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BOTANICAL SURVEY OF INDIA

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—i—

VOL. LXIV.

PART II (NATURAL HISTORY &c.)

LIST OF CONTRIBUTORS.

	Page
ALCOCK, ALFRED;— <i>Description of a New Species of Oxyrhynch Crab of the Genus Parthenops</i>	296
—————;— <i>Materials for a Carcinological Fauna of India. No. 1. The Brachyura Oxyrhyncha. (Plates III, IV and V.)</i>	157
—————;— <i>On a new species of Flying Lizard from Assam. (Plate III).</i>	14
BOSE, J. C.;— <i>On Polarisation of Electric Rays by Double Refracting Crystals. (Plate VI).</i>	291
CUMMINS, H. A.;— <i>Description of a New Lathraea from the Eastern Himalaya</i>	137
FINK, FRANK;— <i>Contributions to the Theory of Warning Colours and Mimicry, No. 1. Experiments with a Babbler (Crateropus canopus)</i>	344
GODWIN-AUSTEN, H. H.;— <i>No. 3. Notes on, and drawings of, the animals of various Indian Land Mollusca (Pulmonifera). (Plate VII).</i>	151
KING, GEORGE;— <i>Materials for a Flora of the Malayan Peninsula.</i>	16
————— AND PANTLING, R.;— <i>On some New Orchids from Sikkin</i>	329
————— AND PRAIN, D.;— <i>On a new species of Renanthera</i>	328
NICEVILLE, LIONEL DE, AND MARTIN, L.;— <i>A list of the Butterflies of Sumatra with especial reference to the Species occurring in the north-east of the Island</i>	357
OLDHAM, C. F.;— <i>Natural History Notes from H. M. Indian Marine Survey Steamer 'Investigator,' Commander C. F. Oldham, R. N., commanding.—Series II, No. 18.—i. The Topography of the Arabian Sea in the Neighbourhood of the Laccadives. ii. The Physical Features of some of the Laccadive Islands, with Suggestions as to their Mode of Formation. (Plates I and II).</i>	1
PEBLER, ALEXANDER;— <i>Notes on the bleaching action of light on colouring matters</i>	139
PRAIN, D.;— <i>Noviciae Indicae IX. Some additional Papaveraceae.</i>	303
RANKING, GEORGE;— <i>A contribution to the History of Artificial Immunity</i>	299

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- No. III.—Containing pp. 299-555 was issued on February 1st, 1896.

LIST OF PLATES.

- No. I.—Contour Chart of the Arabian Sea in the Neighbourhood
of the Laccadive Islands.
- .. II.—Temperature Curves.
- .. III.—*Draco noreilli*.
- .. III.— { *Lambruchius ramifer*.
 { *Physachus ctenurus*.
 { " *tensor*.
 { *Gypuchius hyalinus*.
 { *Luchooides dolichorhynchus*.
 { *Apocremnus indicus*.
- .. IV.— { *Nauia investigatoris*.
 { *Macrocoloma nummifer*.
 { *Maia gibba*.
 { *Achms cailelli*.
 { *Chorilibinia andamanica*.
- .. V.— { *Coliodes malabaricus*.
 { *Paratymolus hastatus*.
- .. VI.—Polarisation of Electric Ray.
- .. VII.—Indian Land Shells.

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ing from 5 to 10 fathoms on it, which inside the 100 fathom line extends from 15 miles and forms a slight curve, the convex side to the N.-W.

The southern atoll has the island of Agatti situated on its eastern side; a broken coral reef forming a shallow lagoon extends in two arms, like claws, from its north and south extremes, leaving a good entrance for boats between. The island is four miles long by half a mile broad, its greatest breadth, as in Kavaratti, being towards its north end, narrowing to a point to the southward; a narrow shallow channel separates the south point from the small island of Kalpathi. On the western and southern side of the island a long line of coral-sand rock is exposed on the beach, as though the preceding south-west monsoon wind had removed the loose sand in the neighbourhood; also towards the south end a line of it is visible in the lagoon thirty feet from the shore, while on both sides of the sandy spit forming the south point broken and dead branches of the bushes lie on the spit. Towards the north and north-west, where the island has its greatest breadth, the lagoon beach is being added to, and coconut trees are being planted: in fact, the whole of the north end is very level, and leads to the idea that it has been comparatively recently formed by the deposition of sand from the reef and southern part of the island. The eastern side is steep too, with a narrow fringe-reef. Kalpathi is situated to the south of Agatti and is formed of coral rock and sand; its northern point extends in a sandy spit towards Agatti.

The northern atoll extends east and west, and has an average width of two-and-a-half miles. The coral-reef enclosing the lagoon is somewhat rectangular in shape, and is continuous, except on the western side, where there is a broad shallow entrance; in the centre is the island of Bungarra, and two other islands and some islets are situated towards the eastern side of the atoll; they are all very low and level, and no fresh water is obtainable; as at Betra, they appear to be merely sand-cays covered with vegetation. Bungarra, the centre islet, shewed signs of being washed away on its north and west sides, the coconuts on these sides having fallen and lay rotting on the beaches. The central portion of the lagoon is full of coral heads, with 2 to 4 fathoms of water between, but all round the inside of the reef is a level flat, similar to the flat at Betra and Peramul Par; it has an average width of one-third of a mile, except on the south side, where it attains a width of about three-quarters of a mile. Flood tide was found to set S. S.-E., ebb N. N.-W.

Off the western side of Bungarra, and extending out towards the entrance, are two long sandy arms which curve round towards each other and dry; they are probably formed by the deposition of the sand

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Petals 4 or 5 ; fruit capsular, dehiscent 10, He

*Cell> of ovary 2- to 8-ovuled; stigma discoid; fruitcapsuhr ;

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of ovary with numeronq

: tit capsular ; seeds thin, winged Cmaii

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or tubular. Ovary short, 2- 4-celled; style filiform, usually exceeding the staminal tube; stigma capitate or cylindric, usually with a ring at its base; ovules usually one in each cell. Capsule sub-globose, often beaked, thickly coriaceous, 2- 4-celled. Seeds often enclosed in an imperfect aril; cotyledons usually peltate.—DISTRIB. An Indo-Malayan genus of about 22 species.

Inflorescence only a few inches long, much shorter than the leaves, spike-like, few-flowered; fruit beaked.

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8. *C. erythrocarpus.*

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⁵ to 9 in., Lth 1-7

ilutes *2 in. Panicles'*

-axillary, si.-

ii a few primary branches; tlie sec-

ches short, few-flowered, the flowers usually
or '5 in. long, i lerulous, outside, leas than 1 in.
long,

shortly cylindrical, mouth entire or sometimes obscurely crenate, truncate. Petals 4, many times longer than the calyx, linear-obovate, slightly concave at the apex, puberulous outside, glabrous inside. Staminal tube inside, the mouth slightly waved. Anthers 5, elliptic, included. Ovary small (in the male flowers), sericeous. Style longer than the staminal tube, sericeous at the base, otherwise glabrous, stigma cylindrical. Ovary of female flower not seen. Fruit depressed-globose, tapering into a short pseudo-stalk, minutely tomentose. 1.5 in. in diam., crimson when ripe.

Perak: Scortechini, Nos. 219 and 388; King's Collector, Nos. 1876, 4348, 5735, 5765, 7783.

In many respects this resembles *C. patens*, Bl., but it has larger flowers and much less pyriform fruit. The staminal tube of this is moreover only slightly toothed at the apex, whereas that of *C. patens* has 6 long lanceolate teeth.

13. CHRISOCHETON PATENS, Blume, Bijdr. 169. A tree 20 to 40 feet high. Leaves with the petiole and rachis almost glabrous, 1 to 3 feet long; leaflets 10 to 13 pairs, opposite or sub-opposite, thinly coriaceous, oblong-lanceolate, rarely oblong-elliptic, narrowed and unequal-sided;

narrowed and unequal-sided; lower pale and with the 10 to also the reticulations prominent petiolule 1.5 to 4 in. Male (female shorter), supra-axillary, vergent branches the lower of and the uppermost short and stout pedicels. Calyx cupular truncate or wavy. Petals 4, the sub-spathulate elliptic, glabrous staminal-tube. Staminal tube expanding slightly upwards, pubescent outside, pubescent inside, the are slightly shorter than the small, surrounded pubescent; stigma below into a thick stalk-like part is 1. Lugd. Bat. IV, 2. Hieru in Hook. fil. Malacca: Mair No. 30, Hallett No.

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opposite or alternate, more or less acumina the apex and oblique
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eqnai to or twice aa long as tire ova:-y, .re at the moi
>> *Ovary* usually 8- 4-celled ; st^ ue staminal t
usually 2 in each cell. *Ca* aped, coriaceous
thickly so), 1- 4-celled, loctilicidal; seeds aril fate or
exarillat.)aminotis.—

DISTBIB. Species about 100, i found lay Archipel
a in Australasia.

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Panicles slender, lax, few-flower-Leaflets
linear-lanceolate

LeafletB oblong-lnnceolate, c
minato ; flowers "15 in. loi
Panicles with few branches ; the branch!
very short, spicate, distant; the flowers
only '1 in. long, densely crowded -ft. T>.
Panicles with many div ug branches, I
many-fiowered.

Leaflets minutely mgrnloBe when dry,
their main nerves indistinct

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i e, longer tlian the densely
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flowjirs "3 to "35 in. long;
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sericeous ovary; flowers '15 in.
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io membranous, glabrous out si
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ovoid-conic sparsely pilose ovur
Bowers -35 iu.

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Spikes or racemes axillary.

Spicate cymes or racemes from 4 to 8 in. long.

Disc fleshy, glabrous, crenulate, slightly longer than the hemispheric densely puberulous ovary; flowers 2 in. long ...

15. *D. racemosum*.

Disc puberulous, with thickened rugulose pilose mouth, longer than the ...

... 17. *D. flavescens*

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mouth with 8 obscure broad blunt teeth. Ovary depressed and broadly ovoid, pilose, 3-celled; style short, stout: stigma thickly discoid with an annulus at its base. Fruit unknown.

Perak: King's Collector, No. 6349.

A very distinct species distinguished at once by its small densely crowded flowers in interrupted spicate panicles.

5. *DYSOXYLUM ACUTANGULUM*, Miq. Fl. Ind. Bat. Suppl. 196, 503; Ann. Mus. Lugd. Bat. IV., 26. A glabrous tree, the young branches rather stout with pale brown striate bark. Leaves 6 to 12 in. long, equally pinnate: the rachis and petiole 4-angled: leaflets 3 or 4 pairs, coriaceous, opposite or sub-opposite, unequal-sided especially towards the more or less acute base, elliptic or ovate, or sometimes slightly obovate, the apex acute or shortly acuminate, both surfaces minutely rugulose and of a pale olivaceous colour when dry; main nerves imperceptible; length 2.5 to 4.5 in., breadth 1.25 to 2.2 in., petiolule .2 to .25 in. Panicles 2.5 to 4 in. long, spreading, puberulous. Flowers rather crowded, .35 in. long. Calyx puberulous, very shallow, with 4 deep reflexed triangular teeth. Petals 4, thin, much larger than the calyx, oblong, sub-acute, puberulous on both surfaces. Staminal-tube a little shorter than the petals, cylindric, the mouth with 8 rather deep sharp teeth, striate, puberulous on both surfaces; anthers 8, oblong, rather small, slightly exerted. Disc widely tubular, slightly exceeding the ovary, fleshy, its mouth slightly inflexed, obscurely 8-toothed. Ovary adpressed-pubescent, broadly ovoid, tapering into the long style: style pubescent in its upper part, adpressed-pubescent in the lower. Stigma exerted, shortly cylindric, with a small annulus at its base. Fruit obovoid, 3 in. long; the pericarp very coriaceous, glabrous, pale brown when dry and minutely rugulose, 3-celled. Seeds one in a cell, obovoid and apparently when fresh embedded in pulp. C. DC. in Mus. Phan. I., 525.

Singapore: Ridley, No. 3828. Perak: Scortechini, No. 1048. Distr. Bangka.

The late Fr. Scortechini collected only a single specimen of this which is in flower, and Mr. Ridley collected it in fruit in Singapore. These specimens agree absolutely in their leaves with a specimen from Bangka now in the Leiden Herbarium on which Miquel founded the species.

Miquel does not mention the flowers, and the specimen lent to me by the Leiden Herbarium is in fruit. In the Leiden Annals, Miquel expresses a doubt whether it may not be Aurantiaceae. [redacted] (which Miquel had never seen) are however unmistakably Meliaceae, and the leaflets moreover are not pellucid-dotted.

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21. A glabrous tree 40 to 50 feet high. *Leaves* 9 to 14 in. long; *leaflets* sub-coriaceous, opposite, about 4 pairs, elliptic-oblong or elliptic, cuspidate or shortly acuminate; the base acute, slightly oblique; main nerves 10 to 12 pairs, curved, spreading, stout and prominent on the lower surface; length 3.5 to 6 in., breadth 1.5 to 2.75 in., petiolules about 3 in. *Panicles* axillary or terminal, about half as long as the leaves or less; their branches divaricating and racemoid, glabrous. *Flowers* u« or. bud. *Calyx* a very short obscurely 4-toothed cup. *Petals* 4, oblong, obtuse, minutely puberulous externally. *Staminal tube* free from and nearly as long as the petals, cylindrical, the mouth with 8 broad shallow crenulate teeth, glabrous outside, villous inside. *Anthers* 8, short, ovate, included. *Disc* tubular, glabrous, crenately 4-toothed, longer than and surrounding the ovary. *Ovary* glabrous, narrowly ovoid, tapering into the cylindrical style. *Stigma* slightly exserted, discoid with a band round its base. *Fruit* depressed-globular with 3 shallow vertical grooves; tapering at the base into a pseudo-stalk, 1.5 in. or more in diam., 4-celled; the pericarp woody, glabrous. *Seeds* sub-globular. G. De Caud. in *Mon. Phan.* 1, 503. *D. brevipes*, Hiern in *Hook. fil. Fl. Br. Ind.* 1, 560; C. DC. in *Mon. Phan.* 1, 503. *Hartighsea costulata*, Miq. *Fl. Ind. Bat. Suppl.* 196, 505.

Malacca: Smith; *Maingay*, Nos. 319, 320 (Kew Distrib.), Stolierza, Wray, King's Collector. *Pahang*: Ridley. *Singapore*: Ridley. *Sumatra*.

The type specimens of *D. brevipes* Hiern at Kew agree exactly with those of the older *D. costulata* Miq. in the Royal Herbarium at Leiden.

10. *DYSOXYLUM MACROTHEPUM* Miq. in *Ann. Bot. Soc. Lond.* 1859, p. 105.

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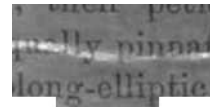
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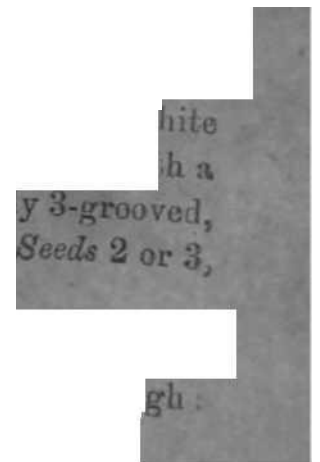
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◀◀ South Andaman: King^a Collector.

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 surfaces when dry minutely papillos
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 length 6 to 1*2 in., toe to o in., petiolules only -IS
 tomeutoae- S. ;illary, -75 to a. long-, the.rac]>

woody, tomentose. *Flower-buds* globose, *15 in, in diam., on thick pedicels. *Calyx* carapanulate, enveloping the petals, tnembraouB, densely tomentoao cxtornally, *Petals* 4

Sth truncate bases and frab-aeute apices, concave, densely ad-
 ubescent n inside. *Stawinal tube mnplt* shorter
 petals, c\ it, her fleshy, gUbrous, the month with 8
 tallow e ..:eth: s 8, oblong, longer than the
 •I. *Disc* (if any) very small, *Ovary* broadly ovoid,
 , into the k style win .tsely pilose towards
ima thick, discoid, depressed in the centre. *Fruit* unknown*
 t»g's Collector

■ in this plant, if ,t at all, must be very small
 i detect it in the bud. In ,1 refer it to *Dysoxylm*
 \ it baa the general facies. The shrubby habit, short
 thick
 Inflorescence, globular nower-l* nd the occasionally per-
 f leaves make this a remarkable and easily rec
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6. AMOORA, Rosb.

illy-pinnate; lefci
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 jtinve, hi >r1 act- campanula!
 jcot ly 6-10-crenate ; ani -10, included. *Bis*,
 ■■, short, 3-celled; cells 1-2-ovuled, stigma sessile. I
 -globose, c i> loculicidall; I. or
 h ventral liile.—D;
 of about 25 sp& lining only in India an Malay Archi
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Bpcoios

more than 3 petals, and I have abandoned .in the form
in the note under the genus *Aglaia*, I have explained
have made in the structural character of that genus. I may add that
r, Hiern, is certainly on *Ag* all that .1<>>•
with *m* 10 anthers in two ovoid 5-celled ovary and fruit, , of
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female *s in
Stamens 3 ' ' " ^ ---H-L loculic
Stamens 6 iA.
ors -15 in. long A. ft_c

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lfiGt! Caadat(oaso 6. A. cucullatc
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long, etaramal tube cylindric

Stamens 10 Jf2iV
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flowers 'lo in. long
Panicles g to 10 i*. long, TMfy-pul &• A.
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- . rotu n i.l. v v e an d m n ch i mbri catc, gl abrous in side,
tetimes puberu mtside. *Stamina! column* Seshy,
globular-ovoid,

rath almost cL elliptic,
■picnlatc; radimeni vary minute,
^toall pubescutit disc. . iown ; the fruit
implel tiger tin leaves, pinki:
II |to*ei sub-globnhv dehiscent, about
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ml Rianer. I..

■i'fm ii, Wray, King's Collector. Penang:
Curtis,

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jlow< md the petals are pink.
[imens agree -barium from
jh Miquel founded the 6 Miquel in his descrip-
in that i Irons,—a character by which
TS^^tf recognised.

ROUITUKA, W. and A. Prod. 119. A tree from 30 to
it high ; young branches stout, lenticellate, at first puberulous,
glabrous. • 1 to 3 feet loi "qually pinnate, the
ulous; h-aflets 9 to ; '-coriaceous, opposite, oblong
iy and bluntly acuminate, entire j tliL nar-
sue ; both su nerves 12 to 1*
3 to 9 in., breadth 175 to 3*5 in., petiolnie "2
lobular, in solitary ax31ar

■;lo3' ; &\$ the ibout 3 in.
angles oi tly drooping; the flowera name-
minute scale-like bract, the pedic ort, stout.
◀Hwlinir^^ ^11 ronit'orm sepals, pubescent

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small openin i ing th(
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L to the to try ovary
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puberulous spiki

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ii' or ellipsoid with a 3-lobe- typogynou Uy
ular, yellow when ripe, 1 to

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B.: Ind. I, 559; C. DC. M¹ > , — , *., 'M<<. i'i, oyivat t

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Perak: not uncommon. Malacca; Griffith (Kevv

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Maingay (Kcw

damans; King's Collector, l.i,

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581. A tree 20 to 30

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indiam. Ca^ cnpular, wii

ia the lower half and puberalous outside.

coucave, much larger than the sepals,

shorter than the petals, flesh

Ioded. Ovary depress

beru Ions; stigma elong;-

bnmohed or only slightly branchou rn

with larger ovaries. Fruit a

brous, Miq. Wk Ind. Bat. !, pt. 2. p. 535:

DC. Monogr. Phan. I} 581.

■ *Bijdi*

ion the leaves of this species often
attain greater size Mian the measurements given above.

I. AMOORA RUBIGIXOSA, 'Hiern in Hook. fil. PL Br. lad A
tree 80 to 100 feet high; young branches stout, rusty-puberulon rfy.
Leaves 18 to 24 in. long, equally pinnate ; leaflets 8 to 10 opposite or
alternate, coriaceous, oblong or elliptic-oblong, sub-j or shortly

fat

acuminate, the base cordate and slightly oblique ; *un* face
glabrous, shining, the lower densely covered by minute

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superficial stellate hairs; main nerves
r.ent beneath; length 5 , -e^tl

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Maingay, No. 340

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in Monogr. Phan. I, 584.

!>.), No. 343.

. Roxb. Corom. PI. III 54 t 258 A

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iiposite, oblong-elliptic, sub-falcate,

' y obli_{qne} at the base : main nerves indistinct, numerous,

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'JPntfeto about equal to the leaves, axillary, with

rapular, lepidoto outside, with 3 broad
blunt

fch. P ban the calyxj glabrous *b*
 apex blunt and concave. 81 Itorter I an
 ifca mouth with 6 shallow broad blunt ero
 include iif-way up the tfc
 -truncate. /■' **little I**
 aw-flW JS aboi
 jtaminal tube and antb
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lor, 2*5 in. in diam., dehiscii -, -es, the peri

a Burma T, '221 ; C. Q\ oogr. Pbnn. ;,
 Br. Iud. I, . W\ .Sjlv. Uq. Am

b. 37.

212.
 iq. MSS.
 iini. 9 pore: Ridley.
 Dis' thfils: Burma, Khaaia Hills,
 7. ■.-. sp. A ffree
 achi long, unequally pinnate : **leaflets** 11 to 17,
 sub-onposite

»>long-i<

the base wanded or cuneate, very n b surfaces gl
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 rer than the calyx, brew;
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tensely pubes ■ large,
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cnto
 in. in diam. when ripe, indehiscent, usually **with** 2 s^eds J
 length ; peduncle, stout, -5 in. lo

ak: King's Collector, 2 i)tf

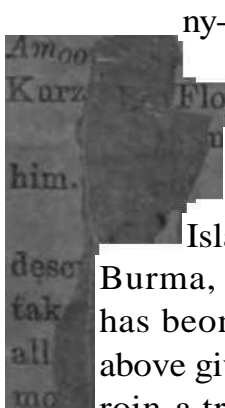
7. Pahau'J : Ridley, No. 50iJ7

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us, opposite or sub-opposito. narrowly of
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both surfaces glabro J6 to 18 pa -ominei the
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Fruit obovoid, about k • ■'



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fit Wallich's plant at all.

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. Hiern in'Hook. fil. PI. I JL
feet high; young branches stout, rusty pubescent.
18 to 30 in. U, i; L5, opposite, thin I;
sub-acute or obtuse "Toward and oblique at tip, both
glabrous; main nerves 8 to 10 pairs, ascending! ■ pro-
neath; length 4 to 5 in., branches 1/5 to 2/5 in., petioles
Panicles solitary, axillary isfycy pal
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^wers ovoid or obovoid-glol

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Flowers ovoid-campanulate with calyx and

and U. A.F, a, -05 in. long; calyx lobes, divided to the base

Flowers obovoid-globose, .08 in. long; calyx with 5 broad shallowly whitish

of ... 13. A. Kunst per, pubesc Panicles small branch

Panicles crowded, mainly crowded,

Leaves in the nerves covered with rather white stellate hairs intermixed, and with superficial shining lines; flowers sub-globular, petals orbicular ... 15. Leaflets as in text. 'g elliptic,

var.

Leaflets tomentose on the lower surface, scales in any not shining; petals elliptic, Rows ovoid ... 15, A. argent} far. est

Panicles not condensed, their main branches spreading, the ultimate divisions singly flowered spikes; flowers depressed-globular, sessile. Flowers 1 in. in diam.,

Main nerves of leaves 28 to 36 pairs: panicles 9 to 12 in. long ... 16. A. Main nerves 16 to 24 pairs; panicles 1 to 8 in. long

•4 in. in diam.

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a Flora of the Sjihtyom Feni:

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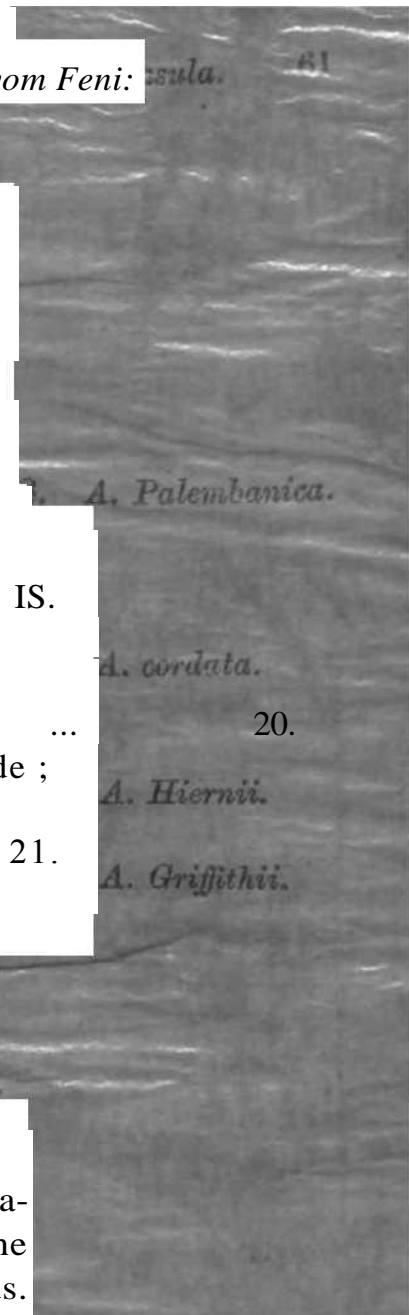
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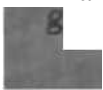
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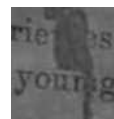
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Under his species *A. cordata*, Mr. Hiern has in my opinion included two plants. The species *A. cordata*, as here limited, includes only Hiern's form with hirsute calyx, and is really little more than a large-leaved variety of *A. palembanica*. Mr. Hiern's form with glabrous calyx is, in my opinion, a distinct species, the calyx differing not only in being glabrous, but in being much smaller, and of quite a different shape. I have described it as a species under the name *A. Hiernii*.

20. *AGLAIA HIERNII*, King, n. sp. A tree 40 to 80 feet high; young branches, petioles, rachises, petiolules and inflorescences, densely clothed with rather soft rusty stellate tomentum. Leaves 14 to 18 in. long, unequally pinnate; leaflets 7 to 9, the pairs opposite, thickly membranous, oblong or oblong-lanceolate; the terminal one oblong-oblanccolate, longer than the others and two or three times as long as the petiolule; the apices of all shortly and sharply acuminate, the bases cuneate, especially of the uppermost ones; upper surface glabrescent with a few scattered stellate-hairs, the midrib and nerves densely stellate-pubescent; under-surface uniformly covered with pale-brown-centred scales and a superficial layer of rufous stellate tomentum; main nerves 13 to 22 pairs, sub-horizontal, depressed on the upper and bold on the lower surface when dry; length 4 to 6 in. (the odd one an inch longer); breadth 1.75 to 2.25 in., petiolules of the pairs .45 in. Panicles slightly supra-axillary, solitary, 8 to 12 in. long, the branches divaricating, the ultimate branchlets bearing densely-flowered spikes. Flowers 4 in. long, sessile, globular. Calyx cupular, quite glabrous, with 4 or 5 deep broad rounded imbricate lobes. Petals 5, rotund or ovate-rotund, unequal, much longer than the calyx, the outer 3 the largest, all concave and glabrous. Staminal tube shorter than the petals cup-shaped, the mouth wide; the 5 ovate anthers inserted by very short filaments on the edge of the tube, but inflexed so as to be included. Ovary small, pubescent; stigma depressed-spheroidal, pubescent. Fruit unknown.

Malacca: Maingay. Perak: King's Collector, Nos. 5976, 6706, 10875.

This is allied to *A. cordata*, Hiern, but differs from it in having leaflets with more numerous and more horizontal main nerves, more densely tomentose and lepidote beneath. The calyx of this, moreover, is conspicuously different, being smaller, having broad lobes much shorter than the petals, and quite glabrous, while the calyx of *A. cordata*, as limited here, has a large calyx densely stellate-tomentose externally, and with acute lobes often longer than the petals. This is a large tree, often attaining a height of 80 feet, while *A. cordata* is a small tree from 20 to 30 feet high.

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1-2-seeded; seeds oblong, invested in a pulpy aril, exalbuminous.—
 DISTRIB. Four species, all Indo-Malayan.

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|---|-----|-----|-----------------------------|
| Leaflets 5 to 10 in. long; main nerves about 10 pairs | ... | ... | 1. <i>L. domesticum</i> . |
| Leaflets 2 to 3 in. long; main nerves very numerous | ... | ... | 2. <i>L. cinereum</i> . |
| Doubtful species | ... | ... | 3. <i>L. pedicellatum</i> . |

1. *LANSIUM DOMESTICUM*, Jack in Trans. Linn. Soc. XIV, 115, t. IV, f. 1. A tree 30 to 50 feet high; young branches with pale glabrous lenticellate bark. Leaves 12 to 18 in. long; leaflets 5 to 7, alternate, coriaceous, oblong-elliptic, sometimes slightly obovate, abruptly shortly and obtusely acuminate, narrowed and slightly unequal at the base; both surfaces shining, reticulate, glabrous or slightly puberulous toward the base; main nerves about 10 pairs, ascending, curved, depressed on the upper, prominent on the lower surface when dry; length 5 to 10 in., breadth 2.75 to 4 in., petiolules .5 in.; the terminal 1 in., jointed. Hermaphrodite spikes from the trunk and larger branches, solitary or in fascicles, pubescent, much shorter than the leaves. Flowers sessile or on very short pubescent pedicels, solitary, minutely bracteolate at the base. Calyx fleshy, puberulous, with 5 shallow rounded teeth. Petals longer than the calyx, sub-rotund, glabrous. Staminal tube sub-globose, the mouth sub-entire, truncate, shorter than the petals, the stamens in a single row. Ovary sub-globose, tomentose, 5-celled; style short, thick, 10-nerved; stigma large, discoid. Berry oblong-ovate to obovoid, sub-tomentose, 1 to 1.5 in. long; seeds usually about 2, embedded in much translucent aril. Correa de Serra in Ann. Mus. X, 157, t. 7, fig. 1; Blume Bijdr. A. Juss. Mem. Mel. 81; Miq. Fl. Ind. Bat. Vol. I, Pt. 2, 545; Hiern in Hook. fil. Fl. Br. Ind. I, 558; C. De Cand. Mon. Phaner. I, 598.

Malacca: Griffith, Maingay (Kew Distrib.), No. 338. Perak: Wray, King's Collector, common. Cultivated in all the Provinces, except the Andamans and Nicobars, on account of its edible fruit. DISTRIB. The Malayan Archipelago.

There are several varieties of this which have been by some authors regarded as species, e.g., 1. *L. ...* Hassk.

2. *LANSIUM CINEREUM*, ... Fl. Br. Ind. I, 558. A tree; young branches ... afterwards cinereous. Leaves 3 to 5 in. long, ... ts 3 to 5, opposite, sub-coriaceous, elliptic-oblong, the base acute; both surfaces quite glabrous, ... main nerves very numerous, obscure; length 2 to 3 in., breadth .8 to 1.5 in., petiolules .1 to .25 in. Spikes nearly as long as the leaves, glabrous. Flowers hermaphrodite.

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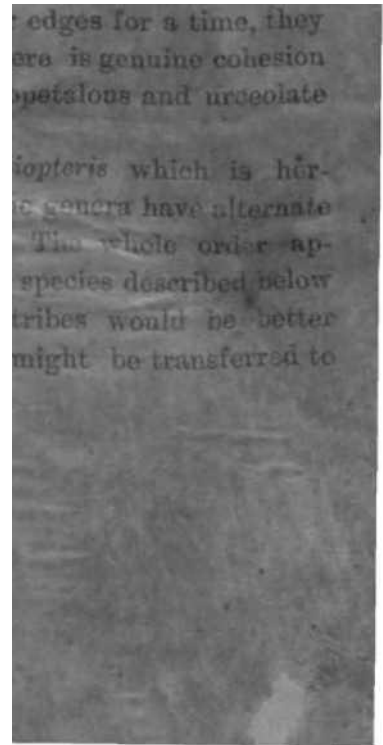
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I. STROMBOSIA, Blume.

Trees or shrubs. *Leaves* alternate, petioled, simple, penni-nerved. *Inflorescence* shortly cymose. *Flowers* regular, hermaphrodite. *Calyx* a shallow cup, more or less 5-lobed, inferior (partly superior in some species). *Petals* 5, free, hairy within. *Stamens* 5, opposite the petals and adnate to their bases. *Anthers* 2-celled, introrse. *Staminodes* 0. *Ovary* wholly superior, or (in some species) partly inferior, imperfectly 4-5-celled, surrounded by a perigynous lobed disk. *Style* simple. *Ovules* 4-5, pendulous from a central placenta. *Fruit* drupaceous, surmounted by the remains of the calyx-lobes and of the style, stone crustaceous. *Seed* pendulous, embryo minute within fleshy albumen. *DISTRIB.* Species 6, natives of the Western Peninsula, Ceylon and the Malayan Archipelago.

- Flowers in pedicelled few-flowered cymes ... 1. *S. javanica*.
 Flowers in sessile many-flowered fascicles ...
 Leaves ovate to oblong-ovate, petals 2 in.
 long 2. *S. multiflora*.
 Leaves more or less rotund; petals 1.5 in.
 long 3. *S. rotundifolia*.

1. *STROMBOSIA JAVANICA*, Blume Bijdr. 1154. A tree 20 to 50 feet high; young branches rather slender, glabrous. *Leaves* thinly coriaceous, glabrous, oblong to elliptic, shortly acuminate, the base rounded; main nerves 5 or 6 pairs, curved, ascending, slightly prominent beneath; length 4 to 7 in., breadth 1.65 to 2.65 in., petiole .6 to .75 in. *Cymes* axillary, not longer than the petioles, few-flowered; bracts small, deciduous, leaving pale scars. *Flowers* ellipsoid in bud about .2 in. long. *Calyx* nearly flat with short lobes, inferior in the flower; (accrescent and half inferior in the fruit). *Petals* erect, much exceeding the calyx, oblong, obtuse, hairy towards the apex. *Stamens* opposite to, nearly as long as, and adhering to the petals. *Ovary* elongate, tapering into the short style. *Fruit* oblong-ovoid, glabrous, .8 in. long, and .6 in. in diam., the apex crowned by the calyx and disc. Blume Mus. Bot. Lngd. Bat. I, 251; Mq. Fl. Ind. Bat. I, Pt. I, 787; Mast. in Hook. Fl. Br. Ind. I, 579; Kurz For. Flora Burmah, I, 235; Valetou, Olacinae, 86.

Penang: Wallich. Malacca: Maingay. Perak: King's Collectors.

2. *STROMBOSIA MULTIFLORA*, King, n. sp. A glabrous tree 50 feet high and upwards; young branches slender, striate, minutely lenticellate, cinereous when dry. *Leaves* coriaceous, ovate to oblong-ovate, acute or shortly acuminate, slightly oblique, rounded at the base, the edges undulate; leaves 5 to 8 pairs, slightly curved, ascending, slightly prominent on the lower, obsolete on the upper, surface; length 2.5 to 4

in., breadth 1.5 to 2 in., petiole .35 in. *Flowers* in dense axillary fascicles; pedicels shorter than the flowers, each with several rotund, concave, minute bracteoles, one of which is close to the calyx. *Calyx* a shallow cup with 5 broad rounded concave segments. *Petals* 2 in. long, much longer than the calyx, erect, oblong, obtuse, their apices re-curved, pubescent on the edges and in the upper fourth of the inner surface. *Stamens* opposite the petals to which their filaments are attached for two-thirds of their length; *anthers* short, ovate. *Ovary* sub-globular, grooved, much shorter than the long cylindric style, *stigma* minute. *Fruit* unknown.

Perak: King's Collector, No. 7824. Penang: Curtis, No. 859.

Evidently a *Strombosia*; the fruit, however, is as yet unknown.

3. *STROMBOSIA ROTUNDIFOLIA*, King. A tree or shrub; young branches rather stout; their bark cinereous, rugose, much lenticellate. *Leaves* coriaceous, more or less rotund, glabrous; main nerves 6 or 7 pairs, rather straight, sub-ascending, obsolete on the upper, slightly prominent on the lower surface when dry; length 2.5 in., breadth 2 in.; petiole .3 in., stout. *Fascicles* small, axillary, few-flowered, shorter than the petioles; pedicels short, each with 2 or 3 minute rotund scale-like

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- 1. Inflorescence pale-tomentose; flowers 2 to 25 in. long ... 1. *C. parvifolius*.
- 2. Inflorescence rusty-tomentose; flowers 4 in. long ... 2. *C. grandifolius*.

1. *UTENOLOPHON PARVIFOLIUS*, Oliver in Trans. Linn. Soc. XXVIII, 516, t. 43. A tree; young branches terete, purplish when fresh, cinereous when dry. Leaves opposite, coriaceous, elliptic or oblong-elliptic, entire, shortly and obtusely acuminate, the base cuneate or rounded; upper surface shining, the lower dull, both glabrous; main nerves about 10 pairs, faint, spreading, forming a double series of arches within the edge; length 2.5 to 4.5 in., breadth 1.25 to 2 in., petiole 3 to 5 in. Panicles terminal and axillary, shorter than the leaves, condensed, minutely cano-tomentose; bracts ovoid-deltoid, minute, deciduous; pedicels stout, about as long as the calyx. Flowers 2 to 25 in. long, ... *calyx-lobes* sub-rotund, concave, minutely tomentose ... outside ... as inside. Petals coriaceous, erect, oblong, concave, ... the calyx, minutely pale tomentose on the back, ... and inner surface glabrous. Anthers ovate, adnate, ... the filaments. Ovary ovoid-globose, woolly, 2-celled, ... base by an annular disc: style long, cylindric, glabrous, ... ellipsoid, slightly obovoid, apiculate, striate, 6 to ... y pale tomentose; the pericarp woody, splitting cu ... Seeds with an imperfect pectinate arillos. Masters Ind. I, 579; Beccari, Malesia I, 120. ... gay (Kew Distrib.), No. 382. Perak: ... rtechini, ... tor.—DISTRIB. Borneo, Beccari, P. B., ... o. 2637, ...

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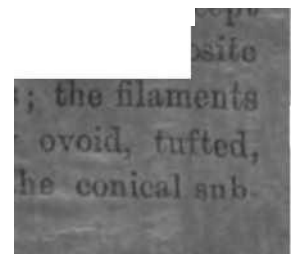


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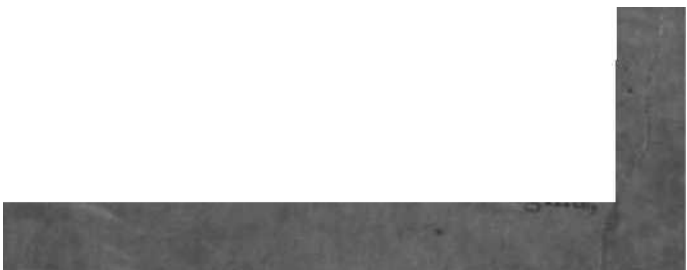
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OF THE

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JOI . LXIV- Part II.-NATURAL
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No. II. — 1895.

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4. All colour-solutions in water, placed in test tubes without boiling and simply closed with a plug of cotton-wool.

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Litmus	Unbleached.	Unbleached.	Unbleached.	Unbleached.	Unbleached slightly more purple.	Unbleached slightly more purple.	Began to bleach after few days, in 2 months quite bleached.	Bleached.	Bleached.
Methyl Blue	Unbleached.	Unbleached.	Unbleached.	Unbleached.	Unbleached.	Unbleached.	Unbleached.	Unbleached.	Partially bleached.
Methyl Green	"	"	"	"	"	"	Partially bleached.	No green colour left, solution blackish.	No green colour left.
Methyl Orange	"	"	"	"	"	"	Unbleached.	Result inconclusive.	Experiment lost.
Eosine	"	"	"	"	"	"	Partially bleached.	Considerably bleached.	Almost colourless.

1895] A. Pedler—Bleaching action of light on colouring matters. 143

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E. Cotton-wool dyed with strong solutions of colours, then dried thoroughly and placed in tubes which were rendered

1895.] A. Pedler—Bleaching action of light on colouring matters.

J. H. P. 67. 11. 19	Colour.	IN TOTAL DARKNESS.				EXPOSED DAILY TO DIRECT SUNLIGHT.			
		2 months after.	10 months after.	14 months after.	35 months after.	2 months after.	10 months after.	14 months after.	35 months after.
	Litmus ...	Unbleached.	Unbleached.	Unbleached.	Unbleached.	Still strongly coloured.	Still rather strongly coloured, but less so than when started.	Considerably bleached but still has light blue colour.	Considerably bleached but still has faint colour.
	Methyl Blue ...	"	"	"	"	Apparently slight tendency to bleaching in parts.	Slight tendency to bleaching, colour not so brilliant.	Slight tendency to bleaching.	Still strongly coloured.
	" Green ...	"	"	"	"	Considerably bleached.	Considerably bleached.	Practically entirely bleached.	Practically bleached.
	" Orange ...	"	"	"	"	"	Distinctly bleached.	Entirely bleached.	Bleached.
	Eosine ...	"	"	"	"	Very decided bleaching.	Almost entirely bleached.	Practically entirely bleached.	Bleached.
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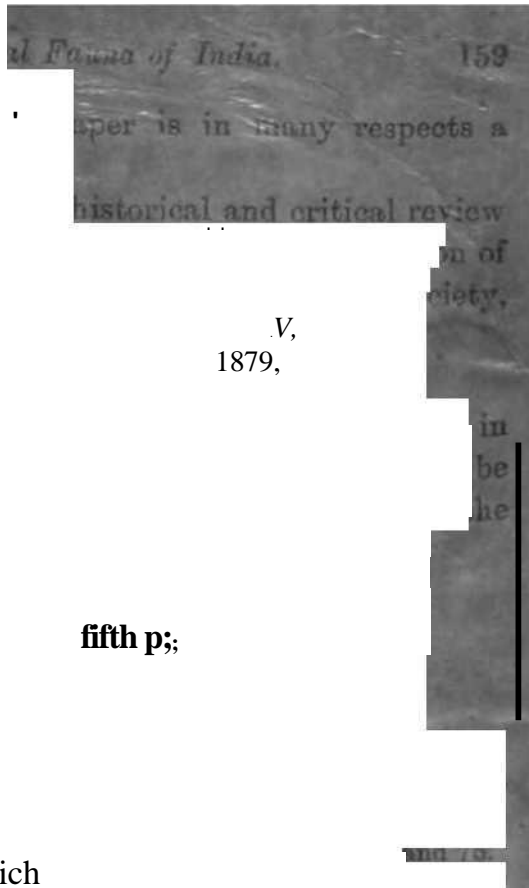
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Paratymolus, Miers, P. Z. S.,

Paratymolus, Haswell, Ann.

Anstr. Crust., p. 142.

Paratymolus, Ortmann, Zool. Jahrb. Syst., &c., VII. 1893-94, p. 31.

I agree with Ortmann in placing this genus among the *Achseus*-like *Maiidae*: the position of the external genitalia of an ovigerous female in the Museum collection is conclusive.

Carapace elongate-subpentagonal, not depressed.

Eye-stalks long, slender, salient, non-retractile: no orbits or pre-ocular and post-ocular spines. Antennules longitudinally folded beneath the rostrum.

Antennae long, exposed, dorsally, in the greater part of their extent: the basal joint slender, but so short as hardly to reach the front.

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Echinoplax pungens, Wood-Mason.

Echinoplax pungens, Wood-Mason, *Ann. Mag. Nat. Hist.*, March, 1891, p. 250.

Carapace pyriform, ... regions well delimited; densely ambulatory legs, and exte- nies. The abdominal tergite of

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trum simple, shaped like the beak of a bird. Eyes retractile against the sides of the carapace: a small pre-ocular and post-ocular spine, but no definite orbit.

Basal antennal joint slender throughout: the antennae visible, dorsally, from the base of the second joint.

Mems of the external maxillipeds produced antero-externally to form a foliaceous lobe which covers the greatly produced efferent branchial orifice.

Abdomen in the male seven-jointed: in the female the fourth, fifth and sixth segments, though distinctly recognizable, are firmly fused together.

Chelipeds in 11 fler. gs long and slender.

Only eight Le

Encephaloides armstrongi, Wood-Mason

Encephaloides armstrongi, iVoo'l-^l ason, Ann. Mag. Nat. Hist., March, 1891 p. 259.

Carapace heart-shaped: its greatest breadth is equal to its length with the rostrum: its surface in the adult is nodular or pustular, in the young coarsely spiny. The gastric and hepatic regions are well-defined; but the cardiac and intestinal regions are entirely concealed by the branchial regions, which rise up like a pair of mammae, and meet, but without any fusion of walls, down the middle line.

The rostrum, which is shaped exactly like the beak of a bird, is about one-fourth the length of the carapace proper, and has a finely serrated edge.

In the male the abdomen is distinctly seven-jointed; but in the female the fourth, fifth and sixth segments are immovably sutured together.

The eyes which are small, slender, and unpigmented, are retractile against the side of the carapace: there is a very narrow supra-orbital cave ending anteriorly in a minute tooth, and there is a small post-ocular spinule.

On the dorsal aspect the antennae are plainly visible on either side of the rostrum, from the base of the 2nd joint of the peduncle: the flagella, which are of hairlike tenuity, hardly surpass the tip of the rostrum.

Owing to the prolongation of the efferent branchial canal, the front edge of the buccal frame is V-shaped.

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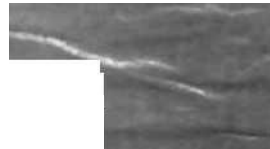
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elevations. On the cardiac region, and also on the intestinal region, in the middle line, an acuminate eminence.

The rostrum consists of two divergent spines, about one-third the length of the rest of the carapace.

The eyes stand well out from beneath the pre-ocular spine, and are retractile against a small post-ocular tooth.

The other appendages closely resemble those of the preceding species; but the chelipeds, in the adult male, are shorter, being only equal in length to the carapace and rostrum, and the fingers have their

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Stomatia beauchampi.

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pair of legs are hardly longer than the ()
much longer than the last three pairs: t
curved, and strongly toothed along the p

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Mergui, the Nicobars, and the

Naxia diacantha

Crust., p. y

Naxia diacantha, Adams and White, 'Samarang'

Naxia diacantha, Stimpson, Proc. Acad. Nat. Sci.

Naxia diacantha, Heller, 'Novara' Crust., p. 3.

Hystenus diacanthus, A. Milne-Edwards, Nouv.

p. 250

Naxia diacantha

figs. 172, 173 (male a

Hystenus diacanthus, pp. 19 and 26; and Zoology H. M. S. 'Ale

v. 182 ai

Brachyura, p. 57.

Hystenus diacanthus, H.

and Cat. Austral. Crust., p. 20

Hystenus diacanthus, de

Naxia diacantha, C. W. S.

1888-89, No. 4, p. 51, pl. ii. fig. 8

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p. 109

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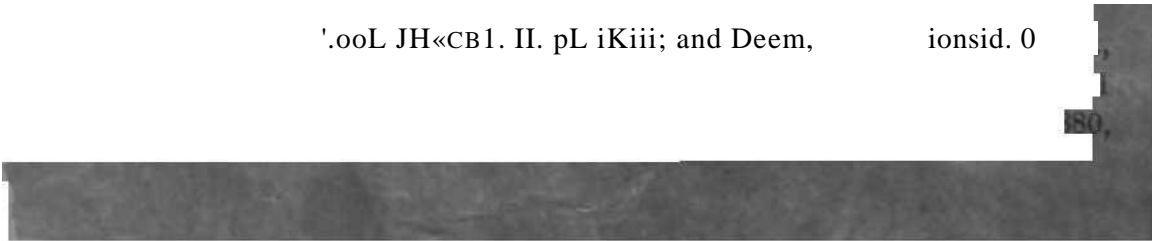
Hlgeria arachnoides (Rumph), Edw.

anpfa, pL viii. fig. 4 j [and I*treille, Eucyc. Pl. 281. fi>
 . 291; ana Neumann, 6y*t. C
 - Wales, IY. 1379, p. 439, and Ca<
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 p 48j and J. R, He

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The abdomen consists of seven segments in the male, and of seven in the female of all except *D. muricata* and *hybrida*.

Key to the Indian species of Doclea.

I. Pterygostomian regions distinctly canalculated fore and aft.

- 1. Rostrum elongate—[redacted] length to two-fifths the length of the carapace proper, and with the points very widely divaricate. [redacted] the last lateral [redacted] the median posterior spines [redacted] buge size *D. tetraptera.*
- n.] [redacted] on the branchial region [redacted] spine..... *D. ovis.*
- ii Three lateral spines on the branchial region, the last being short: a short median posterior spine: [redacted] no apme [redacted] urn o [redacted] t) *D. japonica.*
- iii. Three lateral spines on the branchial region, the last being, like the postero-median spine, long: a line of tubercles, two of which are usually produced to form spines; down the middle of the carapace..... *D. canalifera.*

II. Pterygostomian regions not canalculated.

- 1. Carapace discoid: [redacted] pair of trunk-legs three to four times the length of the carapace: a single series of tubercles or spines down the middle of the carapace..... *D. gracilipes.*
- 2. Carapace globular: 2nd pair of trunk-legs hardly twice the length of the carapace: a short series of tubercles or spines on either branchial region parallel to a long median series of tubercles or spines [redacted] den [redacted]
 - i. Tubercles, not spines on the carapace..... *D. hybrida.*
 - ii. Spines not tubercles, on the carapace..... *D. muricata.*

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Brachyura, p.

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Vdawie and

Croat., p. 13.

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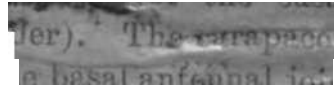
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2ticipp", Leach,
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Journ. Linn.

Joarn. Linn. Soc.

au Hist., Vol. XV. 1885, p. 3; and '

Vol. XIV. 1879, p. 0

gar' Brachyura, p. 69.

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philyra, (Herbst.) Leach.

Cancer v\ ,rbst(KrabbeD, TIL iii. p. 51, pi. lviiL tig. 4.

< *philyra*. Leach, ! Ucell., IH. 16; mid Desmreat Condit

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a. A., pi. via

Kdwarda, Hist Nat. Crust., I. 330 ; and Adams and White, ' Samaraiig ' Crust.,

Vi-chiv. du &W VIII. J&72t p. 289

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and KOSSMANN, jtauc lioux. MEitH., CULST., ,

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> arete, Hist,
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Mihi

ttid JiiEttS, Zoology H. M. S.

. i, Vol. XV. p. 10 [■ (*). ai!> iengor^l
i Boll. Soc. Nat.,Napol.,III. 18<9,.p. L79] ; -and Or . Jahrb. I

»; and Henderson, Trrjui. Linn. 3oo., Zool

(=-var. *aculetta*), de Haau, Faun, Jt<

aas, Siidafr. I I; and BianconJ,

p. 103, pL v tig- 2 ; and K ieiso Roth, Meet. Cr

fig IWgou dBichi

int., p. \-U

Man, Joum. Li'

Proc. tl J. II.

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MAOR

A^ Miers.

Jfocroscrioma,

v ;

V. 1879, p. 665;

and

'Challenger' BJ

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..<rs, Zoology H. il.

Oaa

Bubpyrifurm, but bro.

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orbits: t\

-al surface unarmed,

ulated, or with

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of elongated lateral spin*

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strongly developed latei

Lpibranchial spine, prei

mailer spiues. The spines of the rostrum are well deve-

i. The o;

sre rotmctilo wi

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which are

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"onatMorably enlarged and armed

with one or two 8]

Tl

(bile portion of the antenna

is

concealed by the rostrum, sometimes exposed. The margin
of the external maxilla is produced into a sharp point
at an angle I between the ischium, and the insertion
of the palp.

either are

The chelipeds in the male are rather short. The ambulatory legs are enlarged only at the tip, or not. The ambulatory legs are rather short.

which, be included

with

•*coeloma* nwt>

, Plate IV. fig.

Closely allied to *Macroco*[^]

*Her**, *Challenger'

ohynra, p. 81, pi. x. fig. 2 ; and to *Bnt*>.

¹pgy

I. S. 'Alert,' p. 526, pi. xlvi. fig. B.

gions

still larger—one and two

•*anchii*

;

■*apaco* rather

more than } longer t

i-defined

surface is regularly and

oil with twos' j tines—one behind t

Larger—side by side—on the cardiac obliquely behind the other—on the lateral very small ones—one behind the other—on I

The rostrum consists of two straight shari: slig'ti

hi< about one-fifth or. one-sixth the length of t ice pro;

in the male are sligl \-.y QL in the areati

d.

the basal joint of

•*ennaa* i: broftd

•lar ; its antero-orbit— antero-mter->ie orbits, which Tged lips, ;

external

angle is

pro3

■bital process having ii.^

arriesa

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the form of large deep pr

stituted as in *Micippa*.

^arply gr-inular as far as I. v

The chelipeda ft' the male they i long n,s the carapace strongly arched mi,

than the other legs, are i and have large bro at the tip. In

shorter, than lh<

fingers

alipeds, although not
hardly stouter than the other legs, and fingerp +h.Rt, can be cloi
ipposod throughout then¹ extent.

The ambulatory legs are slender: in all the meropodite has
its
posterior margin minutely spinuloae, find has e on the far end
the upper margin: the first pair, which are the longest, are a lit!
longer than the chelipeda.

um carapace and le^s arc beset ivtth stiff curly hairB,

The abclomen in both sexes t: a of seven distinct segments.

This ape >mmouly eucru> i'latc armour

■itolites, romi.

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Dana, I
no, Kiera, J

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in ar orbits formed by a proi
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iilar toofcb, and *by* a process of t
being in' the closest.
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light *no* }ion of its nal angle, and t]
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. S. Ex]

I. Ilai

I lines
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nearl;
length is aboi,

onea have the basal joint 1>

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next two joi>

the flagellum is eho.

formed as already described : ti dl;

and the post-tK ular tooth is %U

Lidt male are as Id., 10 carapac©^

■ or legs : then

c sui'faco; the carpus is

id th

id deal broadened and i tflatr '—and the

mooth and polished, the fingers bfcin^ .

Li

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y as lontr

portion

Long claw-Ul.

iicnlate; the isclaum in all

isTitoreor less nodular on the upper aorface; and

in the first]v tiicli are considerably

ceed the length of tihs carapace and ros :

he.Mnsenm coilectiou ai^e forty well preserved

nans. ■

Ti: relation betweeni

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ed and is so broad in front as to be a]

the

am is defloxed at an angle of 4

;

ger' Brachyura, p. 91.

T: s are
floor of v
is usually filled ^
mcl pe basal antennal jo
ner angle of the orbit n
anulcs fold a little obliquely. ;_arv f

The / rthenopidx are divided by Miera nto two sub-fa<
:—

Sab-family i x ; in which the carapace is BOW
sub-pentagonal pentagonal, more commonly ecjuilaterally
folar, and st Bemiarcular or semi-
in whicl -inc and -gastric regions are usually so deepl
,ked oit 1 giona c either side as to mab
sullatthe CJ ; ia which the
tly longer and more ma e ambulatory legs ; and in which
• rostrum is either simple or obscurely fcirlobed.

-family IT Ionium, in which the carapace i
shar intagonai, lie junction of the antero
I iu which the i
uic
re not marked off from the
md iu which the branchial i
ire of moderate size.

Sub-family I. PARTH' > \S .J ■J. Mh

Joura. Linn. Soc, Zool., Vol 1879, p. 668.

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LAMBRVS.

2. antennal jqu
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it Carapace moru or IBSB ex _1 III
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1. Carapace tw triangular; greatly
expfluded both luier&Uy and posteriorly CRYPTOPODIA.

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Car broadly triangular rounded
fce-pentagonaJ 'th fret pointed but extr*
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voeu the antenaulary l. 'ie large lobe that coat.

Thi 1 frame in usually q

^{Perj lai'gi}
usually of in
i to th 't slender amlmlat-
illy prismatic, ongly •
e mncli shoi'fcei tin palm, and ai-j abruptly
■little downw
abdomen of tlio usually cousistsof seven segj.
de of five or six.

ofessor A. Milne iise. Sci. Mex., Crnsfc.,
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subtlivitlos the j • iuto ten sub-gev
dtuuc of all of which, ho< not universally fidai

The sub-genera ai kno^vn to exist in
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t. Alcock—I

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;U angle produced to form ■ - ■ ■ :) . e apiuei
ipace worn and ero I :cular in outline, with iely, fliB
ilie rosti uia more hardly, :tni*
breaking the pro-
but a fairly distinct poafc-hej»atu- lot, or
with the arm and ban i t-ocular

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'ly trig ■ . if spiu a ,
P oarpua
: the ct for the genus.

ttus, A. MUue-Edv,

Lamkrus, A

la, Miss. Sci. Mex. Crust., I. p. liG.

ngor' Brachytira, p. 92, (jw

Carapace ovate-J«;L ^gonai, with the aui»ftice g • pustul
but little cariu e adult: rostram exceedingly short.

>ms hit

ilumph, J-. iboin. Rariteitk., pi. viii. U
1,8,9. br. Soppl.,
p. 358.

rix. figs. 105» 107.

Trans. Li ^15, p.
,34 • anJ Cuvier, iiogmi Animal,
White, ' Sa

a the mJ

i On the branchial region; +*h*?. pt

ou the inferior 'I

Li 'inct at the bases ot th

rostrum, which 's

length being less than or

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The clvelipcrs, **which** are massive

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carapace in the malt, alimtt 3

is prismatic, or*^P***

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posterior edges are armed with

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alternating larger and smaller; its

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per is a row of spinules ; it

edge is rounded

tuous series of epinules ; ibs 1

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A.palvt has twelve or mci

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ibulatory legs bave the merus compresses Emd s]

especially the posterior ior) edge : the '

trdly longer ths e meropodite of the chel

ra in life, pale lilae dorsally, white ventrally.

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•i AnVKun and JIergui, and from the An us.

Snb-genus

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s and *EnopJolambrus*, A. jtOnQ-Edwacdl

Sci. M

¹W and 147.

, Siisrs, * Challenger* Braobyura, p. 92 (*pa*

Carapace carinated or tuberculated, bi'oad.-b

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-ocular constriction

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BOi¹, A. Milne-L<I Wd i . III. 1870-71,

■-o); and Miss. Soi. . **trcHiv. du Mu**

, L. S., I **p. 147** (foot-not

XX, 1890, p. **109** (nan.

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ha. 8oi. *Hex.*, **Crust.**, **I. p.**

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Herbst, Krabt >5, taf. rix. figs. 108-10g.
/o, Fabr., Snpploent, p. 3

Bosc, I :
girttfa, Denuaivxt, *Cotygi*
--, ilil—EdwnrJs, Crnst., I. 856.
F -city urn.

Carapace 1 th»n lew dly triangular with tho
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-oves. The entire carap > w not very den
a and paXiJiform cles, the s
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neb. are occupied, but not *de*< erisp, nps

lateral ma lietl ^vicli ramose spines, whicli increnae
e back : tha pejtterior nd part of the p₀₈'
margins i-med witli tubercle like tbofo on the surfao
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Th; legs are rather stout for a La*,

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specirnci female, are ft

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millim. resj. ly.

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Qd 199; an

1871*;

p. 18;

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1891

p. 187.]

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rounded lateral margins are 6 01
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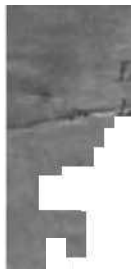
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of the chelipeds are quite smooth, but the upper surface of the arm has an incomplete longitudinal line of beading. The ambulatory legs are long and particularly slender.

In the Museum collection are specimens of males, ovigerous females and young, from the Andamans and from off Ceylon.

Lambrus (Rhinolambrus) deflexifrons, Miers.

Lambrus deflexifrons, Miers, Ann. Mag. Nat. Hist., Vol. IV, 1879, p. 21, pl. v.

fig. 5. : species, whin

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inchial region, and elsewhere appears to tooth.'1

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P. Z. S., 1847, p. 58; Ann.

Samara ng ■ Crust., p. 2;

Prou. Linn, SQ^

1847

post-ocular con

Tl cylindrical
1(Jtl) mbcylindrical, becoming enlarged and trie
he male the ol

times

nl&tory tegs rj ; perieetlv *m,06tfr
tm coll ■ i from i

From the Madras coa i off Ct

There are undoubtedly (so s : one sort resets¹
ohelipeds

ing very long chelipeds.

Lamina (2?? ' iJaw* rus) *cybelis*, n. sp.

This tipecM 3 closely *re*^c mbles *L. twrriger*, from "which it diffei
only in the following

,vs —

0) of the cur. &TGall nr and on
the other, in the middle line-
are i

erect epii ■■■ ; while in the niiddl-

nular posterior border :a a single spinnle :

-mrface of the CM ides being granular,
evenly an tl regular! j iculated:

(3J the roBtrum, which is nearly one-third the grt.

the carapace, is more distinctly trilobed: (4) the
chelipeds (which in females and young males aro c
to 3| timey the lengih of the cai-ain.ee and ro
though of the f>ame general slender proportion
have the <■ ighonal ri
an> i band armed with sharp lacinia¹
on the npper aspec

inner male from off I s., and two p

males an vigeroua female, fromoff£ the Andamaus, hi to86 i'ath;

Carapace of the sa neral

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L,nou is extremely well den

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almost vertical outer wall.

Tlv . iform

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an^ero-l ^al frame

hepatic region, strong ujjcur

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■urn, the breaitli of wlncb; ia about ^ the

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the carapace, ia elegantly trilobed.

The as of the carapace are strongly elevated

sui 1 or reticulated: in th< iniddle line on the gastric region i

a sinj.' ■ conical spine, on the i ardiao legion tw

branchial region there is *it B* t of the gast

ae

epineb d ttan ly.

Th tra-orbitaHina\ 'g-in '■■ ?troi . , arc)

infra-orbi

lobe is.c o two elegantly crimped leaflet* or petala.

The post-ocular * distinct.

ipeds in tht- fou* and-a-half times i

and rosin er and Bnboyliin

of many spinnL i- inner and. outer bor

ken line of sharp tu upper surface, and a

along its lower border, *h* it is bherwi* mootli and po

the *carpus* has a few coarse apinu ' on its o *ei Burfao

though itly trigonal, is long' and Hlender, uot is eulaiged 8

-id outer borders are irregnarly *aud u-*

hf d, the teeth becoming larger and closer" s<

I ; except for long its lower border

Q ^{HI}

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its surl

The ambulatory legs

, -nder and very shoi

»ace dul

Ed

p. iJ.7.

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A. M.-E

;vrdsf Nonv. Axclti

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Lorsally gi

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!IG outer border of the ! ;-e very consp
tory legs are slender and smooth.

ry dei.

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'ie canal
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Jjwmhrus (-iu;ac#la?nL

otus, A"

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T Vol. IV. p.

. 1870:

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antero-lateral

m size, and

;>ine: and internal

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[ifct]*

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8-spinate, wil

All our sp
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to Adam

" ■ , Mi
Mag. Nat. Hist.. VoL IV. 1879, p. 24j
98.

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y particular except (1) that the rostrai

that **the** an

fcs are powt Ei¹

! (3) 1

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¹ liat tin inner surface

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Lamhrvs (/I' ar

ff, Adams and White (nt=

u

t«, A. Milne-Edwards, Nonv. i
Crust., I. p. **1-17**

u Mus-, VIII. 1^,

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fa

98.

irapaw

s^{1*}" of *the* e

pfeiyg

canal,

itbles tli3 two |ii

harply c^onulate am while

iddle li

her on the cardiac

rhile on

are two similar spines.

in dip]

Sub-genus 1

148.

Miera ' ■ ■ soc. Zool., Vol ^ 1
Brachyura, p.
semi-circular, vs
t, the o-lafceral **angles**
•at length, never sharply serr
aitely contorted. The rostrum is

1

ral man -■gione .cry pr
Oarapa ■ .■ ■ **than** kmj wrongly
duiar and *\$r< Ls l<>>s U

L. Itarynz.

tit :—
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m mod.

T0W8 (■
■'./■;*,■*) calapp

Pa= .,damB ^nrt Wliii

Haswell, P
Cat. Ausci-al. Cms;
Lt Miers, Zo< f 1
01.
>cook, Aa:
75.
'ar in oil ion

rgins,

or incised, bui On

either side of thu gi

le of the front part of the cardiac region la a d<

The cbelipeds in bhe male are not twice the 1.

ie arm is eoarsel; tte along . ^

.1 still more ely and bluntly long its contorted upi

egS compressed, ,flie 3rd

to 5th j.' ogulaily dentate, this being most marked

in the <

) has a sort of h> able; and owing to frequent and

6'V
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[ergui, Ai7ikan, Ceylon,* and :#

Lambrus (Parti

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-P.&P

Very i . Parti,

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Ed

. (2) XXI. 1869,

Hpecies

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h watei-, ann is

•■ — the ad

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being KO mili]

■ I red distinct.

ice is semicirt

trve being broken (J) by

^., and (2) by the pr

middle lobe

itly curved antero-lateral bo are do

•ted teeth, the bases of ■

; of these

three, situated on the

illei¹ thi

■! of er)ttal si.

lateral

Jar!y eeiTate.l

■ xe middle of the poateriot >>

11.

^ ^

>atD0i always, in the male, and seldom in the female, arecti
,n the gastric region, iii the-nTiddle line; and generally in

J

female, the conical cardiac region k

ie or two inules

antenual peduncle is R , aly
 'lie sternum, as abdominal U tre _
 andtl ... surface, like that of the external maxillij
 ms, is very sharnly, closely am
 B in the-a fche length of "the cara]
 in both :es they .. ■
 p to the clisVil enb geujent of th
 7 ai-e evf most markedly so
 nnd.M' surface: the inner boi f the: . d
 the
 >f the movable finger, P of tho hand may late, th
 have two 'id that of the r in a few I bluui
 spic the tnerop 5

■ or dui sterior, margi y ^
 two jointi

est length of carapace ,, millim.
 breadth igh of cheHi ! i 10-5 ,,
 ..
 B., and, udamana, 41

■ *mbrus* (*Pa lenolamhrn*^ *irpeins*, Ad. and \Vh.
 Idams ami W^i "ii-ang' Crast., p. 35. ph
 v;
 rs, 'Ohs ' Bi-achjnra, n. 90.

Caraj -id with ncLmerottft large . ><! md with
 ion bes—a median and twn luterl^WGll-mapk
 '■■■ projects ver I'wards, but is b
 fc° g ;ee by the fact that the carapacu is so^
 ^rn yes, and exwivatetl and con: behind
 lepatic regions themeelvea: ' ;. antero-la ^areL¹
 o-Jateii uiids in a round ad lol
 'oeterior and post ! margins ore irreghnt

ly tooth
 11 rum, which *h* deeply excavated and considerably di
 !s in a

the

fathoms.

brus) .

I dams a
■-! *liavpa*», Haswell, P. I. WaW. w' LV. 1879, p. 4

ology B ■ pp. 182
Brachyura,

i^actj di ■■ mi-elliptical, as *I*
surface almo ! sgi on is "arinatt
)ifur an e ◆riang'
he ey u laic the gastric
Vrgf pt¹¹ ■ lie card 1/ the latter.

- with a series of crenati<

sating i is pi
a cristiforra ed.

Iniated md
posterior boi . a: Lraly tri-

rrom the bluntly
iliquely '■ th<
the branchial region.

istrnm is strongly *t*) flexed, and an ?ely i

ip. The chelipeds in the m_LN. aro nen,
e carapace, and are thin and compressed aharj

. *arm* both the inner and outer
ower edge faintly gran;

date : the thin *hand* %

crennla-e granules on i
grannloa ane; tht> rvable

The ambulatory legs

especially in the 1
th ma.i-f-

det

Onr specimen is fi'om the Andamaus.

ry H. M. S. ' Aleit,' p. 2u£j co /,, 6at

tne-J

form n> are of the ci
 ?*arthmol* hut the genus is dis lied fi'oni
 of the so-callec 'intern at, whic
 arly reaches to the levu of ■ ubitaJ Matt
 al so a re mac I burne d 13.

Kr>y tf the. Indian s] pe.

remark: .^ose or .| inose n
 of the ordinary¹ T^rrn^ *, and '
 spines: ambulatory it ^ '.*" ■ ^r

1. Carapace and ohelipodg beset.
 cles aiiu spines: ttarapa'MS about t
 bron'l.

2. Carapac<
 are shar <la c

tie bodj
 paxilHfonu i liich nr
 or frosting: ipiny

cia, Fabr.

!

orridiw, 'l. >n. Syst". Nat. JI. iOi7, 43.
 iw- fcomftt*, Hm-bst, I. ii. 2J2, tab. xiv. fl*c- 88.
 ida, Fabr., Snppl., 353.
 da, Leach, Zool. Mist¹
 me hi iJesinarest, Con¹ :¹ tst., p. 143. s Sxtt 1.

, Hist. Nat. Crust., I. 3f>0.

ov. Upgj pi. xxvi
 \. Milne-Ed wards, 1

■ da, Hiers, Phil L68, p. 486.

Pa iuck, 7. ■ -■ ;-. it

o.4,
 [Pa

C. W. S- Am-in iius, Kougl.

in;r in

bite circular, deep.

"ial,

with all the

* deeply ,, with a deep c>

aloj^ (of f a series of dc
er Bide.
"eyloii, 31

i.

iii.

reunion, Annex*

177.

its breadth; ita su
^pinate: the ahtero-latei'a
is; fcho posterior an I
ly-pro '
.; onto I

its length
l(f sharply
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The three l&Ue'a of

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Til" m if; T ,y akl Dll
• ry spi

Tll_

asymmetrical, and aro beset, n.

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i great ramose and lucinial

ro armed with oitrfliiK

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Tl ^men of

H_{an} f]

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either side

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i male auH Female from the 3ay of Bengal, 88

! i - genus PAETHB»OMEBUS, WD.

y the cheiipe. hich have a thi^h-s!

t, which are neai-lyas long as .

—from t

1 form
unuin



• are no large tubercles, and, <
lines. On fche arm. nai
tips, on both the lower-inner, a
ree on the lower-s lers;



and tho fi
tle-Kia a. Th tun

Only one cfcliped remains in specimen ;
»a little over twice the length of the cu , has a n
tie raeropodite is hi rh-siiii

^the-carpus is slenderer il. ue end of the nierppodifce hand
ia still slenderer than the carpus : the lingers are ng ->rly as
long as the palm — are extremely slender, and, as already
e beset with long slender spines. A single female,
from the Andaman Sea, 36 fathoms.

proFfcDU, Kdw.

Milne-Ed
. tiers, JonV
ia, MiefV'C"

--at. Cm-
Soc. (Zoo!), X*. | . p. 6fl
p- 101.

itrapace very brtngular, ^ ■
vaulted expanf bi ■ (ely conceal the ambul-
ind are prolonged "id the ■
,ace bet. a cardiacregioi

Lent. TIJU pter : regions are smooth, not rided. Tht
its are very Biaall, nearly circular, with a Biiture in the superioi
margiu. The e - 3 well developed j the antennnlary f<K
rrow and a 'ique. The abdomen, in the malt
fii-

: the i if th segments ooalescent. The eyns are
111 and retractile. The hnsal antennal joint ia slightly dilated fnd
reach the internal orbital hiatus, which is tilled by

i.nt. The buccal cavity and external maxill
Tht3 iacin E the maxillrpeds is not proda*'
distally truncate

?>tly] ed, the interior margin notched b
are ueiirly as in

ing-like lobe o u t jr margin uei lie distal ^

IL 453.

B-SO.

pi., p. 352,

. N. S. W "os,
Vt I.....

V. 1893, ?.-S51.

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ted, ti,

■ne sta'ong ci
lint traces of ci
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ie triai .
s, the 1
>ns. The i
as broad; and has its ed
1 ^eds arf considerably
Tet.s thrm I

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i: the antei*o-l«tc
ad postero-lateral n
ich is either unbroken
rface of the carapace

sion is a little pi
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■ 3f>2 (v. wyn<
sx. figs. E

fig. 4; most of tl

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I p.
109 ; ni

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I both t iu* inner and I /

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^tion are name:
ersian Gulf.

data, Kdw. and Lu<

Edw. and Lucas, ArcTaiv. dn 51 ;.

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'he triangi
P. n as which bound it a
granules on e branchial regie
ing for . n the apex of the I
■o of the
icaia, -ith the e
. inner ai<
I and med with sharp laciui
eras simply urinate above, s]>
carpus and propodite caiinate, and^J the las
th edges so a wimming blttde.
Or list, 20-25 fathoms. M; coast, *28 fal

In a Iti Male from tin ;e is muc
aular; and the chelipeds IM.YB the spinalu- more ac
i laciuiute, and their surfaces- he under Burfaco—•.
instead of nearly smooth.

a anj> nov.

this vario' * ifFerencfs are : (i) th a
, !S a few grannies on its upper surface ; and (2> the olio
w in the mi ddh of th& carapace i s rath er deep er. an
id spines on tin: rul\; s tlia* I

>nt; one and ;

These presont in i both *.-xes, but an
mo> mnced ii) 'G
Karachi.
aeu, female, has un extreme breadth of
45 millim.

HETEKOCBYPTA, Stimpson.

•Krypta, Stimpson, Ann. Lye. .\i;. Hist., New York, \
irda, Misa. Sci. Mci.f Crust., ! J. L. 8.,
Zool., Voi 103.



Pit;
Th> i^{or} Λ(<
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The ptevygcstomian

iccal c;

e broadly d ; the ; the posterior
other fcr ;he ra so
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pace is either amool p
liolar- 'be grannies, when

jpatic regioTis are

fcravers-
preset

Alipeds.

t of the branchial regions.

The cbeli] rhich . the length ^f the carapace,
inner and outer ed< >i the arm sharply dentate HI
ate as in *Gryptopodia*), and we lower edge bea ti : tK car}
globulin-: the hand h b the inner an* * edg'
id the under surface like granul

The ambulatory legs have the uppe , 3rd, 4tL
joints sharply carinate : the meropodite also, in the cas
of legs, ha. a single row of teeth r lower
in the , last two pairs of iaa a daub! row of
along the lower edge.

Like all the species of thi j> the
D nee in tho larf "'en bein-
It is not uncommon . P^^ts of *Indi

0 fathoms. It w.ould seem to be allied the *Oi*
oc. Ac. Nat. Sci., Philad., iB57, p. 220).

:HKA, Leacli.

r<<, Leach;
Oa^ra, llilne-EdwwrclR. n*thra A Milnc-EdvFards, Hiss. Sci.
Mex., Cmst.f I. p. I"
hto, Jonrn. Linn. Sac, Z 79, p. 669.
The carapace is regularly oval

he
filled

[a
1 joint of the antennae;
antennular fossae are basal
basal -Hal to width
The basal orbital carinae
external angle extremely
; antero-internal angle of the
chelicerae are about equal
; tamed flagellum, but antennae
ambulatory legs are all strongly
dentate-carinate, or chitinous
of the female (and ventral
folds).

. and reaches to terminal
rudimentary:
caudal
: terminal inserted
they
■ joints
:- length:
* seven

"ra acru^hjsa, h.

[Co "■ J. T. J. v.

Oethra - -J?iw>. Sum
W&, ' E# I Id. Cruft **fig. L'.**

poso, Mi vardsj Hist. Na;
poso., Cuv., E. A., Ti; ; i. fig. 2.
. Nat Sci. I hilaa, Edw. iu J **Jard*a**
File **Rdunion, Annexe F.**, p. 3. and
. Mus., \ ~±>▷i^l
iaou_f Traps. Linn. Soc., >I., (2) T. 1893, p. 351.
eh. Ge- ^{73.]}

so, **var.** scutaria A. Milne-Edwards Mias. Sci. **Hex.**, (xxxi. **fig. 2 = Oethra** Si Smith, Amer. Jon **KLVIH.**
i and Ann. **1** if. vol. I^v- P- 230, 3ff.
-Edwards to be only a variety of the Linnaean type.)

The antero-lateral borders are divided into 6 or 7 total lobes
deep narrow sutures, each fold being
edge by a faint crest.

region is extremely prominent, and is divided into
each lobe-K

< regio mewhai
t\u

T

iter edge of I PUS sht
 e the 3rd, 4th and 5th joints
 the 3 joints cristate below
 are cristate «•■ an McCLEWB.
 The abdom
 In An damans,
 female from Ceyl-

EDO]

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 of the anto
 Ainbul .mpnaased : —

IUDA. 2.

or nf the ^oaa to eor.-.
 rom the orhit: ohelipods
 armed: ambulat Ci

Z;

p. 23.
70.

.rhomb the rostrum
 nor, almost parall ; tmd wi
 d to form tw< similar laminar teeth
 projei.'
 plane parallel to the un.
 heir inn< i^ug filled b\

t.ennalss fold obliquely. The antenna- are entirely cone.

j ^ atrum: their flagellun-. and

{'■

t al joint is longish, reaching to the in it.

Zrhrirla

• S., 18 ! Ann. Mag
ng¹ Cm p, 21, pi
: raiis. Li 351.

V. 1879,

of a H

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fcs, i

ian longifcudii a band
ud, discontbi ace alo

The en unent • body a ibs is si
!. The fc, "vvitii ,}«»*«-. ,T»I
trigonal with si nt laminar t the appei* and towei
I in shai-j its broa distal ond is also i e: the
suvv I by throe laniin; d in a triangle: t]
haa iti ■ edge rai bo a compresaed
ambu¹ egs ar-tooth.
e ambulatory legs fci h joip,
compresed, with t' sdge ad neuminiu. ∴
the fifth joint - LietaiH} iy recu
jtractilt. . a tiyy man
In the MIL. ilection a' *nale* from the c

Hist. ^ .
Sfiers, J.

it of **the** auteuual peduncle. Anteunale-isal joint of
large size.
AnUnnffi) entirely concealed **beneath the front** · HIG
flagellum short. ¹ mnnl

ab ii an the third
in bo;

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lateral be

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Qg, broad, s

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'ength as th
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^hiam has a, sharp tootl» on ii.

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aa strongly compresses

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lie larger specimen

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Miers,

Linn.

•iiger' Brachyura, i

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-alar]obe joi
oin the orbits.

Tlie basal

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ateral angle, th

P Produced

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ats not dilated, the merns and carpus son : the dad

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1847,]

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irfaoe smooth benei

„ te slender gp :iodi

res, ' forwards but no ?... are
part <v J itral ge, very

- ncu me. [A spinuh ent o?
t of the si

i-fcennal joint ; he mobile portions of the ante:

3l, ■ aide of the rosi

The e have the meru^

lie pal : -internal i

The ambulatory legs, c^r which the first pair are I
si, hare strongly ree li-

ie chelipeda in the female (male unknown) are not f s
abdominal segments in the female appear to be all

has a superficial resemblance to

here is a lai

>, and the eyes ar) be retractile against thii

Mi- • " ■ ^P-

; legb we, with additional long 81

m, somewhat *Achasmus-like*

i the ■ id the

he; • lie bn naootb, >

btions ;

froi
much s

Tl;

Me forwni aiito non-r
 trt concealed be
 neat] has its antei■■■
 gle produced outwards. No :
 [Tin lie on the ventral surface of the hepatic
 ise a post-ocular spine.]
 antenna I joint «B and has its
 hat as in Dana's figure of *Qregonia g*>
 pi. iii, fig. 26.) ■ ifc sharp an
 like the and tl 'run,
 >ve, be. the mob antenna
 more than I he earn pace and
 The chdipeds in the femal- other
 irter tha tb.e carapace ami rostrum: their p ;^
 near!
 B length of ti -rs, which meet or¹ ■ ∴ fch
 ambulatory legs all have*-' acar
 IS: thi hid; ; in
 tl
 ■nger tian the carapace *wad* posti
 laden female ha: wing dimeusions :—
 ;e and ro> ... •■■ 6*2+2—8*2
 millini.
 1 th of carapace
 ...
 nabalatory legs

lii.

the above genus in the " Key to the li
konychiur ∴>■ 130 and 191 ante).
 nj i both of ly diagnosed ({)
 iting of *two* sharp slender sjp
 their extent, and (2) by the 1
 Una and b proded ouf.

The unique specimen has only just been
in collections of the season 1894 :

PLATE IV.

iodifls 'loKchorhyiehus, <f.
na iudicua, (f. ■ia,
<f.
tf.

PLATE V.

\in cadslly, d'' •
2. - ■ •, Chorilibmia anclainunica.
•* >
9-IOIUB hastatu

X 1. VTAB.)B. SC. (LONft.)
Lst May.3

A ray of ordinary liglu u <udent ou a crystal of Ic<
.treated after trans mission, and the I
ud polarised in planes at right angles to each oti.
■nt inquiry is to find natural noesw l
Lectrical ray. It A
twe Pic radiation and ligM be render
cl&t stance whicl light
pola :j. The identity ot tin

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ave length of an electrical ra.
t of visible one would think very large cryst;
nature, would he required 'ly
vt

I

npamtms has since been improv
ible to detect the polarisation effects with i
method of detecti
t-rose the double refracting strn<
crossed The interposition of the
crystal get
the dark field. This is known as the
depolarising effei

for louble refracting substance

no depolarising effect, when the princi; me

aides with the r»o!aris;t!io plants of either uhe polar

The field also remains dark, whea the optical axis of
jarallel to the incident ray.

A similar method was adopted for experimenting with pol i ic

radiation. Tho electric ray is first polarised by a win !ar grating acts

as an analyser. The two gratings an the crystal to be examined

is interposed. The Be modified form of 'Coherer' with its
associated Voltaic cell and Gah

leter. Brightening of tho field is indicated by a throw of the

I meter needle.

APPARATUS C

—A small Ruhmkorff t ->r i is used for the production

oscillatory discharges between two sn= i lie spheres, the dia

each sphere being 1-5 c. m. The • of a coil to produce

elec is dilation has been a matter of nece« y I obtained

oscillatory

md certainty by using a small influence machine of t;

nisher But in the damp atmosphere of Calcutta, the K;

ori t machine is | matter of great difficult}'-, at

portion of the I had therefore to abandon the in flu-

h regret, ai) a RuhmkorfE's coil instead. Tl

> cubits, Th

ease to bo oscillatory; after a great deal of co;i would

Ltisfactorily just for a short time. The only coil I could get, i

y , ag the condenser and improvin vibrator. Bj' lookin
to

fcodete

y for several hours. It must be borne
reiving apparatus also requires careful adjustment. and that

in

noug the following—

The current, actuating the coil may vary after
difficulty a const;;
vibrat rod by
tact points, and otlie , Any chau
vibrator is at once made evi
i the pitch of >te given out by
3rd. The sparking ball have the
To • B oltj
vii coated with ci : ■ • ■ ■ < • turned
round(

vals to expose fresh su>
The coil with a storage cell is ei ith the exception of
ratal tubular opening, in. ide K, not dissimilar in
nice to an Optis , The interrupter is actuated by turn-
a key from outsii a, Tlu^ -ing balls are at one c
ibe 25 cm. long and atueter. At the
>Polariser. I . ;»eisplt da com., 1
k gap at its principle focus. With the help of the V LOR
jhragms, the electr 'am is made approximately parallel,
of an Iris diaphragm, the amount. uJ" radiation may be varied.

—The success of the experiment depends greatly on a
care with which the Polaris or and Analyser are constructed. Fine copp<
wire '2 m. m. in diameter is carefully wor id it, ;
two thin sheets of mica. There are about > linos for
every i
c. The mica pieces are then immersed j IUU.
an<:

wires thus fixed/ By cutting round i j.'ar] cor
tabling the gratings are obtained. The mica
e any disturbing effect. The gratings ar- , i i,
pai-ftlU
be ends of a tube 5 cm. long. This Polar- rotates
rjtmnd of the tube which sends out the parall".* elect*

udyser.—The Analyser is similar ia construct Pc
It rotates inside the Receiving tube, which contains I ;enflii
on,
B ceiving apparatus consists of a'Oohe:
aic cell and G meter iu series. The Coherer is modified
from
usual tubular form. The filings, a single layer thick, are spre;
rge surface. This arrangement secures great sensitiveness. A

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The Geological De of India kindly lent me a lug
for which 1 -,f experiments, I give
below « account of 8.

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The crystal was now placed parallel to the direction of the incident light. There was no action on the Galvanometer.

Galvanometer. The intensity of the light was not affected. *Apatite*.

<The fibrous structure of the crystal exhibited strong depolarisation effects which will form the subject of a future communication.

A large quantity of Barytes was found

system.—Microscopic examination of the double oblique type, exhibited polarisation effects to

marked angular system.—A large crystal of Iceland spar which was expected did not produce any effect.

Having satisfied myself of the nature of crystals other than a regular, prismatic double system, consequent polarisation of electrical rays, I investigated the action of electricity on ordinary optical materials.

I got a fairly large piece of tourmaline. On passing this ray, with its plane vertical, there was a marked movement of the spot of light. There was no action on the galvanometer, when the principal plane coincided with the planes of polarisation of either the Polariser or Analyser. With ordinary light a piece of Tourmaline of sufficient thickness absorbs the ordinary, but transmits the extraordinary ray.

transmitted;

that was observed, way. The bearing on this

Lastly I performed an experiment with a crystal of Iceland spar out of a Polarising apparatus. With this I got distinct action.

The results, with the exception of the last, were of a better quality. These were often rough and irregular. No doubt may be obtained by judicious

grinding and polishing the faces. Summary.—It is to be seen that crystals which do not

Regular System, the whole they do a ray of ordinary light. The tourmaline used in the last experiment I found

ined to me, with unequal intensities. In other
greater absorbtion than tUe other. It seems pro-
■ thickness of crystal one ray would be completely
I other crystals behaving more or less in
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mother communication ^p

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a New Species of Oxyrkync
—By A. ALCOCK, M. B., O. M. Z.'S., *Spperinttn*
the Indian Museum.

[R^ad 3rd July.]

Tlie spi **bed** is a *PartJiei* Hmite
! *, Journ. Linn. S el, XIV. 1879, p. t i

PAL, , n.

'fc equilaterally t ilar, fche very .-
; [l]y craded and rugose as in P. I

is almost devoid sharp tul

aTitero-lateral • are s

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two larger ones -

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The am^niatory logs are compressed:
V ;onal, with the edge?, 1 dally I
indistinctly nodular: tl

mdes on its po^ margin: the .« is c
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The abdominal ••etaWT** qaadrau-t
alar convexities dowi he

Loc.—Pedro: dej ud un.ce ««ores, 28 ims.
Length of caraiv ;;est specimen (foraale) 45 millim.,
grea
fc breadth Gl mi)]

The position of the above species in the key to tic Tn
the gmus Parthenope, page 279 ante is thus shown :^
arapace remarkably rugose (or spinose); chelipeda of the ordinary
L<t>iln-us form:—

- 1. Cavapao somewhat pentagonal, not vertically
deflexed from the front of the gastric i
abdominal terga of the female witl* a
of largo eroded T ^ .; , v.v. oither i
2. Caini.-ace some -^ ijuilaterally trim
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(like all the other parts of the
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Zoology of the



JOURNAL. ASIATIC SOCIETY GILBERT ISLANDS.

Vol. LXIV.
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that re Himalayas and Tibet and occurring in Szechuen and Yunnan; species 4-8, the group *Robusta* *pedalis* V 80 far as is known to the central and Eastern Himalaya; species 9 belong to the group *Primulina* of which the remaining known members inhabit Szechuen and Yunnan; species 10 and 11 to the *Grandes* of which the three other known members occur in Kansu, North Tibet, Szechuen and Yunnan; species 11 is the only representative of a very distinct group the *Bellae*.

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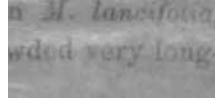
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ttmmit of

flower in A rua

CIERHOPBTALUM SARCOPHY

beai-iug at intervals o

^{me}
diso^like

r:liud

-is, oblong-

lanceolate, sub-1.

conh-acted at tl

to a thick eylin

I

IFaie_1*

Lifce shea!

Di >

Tals n

„-e as 1.

ring for bi

-a of i

ilous. *Petals* oblong, falcate,

2 in. Lo

igue-shaped, ckanuellofi below. *Column*

r divergent spurs with

A the baso of each ■ mm-

with two parallel cent

, of a^^ reciu,,

Toll

aeate.

:dm: **atRishap**

ir **2,500** B

flower m Sei

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CHF

LOSS.UM,

i.

WalisuL •

pron

stalk

. in. lo

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in. long,

xed,

-equal, the dorsal Is

le

tbesej

Lip co:

IP fill!

rounds b inutely emarp:>nat8 imcl cK
<fitudinal minutely hi
L the o apex where they unite,
^s long as the entire colnum. *Anther* with two projecting
Poll viscid disc,
: in the Chel valley, at an • (00 feet; in flowci

S^{havin if a ■}
solumn. J ' an otjpl(
Lindl.

LIA FIB!" >pec. i ' /6s
crowded and often

m. *Leaves*
membra-sessile, the edges miir i in. long, their 0¹
iiiigmoi' date.

mitted to i <i

2-lip
in ai ase. i icoolate, sub-acu
ly curved, calyx. connivent
e Lhe very small lip, (1
&a long as the
iwed at the base, i. ■ tee co ifo lobes
broar
rounded, the pai miniate edges,

long :L> the ■ fc«
•sandupp L of th

membranes,
the base of the hills, at Sivi

flower in Octoi¹
This belong the section find is allied to *E.*
^ndl. and *i.* a, Par. A -:■•'- w

the flower arc of ii ilow.

TAINIA, Blur

,se together from a
stout i

t in a bi >IS alao tie
plicate, oblong-iftnceolate, tapering m
long and about 3 in. bro

ut 10 in. long, its stalk about twice a
feet sheathing bracts base
long, their oval-

him.

ah sub-equal ant
incurved side-1

■ largo

ipperunrfi > middl

The base as lines, pn

towards

imr blunt, incurred, exc

,y -12 in.

Anther with two bosses.

valley of the Teosta at an elevation of 1,000 f<*

flower in M:ueh.

The colour of the sepals and petals is greenish w
le lip is white, and its lam re jellow spotted
Th

Th

nthtr is pink and

to £■

We have deu

r.

CALANTH)

CALANTHB TEUI

lanceolate acute,

sessile, 9 i

Qg. Raceme abon

, stalk about

the

same length, pubernlous. }■

18, 8(about 1 in. in

diara.; floral bracts linear-lanoeolate

to or exi the stalked

puberulous ovaries. Dorsal sepal oval.

solate, narrowly acum

in. long; lateral

tsa • •, longer than the doi

•is linear, acute, shorter than th

1 sepals. Lip Bessile,

trowel-

iped, the base en+ire, the sides irregularly crenate-dentate, not lobed:

apex acuminate, the upp

face with two converging

extend;

the apex: [lori

mfc; its mouth triangular, its

V bristly. Poliinia in 4 ol;

;al pairs.

ikkim: on Mahaldaram Peak: ele\ ation 6,000 feet; ftowei-ing fi
in July.

A species allied to 0. puherv

I differing from thi

j in having sessi eg and a \

lobes. The

colours

■ The lip and petals are brown with a white line. The lip is a triangular-ovate shape with a white margin at the base.

Vandae.

EULOPHIA, E.Br

EULOPHIA QUEKIANA, n. spec.

It is three and a half inches

high of which the pedicel forms one-third, linear-lanceolate, serrate, plicate. Flowering stems about 1 foot long, clothed

throughout

with sheathing bracts 1 to 3 in. long, and bearing at its

apex

a 6- to 8-flowered raceme. Flowers 1 in. diam.,

each with a

lanceolate acute bract equalling the sub-sessile, cylindrical

ovary.

Dorsal

blunt: the

lateral lobes lanceolate,

sub-acute

a on the truncate apical lobe: s]
 with, a small 2-
 Sikkim: in the e Toe 1,000
 lowering in August.
 rjijy brown, the petals a low.
 ,ves form a pseudc h

»cap⁽ⁱ⁾

3 Btiff, erect J ftp< t long, al

rra, **1C to 20 in.**

in. u

th two or
 thr I lanceolate.

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Sikkim- in fcl
 cefc: flow.

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Tl. ra of <

petals are

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R, Par.

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pai oval

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•Siltki
sam: loc.^i

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also white
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The

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i. spec.
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(■ in. I
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(-falcate

in. bn

he sep;

• apical 1

) sep;:

■ the lateral lobes by a -

lip .

* slender,

n : at ■

∴ flowering

Th, **ier.**
ie ftowers in this, **Bpee** i
i has brown *h* ie lobes. Ji
paler yellow are vy cbmm<
iine;
nave las rag

rnus and fl >e about '75 u B. Bi 3 la
 bely bra I jg. , -
 Hal, liuear-li laterals i
 bhe base linear-, side ioi' itn
 sub-acted.

i, the gland ovate,
 levatious of about 5,00 ig in *Inne*.
 A very inconspicuaa* spe !ie curious re

like the lip.
 >CHILUS cRKP rDit nuto leafless plant
 am oota. n. long, fl'
 •J 5 in. long, bractv s»b-e(
 luiit. *Petals* slio!
 mi. 1-Tniing a rou<i :

till i to a single thread-liko !e : g'
 8ul 1 in. long, cylmdric.
 i: in Topical **valley?** tepals jiml petals of th^
 curious little plant are greeni

• ia has pu .irvrgins, It is ni
 lice of the combiued lip ' d spur ipper or lust.
 lip ■c. *Stem very* abort. (I to the base,
 sub-fi

id to the U|
 rachis, distichous, ;iam., sessile.
lftHceol;tte, apiculate, the il» attached to isu oi
 a. *Petals B\|O]* I ■, aub-a
 lit angles a short and U
 es narrow, elongate, fit
 I with two fia i tie of the
 body of thy Jip with

am. &

ill, ov

t the Teesta; elevation about 1,500

enow, . . . white, with two blotches of brown on the calli
of
They o] gly and s mel 1 of al 11

SACCOLABIUM, Blum

[CHOM, a, 3] 3 slender, G I

to i:> in. fong,
'umbel

■ 's sub-eu al, oblaneolate- ^7'

Hoshy, - ; .
- 2, entire, uv

Sikkim : at elevations of 6,000 - 8,000 feet: flou, ■ ■

■ »ber.

grows along with ,S n* ndl. to wh Lc h i f c is cl o
As in that s/>- and pe
ish with spots ; the lip ' is is .
(be which is orange. The chief distinci

•m s. two large calli situat©

The times of floweriv.g of the two are moreovei ded by
three
months.

Neottiese.

CHEIROSTTLIS, Blume.

(J 1 TUBA, n. spec. Soots short tubercui
.. -il. s slightly swollen. Leaves few,
scattered,
glal e and much reduced in +1
in the yonng pi 25 to *35 in. lon^, ovate and shortly
Haceme pi fat, 1-to 2-flowered. F2w _!5 to ' Vlm
ovate bi-acts ber than the ovary. Sf.pals oblong,
■ for one-third _^th ; the dorsal e, shoi n *h(
with

ivided ini.o two lit

mediai

>nonr

highlands of South-W> ions made by the Al
China,

, R, Bi-

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'Hy ov..

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5 in. long,
h pin!

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Sikkim : < Le and n lew

v»0feet: flow

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Rhizome

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15 in. long, be

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of a Btaall B of my hi.

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I have also to record m; obligations L. de K i
. Barlow of the Museum staff, fo \ j,
in and after dealt wi

EXPE

a BAfIJ.1

MEST.

SERI

AC

11 lh.—Offered various its to four I'
) which I had just bought a Ian
boiled i i
bea (i neta amencana)
and

is whole.

T] it as readily, and I thought I
no difference tr behaviour.

on in the day, giving the bifds two raoio Da they
,!y seized and in railed them, but left tin
found pieces of body and wing froi
ese disappeared Inter. A *Delias cucharis*
tnd some of the body at least eaten before my
er 12tk.— lae Buhbl d still some rice left tin
and gave them, butterflies. I saw *Bunau*
I left, whilo of a specimen
eaten.

', ;wA even fthe
about mil ■ be]

be quite sit U3i/i.—Th[
came to the i. 'i ■ had no
e ciitc One oi took and m:

its wings pi<_

Frank Finn— *Theory of*

* *such* aug i

■rover

WITH BAB

■ — Afresh BaW.

-me, but I found it left aft, r >
men winch he had knocked off, tM not S{

.4.—Sahrit. | \$Q ea£ g

abdomen.

>er 13**.—This Bai>

no* seize a

nother

to bnt di<] i. , aort other birds

December

i netting, I saw one of tJ er of these inae

Ko demoleits T. eucnaris, though des

not ea Is in the a>
from h ilies.

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eat a *Tericu.* Latt^

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Rferfties, an

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-Up (*Pi/r/* -hula). I
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Another

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ach more readily. >w

If did not Keeui I a
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I much fii-st, seemintr ospe «.

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fight. S*
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some E Uj
l.]>. I iine, too,
as I sa\r no bodies lying about I
some plantain (a I an
eaten, tlioufrh fcl.

iu the
ik, I pni I pilli ' !
oioiii, in again, it ■ itouuhe
norning I fooud it dead i'i the wa Th
even to look at ifc.

2UL— i w. pf the Babbles h . l been planed in i
and this bird put ti
ass(J'O) -din these exr
her of the hairy caterpillars noted prei
i*ateu by a Babblers leuiained urn i for some time
I found it dead a ed of its hair, but uneaten. 1 di
i is. I>Q! lot of butterflies in ■

B- liiob was imm- times U,ke v
itterfl; 'u-ence to !)<■
could easily have can I, I
id sei>-before any

butterflies. At the end



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>v of til with • ei-fl. I

in the f experim
which
moth, winch n uched, tin

had)jeL>n remov
Befu!" "•!
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vy 3rd oty,iS95, on COM
t to reooi
telj. One J hvo, of the present birds v.
otea are not quite clear OD this poiut,

BABBI CONF LKS C.
evening, first some grasehoppGi-s, which
n some butterflies {Dan '■ri/sippus,
hiae aad some non-warningl^ o

most numero lonred spc
■a but om- jenulia and the Pa
►re or less mauii
ISuptoeOf and another (The T
tea at least, an>■ os looi.
it. A very w ■ :!o^ -E-!
the lii by the
Babble

' parti;
.v bits i
ntsont
other

■ died the result, i - be r.

ist it.



'wer iatalv*«1-τ *
.ppose eaten ;

after .11. ■ o f all the butterflies I had put in, ,,, I suppose it
,13 lm(J ,,ad somo grasshopperii firat *
'f'M" S " 'the a-,
n it whole. A -itipput was taken by a Babbl.
■I1«B off the win_{ss} with no ,,

m« Dri, , ond, -. l.y a B
, and the birds_s *
y two or fchra
owing it-, A T).
kind (1) c.hr
so: jrs son fcille(
it in—

(a.) One oaoth of ysippm g . ^nd " 'nv-
'I the 7¹ Wni
took n id away, ami the *Catopsif*
the next taken. The *Buphcn* -.vatlowed wL
'D. chr : and a large brown species put i i
fust look the *liiito*"*

(c.) The same two *ekri/sippia* were put i
fcnwetln
Jn birds advanced at once ai
Jnno» *u - i x D . chrysippus.* The .)
oaten . and I saw tbi ■ begun
with m^o J?. *clirygippus* an>.
pn s latl
tbe rtrd whici. hi a time I saw
eat the body of a *Danais*, and soon found tw out.
The birds pe id noi to can
in a I :
the bi iue at once. k the
fsippus.

Put in a *Catopsilia* and one *JD. ehryaipptts.* Tiio fi "et*
took the former, and diately nfternr^ixls tho

: Tlit; was e

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IV. The birds ban

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id **not** seem tome A
;ly preferred them.

:es, and I **sav, no**

Thero **was**

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the Bi

irfc of the winga, bu

abdoi.

io of ti

was first **tafc**

ith two Z?.

Offered the birds . Da* ,11;! a ^
 J- wo ot them came at once, ao 1 was not q
 bu
 t
 iwkw the lattf* was preferred.

repeated the experiment with two *D. chry** and o]
 L^l ■ inctly chosen by the first
 J J
 eon

(/•) Repeated the [ft twQ ^ ^ f t
 /tnoai< bird) took

th (g.)

Put in a

A B;ibblc *lolochia* (h.) Offered

V no traoc3
 e latter, but the

former v

(t.) A *Ptppilo ihniolate* and a Da JJJ)U* offered. One
 bird

came, ami chose the s; bi t th *Qanais* waa soon
 One Oa/1^ ■! one D. *rysippu* • offered.
 foi by the fi;"t com er.

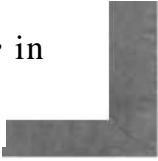
11 left in the vessel at this time.

VI. (a.) (:*ds, ia my hand, one specimen each

of
■ *lais chrysi* -*moteiis*, and *P, polites*. The la
s taken firs *G Dana*;
(b.) A ' was otTevod in my
h
;et\xei> with iu«. T
wraa > tliPit.
A Da/n. and a : tht
lat s UkeArfir,
A protective' : s .
again offered with a *I*), *ch* The wa
it TVas near sst to tho jird.
neated wit *a* taken fir-rimem

f A small uatyrid bu
iny
hand. Tl

ic-e in



^nt i ;d. This time *Hi*.,

Li-

dead specimens of the last, put u
backed at once. The birds had no food by tl *Til*,
(a.) Offered to the birds *Papilio demoleus* a;
tie of each. Former taken fir

experimej a u\t.
nt again i. result.

Same RJ red with a female
Hw ap]

coarse e:
comps . — „
ad y one 'i. The.' Dts <>i i i

phia. i taken fii (/.) *ts ta ult.* ile.

Experiment i
id')

The P m
(ft.) Experiment again repeated ; 'ts taken tiio
d which took :

mind another But
(t.) Experiment repe; *loea ta!*
(J.) I*rotectively-co] ea offered

former ehos Iy eaton
Two or threo Terid. lay. A tot of *Da* *J*J (c/i;v
) and iiVy aon-warningly- loured sp
,. ,M; : ie lattoi oaten first, .

re ; whole.
!..) Off. of *PapUio* '
Both were taken a. 1 most simlntaneously ; tl

i Offi :e each of a *Ca* D.

2. The

in ohor

(e) Small irown Satyrid butterfly offered with *D. geniitia*;
former was deliberately chosen,

d immediately a Ls
aristolochiae were i loft, while some of
the
mentioned were being -^h souio were
■en. The birds had food by them

at red them —

.) A *Banais geniitia* and a brown Satyrid gpecieB. The
fi)

comer having a fair field, first took the former, and then
pped it and took the otl.

.,fc experiment repeated; two biro t once, and
the

Dan m,

:.) Offered *yen-u'ia*; was taken fiiB'

!.) PuL in one (*itopxilia, nai*
s (ont; mimetic of *P. aril* Tiie
first comer deliberately cb od at
the re

I

CO'J' : •
had

fur C . . ' ■ / ' ■ - a .

red

One *Dana*

[b.) *D. chyy* bird.

Same expb'* repeat-

ame e^pe,

) On 'tia ofli
ately taken first.

One female of JEftyi]

i at. The i

>: taken first.

Ha. Ijfuter taken firs.t, by

aken first, esult.

vutopsttui. Latter

deli-

ne Oatopsilia.

<.kn

find-swallowed whole.

r

r■ and two

tbei' not). *psilia*; the

next ed away ; then a.

■wed nearly whole— same

ind'-'iu.ual. The birds

Uturfies previously put not

seem very eager even

disabled specimens as

ken first.
me Bpeoies of *Pnpiido* auu an *Emploea*, Pa/
I). *'Ho polites.* Both, of tiieso
wi

first, and BM

r taken

) Same taken f
expertp seated. Prot<
and eaten rd.
is bird a^in^{ate one o_} though there Da
j uneai

the same bird took and began upon
lowed by another.

<a_{omb} utia and
\i own in, **but** though one or bwo bins pull.
'ne c The **birda** were now going to iv>
ect food before on this day, but a number of es 1
before.

X Offered COB—
A Onel- Ua_ Ln
;6) OneV> former oho
^ "; gai , :hia time the bul
be
floor; tooV it.
a biro ped from

One i
... (?)

(/.) One Jhqv {g.) Oae Paj-'r
!10tea_

(h) Same experimi
ting, an, « ' ... ,

Ono Bmall pi offered.)
Lely cli-

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Put in three E r i.aken n
T, ; JVO mo

Iiberatel7 by young
The forme
I did the oil
a flwallow

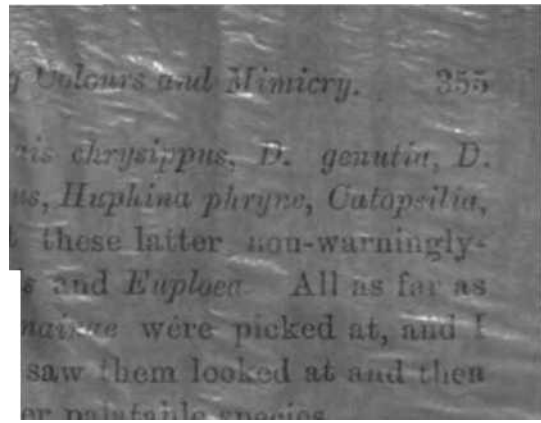
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I had to Ic ; and

bird

missing I saw 6
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roach, which we
; ice, &'



DfLV

In the
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ono seemed
ing about, left from ye;
pge browu moth and a ■
however, did not seem to wish fc
though sr their <

»J eaten some the da
*noou I oir«t»a them some butterflies,
. . . D, these
were eaten, as far as I

erw&r di ind other noi

On tbi

igly-colo from
my hand, vrh

These experiments)■ to the

the i pia was uup&lat&biiity of Da
imbt i the aruingly - B.

Birds would often only loot
at t ■ nd soon left them tvlieu picked up.

Next day the birtts h i oared, aad BO my expe
with this species.



, O.M.Z.S I—By Lros
,iATn DB. L.

. i! Angti3fc, 1895.]

a island of Sumatra.orneo and Celebes, forme one
the Great Sumla groap of islands. Rather more than half as largo
fcoineo and more than twice as large as Java, it is nearly so as
e. Some 1,070 miles in length, with an average breadth of over
' miles, it lias a total area of about 128,000 squaro miles, or 8,000
tre square miles than are contained in tho United Kingdom, Oblonjp
' in shape, with ager d r running north-west to south-.:
the islai.■' .lies between 95° and 1C6° -Long. E., and is almost esaotl
bisected by the equator, six degroea north and south of which it ex)n the
west it is washed by tho great Indian Ocean with no adjace land
except a parallel chain of smatl islands of which JTias is the largest; >.the
east is the shallow Strait of Malacca, with tho Malay *i*>

large island of Banka and a few other smaller ones at no gren
To the south lius the large island of Java, separated ouly I
ada Strait; to the north the Nieobar and Andaman chain
■•m to form a natural continuation of the enormous volcanic range
ormtains that beginning in the Banda Sea, extends through
■ is of AVetter, Fiores, Sumbawa, Lombok, Bali, Java and
nds in the Arn Sea, Throughout the whole length of
Sumatra

several parallel ranges, with i
slateaus or high Ian rern, called "TUB Barislaus,"
highest mount! o mostly vofcanoes, which reach ai a of
about 15,00⁶ ii Mount Kar Other lofty peaks are Indra-
rara, 12,255; Lusi. 11,0 >^; AbonL

..■ pi, i/,6- iVO; t.ml

Two of lhe«e volcanic ^ -es, Merapi and Talang, ai I
to ba

active, OJI the west coast the monr ise abrv, om tho
nd in consequence there *Is* no alluvial soil on that side of
coast there are large aoluvtal plains, abound-
nrater, and in' s plain is increa

being gradually built ap b; road '-

. In the northern half of Sumatra in the abov

are

siuiill Malayan .angkat,
and

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2. **The** xotio of the

hills,

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en tlu d for a tin box, fit terfly
\\ moved ofl' with their lowly and
.ds to the evergreen a iua. Being moreoi
inpoasiblo to gran', tliorn a <?«fa.ry, so they were ^H
id by , hey brought in.
the insects and set to
-ambling, and -as a

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down to Sumatra some of the

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>arjiling to Dr.

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and refused to go to the mon

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m a Battafc guide and in:

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the hills regularly, and did *very* well there.

'l m ti

-Ld occur only in the mountains, from the

vliich and from the high Central Plateau, alone, ai\

the interesting

s that arc common to the eastern

Himalaya

atra, cleai-iy showing the afori'imo continuation of the Asia'it?

continent by way i

Mulay Peninsula tlu-ough Sumatra to

Java

and Bali, between which hitter small island and th< ly small islai

Lombok (he .deep depression in the sea floor which

forms

allace's L

alayan from the Au^tro-Malay an

region. The most renu

species which are con

him Himalayas ai

of feuniatra, bat

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2 not RS yet been

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Peninsula

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Apattira numoun .-la;

p&is sankcra. Kollar.

■ *fymiis* ifl.

Limenitis danava, M6ore, local race *idboniar*>*jiafita*, Weymer.

„ *dudu*, Westwood; local r ■ it, Aloore.

Cyrest-is (Ghenonesiu]

Hewitson,

local race

cyanee, de Niceville.

CastaUus am ida, dc ^i enlle.

I

Arrhopala teesta, de Niccville. *les*,
Godart, local race i7«, 'le Nice • ille,
Hapala schisiacea, Moore. „
scintilhi, de Niceville. *Delias*
belladonna, Fabricius. *las Ubythea*,
Fabricioa. *lliiphlna nadina*, Lucas.
rissa, Fabricins, local race
sjunatrana, Hagen. *Papilia*
cloanthus, West wood, local race
sumatrauu, Hageix 'ioiaduval *itJut*
furri'ca, Moore. -on.

bring peculiarities

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- **nomenclature** employed in this pa

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Men. " Muldej

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rdost-Sumatra."

Munich, 1895.

P

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i: the isla

Kirby's " A Synonymic (877, and ^M The Kecord of

the Zoplogia of the last volume published ;

up to

Hies; Mr. A. Ok Butle

Malacca j Dr. O. Staradinger's "Exoti Scametterlin ^{ad}

Bni Icurr Geovg Semper's " Schmetterlin

iippjnischen Inseln;" and M*. W, L. Distant'a "

Rhopa

aa." It is hoped that f>

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tch specie,

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ats of the* oifferent writers who liavc

a. All those a that have not been ob<

ixed to the name. Dr. Martin

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Subfamily DAXAINJE.

1. HLSTIA LTKCETT8, Dnny.

i, ftlooro, Proc. Zool. Soc. Load.

i, 1. a, p. 219, n. 6.

Snellen as *Ivnc&ui* [sic]. Hagen as *lynetms* an
ncerts [-

i tier, Staudinger. 1)

V common species, ocnrring from he lower slopes oJ

As nsnal it is vi two of i

Coore as distinct species o< sni i Sunv

variety figured by Diataut in Rhop. Malay., pi.

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 h: Snmotra'J. do ban Bekantschau.
 .td by a very b 1 day-flj ing j iobably of i I
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 Tlio Crag " ■ ery common.

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lh. A common f of the plains, tie female mi
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isc Smith. Snel 51 ley Gr*
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year

Dr. *B* a'iug in .

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■er, and the aberrational form has
ivnd more common.

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MoorOj Proc. V

p. 242, n

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a common species
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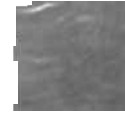
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SIA, Fabricius.



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en. Bomb. Nat. Hist. S

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>v each, iind they ai

JJ. aspat be found in Su all th

always only singly. In the spots where a bine H<
or is in abundance, the males of this species will occi
r with numerous Bpeciea of *Dm ad EupJcea*,
IJU^

>nly found in the forests, and never f s of
their husbands, brothers and cousins.

DES,' F.

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Grose S

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DANATS (*Caduga*)

rroso Smith
as *aylea* and *melaneus*. It

nmsula. **Occurs on the Oentra**
I . the **gpe**
and darker iu colour than th'os- rion,

17. 'EUI'LCEA (*Menama*) nuxToxr, **Moore.**

Metiama by , **Zool. Soc. Loud.. 1883**, p. 265, n. 5.
Moore, **Origii,, pibed from Sumatra. U**
b with any sp iiis **distinct** subgen. Sumatj

¹Eci'L' *uama*) Mi . But]*

^se Smith. **Originally** described from Siam.
doubtfttl if two 'GSubTY-iUIS \

records quite **funnyly** " *Mena* a near
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Jlopeni hftn Naoe Oekar. It
? the evergreen fo

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uctinig

.^Batlor, Jour., Lm, Soc.

Wl., Zoology," TO] J.

Ion. Entirety

372 L. de Nieéville & Dr. L.

24. *EUPLEGA (Antusena) d Lth. B > ?fcaitt. Nat \>
Kirby. Butler as Tnma .
described from Tatu; mid also cm the v doul
Sumatran.

25. *EUPLEGA ■11 - male a
Kirby.

26. **H;**
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B-litcB Bowers. ' much rai
s ii violet gloss M o the U|
female oi su, Fein- aever baa. 11 iu
ucn lar male-mark " **than** in L, mi

IRE, Cramer.

Jed fr . matro
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continent ui" India.

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browu *Jjlnpkeas* in our area. JBotli se:
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31. *! iia) AMYJtOXB, G

Gc ■■ Mt'tli , vol. ix, p. 179, n. 11 (18VJ),
bh t ' ■ HIL Soc, Loud., 188">, p. 271), n. 13.

r. Moore. !

Jhina

known to

\ (Crastia) FKLDEEr, Butler.

1,1S6G, p. i 20.

j was from
Sumatra. Unknown to us.

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Ingle male Sumatra. Rut, for
cies has always been considered t<

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38. Ei

UCOSTICTOS, Gmolin.

Croee Bhewn Smith -as *novarm*,
Hagen as *n< igiata*. Very
rare in Snu

ag mn-ny years pas!

^ronp of *Eupltaa* I could obtain,
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, described in 1789 E

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with folded wings; this evidently mncb-enjoyed sport

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Martin **\$. *leucostic*

39. #Em i _ ■ CB

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Distant. TJt* ler.



40. *EOPL(EA (j . ':

Distant. Moore. Mi 'Istani sses the opinion Lh

111 an e x f r e n i e v a r i o t y o f 7ⁱ; *chhn*" G u b r i n, w h i c h

WE**.

-ted to Province Wellesley in the Malay Peninsula.

oE this opinion, hut keep it distinct, for the • as I

pect men agreeing exactly with Mr. Distaut's ii

*Ei ./) BOPHTA, Moore.

•i-iginally described from Sntna ■

(*Isavtia*) M\ : ■

. Sutilloii, Midden-Sumutra, 1

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■. and found on I

The female is exc

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higher mountains and on the ■
-erbel. ^{tToil} broi ^[n j] 'm equal numbers. almost irarn
in the rich velvety deep blauk col . Ql Jt, pppowi*

(' .t

i as *iyrianllmm*. Hagan as fa, [sic], M<
As I can exactly m; o| ^'.

[oore, with Khasi Hill examples of *E. ha*. Felder, 1
under the latter name, as it is much the older. *B.* is
richly blue-glossed, in spite of Mr. Moore having stated th
doptera [ndica, vol. i, p. 188 (1S91). In Sumatra it '
fairly constant, though the spots on botli wings as usual
le variation b size and number. I possess some
coincide precisely, spot for spot, and in the ex {3}æ
col Mr. Moore's figure of *SHctopi-axL crowl* «]];;
2, *mah* 'or notes on the variability and synonymy of *J*,
see do Niceville, Proceedings Asiatic Society Bengal, 1SV
Sumatra it is found in the alluvial plain and also as high ns Betantschan
and Kc \ the hills. The female is as usual very rare. I rtin
-lit hi tie specimen under the roof of a wooden bridge over
the Bindjei river near Namoe Oekor, h

46. *1. , (*Stick* > HCINA, But!

E, ficina, B i-uml, 186ft, p. 280, n, 36, |>i. JCXX, fig,
'• ■ ; Xtoore. [ginalty described from Suma
Unknown

◆] *Stictopl* Rntler.

liter. Moore.
to • Origi

nilv

21 (i

■•■ Snelleii ns v ■ iy in

tkfi large forest, and never

atNamo* >r and ilience into tlie fulls.

i nd on or very near to the ground.

. er is a perfect specimen obtained.

4<). »MYCAI i is (DlIapa) soT>KA, 1 oore. Not rare in

Java ur' uown to na from Sumatra.

M\ ' . . . : ■ (Sitralai/h) ■ ■ ■ Hewltfi

nitli. FTagen. n. Kirby. Distant Also
a i

i if the high forest, and is fche only Samaferan M

lift* ish gloss on the upperside oM ^ny forest hit :

■i eater oi'less i , such;. . Thau;

lloiiintli, und others ; D'. ti the I if the I

Snellen, L. elpis, ' . I oi-e, aio

I

-eper blue than th - L a Cmraei of the i

51. MTCALESIS (Orsot) MEDO.S, Fabricina.

Hewitson as hesiove. Sns'len as h^sione. Grose Smith as

7

common in the plains. T)

the :i)ttnd in many if [utiia, M

unl;: u Sumatra. Dr it in Sumatra

fn, 'd by females *b proni

fdosanut which bred from the egg laid in

^]P !;i: nera also feeding on various

all the year round, generation fo]

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Butler. Mr. i

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well as *M*

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6 com J

ore.

bcvi, figs. 2,

L. delinV- »r. L.Mi

o6, MYCALZSIS (*Onlapa*

. *fmuuicles*, He

.1, *iiit* pl

figs

Hewitson. < *K Hagen as mufMieZe* [sic]. Distant.

Kirby.

■ nllr deer- om Sumatra. Rather rare in the X. I
in

peppor gardens: so low an, elevai en as Namoe O<
somewhat pi I at Loeu Boentoe near the Battak frontier.

This

species is the hirgeet of all theStimatran AJ ..'«, and small

ntity be equalled in size by . , of ji/ mi

or JV. *orseis*, Hewitaon. The shape of tho ing also *la*

vc

from all our otht*' specie

57. MTCALF .&Vrr-*anda • A, Moore.

Grose Smith, iiuelle > I on. Di Occurs not nncomiuoulj
in the forestB of tho plain

js a " male-mark "—in flbi ' cell of the fore win:

the uppersido of the maTe,/*nd the mottled le of both'

-wings

makes .this spocies of ea« Q T! pillar*} feed only
at

tific. Tho b' terfly emerges fivin the] f ry lat-e in tho day,
before two or tnrep o'clo<- 11 the othei species-bred by

Jlartin emerged between nine and ten o'clock A.M. It flies
mostly at

dawn and the dusk of the e7enin< if a good example of the crepuB-
cular habits of so many trojnean^ flies.

5S. #MTCALI I ,

Hewitson. I Orii ribed from Tertr

Hewitson records it from Macassar in CHel iolo, Batchian, Temate,

>iatra, Malacca a: i; Moore recorda it from Celebes, Gilolo aud

Butchian. It is uol QOTV as.

59. MTCALS PUSCUS or.

Hewiison as J 'che. Saellen. Grose : fts *diniche* twice over.

ea [sic]. Common in tho foi **stn* at the foot of the
bills and also in tht plains, nearriver-8, ition
it is intenii^diato between the fuscous and yellow species of *3lycale*\$i\$.

60. W is {*Mydosama*) ANAPITA, Moore.

Hewitson. Grose Smifh. ■ Siellen. Hagen. Common

in the forests of the plains.

ydosama) JIATKMNATA, Moore.

ta, Moore, TraDB. Enf. Soo. Lond., 188J, p. 307.

M* ilagen. Originally described from Sumatra. Occurs only

c. It be common n [Qmⁱc to the Baltak

*. .7.ma) DODERTrr, Elwes. , Proc. Zool. Soo, Lond., 1891, p. 1 XICTU, fl*B. 8, male;

ribed from k in the Mala- Peninsula. Dr. Martin obtai
foi'u E u, and later a female from
Soeka-

nd i.. pnir from liykanUcl»an. It is on& of :
utterlies in f ollectiug he only obtain
h four specii

63. *M.7Cki.£\$i£-(Mv tus>

Grose igkially desc; MftM«mi Mj-aiL Recorded
from Now Guinea, Wai)d Temato by Moore Unknown to u

64.

MR

Hewitson.

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Jfoore allows Jj.

s u ^

-shall], to si (>ecieH, in preference to *L. fervlda*, Batli

is an older name, being the first published. Colonel lid Ild
description of *M. surhlta* vraa read before Mr. Butler's paper was pu
d, bat that does not give piiority, *M. fervida*, *M. surkha* ;v
lata, Distant, are all .synonyms of Af *oroalis*, described from Ju

The first two names *he last tv:o wet-season for

Kf one and the same speci- if diy-seaBon form certainly docs
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centr in Sumatra it i m to me if it is it u JaTa. J/".

oroa:

IA eoniewi » the lower hills ; mue Oekor, Nau.

s, and itschan. l*e yellow species

of

tynlesis fou Females are rare.

65.

iot appear havo ever been

rose Smith. TJ'<s
species **escribed**.

G6. *MYCALti S

Grose Smith. Also apparently
nondescript,

y perhaps be here noted tli;' all the Sumatran species of
ire Tory earth-loving insecK they always kei *e to
md, which th \y leave for high er flights-on two occasions, v

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A. martini, I:-...

Grose

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This is also tJ
Hie PLilipines.

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ho British W e are nil tl
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 [u B spe. are inlu
 shy. I;

1 careful!;

.1 are not easily seen en the dark ground covered wit
 •s in the dim l-e-;...-.. f *^Ke forest. Tin
 ;he difficulty of discovering ;

hv they are so seldom met with in i is of
 uat *Neorini low* v and Hewitson ••<■ *MelanU-is.* so
 he would call the species of *Co&lites* the *Mel^mUis* e forest. t Being
 ie forest insects hibit a beautiful gle ne colour (confer
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73. LETEV. ■ i
 HewiUou. drose Smi fier-■■ Common
 everywhere in the p: n the mountains, and ever the
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 Tplateau; the specimens from *the.* mo 3 liav owish-red
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 larva feeds, and i . ni;CHt

74. LETHE (I?«&W) CM
 Hageru Vi'17 rare ■he mountains s" tbe Cei
 •e than ten or tweh
 iens during his long¹ S'.ion

75. LETHE (*Del*
*L. Aarena, *e Kioevfl^ Jotua* Bomb. Nat. **Hist.** Soo., voL viii, p. 4^ n. 3, pi.
 ig.7/i»aM1893).
 Yery rare in the BatUlc 8 sad not found below 3,0<
 p_r Martin wist idd -" I cannot lose this op]
 toCent my compliment to «v -I Mr. Lionel deNicev,
 binary entomological knowledge and kpen insight tn havmg a
 ,he very different fer , Lepidoptera, a-u

obtained by Mr. F. Moore, Java, from whence this species was first obtained, recorded first in the female — described by Dr. Felder. *L. darena* — the rarest and most beautiful, if not the most beautiful.

76. LEV-R

BDROPA, Snellen

Mr. F. Moore, is found in nearly 3 but *L. arcuata*, another species in Celebes. *L. arei* is both in the mountains and in the plains of Celebes.

77. LETHE ROK:

Hagen. It is found in the Batta.

78. *YPTHIMA CEYL* B. n.

Ilwes. Unknown to us from Sumatra. It occurs on the east coast of India (Orissa and Ganjam). in South India, and in Ceylon.

79. YPTHIMA BALDUS, Fabricius.

Smith. Hagen as *methora*, Fabricius [sic], Elwes (the commonest species in the plains and everywhere). The larva is ubiquitous in *Gramineae*. I Mr. W. L. No species of *Ypthima* in the dry-season.

YPTIUM, ■ Niceville.

Y. iarha, do Nießvj e, J. Bomb. .. x, p.] , pL . mate; L895).

Very rare in 11 Dr. in has not more than a dozen; large size, IG to IP Liichea and es

It is only on the hind wing, a pair at L¹ e anal angle, a pair in the middle of the wing, and a single one in the upper subcostal interspace.

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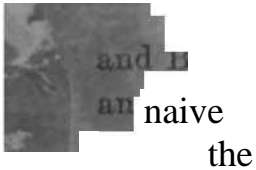
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■.nnyiti oi *R. crisia*, and Mr. ilooi-e'ii. *bat work does not give reasons for st • tliein.

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A. 8. B., vol. Ixii, pt.2, p. 1 (1!

rs ISMESE, Cramer.

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But *de JILUI.* Borneo, both *"ma*
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 btran speciraena t than Drury, from India; *E.* (
 8] from Ceylon; *B. dim* ,
 from Java)
 1 in Sumatra. Thai r the commonest of
 tiurrinj ie is lav.
 **er succoeding general rJ ^e larva feeds on th(
 doubtless on various species of palms also-

US [,RUCOCTMA, Godi

Hagen as *leucocyma*, Godardt [sic]. This spr-io*⁵ ^is d< -m
 Java, and is evidently ~ery closely allied t
 May not *E. leuco* aym of *E. protege*
 is doubtful if two distir cies of this
 Dr. Hngfin records two species of *Ely-* *i this g
 .-a, but I h ilj seen oue, which, however, is de
 able, but cannot in my opinion be split up into sejmrale

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ELYMNIAS {*Melynias*) LAISTPIS, de -.%ieeville, n. sp. Braith as

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Distant as :

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■'. ::, p. 39 (1859). We

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97. BLTMKUS (*Melynias*) <::.

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ccvillo, Journ. **Bomb.** Kal. Hist. Soc, vol. z, p.

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nith as *ceryx*. Hagen as *ceryx*, O <he

Jen* Bateau «t nofc less 3,000 feet elevation,

E- is ftjund in June and July, bnt chiefly i: mber

Dr. -\i other, Dr. F.

Tuba I oar Bat«e GaJjah, v : b^h

.TIM.

ELT.MI

:INTES, de Nic^ville.

E. (Melynias)er

■ ■ nIc, Jonriu B.I.I; ^1895).

■■■. Soc, vol. x, p. 19,

A very rare specie* found only in tho lii^h forest at Sekssoh and y to tho lower slopes of the hills at Belrnntslmn, and iu mtains in September. Dr. JIartiu has obtained three is nearly allied to I?. ca\$>hone, Hiibner, more *tar a*, Moore.

is {*Melynias*) n, de Xiceville.

F. : . de Nic^villo, Journ. Bomb. Nat. Hist. Soo., vol. x, p. 21, de (1895).

ies was describedfromasingle male obtained in Sepl Bohorok near the Battak frontier by Hen-11. Ude, the]

a. As Bohorok iz on t] :> the -

luntrieB, it it; t this *Elymi*

thi ire plentifully, as these regions aro quite unknown. It is alii
to h iwood.

100. Ei i (*B,-uasa*) SUMATRAXA, Wallace,

se Smith ns *snmatrana* andjjei.'om/a.

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It occurs in

i to be one of tlie

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aiued tlire*

.Jn.s, on.

which he caught himself in a forest near the Saentis Estate, not more than two miles from the sea.

101. ELYMNIAS (*Bruasa*) ABRISA, Distant.

Very rare in the high forest

Oekor. Both sexes are

by Mr. Dial

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fin-ured. We have seen
Distant describe
as to be a dimorphous
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Dydis etwoides, . 2,
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^ -ce specimens only have been obtained, 01
near Selesseh in July, two in the lower hills.
. of *Ei* .>■ have a, soft
nps. They are very fond of
they remain for ft long ;
onl P frightened or
driven away. As (*Agrusia*) ESACOIDES, de Nicéville they all rest
with shut v,
they are in this position much, less conspicuous than when

©title often

Subfamily

SIBIA AMBTITE

igen. E Butler. Distant. Standin^er. frand
s like all the rest of the g ot .it a
: lian Bokantschan in September. It occurs higher in the
The female has the macular band on
-* *lae* fore wing white.

XO i-Ynhstorfer.

■■ohstorfer, Eut. Nach., vol. *xxi*, p. 196 (1805).

r. Described as being a local form of *Z*
/estwood. The 1: described from a female S]
//jj ?« somewhat roughly figured in th-
, 1. Di figure* both sexes ai m P

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>n his authority \

>mi ■>tfh]i\$-ii:. Butler, and iC occurs at
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Serftugau, suit unarei tso iii Asaluiu.
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rose Smith a [eic] Or,!y known t
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106. ZGCXI

G' Hi' Staudingcr. K ni«-

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female ol -a, Occnrs from S
Befeantscl fgher in May and .September ; is rarer than
OtherR]M .a-as. The female often measures six
inches ac nigs, and ia one of tKo hir^est-known B/
wing «ii a. The female has the band I the
Eorevnuej whit All Z> only- met with '<y|| forest
rsmall Btr on whose b- here are usr bamboos,
os of wbi jh most probably the larr^i feeds. Th. -ipitlly
often, but always in a dense inaBs of branches ia of
lies, su thai they ara very difficult, to seenre. The befit
way to
them is to plaoe rotten plantaia frnit Cpisaogs or bav along
ams Muu «JiQDt4o which H*fty will come. The males of
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SSeuxulias ai inh&^ii&nts of, the forest, toid cxhi >te
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jat resemi.'auce tti dead leaves on the i ude makes them
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ifficalt to distinguish amongst the true ves wliicli alwa)
at all seasi J»V fhe forests u In South.-East Boi
sin) ail species of Zei appear to be far oommoner than
Sumatra, the Malay Peninsula and Burma. Out of 1
specimens of butterflyea Dr. ia received from thence, 200
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three specius of *Ztuxidia*.



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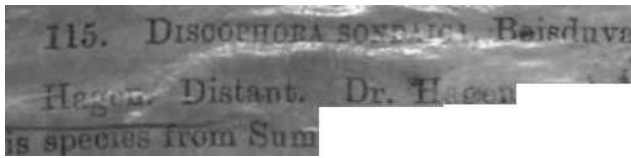
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The males always settle with foldei

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* streams running through the forest.

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All species of *Oethosia* are forest buti
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and go **ly-coloured I**
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and 0, ■ !* live on *Passij:* \

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of the wlucli in eating a twig hi

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L'A, Fabricius,

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i. Soc., vol. viii, p. 41, n. 4,

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I. XX, p. 305 (1894).

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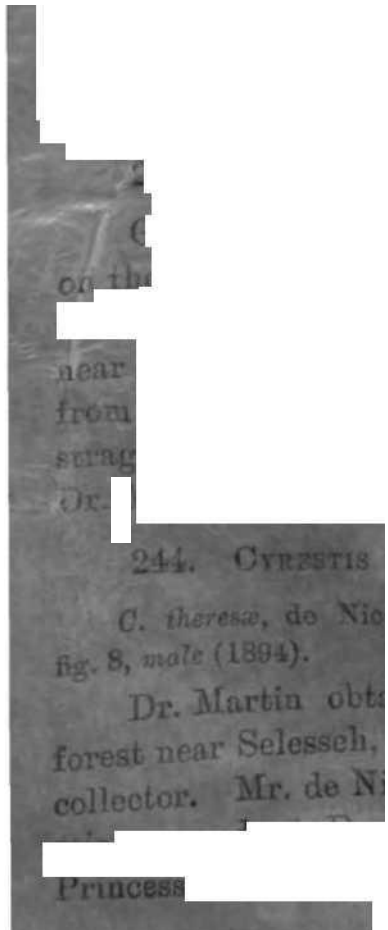
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274. TAXILA

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Sumatra which lies between Nias and Penang. I may remark also that I wrote blindly in *Butt. of India*, vol. iii, p. 21, when I suggested that the genus *Miletus* belongs to the *Gerydus* group; at the time of writing I had seen no specimen of true *Miletus*. Previous writers had used *Miletus* and *Gerydus* for *symethus*, Cramer, which led me astray. "*Miletus*" *zinnæ* would appear to be a true *Gerydus*, but as it was described from Ashanti, is not likely to be found also in Sumatra. The nearest Sumatran species to which it is superficially allied is *G. gœtulus*, de Nicéville.

291. PARAGERYDUS HORSFIELDI, Moore.

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A very distinct species from Bekantschan and at higher elevations. Flies in February, March, and again in November.

294. PARAGERYDUS FORTUNUS, de Nicéville.

P. fortuneus, de Nicéville, Journ. A. S. B., vol. lxxiii, pt. 2, p. 27, pl. v, fig. 14. male (1894).

The very dark colour of the underside will suffice to distinguish this species; Sumatran specimens are even darker than typical ones from Java, the ground colour being pale ferruginous instead of pale ochreous, with dark ferruginous mottlings. Is commoner than the

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448 L. de Nicéville & Dr. L. Martin—*Butterflies of Sumatra*. [No. 3,
Martin obtained only two males of this rare species at Bekantschan in
March and May.

305. *PORITIA SUMATRANA*, Felder.

Felder. Butler. Grose Smith. Kirby. Distant. Originally described from Sumatra. A very distinct and easily recognised species which shews but little variation. Occurs in the Battak mountains.

306. *PORITIA ERYCINOIDES*, Felder.

Grose Smith. Hagen. Felder originally described and figured a male from Java, Hewitson described and figured the female as *P. phraetia* from Singapore, the latter being black on the upperside marked with orange. I have a good series of both sexes from Java, which agree with Sumatran ones from the Battak mountains.

307. *PORITIA PLEURATA*, Hewitson.

The type of this species was from Singapore. The male may be known from *P. erycinoides*, Felder, by having the apical half of the forewing on the upperside black and unmarked instead of heavily marked with blue. The female of *P. pleurata* is marked with blue in some lights, green in others. Occurs in Sumatra at Bekantschan.

308. *PORITIA PROMULA*, Hewitson.

Originally described from a female from Java. Dr. Martin possesses female specimen is *wtiiei* agree very well with Hewitson's figures and description.

309. *PORITIA PHILOIA*, Hewitson.

Hewitson. Grose Smith. Kirby. Originally described from Sumatra, where it occurs at Selesseh and in the Battak mountains. It is found also at Pabang and Johore in the Malay Peninsula. The female is unknown. The male is easily distinguished by the very dark colour of the underside, Mr. Hewitson calls it "rufous-brown, undulated throughout with paler colour." I would describe the ground-colour as fuscous, the macular bands very close together, dark ferruginous in colour, outwardly defined with black.

310. *PORITIA PLATONI*, Staudinger.

P. platoni, Staudinger, *Iris*, vol. ii, p. 104, pl. i, fig. 8, male (1889).

Originally described from two males from Palawan in the Philippine Isles. It is a most distinct species, all the bands of the underside present in every *Poritia* are in this species broken up into well-separated spots. The *Poritias* in the male sex have perhaps on the

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325. CTANIT:IPAKASA, HO

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326. CTAK' : ,. e Niceville.

C. cosswa, d . Journ. Bomb. Kat- Hist. Soc. , p. 271, a. 9, pL
figs. *U, mal* .1895).

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327. CrAjrBis ai0S, de Niceville.

C. eorythus, do JTiceville, Joarn. Bomb. Nut. Hisft. Soc, vol. i^, p. 2V3, «.]O, 1
0 fig³- ^^' male; 17, female (1895)*

N^ot rare in the I mountains in ber.

CTANIRIS PUSPA, Horsfield,

'en as *cagaja* [sic]. Snellen to Sumatran s

merest tmce of white sprinkling¹ on the upperside of 1

igs in the mal< tistan^ the
Malay Peninsula

of
O. puspa, u1 ,v.
bracing a form insepa ■able *O. cagaya*, Feld<
has the black border to both wings on the upperside
■n in Jaran specimens of *G. puspa*, from whence it was first described.

320. Cr^mis CARNA, de Nicoville.

C. eartta, de Nic^WHo, Journ. Bomb. Nat. Hist. Soo., TOI. ix, p. 2%*, n. 11, pi, °. j. 18, mute (1895).

The rarest of all the ^umntan species of the ge^ug. " The infis-
ition of th of the forewing on the rsicle" is
I ways present, tier characters given in doription will
iflice to distinguish" tkis species from it« allies.

330. CyAHinis MTT^INA, Snel!" ~

O. mvrina, do NioBville, Joirn. Be «t Boo., vol. ix, p. 375, n. 12, pi. O, 19, mule (1895).

A very common spec* I have not be-
typical specimens of this specie6 froni Java to compare Sutuatium.
examples. ..

851. OYAKTKTS PUCIDA, de N■Vrille.

Not very common in Sumatra.

332. CTANJRIS CAMEN^I, de N -eville.

C. came»x, do Nio^nUe, Journ. Bo-nb. Nat. HiBt. Soo., vol. ix, p. 278, n. 14, pi. .22, male (1895,..

The cominoi it species of the genus occurring in Sumatra.

LIMBATPS, Moore.

334. Cfi : a»A, Doherty.

Originally described from the Tenasserim Valley, Burma. Veiy
rare in Sumatra, Dr. Martin has obtained two or three specimens 011I3
Battak mountains. Of the ten Sumatran species of *Oyanirii*
only tw\T occi. die plaius, *C. cossm*, de Niceville, and *C. j*
HorbHold, all the others are found in the mountains at high elev:
in Soeng,;i Batoe to tbe Central Plattr.i, and on the 1 0.
akasa, *HOVB*field, and 0 *fhus.* de Niceville, are somewit»*6C

C. carna, *He ^Nie^villo*, and (ilio four remaining 3 are veiled;

1 on tl females can only tx ting on tl I-plants of the larva . *Compositse*.

335. *OANIRIS H; icing, *Grose* Smith as J . *iraldus* and *anmiqa*. I seen this n

Kii

scord from P a is probably cor ikoly to have *fih&n* wrongly identifi synonym of *us*. Itliink i type B] uuial to al pecies of *Oyaniris* known to mo.

ZIZEBA LTBIMOH, Hi

n as I a.

>f the genus occurring in :- a ns-U*i

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hjsizone. Al 'ireo Z

tnd. Z, vy common in the plai . f a w Lftnieeus), and on the> small pecieB of *PortvZaca*. Z- *gaika*, 1 so Mr. Trim.

!;. if in took ii in hi^

id on the CeutntJ ' Uiflftto, ami m to the mon

339. AZAJ -IALIS, de Ho.

^ . a^iViilis, d Niceville, Joan b. Nat. Hist rol. x, p. 33, n. tC,

p S2, male I

pee t from a single example caught July, 189*.

10 LYCANESTHES BMQLUS, Goda





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of Nias Island, 1
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Dr. Martin
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f?ADCBA MACR

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^{mf.}
34o. NAOADCBA PAT,^

iginaliy described from J^

KifADi" i:KiANA, Distant.

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hem. I refrain from d< t until I have obtain

34b. 3&CADCBA.

Grose Smith. This species^ 'miner**, Moore.

utn JIEBMV ser.

g = JT. tuofa, "Moore, = P. vnieolar

p. 66.

described f

and

<* lierr Ki *s sent me a male from Cerai

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rran», EL we., Prcft. Zoo) Lond.,

pi. xliv, fig. 6, male ; PWi iut wtw, R5ber, Iris, v

(1888) ; Nacadubu ;on,

I Dr. O. Staudinger

■u per both sir Pi

873, p

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h two h.
b the Bpi

AXPA, de Niceville.

W. lo, Jonrn. Bomb. Nat, Hist. 9oc.j vol, at, p. 31, n-

.DUBA SELIDES, tie Niceville.

Jouru. Bomb. Nat. Hiat. Boa, 7ol. is, p. 280; n.l<

NACADUBA NOREIA, !

°fl <tes, Moore.

.illeBS, and was described from Ceylon from a feinale,
tjpe at Vienna, and it is what I have called the tailless form of
■ ardates. N. noreia o< ypically in Sumatra. What T consider to
'■ its female, and of whfcli we possess many specimj
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Dr. L. Martin—*Butterflies of Sumatra.*

■ES SA.TORATA, Snellen.

Snellen, Tijds. v. Bnt., vol. xxiv, p. 137, n. 3 (1892). Kribed from Java, but? not figured, ication, it is difficult to identify species

■th< lies of *La*
■tl(iinafcra, a possess a very lc
to of is of it from all these p

TALINGA, Kheil.

■KlioU, I 29, n. 86, pi. v. figg. 32, m.
.884).

■altnga, do Nice , Bomb. vol. x. >■
Nfli. la

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A very md tjuite distinct speoies. Or!

9, at. iitiou i ~W&*mm»

BrjPis, Godarfc.

Snellen. H; *eights* [sic], Godarc.t [sic],

362. *LAMPIDES -Her.

Snellen, Original ed from Kar Nic I hai
tho typo specimen, a male, at Vienna. In the, India
are a pair of Kpeoin; nkowri, one of the Nic

land and tlie r^Tuijipines.

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/3,.p. 349, n. lo: rl. x

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male of C. common species, but the markings of
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379. *CUPIDO-' JTHEEIAI.13, var.

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380. *I*TCANA AUGUSTA.

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390. ARRHOPAL.-

, vol. vii, p. 329, n. f.

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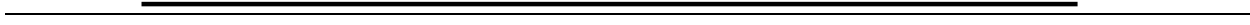
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BOPALA TEESTJ

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401. AaRHOPALA API Cramw_

G Smith. Distant.
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403. Asp *
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teen in March, J¹ 405.

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413. AKRHOPALA SINGHAI'UEA, Distant,
from Singapore. ins species fro--
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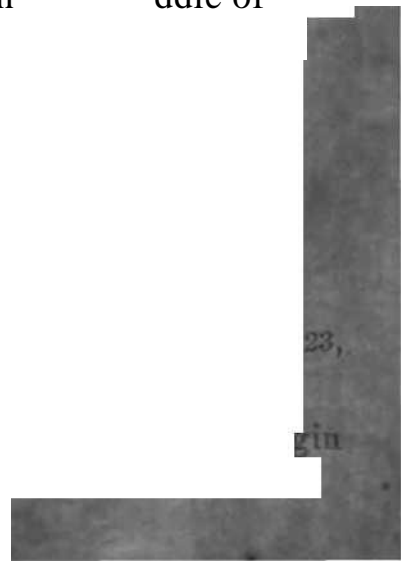
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447. 'TAJ urn A rVoricin;;,

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tlie llalay Peninsula—so it is ab

^u 448. TAJTTRT* IAKTRA, Fold.

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39. i. 3-1, p]

(1894).

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p. 29.¹-

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1891, which I have not se u

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Me is indistinct, and can l only
a it is exce .- prominent, qn
loar. It is very rare
i a single male taken in tho
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nrns as BritomwrtU cle<>hmv.h:s, Elwes, trdru and Borneo. It

is rare iu Sumatra, found in Jnno and July

459. BIITO, de'Nicevill

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Occurs in Burma ana Sumatra
from each locality.

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. SUASA SUESSA, de Niceville.

8. suessa, d • Niceville, joani. llomb. Nat. 1

307, n.

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:■!. H, t.^s.^S, male; 0, Jamah (1802).

Orignially .escribed from the Malay Peninsula.

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463. TtYPO!. THECOTDES,

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vol. ix, p.* 301), n. 30, . nene
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Found in Java.

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in June, July and Angus-s
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2, p. 59

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B.. vol. Ixiii pt. 2, p. 41, ». So,

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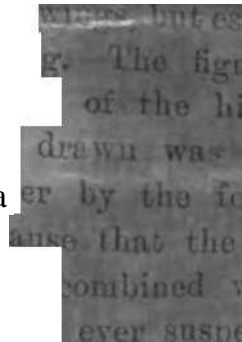
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down, the black antennæ of *O. crocale* being sometimes found with the ocellated underside of *O. catilla*, and vice versa. The restriction of the yellow coloration of the upperside of both wings of the male to the basal area, or its equal diffusion over the whole surface, correlated with the presence or absence of the ocelli on the underside, is also quite an unstable feature by which to distinguish the two species. Dr. Martin writes:—

How
wri

“I am quite unable to follow Mr. de Nicéville in his amalgamation of *O. crocale* and *O. catilla*, and am forced to keep them separate for the following reasons:—

“*O. crocale*, the far commoner species, occurs in Sumatra on roads, near houses and gardens, and is never found in the forest. It sometimes appears in large numbers, in which case the larvæ are very destructive, as in January, 1893, near the Pongei Estate, five kilometers north of Bindjei, they destroyed in a short time a fine plantation of young iron-wood trees, *Cassia florida*, Vahl, valued at least at \$ 3,000, by

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and eating up all the every Ion shrub near

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no to be an abundant
black in both sexes.

■ Ucnv and white of a *vra* ut Bbade. T] ;ie foioing is isb. There i of. form figured by Distant pi. xxv, fig. 12, without a ow colour the apperside; Suraati'au specimens are .n Distant's figure, and BIIOW OU the ■ or five submarginal black lunules, this form 'he coraiuoner form is **brighter**, net basal Udf of the apperside of both wings is nearly, as⁴ IQ black markings on the costa, apes, at the ei ;vnd the outer margin of the fore whig on the uppc **efined.** *O. ocale* i.-> nuon, and c

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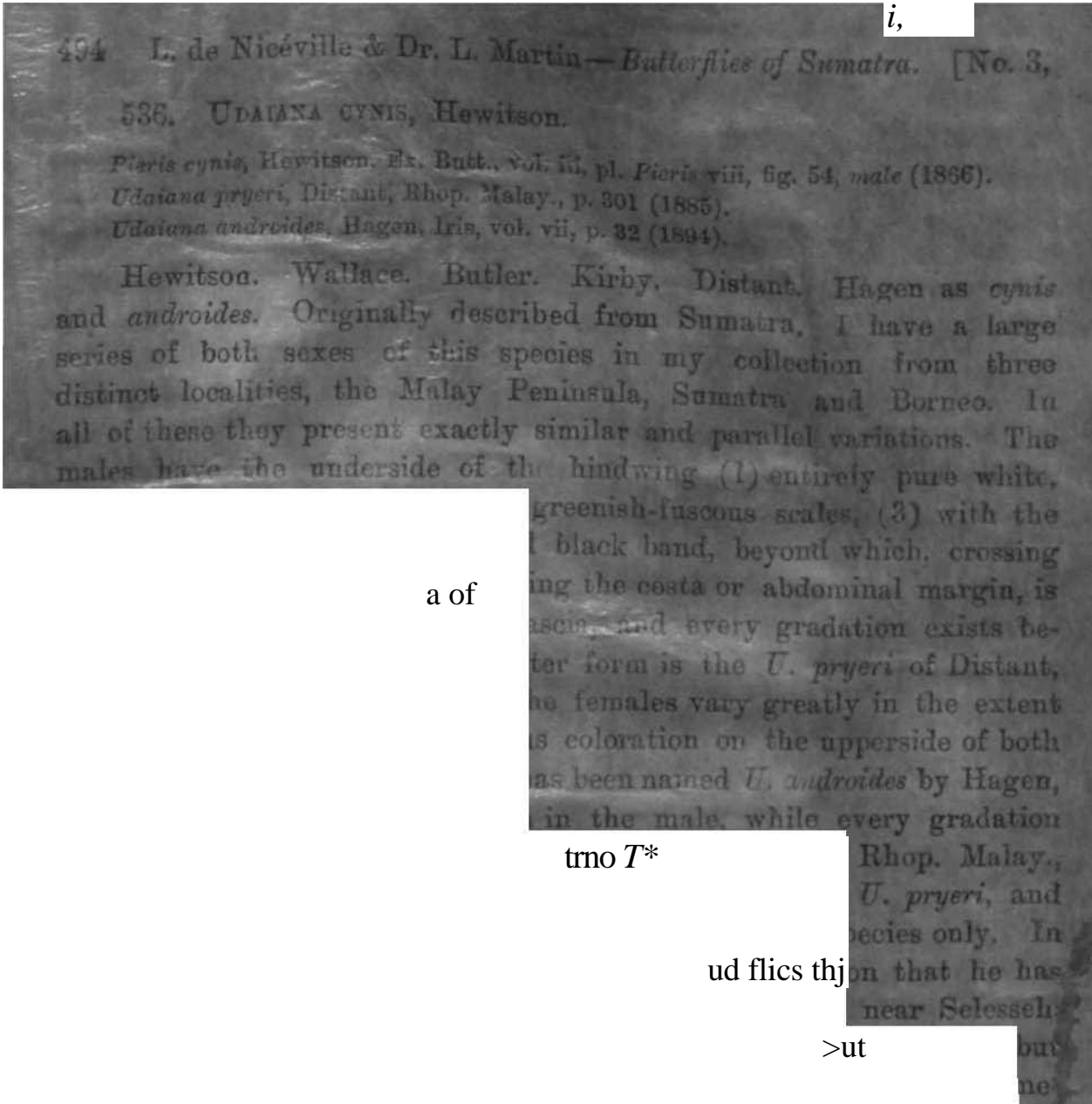
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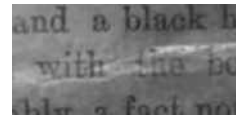
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the forest hunting for flowers for herself, or for the food-plant of her larva. Dr. Martin has often seen them on the same flower that is frequented by the female of *Udaisia cynis*, Hewitson. He has bred the butterfly from the larva found feeding on a small shrub called by the Battaks "Daoen Tangla," which grows on the banks of rivers. The larva superficially does not greatly differ from the larvae of the *Catopsilias*, but in shape is more slender. The pupa, however, is quite different, with a stellar indented thorax. The imago emerges in seven days. Only bred females have the beautiful olive-green colouring; almost as soon as they fly, this colour is blanché out. *C. hippo* occurs all over our area, and is one of our most common butterflies.

555. *CATOPHAGA LEIS*, Hübner.

Hagen as *amasene* and *leis*. Distant. Wallace as *alops*. Grose Smith as *alops*. I follow Mr. Distant in his identification of this species, not having Hübner's *Zutraego* H. Schmett. to consult; also in considering *C. alops*, Wallace, from India, Sumatra, Java, and Borneo, to be a synonym. *C. amasene*, Cramer, described from China, is superficially like the male of *C. leis*, and probably Dr. Hagen identified this species under that name. Semper identifies *C. leis* as "*Appias*" *agave*, Felder, from the Philippines. In Sumatra *C. leis* is restricted to the plains, and is only found in forest throughout the year. The female is very rare; the male comes to damp spots on forest roads as does *Catopsilia crocale*, Cramer, and many other *Pierine*. Common near Paya Bakong, the small forest reserve red the ned in the Introduction (page 359). Distant has well figured male and two for of the female from the Malay Peninsula.

556. *CATOPHAGA PACHINA*, Cramer.

Grose Smith as *albina* and *pachina*. Hagen as *pachina* and *albina*. Semper identifies this species from the Philippines as "*Appias*" *albina*, Boisduval. The male of *C. pachina* from Sumatra exhibits the same variations as it does in India, some specimens on the upperside of the forewing having a marginal black thread only, others have the apex widely, the outer margin decreasingly to the outer angle, powdered with black scales, while there is found every gradation between these two extremes. There are three distinct forms of female, the first and second are white on the upperside of both wings, the third is dark primrose-yellow-coloured; on the underside of both wings the first is of "A glossy tint of pearly-white" as Wallace well expresses it, the second has of the forewing and the entire hindwing rich ochreous, tho' the hindwing is these areas of a different shade, ochreous



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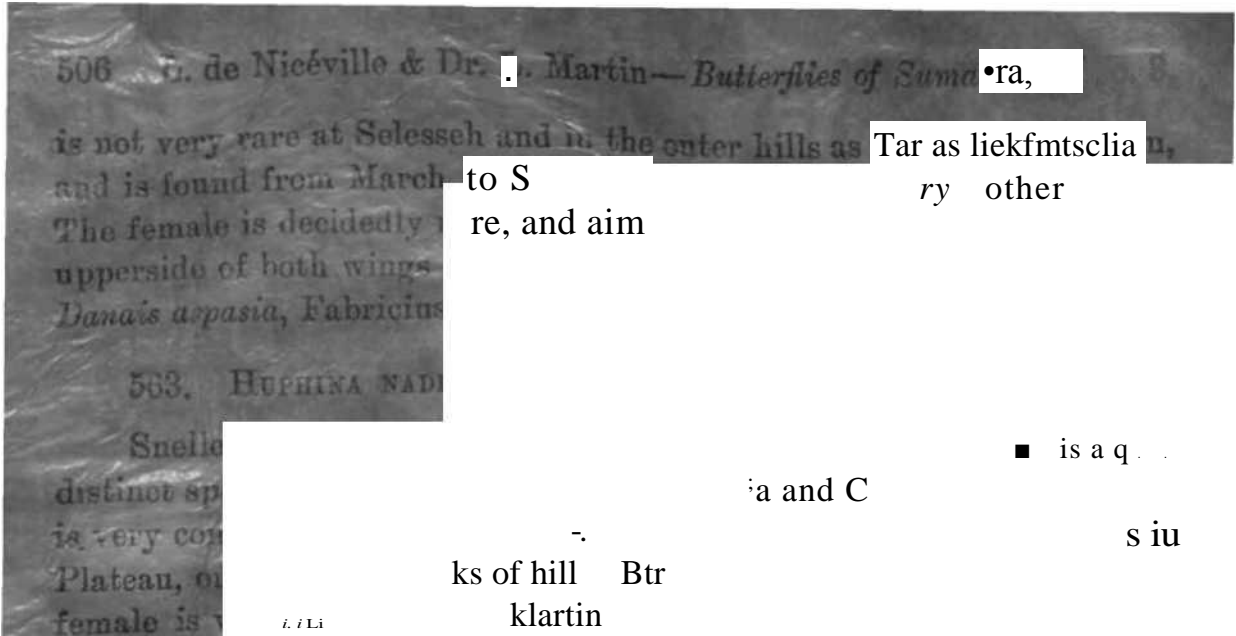
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506 G. de Nicéville & Dr. J. Martin—*Butterflies of Sumatra*,
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Danaïs aspasia, Fabricius

563. HUPHINA NADII
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P. (*Panagerani*) *hageni*, de Nicévil
p. 55, n. 16, pl. M, fig. 2, *female* (1893); Journ. A. S. B., vol. lxiii, pt. 2,
p. 45, n. 39, pl. iv, fig. 6, *male* (1894).

Rogenhofer. Hagen. Originally described from Sumatra, where

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Originally described from the Malay Peninsula and is a local race of *P. canus* Westwood, of Java. It is one of a group which are amongst the most perfect mimics known, their models being the different local races of *Euglyptus timoteanus*, Fabricius. It is very rare, Dr. Martin in thirteen years has obtained two specimens only, both males, in forest near Selesseh, the first on 23rd April, 1893, the second on 15th July, 1894. The first was captured by a very clever Chinese collector, who watched and followed the butterfly for nearly half the day before he was able to catch it. He correctly took it for a *Papilio*, but thought it might be a female of *P. butleri*, Janson. Rothschild records this species from Sumatra as *P. canus segialus*, Distant, and notes that "The type-specimen of *P. segialus*, Distant, now in my collection, does not differ from that of *P. velutinus*, Butler, in the British Museum, except in the submarginal markings of the hindwing, which are a little smaller in *P. velutinus*; one of my three *P. segialus* from the Malay Peninsula has these spots, however, not larger than the type of *P. velutinus*."

594. *PAPILIO* (*Achilles*) *A* i : ' A*, Horsfield.

Papilio gedenais, Fruhstorfer, Ent. Nachr., vol. xix, p. 287 (1893).
Papilio gedenais, Stål, Ent. Zeit., vol. 10, p. 118 (1894).

Wallace, Hagen, Standinger. Herr H. Fruhstorfer has recently described not only *P. gedenais* from W. Java and Sumatra, but also *P. prillwitzii* from W. Java, and *P. tenggerensis* from E. Java, while admitting the occurrence of *P. arjuna* also in Java. I have not sufficient material to form an opinion as to whether or not all these four species (five including *P. karna*, Felder), all closely allied, and from one island, are distinct and valid. Herr Fruhstorfer has sent me specimens of *P. gedenais* from Java which agree with my Sumatran examples of *P. arjuna*. They differ from Horsfield's figure of the latter in lacking a pale green band across the disc of the forewing on the upperside. In Sumatran specimens are found with and without the green band, the latter are the commoner. Further observations appear to be necessary before Herr Fruhstorfer's species can be accepted. *P. arjuna* in Sumatra is restricted to the Central Plateau, where it is common and flies throughout the year, as the collectors brought in specimens in every month. Is not nearly so shy or quick on the wing as *P. palinurus*, Fabricius. Rothschild places *P. tenggerensis* as a pure synonym of *P. arjuna*; he gives *P. gedenais* as *P. arjuna*, Horsfield, (*a*²), ab. *gedenais*, Fruhstorfer; and allows *P. prillwitzii* full specific rank.

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Mabile (= *subfasciatus*, Moore, and *abunda*, Plöiz), occurs in South India, Burma, the Malay Peninsula, Java, Borneo, the Sulu Isles, and the Philippine Isles. In Sumatra it is common on the outer hills and plentiful near Namoe Oekor throughout the year.

645. *KORUTHALALOS XANITES*, Butler.

Groese Smith. I sent a long suite of specimens of this genus allied to *K. xanites* to Captain Watson, who pronounces that amongst them are several undescribed species from Sumatra to be discriminated by the length of the palpi and the greater or less prominence of the orange markings on both sides of the forewing. As this latter feature is apparently extremely variable I hesitate to describe any of these supposed new species, as before doing so I think that critical examination of the prehensores of the males of all the species of the genus should be made.

646. *KORUTHALALOS VERONES*, Hewitson.

Asiactopterus verones, Hewitson, Ann. and Mag. of Nat. Hist., fifth series, vol. I, p. 341 (1878).

Hewitson. Groese Smith. Originally described from Sumatra thus:—"Both sides of the anterior wing marked by a subapical line. This is one of the well-marked forms of the genus, which I possess also from Java. It occurs in Sumatra not uncommonly with *K. xanites*, Butler.

647. *KORUTHALALOS KERALA*, de Nicéville.

K. kerala, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. 33, pl. T, fig. 48, male (1895).

Somewhat rare, occurs in the mountains in May.

648. *KORUTHALALOS KOPHENE*, de Nicéville.

K. kophene, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. 34, pl. T, figs. 49, male; 50, female (1896).

A rarer species than the one last-named, we possess three or four specimens only from Sumatra. All the species of the genus are inhabitants of the forest, where they are chiefly found on grassy forest paths and on low flowers. They occur more abundantly at higher elevations south of Namoe Oekor.

649. *SEADA SWERGA*, de Nicéville.

S. swergera, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 372, n. 1 (1895).

This species has a wide range, occurring in Sikkim, Burma, the

Malay Peninsula and Java, as well as at Bekantschan in N.-E. Sumatra in November, rarely.

650. *SUASTUS GEMINUS, Fabricius.

Staudinger. A very common "Skipper" in India, Ceylon, and Burma, but we have not met with it in Sumatra.

651. SUASTUS TRIPURA, de Nicéville.

Tagiades tripura, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. vi, p. 392, n. 36, pl. G, fig. 39, female (1891).

Originally described from Perak; occurs also at Selesseh and in the outer hills of Langkat rarely in March and December, and in Java and Pulo Laut.

652. SUASTUS PULCHRITUDINATUS, Hewitson.

Hewitson. Grose Smith. Kirby. Originally described from Sumatra, where it occurs rarely at Nagoes Oekor.

653. IAMBRIX STELLIFER, Butler.

Grose Smith as *salsala*. Captain E. Y. Watson notes that "*I. stellifer* is quite distinct from *I. salsala*, Moore, with which it has been said to be synonymous. It is smaller and darker, and is entirely without the golden yellow scales on the upperside which are characteristic of *I. salsala*." It is a common species in the forests of the outer hills throughout the year. It has a very quick flight, and keeps close to the ground; being so small it is not easy to see when on the wing.

654. IAMBRIX SINDU, Felder.

Hagen. Grose Smith. Found in the same localities and at the same seasons as the last-named butterfly, but is rarer and not so quick on the wing.

655. GEGETA, de Nicéville.

G. geta, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 374, n. 39, pl. Q, fig. 51, male (1895).

Described from Penang in the Malay Peninsula, and from N.-E. Sumatra, where it is very rare, a few males only having been obtained from Selesseh and the outer hills in July.

656. AMPITTIA MARO, Fabricius.

Thymelicus palemonides, Snellen, Midden-Sumatra, Lep., p. 28, n. 1 (1892).

Snellen as *palemonides*. Rare and very local in our area, found at Stabat and near Bandar Quala in Serdang.

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means the well-known hesperid genus *Satarupa*, Moore, which occurs in Sumatra, and is not mentioned by him, though he records *Satarupa sambara*, Moore, from Sumatra, under the name of *Tagiades sambara*.

753. *ISOTEINON PERTINAX

Grose Smith. There is a "*Papilio*" *perlinax*, Stoll, described from Surinam in South America, which is placed by Kirby as a synonym of *Telegonus perlinax*, Hübn. From the figure I cannot find that it resembles any oriental hesperid. There is also a "*Papilio*" *perlinax*, Sepp, from Surinam, which has been re-named *Pamphila schelleri* by Kirby. The book in which it is described and figured is not available to me. Furthermore, there is a "*Papilio*" *perlinax* of Cramer, described from Surinam, which name stands. This species is the type of the genus *Phlebodes*, Hübn.

754. *ISOTEINON MERJA.

Grose Smith. I am unable to trace this species, and Mr. Grose Smith does not say by whom it was described.

755. *PAMPHILA FETTINGI, Möscher.

P. fettingi, Möscher, verb. zool.-bot. Gesellsch. Wien, vol. xxviii, p. 219, n. 26 (1879).

Material I y described from males from Sumatra. From the def closely allied to *Padraona pavon*, de Nicéville (author) -> eai's to be c-

756¹

H. traviata, Plötz, Stet. Ent. Zeit., v. [redacted] ii, p. 91, n. 75c (1886).

Originally described from Sumatra. It is compared with *Lotongus parthen* [redacted] i the description probably belongs to that genus (*vide* No. 689 *ante*).

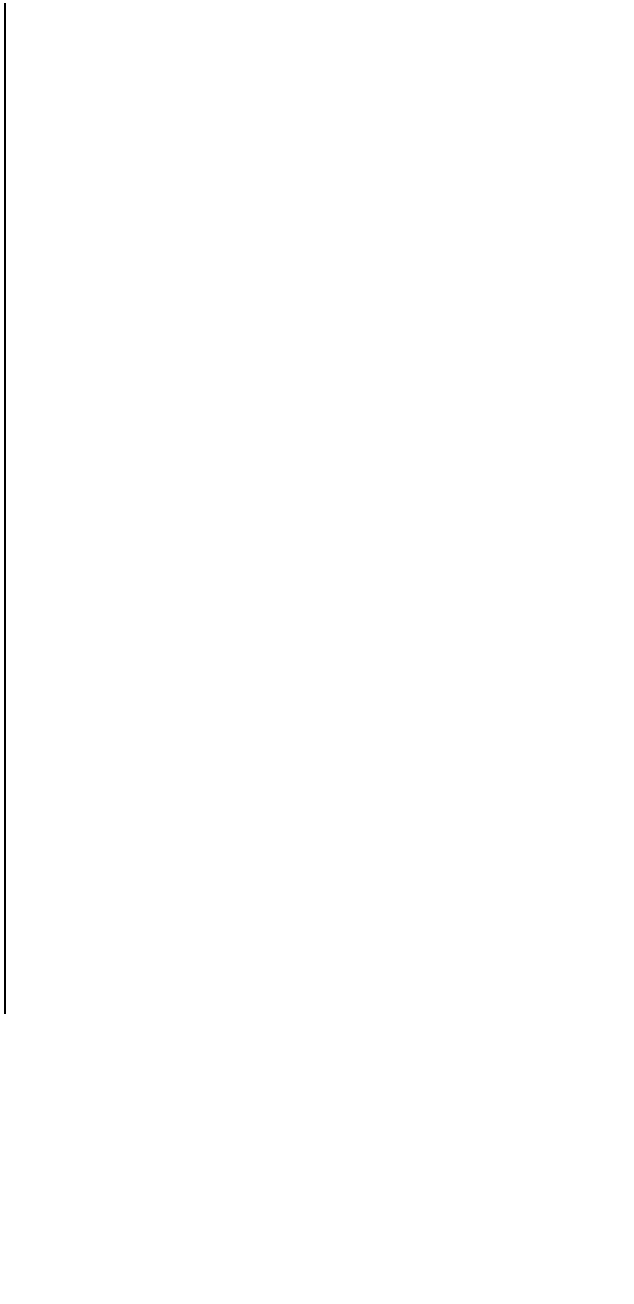
INDEX.

Names of New Genera and Species have an asterisk (*) prefixed.

- Abisara aita*, 441
 " *echeirus*, var. *kausambi*, 441
 " *kausambi*, 441, 442
 * " *kausambioides*, 442
 " *prunosa*, 442
 " *savitri*, 441
 " *susa*, 441
ACANTHONYCHIDÆ, 164
ACANTHONYCHINÆ, 160, 190, 289, 290
Acanthonyx, 158, 164, 191, 198, 287
 " *consobrinus*, 199
 " *mocleayi*, 199
Acanthophrys, 165, 240, 241
 " *aculeatus*, 241
Acerbas unthoa, 162
Acazina ammon, 170
Acanopsis, 162
Achaus, 162, 169, 177
 " *afinis*, 169, 172
 " *breviceps*, 172
 " *brevicostris*, 171
 * " *cadelli*, 170, 171, 291
 " *hyalinus*, 177
 " *lacertosus*, 169, 172
 " *lorina*, 171
 " *spinosus*, 170, 171
 " *tenuicollis*, 170, 171
Achillides arjuna, 522
 " *discordia*, 523
 " *karna*, 523
Achlyodes sura, 533
Aerica vesta, 397
AERINÆ, 397
ACULEATÆ, 310, 313
Adigama, 371
 " *malayica*, 371
Adolius agnis, 425
 " *decoratus*, 427
 " *pulgana*, 423
 " *pardalis*, 423
Aegista, 156
 " *huttoni*, 156
 " *oculus*, 156
Aeromachus indistincta, 536
Aglaia, 17, 51, 58, 79
 " *ancolana*, 71
 " *andamanica*, 62, 79
 " *argentea*, 60, 70, 79
 " " var. *Curtisii*, 60, 71
Aglaia argentea, var. *ezimia*, 60, 70
 * " *cinerea*, 59, 66
 " *cordata*, 61, 73, 74, 75
 * " *Curtisii*, 60, 71
 " *cuspanioides*, 77
 " *dysorxyloides*, 59
 " *edulis*, 77
 " *elliptica*, var. *Sumatra*, 73
 * " *Forbesii*, 60, 68
 " *Forsteni*, 65
 " *fusca*, 59, 62
 " *fuscescens*, 62
 " *Ganggo*, 59, 65
 " *glabriflora*, 59, 63
 * " *glaucescens*, 59, 64
 " *grandis*, 71
 " *Griffithii*, 61, 73, 75
 " *heteroclita*, 62, 78
 * " *Hiernii*, 61, 74
 * " *humilis*, 60, 69
 " *Korthalsii*, 80
 * " *Kunzleri*, 60, 69
 * " *lanuginosa*, 60, 71
 " *latifolia*, 69
 * " *leucophylla*, 59, 66
 * " *macrostigma*, 62, 78, 80
 * " *Maingayi*, 79
 * " *membranifolia*, 61, 75, 77
 " *minutiflora*, 75
 " " var. *Griffithii*, 75
 " *odorata*, 59, 62
 " *odoratissima*, 59, 67
 " *oligophylla*, 59, 63
 " *pachyphylla*, 72
 " *palembanica*, 61, 72, 73, 74
 " *polystachya*, 54
 " *Roxburghiana*, 67
 " *rufa*, 73
 * " *Scortechinii*, 59, 64
 " *sezipetala*, 67
 " *Sipannas*, 72, 73
 " *speciosa*, 65, 70
 * " *squamulosa*, 60, 68
 " *tenuicollis*, 61, 76, 77
 " *tomentosa*, 72, 73
 " *trichostemon*, 62, 77
Agrusia esacoides, 392
Ala, 167
Allotinus, 445

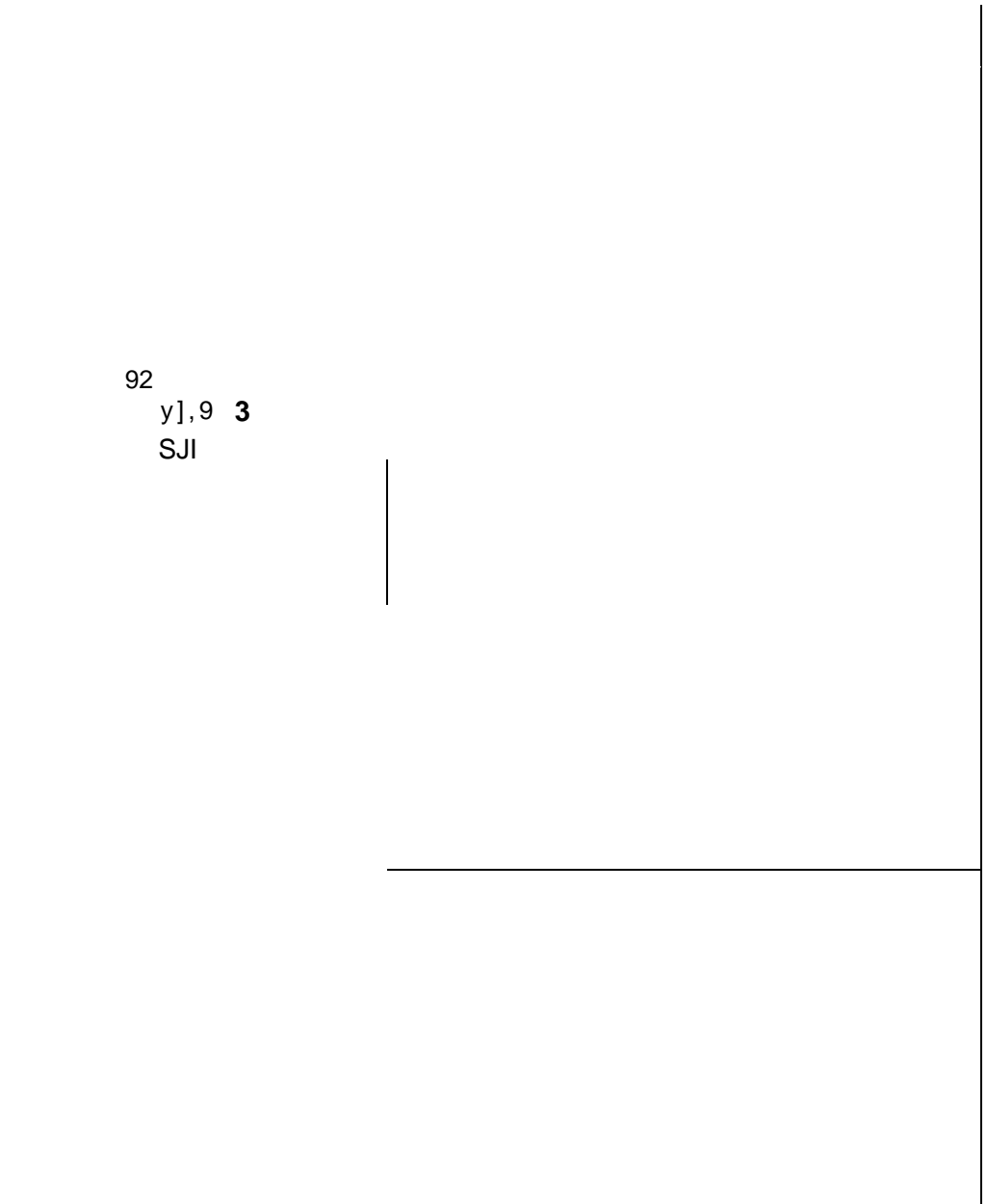
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92
y],9 3
SJI



t31

- Elyonaxias coryz*, 391
 " *coryroides*, 391
 " *distalium*, 390
 " *ōra*, 390
 " *discrepans*, 389
 " *dubnii*, 391
 " *erinyes*, 391
 " *osacoides*, 392
 " *testatna*, 389
 " *sumatra*, 391
 " *lata*, 390
 " *laevis*, 373, 390
 " *leucocyma*, 389
 " *late-cyma*, 389
 " *malensis*, 390
 " *nigrescens*, 389
 " *panthera*, 389
 " " *var. lutescens*, 390
 " *patna*, 391
 " *penanga*, 391
 " " *var. sumatrana*, 391
 " *protogonia*, 389
 " *sumatrana*, 391, 392
 " *sumatra*, 390
 " *finckiana*, 389
 " *radularis*, 348, 350, 353, 355,
 356, 389
 " (*Agronia*) *eracoides*, 392
 " (*Brunsa*) *abryca*, 392
 " " *sumatrana*, 391
 " (*Melynius*) *coryroides*, 391
 " " *dubnii*, 391
 " " *erinyes*, 391
 " " *laevis*, 390
ERMENINE, 389
Ernia drupada, 440
Encephaloides, 159, 163, 186
 " *armstrongi*, 187
Eriopa, 382
 " *cathynus*, 381, 396
 " *tenellata*, 396
Erioplatambus, 201
Eriomomyz, 167, 254
 " *spinous*, 256
Eriopylides tharis, 481
Erioptus, 164
Erpichaeis altissima, 47
 " *densiflora*, 47
ERIPENDULE, 329
Eriopastis, 165
Eriopsis, 395
 " *aridus*, 398, 399
 " *isens*, 398, 399
 " *merionis*, 398
 " *lapchana*, 398, 399
Eria, 336
 " *bulbiformis*, 336
 " *Lichegona*, 336
 " *astulata*, 336
Erioceras, 163
Eriopylus, 163
Eriomita nitida, 538
 " *sanguinolens*, 538
 " *Osier*, 538, 539, 554
Erites argulata, 387
 " *argentina*, 387
 " *elegans*, 387
 " *maiana*, 387
Erythrina indica, 488
ERYTHROPALEAE, 98
Erythropalla, 139
Erythropalum, 95, 98, 129
 " *populifolium*, 129, 130
 " *scandens*, 129, 130
 " *vagum*, 129, 130
Esopus, 165
Escinetops, 163, 166
Eucochlias, 152
 " *bon anvillei*, 153
 " *illustris*, 153
 " *ochoplar*, 152, 153, 156
Eudamus calathus, 542
 " *guttatus*, 550, 551
Eulacura osteria, 405
Eulepis athamas, 435
 " *delphis*, 433
 " *hebe*, 435
 " *jalyus*, 435
 " *kudenii*, 434
 " *moori*, 435
 " *schreibari*, 434
Eulophia, 337
 " *geniculata*, 337
 " *lachnocheila*, 338
ECMEGONINE, 258, 286
Ecmeconus, 286, 287
 " *zebra*, 288
EUPHORBIAEAE, 132
Euphorbia, 164
Euphonia, 347, 348, 349, 352, 353, 354, 355,
 356, 359
 " *egyptus*, 372, 370
 " *amraonis*, 373
 " *aristotelis*, 374
 " *bellinda*, 371
 " *bremeri*, 370, 371, 373
 " *buxtorfi*, 370
 " *castelnaui*, 374
 " *chico*, 370
 " *conatilis*, 374
 " *cora*, 372
 " *dehaani*, 375
 " *dejeani*, 375
 " *dioclitianus*, 375
 " *dioclitiana*, 375, 399, 522
 " *distans*, 372, 375
 " *elensis*, 375
 " *evans*, 374, 391
 " *folderi*, 373
 " *harrisi*, 377
 " *heybertii*, 371
 " *inconspicua*, 373, 377

- Bambusa* *stiriana*, 423
vichra, 426
 (*Dopha*) *derma*, 420
 dunna, 420
 gura, 420
 (*Pidaxia*) *ambra*, 422
 blanca, 421
 cocynna, 421
 cocynna, 421
 diardi, 421
 ludikengii, 421
 macleyi, 421
 mitra, 421
 pusada, 421
 stobieskana, 421
 (*Larus*) *cyamiparvus*, 421
 diaton, 421
 parifolia, 421
 (*Nora*) *decorata*, 427
 crana, 427
 laccina, 427
 imbricaria, 427
 ramens, 427
 salia, 427
 (*Tanacetum*) *arund*, 423
 clona, 424
 mantegoni, 424
 palsa, 424
 phanta, 423
 pulchra, 423
 superbia, 423
 viviana, 423
Bacca, 480
 trigada, 455
 capitata, 455
 plumosa, 456
Felateria, 421
 auka, 422
 blanca, 421
 cocynna, 421
 cocynna, 421
 diardi, 421
 ludikengii, 421
 macleyi, 421
 mitra, 421
 pusada, 421
 stobieskana, 421
Fischeria, 47
Frustricola *baeriana*, 156
 lata, 156
 schubertii, 156
 huttoni, 155
 montana, 156
 pubescens, 156
 plethrona, 155
 racemosa, 155
 similata, 156
Gemma *costalis*, 365
 dita, 365
Gumaca *thyrsus*, 539
Gastrodia, 342
Gastrolia *Dyeriana*, 342
 glata, 342
 ozilla, 342
 robustoides, 343
Geala, 535
Geometra *javana*, 549
Gelaniopsis, 615
Geophila, 445, 446, 447
 bigonii, 443, 444, 446
 boissierii, 444
 gosa, 444
 gelulas, 444, 445
 gallus, 443, 444
 gigantes, 443
 gopara, 443
 symethus, 443, 444, 446
 zinkenii, 444
 zymna, 444
Glaucium, 301, 322, 323, 324
 arabicum, 324
 corniculatum, 323, 324
 ciogus, 323, 324
 fruticulosum, 324
 leptopodium, 327
 lutescens, var. *fruticulosum*, 324
 persicum, 324
 pumilum, 324
 squamulosum, 323, 324
Glauc., 324
Gomphandra, 97, 111, 116
 andamanica, 112, 115
 comosa, 111, 114
 gracilis, 112, 115
 lanceolata, 112
 " var. *angustifolia*, 116
 " *sel. Burra*, 112
 " *Maingayi*, 112, 114
 " *nyasifolia*, 112, 114
 " *penangiana*, 112, 113
Goniatrochilus, 164
Goniocheton *arborescens*, 39
Goniothorax, 164
Gonocaryum, 97, 118
 alium, 120
 gracile, 119, 120
 longi-racematum, 120, 121
 pyrifolium, 119, 120
 Schellianum, 120
 Toystamianum, 119, 120
 Waltchii, 120
Gonocera, 342
 Hemslayana, 342
 mitata, 342
GRAMINEAE, 359, 379, 385, 396, 462, 490
GRANDES, 311, 313
Gespachius, 173, 177
 lyalinus, 177, 291
Guarea *benkiana*, 47
Gynocephalum *bracteatum*, 123

- Gynocephalum oblongum*, 123
 " *palmatum*, 123
Habenaria, 343
 " *Burmahiana*, 343
 " *Caspianiana*, 343
 " *palmicaulis*, 344
Helinus, 164
Halpe beluzia, 548
 " *hieron*, 548
 " *homolae*, 547
 " *insignis*, 548
 " *mariana*, 548
 " *moorei*, 548
 " *zema*, 361, 548
Haridra aristogiton, 438
 " *borneensis*, 437
 " *distanti*, 438
 " *dunfordi*, 437
 " *harpaz*, 437
Harimata palinurus, 523
Harmandia, 95, 96, 99
 " *Kunstleri*, 100
 " *makongensis*, 100
Hartigella acuminata, 39
 " *costulata*, 41
 " *variflora*, 46
Hasora badia, 553
 " *celeanus*, 554
 " *chalcema*, 553
 " *curonza*, 553
 " *chuxa*, 542, 554
 " *hadria*, 553
 " *malayana*, 554
 " *maria*, 553
 " *simplicissima*, 553
 " (*Pezala*) *celeanus*, 554
 " " *chromus*, 553
 " " *chuxa*, 542, 554
 " " *malayana*, 554
 " " *simplicissima*, 553
Hebomora borneensis, 380, 483, 505
 " *celebensis*, 505
 " *glaucoippa*, 505
 " " var. *samaritana*, 505
 " " *samaritensis*, 505
 " *juvanensis*?, 505
 " *philippensis*, 505
HELICTA, 152
Helic achilifera, 153, 155, 156
 " *lobata*, 156
 " *clathratula*, 153
 " *cyclaripa*, 153
 " *hispida*, 155
 " *huttoni*, 155
 " *minor*, 154, 156
 " *orthoglaea*, 151, 152, 156
 " *oldhami*, 156
 " *pinensis*, 153, 156
 " *pinquua*, 156
 " *stiffora*, 153
 " *similaris*, 156
Helic (Eucyclia) orthoglaea, 150, 156
 " (*Pinnipera*) *pinquua*, 156
 " (*Plectroplitis*) *oculata*, 153, 155, 156
 " " *clathratula*, 153
 " " *cyclaripa*, 153
 " " *minor*, 154, 156
 " " *pinensis*, 153, 156
 " " *retifera*, 153
Hemna, 167
Herbatia, 143
Herbatella, 168
Herona samatrana, 461
Hesperia alba, 549
 " *bada*, 550
 " *barca*, 548
 " *baru*, 545
 " *calceps*, 541
 " *haji*, 540
 " *indonea*, 540
 " *julianae*, 549
 " *sumatra*, 550
 " *latolia*, 540
 " *mathur*, 549
 " *modesta*, 550
 " *naoa*, 541
 " *narosa*, 549
 " *ornata*, 548
 " *oranta*, 548
 " *locata*, 551
 " *transita*, 542, 555
Hesperia, 520
estia helva, 361
 " *dava*, 365
 " *diava*, 364
 " *indana*, 364
 " *lycora*, 364
 " *lycora*, 364, 385
 " *reimardi*, 364
Hestia, 382
 " *carolinae*, 405
 " *nima*, 405, 406
Heterocrypta, 255, 283
 " *investigatoria*, 284
Heynea, 17, 86
 " *akara*, 86
 " *can. rades*, 86
 " *pubescens*, 86
 " *quinquefida*, 86
 " *saustroya*, 86
 " *trijuga*, 86
 " " var. *multijuga*, 86
Hibiscus, 549
 " *roed-simensis*, 491
Hidar japonica, 543
 " *harmacha*, 543
 " *hara*, 394, 543
 " *staudingeri*, 543
Hiperlova, 382
Hypocrypta cordata, 489, 504
 " *telaga*, 504
 " *lepta*, 504

- Hypocistis* *lydia*, var. *plana*, 503
 parviflora, 499, 503, 504
Holocalyx, 344
Heplophragma, 166, 201, 233
 costalis, 233
Hesperis, 165
Hesperis *halimifolia*, 479
Huella, 158, 164, 191, 194, 196, 200
 breviscapitata, 196
 prodens, 195
 pyramidalis, 196
 simplex, 196
Huananoides, 191
Hyalostema *amalia*, 506
 judith, 507
 lea, 506, 507
 " var. *naami*, 506
 andina, 364, 506
 nerissa, 364, 506
 phoenicea, 352, 354, 355, 505
 reaha, 505
 manatranca, 364
Hyalostema *auriculata*, 536
 phoenicea, 535
Hymen, 165
Hymenocallis, 165, 200, 202, 206, 235
 aries, 208, 211
 brachy, 216
 caucasicus, 208, 213, 214
 comicus, 216
 diacanthus, 208, 210
 gracilibrachy, 207, 215
 helgendorfi, 207, 209
 orys, 207, 214
 planasius, 208, 212, 213
 pleione, 207, 208
 soma, 207, 213
 spinosus, 208, 211
 leucocornia, 207, 215
 " (*Chorizia*) *orys*, 214
 " " *planasius*, 212
Hymenocallis *apud*, 155
Hylomelon, 327
Hypochaeris, 414
Hypolepis, 406
 dicentra, 413
 " *angustata*, 373, 413
 " *antigonae*, 413
 " *utilis*, 413
 " *bolina*, 413
 " var. *jacintha*, 413
 " *diocippus*, 413
 " *iphigenia*, 413
 " *jacintha*, 413
 " *melita*, 413
 " *niagrippus*, 393, 413
 " *proserpina*, 413
Hypolychnis *erythraea*, 476
 apylus, 476
 " *theryctes*, 477
 " *theclioides*, 476
 " *silvestris*, 535
 " *sinuata*, 535
 " *stellifer*, 535
Hypoxis, p. 96
Hypoxis *laos*, 365, 323
 " (*Hypoxis*) *laos*, 365
Hypoxis *speciosa*, 361, 472
 " *laos*, 361, 472
Hys, 133
 " *cynosa*, 131, 136
 " *optimalis*, 133, 134
 " *glomerata*, 134, 135
 " *triginta*, 133, 135
 " *macrophylla*, 134, 136
 " *Maingay*, 134, 135
 " *sclerophylla*, 134, 137
 " *singaporensis*, 137
 " *spicata*, 133, 134
Hyades *forbesi*, 517
 " *morosau*, 515
 ILICINAE, 136
Impatiens *arundinacea*, 358, 359, 396
 INACHIDAE, 158
 INACHINAE, 160, 162, 168
 INACHOIDEA, 160, 163, 164, 185
Inachoides, 164, 185, 196
 " *dolichorhynchus*, 186, 201
Inachus, 158, 164
 " *orabicus*, 197
 " *aranea*, 183
 " *varicidus*, 231
 " *longipes*, 223
 " *muricatus*, 230
 " *omnis*, 227
 " (*Oncinopus*) *depona*, 182
Iodes, 97, 126, 132
 " *oblonga*, 126, 128
 " *ovata*, 126, 128
 " *reticulata*, 126
 " *tomentella*, 128
 " *velutina*, 126
Iolans *sericea*, 475
Iraota *hirsutissima*, 463
 " *nila*, 463
 " *rocana*, 463, 464
 " *timoleon*, 464
Isamia *aperta*, 376
 " *chloa*, 376
 " *dejeani*, 376
 " *sophia*, 376
Isertia, 315
 " *glauca*, 362
Isua *bononia*, 536
 " *corissa*, 537
 " *jerania*, 536
 " *maritima*, 537
 " *reticulata*, 537
Ismene, 553
 " *antigonae*, 553
 " *chloa*, 552
 " *horisa*, 552

- Leptocarpus*, 378
 albidus, 430
 albivus, 456
 agnata, 458
 baobab, 460
 calens, 378, 453, 460
 cheulu, 453
 lipsis, 378, 459, 460
 kambona, 459
 karandam, 459, 460
 kuila, 460
 malaccanus, 458
 meridiana, 460
 microcarpa, 460
 ovata, 458
 saturata, 378, 459, 460
 modata, 378, 459, 460
 serena, 460
 stagna, 459, 460
L. spina, 17, 81, 80, 82
 aquatica, 81
 graciliana, 81
 dissectum, 81
 nitida, 81
 pedunculatum, 81, 82
Leptocarpus, 523, 527
Leptocarpus, 116
Leptocarpus, 97, 116
 truncata, 113
 malaccana, 114
 malaccensis, 117, 118
 serendibata, 117, 118
 sumatrensis, 117
Leptocarpus, 35
Leptocarpus, 137
 clandestina, 137
 japonica, 138
 purpurea, 137
 Rhodapsea, 138
 squamata, 138
 (*Cladostema*) *purpurea*, 137
Leptocarpus dimorphus, 440, 441
 lyclene, 440, 441
 argyrea, 441
 indica, 440
 telesia, 440
Leptocarpus alankara, 415
 var. *sumatrensis*, 415
 attenuata, 415
 lamour, 415
 martha, 415
 var. *sumatrensis*, 415
 ponaka, 415
 sumatrensis, 415
LEMONTINA, 439
Leptocarpus, 165
Leptocarpus, 95, 96, 104
 oblongifolius, 105
 sylvestris, 104, 105
Leptocarpus, 165
Leptocarpus, 436
Leptocarpus (*Leptocarpus*) *serendibata*, 486
Leptocarpus, *serendibata*, 521
 serendibata, 521
 serendibata, 521
Leptocarpus, 166, 241
Leptocarpus oblongifolius, 165
Leptocarpus, 167
Leptocarpus, 158, 163, 168
Leptocarpus, 161, 162, 168
Leptocarpus longipes, 223
Leptocarpus, 489
 serendibata, 486
Leptocarpus, 384
 serendibata, 385
 arcta, 385
 chaudica, 384
 durena, 384
 aurea, 385
 serendibata, 384, 385
 univera, 384
 rubra, 385
 (*Devis*) *chaudica*, 384
 " " *durena*, 384
 " " *malaccana*, 384
 (*Nemata*) *univera*, 384
Leucippa, 164
Leucodermis javanica, 137
Leucophasia sinensis, 486
Leucophasia, 421
 arcta, 421
 perulifolia, 421
Leucophasia, 165
Leucophasia, 165
LEUCOPHASEA, 439
Leucophasia myrrina, 439
 narina, 439
 rohini, 439
LEUCOPHASEA, 416
 agnata, 416
 albomarginata, 361, 416
 bachii, 361, 396, 416
 dansoni, 361, 416
 dayana, 416
 duda, 361, 416
 hagani, 416
 martha, 415
 proctis, 417
 seleniphora, 419
 (*Montana*) *proctis*, 417
Leucophasia chrysiptera, 367
Leucophasia, 163
Leucophasia, 166
Leucophasia, 161, 166, 201, 236
Leucophasia, 381
 serendibata, 381
 sumatrensis, 381
Logania, 447
 luca, 447
 malaccana, 441, 447
 univera, 447
 malaccana, 447

- Lomelosia villosa*, 446, 447
- Lophandros imbr.*, 536
- LOBANTHACEAE, 489
- LOBANTHACEAE, 180
- LOBANTHACEAE, 180
- Loranthus*, 489
- Lotongus amata*, 542
- " *calathus*, 541, 542
- " *estelliana*, 542
- " *maculata*, 542
- " *parthenoc.*, 542, 565
- " *rehardt.*, 542
- Lophodrychnus*, 165
- Lobelia atymus*, 481
- " *casiepina*, 481
- Lycana angusta*, 463
- " *nova*, 467
- " *calvarata*, 459
- Lycopodium imobis*, 454
- " *lycoides*, 455
- LYCENIDAE, 439, 440, 457, 460
- Lycenopsis*, 454
- " *oxyma*, 454
- " *cyllale*, 463
- Mackaya*, 129
- Macrocheira*, 163, 181
- Macrostoma*, 162, 167, 235
- " *concava*, 255
- " *nummifer*, 255, *
- MACROPODIENS, 160
- Macropus longipes*, 223
- Macrotalia americana*, 470
- Maca*, 158, 162, 166, 237, 238,
- " *echinata*, 204
- " *foeniculata*, 232
- " *sibea*, 233, 291
- " *girajia*, 204
- " *hybrida*, 221
- " *maeris*, 230
- " *maricata*, 231
- " *ovis*, 227
- " *spinigera*, 239, 241
- " *summodo*, 240
- Macha*, 166
- MAIENE, 160
- MAIDES, 158, 159, 160, 162
- MAINE, 161, 162, 230
- MAINE, 153, 160
- MAIDERS, 159, 161, 166, 237, 238
- MAIPIA, 160
- Maja apris*, 243
- " *longijuga*, 242
- " *nov.*, 165
- " (*Urosalpinx*) *longijuga*, 243
- " (*Diplosalpinx*) *nov.*, 243
- " (*Huonia*) *proteus*, 195
- MALACOSTRACA, 177
- Mand. martina*, 478
- Marmosus holoduratus*, 481
- " *nov.*, 480, 481
- " *nov.*, 481
- Manandora janardana*, 380
- " *nov.*, 380
- Mangia hartwegii*, 449
- Mutisia urica*, 537
- " *ovis*, 537
- " *draca*, 537
- " *nov.*, 537
- Meandrua pumila*, 523
- Meconopsis*, 304, 309, 311, 319, 322
- " *aculeata*, 309, 317, 312, 313, 314, 315
- " *bella*, 319, 321, 313, 324
- " *betonicaefolia*, 312, 326
- " *cambica*, 313, 314
- " *epidemia*, 317, 311, 312, 313
- " *crassif.*, 312, 313
- " *Del.*, 311, 318, 320
- " *arabica*, 311, 312, 313
- " *Gulmiana*, 311, 312, 313
- " *Heurica*, 311, 313, 319
- " *latifolia*, 312, 313
- " *laevigata*, 309, 311, 319, 315
- " *var. latifolia*, 315
- " *var. latifolia*, 315
- " *typica*, 312
- " *intermedia*, 311, 313, 320
- " *lanceolata*, 311, 313, 320
- " *Oleifolia*, 311, 312, 313
- " *napaulensis*, 310, 314, 313,
- 314, 315, 316,
- 317, 318
- " *nov.*, 315, 316, 317
- " *paniculata*, 310, 311, 313, 316,
- 318
- " *var. lata*, 316, 317
- " *typica*, 316,
- 317
- " *pyramidalis*, 309, 310, 311, 313,
- 319
- " *panicca*, 311, 313, 321
- " *quantalipharica*, 317, 313, 321
- " *incana*, 313, 314
- " *robusta*, 309, 310, 311, 313,
- 315, 316, 318
- " *simplicifolia*, 310, 311, 313,
- 320, 321
- " *stans*, 309, 311, 313, 314, 315
- " *var. Protos*, 314, 316
- " *typica*, 314
- " *supra*, 310, 311, 313, 317
- " *Wallisii*, 310, 311, 313, 316,
- 317, 318
- " *var. rotundifolia*, 313,
- 318
- Megaphylla*, 17, 23, 32
- " *Parakusa*, 24
- Megala castane*, 452
- Melastoma*, 382, 381, 388, 390
- " *nov.*, 388
- " *nov.*, 388

- Melanthera anea*, 388
 " *bata*, 388
 " *determinata*, 362, 387
 " *isamae*, 362, 387, 388, 387
 " *leida*, 362, 387
 " *suvidana*, 388
 " *virginis*, 388
 " *17*, 19, 20
 " *virginea*, 18
 " *virginica*, 18
 " *virginica*, 18
 " *virginica*, 18, 19, 20
 " *virginica*, 18, 20
 " *virginica*, 18
 " *virginica*, 18, 19, 20
 " *virginica*, 18, 19
 " *virginica*, 20
 " *virginica*, 23
 " *virginica*, 29
 " *virginica*, 18, 19, 20
 " *virginica*, 21
 " *virginica*, 18, 19
 " *virginica*, 20, 20, 89
 " *virginica*, 20
 " *virginica*, 54
 MELIACEAE, 16, 63, 84, 95, 99
Melospirium rubra-stamineum, 83
Melipha corymbosa, 391
 " *dohrnii*, 391
 " *ermyca*, 391
 " *iridica*, 390, 391
Mentha, 289
 " *bicornis*, 289
Mentha, 164, 191, 197, 289, 290
 " *angustata*, 197
 " *arabata*, 197
 " *dentata*, 197
 " *depressus*, 197
 " *inornatus*, 197
 " *monocera*, 197
 " *procollis*, 197
 " *subseriatus*, 197
 " *tuberculatus*, 197
Mexima buziani, 370
 " *lozza*, 370
 " *lorae*, 370
 " *modesta*, 370
Menamopsis petraea, 518
 " *petraea*, 519
Menciades antiphata, 516
 " *coona*, 510
 " *delianus*, 511
 " *medanus*, 511
Metoporphia, 163, 168
Micahia chaucyca, 507
Micippa, 158, 164, 167, 238, 246, 248, 251,
 257, 257
 " *crispata*, 162, 252
 " *huangi*, 252
 " *normis*, 252
Micippa marginifera, 249, 253
 " " var. *petraea*, 249,
 253
 " *moscovica*, 250, 251
 " *phlyra*, 249, 251
 " " var. *latifrons*, 250
 " " " *moscovica*, 250
 " " " *platipes*, 249
 " *spatulifrons*, 250
 " *superbiosa*, 250
 " *thalia*, 162, 249, 251
 " " var. *petraea*, 251
Micippa bicarinata, 250
 " *hirsuta*, 250
 " *miliaris*, 252
 " *platipes*, 250
 " *petraea*, 252
Micippides, 167, 255
Microchloa, 164, 166
Microphya, 162, 167, 234
 " *corantus*, 169
 " *styz*, 235
Micropis, 166
Microphyllus, 164
Microstylis, 329
 " *Macimowicziana*, 329
Mitras, 445
 " *calisparus*, 444
 " *cyana*, 444
Mitras argentea, 70
Mitras, 167, 234
 " *styz*, 235
Mimulus, 164
Miquelia, 95, 97, 121, 124
 " *caudata*, 124
 " *Kleinii*, 125
Mithraculus, 167
Mithras, 167
 " *affinis*, 244
 " *asper*, 243
 " *dama*, 245
 " *spicifrons*, 244
 " *suborbicularis*, 245
 " *triangularis*, var. *dichotoma*, 244
 " " " *excipr*, 244
 " " " *indica*, 244
 " (Schizophrys) *affinis*, 244
 " " *dama*, 245
 " " *triangularis*, var.
dichotoma, 244
 " " var. *excipr*,
 244
 " " *indica*,
 244
Mocosa, 164
Modocca, 129
Modocopsis, 129
Modura proser, 317
Monocycis robusta, 85
Musa, 338
Mycalis arripita, 378, 380

Campanula bellucida, 549, 550
 " *maritima*, 545
 " *trachelium*, 549, 550, 551
 " *acuminata*, 547
 " *scandens*, 555
Panista sinensis, 417
Pinguicula crebula, 513
 " *hageni*, 512
 " *praeopus*, 512
 " *eyouxi*, 512
Papaver, 304, 307, 313, 322, 323
 " *algatum*, var. *caeruleum*, 305
 " *ambrosiacum*, 313
 " *cauliflorum*, 312
 " *caucasicum*, 305
 " *eroticum*, 305
 " *Dacotense*, 303, 307, 308
 " *dubium*, 304, 305, 307, 308
 " " var. *Dacotense*, 305
 " " " *albidum*, 307, 308
 " " " *umbellatum*, 307, 308
 " *glaberrima*, 307
 " *Hockeri*, 306
 " *hugricum*, 304, 305
 " *leucostictum*, 307, 308
 " *Linnæi*, 312
 " *macrodonum*, 307, 308
 " *nudicaule*, 304, 305
 " " var. *caeruleum*, 305
 " " " *grandiflora*, 305
 " " " *rubro-aurantiacum*, 305
 " *paniculatum*, 315, 317
 " *parviflorum*, 304, 305
 " *Rivini*, 304, 305, 306, 308
 " " var. *rossii*, 308
 " " " *latifolia*, 306
 " " " *typica*, 306
 " *simplicifolium*, 321
 " *strawferum*, 305, 309
 " *stylatum*, 312
 " *turbidum*, 304, 305, 307, 308
PAPAVERACEAE, 303
Papilio argatus, 521
 " *argyrea*, 520, 521
 " *apimmon*, 527
 " *argus*, 524
 " " var. *insularis*, 524
 " " *insularis*, 525
 " *albolineatus*, 514, 515
 " *antlerates*, var. 525
 " *antiphates*, 524
 " " var. *alcibiades*, 524
 " " " *pompilius*, 524
 " *antiphus*, 510, 514, 517, 518
 " *archippus*, 383
 " *aristea hermocata*, 325
 " *aristolechiæ*, 347, 348, 350, 351, 352, 510, 518
 " " *antiphus*, 519

Papilio argata, 522
 " " var. *pedemontis*, 522
 " *larva*, 523
 " *aryctes*, 527
 " *bathycles*, 526
 " " *bathyclides*, 526
 " *brachyda*, 438
 " *branta*, 523
 " *brigitta*, 494
 " *bulleri*, 374, 519, 520, 521, 522, 528
 " *caucus*, 521
 " " *argulus*, 522
 " *cleonius*, 361, 523
 " " var. *clymenus*, 523
 " " " *sumatrana*, 523
 " " *sumatranus*, 523
 " *coca*, 510, 511
 " *crio*, 523
 " *dactylus*, 523
 " *deies erui*, 360, 525
 " *delaucus*, 511
 " *demoleus*, 343, 350, 351, 352, 353, 354, 355
 " *demolior*, 513
 " *desclidianus*, 375
 " *diophauntus*, 515
 " *diphidus*, 510
 " *discordia*, 523
 " *distantis*, 521
 " *doubledayi*, 511
 " " var. *delaucus*, 511
 " " *delaucus*, 511
 " *erpedocles*, 525
 " *erbus*, 510, 512, 513
 " *eroneus*, 380
 " *erthrasus*, 346
 " *esperis*, 515
 " *eucypylus*, 525
 " " *erion*, 525
 " *eura*, 523
 " *evomon*, 525
 " *fachsi*, 362, 515, 517
 " *godeensis*, 522
 " *hageni*, 512
 " *helanus*, 382, 514, 518
 " " *palawanicus*, 514
 " *hermocrates*, 360, 525
 " *hewitsoni*, 519
 " " var. *sumatrana*, 518
 " *insularis*, 524
 " *iswara*, 514
 " *itamputi*, 524
 " *jason*, 525
 " *javanus*, 518
 " *juda*, 519
 " *justina*, 379
 " *karab*, 522, 523
 " *korra*, 519
 " *leoderus*, 528
 " *leucanthus*, 521, 528

- Eleonithecus (Asterianoides) longispinus*, 242
Parantica aglaides, 369
 napaulica, 369
Paranticopsis dolosectus, 528
 laucothoe, 528
 negarus, 529
 zanthosoma, 528
Paratithoeops gaura, 451
Parata cepheus, 554
 chryseus, 553
 chusa, 542, 554
 malayana, 554
 simplicissima, 553
Parathoe, 166
Paratymolus, 163, 173
 hastatus, 174, 291
Paraba trysichore, 397
 costa, 361
 costata, 361, 397
Parnara bada, 550, 551
 calcaea, 550
 cinnara, 552
 colaca, 552
 conjuncta, 549
 festuoides, 551
 gustata, 550, 551
 pellucida, 551
 pugnans, 553
 joana, 549, 551
Parthenocampus, 280, 275, 279
 beniaminii, 275, 276
 caloppoides, 275
 harpas, 275, 278
 turcius, 275, 277
Parthenomerus, 280
 efflorescens, 279, 281, 298
Parthenope, 258, 279, 290
 bouvieri, 276
 caloppoides, 275
 efflorescens, 279, 281, 298
 fornicata, 282
 giraffa, 264
 horrida, 270, 296, 297
 investigatoris, 290, 298
 longimanus, 260
 spinimana, 266
 spinosissima, 279, 280, 296, 297
 trigona, 276
 (Parthenomerus) efflorescens, 279, 281, 298
 PARTHENOPIDE, 158, 159, 257, 258
 PARTHENOPINE, 258
 PARTHENOPINEA, 257
Parthenopoides, 275
Parthenocampobrius, 41
 flaccidus, 415
Paratara, 401
 Haycockii, 130
Pathysia multiplores, 524
Pathysia barbecrofti, 525
 finlayi, 524
Paratta, 513
Pelia, 165
Palaeoplatys, 166
Peltania, 164
Pansa menetriesii, 372
 pinicillii, 372
Pericera, 167
 cornigera, 256
 setigera, 256
 tiarata, 256
 PERICERIDA, 158, 167
 PERICEROIDA, 162, 167, 238, 248
Perinea, 166
Periplaneta americana, 345
Peripterygium quinquelobum, 132
Petalium bancana, 101
Phadyna, 410
Pharbitis, 458
Pharcolus vulgaris, 462
Phaloboclymna, 119, 120
 Griffithiana, 120
 Lobbianum, 120
Phycodes, 166
 Physochonus, 168, 174
 ctenurus, 175, 176, 291
 tensor, 176, 291
Phytocrene, 95, 97, 121, 132
 bracteata, 122, 123
 microcarpa, 123
 oblonga, 122
 palmata, 122, 123
 PHYTOCRENE, 97
 PICOCHEROIDES, 162, 167
Picrocerus, 162, 166, 235
 PIERINE, 433, 435, 443, 483
Pieris amasia, 506
 asterops, 501
 chrysochloria, 487
 cassis, 494
 domitia, 501
 leu, 506
 naomi, 506
 nerissa, var. *sumatrana*, 506
 panda, 504
 var. 505
 amboanga, 501
Pirdana hyela, 540
 pyrona, 540
 ruolophii, 540
Pisa, 158, 165, 234
 arica, 211
 corallium, 235
 cornigera, 256
 diacantha, 210
 monoceros, 197
 planana, 212
 styx, 235
 (Naxia) diacantha, 210
 PISINE, 160, 165, 206

- Pisoida*, 161, 165, 200, 201
Pisoides, 165
Pithauria aitchisoni, 544
 (*Pithauriopsis*) *aitchisoni*, 544
Pithauriopsis aitchisoni, 544
Pithecopa dharmia, 451
 " *dionisius*, 450
 " *fulgens*, 450
 " *hilaris*, 450, 451
 " *maria*, 450, 451
Pithe, 167
Plagiolata (*Chickrassia*), 88
 " *velutina*, 89
Planispira, 156
 " *propinqua*, 156
 " *zonaria*, 155
Plantarum, 119
Platengia callidura, 540, 541
 " *fruhstorferi*, 541
 " *helena*, 541
 " *hieroglyphica*, 531
 " *margherita*, 540
 " *naga*, 541
 " *submaculata*, 537
 " *fessellata*, 541
 " *varmiculata*, 541
Platea, 97, 110
 " *excelsa*, 111
 " *Griffithiana*, 120
Platylambrus, 260, 261
 " *curinatus*, 262, 263, 264
 " *echinatus*, 262, 264
 " *holdsworthii*, 264
 " *prensor*, 262
Platymia, 163, 180
 " *wyville-thomsoni*, 181
Platypus, 167
Platyrachus, 166
Platylabus kupa, 457
 " *lucifer*, 451
 " *plato*, 458
 " *polysperchius*, 455
 " *siraha*, 458
 " *subfestinus*, 456
 " *talanga*, 459
 " *unicolor*, 456
Platylabus hylax, 450, 451
 " *malaya*, 452
Plectopylis, 153
 " *achatina*, 153, 155, 156
 " *brachydiscus*, 154
 " *mathratula*, 153
 " *cyclasys*, 153
 " *macromphalus*, 154
 " *minor*, 154, 156
 " *pacis*, 153, 154, 156
 " *plectontoma*, 154
 " *retifera*, 153
Plectotropis elegantissima, 155, 156
Pleistacantha, 163
Plesioneura alysos, 541
Plesioneura utilia, var. *palaeonema*, 532
 " *montetthi*, 544
Pleurophricus, 166
Podalirius pompilius, 634
Podochala, 163
Podohuenia, 167
Podonema, 163
Podopiza, 165, 216
 " *petersii*, 218
Poinciana pulcherrima, 509
Polychaeta paniculata, 316, 317
Polyommatus baticus, 455, 462
POLYZOA, 254
Pompeoptera amphysus, 508
 " *cuneifera*, 509
 " *helena*, 507
 " *honrathiana*, 507
Poritas, 6, 8
Poritia, 448, 450
 " *crycinoides*, 448, 449
 " *philota*, 448, 449
 " *phraotica*, 448
 " *plateni*, 448
 " *plenata*, 448, 449
 " *promula*, 448
 " *sumatris*, 448, 449
POBPAX, 336
Portulaca, 454
Precis, 382
 " *ida*, 406
 " *iphita*, 406
PRIMULACEAE, 324
PRIMULINE, 311, 313
Prinos cymosa, 137
 " *spicata*, 134
Prioneris autothus, 490
 " *clemantha*, 360, 489
 " *hypsipyra*, 489
 " *hypsypula*, 489
Prionorhynchus, 165
Proctides excellens, 542
Prothoe, 420
 " *angelica*, 439
 " *belizama*, 439
 " *calydanus*, 426, 438, 439
 " *chrysonia*, 439
 " *frankii*, 439
PSEUDO-AGLAIA, 51, 58
Pseudodipsas bengalensis, 454
Pseudomicippa, 166
Pteleocarpa, 98, 119, 130, 132
 " *longistyla*, 131
 " *malaccensis*, 131
Pterygospidea simula, 530
Ptychandra, 383
Pugettia, 158, 164, 190, 200, 202
 " *globulifer*, 205
 " *velutina*, 206
PULMONIFERA, 161
Pygacra bucephala, 346
Pyramcis, 129

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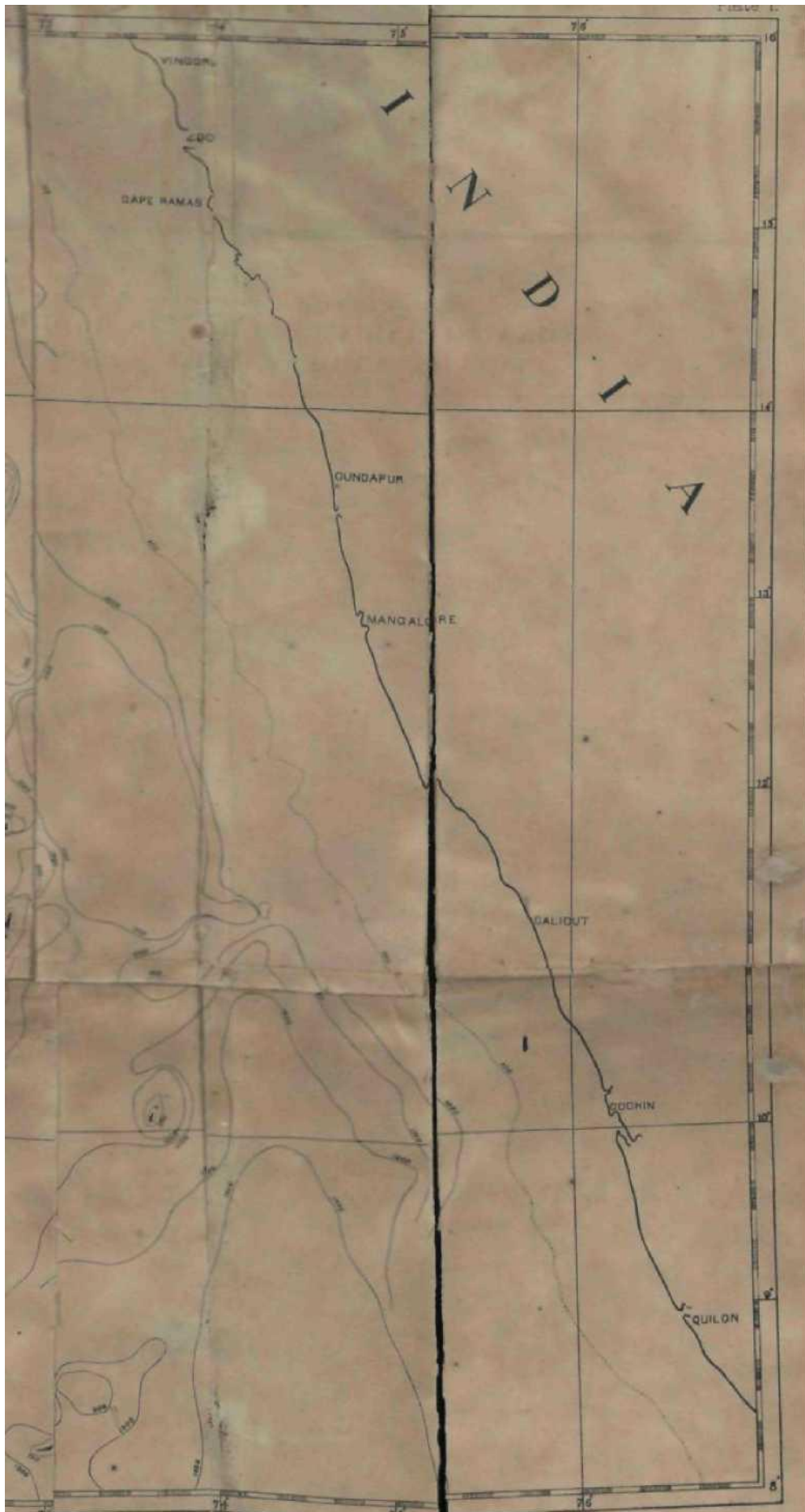
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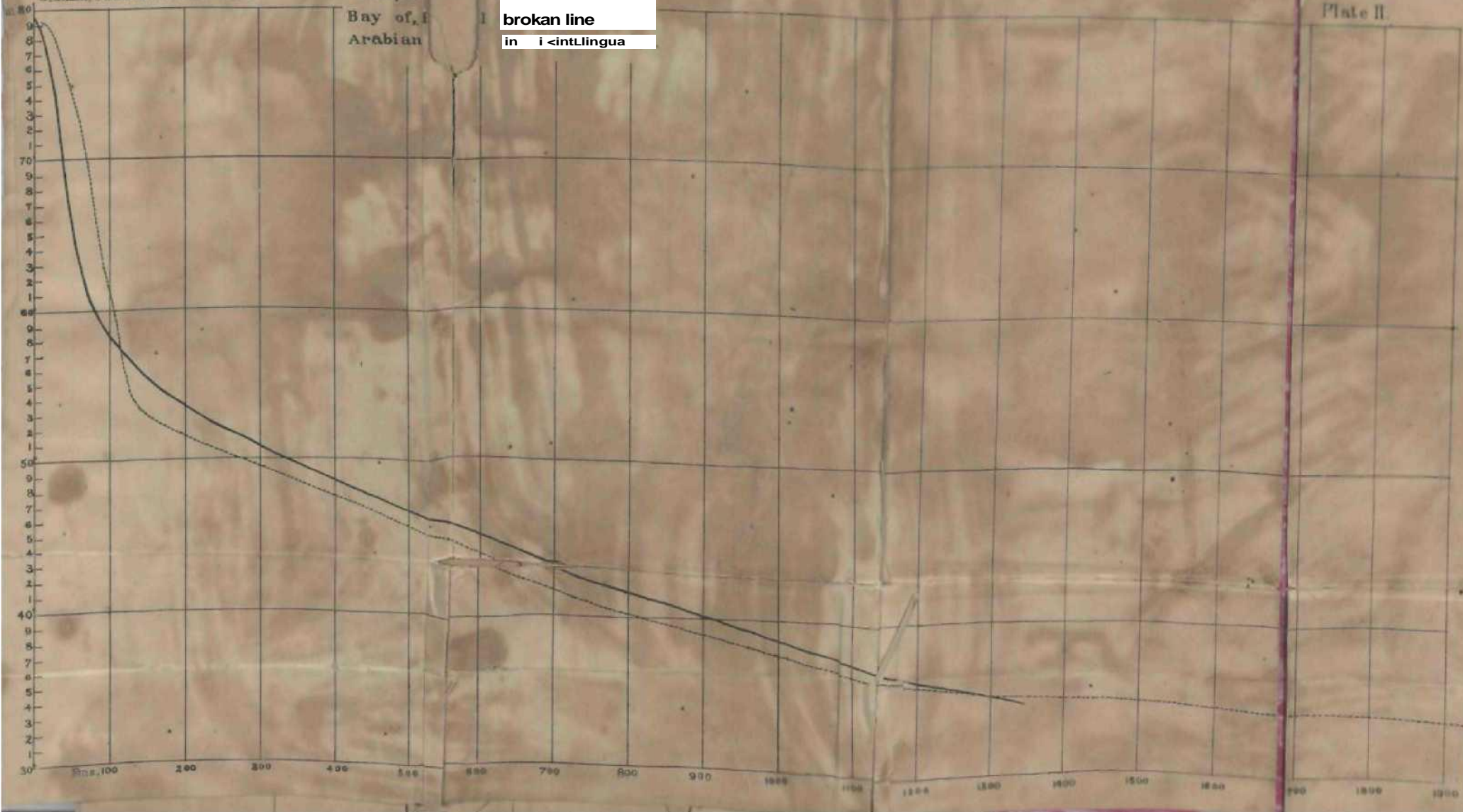
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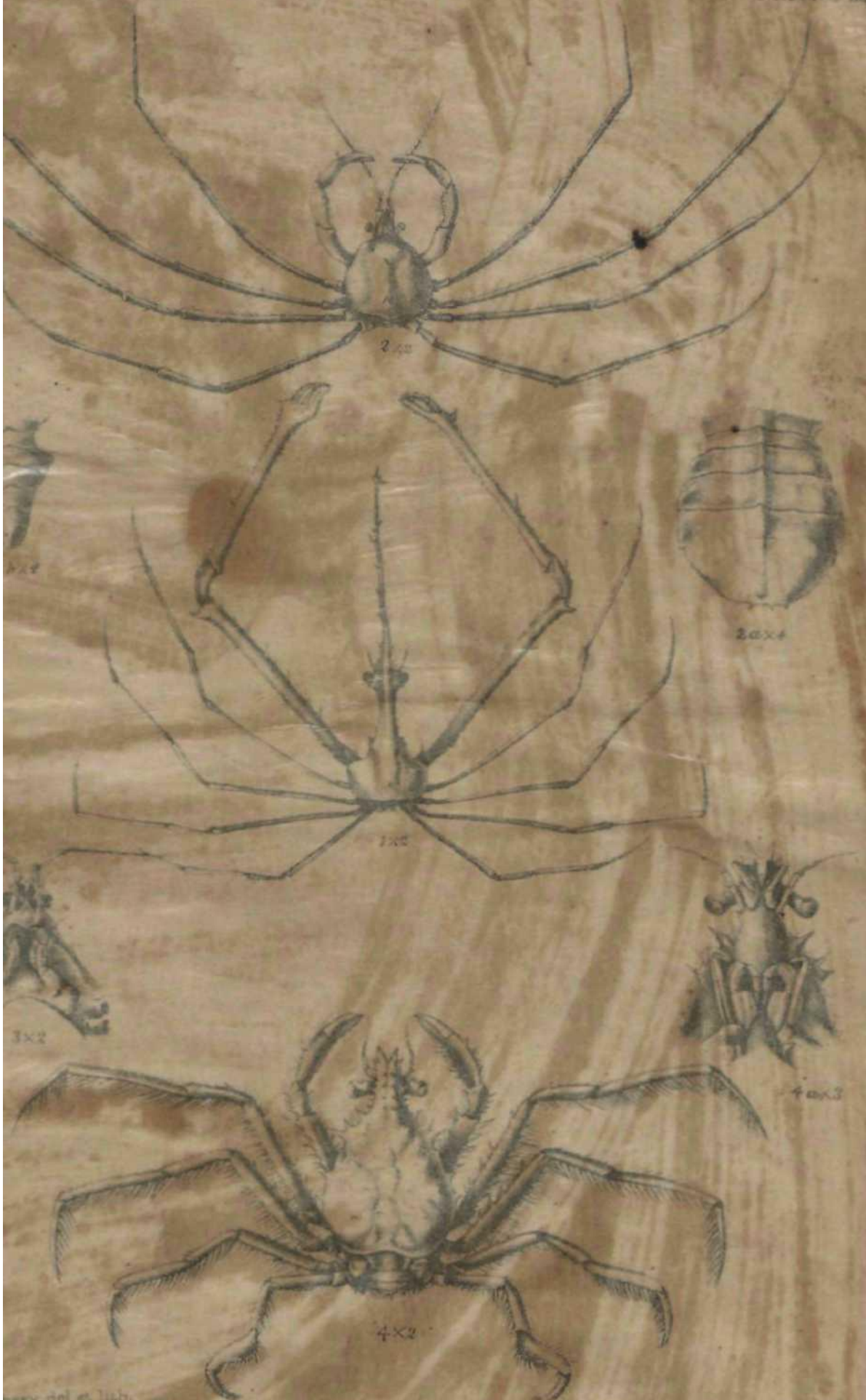


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FAGO NORVILLI





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 æus tonsor

2 Physachæus otenurus.
 + Grypachæus hyalinus.



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1 x 2



2a x 4



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1. Inachoides donchomynensis
3. Naxia investigatoris.
5. Maia gibba.

2. Ap<

4. Macro

ALBORE, U. A. S. DE VOL. LXIV, PL. II



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