phyllastrephus terrestris terrestris</i> , | Cape and Natal. |
| „ | „ <i>intermedius</i> , |
| „ | „ <i>suahelicus</i> , |
| „ | „ <i>rhodesiae</i> , |
| | Upper Zambesi. |

Andropadus importunus noomei, subsp. nov.

Differs from *A. importunus importunus* in having a distinct wash of yellow on the abdomen.

Type: ♂, T.M. No. B 7804, Haenertsburg, north-eastern Transvaal, 5th December, 1909, ex collection F. O. Noome. Wing 88 mm., tail 85, tarsus 24, culmen 16.

Also a series of skins from the same place and the neighbouring forests.

Two specimens of *Andropadus* from the neighbourhood of Delagoa Bay have the underparts yellow, more or less clouded with olive-green on the chest. Peters obtained the type of his *Andropadus oleaginus* at Delagoa Bay, and these two specimens would therefore appear to be topotypical. A single specimen from Zimbiti, Beira, is of an altogether brighter yellow and appears to be referable to *A. insularis*. The southern birds should therefore be recognized as *A. insularis oleaginus* Ptrs.

Parasitism amongst Finches.

(Read before the Transvaal Biological Society, 27th January, 1916.)

FROM time to time in the *Journal of the South African Ornithologists' Union* I have referred to the parasitic habits of the Pin-tailed Widow Bird (*Vidua serena*), and am positive from my numerous observations that this bird never builds its own nest, but deposits its eggs in the nest of some other bird, by whom they are incubated and the young birds reared. I have known it to leave its eggs in the nest of four species of Finches, these being the Common Waxbill (*Estrilda astrild*), Dufresne's Waxbill (*Coccygia dufresnei*), Ruddy Waxbill (*Lagonosticta rubricata*), and the Red-collared Widow Bird (*Coliuspasser ardens*), the first three of which are smaller and the last rather larger than the Pin-tailed Widow Bird. It frequently deposits more than one egg in a nest, and I have known the whole clutch to be replaced by those of the parasite. Unlike the Cuckoos and Honeyguides, this bird does not, when hatched, eject the young of the host, but instead, the parent parasite when depositing its eggs in a nest appears to destroy one of those of the host to make room for her own, and the young birds grow up together. There has been no direct corroborative evidence as to these observations; but various quite different types of nest have been ascribed to this bird, and we may safely assume that these nests were either wrongly identified, or that the young birds which were seen in them were parasitic on the owners of the nests. Mr. Frank Bolus also recorded an incident which he observed in the Cape District: a hen of the Pin-tailed Widow Bird was observed seated on the ground apparently in difficulties, and on his approaching it, it flew away

and left a white egg on the ground; the measurements given of this egg agree with those of the species taken from various birds' nests and now in the collection of the Transvaal Museum. Some importance may be attached to the last incident, since Cuckoos are known to lay their eggs on the ground and subsequently to carry them in their beaks to the nest in which they are to be deposited in the absence of the parents.

In a recent paper on "Egg-collecting in the Bushveld," in the *Journal of the South African Ornithologists' Union*, Vol. IX, p. 36, I mentioned some cases which seemed to indicate that Rendall's Seedeater (*Anomalospiza imberbis*) might also be parasitic. I have just obtained proof that my supposition was correct. On Sunday last (24th January, 1916), I searched for a nest of a pair of Black-chested Wren Warblers (*Prinia flavicans*), which had been observed for some days to be very busy carrying grubs and insects to a nest somewhere in my garden. The nest was discovered and to my delight was found to contain a young Rendall's Seedeater. During the day I showed the nest and bird to quite a number of friends and relations, but for fear of scaring the birds too much, we did not do more than peep carefully into it; the young bird filled the whole of the bottom of the woven nest, and this accounts for overlooking the presence of a young warbler as well, which must have been hidden under it, of which more anon. On the following morning a telegram was dispatched to my brother at Johannesburg, to come over as soon as possible with his apparatus to photograph the birds; this he was unable to do until late on Wednesday afternoon (26th), and to my dismay on Wednesday morning I discovered that the young had left the nest. I spent about an hour in trying to find them and was at last rewarded, after watching the movements of the old birds, by flushing first a young *Prinia*, which I guessed must have been hidden under the parasite, and I did not therefore follow it, and then, not a yard farther on, the young parasite. Both birds were then caught and put into an extemporized cage, and the old birds were soon seen to feed them. In the afternoon my brother arrived and the young birds were transferred to a canary cage, which was put close to a disguised tent in which my brother took up a post with the camera. The young Wren Warbler managed to wriggle through the bars of the cage and to fly away repeatedly at first, but was always caught and put back again, until at the last it was so blown by its exertions that it remained quietly on the bottom of the cage, as shown in the photographs; just after the last plate had been used, it hopped on to the perch alongside the parasite. The Seedeater proved to be more amenable to handling and soon settled on a perch where it could easily take food through the bars from its foster parents, and a number of fairly good photographs were taken; but light was rapidly failing and the last was taken just before sunset. Its demands for food were incessant when all was quiet after I had retired, and the foster parents fed it on an average of about once a minute. Next day was clear and scorchingly hot; but undismayed by the discomfort of having to sit in the sweltering heat of the tiny tent, my brother remained at his post nearly all the morning and secured an excellent set of photographs, on which he is to be congratulated. The Seedeater seemed to be so tame that we decided to take no more photographs of it in the cage,

but to put it outside on a stick. This had its disadvantages, as the foster parents continually led it away and we frequently had some difficulty in tracing it, as my brother was shut up inside the tent and I had to stand some way off so as not to scare the old birds; but we always succeeded in finding it by watching the movements of the foster parents or listening for its chirping. The young Wren Warbler was not so tame and as soon as we put it on a stick it would fly away and eventually we lost sight of it; even while this young bird was some distance from the tent, its parents seldom troubled to feed it, preferring to satisfy the incessant demands of their fosterling. After the second set of half-dozen plates had been used in photographing the parasite as it was being fed by the Wren Warblers, a photograph was taken of the nest, the bird being put into the nest but refusing to stay there and being then "snapped" as it was half-way out. In putting the bird into the nest, I found that there was still an addled egg of the Wren Warblers in it, which I had previously overlooked. An incident which occurred on Wednesday evening while my brother was fixing up the camera inside the tent is worth recording. The parent Wren Warblers were much concerned and fussed about amongst the weeds a few yards off, and while I was watching them I noticed a finch settle on a tree some thirty yards away, which looked like an adult Rendall's Seedeater, though I could not make sure on account of the failing light; while I was watching it and telling my brother that I thought one of the parents of the young Seedeater was watching us, the Wren Warblers also caught sight of it, and instantly flew at it with every evidence of rage, driving it away and following it for fully a hundred yards. This occurrence is not, as some might suppose, evidence that the parent was there to feed the young one, since it has been noted that Cuckoos and Honeyguides sometimes visit their offspring; but they appear to be prompted to do so more out of curiosity than an affection for, or intention of feeding, their young.

I may here mention that the adult Black-chested Wren Warblers are indistinguishable in colour, and young ones which I have seen in Pretoria have a very distinct band across the chest, even when the tail is as yet only half-grown, but the band is not as broad as that of the adults nor so clearly defined. I note this because some specimens we have from Damaraland, taken in October, appear to be quite adult and yet have only a row of contiguous spots across the chest.

My brother once expressed an opinion that *Quelea sanguinirostris lathamii* was also possibly parasitic; * and I may state that I was also of that opinion, though doubtful in the absence of definite proof. My reason for thinking so was that at Potchefstroom, where this bird was very common, a most assiduous search and inquiry failed to throw any light upon its breeding habits. Some time later, however, Mr. F. O. Noome informed me that he had seen thousands of old nests in the northern Transvaal, and there was a clutch of eggs in the Transvaal Museum Collection, presented by Mr. R. Duncan, which had been laid by the birds in captivity and indisputably belonged to this bird. In the *Union Agricultural Journal* for April, 1911, I was careful therefore to state that nothing definite was

* Cf. *Journ. S.A. Orn. Un.*, Vol. V, p. 23.

known of its breeding habits, but that it was supposed to be parasitic ; this called for an interesting private letter (which was published in a later number of the same journal) from a gentleman residing at Halesowen in the Cape Province, in which he stated that this bird had once visited that district in great numbers and nested in hundreds in a plantation ; this was in April, and after the birds had reared their young they disappeared and did not return.

In writing a paper on " Egg-collecting in the Bushveld " (*loc. cit.* p. 33), I mentioned the finding of a nest of *Ploceus auricapillus* (= *Hyphantornis tahatali* A. Sm.), which had been deserted and which contained three uniform greenish-blue eggs, which I thought might possibly be those of *Quelea*. About the time when this paper was being published, however, that is, in August, 1913, while on a hunting trip with Mr. F. O. Noome in the Matibi District of South-Eastern Rhodesia, we came across thousands of old nests that could hardly have been those of any species but the *Quelea*, which was frequently there to be seen in scores—or even in hundreds—of thousands in single flocks. These nests were placed in tall thorn trees scattered about amongst the mopani trees over an area covering many miles in circumference ; the trees were so well protected by tangled thorns, that the local Tschangaans had gone to the trouble in many cases of chopping down the trees in order to get the young birds. On inquiring from the natives as to the species which had built the nests and the season when they were to be found breeding, Noome's, and by this time my own, conclusion was confirmed, for they stated that the nests were built by the birds which were then to be found in huge flocks and that their breeding season was at the end of summer (about April) ; they also pointed to very distinct but disused tracks leading from tree to tree, which they said had been made by carnivorous animals, even lions, which were in the habit of patrolling the place when the birds were breeding, in order to pick up any young ones which might fall to the ground. The nests were rough, globular, woven structures with little, if any, lining. This repeated evidence of the real nesting habits of this bird leaves no doubt as to its not being normally a parasite, and the explanation of the birds not being found breeding at Potchefstroom seems to be that they repair to some wilder part of the country towards the end of the summer to breed. What species the eggs mentioned by my brother and me may be referred to, still puzzles me. Either the *Quelea* may at times depart from its usual custom and make use of the nest of some other bird, or the eggs may have been those of some other parasite—possibly *Anomalospiza imberbis*.

FOURTH SUPPLEMENTARY LIST OF MAMMALS IN THE COLLECTION OF THE TRANSVAAL MUSEUM.

By AUSTIN ROBERTS.

IN previous papers * I have given lists of specimens in the mammal collection of the Transvaal Museum, and I propose now to deal with those more recently acquired. Several gentlemen have kindly presented specimens, other specimens have been purchased, and the rest have been collected by members of the staff of the Museum from time to time. Amongst the donations may be mentioned two beautiful specimens of an apparently new *Malacothrix*, kindly presented by Harold A. Fry, Esq., and taken at Klipriviersoog, Krugersdorp District. Dr. P. G. de Villiers has also presented some good specimens of *Cynictis*, *Erinaceus*, and *Proteles*, collected at Hatfield, Pretoria suburbs. Mr. W. Powell has been employed in collecting specimens in the wilds of Rustenburg District, and has secured a number of specimens that are either new to science or new records showing greater extension in the distribution of certain species. Mr. Noome, of the staff, has secured good series of larger animals in Portuguese Gazaland. Mr. Van Dam, in addition to his good work in collecting lower vertebrates and *Arachnids*, has displayed a commendable zeal in securing small mammals, the most notable of his captures being specimens of *Helogale parvula* and a new *Georychus*, both from Leydsdorp in the Lydenburg District. Messrs. J. Breyer and A. A. Adendorff have also assisted in securing specimens from time to time. I have again to thank Mr. A. L. Hall for kindly taking me with him on two occasions during his geological survey of the region south of Barberton and on the western border of Swaziland, when good series of small mammals were secured.

So much material has been acquired that I have thought it advisable to review the known species of South African *Georychi*, and in doing so have had the assistance of the collections in the Albany and South African Museums, for which I have to thank the respective Directors, Messrs. J. Hewitt and Peringuey. The *Georychi* of the Cape Province prove, however, to be still too puzzling to satisfy me that there are not more species found there than has so far been admitted. The Director, Dr. Breyer, has therefore consented to allow me to proceed to the Cape Province to study these animals as soon as the climatic conditions are suitable, and I hope therefore at a later date to be able to report thereon. In the meantime I shall confine my attention to the description of some new species in the genus.

Papio porcarius (Bodd.).

1 ♂, Mooivlei, Rustenburg District (Powell).

In this specimen, as well as another ♀ from the same place, which had to be destroyed, the hands are black and the feet partly black.

* *Annals of the Transvaal Museum*, Vol. IV, pp. 65-109; Vol. IV, pp. 180-186; Vol. V, pp. 116-124.

Cercopithecus pygerythrus Cuv.

1 ♂, Fairfield, Rustenburg District (Powell).

Galago moholi (A. Smith).

1 ♂, ad., 2 ♂♂, juv., Rooikrans, Rustenburg District, (Powell).

2 ♂♂, ad., Fairfield, Rustenburg District (Powell).

Epomophorus wahlbergi Sund.

1 ♂, Steynsdorp, Carolina District (A. Roberts).

Rhinolophus hildebrandti Pts.

1 ♂, 1 ♀, Fairfield, Rustenburg District (Powell).

So far this species has not been recorded south of the Limpopo, and is one of several records showing the southerly extension of more tropical species to the Limpopo River basin. Powell found these specimens hanging to the inner branches of thick-foliaged trees.

Rhinolophus simulator K. And.

5 ♂♂, 5 ♀♀, Mooimeijesfontein, Rustenburg District (Powell).

10 in spirits, Mazambo, Lower Limpopo, Portuguese South-east Africa (Van Dam and Breyer).

Rhinolophus capensis Licht.

2 in spirits, Grahamstown (pres. Albany Museum).

Hipposideros caffer (Sund.).

1 ♀, Griffin Mine, Leydsdorp (Van Dam).

3 ♂♂, Mazambo, Lower Limpopo, Portuguese South-east Africa (Van Dam).

3 ♂♂, 5 ♀♀, Mooimeijesfontein, Rustenburg (Powell).

Nycteris capensis (A. Smith).

1 ♀, Pretoria (Powell).

7 ♂♂, 3 ♀♀, Rooikrans, Rustenburg (Powell).

1 Guja, Lower Limpopo, Portuguese South-east Africa (Van Dam).

Cloeotis percivali australis subsp. nov.

3 ♂♂, 5 ♀♀, Mooimeisjesfontein, Rustenburg (Powell).

This southern race differs from the typical one in being slightly larger, and in the lower anterior premolar not reaching to half the height of the posterior premolar. The following are maximum and minimum measurements taken from the series as compared with the typical race:—

| | <i>C. p. australis.</i> | <i>C. p. percivali.*</i> |
|----------------------------------|-------------------------|--------------------------|
| Head and body..... | 41-33 | 35 |
| Tail..... | 31-22 | 28 |
| Ear..... | 9-8 | 8 |
| Skull— | | |
| Extreme length..... | 13·6-13·2 | 13 |
| Greatest width..... | 7·6-7·2 | 7 |
| Mastoid width..... | 7·6-6·8 | 6·5 |
| Dental series..... | 4·3-4·1 | 3·8 |
| Forearm..... | 35-33 | 31 |
| Third finger, metacarpus..... | 29-27 | 26 |
| Third finger, first phalanx..... | 11·8-10·6 | 10·5 |

* Cf. *Ann. and Mag. Nat. Hist.* (7), Vol. VIII (1901), p. 28.

Colour.—Face “warm buff,” browner towards and round the lips; top of head and back buffish-brown, lighter on the posterior margin of the wings; under surface varying from light buff to golden orange, the base of the fur darker, in proportion to the colour of the tips.

Type.—T.M. No. M 1670, ♀.

Metatypes.—T.M. Nos. M 1669, 1671–1676.

Vespertilio capensis (A. Smith).

1 ♂, in spirits, Pretoria (Van Dam).

Scotophilus nigrita dingani (A. Smith).

1 ♂, Griffin Mine, Leydsdorp (Van Dam).

Scotophilus nigrita herero Thos.

2 ♂♂, Pretoria (pres. native messenger “Frans”).

Nyctinomus limbatus Ptrs.

1 ♂, locality ? (pres. Sr. A. Moreira).

Nasilio brachyrhyncha (A. Smith).

1 ♀, Rosslyn, Pretoria (A. Roberts).

1 ♂, Mazambo, Lower Limpopo (Van Dam).

1 ♀, Mooimeisjesfontein, Rustenburg (Powell).

2 ♀♀, Rooikrans, Rustenburg (Powell).

Elephantulus rupestris jamesoni Chubb.

1 ♂, Rosslyn, Pretoria (Van Dam).

Crocidura flavescens (I. Geoffr.).

1 ♂, Arnheburg, Carolina District (A. Roberts).

Crocidura silacea Thos.

1 ♂, Roodeplaat, Pretoria (A. Roberts).

1 ♂, Magaliesberg, Pretoria (A. Roberts).

1, Fountains, Pretoria (C. Gaze).

Crocidura martensi Dobs.

2 ♂♂, Hectorspruit (Streeter).

(?) 1, Doornhoek, Carolina District (A. Roberts).

Amblysomus hottentottus longiceps Broom.

2 ♀♀, Carolina (A. R.).

Erinaceus frontalis A. Smith.

1 ♀, Jakalsspruit, Rustenburg (Powell).

1 ♂, Hatfield, Pretoria suburbs (pres. Dr. P. G. de Villiers).

Mellivora ratel (Sparrm.).

1 ♂, 1 ♀, Rooikrans and Kwaggavlakte, Rustenburg (Powell).

Ictonyx capensis limpopoensis subsp. nov.

1 ♂, Mooivlei, Rustenburg (Powell).

This single specimen of *Ictonyx* is so unlike the common species found distributed over the colder parts of South Africa, that I have no hesitation

in regarding it as distinct. It agrees best with *I. capensis shooe* Thomas, as it has the stripes on the back clearly defined and not softened by an admixture of white hairs amongst the black, and very little white on the tail by comparison with *I. capensis capensis*; but it differs from the north-east African race in having a smaller frontal spot, almost circular in shape; in size it does not differ from specimens from Grahamstown. The skull differs from the Cape form in having larger bullae, with the gap between them deep and trenchlike. The hair is long and coarse, with little of the soft underfur so conspicuous in specimens of the typical race, this being most likely due to the nature of the climatic conditions of its habitat. The tail is mainly black, only the distal fourth and short lateral extensions of the dorsal stripes being white externally; the base of the hair is white, but hardly shows except at the distal portion, where there is a broad black band on the middle of each hair which lessens the white effect.

Type.—T.M. No. M 1877, very old ♂, Mooivlei, Rustenburg District. "Head and body 343 mm.; tail 261; hind foot 63; ear 29." Skull: extreme length 70 mm.; basilar length 60; zygomatic width 45; mastoid width 36; width of brain case 29.6; antorbital constriction 18; post-orbital constriction 14.5; palate length 29.8; greatest diameter of P⁴, 8.5; external length of P⁴, 7.2; greatest diameter of M¹, 7.2; depth of bullae 6.

Canis mesomelas Schreb.

3 ♂♂, Kwaggavlake, Rustenburg (Powell).

Proteles cristatus (Sparrm.).

1 ♂, Hatfield, Pretoria (pres. Dr. P. G. de Villiers).

Genetta rubiginosa Puch.

2 ♂♂, 2 ♀♀, Rooikrans, Rustenburg (Powell).

Genetta ludia Thos. and Schw.

1 ♀, Rooikrans, Rustenburg (Powell).

3 ♂♂, 3 ♀♀, Mooivlei, Rustenburg (Powell).

Mungos cauxi (A. Smith).

1 ♀, Doornhoek, Carolina District (A. Roberts).

2 ♂♂, ad., 1 ♂, juv., Fairfield, Rustenburg (Powell).

1 ♀, Rooikrans, Rustenburg (Powell).

1 ♂, 2 ♀♀, Mooivlei, Rustenburg (Powell).

Mungos grandis Thos.

1 ♂, ad., Arnhemburg, Carolina District (A. Roberts).

1 ♂, juv., Hectorspruit (Streeter).

Helogale parvula (Sund.).

2 ♀♀, ad., 1 ♂, juv., Griffin Mine, Leydsdorp (Van Dam).

This record is probably the most northerly of the species, and establishes the claim of *H. brunnula* to specific rank, since their ranges cross.

Helogale brunnula Thos. and Schw.

- 1 ♂, Hectorspruit (Streeter).
 1 ♂, 1 ♀, Rooikrans, Rustenburg (Powell).
 1 ♂, 2 ♀♀, Hempton, Rustenburg (Powell).

Cynictis penicillata (G. Cuv.).

- 1 ♂, Lake Chrissie, Carolina District (A. Roberts).
 1 ♂, 1 ♀, Hatfield, Pretoria (pres. Dr. P. G. de Villiers).
 1 ♂, 1 ♀, Wilgekuil, Rustenburg (Powell).

While differences in general are noticeable amongst the specimens in the collection, the series is still not large enough for me to separate them into the subspecies so far described; the amount of tawny-reddish on the lower back seems to vary in individuals obtained in the same localities.

Crossarchus fasciatus canescens Thos. and Wr.

- 1 ♂, 1 ♀, Fairfield, Rustenburg (Powell).
 4 ♂♂, 2 ♀♀, Mooivlei, Rustenburg (Powell).

While the general characters of *C. f. fasciatus* and *C. f. canescens* appear to be the same, the greatest difference between them being the shade of coloration, I think that they should be regarded as distinct species. A skin without a skull from north-western Rhodesia in the Transvaal Museum Collection is apparently also referable to this race, although it is much paler.

Felis serval capensis Gmel.

- 1 juv., Knysna (J. H. Rex).
 1 ♂, Fairfield, Rustenburg (Powell).

Felis ocreata caffra Desm.

- 1 ♂, Arnhemburg, Carolina District (A. R.).
 1 ♂, 1 ♀, juv., Jakalspruit, Rustenburg (Powell).
 4 ♂♂, Fairfield, Rustenburg (Powell).
 1 ♀, Vliegenpoort, Rustenburg (Powell).

Paraxerus cepapi (A. Smith).

- 3 ♂♂, 3 ♀♀, Rooikrans, Rustenburg (Powell).

Graphiurus eastwoodae mihi.

- 1 ♂, Steynsdorp, Carolina District (A. R.).
 1 ♂ (no skull), Wonderboom, Pretoria (A. Adendorff).

Both these specimens were trapped in caves.

Graphiurus pretoriae mihi.

- 1 ♂, ad., 1 ♂, 1 ♀, juv., Rooikrans, Rustenburg (Powell).
 1 ♀, Koperfontein, Rustenburg (Powell).

Graphiurus spec. ?

- 1 ♂, 1 ♀, Guja, Lower Limpopo, Portuguese South-east Africa (J. Breyer and Van Dam).

These two specimens represent a small species I have not been able to place. They were found together in the hollow of a dead tree that was felled for firewood.

Tatera brantsi (A. Smith).

- 1 ♀, Vijgeboomspoot, Waterberg (Van Dam).

Tatera draco Wr.

- 2 ♂♂, Vlakfontein (6000 feet), Carolina District (A. R.).
3 ♂♂, 2 ♀♀, Arnhemburg (4000 feet), Carolina District (A. R.).

Tatera lobengulae mashonae Wr.

- 5 ♂♂, 2 ♀♀, 1 ♂, juv., Hectorspruit (Streeter).

Tatera miliaria salsa Wr.

- 1 ♂, Manango, Lower Limpopo, Portuguese South-east Africa (Van Dam).
1 ♂, Buffelsdraai, Rustenburg (Powell).
1 ♂, ad., 1 ♂, 1 ♀, juv., Rooikrans, Rustenburg (Powell).
1 ♀, ad., Rondekoolbult, Rustenburg (Powell).
1 ♂, Mooivlei, Rustenburg (Powell).
1 ♂, Jakalsspruit, Rustenburg (Powell).

Tatera panja Wr.

- 1 ♂, Rooikrans, Rustenburg (Powell).
1 ♂, Jakalsspruit, Rustenburg (Powell).
1 ♀, Kwaggavlake, Rustenburg (Powell).
1 ♀, Wilgekuil, Rustenburg (Powell).

Otomys irroratus Brants.

- 2 Pretoria (Adendorff).
1 ♂, juv., Hectorspruit (Streeter).
1 ♂, 1 ♀, Arnhemburg, Carolina (A. R.).
1 ♀, Fairfield, Rustenburg (Powell).
1 ♂, 1 ♀, Wilgekuil, Rustenburg (Powell).

Dendromus pumilio Wagner ?

- 1 ♀, in spirits, Irene (A. R.).

Dendromus jameson Wr.

- 2 ♂♂, juv., Hectorspruit (Streeter).

Steatomys pratensis Ptrs.

- 1 ♂, Doornhoek, Carolina (A. R.).
4 ♂♂, 1 ♀, juv., Hectorspruit (Streeter).

Malacothrix typicus Fryi subsp. nov.

- 1 ♀, ad., 1 ♂, juv., Klipriviersoog, Krugersdorp District (pres. Harold A. Fry, Esq.).

This is the most northerly record of the species, and, as might be expected, the specimens are not like typical ones from the Cape Province. In general coloration these specimens are paler (pale-buffish), with a fair sprinkling of black or brown hairs over the dorsal surface and sides, more condensed over the shoulders and forming very distinct dark patches on the crown and side of the lower back and a stripe between the latter. Ears coloured as in the typical race. Fore and hind feet white, the lower external part of the latter blackish. Under parts white, with greyish

fulvous patches across the sides of the upper chest. The skull in essential characters does not differ from that of the typical race, but is larger. "Head and body 89 mm.; tail 32; ear 19." Skull: greatest length 27·5; basilar length 21·5; zygomatic width 15·5; interorbital constriction 3; molar series 3·9; diastema 6·8; length of palatal foramen 5·9; greatest diameter of bullae 5·1; width of brain case 13·2.

The juvenile specimen is much smaller and slightly greyer; but has the dark patches quite as clearly defined. The dark patches and dorsal stripes show up remarkably against the pale ground colour, and Mr. Fry is to be congratulated upon the excellent preservation of these characters when making up the specimens.

I am indebted to Dr. Peringuey, Director of the South African Museum, for the loan of specimens for comparison.

Epimys * *rattus alexandrinus*.

2 ♂♂, Sunnyside, Pretoria (pres. C. H. Barrett, Esq.).

1 ♂, Zoological Gardens, Pretoria (Adendorff).

Specimens from the upper parts of the city of Pretoria usually have the under parts white, the hairs white to the base; they usually frequent hedges of fruit trees, such as quinces and figs, but often find their way into the houses. On the other hand, the majority of specimens from the busier parts of the city, which are trapped in storehouses and large buildings where they seem to have taken up a permanent abode, have the under parts only a little paler than the upper. This seems to coincide with De Winton's observations in regard to *E. r. tectorum* and *E. r. alexandrinus* in Egypt, except that our specimens are of about the same size in both forms. Specimens from the busier parts of the city are also frequently entirely blackish, and it is to be noted that variations between the light and dark coloured forms are rare.

Epimys (Aethomys) chrysophilus tzaneenensis (Jameson).

3 ♀♀, ad., 1 juv., Malelane, Barberton District (A. R.).

1 ♂, ad., 1 ♂, juv., Doornhoek, Carolina District (A. R.).

2 ♂♂, 2 ♀♀, Arnheemburg, Carolina District (A. R.).

1 ♂, Mazambo, Portuguese South-east Africa (Van Dam).

2 ♂♂, Komatipoort (Van Dam).

Epimys (Aethomys) chrysophilus pretoriae mihi.

1 ♂, 1 ♀, Hectorspruit (Streeter).

1 ♂, 1 ♀, Roodeplaat, Pretoria (A. R.).

3 ♂♂, Buffelsdraai, Pretoria District (Powell).

1 ♀, Koperfontein, Rustenburg District (Powell).

1 ♀, Wilgekuil, Rustenburg District (Powell).

1 ♀, Kwaggavlake, Rustenburg District (Powell).

In none of these specimens does the length of the tail exceed 160 mm., although some of them are very old.

Epimys (Aethomys) namaquensis monticularis (Jameson).

1 ♂, Malelane (A. R.).

4 ♂♂, 1 ♀, ad., 1 ♂, juv., Roodeplaat, Pretoria (A. R.).

* In former lists placed under *Mus*.

- 1 ♂, Rooikrans, Rustenburg District (Powell).
 2 ♂♂, 1 ♀, Mooimeisjesfontein, Rustenburg District (Powell).
 1 ♀, Springbokkopjes, Rustenburg District (Powell).

Epimys (Mastomys) coucha (A. Smith).

- 1 ♀, Koperfontein, Rustenburg (Powell).

The mammae are apparently twenty in number. I can find no difference between this specimen and three males sent for identification from Albany District, Cape Province, except such as may be accounted for by the sex.

Epimys (Mastomys) limpopoensis (mihi).

- 2 ♂♂, Arnhemburg, Carolina District (A. R.).
 ? 2 ♂♂, 1 ♀, Arnhemburg, Carolina District (A. R.).
 ? 4 ♂♂, 2 ♀♀, Doornhoek, Carolina District (A. R.).

The first two specimens are coloured exactly like the type, but are larger; they are almost exactly the same size, though caught at different parts of the farm; the other three specimens from Arnhemburg are darker coloured, and were trapped in a vegetable garden some distance from the homestead; only one is adult and is of about the same size as the two pale coloured specimens. Of the Doornhoek specimens, which were trapped on the banks of the Komati River, all are dark coloured; but only the two ♀♀ are adult; one of these has twenty mammae and is small as compared with the other, which has only eighteen mammae. All these specimens have the tail longer than the head and body, and were caught away from human habitations.

Epimys (Mastomys) natalensis (A. Smith).

- 2 ♂♂, Arnhemburg, Carolina District (A. R.).

These two specimens were trapped in the house, and are exactly the same size, with the tail equal to the head and body in length, that is, about 110 mm., whereas in the other species caught in the wilds on the same farm, in which the length of the head and body is the same (112 mm.), the tail is about 8 per cent. longer (120 mm.).

Epimys (Mastomys) spp. ?

- 2 ♀♀, Malelane (A. R.). Mammae 20.
 1 ♂, 1 ♀, Komatipoort (Van Dam). Mammae 20.
 1 ♂, 1 ♀, Roodeplaat, Pretoria (A. R.). Mammae 16.

Epimys (Aethomys) moggi moggi (mihi).

- 2 ♂♂, 6 ♀♀, ad., 2 ♂♂, 1 ♀, juv., Roodeplaat, Pretoria (A. R.).
 1 ♂, Jakalspruit, Rustenburg (Powell).
 1 ♀, Rooikrans, Rustenburg (Powell).
 1 ♂, Wilgekuil, Rustenburg (Powell).
 2 ♂♂, 1 ♀, Fairfield, Rustenburg (Powell).

*Mus * bella marica* (Thos.).

- 1 ♂, Hectorspruit (Streeter).

* In former lists placed under *Leggada*.

Mus deserti (Thos.).

- 1 ♀, Mayville, Pretoria (pres. C. C. Barrett, Esq.).
 1 ♂, 1 ♀, Mooimeisjesfontein, Rustenburg (Powell).
 1 ♀, Buffelsdraai, Pretoria District (Powell).

Mus minutoides umbrata Thos.

- 1 ♀, Lake Chrissie (A. R.).

Saccostomus campestris Ptrs.

- 1 ♀, Rooikrans, Rustenburg (Powell).
 1 ♀, Springbokkopjes, Rustenburg (Powell).

Saccostomus streeteri mihi.

- 4 ♂♂, 3 ♀♀, Hectorspruit (Streeter).

Dasymys incomptus Sund.

- 2 ♂♂, Arnhemburg, Carolina District (A. R.).

Arvicanthis dorsalis (A. Smith).

- 1 ♂, Rooikrans, Rustenburg (Powell).
 1 ♂, Jakalspruit, Rustenburg (Powell).

Arvicanthis dorsalis calidior Thos. and Wr.

- 1 ♀, ad., 2 juv., Hectorspruit (Streeter).

The acquisition of more material from the "bushveld" region of Pretoria and Rustenburg Districts enables me to separate the races of the species, and I find that the specimens from Hectorspruit and Tzaneen should be referred on size to *A. d. calidior*, and those from Boror to *A. d. rosalia* Thos. The long series of skins from Tzaneen shows a certain amount of individual variation in colouration, as also do the fewer specimens from Hectorspruit; but, on the whole, they are darker and more ferruginous on the hind quarters and root of the tail than those from Pretoria and Rustenburg. Sir Andrew Smith stated that he found this species "only sparingly within the limits of the colony, but abundantly beyond the northern frontier to the north of the Great Orange River." We may, therefore, assume that his type was collected somewhere in the western Transvaal and that the three specimens in the Transvaal Museum are more or less topo-typical. The following measurements may therefore be of assistance in the identification of the South African races:—

| | Head and Body. | Tail. | Hind foot. | Ear. |
|---------------------------------------|----------------|-------------|------------|------|
| <i>A. Smith's</i> $\frac{a}{c}$ | (4" =) 101 | (4" 6") 113 | (1") 25 | — |
| Zoutpan, old ♂..... | 101 | — | 25 | 15 |
| Jakalspruit, old ♂..... | 106 | 122 | 27 | 16 |
| <hr/> | | | | |
| Hectorspruit, old ♀..... | 125 | 140 | 26 | 15 |
| Tzaneen, old ♂..... | 133 | 139 | 27 | 16 |
| Type: <i>A. d. calidior</i> ♂..... | 135 | 146 | 27 | 17 |
| <hr/> | | | | |
| Boror, old ♂..... | 115 | 116 | 26 | 16 |
| <hr/> | | | | |

Arvicanthis pumilio dilectus Wr.

1 ♂, Arnhemburg, Carolina District (A. R.).

Pedetes caffer sabinae Wr.

1 ♂, 2 ♀♀, Rooikrans, Rustenburg (Powell).

Georychus natalensis mihi.

7 ♂♂, Forbes Reef, Swaziland (A. R.).

2 ♀♀, Vlakfontein, Carolina (A. R.).

Georychus komatiensis spec. nov.

3 ♂♂, 6 ♀♀, Arnhemburg, Carolina (A. R.).

1 ♂, 1 ♀, ad., 4 juv., Steynsdorp, Carolina (A. R.).

A species allied to *G. natalensis*, having the same general characters, but much smaller in size; the mammae are two pairs pectoral, none inguinal. A specimen previously recorded from the same district as *G. jamesoni* (cf. *Annals of the Transvaal Museum*, Vol. V, p. 122), belongs to this species. The type is an adult ♀ from Arnhemburg, measuring as follows:—"Head and body 125 mm.; tail 20; hind foot (s.u.) 21." Skull: greatest length, from the tips of the incisors to the back of the occipital condyles, 35·3; from the tip of the exposed portion of the premaxilla to the condyles, 32·3; and from the tip of the nasals to the condyles, 31·4; basilar length 27·5; zygomatic width 23·2; width of brain case 14·2; mastoid width 17; interorbital constriction 7·2; width of premaxilla at base 5; molar series 5·5; diastema 10·5; length of bullae 9; nasals 12·3 × 3·1.

Georychus rufulus spec. nov.

The species referred to under No. 207 in my first list is apparently not referable to any of the southern Cape Provinces species, and therefore requires a name. It is characterized by having two pairs of pectoral mammae, a sandy-buffish coloration (nearest to "pinkish cinnamon" in Ridgway's *Nomenclature of Colors*, 1912), and its small size; measurements will be found in the *Annals of the Transvaal Museum*, Vol. IV, p. 99. The type is an adult ♀, collected by Jameson at Tzaneen. The following specimens recently acquired appear to be referable to this species:—

7 ♂♂, 1 ♀, Hectorspruit (Streeter).

3 ♂♂, 1 ♀, Mooivlei, Rustenburg (Powell).

Georychus stellatus spec. nov.

1 ♂, Komatipoort (G. van Dam).

This species is even more brightly coloured than *G. rufulus* and has a conspicuous white mark on the forehead. Its skull may be readily distinguished by the narrowness of the interorbital constriction, a character which is usually very constant in all species of *Georychus*. It was unfortunately not measured properly, the length being given as 158 mm., probably including the tail, and the hind foot as 23·5, which may be correct. The skull, which indicates that the animal was a very old one, measures: greatest length to tip of incisors 37·6; to the tip of the exposed

portion of the premaxilla 34·7; and to the tip of the nasals 33·2; basilar length 29·5; zygomatic width 25·5; width of brain case 14·7; mastoid width 18·7; interorbital constriction 6·4; width of premaxilla at base 6·7; width of incisors at base 4·6; molar series 5·5; diastema 11·2; length of bullae 9·7; nasals 11·3 × 3·8.

A specimen trapped at Arnheemburg may be referable to this species. It was found amongst shaly rocks and pebbles amongst the hills, and although a dozen traps were set at the same place for a week and constantly attended to this was the only specimen secured. The burrows were very small and so close to the surface that they could be broken open quite easily with the hand, but wound about under rocks in places so that it was almost impossible to follow them for any great distance. This specimen is immature and is consequently much smaller than the type, but the interorbital constriction is the same, 6·4 mm. Similar burrows were observed at Worcester Mine in 1914, but there also they were equally difficult to capture and I had failed to secure specimens.

Georychus vandami spec. nov.

6 skins with skulls, 1 without, Griffin Mine, Leydsdorp (G. van Dam and J. Breyer).

This species is grey, paler than any other South African species with which I am acquainted, and has the nasals somewhat widened at the tip. The alisphenoid canal has the posterior opening quite exposed in all the specimens, a character also found in Knysna specimens, and markedly different in this respect from *G. natalensis* and *G. aberrans*, in which the posterior opening is hidden; this character is variable in some other species, however, and cannot therefore be relied upon. The type, an old ♂, measures: "Head and body 133 mm.; tail 17; hind foot 23." Skull: greatest length to the tip of the incisors 37·5; to the tip of the exposed part of the premaxilla 33·5; and to the tip of the nasals 32·2; basilar length 28; zygomatic width 23·7; width of the brain case 15·1; mastoid width 18·5; interorbital constriction 6·9; width at the base of the premaxilla 6·2; width at the base of the incisors 4·3; molar series 5·6; diastema 10; length of bullae 10; nasals 11·8 × 3·5.

Specimens from the banks of the Limpopo and Stimela, south-eastern Rhodesia, recorded in the *Annals of the Transvaal Museum*, Vol. IV, p. 183, are referable to this species.

Georychus anomalus mihi.

1 ♂, 1 ♀, ad., 1 ♂, juv., Skinners Court, Pretoria (A. R.).

Georychus jamesoni mihi.

4 ♀♀, Van Dyk Mine, Boksburg (J. Breyer).

Georychus jorisseni Jameson.

1 ♂, 1 ♀, Fairfield, Rustenburg (Powell).

Powell confirms my observation in regard to the partiality of this species for a small aloe that occurs commonly in the bushveld.

Georychus caecutiens Wag.

5 ♂♂, 1 ♀, Wilgekuil, Pretoria District (Powell).

4 ♂♂, Rooikrans, Rustenburg District (Powell).

These specimens are similar to *Georychus* specimens from Knysna (? *caecutiens*), in the shape of the nasals, colour, and the presence of an inguinal pair of mammae. I may here state that three specimens in the South African Museum, Capetown, kindly lent me for comparison by Dr. Peringuey, from the Paarl District, differ from Knysna specimens in having the nasals shaped as in *G. natalensis* and in having a yellower coloration, matching that of *G. rufulus*; the mammae are six in number, two pairs pectoral and one pair inguinal. *G. natalensis*, *komatiensis*, *jamesoni*, *rufulus*, *arenarius*, and *jorisseni* all have two pectoral pairs of mammae, but none inguinal. The occurrence of a species with an inguinal pair of mammae so far north is therefore of considerable importance. *Bathyergus suillus*, *B. janetta*, and *Georychus capensis canescens* all have the same formula as in *G. hottentottus*; but typical specimens of *G. capensis* from the neighbourhood of Capetown have an extra pair of inguinal mammae, or four pairs in all. *G. anomalus* has three pectoral pairs, but no inguinal mammae. When these facts are taken in conjunction with some small differences in the skulls and coloration, some surprising results are obtained, for it becomes apparent that there is a certain amount of homoplasy in their evolution, and we may look for the occurrence of more than one species in many places. Powell has collected three species in the "bushveld" region in the neighbourhood of the Crocodile River, namely, this Knysna species in marshy flats, *G. rufulus* on the drier ridges, and *G. jorisseni* where a certain aloe grows in abundance; and the difference between these species in cranial and colour characters is not very striking.

Georychus vryburgensis spec. nov.

In the Albany Museum there are a number of specimens of a large grey-brown species collected at Vryburg, which appear to represent a new form, for permission to describe which I am indebted to Mr. J. Hewitt. While it is unfortunate that none of the skins with complete skulls are adult, even the youngest specimens show the same characters as a very old one with only a part of the skull. The most striking character is the thickening of the arch above the antorbital foramen, otherwise the cranial characters are those of *G. anomalus* enlarged. The largest specimen, apparently a very old ♂, with only the anterior part of the skull preserved, measures: "head and body 235 mm.; tail 17; hind foot 24"; width of the incisors at the base 6.3; width at the base of the premaxilla 9.2; molar series 6.8; diastema 15; nasals 17.3 × 4.3. The type, a young adult ♀, measures: "head and body 155; tail 15; hind foot 25"; greatest length of skull to the exposed tip of the premaxilla 38.8; to the tip of the nasals 35; basilar length 32; zygomatic width 28.2; width of brain case 15.8; mastoid width 19; interorbital constriction 7.8; width of premaxilla at base 7.6; width of incisors at base 4.9; molar series 7.1; diastema 13.2; length of bullae, diagonally, 11; nasals 14.8 × 4.1.

Georychus spec. ?

When travelling down from the top of the watershed at Oshoek on the Swaziland border, my dog captured a small naked *Georychus*, which is of some interest, if not a pathological freak. I thought before skinning it that it might possibly be a form of *Heterocephalus*, and was therefore not surprised to find on examining the skull that it had only three teeth; the teeth are apparently young, however, and though fully developed it is quite possible that the fourth tooth would have developed later. The tail and general appearance is that of an ordinary small-sized *Georychus*. The bristles of the face, feet, and tail are all that there is of hair. The skull when compared with that of a young *Georychus* with three molars, captured at Steynsdorp in the valley below, nearly 2000 feet lower than the place where the naked specimen was captured, seems to show that the Oshoek specimen is older, judging by its angularity, though smaller. This specimen may therefore prove to belong to a different species; but as the loss of hair may have been due to some pathological cause, and at the same time the growth of the animal may have been retarded, it would be unwise to describe it as a species until more specimens are forthcoming. We are still largely ignorant of the existence of many species in South Africa, and still more ignorant of their habits and distribution, owing to their fossorial habits; but we are hardly likely to find a naked species occurring in a cold, moist locality, such as that of Oshoek, where this species was obtained, for there can hardly be any doubt that the specific loss of hair is due to peculiarly dry conditions of habitat.

Lepus zuluensis Thos. and Schw.

- 1 ♂, Steynsdorp, Carolina (A. R.).
 1 ♂, juv., Arnheemburg, Carolina (A. R.).
 1 ♂, juv., Rooideplaas, Pretoria (A. R.).
 3 ♂♂, 1 ♀, Rooikrans, Rustenburg (Powell).
 1 ♀, Wilgekuil, Rustenburg (Powell).
 1 ♀, Vliegenpoort, Rustenburg (Powell).

Pronolagus randensis Jameson.

- 2 ♀♀, 1 ♂, Rooikrans, Rustenburg (Powell).

Hystrix africae-australis Ptrs.

- 1 ♀, juv., Rooikrans, Rustenburg (Powell).

Procavia capensis Pall.

- 4 ♀♀, Rooikrans, Rustenburg (Powell).
 1 ♂, 1 ♀, 3 juv., Koperfontein, Rustenburg (Powell).
 1 ♂, juv., Vliegenpoort, Rustenburg (Powell).

The Vliegenpoort specimen is of a reddish colour over the greater part of the body, apparently due to staining from the rocks of its habitat during the rainy season. Powell states that all the members of the colony were similarly coloured.

Phacochoerus aethiopicus Linn.

- 1 ♀, Kwaggavlake, Rustenburg (Powell).

Cephalophus grimmi Linn.

1 ♂, 1 ♀, Fairfield, Rustenburg (Powell).

Oreotragus oreotragus transvaalensis subsp. nov.

1 ♂, 3 ♀♀, Rooikrans, Rustenburg (Powell).

1 ♂, Arnhemburg, Carolina (A. R.).

Transvaal specimens of the Klipspringer prove to be different from the typical one, in having a very distinct dark-brown or black mark above the hoofs and the under parts of the body white in strong contrast to the upper parts. They differ from the Nyasaland race in having the top of the head of the same colour as the back. The type is from Rustenburg District, one of the ♀♀ mentioned above: "head and body 800 mm.; tail 75; hind foot (s.u.) 185; ear 81." Skull: length from tip of premaxilla to back of parietal 142 mm.; from nasals 127; basilar length 122; greatest width at orbits 80.5; at zygomatic arch 77; interorbital constriction; postorbital constriction 53.2; width of brain case 54.2; width of maxilla above, at nasals, 23.8; length of molar series 51.5; length from tip of premaxilla to nearest premolar 30; median width of palate 26.5; greatest diameter of bullae 18.5; nasals 40 × 19.5; length of mandible, basally, 113; height, posteriorly, 58.

Skulls vary considerably in size, very old specimens being very much larger. The measurements recorded above are of about the average size of adults.

Rhaphiceros campestris subsp. ?

1 ♂, Arnhemburg, Carolina (A. R.).

2 ♂♂, Fairfield, Rustenburg (Powell).

I am unable to refer these specimens to any of the described races of Steenbuck, and hope at a future date to offer some remarks upon them; at present some of the specimens, from various places not yet recorded, are still dry, folded skins, and cannot therefore be properly examined.

Rhaphiceros sharpei colonicus Thos. and Schw.

1 ♀, Hempton, Rustenburg (Powell).

This is the first record of this race so far west; it appears to be rare; only one other specimen was seen by Powell and was subsequently found to have been killed, apparently by a leopard. The Steenbuck found side by side with this species does not appear to be referable to *R. campestris capricornis*, which is curious, as one would naturally expect the range of the races of the two species found at Klein Letaba to be coextensive. The Letaba race of the Steenbuck may, however, be found there, but as rarely as the Letaba Grysbeck, and may therefore have been overlooked.

Madoqua damarensis Trim.

1 ♂, part of flat skin and skull, Damaraland (pres. Capt. L. C. Thompson, S.A.M.C.).

The following specimens have been more recently added to the collection :—

Elephantulus rupestris mapogonensis subsp. nov.

Apparently most closely allied to *E. rupestris myurus* Thos. and Schw., with which it agrees in colour and general characters ; but smaller in size. "Head and body 111 mm. ; tail 131 ; hind foot 32 ; ear 22." Length of upper tooth row 18·7 ; breadth across M¹ 11·8 ; nasals 14·5.

Type : adult ♀, Ngelelle River, Zoutpansberg, ex G. van Dam, 3rd July, 1916.

The skull is broken, but the forepart and mandible are intact so that the dentition is complete. I¹ is large, twice the height of I² ; I³ is long with a conspicuous posterior ledge ; C long but flattened, with a posterior sloping ledge ; P¹ about as long as C, but with a posterior cusp rather lower than the anterior ; P² has an inner cusp situated in the middle. I¹ and I² are close together, but not touching ; I³ is separated by a diastema equal to the length of I² ; C separated from I³ by a diastema equal to the length of I³ ; a narrow gap separates P¹ and P² and a wider one between P² and P³. In the lower jaw a divergence from the typical race is to be observed : I₃ and I₂ are separated, but the C abuts on I₃ ; P₁ is isolated by gaps on each side. Posterior palatal foramina elongated oval, terminating anteriorly opposite middle of C and posteriorly opposite cusp of P².

Elephantulus intufi (A. Smith).

A ♂ specimen was secured by Van Dam not far from a place where he secured the above-mentioned new race of the Rock Shrew. As it is a rare animal, the following observations on its skull may serve a useful purpose, although it is not quite topotypical. Anterior palatal foramina extending farther forward in front than in *E. rupestris mapogonensis*, beyond the canine as in *Nasilio*, and posteriorly terminating at a point opposite the front margin of the anterior inner cusp of P². The posterior palatal slits are narrower than in *E. r. mapogonensis*. I¹ comparatively small, not much higher than I². I³ not so long, and with hardly a trace of a posterior ledge and no bigger than I², projecting slightly backwards. P² very broad, with *two* inner cusps. I¹ I² almost touching ; I³ quite isolated, the diastema in front almost equal to its length and behind greater. P¹ separated from P² by a gap equal to half the length of P¹. In the lower jaw the teeth are all contiguous. "Head and body 111 ; tail 119 ; hind foot 32 ; ear 22." Greatest length 34·3 ; basilar length 30 ; greatest height 14·5 ; greatest diameter of bullae 8 ; upper tooth series 17·3 ; breadth across M¹ 11·1 ; length of nasals 14.

Georychius van dami mihi.

3 ♂♂, 3 ♀♀, Ngelelle River, Zoutpansberg District (G. van Dam).

These represent both sexes of different ages, but no very old ♂, and include a very old ♀ which had two pairs of distinct inguinal mammae, in this respect establishing my previous conclusion as to the distinctness of the species founded upon cranial and colour characters,

The following Molerats were also secured by Van Dam :—

2 young ad. ♂♂, 1 young ad. and 1 juv. ♀♀, Manetsi River, Zoutpansberg District.

These specimens are more uniform grey than "*van dami*," and decidedly larger. They have the nasal and other cranial characters of "*natalensis*," but in other respects differ in being decidedly greyer and slightly smaller, though not so small as "*komatiensis*." This well-marked form I name *Georychus natalensis pallidus* subsp. nov., characterized as above.

Type: young adult ♂, Manetsi River, near Malala, Zoutpansberg District. "Head and body 146 mm.; tail 14; hind foot 25." Skull: extreme length from tip of incisors to back of condyles 39 mm.; from premaxilla to condyles 36; from front of nasals to condyles 34·8; basilar length 31; zygomatic width 23·8; width of brain case 13·5; greatest width of mastoid 17·2; interorbital constriction 7·1; width premaxilla 7·2; width incisors 4·7; length molar series 6·5; diastema 11·2; greatest diameter bullae 10; nasals $12·1 \times 3·7$.

Amblysomus hottentottus garneri subsp. nov.

Differs from all previously described forms of *Amblysomus hottentottus* in having a dark-brown stripe down the ventral line from the throat to the belly. General colour dark-brown dorsally, with a prismatic sheen of coppery green; ventrally brownish-yellow, more clearly yellow on the cheeks, throat, sides of chest, and inner side of hind legs. The skull conforms with the characters of the species, but in the two specimens examined the posterior ledge of the hindmost lower molar is absent or represented by only a very slight prominence where the ledge is normally situated, and the posterior ledge of I_2 is also not so conspicuous. The two specimens are both old ones, but are smaller than specimens from the eastern Transvaal (*A. h. longiceps* Broom).

Type: T.M. No. M 1995, old ♂, Commissioner's Residence, Piggs Peak, Swaziland, 22nd May, 1916. "Head and body 130 mm.; hind foot 13·5." Skull: greatest length 28·3; basilar length 19·2; greatest breadth 17·7; interorbital width 8·4; posterior height 13·4; dental series 10·9; molar series 6·3; breadth across on side of M^1 8·6; length of palate 11·5; length of mandible 17·6; lower dental series 9. The other specimen, a ♀ which had one pair of well-developed mammae, is smaller, measuring: "head and body 125; foot 13." Skull: greatest length 27·3; greatest breadth 16.

NOTES ON THE EXPEDITION TO KOMATIPOORT, 16th–28th June, 1916.

By Dr. H. G. BREYER.

A SMALL expedition was undertaken to the neighbourhood of Komatipoort to procure skeletons and skins of *Hippotragus equinus*, *Bubalis lunatus*, and *Strepsiceros strepsiceros*, and to get an idea of animal life there in the beginning of winter.

Members of the expedition were: the Director, F. O. Noome, taxidermist, G. van Dam, and J. W. F. Breyer.

Camp was made near the kraal of Machabezane, about two miles from the police post at Squamman, near the Komati, and 14 miles S.S.W. of Komatipoort. The river here is about 100 yards broad, and the banks on our side are fairly steep and rocky. We chose this stony spot in order to be more or less safe against nocturnal visits of hippopotami. There were about fourteen of these in the vicinity; being never troubled or interfered with, they have become rather inquisitive, and just a few days before our arrival they had paid a visit at night to some hunters two miles up the river and had quite upset their tent. There were many crocodiles in the river and several were shot, but their bodies were not recovered. We crossed the river at Inguenhene Kraal (Steinecke's Drift) on the farm Coopersdale. The drift is good, sandy, but deep. Whilst travelling, we saw three *Bubalis lunatus*, of which one male was secured. Between Inguenhene and Machabezane is a long stretch of nearly impenetrable bush, not more than 300 yards broad, which is reported to swarm with game, mostly bushbuck and koodoo. Wherever the banks of the river were stony and rocky there was an abundance of lizards, mostly *Gerrhosaurus validus* and *Mabuia quinquetaeniata*. Several of them were secured by shooting them with a small .410-bore collecting gun. I may mention that, in the immediate vicinity of Komatipoort, just behind the soda-water factory, these two species can be easily secured in quantities, whilst there is at the same place also a magnificent cluster of *Sarcostemma viminalis*, which when in flower attracts many insects.

The only snake we met was a *Sepedon haemachaetes*. Near our camp we found on the wing: *Charaxes aethalion*, *Ch. brutus*, *Catopsilia florella*, *Teracolus achine*, *T. evenina*, *T. antigone*, *Hypanis ilithyia*, *Pyrameis cardui*, *Danais chrysippus*, *Terias zoë*, *T. brigitta*, *Pieris severina*, *P. mesentina*, *Hamanumida daedalus*, *Junonia clelia*, several *Lycaenids*, and a few *Hesperids*, but none of these were plentiful except the kinds of *Teracolus* and *Pieris*.

On walking along the banks of the river I discovered a few plants in flower: some *Vernonias* and a kind of *Conyza*. This last one attracted two kinds of *Acræids*, *Atella phalanta*, *D. Chrysippus*, and fairly many *Hymenoptera*, besides the Noctuid, *Egybolis vaillantina*, Stoll, the *Vernonias* being visited mainly by *Teracoli* and *Pierids*. Under the bushes a *Justicia* was often found in flower and here also settled some *Pieridae*. Near an ancient cattle kraal some specimens of *Lippia asperifolia* were open, and these attracted *Lycaenids* and *Catopsilia*.

In every crevice between the stones, where good soil had been washed in, aloes were growing; a few of them were already in flower, others still developing their large succulent flower-stalks. They were visited every morning by green

pigeons, *Vinago delalandii*, and small parrots, *Poocephalus meyeri*, which gave life to the scenery. The young leaves and the flower-stalks were eaten as well as the buds.

A beautiful *Hibiscus*, growing 7 to 8 feet high, which I found often the year before at Gadhla's Kraal, Maputaland, and which yielded such good results (*Teracolus regina*, *T. difficilis*, *Eronia cleodora*, and lots of *Trypetidae*), was constantly under observation. Its flowers began to open at 9.30 a.m. and closed about half an hour before sunset; but, at whatever time I visited this conspicuous plant, not a single insect was found, not even a *Mylabrid*.

Every night traps were set for small rodents and insectivora. Before going to bed, and just before sunrise, the traps were inspected. Notwithstanding these precautions several specimens were lost, through ants having eaten the lips, nose, and the pads of the toes. Unfortunately three fine shrews were mutilated to such an extent that the skins were absolutely spoiled.

Molerats were very scarce, but we succeeded in capturing one, which is described by Mr. A. Roberts as *Georychus stellatus*.

Birds, on the other hand, were plentiful, especially *Buphaga erythrorhyncha*; every ox we saw carried several of them. Besides these I noticed the common guinea fowl, *Numida coronata*, *Francolinus shelleyi*, *Elanus caeruleus*, *Plotus rufus*, several common weaver birds, *Nectarina famosa*, two kinds of woodpeckers, a barbet, the two kinds of *Crateropus*, *Urolestes*, etc. No ducks were seen on the water.

A good deal of trouble was taken to secure trapdoor spiders. In the beginning we found hardly any until it was found out that one species made its nest quite near the stems of aloes and other trees, whilst the *Pelmatorcyters* built practically against the stones. One nest was rather remarkable. It was found under a tree, which had shed a very large number of nearly circular leaves of the size of a sixpence. Whilst blowing away these leaves, we remarked that one of them was kept in its place by almost invisible threads, and on closer examination it proved to be attached to the lid of a trapdoor spider nest, entirely covering the entrance. The nest is carefully preserved in our collection and the spider belongs to the genus *Acanthodon*.

Amongst the plants there were few interesting forms, except the *Huernia zebрина*, the first record from Transvaal. This species being only known from Zululand, without further reference to locality, specimens were brought to Pretoria and planted in the Zoological Gardens; but they all died during the winter.

The following list of the captured Rhopalocera, with a few remarks, was made by Mr. C. J. Swierstra, our first assistant and entomologist:—

LEPIDOPTERA FROM KOMATIPOORT.

LEPIDOPTERA—RHOPALOCERA.

Family NYMPHALIDAE.

Sub-Family ACRAEINAE.

1. *Acraea neobule* Doubl. 3 ♂♂, 2 ♀♀. Typical specimens. 1 ♂ and 1 ♀ are in perfect condition, the others more or less worn.
2. *Acraea caldarena* Hewitson. 2 ♂♂, 1 ♀. The ♀ is very small but otherwise quite typical, as are also the ♂♂.
3. *Acraea oncaea* Hoppf. 9 ♂♂, 2 ♀♀. The ♂♂ are of the typical form, while the 2 ♀♀ are of the darker variety with the white spots well developed in forewing.

4. *Acraea terpsichore* L. var. *rougeti* Butler. 15 ♂♂, 9 ♀♀. Some of the specimens are perfect, whereas the others are all more or less worn. They show the usual variation in size, and the ♀♀ in coloration also.

Sub-Family NYMPHALINAE.

5. *Atella phalanta* Drury. 1 ♂, 1 ♀.
 6. *Precis clelia* Cramer. 1 ♂.
 7. *Precis cebrene* Trimen.
 8. *Hamanumida daedalus* F. 1 ♂.

Family LYCAENIDAE.

9. *Deudorix licinia* Mabille. 1 ♀. A very much worn specimen.
 10. *Deudorix antabus* Hopf. 1 ♂. A very much worn specimen.
 11. *Hypolycaena philippus* Fabr. 1 ♀. This seems to be a fairly rare species. Although recorded from several localities it has nowhere been observed in numbers.
 12. *Hypolycaena cocculus* Hoppf. 1 ♂. A worn specimen. Komatipoort seems to be the most southern limit of this species so far. It occurs right up to German East Africa and to Mukenge in the Congo.
 13. *Aphnaeus natalensis* Westw. 1 ♂. A worn specimen.
 14. *Asciocercis harpax* Fabr. 1 ♂. Worn.
 15. *Cupido melaena* Trimen. 2 ♂♂.
 16. *Cupido Jesus* Guérin. 1 ♀.
 17. *Cupido malathana* Bsd. 3 ♂♂, 2 ♀♀. All specimens very much worn.
 18. *Cupido osiris* Hopff. 1 ♂.
 19. *Cupido osiris* (Hopff) var. 1 ♂.

Family PIERIDAE.

20. *Mylothris agathina* Cramer. 1 ♂, 1 ♀.
 21. *Pieris severina* Cramer. 3 ♂♂, 1 ♀.
 22. *Pieris mesentina* Cr. 5 ♂♂, 1 ♀.
 23. *Teracolus annae uallengreni* Butler. 4 ♂♂. Typical dry-forms, but not the extreme.
 24. *Teracolus achine ithonus* Butler. 15 ♂♂, 4 ♀♀. In all gradations of size and freshness. The greater part of the specimens come very near to *T. achine simplex*, only 2 ♂♂ being typical *T. achine ithonus* Butler.
 25. *Teracolus evenina* Wllgr. 2 ♂♂, 1 ♀. These are quite fresh specimens and intermediate between *T. evenina* and *Aurivillius* var. *hib. deiclamioides*.
 26. *Teracolus antigone* Bsd. 8 ♂♂, 9 ♀♀. These 17 specimens are all really intermediate between *T. antigone* and *T. antigone phlegetonia* Bsd.
 27. *Eronia leda* Bsd. 1 ♂. A fairly good specimen.
 28. *Terias storicola ceres* Butl. 1 ♂.
 29. *Terias brigitta* Cam. 9 ♂♂, 1 ♀.
 30. *Terias brigitta zoë* Hoppf. 6 ♂♂.
 31. *Catopsilia florella* Fabr. 2 ♂♂.

Family HESPERIDAE.

32. *Pterygospedia flesus* Fabr. 1 ♂. Worn.
 33. *Pyrgus vindex* Cram. 1 ♂.
 34. *Pyrgus hottentota* Latr. 1 ♂.
 35. *Pamphila fatuella* Hoppf. 1 ♂.
 36. *Pamphila mohopaani* Wllgr. 1 ♂.
 37. *Hesperia forestan* Cram. 1 ♂.

LEPIDOPTERA—HETEROCERA.

Family ARCTIADAE.

38. *Utetheisa pulchella* Linn. 1 ♂, 1 ♀.
 39. *Rhodogastris astreas* Drury. 1 ♂. The first specimen recorded from the Transvaal.

Family NOCTUIDAE.

40. *Parathermes melanocephala*. 1 ♂.
 41. *Thermesia atriplaga* Wlk. 1 ♂.
 42. *Acontia groellsii* Feisth. 1 ♂.
 43. *Egybolis vaillantina* Stoll. 1 ♂, 1 ♀.

Family GEOMETRIDAE.

44. *Rhodometra sacraria* Linn.

The other insects collected on this expedition are not yet identified, neither are the trapdoor spiders. The smaller mammals are enumerated in the article of Mr. Roberts' additions to the collections of the Transvaal Museum.

As regards the larger kinds of game, I am greatly pleased to be able to state that between Lebombo and Komati there is an abundance of roan antelope, *Hippotragus equinus*, blue wildebeest, *Connochaetes taurinus* and *Aepyceros melampus*, whilst koodoo, waterbuck, bushbuck, rietbuck, and duiker are not at all scarce. Sassaby were very scarce; the only time we saw them was on our first day, as mentioned.

NOTES ON EXPEDITION TO GAZALAND, ALONG THE LIMPOPO RIVER, 29th June to 12th August, 1916.

By Dr. H. G. BREYER.

MEMBERS of the expedition: H. G. Breyer, leader; F. O. Noome, taxidermist; G. van Dam and J. W. F. Breyer, assistants.

The party left Lourenco Marques at about 8 o'clock by train bound for Moamba, on the main line to Pretoria; from there a branch line has been constructed, which terminates at Xinavane, where there are extensive sugar plantations. Our destination was Magude Siding, about 12 miles from the terminus. We arrived there at 1.30. The siding is situated in a sandy wilderness.

The village of Magude is built on the left bank of the Komati and is at a distance of $4\frac{1}{2}$ miles from the siding. Our luggage was transported in large punts to the other side of the river. The left bank is very high and steep, but a good road and a stair had been built, so that it was not difficult to reach the plateau where the Administrator lived. The village consists of perhaps forty houses, besides the offices and "rondavels" of the police. One has a magnificent view from this high bank of the Komati and the vast forests beyond.

Our object was to get a good number of skeletons and skins of larger animals, especially the skeleton of an elephant, and both skins and skeletons of elands. Besides these, it was our intention to collect all kinds of animals and plants, and to take photos of the interesting spots, trees, and so forth. The Administrator informed us that elephants were not far off, near Chiburro, and that at Macarre large herds of blue wildebeest, zebra, and impala were to be found. The elephants, however, were reported to have small tusks and to be of small size, consequently we decided to go further inland to Mazammbu, where we might get huge specimens, and where elands were to be found.

We left Magude on 1st July with two scotch carts, fifteen carriers, and a native guide. In the evening we crossed the Manzimhlope, which was practically dry and did not contain pure white water such as the name would appear to indicate. The country is nearly as flat as Holland, and one can imagine that in summer time, in the rainy season, large tracts of land are transformed into lakes. Near the junction of the Manzimhlope and Komati is a big lake, lago Chuale, whilst the Komati divides there into two branches and forms a fairly large island, Marianna. Needless to say, this country has an extremely bad reputation for fever.

We passed Macarre in the afternoon and found the information of the Administrator quite correct. Several herds of wildebeest could be seen in the distance, as well as ostriches, impalas, and "gompauws" (*Otis kori*).

The next evening we reached Guija on the Limpopo, 47 miles from Magude.

The river itself was about 100 yards broad, while from bank to bank the distance is certainly 300 yards. Everywhere we saw vestiges of the floods of the previous summer, and miles before we reached the river we noticed dry reeds and grasses in the branches of the trees. We were informed that the natives had been obliged to climb into the highest trees and had been gradually rescued by boats. On the highest banks more to the north we found long rows

of temporary buildings made by the natives, where they had lived till the water subsided. Their temporary inconvenience from the inundation was amply compensated, however, by the increased fertilization of the soil, and this year we saw the natives planting and harvesting at the same time, and mealies (maize) in every stage of growth.

The Guija we reached is not indicated on the map. Its old name is Canicado, whilst Guija marked on the map is about 20 miles more upstream. It is the seat of an Administrator, and the chief town of the extremely large province of Guija, its area being larger than that of Magude, Bilene Chibuto together. We had to cross the river as we wanted to follow a footpath along the left bank.

On the 4th of July we left Guija with a number of natives and two new scotch carts, each with four oxen, provided by the Administrator. We soon found that game was not at all plentiful; in fact, we did not see any during the first days, except birds. Near the road, on both sides, we saw several most beautiful pools, full of gorgeous waterlilies in flower, and *Utricularias*, whilst delicate *Limnanthemums* adorned the banks. Large numbers of ibises, herons, divers, jacanas, gallinules, geese, and ducks were feeding there, and without these it would not have been possible to feed the natives sufficiently. Sometimes large flocks of pelicans gathered on the banks or were seen swimming majestically amongst the Nymphaeas, and these especially were selected for culinary purposes, not so much for quality as for quantity. The banks of these pools offered very good collecting ground for Amphibia.

On the second day we reached Mopane forest, but every now and then the footpath brought us near the river where the forest is of quite another nature. I was astonished not to find the *Azelia quanensis* (we had noticed some near the Manzimhlope); a few *Kiggelias* and *Adansonias* gave occasionally a change to the general aspect of the forest of fever trees, wild figs, and marulas. In many places there may have been in the past plantations of *Ricinus communis*, and, if so, the seeds may have spread all along the river; the plant is, however, so common, that one gets the impression that its original home may be here.

On the evening of 5th July we camped about three miles from the junction of the Elephants and Limpopo Rivers, near a large pool called Fukwe. Natives told us that hippos were abundant at the junction. We decided to try and shoot one the next morning as we were very short of meat. We saw several rather far away and only succeeded in wounding a large bull.

The scenery here was very fine, the road climbing higher and higher to about 300 feet above the river, unfolding a most wonderful landscape. It was only here that I saw long strings of *Usnea* hanging from the trees, and noticed that the forest had some similarity to that of the Likuani forest in Maptuland. A few miles beyond the junction there was again a large pool, several miles long, called Pungwe, swarming with pelicans. Thousands of them must have been there; in the distance they gave the absolute impression of a huge flock of sheep.

On the evening of the 7th we reached the grounds of Papai, where game was said to be fairly plentiful, and where elephants might be found also. Camp was made here and two natives were sent out to Mananga to ascertain whether the reports about elephants were true. They returned two days later with fresh dung, and we decided to proceed about 14 miles to the north-east. In the meantime, I had been collecting insects and plants. Insect life was scarce at Papai; a few wasps were caught and robber flies. I noticed also that one kind of ants was very active. Amongst them seemed to be ants of a very different type. When I succeeded in catching some of these, apparently larger individuals, they proved to be two individuals of the same kind. They moved so quickly that it was impossible to distinguish how they were interlaced, and

it took some time to disentangle them ; they appeared to be on friendly terms. Just next to the open place, where these ants were at work, two specimens of *Vernonia fastigiata* were in flower. They attracted a fair amount of wasps and also a most beautiful Mylabrid, the *Coryna argentata*. Peringuey describes this beetle in the *Transactions of the Royal Society*, Vol. I, part I, and thinks that it is evidently a straggler. I differ from him, since on these *Vernonias*, which I visited for about five days nearly every three hours, I collected twenty-two of them. They agree in all respects with the description and the plate (where the insect is marked as *Coryna elegans*), but some of my specimens are considerably smaller.

There was no road, so we had to leave the tent and wagon at Papai, and travelled to the indicated spots only with the barest necessities. Low mopane shrub, sometimes with patches of a very thorny Euphorbia made our progress rather slow ; it took us more than six hours to cover the distance. We chose a magnificent spot for a camping place near one of those wonderful pools mentioned above. Everywhere we found traces of the activity of elephants, and the banks of the pool were so full of deep holes made by their feet that it was extremely difficult to hunt for insects without falling into them.

Not one shot was fired during the first few days ; but when our hunters returned day after day without success we gave up hope of finding elephants in the vicinity and started shooting for the pot. Nothing was to be got except birds, and after a stay of five days, hunger compelled us to go back to Papai. The reason that the elephants were so difficult to find was probably that the excessive rains of the previous summer had filled all the pools and every depression of the soil, and water was so abundant everywhere that the animals were not at all confined to any special locality.

On the 1st of July we returned to the tent and the following morning started for Mazammbu. Our first trek was long and brought us to the chief town of Papai. Butterflies were fairly plentiful. Under the tree where we outspanned we found the remains of a large number of them, mostly *Charaxes brutus*. Several *Melanites leda* were captured and it was only here that I found the rare *Mycalopsis* spec. ?

The next place we reached was a kraal called Macafene. Some of the natives residing here were armed with bows and poisoned arrows and the number of skulls and skins showed sufficiently that these bowmen understand their work. From here we proceeded the next morning to Mazammbu. On the road we saw several impalas and a fair number of birds. The floods of the previous year had left some waterholes, and water-birds (*Nycticorax*, *Plotus*, *Halcyon*, black *Ibis*, and a few others) were enlivening the scenery.

It was here that a fair number of *Pergularia* were found. This plant, of which I had only found two specimens near Salamanga on the Maputa and never anywhere else, was fairly plentiful in some places.

We camped at a kraal on the eastern side of the Limpopo, opposite the large kraal of Mazammbu, which is situated at the western side. It was a beautiful spot, which looked very promising. Large trees, belonging to the *Capparidaceae* according to the fruit, gave beautiful shade, old mealie fields were quite near, and game was fairly plentiful. The natives seemed to be very active in trapping, for we saw a fence of thorn trees and bushes more than a mile long, in which openings had been made every 20 yards for the whip-traps.

Unfortunately the weather began to change, clouds appeared, the wind turned to a gale, and shortly after it began to rain. This greatly impeded our work. Having no tent it was hardly possible to dry plants or to cure insects and skins. A native hut was put at our disposal, but it was so dark

and windy inside that it was impossible to do any delicate work. In the meantime, two men, whom we had sent out to get information about elephants and elands, returned and reported that about four hours east elands were to be found, as well as sable antelope and koodoo, whilst elephant spoor was plentiful.

We decided to leave Mr. Van Dam at Mazammbu with the wagons so that he could devote all his time to the collecting of small mammals, plants, etc., and the other party proceed to the place indicated by the guides.

On the 18th July we started with a considerable number of carriers to the land of promise, and arrived wet through at the kraal of Magulele, situated about 14 miles to the east. It had again begun to rain, and a spell of such cold weather set in that it was impossible to go out without serious risk of catching a chill. However, it did not prevent the taxidermist, my son, and some of the native hunters from taking the risk, as food was extremely scarce and mealie meal unobtainable. Fortunately, they shot two wildebeeste and an eland, but had to pay for their recklessness with a severe attack of fever. The rain poured down for five days, the cold was intense, and even in the hut of the chief next to the fire we could hardly keep warm.

On the 23rd the clouds began to disperse, but it remained intensely cold and the forest was still too wet to go out shooting.

The next day the native hunters and my son secured four koodoos. Mr. Noome was seriously ill. After the skins had been prepared I considered it necessary to go back to Mazammbu. The spoor of a large elephant bull (2' 1" diameter) had been followed up for two days, but we saw the impossibility of transporting the skin through this wilderness and gave up altogether the idea of securing an elephant.

As the taxidermist was suffering from fever the journey back to Mazammbu had to be done in two stages. First of all we camped at one of these beautiful pools, about three miles from Magulele. Here we secured two fine sable antelopes, and a good number of butterflies, mostly *Acrea zetes acura* and *Pardopsis punctatissima*. After a stay of three days we left for Mazammbu and reached it on 29th July.

Amongst the plants collected here the *Crozophora plicata*, a *Euphorbiaceae*, is worth mentioning, as Mazammbu seems to be its most southern locality. It belongs to the tropical flora, and, indeed, Mazammbu is situated almost on the tropic of Capricorn. The identification was done by the Kew authorities; according to its description in the tropical flora, the plant must be prostrate. The specimens which I collected were, however, far from prostrate—they were nice erect shrubs. The only place where I found them was in some old lands, between the village and the river. I had also noticed that some natives made a very good quality of rope from the bark of a tree. On inquiry the tree was shown to me, and fortunately it was bearing flowers whilst still having some fruit left, hence the identification could not go beyond the genus; it was a *Sterculia*, a tree growing about 20 feet high, fairly scarce near Mazammbu, but abundant near Mananga. Our return journey was not characterized by any specially noteworthy points, except at the junction of Limpopo and Elephants Rivers, where we succeeded in killing a large male hippopotamus. This necessitated a day's stay at this place and gave me an opportunity to collect a good many butterflies, amongst which two fine *Eronia thalassina* Bsd. and a few plants, nearly all *Capparidaceae*.

As a general remark, I should like to state that insect life had decreased in July, not only in specimens but also in species. The genus *Teracolus* especially was much less predominant, and nearly all the Lycaenids had disappeared.

On leaving the Manzimhlope, however, on 12th August, we saw a great number of Zygaenids, *Brachartona titaea* Druce, of which eighteen were captured.

The annexed list of the Rhopalocera collected on this expedition was made by Mr. C. J. Swierstra, entomologist and first assistant of the Museum:—

LIST OF LEPIDOPTERA COLLECTED IN
GAZALAND.

RHOPALOCERA.

Family SATYRIDAE.

Genus MELANITIS Fabr.

1. *Melanitis leda* (Linn.). 1 ♂, 1 ♀. In very poor condition.

Genus MYCALESIS Hübn.

2. *Mycalesis* ? spec. 6 ♂♂, 4 ♀♀. This *Mycalesis* belongs to the *safitza* group, but differs mainly in the large ocellus of forewing which, on the upper side, is as in *safitza*, but on under side, instead of being black, is reddish-brown, with the white pupil not placed in the centre but at the top of the ocellus, giving it a rather drawn out appearance; it is also much smaller. Not having sufficient literature at my disposal I am unable to refer it to its specific rank.

Family NYMPHALIDAE.

Sub-Family ACRAEINAE.

Genus ACRAEA Fabr.

3. *Acraea zetes acara* Hewitson. 15 ♂♂, 1 ♀. The ♀ is a brightly coloured specimen with the white submarginal spots in the hind wing very much pronounced. Almost all the ♂♂ show more or less the white suffusion on hind wing.
4. *Acraea anemosa* Hew. 1 ♂. A small example.
5. *Acraea aglaonice* Westw. 1 ♂. This specimen has the transparent spot and the black spots in fore wings larger than the ordinary Transvaal specimens. The black marginal border of hind wing is of medium width and the specimen is exactly like a ♀ from Maputaland, Portuguese South-East Africa.
6. *Acraea terpsichore rougeti* Quin. 7 ♂♂, 6 ♀♀. This series exhibits all the peculiarities in variation of colour common to this species. All the specimens are below the average size.

Genus PARDOPSIS Trimen.

7. *Pardopsis punctatissima* (Bsd.). 7 ♂♂, 7 ♀♀. All 14 specimens are smaller in size than any in the Museum series. They undoubtedly represent the dry phase of the species.

Sub-Family NYMPHALINAE.

Genus PRECIS Hubner.

8. *Precis oenone cebrene* Trimen. 1 ♂, 1 ♀.
9. *Precis orithya madagascariensis* Guenée. 1 ♀.
10. *Precis antilope cuama* Hewits. 1 ♀.

Genus EURYTELA Bsd.

11. *Eurytele dryope* (Cram.). 2 ♂♂. Worn specimens.

Genus BYBLIA Hübner.

12. *Byblia Götzius vulgaris* Staud. 1 ♂, 1 ♀. Worn specimens.

Genus CRENIS Bsd.

13. *Crenis natalensis* Bsd. 2 ♂♂. Very much worn examples.

Genus NEPTIS Fabr.

14. *Neptis Goochi* Hopffer. 1 ♂, 1 ♀. Very much worn examples.

Genus HAMANUMIDA Hübner.

15. *Hamanumida daedalus* (Fabr.). 1 ♂.

Genus CHARAXES Ochs.

16. *Charaxes pelias saturnus* Btl. 1 ♂. A perfect specimen.
17. *Charaxes neanthes* Hew. 1 ♂.

Family LYCAENIDAE.

Genus DEUDORIX Hewits.

18. *Deudorix antalus* Hopff. 2 ♂♂, 3 ♀♀.

Genus HYPOLYCAENA Feld.

19. *Hypolycaena coeculus* (Hopff.). 8 ♂♂, 3 ♀♀.

Genus APHNAEUS Hübn.

20. *Aphnaeus ella* Hewits. 1 ♀. A very much worn specimen.

Genus AXIOCERSES Hübn.

21. *Axiocerses amanga* (Westw.). 1 ♂.
22. *Axiocerses harpax* (Fabr.). 1 ♀.

Genus LYCAENESTHES Moore.

23. *Lycaenesthes amarah* Guerin. 1 ♂.
Lycaenesthes neglecta Trimen. 1 ♂.

Genus CUPIDO Schrank.

24. *Cupido melaena* (Trim.). 1 ♂.
25. *Cupido telicanus* (Lang). 1 ♀.
26. *Cupido malathana* (Bsd.). 4 ♂♂, 2 ♀♀.
27. *Cupido osiris* (Hopff.). 2 ♂♂.
28. *Cupido trochilus* (Freyer). 2 ♀♀.

Family PIERIDAE.

Genus MYLOTHRIS Butler.

29. *Mylothris agathina* (Cram.). 4 ♂♂, 5 ♀♀.

Genus APPIAS Hübn.

30. *Appias epaphia* (Cram.). 1 ♂, 1 ♀.

Genus *PIERIS* Schrank.

31. *Pieris gūlica abyssinica* Lucas. 3 ♂♂.
 32. *Pieris severerina* (Cram.). 2 ♂♂, 1 ♀.
 33. *Pieris mesentina* (Cram.). 1 ♂, 2 ♀♀.
 34. *Pieris pigea alba* Wallgr. 1 ♂, 1 ♀.

Genus *TERACOLUS* Swainson.

35. *Teracolus amatus Crowleyi* E. Scharpe. 1 ♂.
 36. *Teracolus resta argillaceus* Butler. 4 ♂♂, 4 ♀♀.
 37. *Teracolus eris* Klug. 4 ♂♂, 5 ♀♀.
 38. *Teracolus ione phlegyas* Butler. 3 ♂♂, 4 ♀♀.
 39. *Teracolus regina* Trimen. 1 ♀. A very beautiful specimen of the form as mentioned by Trimen, *S.A.B.*, III, p. 112, and figured on pl. II, f. 3
 40. *Teracolus Annae Wallengreni* Butl. 6 ♂♂.
 41. *Teracolus omphale theogone* Bsd. 3 ♂♂, 2 ♀♀.
 42. *Teracolus evenina deidamioides* Aur. 3 ♂♂, 2 ♀♀.
 43. *Teracolus antigone* Bsd. 17 ♂♂, 8 ♀♀.
 44. *Teracolus auxo topha* Wellgrn. 14 ♂♂, 9 ♀♀.

Genus *ERONIA* Boisd.

45. *Eronia leda* Bsd. 2 ♂♂, 1 ♀.
 46. *Eronia thalassina* Bsd. 2 ♂♂.
 47. *Eronia Bugueti* Bsd. 1 ♂.

Genus *CATOPSILIA* Hübner.

48. *Catopsilia florella* (Fabr.). 2 ♂♂.

Genus *TERIAS* Swains.

49. *Terias brigitta* (Cram.). 2 ♂♂, 1 ♀.

Family *HESPERIDAE*.Genus *PYRGUS* Westwood.

50. *Pyrgus borbonica* (Bsd.). 1 ♂.
 51. *Pyrgus fatuellus* Hopff. 1 ♂.
 52. *Pyrgus mohopaani* (Wllgr.). 1 ♂.

*HETEROCERA.*Family *AMATIDAE*.Genus *TRICHAETA* Swinhoe.

53. *Trichaeta fulvescens* (Wlk.). 1 ♂.
 54. *Trichaeta pterophorina* Mabille. 1 ♂.

Genus *AMATA* Fabr.

55. *Amata cerbera* (Linn.). 1 ♂.

Family *NOCTUIDAE*.Genus *CHALCIOPE* Hübner.

56. *Chalciope delta* Bsd. 1 ♂.

Family HYPSIDAE.

Genus DEILEMERA Hübner.

57. *Deilemera leuconoe* Hopff. 1 ♂.

Family GEOMETRIDAE.

Genus CHOGADE.

58. *Chogade acaciaria* Bsd. 1 ♂.

59. 1 specimen. Gen. et spec. ?

Family ZYGAENIDAE.

Genus BRACHARTONA.

60. *Brachartona fitaea* Druce. 18 ♂♂.

Family PYRALIDAE.

61. 1 specimen. Gen. et spec. ? 1 ♂.

ANNALS OF THE TRANSVAAL MUSEUM.

Supplement to Vol. V, No. 3.

A NEW SISKIN FROM SOUTH AFRICA.

(Read before the Transvaal Biological Society, 14th December, 1915.)

By AUSTIN ROBERTS.

AMONGST some birds recently sent for identification to the Transvaal Museum by Mr. R. E. Symons, Superintendent of the Giant's Castle Game Reserve, were two specimens of a very distinct new species of Siskin. Upon being informed of the fact, Mr. Symons was kind enough to present this pair, two more pairs, and a clutch of eggs of this bird to the Museum, and I have therefore great pleasure in identifying the discovery with his name :

Spinus symonsi, spec. nov.

Preliminary description.—Most closely allied to *S. tottus* of the Cape Province, but differing greatly therefrom in the absence of white tips to the wing and all but the two outermost pairs of tail feathers ; the two outermost tail feathers have a white, wedge-shaped mark on the inner web, for the terminal two-thirds in the outermost and for a lesser extent on the penultimate pair, in both cases broadest at the tip ; the general coloration also duller, and in size larger than *S. tottus*.

The type (♂) and series were obtained in the Sanqabetu Valley, Basutoland, but, according to Mr. Symons, the species also occurs at certain seasons on the Natal side of the Drakensberg as well. The females are hardly if at all smaller than the males ; the type measures : wing 76, tail 57, tarsus 15, culmen 11 mm.

ANNALS OF THE TRANSVAAL MUSEUM.

*Supplement No. 2 to Vol. V., No. 3.*PRELIMINARY NOTICE OF NEW REPTILES OF THE
KARROO FORMATION.

By Dr. E. C. N. VAN HOEPEN.

CYNODONTIA.

ICTIDOPSIS FORMOSA, sp. n.

THREE specimens of this species are now in our collection. Two have been found, one by myself and one by my assistant, in James' donga, Harrismith. The third also comes from Harrismith, but the exact locality is unknown. The new species is larger than the type species, and its interorbital space is relatively broader. The hinder end of the nasal is only slightly broader than the front end.

Measurements of two specimens :

| | | | |
|--------------------------------------|-----|-----|---------------|
| Greatest length of the skull | ... | ... | 81 and 79 mm. |
| " width " " | ... | ... | 55 and 54 mm. |
| Interorbital width ... | ... | ... | 18 and 18 mm. |
| The six molars occupy a space of ... | ... | ... | 17 mm. |

GLOCHINODON DETINENS, gen. et sp. n.

This new genus is founded on a badly preserved skull with a small portion of the postcranial skeleton. It was found by myself at Harrismith in a small side-gully of James' donga, to the north of the brickworks and exactly south of the small municipal installation for crushing road-metal.

Molars: In right maxillary eight large ones; in left maxillary eight large ones and a small one between the seventh and ninth. One canine in each maxillary and one in each ramus of the lower jaw. The upper incisors are lost; in the lower jaw there are traces of two incisors in each ramus. Dental formula probably: $i. : \frac{2}{2}$; $c. : \frac{1}{1}$; $m. : \frac{8 \text{ or } 9}{7}$. The molars have two cusps. The hinder cusp is small and directs its point forward. The front cusp is large and bends backwards over the point of the hinder cusp and so that its outer edge stands at right angles with the front of the tooth. Length of the skull: Less than 65 mm.

^{un}
 PLATYCRANI^{on} ELEGANS, gen. et sp. n.

A slightly crushed skull found at Harrismith and in general shape somewhat resembling *Trirachodon* could not be placed in any of the known genera. It was named *Platycranion* on account of its great breadth across the temporal vacuities. The crushing had hidden or damaged the teeth, and only one canine of the lower jaw is visible. The lower jaw has now been ground away to such an extent as to show on one side the roots of the teeth in the upper jaw and on the other side those of the teeth in the lower jaw. It has thus been made out that there are at least eight molars in each jaw. Dental formula probably: $i. : \frac{4}{7}$; $c. : \frac{1}{1}$; $m. : \frac{8}{8}$? Length of specimen from tip of snout to hinder end of parietal ridge: 78 mm. Greatest breadth: 74 mm. The zygomatic process of the squamosum lies on the jugal, leaving a narrow strip of this bone uncovered along the temporal vacuity. The other uncovered part of the zygomatic process of the jugal gradually diminishes in breadth backwards.

ANNALS OF THE TRANSVAAL MUSEUM.

Supplement No. 3 to Vol. V, No. 3.

A NEW KARROO REPTILE.

By Dr. E. C. N. VAN HOEPEN, M.I.

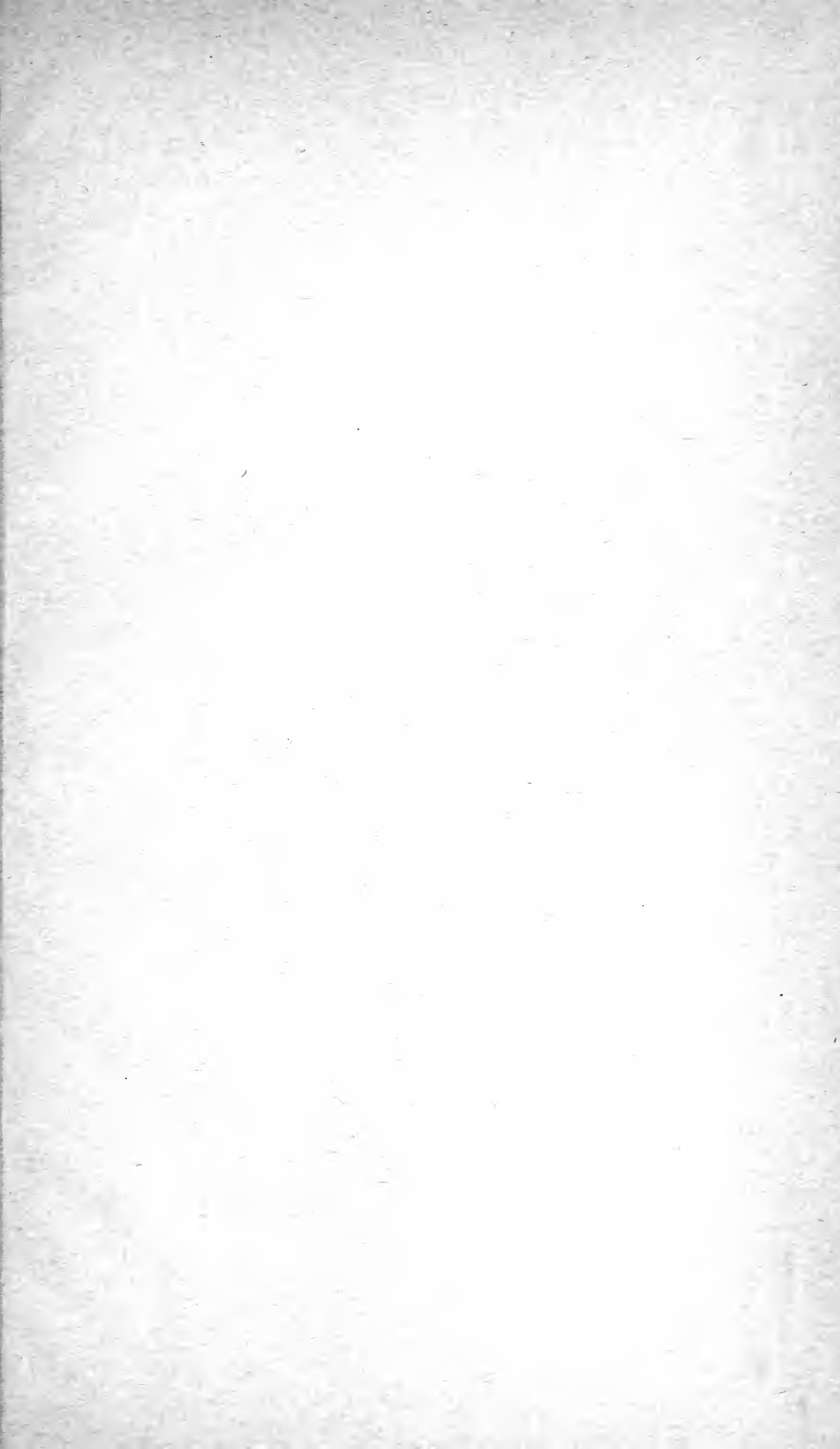
DINOCEPHALIA.

Jonkeria truculenta gen. et sp. n.

A FEW months ago the Museum expedition to the Karroo found on the farm Abrahamskraal, Prince Albert District, the remains of a large reptile. The whole farm is situated on Lower Karroo Beds, and of these probably only the *Pariasaurus* zone is present. The locality of the remains in question is situated near the southern border of the farm, and belongs without doubt to the *Pariasaurus* zone. The remains consist of the skull, with the greater part of the postcranial skeleton. The skull has now been sufficiently cleared of its matrix to allow of a preliminary description and to show that the reptile is undoubtedly a *Dinocephalian*.

The skull is long and narrow, but below and behind the orbits it broadens considerably. The orbits are large and of about the same size as the temporal vacuities. There is no pronounced thickening of the upper and hinder rim of the orbit. The nostrils are far in front and lateral. The parietal foramen is situated at the extreme end of the upper surface of the skull and on the top of a broad and high boss. There are large teeth in the front end of the jaw. Some of these are very probably on the maxillaries. They are typically *Dinocephalian*, having a high sharp-edged anterior cusp and a broad flat posterior cusp. Behind these large teeth on the maxillary follows a row of small molars, the crowns of which are flattened and serrated in front and behind.

| | |
|---|--------|
| Length of the skull from snout end to hinder end of the condylus occipitalis..... | 53 cm. |
| Distance from front end of nostril to tip of snout..... | 8 cm. |
| Distance from front end of orbit to tip of snout..... | 33 cm. |
| Breadth between the nostrils..... | 4 cm. |
| Breadth between the orbits..... | 10 cm. |
| Length of the parietal foramen..... | 2 cm. |



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VOL. I.—Parts 1, 2, 3, 4, and index.

VOL. II.—Parts 1, 2, 3, and 4.

VOL. III.—Parts 1, 2, 3, and 4.

VOL. IV.—Parts 1, 2, 3, and 4.

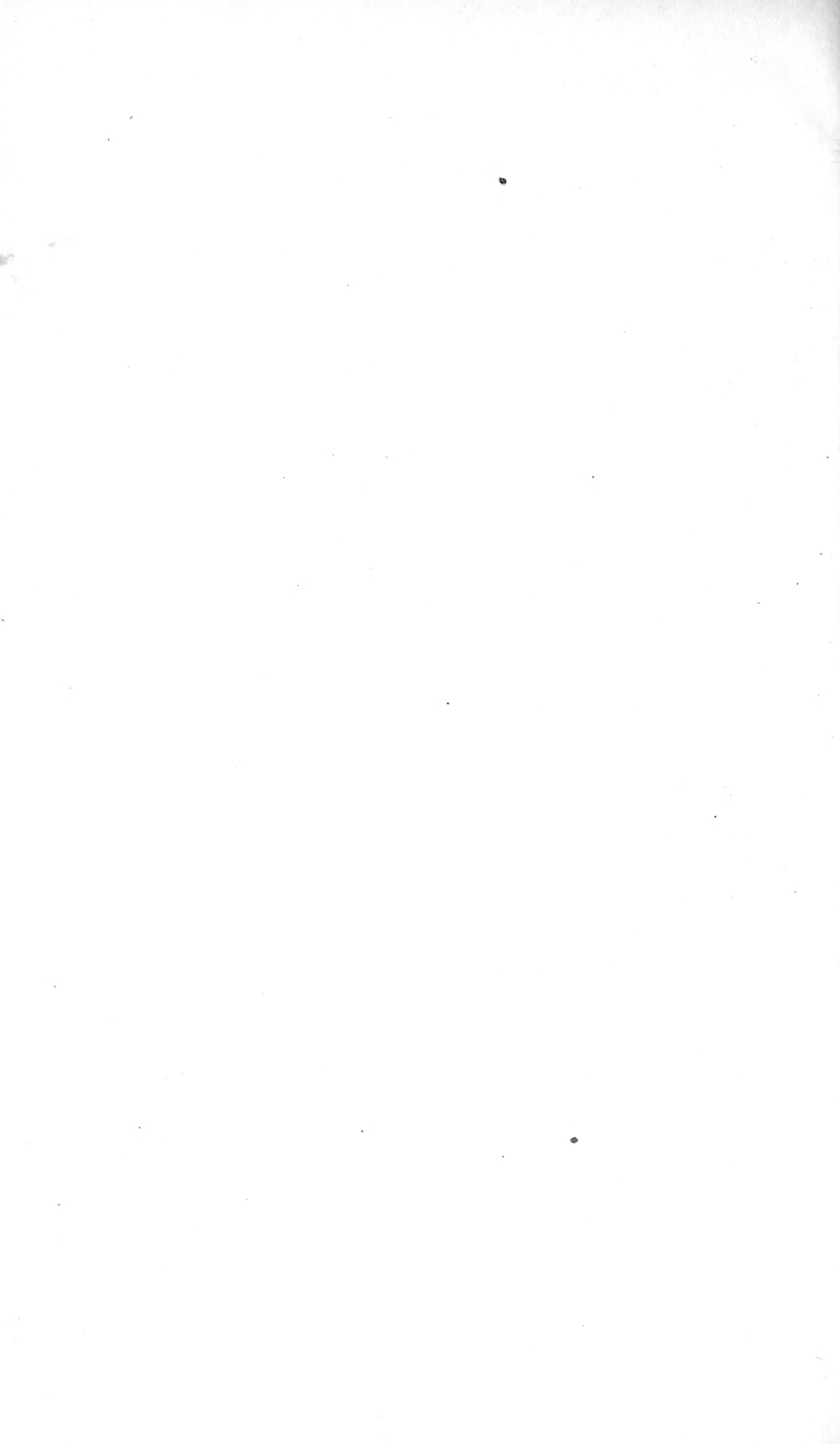
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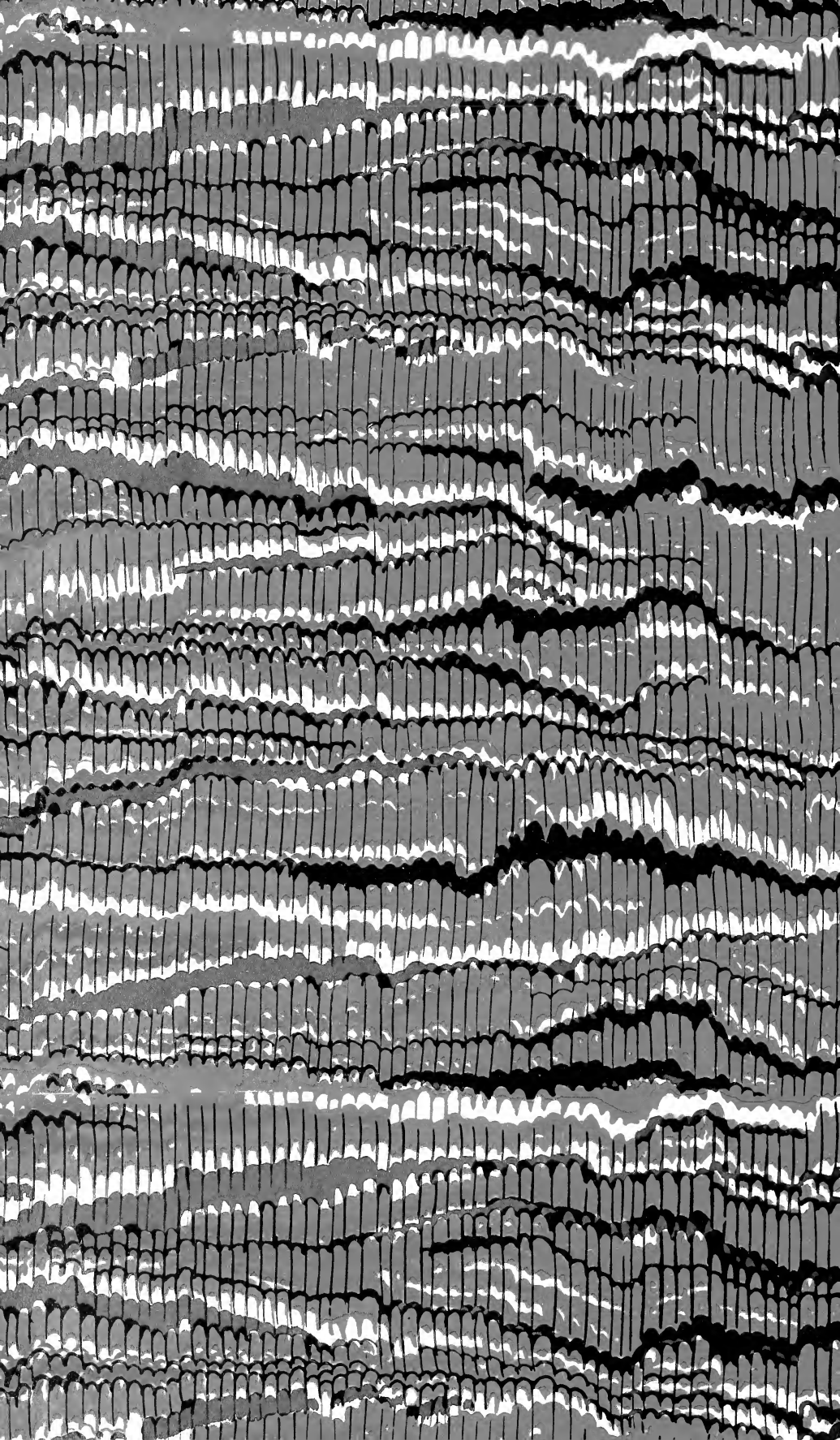
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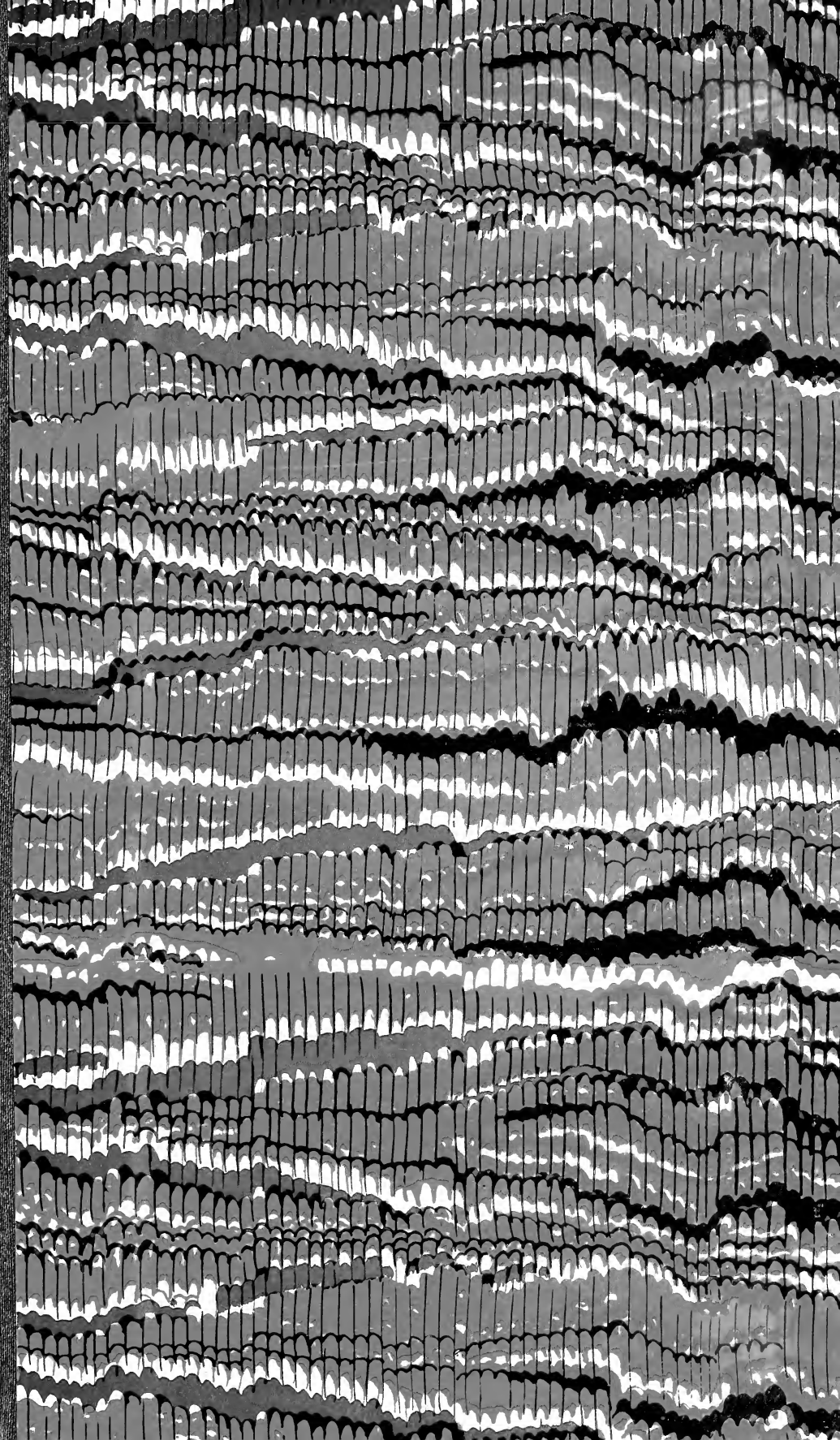
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