PROCEEDINGS

OF THE

GENERAL MEETINGS FOR SCIENTIFIC BUSINESS

OF THE

ZOOLOGICAL SOCIETY OF LONDON.

January 16, 1894.

Sir W. H. Flower, K.C.B., LL.D., F.R.S., President, in the Chair.

The Secretary read the following report on the additions to the Society's Menagerie during the month of December 1893:—

The registered additions to the Society's Menagerie during the month of December 1893 were 62 in number. Of these 29 were acquired by presentation, 15 by purchase, 7 were born in the Gardens, and 11 were received on deposit. The total number of departures during the same period, by death and removals, was 91.

Mr. Sclater exhibited a coloured drawing of the head of *Cercopithecus erythrogaster* taken from the specimen of that Monkey in the Paris Museum, and read an extract from a letter addressed to him (enclosing it) by M. E. de Pousargues (Préparateur au Laboratoire de Mammalogie au Muséum, 55 Rue de Buffon). It appeared that in the adult of this species the hairs on the nose are white, and that the species should therefore probably be removed, in Mr. Sclater's arrangement of the genus, to "Section A. *C. rhinosticti*" (P. Z. S. 1893, p. 244), in the neighbourhood of *C. petaurista*. In the type in the British Museum these hairs were blackish, but there were indications of whitish at their bases, and the specimen was probably young.

The Secretary read the following extract from a letter addressed

to him by Mr. C. B. Mitford, dated Freetown, Sierra Leone, 26th November, 1893:—

"I have one of the most interesting phenomena to tell you about, which has not been seen in Freetown for the last 60 or 70 years, but as it only commenced yesterday I can give you but a short account of it now. At 1.30 P.M. yesterday I noticed the hills at Wilberforce assuming a very dried-up appearance, which gradually extended to the water's edge, and on calling the attention of a native to the peculiar change in the appearance of the 'bush' he informed me that Locusts were coming.

"What he said proved to be correct, for in a very short time huge black clouds appeared above the hills, as if a severe storm were brewing, and those I at first saw, the advance guard, in the brilliant sunshine gradually gave one an idea that the whole of the sides of the hills were on fire; these hills, I should say, are three miles off in a bee-line.

"At 2.45 P.M. these supposed clouds reached Freetown, and proved to be a continuous mass of locusts, which passed without intermission till 5.10. P.M., and, as in their progress they were only 30 or 40 feet above the ground, a sound like a rushing stream at a distance could be distinctly heard.

"During their course the sky was obscured. Myriads settled on the houses, trees, roads, &c., but made no apparent difference in the size of the swarms passing over. The whole town was covered with their excrement.

"Last night, when I went out about 10 P.M. to see what was going on, I found plenty of locusts in the garden, but on a near approach to the plants they dropped suddenly on to the ground.

"This morning, when I got up about 6 A.M., only two or three were to be seen. At 9.45 A.M. the stream began again, but not in such dense masses as were seen yesterday, and continued up to 1 P.M.

"A more marvellous sight I have never seen, nor has, so far as I can ascertain, the oldest resident in Freetown, although I hear they appeared here sixty or seventy years ago, as I said before.

"As you walk along the roads they rise like a large flock of birds, most of them rising and joining the main band, but others coming down and taking their places."

The Secretary stated that Mr. C. O. Waterhouse, of the British Museum, in whose hands he had placed specimens of this Locust transmitted by Mr. Mitford for examination, had determined them to belong to *Pachytylus migratoroides* (Reiche et Fairmaire) (Ferr. et Gal. Voy. en Abyss. iii. p. 430), originally described from Abyssinia, but recently ascertained to occur also in West Africa.

A second extract from the same letter referred to the occurrence of the Elephant (*Elephas africanus*) in Sierra Leone:—

"In reference to the occurrence of the Elephant in Sierra Leone, I can only state, in continuation of what I told you before, that I have been informed, on, I think, very reliable information, that within a certain mountainous portion of the western district

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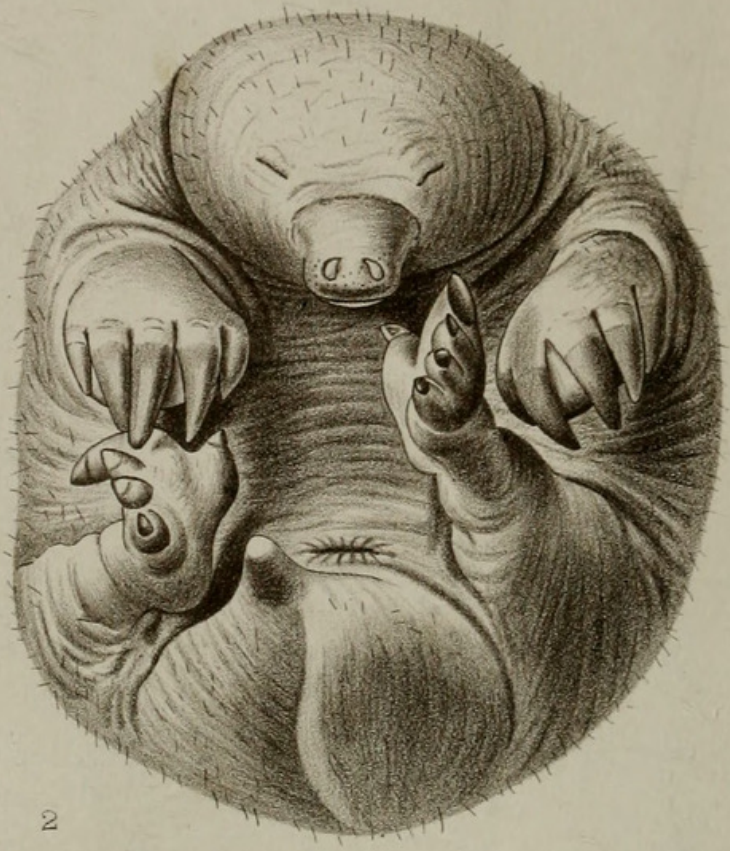

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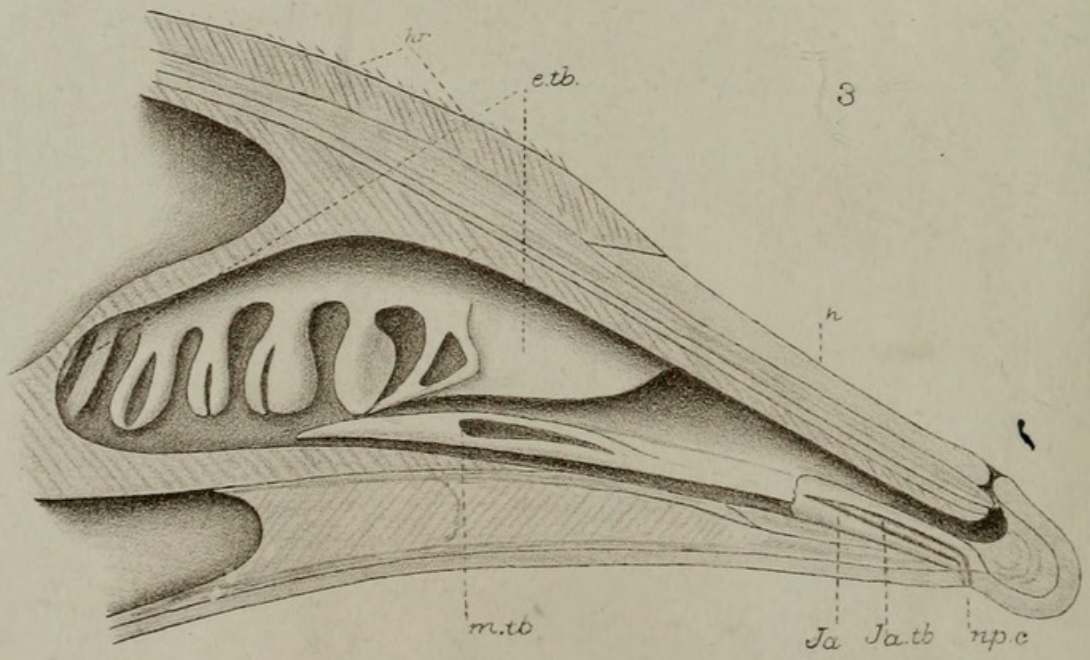

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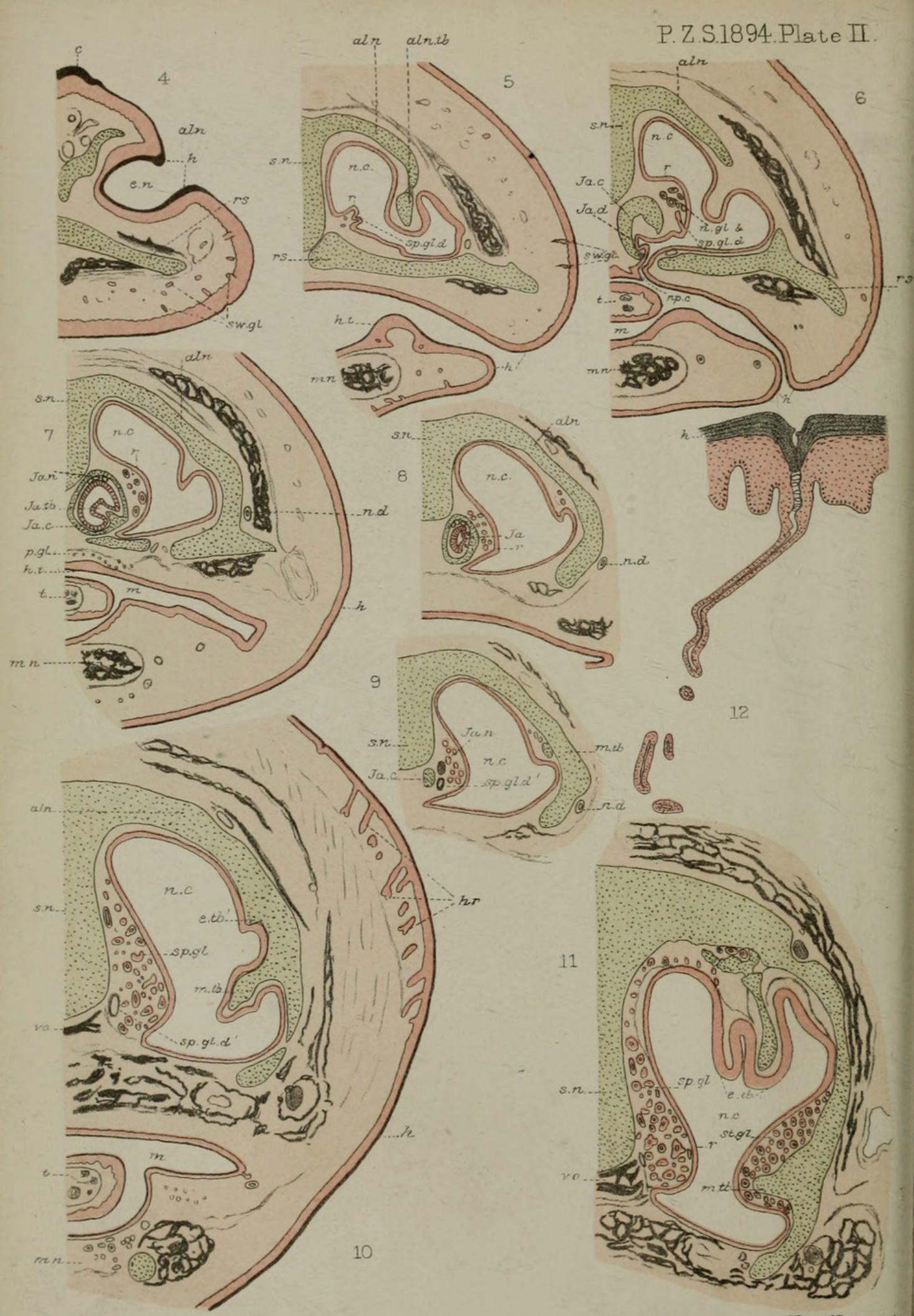
West, Newman imp.

Structure of young Echidna.



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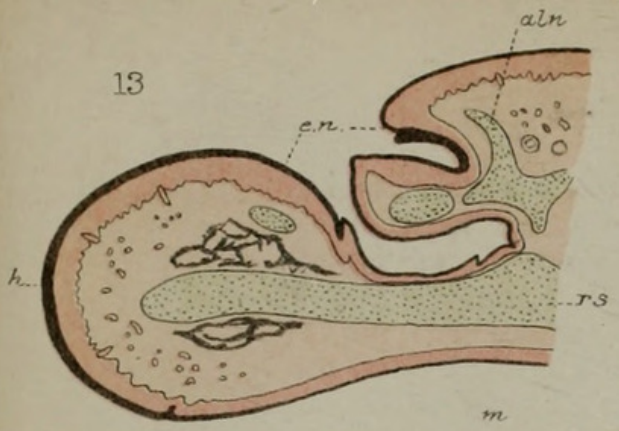

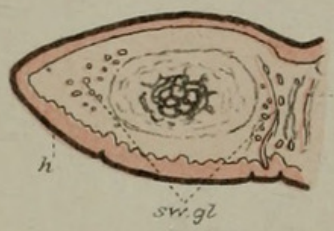

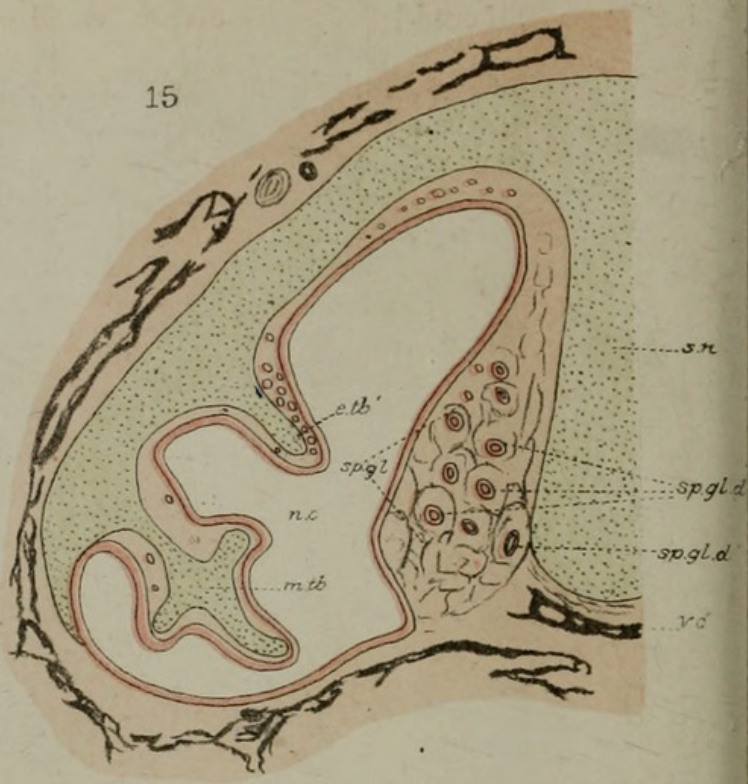

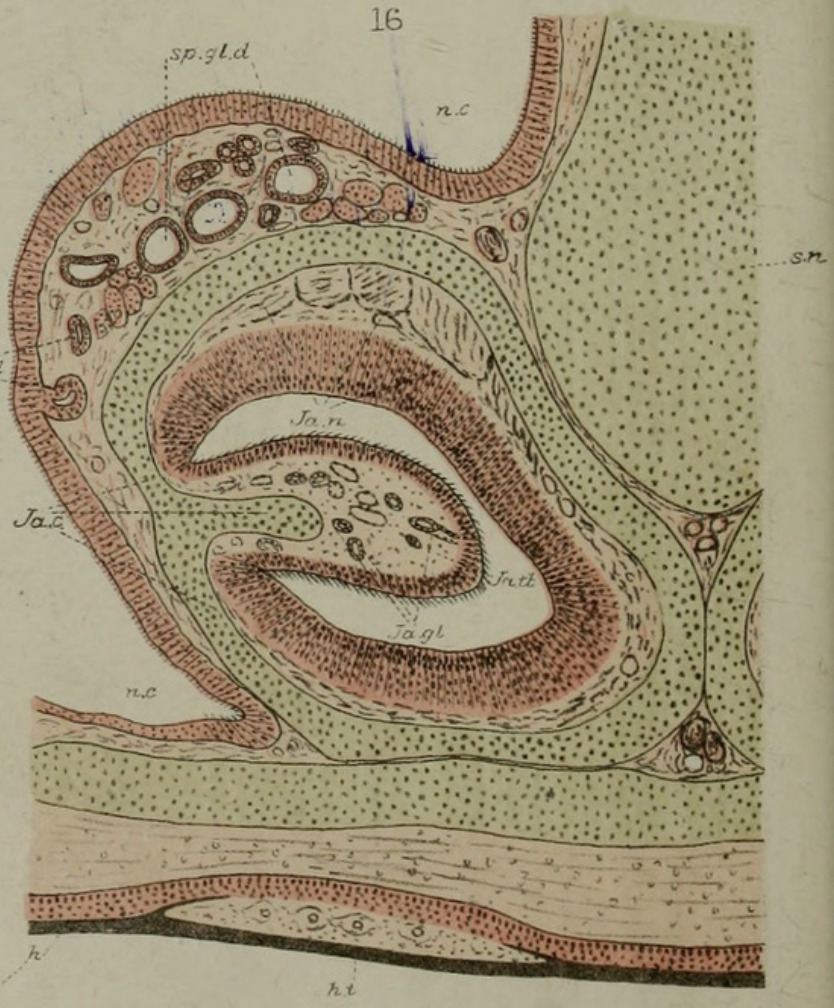

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Structure of young Echidna.

bounded by the farms or villages of York, John Obey, and Tombo, on the sea-shore, and by Pickett Hill in an easterly direction inland from Kent, Elephants do exist.

"Another dead one was found not long ago and a regular scramble took place for the flesh. The skull of the one which I got was found 12 hours' walk from the beach.

"A farmer named Wise often complained recently to the late acting manager that Elephants did a good deal of damage to his crops and made deep holes in the ground when they came down to drink.

"I am assured that if there is one Elephant in the district there are at least a hundred. This statement I accept with reservation, but that they do exist I have not the slightest doubt.

"At John Obey, a place about halfway between York and Kent, the spoor of Elephants can be found on many farms not quite a mile away from the village."

Mr. R. Lydekker, F.Z.S., gave an account of some of the principal objects observed during his recent visit to the La Plata Museum, calling special attention to the series of remains of Dinosaurian Reptiles, of Cetaceans, and of Ungulates of three different suborders. Mr. Lydekker also made remarks on some of the specimens of Edentates and of the gigantic birds of the genus *Brontornis* contained in the Museum.

Mr. Lydekker also exhibited a painting of the head of a Wild Goat (*Capra ægagrus*) of unusual dimensions.

Mr. J. Jenner Weir, F.Z.S., sent for exhibition a specimen of the "Tsetse," *Glossina morsitans* (P. Z. S. 1850, p. 26[1], pl. xix.), which had been transmitted to him from the Transvaal by Dr. Percy Rendall, F.Z.S.

Mr. W. B. Tegetmeier, F.Z.S., exhibited and made remarks on a Pheasant with abnormal plumage assimilating to that of "Pencilled Fowls."

The following papers were read:—

1. On some Points in the Structure of the Young of *Echidna aculeata*. By W. N. Parker, Ph.D., F.Z.S., Professor of Biology in the University College of S. Wales and Monmouthshire, Cardiff.

[Received November 7, 1893.]

(Plates I.–III.)

At the meeting of the British Association held in Cardiff in 1891 I exhibited some young specimens of *Echidna*[1], and made a

[1] Brit. Assoc. Report, 1891, p. 693.

few remarks on the structure of certain parts of the head. The present paper refers to the same individuals, and treats of the external characters and the structure of the fore part of the head only; at a future time I hope to deal with other regions.

The specimens are from the collection of my father, who received them from Dr. E. P. Ramsay, Curator of the Australian Museum, Sydney. I do not know of any description of the external characters of the young *Echidna*; and as such young specimens are very rarely obtained, I have thought it worth while to figure the two stages in my possession (Plate I. figs. 1 & 2), the older of which is rather smaller than the young *Ornithorhynchus* figured by my father in his 'Mammalian Descent' (p. 25).

I. *External Characters.*

Stage I. (Plate I. fig. 1).—The dorsal side is very convex, the head being bent so far round that the snout points directly backwards. The ventral side of the body is flattened, and the trunk passes insensibly into the conical tail, the apex of which is directed backwards. The length of the animal along the dorsal curve from the end of the snout to the tip of the tail is 12·5 cm., and the greatest diameter of the body 3 cm.; the head measures 2·8 cm. in length. The integument has a pitted appearance in the dorsal and lateral regions of the body, and though no hairs have yet appeared at the surface, the places in which the strong spines later break through can be plainly seen. The gape is narrow, and extends less than halfway along the snout, the anterior part of which is distinctly horny, the horn fading off posteriorly, so that the hinder part of the snout is covered with a soft integument like that of the rest of the head. The nostrils are ovoid and oblique, and a projecting septum extends into each from the inner side, about halfway across. Between the nostrils a distinct caruncle or "egg-breaker," like that of the young *Ornithorhynchus*[1], can be seen at this stage. Narrow slits indicate the position of the eyes, the upper and lower eyelids being confluent. The external auditory aperture is also slit-like, and extends into the thick layer of muscles covering the hinder part of the skull. The cloaca is shallow, and the vent is plugged by a rounded projection from its walls.

The fore limbs are larger and stronger than the hind, and the digits are provided with well-developed claws, those of the 1st and 5th being smaller than, though forming a regular series with, the others. The hallux is short and small, and situated more proximally than the other digits of the pes: it has a well-marked claw. The hind toe is very large, its strong claw projecting far beyond those of the remaining three digits, which are of considerably less diameter than the 1st, and bear small claws.

Stage II. (Plate I. fig. 2).—The flexure of the body is similar to that seen in Stage I., except that the end of the tail is now bent under the body, so that its conical end points towards the snout.

[1] *Cf.* W. K. Parker, 'Mammalian Descent' (London, 1885), pp. 45 & 49.

My two specimens of this stage measure respectively along the dorsal curve from the end of the snout to the tip of the tail 21·5 cm. (see fig. 2) and 25·5 cm., the greatest diameter of the body being about 6 cm., and the head 4 cm. in length. The rough integument is covered with papillæ, and the stiff bristles now project about 3 mm.; the position of the stronger and sparser spines amongst these can be seen more plainly than in the earlier stage, though they still hardly project above the surface. The snout is more plainly marked off from the rest of the head than in Stage I., and is relatively flatter: it is entirely covered with horn, and much resembles the "beak" of *Ornithorhynchus* except in the relative extent of the gape. The nostrils are now more completely valvular, and the caruncle is no longer recognizable. The eyelids are beginning to separate, the conjunctival chamber communicating with the exterior by a small aperture. The cloaca has become deeper, folds of the integument radiating out from the vent.

The integument on the ventral side of the body is much folded; and in the larger of the two specimens, which is probably a female, a shallow triangular pouch, the apex of which points backwards, can be seen between and rather anteriorly to the hind limbs. There can be little doubt that this represents the mammary pouch as described by Haacke[1]; and as it is so distinct at this stage, it seems improbable that it would altogether disappear in the adult between the periods of suckling. I do not propose to treat of its structure or of its relation to the pouch of Marsupials in the present paper[2].

The pes is now nearly as large as the manus, though its claws are not so strongly developed. The calcaneal spur can be seen in both specimens, but is considerably larger in the smaller of the two, which is probably a male.

II. *Integument of the Head.*

The resemblance of the snout to that of *Ornithorhynchus* has already been remarked upon; and this is more particularly the case in the later stage, in which it is relatively flatter than in the younger one. As in *Ornithorhynchus*, the lips, as well as the whole integument of the snout, are immobile, owing to the development of a thick horny layer from the epidermis (Plates II. & III.). The horn is much thicker in the older of the two stages, and this is all the more remarkable as in the adult the skin in this region can hardly be said to be horny at all. The horny layer extends over the margins of the gape, and then thins off gradually: it also passes inwards to line the external narial passages (Plate II. fig. 4 and Plate III. fig. 13). The caruncle (figs. 1 and 4) is formed by a ridge of the epidermis on which the horn is especially thick[3].

[1] W. Haacke, "On the Marsupial Ovum, the Mammary Pouch, and the Male Milk-glands of *Echidna hystrix*," Proc. Roy. Soc. vol. xxxviii. p. 72; and Biol. Centralblatt, viii.

[2] *Cf.* H. Klaatsch, Morph. Jahrbuch, Bd. xvii. p. 483.

[3] *Cf.* Carl Röse, "Ueb. die Zahnleiste und die Eischwiele der Sauropsiden," Anat. Anz. vii. Jahrgang, 1892, p. 748.

An examination of the end of the snout with a hand-lens shows the presence of a number of fine dots on both jaws extending about as far back as the gape. These are indicated in figs. 1 and 2. Sections show them to be due to the presence of funnel-shaped apertures in the horny layer, which extend inwards, surrounded by a continuation of the horn, and gradually become narrower (figs. 4, 5, 12, and 13). Just beneath each aperture the epidermis is prolonged inwards to form an elongated oval process (fig. 12), which, slightly below the base of the dermal papillæ, narrows somewhat to form a tube extending for some distance into the derma, where it becomes convoluted; its walls are composed of a double layer of cells, and the lumen becomes greatly coiled on passing into the swollen base of the epidermal process and then communicates with the aperture at the base of the horny ingrowth. It will thus be seen that these glands are precisely similar in structure to ordinary sweat-glands. I should mention that the lumen is not developed in the young stages.

Poulton [1] has described structures in *Ornithorhynchus* which are apparently similar to these, and suggests that they may correspond to modified hairs; this, however, seems to me improbable. I have found nothing which could correspond to the sensory organs of the bill of *Ornithorhynchus* described by Poulton.

No hairs, nor any structures resembling hairs, are present on the horny snout. Behind this, hairs are developed in abundance (figs. 2 and 10), and in the older stage the sebaceous glands can be seen arising as buds from the hair-follicles. No sweat-glands are present on the hairy part of the head; the rest of the body I have not yet examined. It should, however, be remembered that Gegenbaur [2] has shown that the mammary glands are modified sweat-glands in these animals.

III. *The Oral Cavity.*

Even in the younger stage the mouth has already acquired its narrow and tubular form (see figs. 5–7, 10, and 14). The elongated tongue is covered with a thin layer of horn at the tip. The sublingual glands are numerous, and open at various points into the floor of the mouth. The naso-palatine canals communicate with the oral cavity anteriorly (fig. 6, *np.c.*); and from this point backwards, some distance beyond Jacobson's organ, a number of simple gland-tubes, very similar to those already described in the snout, are present on the roof of the mouth (fig. 7). Similar glands are also present in this region in the young *Ornithorhynchus*.

The epithelium in certain regions both above and below gives rise to horny teeth, which on the anterior part of the lower jaw form marked ridges (figs. 5, 7, 14, 16). A dermal papilla extends into the thickened epithelial ridge, which produces a thick horny layer on its outer surface.

[1] "On the tactile terminal Organs and other Structures in the Bill of *Ornithorhynchus*," Journ. Physiol. vol. v. p. xv (Proc. Physiol. Soc. 1884).

[2] 'Zur Kenntniss der Mammarorgane der Monotremen,' Leipzig. 1886.

The question as to the presence of rudiments of true teeth in *Echidna* is of especial interest. After a fruitless search through sections of the older stage, I hoped to be more successful in the younger specimen, but have not succeeded in finding any indication of the development of teeth at all, and am confident that earlier stages must be examined before any signs of these organs can be recognized. It is certainly remarkable for all traces of them to have disappeared so early, especially when we consider how well they are developed in *Ornithorhynchus*[1]: this is probably to be accounted for by the extreme and early specialization of the mouth in *Echidna*.

The fact that Röse[2] has succeeded in finding traces of teeth in a small embryo of *Manis* 7·6 cm. long, while they have entirely disappeared in older embyros from 17–30 cm. in length, further indicates the probable formation and early reduction of a "Zahnleiste" in *Echidna*.

IV. *The Nose and Jacobson's Organ.*

In the note already referred to I drew attention to the marked development of Jacobson's organ in *Echidna*, and to the fact that it possesses a "turbinal" supported by cartilage. The organ had been previously recognized in *Ornithorhynchus* by Sir W. Turner[3] and my father[4], and sections of a young specimen of this animal in my possession showed that it closely resembles that of *Echidna*. Since the publication of my note, however, Dr. Symington[5] has given such an excellent account of the nose of *Ornithorhynchus*, comparing it with that of other Mammals and also giving the literature of the subject, that it will be only necessary for me to refer to this animal for purposes of comparison with *Echidna*.

In each stage I bisected the head to one side of the septum nasi. The half in which the latter was intact was then decalcified and cut into serial sections, the other half being used for purposes of dissection.

Fig. 3 (Plate I.) represents a longitudinal section of the head at the older of the two stages, and shows the form and relations of the nasal cavity, which is 2·5 cm. in length. A comparison with a figure of the adult given by Zuckerkandl[6] shows that the nasal cavity is now comparatively short and broad (compare also transverse sections of both stages, figs. 5–11, 14, and 15, Plates II. & III.).

The cartilaginous nasal capsule is more complicated than in

[1] *Cf.* E. B. Poulton, Quart. Journ. Micros. Science, vol. xxix. 1888; and Oldfield Thomas, Proc. Roy. Soc. vol. xlvi.

[2] C. Röse, Anat. Anz. vii. Jahrgang, 1892, p. 618.

[3] "The dumb-bell shaped bone in the palate of the Ornithorhynchus compared with the pre-nasal bone in the Pig," Journ. Anat. and Physiol. vol. xxv.

[4] 'Mammalian Descent,' London, 1885, pp. 52 and 54.

[5] "On the Nose, the Organ of Jacobson, and the Dumb-bell-shaped Bone in the Ornithorhynchus," Proc. Zool. Soc. 1891, p. 575.

[6] E. Zuckerkandl, 'Das periphere Geruchsorgan der Säugethiere,' Stuttgart, 1887, pl. i. fig. 3.

Ornithorhynchus. The thick and solid septum nasi, which is rounded off below, gives rise to two lateral ali-nasal wings (*aln.*) above, and these extend anteriorly beyond the septum and support the external nostrils on the anterior, inner, and upper sides. Rather further back, each wing gives rise to a curved rod (fig. 5, *aln.tb.*) (the "ali-nasal turbinal" of W. K. Parker [1]), which passes into the valvular process already noticed as extending into the nostril from the inner side, and a turbinal-like ridge is thus formed from the roof of the anterior part of the nasal cavity—this ends anteriorly to the "maxillo-turbinal." In Stage II. the ridge supports a very complete valve, which can probably close the aperture of the nostril completely (fig. 13). It will thus be seen that there are no transverse connective-tissue septa in the front part of the nose as in *Ornithorhynchus*.

Posteriorly to the nostril, the two wings gradually extend further downwards, so as to form an outer projecting wall to the nasal chambers, and a short distance behind the naso-palatine ducts they are continuous ventrally with the partial cartilaginous floor, which supports about the outer half of the anterior part of the nasal cavities (figs. 7–11, and 14, Plates II. & III.).

The lower side of the snout, below the nostrils, is supported by a large transverse rostral cartilage (figs. 4–6 and 13, *rs.*), continuous dorsally with the two ali-nasal wings in front of the nostril and also with the septum nasi. This cartilage becomes constricted off from the septum slightly in front of the naso-palatine canals, and then forms an independent plate on either side, the swollen internal margins of which abut against the base of the septum (fig. 5). This thickened edge is separated off from the rest of the plate as a club-shaped mass in the region of the naso-palatine duct, which passes between the two portions. The inner club-shaped portion then becomes hollowed out on the external side, where Jacobson's duct enters its cavity as an offshoot from the naso-palatine canal, and the cartilage then forms a complete independent tube, enclosing Jacobson's organ (figs. 6–8, 14 and 16). The lateral part of the cartilaginous nasal floor sends up a process on the dorsal side (fig. 6), which soon meets with the roofing cartilage (figs. 7–9 and 14); a small plate becoming separated off from its inner edge (fig. 7), which then meets with its fellow to form a median plate lying beneath the two Jacobson's organs (figs. 14 and 16), and gradually fades off into a median and two lateral backwardly directed processes which end beneath the posterior part of Jacobson's organ. In the young *Ornithorhynchus* the nasal capsule is simpler and forms a more complete box (fig. 17).

Even in the older stage, none of the turbinals have begun to ossify. The ethmoid turbinals ("Riechwülste") are more numerous and complicated than in *Ornithorhynchus*, in which Zuckerkandl describes three only, and he therefore considers *Ornithorhynchus* to be "anosmatic," its ethmoid being reduced in

[1] *Cf.* "On the Structure and Development of the Skull in the Pig," Phil. Trans. 1874.

adaptation to its aquatic habits. Symington, however, thought he could recognize five, the number characteristic of most osmatic mammals, and therefore describes *Ornithorhynchus* as "microsmatic." *Echidna*, on the other hand, is, to use Turner's nomenclature, "macrosmatic"; and Zuckerkandl describes eight ethmoid turbinals in the middle line in this animal. In my younger stage I could only recognize six, and in the older seven, which are easily seen, and probably a smaller eighth behind these (fig. 3). The sphenoidal sinus is represented by a shallow groove.

In Stage I. the six ethmoid turbinals appear in my dissection as simple lobes, all being at about the same level and not reaching the septum nasi. Sections, however, show that some, at any rate, are becoming subdivided (fig. 11). In Stage II. this subdivision into secondary lobes has gone still further, the second to the sixth exhibiting distinct folds (fig. 3); and in transverse sections a considerable complication is seen. In the adult this branching is carried further still, so that in the dry skull about the posterior half of the nasal chamber is filled with a complicated mass of spongy bones (compare pl. i. fig. 3 of Zuckerkandl's memoir): from the fifth backwards these do not extend so far towards the median line as the others, on account of the folds on the septum nasi in this region, between which the turbinals extend. The proper olfactory region of the nasal chamber is thus very largely developed, and the cribriform plate is especially large, and perforated, as in all mammals but *Ornithorhynchus*. The first ethmoid turbinal (so-called "naso-turbinal") is a simple plate extending forwards some distance beneath the nasal bone (figs. 3 & 15, *e.tb.*[1]), with which it becomes united in the adult. The 7th (and ? 8th) are also quite simple in Stage II. A sensory and ciliated epithelium covers all these except the "naso-turbinal."

In Stage I. a simple "maxillo-turbinal" ("Nasenmuschel") extends from near the anterior end of the nasal cavity backwards as far as the fourth ethmoturbinal (fig. 3, *m.tb.*), narrowing off gradually posteriorly as well as anteriorly. Sections of Stage I. show that it has the form of a ridge, which is beginning to become branched (figs. 10 and 11), the branching being carried much further in Stage II. (fig. 15), a fold being visible even with the naked eye along its middle part (fig. 3). The folding is much more complicated in the adult, and from a comparison with the skeletal parts of an adult *E. spinosus* the maxillary turbinal apparently belongs to the folded ("gefalteten"), and not to the doubly-coiled ("doppelgewundenen") variety, as stated by Zuckerkandl; while in *Ornithorhynchus*, according to Symington, it "constitutes a well-marked example of the branching variety (verästigte Muschel)," though Zuckerkandl describes it as a "gefaltete Nasenmuschel." The epithelium covering this turbinal is, as usual, non-sensory, resembling that lining the general nasal cavity, and bearing cilia.

A communication between the two nasal cavities has been described by Home in *Ornithorhynchus*. Zuckerkandl was unable to observe this; but I have satisfied myself that both Monotremes

agree in this respect, and that the left and right nasal chambers communicate by a slit-like passage beneath the septum just behind Jacobson's organ.

On either side of the septum nasi, a rounded ridge can be seen projecting into the nasal cavity ventrally (figs. 5–11 and 14–16), beginning close to its anterior end and passing right back into the ethmoidal region, where it is eventually continuous with the partition separating the nasal chamber from the posterior nares. Within the anterior part of this ridge Jacobson's organ is contained (*Ja.*), while posteriorly it encloses a racemose gland. This, which we may call the "septal gland" (*sp.gl.*), opens by a large duct into the posterior end of Jacobson's organ and by a number of others into the nasal cavity along the anterior part of the ridge, one extending even in front of Jacobson's organ (fig. 5). The anterior part of the ridge was noticed by Zuckerkandl, but he says no more about it. In fig. 3 the part behind Jacobson's organ is removed, so as to show the turbinals.

As already mentioned, Jacobson's cartilage forms a large and independent tube, into the anterior end of which an offshoot from the naso-palatine duct (fig. 6, *Ja.d.*) passes to open into the cavity of the organ [1], which does not extend anteriorly to this point, as it does in *Ornithorhynchus*. In other words, Stenson's duct is situated further from the end of the snout in the latter animal, so that Jacobson's organ does not extend so much beyond it posteriorly as in *Echidna*. From the outer side of the tube an ingrowth occurs so as to form a sort of shelf or turbinal cartilage along the greater part of its length (figs. 7, 14, and 16). This disappears posteriorly, and the tube itself ends about opposite the anterior extremity of the maxillary turbinal (figs. 8 and 9), in which region sections show a solid piece of cartilage, representing part of the wall of the tube, as well as the mass of nerves and duct of the septal gland which plug the end of the tube.

Passing now to the organ itself, it will be seen, by a glance at figs. 7, 14, and 16, that the lumen is narrow and horseshoe-shaped, owing to the projecting shelf on the outer wall. In *Ornithorhynchus* this "Jacobson's turbinal" is distinctly coiled towards the ventral side, and the cartilage follows the curve (fig. 17), so that if straightened out it would more than reach to the opposite wall of the organ. In *Echidna* the shelf extends almost straight across the organ, leaving a narrow lumen between it and the wall, and the supporting cartilage only passes about halfway along the shelf. In this respect the Jacobson's organ of *Echidna* may be said to be less highly developed than that of *Ornithorhynchus*: moreover in the young of the latter it is relatively slightly larger than in the adult and than in the young *Echidna*.

A sensory epithelium lines the concave margin of the lumen, and

[1] For details as regards Jacobson's organ in other mammals compare Herzfeld, P., "Ueb. das Jacobson's Organ des Menschen u. der Säugethiere," Zool. Jahrb., Abth. f. Anat. u. Ontog., Bd. iii.

this is much thicker than the non-sensory epithelium covering the shelf, which is columnar and stratified, and bears especially strong cilia (fig. 16). I was unable to recognize any cilia on the sensory epithelium. The function of "Jacobson's turbinal" must therefore be a purely mechanical, and not a sensory one. The sub-epithelial tissue on the dorsal and internal side of the organ encloses large bundles of olfactory nerves, which send branches to the other parts. A number of small gland-tubes are present in the connective tissue of the turbinal, and these open at intervals into the lumen of the organ.

On the dorsal and lateral side of Jacobson's cartilage a thick mass of tissue is present between it and the epithelium covering the ridge which projects into the nasal cavity and in which the whole organ is enclosed. This tissue contains a number of simple glands, which also extend posteriorly to Jacobson's organ, externally to the more complicated "septal gland," and open at intervals into the nasal cavity (figs. 6–11 and 14–16); the septal gland with its ducts is therefore of great extent, passing along almost the entire length of the nasal chamber.

The epithelium covering the whole ridge is columnar and ciliated like that lining the general nasal cavity, and passes into stratified pavement-epithelium behind the naso-palatine duct, the latter form extending back still further on the nasal floor.

Gland-tubes similar to those just described are also present in great abundance beneath the epithelium of the posterior part of the maxillo-turbinal (=Steno's gland?) (figs. 11 and 15), and also to a less extent beneath that of the ethmo-turbinals and other parts of the nasal cavity.

I do not propose to describe the structure of the eye here, and will only mention that in the young *Echidna* it lies some distance from the surface, and a groove, lined by a thick cuticle, extends inwards towards it from the integument.

In Stage I. the two layers of epithelium bounding this groove join at its base so as to form a solid band connecting the conjunctiva with the epidermis.

In Stage II. the eyelids are beginning to separate, a narrow slit being present in their middle part. There is a very large Harderian and a smaller lacrymal gland, and folds of the epithelium of the eyelids apparently represent the developing Meibomian glands. The naso-lacrymal duct (*n.d.*) opens into the outer side of the nasal chamber rather further back than Stenson's duct, in a bay between the "ali-nasal turbinal" and the floor of the chamber. From this point it extends directly backwards, just outside the nasal capsule, to the conjunctival chamber.

Neglecting their more obvious resemblances and differences, and confining ourselves to the observations recorded above, it will

be seen that the young *Echidna* resembles *Ornithorhynchus* in possessing:—

1. A thick horny layer covering the snout, as well as horny teeth and a horny caruncle for breaking open the egg-shell.

2. Glands resembling ordinary sweat-glands opening on the snout as well as on the anterior part of the palate.

3. A highly developed Jacobson's organ, resembling that of Lizards and Snakes, enclosed in an independent tubular cartilage, and possessing a large "turbinal" supported by a cartilaginous shelf continuous with the investing tube.

4. A complicated "maxillo-turbinal."

5. A communication between the two nasal cavities, as in certain birds.

6. Numerous glands in connection with the nasal chamber and Jacobson's organ, including a specially large "septal gland" and a "Steno's gland." Most of these characteristics are peculiar to Monotremes amongst Mammals.

On the other hand, *Echidna* differs from *Ornithorhynchus* in:—

1. The absence of any rudiments of true teeth in the young of 12 cm. in length and onwards, and the early extreme specialization of the entire mouth-cavity.

2. The possession of a mammary pouch in the young female.

3. The less solid character of the nasal capsule, the much higher development of the ethmoid turbinals, and the absence of transverse connective-tissue septa in the anterior part of the nasal cavity.

4. The slightly smaller relative size of Jacobson's organ and of its turbinal, the organ also not extending anteriorly to the naso-palatine canal.

Since his communication already referred to, Dr. Symington [1] has shown that the Jacobson's organ of Marsupials conforms to the general type met with in the Eutheria, and thus differs markedly from that of the Prototheria. The former may very probably have arisen from the latter, but it has undergone various degrees of degeneration: a very slight step in this direction has possibly occurred in *Echidna*. Symington is probably correct in his opinion that Jacobson's organ reaches its highest development in the Monotremes—higher even than in Lizards and Snakes, in which it presents many points in common with that of the Prototheria.

It certainly seems probable that "*Ornithorhynchus* is far the most primitive type" [2] of the two Monotremes: the young *Echidna* resembles *Ornithorhynchus* much more than does the adult, and is very highly specialized as regards many characters besides those

[1] "On the Organ of Jacobson in the Kangaroo and Rock Wallaby (*Macropus giganteus* and *Petrogale penicillata*)," Journ. of Anat. and Physiol. vol. xxvi., n. s. vol. vi. 1892.

Quite recently Röse has described the Jacobson's organ in embryos of the Wombat and Opossum, and has shown that in the former its duct is situated on the floor of the organ as in *Ornithorhynchus*, and not at its anterior end; and also that a large mucous gland is connected with its posterior end (Anat. Anz. viii. Jahrgang, 15 Sept. 1893, p. 766).

[2] W. K. Parker, *loc. cit.* p. 36.

referred to here. But though *Ornithorhynchus* has probably remained closer to the Prototherian stock than *Echidna*, the presence of a horny bill in both forms as well as the characters to which attention has recently been drawn by Westling [1] and Howes [2] seem to indicate the close genetic relation of the two genera, in spite of their special adaptive characters.

Note (Jan. 8th, 1894).—Since this paper was sent in for publication, I have received from Prof. Wilson and Mr. Martin a copy of their recent paper, "Observations upon the Anatomy of the Muzzle of *Ornithorhynchus*" (Macleay Memorial Volume, part 6), in which it is stated that "the epidermis of the muzzle of *Platypus* is no more 'horny' than that of a dog's nose, from the texture of which indeed it does not greatly differ." There is no doubt, however, that in my specimens of the young of both genera the horny layer of the epidermis covering the muzzle is so thick as to justify one in speaking of a "horny" snout, even though this is of course more flexible than the beak of a Turtle or Bird: and in these specimens there can have been no possibility of a partial desiccation.

I should also mention that "the peculiar rod-like tactile organs in the integument and mucous membrane of the muzzle of *Ornithorhynchus*," previously described by Poulton, have been treated of by the same authors in part 7 of the 'Macleay Memorial Volume,' in which it is stated that no such organs are present on the anterior portion of the snout and palate of *Echidna*: this agrees with my own observations.

EXPLANATION OF THE PLATES.

Plate I.

Fig. 1. Ventral view of a young *Echidna aculeata*, 12·5 cm. in length along the dorsal curve (Stage I.).
2. Ventral view of an older (male) specimen, 21·5 cm. in length (Stage II.).
3. The snout in longitudinal section (Stage II.), the cut having been made to the left side of the septum nasi, so as to show the left nasal chamber. The greater part of the glandular ridge on the septum has been removed, the anterior part, enclosing Jacobson's organ, being left *in situ*.

Plate II.

Figs. 4–11 represent transverse sections through the snout of Stage I.
Fig. 4. Through the external nostril and caruncle.
5. Through the "ali-nasal turbinal," just in front of Jacobson's organ.
6. Through the naso-palatine and Jacobson's ducts.
7. Through about the middle of Jacobson's organ.
8. Through the posterior end of Jacobson's organ.
9. Rather farther back than fig. 8, showing the end of Jacobson's cartilage.
10. Through the septal gland and maxillo-turbinal.
11. Through the septal gland, maxillo-turbinal, and ethmo-turbinal.
12. Section through the integument and a sweat-gland of the lower jaw (Stage II.).

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[1] Bihang till K. Svenska Vet.-Akad. Handl. (Stockholm), Bd. xv. 1890.

[2] "On the Mammalian Pelvis, with special reference to the young of *Ornithorhynchus anatinus*," Journ. Anat. and Physiol. vol. xxvii. (1893).

PLATE III.

Figs. 13–15 represent transverse sections through the snout of Stage II.

Fig. 13. Through the external nostrils.

14. Through about the middle of Jacobson's organ.

15. Through the septal gland, maxillo-turbinal, and 1st ethmo-turbinal ("naso-turbinal").

16. Jacobson's organ from the section represented in fig. 14, more highly magnified.

17. Transverse section of the snout of a young *Ornithorhynchus* slightly larger than Stage II. of *Echidna*. The section passes through Jacobson's organ behind the naso-palatine duct, and is drawn for comparison with fig. 14.

List of Abbreviations.

aln. Ali-nasal cartilage.
aln.tb. Ali-nasal "turbinal."
c. Caruncle.
c.n. External nostril.
c.tb. Ethmoturbinals.
h. Horny layer of snout.
hr. Hairs.
h.t. Horny teeth.
Ja. Jacobson's organ.
Ja.c. Cartilage of Jacobson's organ.
Ja.d. Duct of Jacobson's organ.
Ja.gl. Gland-tubes of Jacobson's organ.
Ja.n. Nerves of Jacobson's organ.
Ja.tb. "Turbinal" of Jacobson's organ.
m. Mouth-cavity.
mn. Lower jaw.
m.tb. Maxillo-turbinal.
n.c. Nasal cavity.
n.d. Naso-lacrymal duct.
n.gl. Small glands of the nose.
np.c. Naso-palatine canal.
p.gl. Palatine (sweat) glands.
r. Ridge on septum nasi.
rs. Cartilaginous rostrum or floor of nasal chamber.
s.n. Septum nasi.
sp.gl. Septal gland.
sp.gl.d. Ducts of septal gland.
sp.gl.d'. Duct of septal gland which enters Jacobson's organ.
St.gl. Steno's gland.
sw.gl. Sweat-glands.
t. Tongue.
vo. Vomer.

2. On a Collection of Butterflies made in Manica, Tropical South-east Africa, by Mr. F. C. Selous, in the year 1892. By ROLAND TRIMEN, F.R.S., &c., Curator of the South-African Museum, Cape Town [1].

[Received November 13, 1893.]

(Plates IV.–VI.)

In communicating to the Zoological Society this account of what I believe to be the first collection of Butterflies made in the Manica Country, I am fortunate in being able to preface it by the following interesting sketch of that hitherto very little-known

[1] Mr. A. G. Butler, who, in Mr. Trimen's absence, has kindly corrected the proofs of this paper, sends the subjoined remarks:—

"I think it would be well to call your attention to the fact that Mr. Trimen has unwittingly redescribed some of the species recorded in my paper on Mr. Johnston's collections from Nyasaland (P. Z. S. 1893, p. 643) not yet published. For example, the *Charaxes* (p. 45) which he calls *C. selousi* is palpably only a slight variety of my *C. whytei* (*op. cit.* p. 649); *Lycæna exclusa* (p. 47) is evidently the male of my *Castalius hypoleucus* (*op. cit.* p. 660) [N.B. Trimen does not adopt the modern genera proposed for the *Lycæninæ*]; *Cyclopides*

tract from the pen of my friend Mr. Selous. It will probably be new to many who are well acquainted with his name as an explorer, a hunter, and a pioneer, to learn that Mr. Selous has not by any means restricted himself to large game, but has for many years kept an eye upon such "small deer" as the entomologist loves. From time to time I have had the pleasure of recording many specimens of his collecting, but the highlands of the South-African Interior generally are poor in Lepidoptera; and it was not until the beginning of last year that Mr. Selous found himself at the best season in an exceptionally rich field, and with characteristic energy set to work to make the most of the opportunity. To construct in the brief space of three months from 60 to 70 miles of waggon-road in Tropical Africa, with raw Mashuna labour and very scant European superintendence, and in the height of summer, is a task well calculated to tax to their utmost the powers of any man, however inured to such exertions; and it is amazing how Mr. Selous found both time and strength enough to form such a fine entomological collection and to note locality and date for every specimen.

Mr. Selous writes as follows:—

"I reached Umtali from Salisbury at the end of January, 1892, at the height of the rainy season, having been sent down by the British South Africa Company to construct a road from Umtali to Chimoia's Kraal. This work occupied me for three months—the three best months of the year, as it happened, for collecting insects—and during that period I devoted every spare hour of every single day to the diligent collecting of Butterflies and Beetles [1].

"I commenced to collect immediately upon leaving Umtali township. Umtali lies at a height of about 3800 feet above the sea-level in an open grassy valley surrounded by hills. The river Umtali flows just below the township. Beyond this river the road lies through an open grassy country to the foot of Christmas Pass, and then at once commences to ascend to the top of the Pass through shady cuttings bordering swift-running little streams shaded by trees and ferns. The hill-sides are all covered with open forest. Although all the conditions seemed so favourable for

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mineni (p. 72) is in my opinion the *Ceratrichia stellata* of Mabille; and *Pamphila zimbazo* (p. 74) is *Pamphila ranoha* of Westwood (which is a species of *Osmodes*). In Plate IV. my *Periplysia johnstoni* is figured as *Physcæneura pione* of Godman (this identification is, I think, correct; the genus *Physcæneura* being new to me), but Mr. Godman's figure is somewhat heavily coloured, and thus I failed to remember it. Mr. Trimen and I have both figured the male, Godman the female. Mr. Trimen, on the same Plate, figures *Precis simia*, Wallengr., which appears to me to be the insect described by me some years ago as *Junonia micromera* (Ann. & Mag. Nat. Hist. ser. 4, xviii. p. 482), but this name is not quoted as a synonym, either in this paper or in Mr. Trimen's work on South African Butterflies."—Ed.

[1] My colleague, Mr. Louis Péringuey, has mounted and arranged the Coleoptera collected by Mr. Selous. He finds 166 species, represented by 510 examples, and provisionally recognizes 15 species as probably new to science.

Butterflies, I did not take any great number on the Umtali side of Christmas Pass, partly doubtless owing to the fact that during the greater part of the time I was working there the weather was very rainy; but as soon as I had crossed the Pass and got to the coast side of the range of hills to the south of Umtali, I at once found myself in an excellent collecting ground. As I had to make a long cutting down the side of the mountain and blast away a lot of hard rock, I was luckily enabled to remain in this happy hunting-ground for nearly a month. Scarcely a day passed that I did not catch something new to me. Just below Christmas Pass was an isolated granite hill, very thickly wooded on its lower sides, and in the hollow between this hill and the main range was a deep shady ravine, at the bottom of which ran a small stream. At the top of the ravine the country was covered with bush interspersed with large granite boulders, and beyond this again open prairie-land running up the hill-sides, on which flowers of many varieties were very plentiful. Thus in a small extent of ground I found a great diversity of conditions and many different species of Butterflies. The elevation of this portion of the country is about 3000 feet.

"After leaving Christmas Pass the road leads through open prairie-land for four or five miles to the head of the Mineni Valley. This open grass country is intersected by the Sikuva River and several of its tributaries. I did not take many Butterflies in this part of the country.

"The Mineni Valley runs between two high ranges of hills, and is for the most part well wooded with open forest, intermixed with large open glades entirely free from forest or bush. Several large tributaries flow into the Mineni from the surrounding ranges of mountains, and innumerable smaller streams. The banks of these streams, overhung as they were by large shady trees and ferns, I found to be very favourable places for collecting, and I caught a great many sorts of *Charaxes* and Skippers drinking at the fords which we cut across the streams for the waggon road. It was also in the Mineni Valley that I was lucky enough to find a tree from one of whose branches some sap was exuding, which proved a constant attraction to many species of *Charaxes*; and on this tree I caught a fine series of *C. bohemani*, one of the handsomest of a genus that are often very difficult to catch.

"After leaving the Mineni Valley one gets out of the hills and enters upon a level country covered almost entirely with forest, sometimes free from underwood but in places becoming thick jungle. This country is intersected by many rivers, such as the Revué (into which the Mineni flows), and the Lusika and Lopodzi. The general altitude of this part is about 2500 feet above sea-level. At the river Lusika I found another tree, a species of Acacia, which was much frequented by Butterflies of the genus *Charaxes*, and here I captured the only specimen of *C. azota* that I saw—a female in very fine condition.

"I do not think there is anything more to be said about the country, except that during the whole of the time I was working

between the Lusika River and Chimoia's the weather was dull and rainy and unfavourable for collecting. Had it been fine I might have seen and caught a few more specimens.

"P.S.—The Pungwe Valley, in which I caught a few Butterflies last September and October, is covered with forest and intersected by numerous streams. The altitude is here, however, below 1000 feet. Below Sarmento, and from there to the coast, there is a great deal of open country covered for the most part with excessively long grass."

The tract so well described by Mr. Selous is a belt of not more than about ten miles in width, running east and west between S. lat. 18° 50′ and 19°, and E. long. 32° 32′ and 33° 20′. From Chimoia's to Sarmento and the Pungwe River is a narrower continuation of the same belt to the eastward for another sixty miles, at first a little north but afterwards slightly south of the 19th parallel. From the existing maps the entire tract seems to be less than 200 miles south of the nearest reach of the Zambesi.

Including two forms of *Mycalesis* which I have not been able to determine with certainty, and two of *Terias* which I cannot satisfactorily place, Mr. Selous's collection contains representatives of 166 species, represented by over 1100 examples. This is a very good result of three months' collecting, but it must not by any means be regarded as completely representing the Butterfly fauna of the district, as there can be no doubt that many forms known to range both north and south of Manica, although not represented in Mr. Selous's collection, must occur in the intermediate tract. Fifteen such species, for instance, are recorded from the Zambesi Valley and from extra-tropical South Africa—ten of them ranging widely also in other parts of the continent—and these can hardly be absent from Manica. Moreover, a certain proportion of species are sure to be peculiar to the dry-season months, during which Mr. Selous had not the opportunity of collecting.

Of the 165 species in the collection 44 are of general distribution south of the Sahara; and of the remainder, 26 (of which 9 appear to be undescribed) seem peculiar to the South-Tropical area. As many as 51 inhabit both the South-Tropical and the South Extra-tropical areas, and 13 others are also found in both these areas, but hitherto, as regards the former area, have been recorded from Manica only. Twelve are dispersed through both these areas as well as in part of the West North-Tropical area, and eight through the two former and also the East North-Tropical area; while seven others inhabit both Tropical areas, but are unknown in the South Extra-tropical area. Three (*Deudorix cærulea*, *Durbania hildegardi*, and *Pterygospidea galenus*) seem elsewhere to be recorded from the West of both Tropical areas, and one (*Lycæna antinorii*) from Abyssinia only.

The collection is disappointing in one respect, viz., its deficiency in *mimicking* species. There is no example of any form of *Euralia* or *Pseudacræa*, and the only imitative Butterflies represented are the female *Diadema misippus* and two forms of the female *Papilio*

cenea. Among the rarer and more interesting species are:—*Physcæneura pione* and *Melanitis libya* (both hitherto represented by single specimens); *Pseudonympha vigilans*, previously unknown to extend into the tropical area; *Acræa asema* and *A. acrita*; *Planema johnstoni*, not hitherto known from south of Usambara; *Precis simia* (of which only the type and one other South-African example had before been recorded); *Precis artaxia*; *Charaxes lasti* (♀), *C. azota*, *C. pollux* (not apparently received before from any part on or near the East Coast), and *C. guderiana* (♀); *Lycæna antinorii* and *L. poggei*; *Teracolus celimene*; *Thymelicus capanas*; *Abantis zambesina*; and *Hesperia unicolor*.

The apparently undescribed species are the following, viz.:—

Nymphalidæ.
(Nymphalinæ.)
Charaxes manica, p. 43.
„ *selousi*, p. 45.

Lycænidæ.
Lycæna exclusa[1], p. 47.
Lycænesthes lunulata, p. 51.
Chrysorychia cruenta, p. 55.
Durbania puellaris, p. 59.

Hesperidæ.
Cyclopides mineni, p. 72.
Pamphila zimbazo, p. 74.
„ *chirala*, p. 76.

Mr. Selous personally brought down his collections towards the close of last year, and I thus had the advantage of obtaining and writing down his notes on the habits of each species as I unpacked the specimens.

Family Nymphalidæ.

Subfamily Danainæ.

Genus Danais, Latr.

1. Danais chrysippus (Linn.).

Three of the four specimens are of the ordinary typical form, but the fourth, taken at Sarmento on the Pungwe River, is of the var. *alcippus*, Cram., and has the white area in the hind wings almost as largely developed as in the West-African specimens.

Genus Amauris, Hübn.

2. Amauris echeria (Stoll).

The two specimens (male and female) were taken at Christmas Pass in February. They belong to the var. *albimaculata*, Butl.,

[1] In a footnote (p. 48) I have described as *Lycæna mashuna* a close ally of this species previously discovered by Mr. Selous in the adjacent district of Mashunaland.

characterized by having all the spots of the fore wings white and the underside paler and browner. These examples are small (*exp. al.* ♂ 2 in. 9 lin., ♀ 3 in.); and the male has the fore wings decidedly less elongated apically than usual, while the ochry-yellow band of the hind wings is in both sexes paler and rather narrower.

Judging from the brief description (Proc. Zool. Soc. 1888, p. 91), I should refer to this variety of *A. echeria* the *A. hanningtonii* of Butler, from Terta near Kilima-njaro. I also consider that *A. jacksoni*, E. M. Sharpe (*op. cit.* 1891, p. 633, pl. xlviii. fig. 2), from Sotik, Kavirondo, is inseparable from the same variety, only differing in the reproduction on the upperside of a good many more of the hind-marginal and submarginal spots of both wings always present on the underside.

3. Amauris ochlea (Boisd.).

Euplœa ochlea, Boisd. App. Voy. de Deleg. dans l'Afr. Aust. p. 589 (1847).

Six examples captured in the Pungwe River present no variation from the Natalian type-form.

4. Amauris dominicanus, Trim.

Amauris dominicanus, Trim. Trans. Ent. Soc. Lond. 1879, p. 323.

Three specimens from Pungwe River quite agree with extra-tropical examples. Mr. Selous noted a good many of this conspicuous species settling on bushes among large trees in a shady ravine.

Subfamily Satyrinæ.

Genus Ypthima, Westw.

5. Ypthima asterope, Klug.

A male (Christmas Pass) and a female (Mineni Valley) are above the usual size and paler; in these respects, in the distinctness of the common submarginal dark streak, and in the well-defined pale space round the outlines of the fore wings they approach those brought from Tropical S.W. Africa by Mr. Eriksson; but as regards the underside, the minute striolation of both wings and the ocelli of the hind wings are much better developed and approximate these two examples to the smaller specimens received from Natal and Zululand.

6. Ypthima itonia, Hewits.

Ypthima itonia, Hewits. Trans. Ent. Soc. Lond. 3rd ser. ii. p. 287, pl. 18. fig. 13 (1865).

There are four males of this distinct species—three from Christmas Pass and one from Mineni Valley. In the hind wings the minute subapical and inferior anal-angular ocelli are wanting on the upperside, and in two examples the first and third in the

series of seven ocelli are very minute and subobsolete on the underside. In addition to the median narrow brown fascia on the underside (described as "rufous" by Hewitson), there is a shorter parallel pre-median one, variable in distinctness but well marked in one example.

This species does not appear to have been met with so far to the South before now. It has a very wide range, the locality of the examples on which the species was founded being the White Nile; while Fernando Po, Gold Coast, and Angola are the habitats given in Kirby's 'Catalogue of the Hewitson Collection' (p. 125), and Mr. Butler (Proc. Zool. Soc. 1888, p. 59) records two examples as sent by Emin Pasha from two localities in the Equatorial Province of Central Africa. The South-African Museum possesses two specimens taken at Sierra Leone.

Genus Physcæneura, Wallengr.

7. Physcæneura pione, Godm. (Plate IV. fig. 1, ♂.)

Physcæneura pione, Godm. Proc. Zool. Soc. 1880, p. 183, pl. xix. figs. 2, 3 [♀].

This ally of *P. panda* (Boisd.), which in the creamy-white of the upperside exhibits some approach to *P. leda* (Gerst.), from Mombasa, was described from a single female example, recorded as taken by Mr. J. T. Last in the Gnuru Hills, opposite Zanzibar.

A good series is in the collection from Manica under notice, a few having been taken in Christmas Pass but many more in the Mineni Valley. I give the following description of the male:—

♂. *Exp. al.* 1 in. 4–6 lin.

Creamy-white, with fuscous borders. Fore wing: fuscous border rather narrow from base as far as extremity of discoidal cell, but broad apically and thence gradually narrowing to posterior angle; inner margin with a broad fuscous border from base, bounded superiorly by median nervure and its 1st nervule, and narrowing abruptly just before posterior angle, where it joins hind-marginal border; along inner edge of hind-marginal border, between 1st and 3rd median nervules, two more or less distinct black spots; basal swelling of costal nervure ochre-yellow, traces of the striolation of the underside visible, chiefly in basal half; two submarginal black streaks, parallel and close together, just perceptible in fuscous border. *Hind wing*: costa narrowly and faintly clouded with fuscous; apex and hind margin with a rather broad fuscous border, irregular along its inner edge, where it is more or less distinctly marked by a series of black spots; submarginal streaks as in fore wing, except that they are bordered, very unequally and interruptedly, towards anal angle by two white streaks; striolation of underside very apparent along inner-marginal area. Cilia whitish. Underside.—Creamy, slightly yellower than upperside; each wing along costal and inner-marginal borders transversely marked with black striolæ of variable length and thickness (here and there confluent), and with a submarginal series of ochre-yellow ocelli

centred with pale metallic golden ; besides two parallel submarginal black streaks, an inner less regular catenulated one outwardly bounding the series of ocelli. *Fore wing*: basal swelling of costal nervure ochre-yellow; a few striolations usually completely across basal third, but otherwise the creamy middle area is clear from base to ocelli; the latter form a nearly straight series of five, of which the last (between 2nd and 3rd median nervules) is usually a little apart from and smaller than the rest, with the exception of the first. *Hind wing*: striolation well developed in inner-marginal area, but very rarely extending at any point into discoidal cell; ocelli seven, of which the first is separate from and considerably before the rest (being between subcostal nervules), while the others are contiguous (the 6th and 7th confluent).

The male is smaller than the female (*exp. al.* 1 in. 4½–7 lin.), and has the fuscous borders much darker on the upperside, where also the ochre-yellow ocelli (always more or less well-marked in the female) are represented only by two or three indistinct black spots. On the underside the male differs constantly in the restriction of the black striolation to the costal and inner-marginal borders, whereas in the female this covers all the area in both wings except a small discal space immediately before the ocelli.

P. pione resembles *P. leda* in its whitish fuscous-bordered upperside, but in its striolation and position of the ocelli on the underside, as well as in its stouter structure throughout, is more nearly related to *P. panda*. The fuscous bar along the inner margin of the fore wings on the upperside is a very striking feature in *pione*, and gives the species a curious superficial likeness to some of the smaller female *Teracoli* and *Terias* in the distant group of *Pierinæ*.

This very interesting *Physcæneura* was found during the greater part of March, flying very slowly in open forest and settling on grass. In Natal I found its close ally, *P. panda*, quite away from forests, frequenting steep exposed hill-sides and often settling on the bare ground.

Genus Pseudonympha, Wallengr.

8. Pseudonympha vigilans, Trim.

Pseudonympha vigilans, Trim. S.-Afr. Butt. i. p. 84. n. 15 (1887).

The single good example (a female) of this Butterfly was captured in the Christmas Pass on the 11th February, a locality about 400 miles northward of the most northern of the previously recorded stations of this generally distributed South-African species, viz. the Lydenburg district of Transvaal. Mr. Selous's specimen comes nearest to the Natalian and Transvaalian examples, but is characterized on the upperside by the unusual restriction of the fulvous patch in the fore wing (which, though it extends rather nearer to the hind margin beneath the ocellus, does not impinge on the discoidal cell), and by the well-developed small ocellus near the anal angle of the hind wing; while on the underside the hoary-grey and brown mottlings are more sharply contrasted, and both

ocelli of the hind wings, though small, are distinctly marked. A second much-worn female, taken in the same locality on 22nd February, appears to resemble the first very closely.

Genus Mycalesis, Hübn.

9. Mycalesis safitza, Hewits.

Mycalesis safitza, Hewits. Gen. Diurn. Lep. p. 394. n. 10, pl. 66. fig. 3 (1851).

All the examples (two from Christmas Pass and twelve from Mineni Valley) have the underside ocelli strongly or very strongly developed, a feature which, as I have pointed out (S.-Afr. Butt. iii. p. 395), is characteristic of the summer or wet-season form of this *Mycalesis*. The specimens in all respects agree with the tropical type-form more closely than with extra-tropical examples, one character being the feeble expression of the ocelli on the upperside of the fore wings, which in two of the males are obsolete, and a second the more strongly-marked common pale median streak on the underside.

Genus Melanitis, Fabr.

10. Melanitis leda (Linn.).

Papilio leda, Linn. Syst. Nat. i. 2, p. 773. n. 151 (1767).

Of nine specimens (six males and two females from Mineni Valley and one male from Christmas Pass) taken from 27th February to 26th March, all but one—a female from the former locality captured on 12th March—are of the typical smaller and darker form, with largely-developed underside ocelli, which is characteristic of the summer or wet season. All the dated material obtained on the Natal Coast by Mr. A. D. Millar and myself and at Delagoa Bay by the Rev. H. Junod confirms Mr. L. de Nicéville's discovery at Calcutta, that in this widely-distributed and highly variable species there are two well-marked seasonal forms, viz. 1, a summer or wet-season race, superiorly duller but inferiorly with well-developed and conspicuous ocelli, and possessing non-angulated or but slightly angulated fore wings; and 2, a winter or dry-season race, superiorly brighter, more or less rufous, but inferiorly with very imperfect, reduced, and obsolescent ocelii, and possessing well-angulated fore wings. As in the case of Mr. Selous's example just referred to, occasional specimens of the dry-season form are met with in the wet season, and *vice versâ*; but these are so very few that they can only be regarded as accidentally late survivors of the preceding, or early precursors of the succeeding generation.

11. Melanitis libya, Dist. (Plate IV. fig. 2, ♂.)

Melanitis libya, Dist. Ann. & Mag. Nat. Hist. 5th ser. x. p. 405 (1882).

There are only two examples of this striking form, both males—one captured in Mineni Valley on 12th March, the other on the

Pungwe River on 1st September. In outline they resemble the dry-season race of *M. leda*, but have even a sharper angulation of the fore wings. The upperside inclines to a more chocolate tint of brown than that shown by *M. leda*, but its notable distinction lies in the great development and oblique position of the two subapical white spots, which have pale bluish edges and are surrounded by a rather vaguely defined deep fuscous space. Throughout all the variations of *M. leda* the corresponding white spots are small and constitute the pupils of a more or less developed compound ocellus, and the lower one is directly beneath (or even slightly *before*) the upper one, instead of almost wholly beyond it. On the underside of *libya* there is evidently (as in that of *leda*) great variation, Mr. Selous's two specimens differing widely from each other as well as from Mr. Distant's description of the type, both, however (but especially the Pungwe River example), having a yellower general tint than I have found in *M. leda*. At the same time the markings in all respects, down to the minute incomplete and partly obsolescent submarginal ocelli, are in unquestionable accordance with those of *M. leda* (dry-season brood); and the striking divergence of the upperside of the fore wings came as a surprise when expanding Mr. Selous's specimens. The captor informed me that both were taken in the shade, among the roots of trees, in the bottom of ravines.

Mr. Distant informs me that he has not seen any other specimens of *M. libya* except the type, which he recorded as inhabiting "Masasi, East Africa." I find that Masasi is placed on the maps to the north of the Rovuma River, apparently about 150 miles inland from Cape Delgado and some 600 miles north of Manica.

12. Melanitis diversa (Butl.).

Gnophodes diversa, Butl. Ann. & Mag. Nat. Hist. 5th ser. v. p. 333 (1880).

Melanitis diversa, Trim. S.-Afr. Butt. i. p. 116. n. 30 (1887).

Three examples from the valley of the Pungwe River, taken on 1st September, do not differ from typical Natalian specimens except in their smaller size, one being quite dwarfed.

Subfamily Acræinæ.

Genus Acræa, Fabr.

13. Acræa obeira, Hewits.

Acræa obeira, Hewits. Proc. Zool. Soc. Lond. 1863, p. 65; Trim. Trans. Ent. Soc. Lond. 1891, p. 172 [♀].

A single female, taken at Christmas Pass on 22nd February, differs from the Natalian and Zululand females described by me (*l. c.*) in having the hind wings and basal half of fore wings pale dull ochry-yellow instead of very dull brick-red. The females of this (the *horta*) group of *Acræa* are inclined to vary in this direction, the females of *A. horta*, Boisd., and *A. hova*, Boisd., sometimes presenting

the same tint, and those of *A. boscæ*, Saalm., and *A. igola*, Trim., apparently being always of that colour. Mr. Selous's example has the last spot of the discal series in the hind wings much reduced in size, as well as the basal and subbasal spots, in comparison with the more southern specimens referred to; the former of these distinctions approximating it more to the figures given by Grandidier of Madagascar examples. Mr. Selous notes that this was the only individual of this species met with; it was flying slowly on an open hill-side.

14. Acræa nohara, Boisd.

Acræa nohara, Boisd. App. Voy. de Deleg. dans l'Afr. Aust. p. 590. n. 54 (1847).

A male and female of the usual size from the Mineni Valley, and three small males from near the Vunduzi River, all differ from the Natalian type-form in the marked reduction of all the black markings; in the fore wings the subbasal spot below the median nervure is present only in two males, while that beyond middle below first median nervule is absent in all the specimens; and in the hind wings the third and fifth spots of discal series are wanting. There is also less black on the apical half of the back of the abdomen in both sexes.

15. Acræa asema, Hewits. (Plate IV. figs. 3, 3 *a*, ♂ ♀.)

Acræa asema, Hewits. Ent. M. Mag. xiv. p. 52 (1877); *nec* Trim. Proc. Zool. Soc. 1891, p. 68, pl. viii. figs. 9, 10.

Mr. Selous's series of both sexes of this Butterfly—3 from Christmas Pass, 1 from Sikuva River, 15 from the Mineni Valley, and 2 from the Vunduzi River—has made it clear that I was mistaken in identifying with *A. asema*, Hewits. (founded on examples from Lake Nyassa), the *Acræa* from tropical South-west Africa described fully by me *loc. cit.* In order to obtain an independent opinion as to the true *A. asema*, I sent one of Mr. Selous's specimens to my friend Mr. A. G. Butler, for comparison with the type specimens in the Hewitson Collection, and he reports it as undoubtedly belonging to the species in question. Mr. Hewitson's brief description of *A. asema* applies equally well to both the forms concerned, but as it is now settled which was actually the subject of it, and as the S.W. African form must in my opinion be pronounced a distinct species, I propose for the latter the name of *Acræa omrora* [1]. I think it well to give a fresh description of both sexes of *A. asema* from the full material supplied by Mr. Selous.

[1] For a detailed description of both sexes, the reader is referred to Proc. Zool. Soc. 1891, pp. 68–70. It will be sufficient to note here that *A. omrora* differs from *A. asema* in the following particulars, viz.:—1, more opaque wings; 2, on both surfaces a much brighter yellower ground-colour; 3, a greatly reduced condition of the black spots, which in some examples are little more than dots, and of which in most examples (especially in the hind wings) there is a varying number quite obsolete; 4, on the upperside, a narrower, more sharply defined black hind-marginal and apical edging in the fore wings, but a broader, blacker, unspotted, or indistinctly spotted, border in

Exp. al. (♂) 1 in. 8–11 lin.; (♀) 1 in. 9 lin. to 2 in.

♂. *Pale dull ochre-yellowish with a brownish tinge, semi-transparent, with numerous small black spots. Fore wing*: a very fine linear fuscous edging along costa and a slightly wider one along hind margin, the apex between 2nd subcostal and 1st median nervules being rather widely tipped with fuscous; across discoidal cell, towards extremity, an elongate spot, sometimes surmounted by a very small rounded costal spot; a small upper terminal discocellular spot; below median nervure, before middle, a rather elongate spot; an exceedingly irregular discal series of 8 spots,—of which the upper four are contiguous, forming a curved costal bar reaching the 3rd median nervule,—the fifth separate, beyond the fourth, between 3rd and 2nd median nervules, the sixth far before fifth, between median nervure and its first nervule, the seventh rather beyond the sixth, below 1st median nervule, and the eighth (very small, minute, or sometimes wanting) before the seventh, on inner-marginal edge; a submarginal series of five small rounded spots, between upper radial nervule and submedian nervure, of which the upper three form a line at an angle with the lower two, which are equidistant from hind margin (in one example there is an additional superior spot, above upper radial nervule); base usually with some limited fuscous scaling, chiefly near inner margin. *Hind wing*: fuscous hind-marginal border variable in width, regularly indented on nervules along its inner edge, and enclosing seven more or less distinct spots of the ground-colour; near base, a rounded spot in discoidal cell (sometimes obscured by some fuscous basal suffusion), followed by a curved subbasal series of five spots, of which the second is in discoidal cell, and the fourth and fifth (both smaller than the others) on inner margin; an exceedingly irregular discal series of 8 spots, of which the first, fourth, and sixth are before the rest and the third small or minute (in one specimen wanting). UNDERSIDE.—*Very much paler than upperside, glossy, the hind wing of a dull pale-creamy tint, in parts sometimes tinged with pale red; markings as on upperside, but those of hind wing more sharply defined. Fore wing*: markings somewhat fainter, especially apical fuscous, which is traversed and in some specimens almost replaced by three pale-creamy marks. *Hind wing*: two additional small spots close to base, one on costa, the other at origin of costal nervure; a pinkish-red inner-marginal suffusion, very variable in depth of tint and in extent, sometimes tinging basal half of discoidal cell but rarely rising above cell; in most examples a slight reddish tinge over the ground-colour before

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the hind wings; 5, in the male a well-defined blackish cloud at the base of both wings on the upperside; and 6, in both sexes, no trace of reddish colouring at base or along inner margin of the hind wings. The abdomen in both sexes is, apart from the dorsal black on basal third, white tinged with canary-yellow, instead of pale ochreous-yellow with prolonged dorsal black (in the female reaching to the tip, and containing two rows of pale-yellowish spots), as in *asema*; and the inferior subterminal corneous appendage in the female has a broader, less deeply forked recurved process.

the hind-marginal border; spots in the latter much larger than on upperside, pale-creamy, the fuscous reduced to a narrow very sharply defined edging to the spots [1].

♀. *Duller, varying from a somewhat browner tint than that of the male to a decidedly dusky pale brownish grey*—the fore wing usually duller than the hind wing (which retains more of the ochry-yellow tinge), and in the darker specimens exhibiting a more or less ill-defined whitish subapical cloud; spots usually larger; basal areas usually duskier than rest of wing, but rarely with the limited fuscous scaling common in male. *Hind wing*: hind-marginal border broader and blacker, its enclosed spots sometimes much paler, almost whitish. UNDERSIDE.—Much paler than upperside, but varying in correspondence with its brighter or duskier tint.

This dull-tinted *Acræa* has much of the aspect of *A. doubledayi*, Guér., the spots being very similar in size and disposition, but differs in its much shorter abdomen, shorter and much less apically-produced fore wings, the possession of three upper submarginal spots instead of linear internervular streaks in the fore wings, the better definition of the hind-marginal fuscous border (and of its enclosed spots) in the hind wings, and, in the female, in having merely an indication of white subapical clouding in the fore wings in place of a conspicuous broad white bar. The colouring and marking of the abdomen agree with those exhibited by each sex respectively of *A. doubledayi*, yet a female received from Rihatla, Delagoa Bay (Rev. H. Junod), approaches *A. omrora* in having the back and sides of the terminal half all white.

It is worth notice, as showing the intimate interrelation of the species of this genus, that every marking in *A. asema* corresponds closely in form and position with those of the totally different-looking, very strongly-marked, and richly-coloured *A. violarum*, Boisd.; and, curiously enough, a precisely similar aberration occurs in the male of both species, viz. all the spots in the submarginal series of the fore wings being crescentic instead of rounded.

16. ACRÆA DOUBLEDAYI, Guér.

Acræa doubledayi, Guér. Voy. Lefebv. en Abyss. vi. p. 378 (1847); Trim. S.-Afr. Butt. i. p. 147. n. 41 (1887).

Of this widely distributed species in Eastern and South-eastern Africa there are 23 examples, 18 being from the Mineni Valley.

17. ACRÆA AXINA, Westw.

Acræa axina, Westw. App. Oates's Matabele-land etc. p. 344. n. 33, pl. F. figs. 5, 6 (1881).

The 10 examples of this small *Acræa*, so closely allied to *A.*

[1] Two small males (*exp. al.* 1 in. 9 lin.), taken by Mr. Selous on the Shashani River, Matabeleland, in 1883, differ from the Manica specimens in having narrower, more elongated fore wings; a much clearer and brighter ochreous ground-colour; a large terminal discocellular spot in fore wings, but all the other black markings smaller, and two (the 4th and 6th) of the spots of the submarginal series in the fore wings wanting.

doubledayi, are from five different localities, four specimens being from near the Vunduzi River. The males are rather worn, but agree with other Eastern individuals in their semi-transparency and freedom from basal fuscous clouding; the three females are all dusky brownish above, but differ much as regards the subapical whitish bar in the fore wings, which in one case is unusually broad.

18. Acræa caldarena, Hewits.

Acræa caldarena, Hewits. Ent. M. Mag. xiv. p. 52 (1877); Trim. S.-Afr. Butt. i. p. 149. n. 42 (1887).

The collection contains 19 specimens of this well-marked form, 12 from Christmas Pass and 7 from the Mineni Valley. The species was first described from examples taken on Lake Nyassa; it ranges westward to Damaraland and southward to the northern Transvaal. One of the females taken in the Mineni Valley is remarkable for the different ground-colour on the upperside, which is a dingy creamy-yellow without any tinge of the ordinary warm ochreous-fulvous; the fore wings are paler, while the fuscous basal suffusion is extended over two-thirds of the hind wings.

19. Acræa aglaonice, Westw.

Acræa aglaonice, Westw. App. Oates's Matabele-land etc. p. 346. n. 35, pl. F. figs. 9, 10 (1881); Trim. S.-Afr. Butt. i. p. 151. n. 43, pl. iii. fig. 3 (1877).

The four males and two females, from the Mineni Valley (three males and a female), Lopodzi River (male), and Lower Pungwe River (female), constitute rather a striking *variety* in the direction of *A. natalica*, Boisd. In this form the male has much more fuscous basal clouding and wider apical fuscous in the fore wings, where also the peculiar subapical transparent spots are obsolete or entirely wanting; while in the hind wings the fuscous hind-marginal border is very much broader and partly radiant on the nervules along its inner edge. The Mineni Valley female nearly resembles that from Delagoa Bay described by me (*op. cit.*), but has the transparent spots of the fore wings obsolescent; while the Pungwe River female, though having this marking well expressed, is very much duller in ground-colour, and also presents the peculiarity to which so many female *Acræa* are liable, viz., a conspicuous white cloud on the middle disk of the hind wings. I have an exactly similar female to this, which was taken in Zululand (Etshowe) by Capt. A. M. Goodrich in 1887.

As regards the male, the South-African Museum possesses one agreeing with Mr. Selous's examples which was taken in the Lydenburg district of the Transvaal by Mr. T. Ayres, and I have examined two others, one taken at Etshowe by Mr. C. N. Barker, and the other at Extcourt, Natal, by Mr. C. W. Morrison.

The three males recorded by me (*op. cit.* p. 152) as taken by Mr. Selous on the Marico and Upper Limpopo are intermediate

between typical *A. aglaonice* and the variety now under notice, having the transparent spots and basal fuscous moderately developed in the fore wings; but the two females differ from the Mineni Valley female only in the much clearer transparent spots.

20. Acræa natalica, Boisd.

Acræa natalica, Boisd. App. Voy. Deleg. dans l'Afr. Aust. p. 590. n. 57 (1847).

This species is numerous over a wide stretch of Eastern and South-eastern Africa. Mr. Selous's collection contains 36 specimens, 29 of which were captured in Christmas Pass.

21. Acræa anemosa, Hewits.

Acræa anemosa, Hewits. Exot. Butt. iii. pl. 8. figs. 14, 15 (1865).

The only examples are an unusually small male, captured at the Sikuva River on 4th March, and an ordinary female taken in Christmas Pass on the 16th February.

In 'South-African Butterflies' (i. p. 158) I have described an "*Aberration*—? ♀," from Damaraland, in the Hewitson Collection, in which on the upperside there is white clouding about the extremities of the nervules in the fore wings, and a large white cloud in the hind wings replacing nearly all the reddish ochre-yellow of the central band. Mr. Selous in 1889 sent me a male presenting the same peculiarities, and also the distinction of the fore wings being salmon-pink without any tinge of the usual yellow-ochreous; this very striking example was captured a little south of the junction of the Chobe and Zambesi.

22. Acræa acrita, Hewits. (Plate IV. fig. 4, var., ♂.)

Acræa acrita, Hewits. Exot. Butt. iii. pl. 8. fig. 18 (1865); Trimen, op. cit. iii. App. i. p. 381. n. 381 (1889).

There are 19 examples of this fine *Acræa* from Christmas Pass, 1 from Sikuva River, 3 from Mineni Valley, 1 from Vunduzi River, and 2 (of a larger variety) from Revué River. With the exception of the two last-named, all may be regarded as belonging to the typical form; the males expand from 2 in. 2 lin. to 2 in. $5\frac{1}{2}$ lin., the females the same. Both sexes show a good deal of variation as regards the width of the apical fuscous border in the fore wings, and in the numbers (7 or 8) and relative sizes of the rounded discal spots in the hind wings; the subbasal black spot in the fore wings is much reduced in several males and females, and is wholly wanting in two of the latter. The males also exhibit on the upperside much instability in respect of the width of the hind-marginal border of the hind wings and the distinctness of its enclosed spots, the border being usually more or less extended internally in a different manner between the third median nervule and the anal angle, and the enclosed spots giving every grade from perfect development to (in one example) complete

obsolescence. This last-mentioned male has some other black markings of the upperside considerably enlarged, and the middle spot of the oblique median row of three in the fore wings is out of line, being nearer to base than usual. Variation in the female lies chiefly in ground-colour, which in most examples is much obscured with brownish-fuscous clouding from the bases to beyond middle, but which exhibits much gradation, especially as regards the red of the hind wings, which in one specimen is almost as bright as in the male. The hind-marginal border on the upperside is more or less diffused internally, and its enclosed spots quite obsolescent in all the females.

The two specimens (male and female) from the Revué River are a good deal larger (exp. 2 in. 8 lin.), with more elongated fore wings; their colouring is brighter and clearer, and all the black markings, except the few spots on the fore wings, are reduced, especially the spots and hind-marginal border of the hind wings, which latter has no diffusion internally and all the ground-colour spots it encloses quite distinct. On the underside of the hind wings the dull lake-red colouring is much reduced, forming internervular rays; and on the back of the thorax and abdomen the paired creamy and whitish spots are much larger and more conspicuous.

Mr. Selous was disposed to think that these larger brighter individuals just mentioned belonged to a species distinct from *A. acrita*, especially as they were found flying in forest tracts among lofty trees, whereas the numerous examples of typical *acrita* frequented open grassy hill-sides. But after very careful examination it seems to me more probable that they represent a seasonal (winter) form, having been captured in June, whereas all the ordinary specimens of *A. acrita* were captured between February 12th and March 18th. The male taken by Mr. Selous in Mashunaland in 1883 (exact date not recorded), mentioned by me *loc. cit.*, belongs to this form, but is a little smaller.

23. Acræa acara, Hewits.

Acræa acara, Hewits. Exot. Butt. iii. pl. 8. figs. 19, 20 (1865).

Six specimens of this species, from Christmas Pass, exhibit no difference in either sex from typical Natalian examples [1].

24. Acræa encedon (Linn.).

Papilio encedon, Linn. Mus. Lud. Ulr. Reg. p. 244. n. 63 (1764).

There are only two examples of this widely-spread Ethiopian

[1] I described (P. Z. S. 1891, p. 72) a single female taken in Ehanda, near the Upper Cunenè River, presenting the aberration of a wide suffusion and coalescence of the black markings of the fore wings. This was the only example of *A. acara* in Mr. Eriksson's first collection from S.W. Tropical Africa; but in a second collection, made in the same region between the 15th November, 1890, and the 1st March, 1891, out of a series of eight males and three females captured in three localities between the Cunenè and the Ondonga Road, five

species, both of the typical brownish-rufous form. They were taken on the Pungwe River.

25. Acræa rahira, Boisd.

Acræa rahira, Boisd. Faune Ent. de Madag. etc. p. 33, pl. 5. figs. 4, 5 (1833).

A male from Umtali and another from the Vunduzi, both of the typical South-African form, but with the black spots considerably reduced in the latter specimen.

26. Acræa buxtoni, Butl.

Acræa buxtoni, Butl. Ann. & Mag. Nat. Hist. ser. 4, xvi. p. 395 (1875).

Twenty-seven examples taken in Christmas Pass, and six others from different localities, agree with Natalian specimens, the females varying in the same manner. One male, however, from Christmas Pass, exhibits a peculiarity on the underside of the hind wings, where in the discal series the 2nd, 3rd, and 4th spots, and also the 5th and 6th spots, are united, so that each group forms a narrow streak.

27. Acræa cabira, Hopff.

Acræa cabira, Hopff. Monatsb. Preuss. Akad. Wissensch. 1855, p. 640. n. 7.

Twelve specimens from Christmas Pass do not differ from those found farther southward.

Genus Planema, Doubl.

28. Planema johnstoni (Godm.).

♂. *Acræa johnstoni*, Godm. Proc. Zool. Soc. 1885, p. 537.

♀. *Acræa* (*Planema*) *johnstoni*, Butl. op. cit. 1888, p. 91.

This species was founded on a single male collected by Mr. H. H. Johnston on Kilima-njaro at an elevation of 5500 ft. The female was noted by Mr. Butler (*loc. cit.*) from two examples, one of them taken in the same locality as the female, the other in the hills of Terta. So very dissimilar are the sexes (the male having the fore wings ochre-red from base up to and including the two obliquely disposed pairs of discal spots, and the female having the

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males and all the females exhibit the same strong melanic marking, and even the remaining three males show a slight tendency in the same direction.

Although *A. acara*, as noted in my S.-African Butt. i. p. 160, varies much in the development of the black markings, I have not seen any other examples that approach the very heavily black-clouded condition of Mr. Eriksson's specimens.

It should be noted that this variation is not at all in the direction of the allied *A. zetes* (L.), which is recorded from Angola and as far north on the West Coast as Sierra Leone, as in that species it is the entire ground of the fore wings that is suffused with greyish fuscous, the black markings themselves not being enlarged or confluent.

entire fore wings black with the discal spots conspicuously white), that, having only the descriptions to refer to, I was inclined to think that the female received by Mr. Butler had been erroneously associated with Mr. Godman's female. But on consulting Mr. Butler, he most kindly sent me figures and notes which leave no doubt of the specific identity of these widely differing sexes.

There are only two examples of this curious *Planema* in Mr. Selous's collection, one captured at Umtali, and the other (on February 24th) in Christmas Pass. The former is so much smaller, and has the hind margin of the fore wings so much more hollowed, than the latter, that I took it for a male although entirely of the female coloration; but closer examination has shown it to be a female. Mr. Butler, however, informs me that during 1892 he had seen both males and females in a collection from Kilima-njaro, and that one or two of the males were less unlike the female than the rest, the ochre-red covering the basal half only of the fore wings [1].

The resemblance borne by the female to *Amauris echeria* (var. *albimaculata*, Butl.) is very strong, but I hesitate to adopt Mr. Butler's conclusion that the former is evidently modified in imitation of the *Amauris*, because, firstly, both *Amauris* and *Planema* are equally protected genera and extensively mimicked by Butterflies of other groups, and, secondly, *P. johnstoni* female does not either in pattern or colouring diverge much from its congeners, coming near *P. lycoa*, Fabr.

Mr. Selous notes that he saw only a few of this Butterfly; they flew on the border of a stream and settled very frequently.

Subfamily Nymphalinæ.

Genus Atella, E. Doubl.

29. Atella phalantha (Dru.).

Papilio phalantha, Dru. Ill. Nat. Hist. i. pl. 21. figs. 1, 2 (1770).

Of this most widely ranging species there are five specimens from Christmas Pass and one from the Mineni Valley.

[1] *Acræa proteina*, C. Oberth. (Études d'Ent. xvii. p. 25, pl. i. fig. 4; pl. ii. figs. 14, 19, 21; pl. iii. fig. 29), is apparently synonymous with *P. johnstoni*, the specimens recorded and figured being from Urogaro and Usambara in East Africa. Mr. Selous's two examples agree pretty nearly with M. Oberthür's fig. 14 on pl. ii., but one of them is considerably larger and with the median space in the hind wings of a much deeper tint of yellow. The species appears to be highly variable, M. Oberthür figuring (pl. i. fig. 4) a small male agreeing with the ordinary female except that the spots of the fore wings are pale yellow instead of white; (pl. iii. fig. 29) a female in which the hind wings on both surfaces, and the hind-marginal area of the fore wings on the underside, are deeply tinged with reddish-ochreous; and (pl. ii. figs. 19 and 21) a male of the typical (*johnstoni*) colouring, and a female in which the reddish-ochreous is strongly prevalent discally on both surfaces of both fore and hind wings. It will probably be found that in this species of *Planema*, as in *P. esebria* (see S.-Afr. Butt. i. pp. 177–78), the varieties are resolvable into two or three in which the sexes more or less agree in coloration.

Genus Pyrameis, E. Doubl.

30. Pyrameis cardui (Linn.).

Two examples from Christmas Pass.

Genus Junonia, E. Doubl.

31. Junonia cebrene, Trim.

Junonia cebrene, Trim. Trans. Ent. Soc. Lond. 1870, p. 353.

One specimen from Umtali, one from Christmas Pass, and two from Mineni Valley.

32. Junonia clelia (Cram.).

Papilio clelia, Cram. Pap. Exot. i. t. xxi. figs. E, F (1775).

Two specimens from the Mineni Valley.

33. Junonia boöpis, Trim.

Junonia boöpis, Trim. Trans. Ent. Soc. Lond. 1879, p. 331.

The four examples (one from Umtali, one from Sikuva River, and two from Mineni Valley) agree with the typical Transvaal specimens.

Genus Precis, E. Doubl.

34. Precis cloantha (Cram.)[1].

Papilio cloantha, Cram. Pap. Exot. iii. t. cccxxxviii. figs. A, B (1782).

Eighteen examples (seventeen from the Mineni Valley) are highly variable in the tint of the underside, five being of an unusually dark brown.

35. Precis ceryne (Boisd.).

Salamis ceryne, Boisd. App. Voy. de Deleg. p. 592. n. 68 (1847).

Twelve specimens from the Mineni Valley and one from Lusika River are in all respects like typical examples from Natal.

[1] In my notes on this species (S.-Afr. Butt. i. pp. 220 and 223) I pointed out the exceptionally robust structure, gradually clavate antennæ, and thick hairy wings of this Butterfly, in comparison with the other species of *Precis*. Mr. Cecil N. Barker has recently reared *P. cloantha* from a larva found at Malvern, Natal; and, from the drawings and description he has kindly sent me, it is apparent that the larva presents the peculiarity of having the two rather long cephalic horns clubbed at the tip, while the pupa is much thickened about the middle and is singularly smooth, wanting all the prominent pointed tubercles so conspicuous dorsally and laterally in the pupæ of *P. octavia* and *P. sesamus*. The larva is described as golden yellow, each segment having a median transverse purplish-black bar interrupted both subdorsally and on the spiracular line; the bristled spines spring from these bars; head dull orange, with an inverted V of purplish black frontally; legs dark plum-colour with a black ring about middle. The pupa is figured as greenish yellow, with a few dull-purplish spots on underside of head, sides of thorax, and bases and hind margins of wing-covers; abdomen with seven rows (longitudinal) of dull-purplish dots. The larva was found on October 23rd, 1892; it began pupation on the 27th; and a male imago emerged on November 11th. The food-plant is not specified by name, but was a "bush herb with lilac-blue flowers."

36. Precis tukuoa (Wallengr.).

Salamis tukuoa, Wallengr. K. Sv. Vet.-Ak. Handl. 1857—Lep. Rhop. Caffr. p. 25. n. 6.

Three specimens from the Mineni Valley do not differ from more southern examples.

37. Precis cuama (Hewits.).

Junonia cuama, Hewits. Exot. Butt. iii. p. 25, pl. 13. figs. 4, 5 (1864).

Precis cuama, Trim. Proc. Zool. Soc. 1891, p. 74. n. 20.

Six examples from the Mineni Valley and two from Vunduzi River. Most of the specimens agree with those from Ehanda and the Okavango River noted by me (*loc. cit.*) as much yellower than the figure of the type, and as wanting (on both surfaces) the conspicuous white centre of the second and third fuscous spots in the discal row of the fore wings, and (on the upperside) the paler cloud in the middle of the hind wings; but two of the Mineni males are intermediate in these respects, approaching the type in tint, having the pale cloud faintly shown in the hind wings, and presenting the two white spots in the fore wings on both surfaces. The underside is most variable in colouring—only one of the two last-mentioned individuals agreeing fairly with the figure of the type, the other being dull and with little trace of rufous, but with all the markings faint, and a strong bronzy surface-gloss; while the yellower examples exhibit beneath different admixtures of ochre-yellow and ferruginous brown, with the markings ashy grey and fuscous, in some cases faintly glossed with violaceous.

This Butterfly is noted as frequenting the shade of the forest, and when settled to be scarcely distinguishable from faded leaves.

38. Precis simia, Wallengr. (Plate IV. fig. 5, ♂.)

Precis simia, Wallengr. K. Sv. Vet.-Akad. Handl. 1857—Lep. Rhop. Caffr. p. 26. n. 2; Trimen, S.-Afr. Butt. i. p. 227. n. 70 (1887).

Of this very rare species—of which the only examples hitherto known to me were the type (collected by Wahlberg) in the Stockholm Museum and a very worn male taken by Col. Bowker at Durban—there are four male examples, three from the Mineni Valley and one from Christmas Pass. The three former are typical, agreeing well with the careful figure of the type (a ♀, judging from the want of the anal-angular projection in the hind wings), except in having all the fuscous markings larger; but the fourth has on the upperside a yellowish-white median discal cloud in the hind wings, and a similar smaller lower discal cloud in the fore wings, and all the black spots of the discal series in the fore wings smaller; while on the underside the basal fuscous in both wings is much effaced by the enlargement (and in the hind wings actual confluence at many points) of the enclosed markings of the ground-colour, and there is also a streak of the ground-colour,

interrupted by internervular black spots, along the hind-marginal edge of the hind wings.

Mr. Selous met with this species flying about the bed of a small ravine, and settling on the overhanging bushes. The three Mineni Valley specimens were captured on 6th March, the variety from Christmas Pass on 27th February.

39. Precis octavia (Cram.).

Papilio octavia, Cram. Pap. Exot. ii. t. cxxxv. figs. B, C (1777).

All the thirteen specimens—11 from Christmas Pass and 2 from the Mineni Valley—belong to the larger, more brightly coloured southern form, which Staudinger has figured (Exot. Schmett. pl. 38, 1885) as "var. *natalensis*."

40. Precis sesamus, Trim.

Precis sesamus, Trim. Trans. Ent. Soc. Lond. 1883, p. 347; S.-Afr. Butt. i. p. 231, pl. 4. fig. 3 (1887).)

Eight examples from Mineni Valley and one from the Pungwe River present no material variation from more southern specimens.

41. Precis archesia (Cram.).

Papilio archesia, Cram. Pap. Exot. iii. t. ccxix. figs. D, E (1782).

In the only two specimens, both male, from the Mineni Valley, the common dull-red band is throughout much narrower than in the typical form and submacular, in this respect resembling the Angolan form *P. staudingerii*, Dewitz (Nov. Act. Acad. Leop.-Carol. xli. p. 193, t. xxv. n. 15, 1879).

42. Precis pelasgis (Godt.).

Vanessa pelasgis, Godt. Enc. Méth. ix. Suppl. p. 820. n. 38–39 (1819).

Out of 14 examples collected, 5 of the males (3 from Christmas Pass and 2 from Mineni Valley) and 1 female exhibit a variation in the direction of the Zambesian form *P. chapunga* (Hewits.), having the common creamy-rufous band much narrowed on the upperside, and the corresponding creamy-white band on the underside somewhat narrowed.

43. Precis natalica, Feld.

Precis natalica, Feld. Wien. ent. Monatsch. iv. p. 106 (1860).

Five specimens from Christmas Pass and thirteen from the Mineni Valley present the usual variation in the tints of the underside.

44. Precis elgiva (Hewits.).

Junonia elgiva, Hewits. Exot. Butt. iii. p. 25, pl. 13. fig. 1 (1864).

Here also the customary variation of the underside colouring is observable in the 9 examples collected—8 from Mineni Valley and 1 from Vunduzi River.

45. Precis artaxia (Hewits.).

Junonia artaxia, Hewits. op. cit. iii. p. 26, pl. 13. fig. 6 (1864).
Precis artaxia, Trim. Proc. Zool. Soc. 1891, p. 75. n. 24

Of this very striking and singularly-coloured *Precis* there is a fine series of 41 examples, of which 37 were taken in the Mineni Valley from 6th to 26th March, 3 in Christmas Pass in the first half of February, and 1 on the Lusika River early in April. The sexes scarcely differ in colouring, the female being somewhat paler occasionally. Hewitson figures an example in which the smaller lower ocellus on the upperside of the hind wings is wanting, and in his description omits all mention of this marking, although it was present in two out of the three Zambesian specimens which I examined in his collection in the year 1867, and, although varying in size, is very rarely obsolete or even indistinct. The small ocellus in a corresponding position in the fore wings is, on the contrary, often obsolescent and never very distinct. The underside varies considerably in colour, presenting several shades in which brown or grey predominate, and being in some cases glossed with bronzy greenish or with pale dull violaceous. The markings on this surface vary in distinctness, especially the nearly straight ochre-yellow streak, outwardly bordered with dark brown, which crosses the middle of the hind wings. There is a tendency to the ocellate form in most of the very small indistinct spots of the common discal series, and two of these, considerably larger than the rest, represent respectively the upperside ocelli in the fore wings and the superior portion of the hind wings.

Mr. Selous notes that *P. artaxia* is usually numerous in the shady forests to which it is restricted. During its very short and hurried flight the large many-coloured ocelli of the hind wings are conspicuous, but it settles again almost immediately on the ground at the foot of trees, where the dead-leaf-like underside effectually conceals it. Although indisposed to take wing ordinarily, it becomes wary when alarmed by pursuit.

Genus Salamis, Boisd.

46. Salamis anacardii (Linn.).

Papilio anacardii, Linn. Mus. Lud. Ulr. p. 236. n. 55 (1764).

The specimens taken (5 at Christmas Pass, 1 at Revué River, and 6 on the Pungwe River) are like those from Natal, having a clearer paler colour, with a less intense rosy-violet gloss, than the tropical West-African examples.

47. Salamis nebulosa, Trim.

Salamis nebulosa, Trim. Trans. Ent. Soc. Lond. 1881, p. 441; S.-Afr. Butt. i. p. 246. n. 79, pl. iv. fig. 6 (1887).

The only example, taken on the Pungwe River, about 15 miles above Sarmento, is a female, larger (*exp. al.* 3 in. 2½ lin.) and with considerably broader fuscous upperside marking than the Zulu-

land female figured by me (*op. cit.*). I have a similar but rather smaller female, captured by Mr. H. M. Barber in the Lydenburg District, Eastern Transvaal, which presents the peculiarity of having the superior discal ocellus on the upperside of the hind wings as distinct and as brightly coloured as the constant inferior one.

Mr. Selous's specimen was captured on 21st September, settled on the leaf of a tree; other specimens were seen flying about the same spot, but were much worn.

Genus Crenis, Boisd.

48. Crenis boisduvali, Wallengr.

Crenis boisduvali, Wallengr. K. Sv. Vet.-Akad. Handl. 1857.—Lep. Rhop. Caffr. p. 30. n. 2; Trim. S.-Afr. Butt. i. p. 252. n. 81, pl. v. figs. 2, 2 *a* (1887).

Nineteen examples (12 from Christmas Pass and 7 from the Mineni Valley) agree in all respects with Natalian specimens.

Genus Eurytela, Boisd.

49. Eurytela hiarbas (Dru.).

Papilio hiarbas, Dru. Ill. Nat. Hist. iii. pl. xiv. figs. 1, 2 (1782).

A single example from Christmas Pass.

50. Eurytela dryope (Cram.).

Papilio dryope, Cram. Pap. Exot. t. lxxviii. figs. E, F (1779).

Three specimens from Christmas Pass and one from the Lopodzi River. In a female from the former locality the discal ochre-yellow band is broader than usual.

Genus Hypanis, Boisd.

51. Hypanis ilithyia (Dru.).

Papilio ilithyia, Dru. Ill. Nat. Hist. ii. pl. xvii. figs. 1, 2 (1773).

The eleven examples taken (8 at Christmas Pass and 3 in the Mineni Valley) belong to the var. *achelöia*, Wallengr., which appears to be the prevalent Coast-district form in several parts of Africa, and specially so in Natal. All have the underside colouring pale; and in one male on the upperside the spots of ground-colour in the hind marginal black border of the hind wings are very much reduced.

Genus Neptis, Fabr.

52. Neptis agatha (Cram.).

Papilio agatha, Cram. Pap. Exot. iv. t. cccxxvii. figs. A, B (1780).

The six examples (4 from Christmas Pass and 2 from the Mineni Valley) vary a little as to the width of the white transverse bands.

53. Neptis marpessa, Hopff.

Neptis marpessa, Hopff. Monatsb. Akad. Wissensch. Berl. 1855, p. 640. n. 8.

Four specimens taken at Christmas Pass agree thoroughly with those found in Natal and other more southern tracts.

54. Neptis goochii, Trim.

Neptis goochii, Trim. Trans. Ent. Soc. Lond. 1879, p. 336: S.-Afr. Butt. i. p. 273. n. 89, pl. v. fig. 6 (1887).

Of this rare little *Neptis*, hitherto only known to me as inhabiting the Durban district of Natal, there is a single example, captured at Christmas Pass on 13th February.

Genus Diadema, Boisd.

55. Diadema misippus (L.).

One specimen from Christmas Pass and another from the Mineni Valley.

Genus Euphædra, Hübn.

56. Euphædra neophron (Hopff.).

Romaleosoma neophron, Hopff. Monatsb. Akad. Wiss. Berl. 1855, p. 640. n. 9.

There are two examples of this very distinct *Euphædra*, taken on the Pungwe River 15 miles above Sarmento on September 19th. This species appears to be the solitary representative of its genus in Eastern and South-eastern Africa.

Genus Hamanumida, Hübn.

57. Hamanumida dædalus (Fabr.).

Papilio dædalus, Fabr. Syst. Ent. p. 482. n. 174 (1775).

Four specimens from Christmas Pass (February 12th to 26th), one from the Mineni Valley (March 29th) and two from near Vunduzi River (April 5th), are all of the form in which the underside is warm reddish ochreous and spotted with white; but in two specimens, dated respectively March 29th and April 5th, the white spots are rather duller than in the rest.

I have for some time been disposed to think that the well-known variation in the underside of this widely-distributed African butterfly is *seasonal*, and these dated captures of Mr. Selous's tend to confirm this view. All the specimen taken by Mr. Eriksson at Omrora, tropical S.W. Africa, from 1st to 25th August, 1887, were (as I have recorded, P. Z. S. 1891, p. 80) of the dull underside colouring, wanting the white spots and with the dark markings very faint, and the same is the case with a pair taken *in copulâ* near Delagoa Bay, on the 9th August, 1891, by the Rev. H. Junod. A series of dated captures throughout the year is wanting in the

case of this species, as of so many others; but the little material available favours the supposition that (as in the case of many *Satyrinæ* and *Lycænidæ*) the warmly-tinted conspicuously marked underside denotes the summer or wet-season brood (where concealment is of less importance among the herbage of that season), and the obscure underside almost devoid of markings the brood of the winter or dry season, when the open-ground vegetation is wanting or thoroughly withered.

In connection with this point, however, the published observations of Mr. D. G. Rutherford (Proc. Ent. Soc. Lond. 1878, p. xlii) and Mr. W. L. Distant (Nat. in the Transvaal, 1892, pp. 41, 42)—both of whom were acquainted with this species in life—should be considered. The former notes that this Butterfly always settles on the ground with closed wings, and that the underside colouring not only was eminently protective from its close resemblance to the colour of the soil, but was found in the various districts inhabited by the insect to vary in accordance with the particular tint of the soil characteristic of a district. Mr. Distant, on the contrary, though agreeing as to the insect's settling on open ground, states that he invariably found it resting with wings expanded, and "nearly always on greyish-coloured rocks or slaty-hued paths, with which the colour of the *upper* surface of the wings wonderfully assimilated." He adds that "large tracts of bare ground of a reddish-brown colour exist with which the under surface of the wings would be in perfect unison; but though I watched for months to see a specimen thus situated, and with its wings vertically closed, I never succeeded in doing so." On reading Mr. Distant's letter to the above effect published in 'Nature' of 26th February, 1891, I wrote to him suggesting that (1) the differences in the underside might be seasonal, and (2) that possibly the upperside might be protective in the wet and the underside in the dry season; I also intimated that all analogy pointed to the underside being protective when the insect is really *at rest*, not merely settling at intervals. To this latter view I adhere; but as regards the second of my suggestions, Mr. Distant's observation that the habits of *H. dædalus* were "uniform in the Transvaal in both the dry and wet seasons" would indicate that even during the winter the underside colouring would not in that country be protective. Mr. Distant does not mention whether the underside differs seasonally in the Transvaal, but two examples (♂ and ♀) taken by Mr. W. Morant near Pretoria in March 1872 are both of the brighter colouring with moderately developed white spots, as is also a solitary example taken near Durban, Natal, in February 1883 by Col. Bowker.

Genus Charaxes, Ochs.

58. Charaxes zoolina (Westw.).

Nymphalis zoolina, Westw. Gen. D. Lep. pl. liii. fig. 1 (1850).

The two specimens (♂ and ♀) were taken at Christmas Pass.

Both have the fuscous borders and markings strongly developed, the male indeed approaching in this respect the *variety* A from Zululand and Delagoa Bay described by me in S.-Afr. Butt. iii. p. 405 (1889); and the female having all the ground-colour spots in the border of the fore wings completely separated from the discal field.

Male examples as dark as the one here noted have been taken at Durban and sent to me by Mr. A. D. Millar.

59. Charaxes varanes (Cram.).

Papilio varanes, Cram. Pap. Exot. t. clx. figs. D, E (1779), and iv. t. cccIxxxviii. figs. A, B (1782).

The two specimens received, taken in the Mineni Valley, agree with those from the Zambesi and Quilimane, and indeed with Tropical examples generally, in having the basal white much better developed (in both fore and hind wings) than in any individual from the extra-tropical area that I have examined.

60. Charaxes lasti, H. G. Smith. (Plate V. fig. 6, ♀.)

Charaxes lasti, H. G. Smith, Ann. & Mag. Nat. Hist. ser. 6, vol. iii. p. 131 (1889); and Rhop. Exot. p. 8, pl. (*Char.*) iv. figs. 4, 5 [♂] (1890).

There are two examples (♂ and ♀) from the Mineni Valley, taken on the 18th and 14th March respectively, a male specimen from the Pungwe Valley taken on 1st September, and two (♂ and ♀) captured on the Pungwe River, about 15 miles above Sarmento, on 19th September.

I have not seen the types of this *Charaxes*, but, judging from the description and figures above cited, I do not think Mr. Selous's specimens can be held distinct from it; although all three males differ in some respects from the figures, they also differ from one another. All three agree in having the transverse irregular series of fuscous markings on the disk disconnected (except near the costa) from the hind-marginal fuscus border, and extended by an additional sagittiform mark below 2nd median nervule, and also in having the lowest and largest fulvous hind-marginal spot completely enclosed in the border; in these features differing from the figure of the upperside. The Mineni and Pungwe Valley males further diverge from the same figure in presenting a well-developed submarginal fuscous band in the hind wing from the costa to the 1st median nervule; and even in the male from above Sarmento, in which all the fuscous markings of the upperside are greatly reduced, there are traces of this long band. On the underside, again, all are paler and yellower than in fig. 5, and only the Mineni Valley male has the silvery-white median stripe across the hind wings (which is, however, much broader than in the figure). The two Pungwe males have all the underside markings much attenuated, and in the example from above Sarmento they are almost obsolete; and both they and the Mineni male have more or

less indistinct whitish lunules (not small spots) forming a submarginal series in the hind wings.

The two females agree with their respective mates, the specimen from above Sarmento having the submarginal fuscous on the upperside of both wings completely broken up into spots, and the underside more reddish and much less distinctly marked than in the one from Mineni Valley.

The South-African Museum has for many years been in possession of a single imperfect male of this species, received with a few other Butterflies collected on the Zambesi by (I was informed) the Rev. H. Waller. It agrees pretty closely with the Mineni Valley male above noted, but has the silvery-white stripe on the underside of the hind wings still broader.

The male expands 2 in. 9–11 lin.; the female 3 in. 4 lin.

C. lasti is the Eastern representative of *C. cynthia*, Butl. (♀ *C. lysianassa*, Westw.), a widely distributed West-African species recorded from Ashanti, Cameroons, and Angola. It is distinguished by its smaller size, by the great expansion of the fulvous and the consequent reduction of the fuscous colouring on the upperside, and by the great attenuation and partial obliteration of the markings of the underside.

Mr. Last discovered this Butterfly at Mombasa, and it is interesting to find it extending so far to the south as the Manica Country.

Mr. Selous notes that both the first and second of the males above mentioned were captured while drinking at the edge of water, while the female in the Mineni Valley was settled, with wings expanded, on the leaves of a thorn-tree.

61. Charaxes azota, Hewits.

♀. *Philognoma azota*, Hewits. Ent. M. Mag. xiv. p. 82 (1877).

♂. *Charaxes azota*, Hewits. op. cit. p. 181 (1878).

♀. *Charaxes azota*, R. Monteiro, Delagoa Bay, &c. frontisp. fig. 1 (1891).

A fine female of this handsome species is noted as being the only one seen; it was taken at the Lusika River on 13th April, frequenting the same tree on which specimens of *C. castor* were found.

Since the publication of my notes on this species (S.-Afr. Butt. iii. p. 388, 1889), *C. azota* has been found in some numbers near Delagoa Bay by the Rev. H. Junod, and a series of eight males and three females has been acquired from him for the South-African Museum. In the male the "tails" of the hind wings are represented only by two short acute dentations; but in the female not only is the dentation on the 1st median nervule considerably more produced, but there is a distinct tail on the 3rd median nervule. This tail varies both in length and form, being pointed at the tip in two specimens and rounded in two others; in one of the latter (Mr. Selous's example) it is even inclined to a spatulate form.

62. Charaxes saturnus, Butl.

Charaxes saturnus, Butl. Proc. Zool. Soc. 1865, p. 624, pl. 36. fig. 1.

Of this common South-Tropical species there are one example from Umtali, seven from the Mineni Valley, and four from the Lusika River. Of the two females from the last-named locality, one expands a little over 4 inches and the other $3\frac{3}{4}$ inches.

63. Charaxes castor (Cram.).

Papilio castor, Cram. Pap. Exot. i. t. xxxvii. figs. C, D (1775).

Mr. Selous notes that *C. castor* was rare; he took but three specimens, all on the stem of the same thorn-tree (*Acacia* sp.) at Lusika River on which the female *C. azota* was captured, and on the same date, the 13th April.

64. Charaxes pollux (Cram.).

Papilio pollux, Cram. Pap. Exot. i. t. xxxviii. figs. E, F (1775).
Papilio camulus, Dru. Ill. Nat. Hist. iii. pl. 30 (1782).

A female from Christmas Pass, taken on 27th February, and a male from the Mineni Valley, taken on 16th March, are the only examples in the collection. These are both distinguished from the West-African specimens that I have seen in possessing not only considerably larger ochre-yellow hind-marginal spots in the fore wings, but also a complete and conspicuous series of ochre-yellow lunules along the hind margin of the hind wings; they further both want on the upperside of the fore wings the lowermost black spot (between 2nd and 1st median nervules). In the female not only are the tails on the hind wings considerably longer and wider than in the male, but the intermediate dentation on the 2nd median nervule is also prolonged into a short tail.

The male was captured sucking at exudations on the branches of the same tree that was frequented by *C. bohemani* (see below), the female fluttering among grass.

Manica is by far the most southern station recorded for this Butterfly, and indeed, as far as I can ascertain, the only *East*-African one near the coast; but *C. pollux* is common at Sierra Leone and extends to Cameroons and Chinchoxo (4° 22′ S.) along the West Coast, while Mr. Butler has also recorded it as among Emin Pasha's captures in Monbuttu, Central Africa, about 4° N.

65. Charaxes achæmenes, Feld. (Plate V. fig. 7, ♀.)

♂ ♀. *Charaxes achæmenes*, Feld. Reise Novara, Lep. iii. p. 446, pl. lix. figs. 6, 7 [♂] (1867).

One specimen from Umtali, one from Christmas Pass, five specimens from Mineni Valley, and five from the Lusika River; three of these are females.

Although the upperside of the male and the underside of both sexes are so completely unlike to the pattern and colouring of

C. saturnus, yet the upperside of the female is so remarkably similar to that of *C. saturnus* as to be with difficulty distinguished from the latter without close comparison.

Mr. Selous notes that nearly all his specimens of this species were taken drinking at the edge of water, but two or three at Lusika River were settled on the branches of a tree.

66. CHARAXES GUDERIANA (Dewitz). (Plate V. fig. 8, ♀.)

♂. *Nymphalis guderiana*, Dewitz, Nov. Act. Leop.-Carol. Akad. Naturf. xli. p. 200, t. xxvi. fig. 18 (1879).

This species was founded on three males captured in Angola by Dr. Pogge, and I have noticed (Proc. Zool. Soc. 1891, p. 81) the receipt of a male from Mashunaland and of sixteen males from the Ambuella Country not far from 16° S. lat. Mr. Selous collected 1 example at Umtali, no fewer than 30 at Mineni Valley, and 8 at Lusika River, and of these 5 each from the second and third localities were females; nearly all were taken in March, but one on February 28th and eight between April 1st and 25th.

As *guderiana* is unquestionably a member of the *ephyra* and *ethalion* group of *Charaxes*, it is very unexpected to find the female, as in the case of *C. achæmenes* just mentioned, on the upperside closely resembling *C. saturnus*, and so differing widely from the aspect of her nearest congeners.

♀. Strikingly different from male. *Exp. al.* 2 in. 8 lin. to 3 in. 2 lin.

Fuscous, with a common ochre-yellow discal band (in fore wing moderately broad but macular and more or less deeply cleft by downward traversing bar of ground-colour, in hind wing continuous, short, and much narrower inferiorly); *bases dull ferruginous-ochreous. Fore wing*: terminal discocellular spot ochre-yellow instead of white; commencement of inner series of spots forming ochre-yellow discal band represents the conspicuous outer costal white spot in male; six spots of incurved outer series of discal band represent the submarginal series of small bluish-white spots in male—in one example only, the lowest spot of this outer series is confluent, between 2nd and 3rd median nervules, with a large spot of the inner series; hind-marginal series of spots ferruginous-ochreous instead of white (the lowest and largest spot, however, more or less whitish internally), enlarged, often confluent into a submacular border. *Hind wing*: discal band simple, whitish yellow on costa and on inner edge, much indented by ground-colour on both sides inferiorly, where it is also more or less tinged and edged with metallic bluish or greenish scales; submarginal series of white, on both sides metallic-bluish or greenish bordered, lunules, much like that in male; upper four lunules of hind-marginal series ochre-yellow instead of white, the remainder to anal angle metallic greenish or bluish with ochre-yellow centres as in male; tails much longer and broad, especially that at end of 3rd median nervule, which is subspatulate instead of acute. UNDERSIDE.—Rather paler, but pattern and coloration according with

those of male, except that the common discal band of the upper-side is represented in white (rather vaguely defined externally), and that its outer series of ochreous spots in the fore wing is faintly reproduced.

The pattern and coloration of both sexes on the underside exhibit the closest agreement with those shown in *C. ethalion*, Boisd., only differing in the greater thickness and (in parts) brighter tints of the markings, and, in the male only, by the reproduction of the costal, outer discal, and hind-marginal white spots of the fore wings. On the upperside the disparity between the female *C. guderiana* and the female *C. ethalion*, and the great likeness to *C. saturnus* in the former, are due to the ferruginous colour of the basal areas and the narrowness and decided ochre-yellow tint of the discal band.

Mr. Selous notes the interesting circumstance that while all the more numerous males were found drinking at the water's edge, the females were invariably met with sucking the exudations on a tree-stem or branches in company with the fine "Goliath" Cetoniid beetles, *Rhamphorrhina petersiana*, *Eudicella trimeni*, &c.

67. Charaxes ephyra (Godt.).

Nymphalis ephyra, Godt. Encycl. Méth. ix. p. 355 (1819).

Nine males from the Mineni Valley. Six of these present on the upperside of the hind wings the series of dull-greenish lunules before the submarginal bluish ones mentioned by Godart (*loc. cit.*) as occurring in a single specimen from the West Coast of Africa. The underside is darker, and with a more ferruginous tinge than usual.

The males of this Butterfly are noted as always found drinking at the water's edge; they were captured during March.

68. Charaxes phæus, Hewits.

Charaxes phœus, Hewits. Ent. M. Mag. xiv. p. 82 (1877); R. Monteiro, Delagoa Bay, &c. frontisp. figs. 4, 5 (1891).

The only example (a ♀) was taken on a tree at Lusika River on the 1st April.

69. Charaxes manica, n. sp. (Plate VI. fig. 9, ♀.)

♀. *Exp. al.* 2 in. 10 lin. to 3 in. 2 lin.

Allied to *C. ephyra* (Godt.), *C. phœus*, Hewits., &c.

Submetallic pale blue, more or less tinged with greenish, with very broad fuscous apical hind-marginal borders; in fore wing a rather broad obliquely transverse white band outwardly bordering the blue as in female C. bohemani, *Feld.* *Fore wing*: blue dull for some distance from base, thence brighter; white band commences widely on costa, encroaching internally a little on discoidal cell at extremity, and is of about even width as far as 1st median nervule beyond middle, but below this is bent inwardly from the general oblique direction, and much narrowed by diffusion of the blue as far as submedian nervure, below which it does not extend; apical

area very broadly fuscous, as in female *bohemani*; two indistinct subapical whitish spots placed obliquely close to costa; beneath these, in one specimen, faint traces of three other spots, the whole indicating an elbowed series of five as in female *phœus*. *Hind wing*: blue forms a large discal space, brighter than the dull basal part which fills discoidal cell, extending from 2nd subcostal nervule to below 1st median; a rather wide costal, apical, and hind-marginal fuscous border; the usual continuous hind-marginal series of dull-red lunules as far as 3rd median nervule followed by bronzy-green lunules thence to anal angle, preceded by a sub-marginal series of thin, rather indistinct, whitish violet-tinged lunules, quite as in female *ethalion*, Boisd., and female *phœus*; inner-marginal border brownish-grey; tails as in the congeners mentioned. UNDERSIDE.—*General colouring and pattern very close to those shown by* ethalion *and* phæus, *but decidedly darker and more ferruginous in tint, without the strong silvery gloss, and possessing in its fore wing the same conspicuous oblique white band as on the upperside.*

It is not without hesitation that I propose a new species-name for the three females of *Charaxes* here described, because their underside, not only in marking but also in its ferruginous tint, bears so close a resemblance to that of the males of *C. ephyra* above noticed, that, were not the female of this species known, I should assign these Manica females to it. The males in question seem quite inseparable from *C. ephyra*, while the females under notice have the upperside totally different from that of the recognized female of *C. ephyra*, and so closely resembling that of the much larger female of *C. bohemani*, that they might well pass for dwarf specimens of the latter species. Only further material collected in Manica can determine whether the male of this aberrant female resembles it in the same way as in the case of the allied *C. phœus*, or whether we have here a dimorphic female of *C. ephyra*.

One example was taken in the Mineni Valley on 29th March, "on the same individual tree on which so many *C. bohemani* were captured," and the two others on a thorn-tree at Lusika River on 1st April.

70. CHARAXES BOHEMANI, Feld.

♂. *Charaxes bohemani*, Feld. Wien. ent. Monatschr. iii. p. 321, t. 6. fig. 3 (1859); Butl. Lep. Exot. p. 28, pl. x. fig. 3 [♀] (1869).

Of this very fine *Charaxes* twenty-eight specimens were taken in Mineni Valley from the 11th to the 18th March, and eight at Lusika River from the 1st to the 13th April. Of the entire thirty-six, nineteen are males and seventeen females; eleven are absolutely fresh perfect examples, twelve in fair condition, and thirteen more or less worn and broken. In expanse of wings the male varies from 3 in. 3 lin. to 3 in. 8 lin., and the female from 3 in. 9 lin. to 4 in. The tails of the hind wings are considerably longer and less acuminate in the female than in the male. There is but little variation as regards the upperside in either sex, except that the blue has in some.

specimens more of a greenish tinge than usual; in one male there is in the fore wings a small separate spot of blue just beyond the extremity of the discoidal cell. The underside is also very constant, but in the male exhibits some variation in the size and brightness of the yellow lunules which form a common sinuated submarginal series.

Mr. Selous informs me that he always found both sexes of this species sucking at exudations on the branches of a tree of moderate size; during flight the blue field of the upperside is conspicuous. Though not uncommon and rather widely distributed over Mashunaland, Mr. Selous was not able to secure specimens of it before visiting Manica.

71. Charaxes cithæron, Feld.

Charaxes cithæron, Feld. Wien. ent. Monatschr. iii. p. 398, t. 8. figs. 2, 3 (1859).

The only example is a much-worn female taken at Christmas Pass on the 29th February. It differs from the typical form so prevalent on the Natal coast, and approaches the female *C. xiphares* (Cram.), on the upperside of the fore wings by the more macular white median band, and by the two subapical white spots being succeeded inferiorly by a sinuated series of five whitish spots growing fainter downwards, and on the underside of the hind wings by the more pronounced markings throughout, and especially by the presence of a narrow white bar externally bounding the highly irregular median dark-blue transverse streak. On the upperside, however, the median band of the hind wings is not broad and ochre-yellow as in *C. xiphares*, but pale violaceous-blue and white as in *cithæron* and narrower than usual in the latter. The tails of the hind wings are very much shorter than in *cithæron*, shorter and narrower than in *C. xiphares* ♀, being in fact as short and acute as in *C. xiphares* ♂.

72. Charaxes selousi, n. sp. (Plate VI. fig. 10, ♂.)

♂. *Exp. al.* 2 in. 1 lin.

Black, with submetallic pale violaceous-blue white-clouded submarginal marking, developed in hind wing into a broad discal space. Fore wing: a sinuated submarginal series of eight blue and white spots, of which only the three lowest, between 2nd median nervule and inner margin, are enlarged and conspicuous, forming a short transverse band widening to inner marginal edge; the other five spots all small and very indistinct, except the 2nd and 3rd, which lie between 5th subcostal and lower radial nervules and are more white than blue. *Hind wing*: violaceous space extending over disk from costa to below 1st median nervule, and from extremity of discoidal cell to a little distance from hind margin—traversed by a whitish ray and with its inner edge white; just within hind-marginal edge a lunulated bluish-scaled streak, dull red as far as 3rd median nervule, but below that

greenish yellow; just before this streak a series of seven small but very distinct and well-separated lunulate white spots, of which the two next anal angle internally edge two small blue spots; tails rather narrow but not very acuminate, of moderate and about equal length. UNDERSIDE.—*Very glossy; before middle, pale olivaceous-ochreous, with an irregular transverse blue-black white-edged streak; beyond middle, pale brownish-ochreous, traversed by a sinuated fascia whitish in fore wing, ferruginous-red in hind wing: a median blue-black line quite across both wings, bounded externally by a white stripe. Fore wing*: three blue-black white-edged spots in discoidal cell, one transversely elongate, close to base, the others subbasal, round, one above the other; transverse streak white-edged internally, interrupted on 1st median nervule; median transverse line almost straight, slightly interrupted on 2nd median nervule; discal fascia strongly sinuated superiorly, thinly fuscous-edged internally, traversed by a very faint indication of a series of pale rufous spots corresponding to the upperside series—the lowest spot being enlarged, geminate, and fuscous; apex whitish. *Hind wing*: in discoidal cell a subbasal blue-black, externally white-edged line; continuation of transverse streak of fore wing interrupted on subcostal nervure, and extending to just below median nervure; median transverse line continuous from costal to inner marginal edge; red discal fascia irregular, continuously black-edged internally, but only imperfectly so externally; white spots of hind-marginal series all larger than those on upperside and subocellate with blue and black; streak along hind-margin not bluish-scaled, ferruginous-red as far as 1st median nervule.

This very distinct species combines to some extent the colouring and pattern of the very much larger *C. violetta*, H. G. Smith, with those characteristic of the *ephyra* group of the genus, especially as regards the underside, but it is on the whole much nearer to the latter. Unfortunately the female remains unknown.

The only example was taken in the Mineni Valley, on 7th March; it was drinking at the water's edge, and the brightly-marked underside attracted Mr. Selous's notice, notwithstanding its small size as compared with its congeners.

I dedicate this *Charaxes* to Mr. F. C. Selous, a naturalist and geographical explorer distinguished no less for his high personal qualities than for his services in opening up tropical South Africa.

Family ERYCINIDÆ.

Subfamily LIBYTHEINÆ.

Genus LIBYTHEA, Fabr.

73. LIBYTHEA LAIUS, Trim.

Libythea laius, Trim. Trans. Ent. Soc. Lond. 1879, p. 337; S.-Afr. Butt. ii. p. 5. n. 118, pl. vii. fig. 3

Four specimens—a male from Christmas Pass, two males from

Mineni River, and a female from Vunduzi River—resemble those brought from Natal, but are smaller than usual.

This species was found settling on leaves in shady places; it flew with moderate speed and was easily caught. These four specimens were the only ones observed; they were taken on 15th February, 8th March, and 5th April.

Family Lycænidæ.

Genus Lycæna, Fabr.

74. Lycæna asopus, Hopff.

♂ ♀. *Lycæna asopus*, Hopff. Monatsb. Preuss. Akad. Wiss. Berl. 1855, p. 642. n. 21.

Two specimens from Christmas Pass.

75. Lycæna parsimon (Fabr.).

♂. *Papilio parsimon*, Fabr. Syst. Ent. p. 526. n. 349 (1775).

Two males from Christmas Pass.

76. Lycæna exclusa, n. sp. (Plate VI. fig. 11, ♂.)

Exp. al. (♂) 1 in. 6½ lin.; (♀) 1 in. 8–9 lin.

♂. Very like *L. parsimon* (Fabr.), ♂, on upperside. *Dull brownish-grey; a fuscous hind-marginal edging line; cilia brownish-grey basally, whitish externally; pattern of underside indistinctly shown, the most apparent marking being the darker terminal disco-cellular striola in both wings. Hind wing*: close to hind margin the usual fuscous spot, between 1st and 2nd median nervules, rather small and ill-defined, externally whitish-edged; below 1st median nervule the trace of a second similar spot; *no* tail. Underside.—*Dull creamy-whitish, with conspicuous black spots faintly white-edged. Fore wing*: discocellular terminal striola thick and black; discal series of six spots—the upper three forming a regular continuous transverse streak between 4th subcostal and 3rd median nervules, but the other three all separate and before the upper three, the 5th spot (between 2nd and 1st median nervules) being nearer to base than the 4th and 6th spots; a submarginal ochreous-brown streak, widening downward, parallel to and not very far before hind-marginal edge, which is bounded by a black line. *Hind wing*: a subbasal series of three rounded spots, the middle one in discoidal cell; terminal cellular striola thick, black, curved; discal series of eight spots (all separate) strongly bisinuated—the 1st and 8th spots before, the 2nd and 5th about, and the remainder beyond middle; the 7th spot strongly crescentic; a black hind-marginal edging line as in fore wing, and a faint indication of a submarginal ochreous-brown line, which below second median nervule widens into two very diffuse ochre-yellow lunulate marks; immediately beyond the latter are a rounded superior and elongate inferior black spot, the upper profusely, the

lower slightly scaled with metallic blue. Cilia as on upperside, but with darker base.

♀. Discal area in both wings whitish, with a pale-blue scaling from base over cell and along inner-marginal area. *Fore wing*: terminal discocellular marking very much broader than in male, reniform. *Hind wing*: 3rd and 4th spots of discal series of underside reproduced, fuscous; hind margin more or less whitish-bordered throughout; fuscous spots near anal angle much enlarged. Underside as in male.

The male and the two females above described were all taken at Christmas Pass on 11th February; the male is in good condition, but the females are greatly worn and faded. Only these three examples were seen, they were flying slowly on an open hill-side.

The large and very irregularly disposed deep black discal spots of the underside readily distinguish this *Lycæna* from all its congeners known to me, with the exception of one very near ally discovered in the adjacent district of Mashunaland by Mr. Selous, which is described below [1].

77. Lycæna cissus (Godt.).

Polyommatus cissus, Godt. Encycl. Méth. ix. p. 683. n. 210 (1823).

One specimen from Umtali, five from Christmas Pass, and one from the Mineni Valley.

78. Lycæna mahallokoœna, Wallengr.

Lycæna mahallokoœna, Wallengr. K. Sv. Vet.-Akad. Handl. 1857—Lep. Rhop. Caffr. p. 41. n. 16.

Two examples from Christmas Pass, and one from the Mineni Valley. Until the receipt of these Manica specimens, the most

[1] Lycæna mashuna, n. sp.

Exp. al. (♂) 1 in. 5–6 lin.; (♀) 1 in. 6–8 lin.

Nearly allied to *L. exclusa*.

♂. *Very pale violaceous-blue, shot with pink; neuration distinctly blackish; a strongly-marked hind-marginal black edging streak; discal spots of underside faintly showing through; terminal discocellular mark distinct, slender, and angulated in both wings. Fore wing*: immediately before hind-marginal black edging a very faint tinge of ochry-yellow, preceded by a very faint diffuse greyish fascia. *Hind wing*: an extremely faint diffuse greyish border immediately before hind-marginal edging; a rather small and faint blackish spot close to hind margin, between 1st and 2nd median nervules, immediately preceded by some very faint ochry-yellowish scaling; *no* tail. Underside.—*Ochre-yellow, with conspicuous black, very thinly white-edged discal spots arranged just as in* L. exclusa; *two series of very faint submarginal white lunules. Fore wing*: field of wing much paler than costal and hind-marginal border; 5th spot of discal series greatly reduced and but little before 4th, and 6th spot wanting. *Hind wing*: hind-marginal black spot darker than on upperside, ochre-yellow immediately preceding it darker than ground-colour.

♀. *Pale-blue field much more limited than in male, the costal, apical, and hind-marginal border being in both wings broadly brownish grey; ochry-yellowish hind-marginal stain much more developed, and in fore wing usually conspicuous between 2nd median nervule and posterior angle, while in some specimens it is also diffusedly present in hind wing. Fore wing*: discocellular terminal

northern locality on the eastern side, known to me as a *habitat* of this curious species, was Pretoria; although further inland it had been found in the Bamangwato Country.

79. Lycæna gaika, Trim.

Lycæna gaika, Trim. Trans. Ent. Soc. Lond. 3rd ser. i. p. 403 (1862).

Two specimens from Christmas Pass.

When I described this species thirty years ago, I little imagined that so exceptionally fragile and slow-flying a Butterfly—one of the smallest of its genus—would be found to range over not only a great part of Africa, but also from Aden over all the Oriental Region to Java, and even into the Western Pacific (Solomon Islands).

80. Lycæna bœtica (Linn.).

Four examples from the Mineni Valley.

81. Lycæna sichela, Wallengr.

Lycæna sichela, Wallengr. loc. cit. 1857, p. 37. n. 4.

Seven specimens from Christmas Pass. With the exception of a male captured at Tati, South Matabeleland, in 1887, by the late Mr. J. L. Fry, these are the first examples known to me from tropical S.E. Africa, but I have recorded (Proc. Zool. Soc. 1891, p. 82) the occurrence of the species in the tropical S.W. area.

82. Lycæna telicanus (Lang).

Two specimens from Christmas Pass, and three from the Mineni Valley.

There can be no doubt that the widely-spread *Lycæna* generally

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marking darker and broader. *Hind wing*: 3rd and 4th spots (rarely also 5th and 7th spots) of discal series of underside reproduced, fuscous; a whitish line, preceded by traces of dark spots, just before hind-marginal edge; blackish spot larger, the yellow preceding it usually taking the ordinary lunulate form; a yellowish space at anal angle. Underside.—As in male, but black spots larger, and discal series usually complete, the 5th spot only reduced in one example, and four others having all six as in *L. exclusa*, but with the lower three less irregularly disposed.

This species is readily distinguished from *L. exclusa* by the blue instead of brownish-grey upperside of the male, and in both sexes by the ochre-yellow instead of creamy-whitish underside; another peculiar feature, most apparent in the female, is the development of more or less ochry-yellowish along the hind-marginal border. The intense blackness of the terminal discocellular and discal spots of the underside is the same in both species, and obtains, as far as I know, in no other species of this group of *Lycæna*. The anal angular spot on the underside of *L. exclusa* is wanting in that of *L. mashuna*. The relation between these two species corresponds very near to that between *L. parsimon* and *L. patricia*, Trim.

The examples collected by Mr. Selous are two (♂ and ♀) from the Hanyani River, not far south of Fort Salisbury, received in 1886; two (♀) from Motoko's Country, East Mashunaland, captured in November 1890; and six (2 ♂, 4 ♀), without special locality, received in 1891. All had suffered some injuries from rough transit by post.

known as *L. plinius*, Fabr., is identical with *L. telicanus*, and that accordingly the range of the latter species must be extended from Aden eastward over all the Oriental Region to Formosa, and also to the Solomon Islands. The distribution of this Butterfly over the Old World is thus rendered almost coextensive with that of *L. bœtica*.

83. Lycæna lingeus (Cram.).

Papilio lingeus, Cram. Pap. Exot. iv. t. ccclxxix. figs. F, G (1782).

Three examples from Christmas Pass.

84. Lycæna antinorii, Oberth.

Lycæna antinorii, Oberth. Ann. Mus. Civ. Genova, xviii. p. 731, t. ix. fig. 3 (1883).

The only individual captured is a male, met with in Christmas Pass on 6th March. This specimen differs in one point from Oberthür's figure of the type, viz. the two series of submarginal brownish-fuscous lunules are much less regular, especially in the fore wings, and are interrupted in two or three places.

It is interesting to find this little-known *Lycæna*, which was discovered in Shoa, Abyssinia, by the late Marquis Antinori, in 1879, occurring so far to the south as Manica. The female appears to be still unknown. From the pattern of the underside, this species is clearly related to the group of *L. juba*, Fabr., but the violaceous tint of the upperside is most like that of the male *L. lingeus*.

85. Lycæna poggei (Dewitz).

♂. *Plebeius poggei*, Dewitz, Nov. Act. Leop.-Carol. Akad. Naturf. xli. p. 205, pl. xxvi. fig. 7 (1879).

Of this remarkable species, founded on a single male discovered by Dr. Pogge in Angola, there are four males in the collection, all taken at Christmas Pass, on the 6th March, drinking at the edge of water.

The ochraceous pink-shot upperside, with the very strongly marked discal series of seven unequal longitudinal black streaks between the nervules of the fore wings, renders this species easily recognizable; the underside nearly resembles that of *L. antinorii*, but is more heavily marked. A near ally is *L. artemenes*, Mabille, from Madagascar, which, judging from the figures (3 and 4) on pl. xxvii. of the "Lepidoptères" volume of Grandidier's 'Histoire Physique etc. de Madagascar,' has the black streaks much thinner and longer, and the cilia very feebly fuscous-varied in the fore wings, while the dark markings of the underside are mostly white-centred instead of uniform brownish grey. Mr. A. G. Butler notes (Ann. & Mag. Nat. Hist. ser. 5, v. p. 337 (1880)) that in the nature of the internervular black streaks the Madagascar species agrees with the West-African *L. juba*, Fabr.

Genus Lycænesthes, Moore.

86. Lycænesthes larydas (Cram.).

Papilio larydas, Cram. Pap. Exot. iii. t. cclxxxii. fig. H (1782).

Three examples taken at Christmas Pass.

87. Lycænesthes liodes, Hewits.

Lycænesthes liodes, Hewits. Trans. Ent. Soc. Lond. 1874, p. 349.

One specimen from Christmas Pass, and another from the Mineni Valley.

88. Lycænesthes neglecta, Trim.

♂. *Lycænesthes neglecta*, Trim. Trans. Ent. Soc. Lond. 1891, p. 175; and (♀) 1893, p. 132, pl. viii. figs. 7, 8 (♂ & ♀).

The only specimen, a female, was captured in the Mineni Valley, on the 7th March; it agrees with the Natalian female figured by me in the paper cited above.

89. Lycænesthes lunulata, n. sp. (Plate VI. fig. 12, ♂.)

Exp. al. 1 in. $2\frac{1}{2}$ lin.

♂. *Metallic violaceous, bordered with fuscous. Fore wing*: apical border very broad, but costal border to beyond middle and hind-marginal border below 2nd median nervule narrow. *Hind wing*: costal border of moderate width and only a little broader apically; hind-marginal border linear below 2nd subcostal nervule, but closely preceded by a fuscous lunulate line, the line separating the two being whitish towards anal angle; ordinary hind-marginal spot between 1st and 2nd median nervules small but black internally, bounded and half encircled by a broad and very conspicuous orange lunule. *Cilia* whitish-grey, in hind wing whiter towards anal angle and traversed by a dark line. Underside.—*Brownish-grey; ordinary markings of the ground-colour but with exceedingly fine darker outlines, their white edgings on both sides slender but sharply defined. Fore wing*: discal series of incomplete touching annulets only slightly irregular, except that its lowest and largest marking is oblique and before the others. *Hind wing*: discal series of annulets rather strongly bisinuated, the costal annulet filled with black; two subbasal, small, round, black, white-ringed spots, one near costa and the other on inner margin; hind-marginal black spot and orange lunule as on upperside, except that the spot is marked externally with greenish-silvery; at anal angle a similar spot and lunule.

This species belongs to the *sylvanus* group of *Lycænesthes*, its underside agreeing more with those of that species and of *L. liodes*, while the upperside more resembles that of *L. otacilia*, Trim., but is of a much deeper and more glittering violaceous. It appears to stand very close to the *otacilia* of Hewitson (Illustr. Diurn. Lep. pl. 92. figs. 35–37), which, as I have pointed out in my S.-Afr. Butt.

ii. p. 103, is distinct from *L. otacilia*, mihi; and, though larger and darker than Hewitson's figure of the male, may prove on comparison with Hewitson's specimens to belong to the same species. The examples in the Hewitson Collection bore the localities of Sierra Leone and Angola.

The two males in Mr. Selous's collection were taken at Umtali and in the Mineni Valley, respectively, on the 28th February and 7th March.

Genus Deudorix, Hewits.

90. Deudorix antalus (Hopff.)[1].

Dipsas antalus, Hopff. Monatsb. Preuss. Akad. Wiss. Berl. 1855, p. 641. n. 15.

Two specimens from Christmas Pass and two from the Mineni Valley.

[1] Mr. A. E. Hunt, lately of Durban and now of Newcastle, Natal, has reared this Butterfly from larvæ found in the seed-pods of *Crotalaria capensis* at Pinetown and near Durban, and has sent me descriptions and drawings of the larva and pupa, from which the following diagnoses are framed.

Larva.—Above greenish grey, spotted with black (in some specimens a tinge of purplish); first and second thoracic segments chrome-yellow, the first bearing a median black mark like a broad arrow reversed, the second with two transverse rows of three black spots each; a transverse row of five black spots on the third thoracic segment and on each of the six following abdominal segments; spiracles black; head black; underside and legs dull yellowish. Last three abdominal segments obliquely flattened and sloping posteriorly, hollowed and wrinkled superiorly. Entire upper surface densely set with short black bristles; also a lateral edging of short white hairs. Length 7½ lines.

Pupa.—Thorax and wing-covers dark glossy blackish brown; abdomen dull reddish yellow thickly sprinkled with black atoms, and with a narrow dorsal median stripe of black; head reddish yellow above, shining black beneath, with a fringe of fine white hairs along the front. Entire upper surface sprinkled with very short white hairs; under surface smooth and glossy. Humped dorsally, being markedly constricted at junction of thorax and abdomen; flattened inferiorly. Attached by the tail and by a silken girth.

It will be seen that the early stages much resemble those of a near congener, *D. isocrates* (Fabr.), common in India and Ceylon, the larva of which has long been celebrated for its singular habit not only of feeding in the interior of pomegranate and other fruits but also of finding its way out shortly before the change to pupa and "spinning a strong web over the basal portion of the fruit and over some considerable length of the attaching stem, so that should the fruit be separated from the stem it will not fall to the ground" (de Nicéville, Indian Museum Notes, vol. i. no. 4, p. 194, 1890; and Butt. India, iii. p. 478, 1890). But the larva of *D. antalus* does not appear to share the very remarkable habit in question (first brought to notice by the late Prof. Westwood as long ago as 1835), as Mr. Hunt notes nothing of the kind. He writes, however, that the first pupa found was attached to the inside of a pod of *Crotalaria* which had a round hole at the tip, while the larvæ subsequently found by him were in pods without holes, and in every case left the pod after it had once been opened. He believes the latter course to be traceable to the pod's twisting as it dried and so squeezing the larva. One or two full-grown larvæ which were placed in a pod ate their way out and fastened themselves under the nest of a mason-wasp that was in the same box. The pupal state, in June and July, lasted from 18 to 21 days. Mr. Hunt adds that the pupa, on being touched or disturbed, gives a very distinct squeak, although he could not trace any movement of the insect accompanying it.

91. Deudorix cærulea, H. H. Druce.

♂ ♀. *Deudorix cærulea*, H. H. Druce, Ann. & Mag. Nat. Hist. ser. 6, vol. v. p. 28 (1890).

♂. *Deudorix obscurata*, Trim. Proc. Zool. Soc. 1891, p. 84. n. 61, pl. ix. fig. 13.

A single male, captured in the Mineni Valley on the 11th March, and a female on the 13th.

Mr. Druce pointed out the identity of my *D. obscurata* with his previously described *D. cærulea* in Ent. M. Mag. 1892, p. 65, and reference to his description shows him to be right. His specimens were from Lagos, Western Africa, while the type of my *D. obscurata* was from Omrora on the border of North Ovampoland.

Genus Hypolycæna, Feld.

92. Hypolycæna cæculus (Hopff.).

Iolaus cæculus, Hopff. Monatsb. Akad. Wiss. Berl. 1855, p. 642. n. 17.

Four males and three females from the Mineni Valley, taken from March 7th to 21st. These are the largest specimens that I have seen, the male expanding 1 in. 4½–5½ lin., and the female 1 in. 6–6½ lin. While the males do not incline to the more violaceous tint of the upperside so noticeable in the examples recorded by me from North Ovampoland (Proc. Zool. Soc. 1891, p. 85), yet both sexes resemble the latter, and differ from the usual East-African specimens, in the much redder and decidedly broader transverse streaks of the underside, though none has these markings so strongly developed as in the supposed seasonal form figured by me *loc. cit.* (pl. ix. fig. 14). It would thus appear probable that on the eastern side the seasonal forms differ less widely than they do on the western.

93. Hypolycæna philippus (Fabr.).

Hesperia philippus, Fabr. Ent. Syst. iii. 1, p. 283. n. 87 (1793).

Three specimens from Christmas Pass, and four from the Mineni Valley.

Genus Iolaus, Hübn.

94. Iolaus sidus, Trim.

Iolaus sidus, Trim. Trans. Ent. Soc. Lond. 3rd ser. ii. p. 176 (1864).

A single example of each sex from Christmas Pass. The female is one of the largest I have seen, expanding 1 in. 5½ lin., and has the red stripes of the underside much broader than in any other specimen that has come under my notice. It was captured on 22nd February, settled on the same bush as the *I. aphnæoides* mentioned below.

95. Iolaus bowkeri, Trim.

Iolaus bowkeri, Trim. loc. cit. p. 176 (1864).

Two examples from Christmas Pass and three from the Mineni Valley.

96. Iolaus aphnæoides, Trim.

Iolaus aphnæoides, Trim. Trans. Ent. Soc. Lond. 1873, p. 110; Hewits. Ill. D. Lep., Suppl. pl. iv *a*. figs. 50, 51 (1878).

One male captured at Christmas Pass on 22nd February. Of this very rare though somewhat widely distributed species I have seen only seven examples, viz.: the types (male and female) taken near Grahamstown, Cape Colony; a male from the Trans-Keian territory; a female from Panda-ma-Tenka, near the Victoria Falls of the Zambesi; two females from Lake Nyassa (Hewitson Collection); and the male now under notice[1]. Mr. Selous's example was taken at the edge of a ravine; it settled repeatedly on the same bush.

Genus Myrina, Fabr.

97. Myrina ficedula, Trim.

Myrina ficedula, Trim. Trans. Ent. Soc. Lond. 1879, p. 324.

Two females from Christmas Pass, agreeing with ordinary South-African specimens.

Genus Aphnæus, Hübn.

98. Aphnæus masilikazi (Wallengr.).

Spindasis masilikazi, Wallengr. K. Sv. Vet.-Akad. Handl. 1857—Lep. Rhop. Caffr. p. 45.

Three specimens (2 males and a female) from the Mineni Valley, and three (females) from near Vunduzi River. These were taken on blue flowers at the side of the road.

99. Aphnæus homeyeri, Dewitz.

Aphnæus homeyeri, Dewitz, Deutsch. ent. Zeitschr. xxx. p. 429, pl. ii. figs. 5, 5 *a*, 5 *b*, 5 *c* (1887); Trim. Proc. Zool. Soc. Lond. 1891, p. 88. n. 70.

A female from Sikuva River (March 4th), and two males and

[1] A description with very carefully executed coloured figures of a very closely allied form (found near Durban, Natal, in March 1893) have been sent me by Mr. A. E. Hunt. In this example the orange-yellow stripes and borders of the underside are reduced to almost linear form, the basal stripe indeed being wanting except for its lower inner-marginal portion in the hind wing, and the subbasal one represented by a discocellular short streak in each wing. The common submarginal series of black spots, and the hind-marginal black spots of the hind wing, are quite as in *I. aphnæoides*; but the costa of the fore wing has an orange linear edging, and the inner margin of the hind wing bears a small subbasal orange spot. It seems possible that this may prove to be a seasonal variation of *I. aphnæoides*, but at present I am inclined to regard it as a sport of that species.

three females from near Vunduzi River (April 6th and 12th). Mr. Selous notes that this *Aphnæus* was seen, five or six together, on the same blue flowers that were frequented by *A. masilikazi*.

All six examples agree with the summer specimens taken at Omrora, S.W. Africa, by Mr. Eriksson (see P. Z. S. 1891, p. 89), in their strongly marked and brightly tinted underside.

Genus Chrysorychia, Wallengr.

100. Chrysorychia harpax (Fabr.).

Papilio harpax, Fabr. Ent. Syst. App. p. 829. nn. 327–328 (1775).

Two (♂ ♀) from Christmas Pass, nine (5 ♂, 4 ♀) from Mineni Valley, one (♂) from Lusika River, and one (♂) from near Vunduzi River.

These examples altogether agree best with Hopffer's descriptions and figures (Peters's Reise nach Mossamb., Ins. pl. xxvi. figs. 1–3, p. 403), but the males are of a darker red on the upperside, like more southern examples, and exhibit much variation in the width of the fuscous border of the fore wing—most, however, having that border very broad indeed in apical area.

101. Chrysorychia amanga (Westw.).

Zeritis amanga, Westw., Oates's Matabele-land etc. p. 351. n. 62 (1881).

Chrysorychia amanga, Trim. S.-Afr. Butt. ii. p. 165. n. 201, pl. ix. fig. 1 [♂] (1887).

Four (3 males and a female) from the Mineni Valley, and one (male) from Vunduzi River. The latter male has the discal red on the upperside of the fore wings reduced to a triangular patch not extending (except by an obsolescent spot) above 1st median nervule; and the female exhibits on the underside much of the lilacine-whitish clouding characteristic of the male, and well developed in these Manica examples. In both sexes, but especially in the male, the discal small metallic spots of the underside are better marked than usual.

102. Chrysorychia cruenta, n. sp. (Plate VI. fig. 13, ♂.)

Exp. al. (♂) 1 in. 2–2½ lin.

♂. Allied to *C. amanga* (Westw.). *Fuscous, with a very dark red discal patch in each wing. Fore wing*: dark-red patch inferior, lying between 2nd median nervule and inner margin, narrow superiorly but widening inferiorly so as to occupy inner marginal edge from rather before middle to a little before posterior angle; costa from base to before middle rather broadly bordered with dull fulvous. *Hind wing*: dark-red patch larger than in fore wing, widest superiorly (where it is bounded by the radial nervule) and extending to hind-marginal edge, over anal angular lobe, and to inner margin for some little distance before lobe; tail long and rather wide, of the same dark red; inner-marginal border broadly

hoary to a little beyond middle; lobe with a narrow silvery edging interrupted by base of tail. Cilia in fore wing white from apex to lower radial nervule, below that fuscous; in hind wing dark red with a fine basal line of fuscous. UNDERSIDE.—*Deep ferruginous red, with numerous thin, silvery, dark-edged spots, arranged as in* C. harpax (*Fabr.*), *but much more attenuated, and in hind wing forming more continuous, less macular, transverse series. Fore wing*: a broad basicostal creamy border for about one-third of length of wing; a rather indistinct lilacine cloud over upper part of disk; below median nervure a conspicuous, slender, elongate fuscous-edged white marking, curved upward at its inner extremity and lying longitudinally; a similar but much longer marking, bent downward at its outer extremity, between 1st median nervule and submedian nervure: these two markings represent the much thicker, more transverse ones in *harpax*; inner-marginal border only narrowly and faintly pale fulvous; apical silvery spot only of submarginal series well-marked, elongate, oblique. *Hind wing*: disk with a faint but extended lilacine cloud; discal series of silvery markings forming an almost continuous irregular streak angulated inferiorly; submarginal series of small spots very indistinct, scarcely darker than ground-colour, except at angulation immediately before anal angular lobe, where two are silvery, sublinear, and dark-edged.

Front of head, palpi, first and second pairs of legs (the first being very densely hairy almost to end of tarsus), and under edge of third pair all of the same creamy tint as the basicostal border of the fore wings. Antennæ without white bar beneath at base of club.

The distinguishing characters of this species of *Chrysorychia* are:—on the upperside, the extremely dark red (in some lights with a faint purplish gloss) of the discal patches, and the limitation of the hind-wing patch (whereas in *C. amanga* and *C. harpax* the red extends over the whole surface except a small basal portion); and, on the underside, the very deep red ground-colour, the thinness and regularity of the silvery markings, the very peculiar elongation and whiteness of the two longitudinal streaks below the median nervure and its first nervule in the fore wings, and the creamy (not silvery-white as in *C. amanga*) colour of the basicostal border in the fore wings. The very dense creamy hair, like wool, clothing the first pair of legs, and the absence of the inferior white bar at the base of the antennal club, are also peculiar features of *C. cruenta*, although the former is, to a much smaller extent, exhibited also by *C. amanga*.

Only two males of this handsome *Chrysorychia* were taken by Mr. Selous—one in the Mineni Valley on 6th March, the other at the Lopodzi River on 2nd April.

Genus PENTILA, Westw.

I do not concur with Scudder (Proc. Amer. Acad. Arts & Sci. x. pp. 244 & 284, 1875), Butler (Ent. M. Mag. xxii. p. 59, Aug.

1885), and Smith and Kirby (Rhop. Exot. i. Afr. Lyc. pl. ii. pp. 2 & 4, 1887) in recognizing the MS. genus *Tingra*, Boisd., with *T. tropicalis*, Boisd., as type, or in taking the same author's MS. species *Pentila undularis* as the type of *Pentila*, a genus first defined by Westwood (Gen. Diurn. Lep. p. 503) in 1851. Although Westwood undoubtedly places *P. undularis* first on the list of species included under *Pentila*, it is equally certain, on studying his diagnosis of the genus, that the characters he gives are not those presented by *undularis*, but are (out of the four species he names) solely applicable to the second species, viz. *P. abraxas*, Westw., which should therefore be held as the type of *Pentila*. With *P. abraxas*, *P. tropicalis* is unquestionably congeneric, and the MS. genus *Tingra* should consequently be abandoned, Westwood defines *Pentila* as having "labial palpi very minute;" in the fore wings, "upper discocellular arising from the postcostal at about the same distance beyond the second branch as the space between the first and second branches; it is also about equal in length to the same space and oblique; middle discocellular short, less oblique;" and in the hind wings, "lower discocellular nearly transverse and very slender, &c." *P. abraxas* presents these important characters, as well as all the others described by Westwood, whereas *P. undularis* has rather long, slender, and porrect palpi; the upper discocellular nervule of the fore wings so exceedingly short as to be scarcely distinguishable, and the middle one very short and quite transverse; and in the hind wings an open discoidal cell, the lower discocellular nervule being wanting altogether. The different arrangement of the discocellular neuration of the fore wings gives *P. abraxas* a long discoidal cell and *P. undularis* a short one. Butler (*l. c.* p. 60) recognizes that *P. undularis* "differs considerably both in neuration and palpi from the other species associated with it," and also that, if no longer held as type of *Pentila*, a new genus would have to be founded for it.

103. Pentila tropicalis (Boisd.).

♂. *Tingra tropicalis*, Boisd. App. Voy. Deleg. dans l'Afr. Aust. p. 589. n. 46 (1847).

♂. *Pentila tropicalis*, Hewits. Exot. Butt. iii. pl. 60. fig. 2 (1866).

♀. *Tingra tropicalis*, Smith & Kirby, Rhop. Exot. i. p. 3, Lycæn. Afr. pl. ii. figs. 9, 10 (1887).

The examples collected by Mr. Selous (three from the Mineni Valley, one at the Lopodzi River, and three near the Vunduzi River) resemble the variation from Mombasa, named *lasti* by Messrs. Smith and Kirby (*op. cit.* Lycæn. Afr. pl. viii. figs. 1–4, 1889), in the better development of the upperside fuscous border and discocellular spots in the fore wings of both sexes, but want on the upperside the common discal series of small spots (reproducing that always present on the underside) described and figured in the Mombasa examples. As regards the macular hind-marginal border on the upperside of the hind wings of the male, it is observable

that, of Mr. Selous's five specimens, two have this feature more developed than in the figure of *T. lasti*, one has it about the same, one has it considerably less, and in the last (in which the fore-wing border is abnormally broad) its only trace is some sparse black scales. As pointed out in my description of this species (S.-Afr. Butt. ii. pp. 211–212), the fuscous markings of the upperside are variable in the Natalian typical form, and this tendency seems more marked farther to the north-east.

104. Pentila peucetia, Hewits.

Pentila peucetia, Hewits. Exot. Butt. iii. p. 119, pl. 60. fig. 3 (1866).

Four examples from the Mineni Valley and ten from the Vunduzi River. Noted as always found in shady forest, flying very slowly, and towards sunset settling very often.

The locality of the type is given by Hewitson as the Zambesi, but in Mr. Kirby's Catalogue of the Hewitson Collection (1879, p. 180) the three specimens recorded are respectively from "Gaboon, Calabar, and Lake Nyassa," showing a very wide range for the species. An example received from the Rev. H. Junod was taken at Morakwen, Delagoa Bay, on 30th March, 1891; it is the only one known to me from an extra-tropical locality.

There is little or no variation observable among Mr. Selous's specimens, and the sexes differ only in size.

I find this Butterfly, as well as its close ally *P. peuceda* (H. G. Smith), from Mombasa, and *P. muhata*, Dewitz, from Mukenge and Cameroons, inseparable generically from *P. abraxas* and *P. tropicalis*, and do not see on what grounds Messrs. Kirby and Smith (*op. cit.* Lycæn. Afr. pls. ii. & ix. pp. 3 & 37) have placed them in Butler's genus *Larinopoda* (Trans. Ent. Soc. Lond. 1871, p. 172), the type of which presents a wide difference from them both in palpi and neuration.

Genus Durbania, Trim.

105. Durbania hildegarda (Kirby).

♂. *Teriomima* (?) *hildegarda*, Kirby, Ann. & Mag. Nat. Hist. ser. 5, xix. p. 367 (1887); and Smith & Kirby, Rhop. Exot. i. Lycæn. Afr. p. 16, pl. iv. figs. 7, 8 (1888)[1].

Fifteen specimens were taken in the Mineni Valley from the 9th to 27th March, and two at the Lusika River on 1st April; four from the former and one from the latter locality are females. Mr. Selous notes that this Butterfly was of very slow flight, and congregated in numbers on the stems of a tall herbaceous plant with blue flowers.

The males agree fairly with the figure above cited, which represents an example from Ashanti, but on the upperside are of a slightly

[1] In *op. cit.* p. 46 (1890) Messrs. Smith and Kirby note that *T.* (?) *hildegarda* may be included in the genus *Durbania*.

deeper ochre-yellow and have the discocellular fuscous markings and extracellular costal bar heavier and more confluent, while the common fuscous hind-marginal border varies a good deal in width, being in some specimens narrower than shown in the figure.

The females [1] are distinguished from the males by their much narrower fuscous markings on the upperside; although these markings vary in development, they are at their widest narrower than in the most lightly marked male. The underside is alike in the two sexes.

This is a very close ally of *D. aslauga*, Trim., but separated by its paler ground-colour (without any tinge of orange) and well-defined fuscous hind-marginal border on the upperside—the latter character being specially noticeable in the hind wings, where in *D. aslauga* it is wanting. On the underside the markings agree with those of *aslauga*, but all the rufous spots are much more conspicuous, being larger and paler, especially those of the hind-marginal and submarginal series. *D. aslauga* inhabits the Natal coast, and has also been brought from Zanzibar.

106. Durbania puellaris, n. sp. (Plate VI. fig. 14, ♀.)

Closely allied to *D. puella* (Kirby) [2].

Exp. al. (♂) 1 in. 3 lin.; (♀) 1 in. 3½ lin.

♂. *Ochre-yellow; fore wing with fuscous border at apex. Fore wing*: fuscous border broad on costal edge, beginning at extremity of 2nd subcostal nervule, and thence narrowing to a point on hind-marginal edge at extremity of 3rd median nervule, whence runs a linear prolongation to extremity of 2nd median nervule; inner edge of this border showing marked indentation on each nervule, the deepest being on upper radial nervule, where the border abruptly narrows; costa bordered for a little distance from base with blackish, and beyond this a small blackish spot. Underside.—*Paler; hind wing and apex of fore wing creamy-yellow. Fore wing*: costal edge with 5 small black spots, of which the 1st and 2nd are subbasal and strongly marked; the 3rd faint, very thin, just above extremity of discoidal cell; the 4th like the 3rd and about as far beyond it as the 3rd is from the 2nd; and the 5th is largest, elongate, rather faint, extending to below subcostal nervure, and corresponding in position to the inner edge of the apical border of the upperside; a very fine black line interrupted on nervules along hind-marginal edge from apex to lower radial nervule. *Hind wing*: 5 well-marked but rather small round black spots, viz., one in the discoidal cell just before origin of 1st median nervule; one below cell, a little beyond the same point; and three discal, one being subapical between the subcostal nervules, and the other two between 3rd and 1st median nervules; on hind-

[1] *D. otlanga*, Smith and Kirby (*op. cit.* p. 46, pl. xi. figs. 9, 10), is suggested as "possibly the female of *D. hildegarda*," but is widely different as regards both colour of upperside and pattern of underside.

[2] Ann. & Mag. Nat. Hist. ser. 5, xix. p. 365 (1887); Smith and Kirby, Rhop. Exot. i. Lycæn. Afr. p. 12, pl. iii. figs. 9, 10 (1888)—*Teriomima puella*.

marginal edge, from 1st median nervule to anal angle, an extremely fine black line.

♀. Like male, but with the black markings throughout rather larger. *Fore wing*: apical border broader costally, more deeply indented on upper radial nervule, its inferior linear prolongation in two examples extending below 2nd median nervule. UNDERSIDE.—*Fore wing*: two additional subapical black spots, one on costa a little beyond large fifth spot, and the other (larger) below and beyond the same spot and between the radial nervules; hind-marginal black line well-marked, continuous from apex to 2nd median nervule. *Hind wing*: an additional small black discal spot, below 1st median nervule; in one specimen the trace of another, close to costa, near extremity of costal nervure.

Head and its appendages black; a ring round eyes, the base and tip of palpi, and a ring round the base of each shaft-joint of antennæ, white. Thorax and abdomen pale ochre-yellow. Legs black, conspicuously white-ringed.

One female has the underside concolorous, the hind wings and apex of the fore wings being no paler than the field of the fore wings.

Described from one male and three female specimens.

This form is distinguishable from Mr. Kirby's description and figure of *D. puella*, a native of the Gaboon territory, by its larger size, and on the upperside of the fore wings by its want of costal spots beyond the middle, and costally broader internally deeply indented apical border; while on the underside it wants two of the black spots present in the hind wings of *D. puella*, viz. one close to costa about middle, and the other median, just beyond the extremity of the discoidal cell.

In all structural characters *D. puellaris* cannot be separated from *D. aslauga* and *D. hildegarda*; and most probably, therefore, its close ally *D. puella* should be withdrawn from the genus *Teriomima*, Kirby, and transferred to *Durbania*.

Mr. Selous's four specimens were all taken at the Vunduzi River, on the 5th April; he found them towards sundown settling on the same stems of a blue-flowered plant that was frequented by *D. hildegarda* and *Pentila tropicalis*.

Genus ALÆNA, Boisd.

107. ALÆNA AMAZOULA, Boisd.

Alæna amazoula, Boisd. App. Voy. de Deleg. dans l'Afr. Aust. p. 591. n. 60 (1847).

The only example, a male, was captured in the Mineni Valley on the 7th March. It differs from all of the same sex that I have seen in the great enlargement of the ochre-yellow markings, and proportionate reduction of the fuscous clouding in the basi-median area of both fore and hind wings, in this respect resembling the female. A male taken by Mr. Selous in 1884 on the Umfuli

River in Mashunaland exhibits the same peculiarity in the hind wings, but in the fore wings is almost as much clouded with fuscous as usual, and I have two quite similar males captured by Mr. H. M. Barber on the Tenda River, N.E. Transvaal, in 1888.

108. Alæna nyassa, Hewits. (Plate VI. fig. 15, ♀.)

Alœna nyassa, Hewits. Ent. M. Mag. xiv. p. 6 (1877).

Two females of this strikingly-marked *Alœna*—one taken in Mineni Valley on the 7th March, and the other in the Pungwe Valley on 1st September.

This species was founded on four examples sent from Lake Nyassa by Mr. Simons. Hewitson's description was evidently made from a male, as he notes the costal portion of the curved white bar of the fore wings as consisting of three "minute" divisions, while in the female (where the curved white bar, as well as the corresponding bar in the hind wings, is much broader and of a purer white) that part is of considerable size[1]. The female is much larger than the male, expanding 1½ inches, and her wings are much broader and more rounded hind-marginally.

A male taken at the Shashina River, Matabeleland, by Mr. Selous in 1883, has the transverse black markings of the hind wings exceedingly reduced, the submarginal streak between radial nervule and inner margin being indeed quite obsolete.

Genus Lachnocnema, Trim.

109. Lachnocnema bibulus (Fabr.).

♂. *Papilio bibulus*, Fabr. Ent. Syst. iii. 1, p. 307. n. 163 (1793).

♀. *Papilio laches*, Fabr. op. cit. p. 317. n. 199.

One male and three females taken at Christmas Pass during February. The females are all different on the upperside—one being exceptionally dingy owing to the almost obsolete condition of the usual whitish or white discal marking, another with small but distinct white marking, and the third with a wide development of faint bluish-grey extending from near base over lower discal area in both fore and hind wings[2].

Mr. Selous notes that he found this Butterfly drinking at the water's edge in company with other Lycænidæ.

[1] In another Mashunaland female captured "between Makoni's and the Odzi" in 1891, by Mr. Selous, the white bar in the fore wings is a little narrower throughout, but the white subapical spot, sometimes found on the upperside between the subcostal nervure and the upper radial nervule, is elongated and conspicuous.

[2] The South-African Museum has lately received from the Rev. Dr. Holland four female specimens of *Lachnocnema* taken in the Ogové Valley, Gaboon Territory, in West Africa, which, except in size, cannot be distinguished from *L. bibulus*. They expand 1 in. 2½–3½ lin., while the range of expanse in South-African female *L. bibulus* is 10½ lin. to 1 in. 2 lin. One of these Ogové examples has only the faintest indication on the upperside of the usual pale discal markings, and in the others those markings are limited and rather ill-defined.

110. Lachnocnema durbani, Trim.

Lachnocnema d'urbani, Trim. S.-Afr. Butt. ii. p. 236. n. 238 (1887).

I refer to this species two specimens captured at Christmas Pass (a male on 1st March and a female on 16th February), finding in them no difference from the more southern specimens except their much larger size—the male expanding 1 in. 3½ lin. and the female 1 in. 4½ lin.

Family Papilionidæ.

Subfamily Pierinæ.

Genus Pontia, Boisd.

111. Pontia alcesta (Cram.).

Papilio alcesta, Cram. Pap. Exot. iv. pl. cccIxxix. fig. A (1782).
Pontia alcesta, Trim. S.-Afr. Butt. iii. p. 8, pl. 10. fig. 1 (1889).

Eight specimens from Pungwe River, agreeing with those found in Natal.

Genus Terias, Swains.

112. Terias zoë, Hopff.

♂. *Eurema puchella*, Geyer [*nec* Boisd.], Forts. Hübn. Zutr. Exot. Schmett. p. 8, figs. 815, 816 (1837).
♀. *Terias zoë*, Hopff. Monatsb. Acad. Wissensch. Berl. 1855, p. 640; and Peters's Reise nach Mossamb., Ins. p. 369, pl. xxiii. figs. 10, 11 (1862).

The only example of this common species is a male from Christmas Pass, in which the underside markings, especially the unusual subapical macular blackish ray of the fore wings, are strongly marked.

113. Terias æthiopica, Trim.

♂. *Eurema senegalensis*, Geyer [*nec* Boisd.], op. cit. p. 41, figs. 969, 970 (1837).
♂ ♀. *Terias æthiopica*, Trim. S.-Afr. Butt. iii. p. 21. n. 243 (1889).

A male from Christmas Pass and three males from Mineni Valley are larger (exp. al. 1 in. 8–9 lin.) than usual, and the former has the subapical ferruginous markings on the underside of the fore wings much reduced.

114. Terias butleri, Trim.

♂ ♀. *Terias butleri*, Trim. S.-Afr. Butt. iii. p. 23. n. 244 (1889).

A single male (exp. al. 1 in. 9 lin.), taken at Christmas Pass on 15th February.

115. Terias regularis, Butl.

♂. *Terias regularis*, Butl. Ann. & Mag. Nat. Hist. 4th ser. xviii. p. 486 (1876); Trim. (♂ ♀) op. cit. p. 26. n. 246 (1889).

Three males from Christmas Pass.

In addition to the above there are three specimens of *Terias* that I am unable to assign satisfactorily to any of the species known to me. One is a male from Christmas Pass, which in the form and development of the hind-marginal border on the upperside is intermediate between *T. æthiopica* and *T. butleri*, and on the underside, although with much more distinct markings than the latter, is much more faintly marked than the former and has only the faintest indication of the ferruginous blotch near the apex of the fore wings. The other two are females, from Christmas Pass and Mineni Valley respectively, and are of a very pale whitish yellow above, but of a rather yellower tint beneath; on the upperside there is no trace of any hind-marginal border in the hind wings, and the border in the fore wings is of the width and shape of that presented by the South-African female *T. floricola*, Boisd., while the underside markings are extremely faint, without any trace of the subapical blotch, and in one example scarcely visible except as regards the terminal discocellular and (in hind wings) subbasal ones. These females approach the white and yellowish-white West-African examples which in collections are usually placed as female *T. senegalensis*, Boisd.; but I have never been able to identify this species, Boisduval (Sp. Gen. Lép. i. p. 672) describing with extreme brevity merely a yellow form from "Senegal," as very like *T. hecabe* (L.) but with the underside markings exceedingly faint, and giving no note whatever of the sexes or their differences.

Genus Mylothris, Butl.

116. Mylothris agathina (Cram.).

♂. *Papilio agathina*, Cram. Pap. Exot. iii. pl. ccxxxvii. figs. D, E (1779).

Seven examples, from the Mineni Valley and the Lopodzi and Vunduzi Rivers.

Genus Pieris, Schr.

117. Pieris saba (Fabr.).

♀. *Papilio saba*, Fabr. Sp. Ins. p. 46. n. 199 (1781).

♂. *Pieris orbona*, Boisd. Faune Ent. Madag. etc. p. 18, pl. i. fig. 3 (1833).

♀, and (as ♂) var. ♀, *Pieris malatha*, Boisd. loc. cit. figs. 4, 5.

Two males and a female from Christmas Pass, taken on 22nd and 26th February. The males have the hind-marginal black markings more developed than usual, and the female is of the typical heavily black-clouded form but with the hind-marginal border of the hind wings less broad.

In my S.-Afr. Butt. iii. p. 42, I noted the apparent absence of any female examples linking the var. *flavida*, Mab., with the typical female; but I have since then received two intermediate gradations from Durban, Natal. In the first of these, taken by Mr. C. W. Morrison on the 16th May, 1890, the ground-colour is tinged with lemon-yellow, the hind-marginal border of the hind wings is very little broader than in the variety, but the basal blackish in the fore wings, instead of being merely a narrow costal border, fills all the discoidal cell except its lower edge, where it becomes a sparse irroration only. In the second, taken by Mr. A. D. Miller, there is more approach to the typical female, the hind-marginal border of the hind wings being broader, and the basal black in the fore wings filling the cell, but not extending below it except in a very faint and narrow irroration at the base, while the only tinge of yellow on the white area is at the base of the hind wings.

118. PIERIS ALBA (Wallengr.).

♂. *Pinacopteryx alba*, Wallengr. Sv. Vet.-Akad. Handl. 1857—Lep. Rhop. Caffr. p. 10. n. 7.

♂ ♀. *Pieris alba*, Trim. S.-Afr. Butt. iii. p. 48. n. 253 (1889).

A male and a female very much worn, taken at Sarmento, on the Pungwe River, on the 18th September, are apparently referable to this species.

119. PIERIS SIMANA, Hopff.

♂ ♀. *Pieris simana*, Hopff. Monatsb. Akad. Wissensch. Berl. 1855, p. 640. n. 13; and Peters's Reise n. Mossamb., Ins. p. 354, t. xxiii. figs. 3, 4 (1862).

The only specimen, a female taken at Christmas Pass, has the fuscous apical border in the fore wings widened so as to include the subapical costal streak, and the fuscous hind-marginal spots in the hind wings also larger than usual.

120. PIERIS SEVERINA (Cram.).

♀. *Papilio severina*, Cram. Pap. Exot. iv. pl. 338. figs. G, H (1782).

Fourteen specimens, 4 males, 10 females; twelve from Christmas Pass, where the paired sexes were captured on 26th February. Though varying a good deal in depth of markings, all these examples belong to the larger form with more brightly-tinted underside, which I have shown (S.-Afr. Butt. iii. p. 72 & note) to be in Natal characteristic of the summer or wet season.

Genus HERPÆNIA, Butl.

121. HERPÆNIA ERIPHIA (Godt.).

Pieris eriphia, Godt. Encycl. Méth. ix. p. 157. n. 134 (1819).

The only example is a fine male, captured in Mineni Valley on

28th March. It is of the typical form, proper to the wet season, without any trace of ochre-reddish colouring on the underside.

Genus Teracolus, Swains.

122. Teracolus eris (Klug).

Pontia eris, Klug, Symb. Phys. t. vi. figs. 15, 16 (1829).

One specimen only, taken in the Mineni Valley on 31st March. This is a perfect and very large male (*exp. al.* 2 in. 2 lin.), with the inner-marginal black band of the fore wings as broadly developed as in Klug's figure, but still marked externally between 2nd and 3rd median nervules with a minute white spot. In the hind wings, however, the costal black band does not extend below the 2nd subcostal nervule, but the hind-marginal nervular black marks are decidedly larger than in Klug's figure. The underside is almost pure white, with the inferior submarginal black spots (3) very strongly marked; and it also presents the peculiarity of blackish hind-marginal termination to the nervules, more pronounced in the fore wing than in the hind wing.

123. Teracolus ione (Godt.).

♂. *Pieris ione*, Godt. Encycl. Méth. ix. p. 140. n. 74 (1819).

♂ ♀. *Teracolus ione*, Trim. S.-Afr. Butt. iii. p. 101. n. 269 (1889).

Five males, taken in the Mineni Valley from 6th to 26th March, agree thoroughly with those described by me (*op. cit.* p. 102) from Transvaal and Delagoa Bay; the upperside presenting fine but complete black neuration of the hind wings, and the underside being almost uniformly white, with no markings beyond the terminal discocellular dots, a faint trace in the hind wings of the costal commencement of a discal ray, and (in one specimen only) dusky terminations of the nervules on hind margin.

North Ovampoland must be added to the geographical range of this species, Eriksson having taken six males and three red-tipped females near Ovaquenyama in February and March 1891. The males are rather small (one, indeed, being dwarfish) and approximate the Var. A described by me in S.-Afr. Butt. iii. p. 103, but on the white underside the black neuration is very variable, being pretty well expressed (though very fine) in two examples only, at extremities alone in two others, and wanting altogether in the remaining two; while the discal streak in the hind wings is developed in but two examples, and imperfectly in one of those. The females, though heavily blackish-marked on the upperside, are less so than in Transvaal examples, especially as regards the borders of the apical patch in the fore wings and the hind-marginal border in the hind wings, the latter being macular instead of continuous. Their underside is very pale yellowish, with the discal ray of the hind wings dull ferruginous and not strongly marked; there is no black neuration except in one ex-

ample, where the fore wings exhibit it close to hind margin, and the hind wings on costal nervure and basal part of subcostal nervules.

124. TERACOLUS ANAX (H. G. Smith).

♂ ♀. *Callosune anax*, H. G. Smith, Ann. & Mag. Nat. Hist. ser. 6, iii. p. 125 (1889); and Rhop. Exot. i. *Callosune*, i. p. 2, pl. i. figs. 5, 6 (♂), 7, 8 (♀) (1889).

♂. *Anthopsyche ione*, Wallengr. Sv. Vet.-Akad. Handl. 1857—Lep. Rhop. Caffr. p. 15.

♂ ♀ *Anthocharis regina*, Trim., var. ♂ and var. ♀, Trans. Ent. Soc. Lond. (3) i. p. 521 (1863).

♂ ♀. *Teracolus regina*, var. A, Trim. S.-Afr. Butt. iii. p. 112 (1889).

♂ ♀. *Teracolus eliza*, E. M. Sharpe, Ann. & Mag. Nat. Hist. v. p. 441 (1890).

There are five specimens (all males) of this splendid *Teracolus*, captured in Mineni Valley from 9th to 27th March. These differ slightly from Mr. H. G. Smith's figure, above cited, of a Mombasa male, having on the underside less irroration basally, a narrower inner black border to the violet apical patch in the fore wings, and smaller nervular hind-marginal black spots in the hind wings; the last-named markings are also much reduced on the underside of the hind wings. The black spots of the discal series on the underside of the hind wings vary a good deal in size and distinctness, one example having them just as in Mr. Smith's fig. 6, two others having all but the first and last larger, another wanting the second spot, and the last wanting both second and third spots; the ground-colour is also variable, two examples presenting it creamy instead of pure white.

As usual in the genus *Teracolus*, it is impossible to define exact limits between *T. anax* and *T. regina*. The Manica males here noticed link *T. anax* to the var. A of *regina* from Damaraland, and so do two others taken by Mr. A. W. Eriksson, in 1885, in the belt of country between Transvaal and Matabeleland; while, as I have noted (*op. cit.* p. 113), another male from the latter tract is intermediate between the var. A and typical *T. regina*[1]. Of two females taken by Mr. Selous in 1882 on the Upper Limpopo, Transvaal boundary, one is typical *T. regina*, but the other is referable to var. A; the latter is on the upperside very close to Mr. Smith's figure (7) of female *T. anax*, but has both the basal irroration of the fore wings and the hind-marginal large black spots considerably broader —the latter, indeed, are so enlarged as to meet and form a continuous border, while on the underside the corresponding spots are very much smaller than in the figure (8) of *T. anax* female[2]. Looking to

[1] This male closely agrees with the male of *T. eliza*, E. M. Sharpe, from near Mombasa, as figured by Waterhouse ('Aid,' pl. 189, 1890).

[2] This female, except for its stronger basal irroration, agrees well with the female of *T. eliza*, E. M. Sharpe, as shown on the plate of 'Aid' above cited, fig. 6.

the evidence afforded by several species of the genus, I am inclined to think that the typical *T. regina*, with greatly-reduced dark markings and more or less reddish-tinged underside, and the large *anax* form (including my *T. regina*, var. A), with strongly-developed dark markings and white or creamy-white underside, will turn out to be respectively dry-season and wet-season broods of the same species.

125. Teracolus gavisa (Wallengr.).

♂. *Anthopsyche gavisa*, Wallengr. Sv. Vet.-Akad. Handl. 1857—Lep. Rhop. Caffr. p. 13. n. 6.

Seven males and three females from Mineni Valley, and one female from Vunduzi River. The paired sexes were taken on 6th March.

The males exhibit considerable variation in the development of the black markings on the upperside of the wings, especially in the longitudinal bars, which in two specimens are narrow and faint, and in another represented by sparse scaling only. One of those of normally strong black marking on the upperside is wanting altogether in the usual black neuration on the underside, in this respect approaching the very closely-allied *T. achine* (Cram.). A female also exhibits almost complete failure of the black neuration on the underside.

126. Teracolus celimene (Lucas).

♂ ♀. *Anthocharis celimene*, Lucas, Rev. et Mag. Zool. (2) iv. p. 426 (1852).

♂ ♀. *Anthocharis amina*, Hewits. Exot. Butt. iii. pl. 5. figs. 1–3 (1866).

A single male, in fine condition, taken on the Lower Pungwe River, on 26th September. Mr. Selous informs me that this was the only specimen he noticed; it was settling on herbage.

Genus Colias, Fabr.

127. Colias electra (Linn.).

Papilio electra, Linn. Syst. Nat. i. 2, p. 764. n. 101 (1767).

Two large males (*exp. al.* 2 in. 2 lin.) from Christmas Pass.

Dr. F. Karsch has noted (Ent. Nachr. xviii. p. 169, 1892) a single specimen collected by Dr. E. Zintgraff at Baliburg, interior of Cameroon. This station is stated to be at an elevation of 1250 metres, and is the first locality for a *Colias* I have found recorded in Western North-Tropical Africa.

Genus Eronia, Boisd.

128. Eronia thalassina (Boisd.).

♂ ♀. *Pieris thalassina*, Boisd. Sp. Gen. Lép. i. p. 443. n. 8 (1836).

♂ ♀. *Eronia verulanus*, Ward, Ent. M. Mag. viii. p. 59

(1871); and Afr. Lep. pt. i. p. 4, pl. iv. figs. 5 (♂), 6, 7 (♀) (1873).

Two examples from Christmas Pass—a male captured on 1st March, and a female on 21st February. The latter has on the upperside the fore wings white and the hind wings pale yellow (rather deeper externally); and on the underside the glossy hind wings and apical hind-marginal border of the fore wings so slightly tinged with yellowish as to be almost as white as the disk of the fore wings.

The female of this species evidently varies much in colouring, the example figured by Ward from Cameroon having the fore wing ochre-yellow on both surfaces while the hind wings are white; while one from Zambesi in the Hewitson Collection had the upperside yellowish throughout. Just as the female *E. argia* (Fabr.) mimics *Mylothris agathina* (Cram.), so the female *E. thalassina* figured by Ward is a manifest imitator of the female *Myl. poppea* (Cram.), var. *spica*, Möschl., with ochre-yellow fore wings, while the Manica female of *E. thalassina* strongly resembles the female *Myl. trimenia*, Butl.[1]

Manica is the most southern station known to me for this species. Mr. Selous noticed a good many males coursing rapidly along a thickly-wooded hillside, but only captured one.

Genus Callidryas, Boisd.

129. Callidryas florella (Fabr.).

♀. *Papilio florella*, Fabr. Syst. Ent. p. 479. n. 159 (1775).

Five males and five females from Christmas Pass and one female from Mineni Valley; the last-named example was taken on 16th March, but all the others from 12th to 24th February. All the males but one are strongly freckled on the underside, and all the females are of the yellow form. The male that differs from the rest has the underside not only more faintly freckled but also of a greener tint.

Subfamily Papilioninæ.

Genus Papilio, Linn.

130. Papilio leonidas, Fabr.

Papilio similis, Cram. Pap. Exot. i. pl. ix. figs. B, C (1779).
Papilio leonidas, Fabr. Ent. Syst. iii. 1, p. 35. n. 103 (1793).

The only example is a male, taken in Mineni Valley on 12th March. It agrees pretty closely with ordinary West-Coast specimens except that the tint of the greenish spots is yellower, and that the basal red stain on the underside of both fore and hind wings is considerably brighter and more extended. This latter difference also appears in two other males taken by Mr. Selous—one in the desert country south of the Mababe River in August

[1] A close mimicker of *M. trimenia* is *Pieris* ("*Belenois*") *lasti*, H. G. Smith, from Mombasa. *M. poppea* is similarly very exactly copied by *Papilio rhodope*, Fabr., and *M. agathina* by *P. thysa*, Hopff.

1884, and the other farther to the north-east, a little south of the junction of the Chobe and Zambesi Rivers, in 1889. This is not a variation in the direction of the closely-allied southern form, *P. brasidas*, Feld., in which the basal red in question is usually much duller and sometimes obsolescent.

131. Papilio corinneus, Bertol.

Papilio corinneus, Bertol. Mem. Acad. Sci. Bologna, 1849, p. 9, t. i. figs. 1–3 [1].

Five examples—a male from Umtali, two females from Christmas Pass, and a male and female from Mineni Valley.

132. Papilio demoleus, Linn.

Papilio demoleus, Linn. Mus. Lud. Ulr. Reg. p. 214. n. 33 (1764).

Eight specimens from Christmas Pass, and two from Mineni Valley. A rather worn female among the former has all the yellow spots deeper and duller in tint than usual, presenting some approach to the specimens sometimes met with in which these markings are of dull ochry-reddish. (See S.-Afr. Butt. iii. p. 227, footnote.)

133. Papilio ophidicephalus, Oberth.

Papilio ophidicephalus, Oberth. Études d'Ent. iii. p. 13 (1878).

The solitary example of this fine *Papilio* is a female taken at Christmas Pass on 29th February. Unfortunately it is very much worn and broken, but it displays a remarkable aberration in the form of the common transverse yellow band, which in the fore wing is not only continuous and non-macular throughout but at its superior extremity is narrower than usual and farther from apex, its inner edge being immediately beyond (instead of some little distance from) the end of the discoidal cell [2]; the oblique marking crossing the cell near its termination it also greatly enlarged and very broad inferiorly. In the hind wings the band is wider than usual in the left wing, and very much wider in the right one.

Mr. Selous saw two specimens only.

134. Papilio lyæus, Doubl.

♂. *Papilio nireus*, Cram. (*nec* Linn.) Pap. Exot. iv. pl. cccIxxviii. figs. F, G (1782).

Papilio lyæus, Doubl. "Ann. Nat. Hist. xvi. p. 178 (1845)"; Gen. D. Lep. i. p. 13. n. 98 (1846).

Fourteen males and two females from Christmas Pass, and two

[1] The pagination and number of the plate are those of the separate copies of the memoir; but, from Butler's quotation of "p. 183, t. 9" for *Deilephila ranzani* (a moth described and figured on p. 19, t. 1), these appear not to be those of the original publication. Butler also gives the date of publication as 1850: the memoir is dated as *read* on "25th January, 1849."

[2] It is noteworthy that this costal incurvation is characteristic of the closely allied *P. menestheus*, Drury, from West Africa, in which, however, the band is very narrow and composed of completely separated spots in the upper parts as well as in the rest.

males from Mineni Valley. The latter and three others from Christmas Pass are the only males that exhibit to a slight extent the shining-greyish underside clouding, that characteristic feature of *P. lycæus* being absent in the rest. The other distinguishing features of *P. lycæus*, as distinct from the West-African *P. nireus*, are, however, well expressed.

135. Papilio cenea, Stoll.

♀. *Papilio cenea*, Stoll, Suppl. Cram. Pap. Exot. p. 134, pl. xxix. figs. 1, 1 A (1791).

♂. *Papilio brutus*, Godt. (pars) Encycl. Méth. ix. p. 69. n. 122 (1819).

♂. *Papilio merope*, Doubl. (pars) Gen. D. Lep. i. p. 13. n. 92 (1846).

♀. *Papilio trophonius*, Westw. "Ann. Nat. Hist. ix. p. 38, (1842)"; and Arcan. Ent. i. pl. 39. figs. 1, 2 (1845).

Twenty-four males and six females from Christmas Pass, all taken during February. The former without exception have a continuous broad or very broad discal black transverse band in the hind wings, but in four of them there is almost an interruption of the band between the 2nd subcostal and radial nervules. The tail of the hind wing is very variable in width and in the extent to which it is spatulate; in most examples it is black for three-fourths of its length, but in others for about two-thirds and in one for barely half. One specimen presents the very unusual feature of two small spots of the ground-colour in the black border of the fore wings between the 1st radial and 3rd median nervules. This strongly marked form of the male has (with the black-and-white southern form of the female so near the female of *P. merope* from West Africa named *hippocoon* by Fabricius) been named *P. tibullus* by Mr. Kirby. There is no doubt that it is characteristic of East and South-east Africa, prevailing along the coast from Natal to Zanzibar; but it occurs along with other less heavily-banded males both in Trans-Kei territory and the eastern districts of Cape Colony.

The females consist of two near the typical *P. cenea*, Stoll, but having the markings enlarged precisely as in the two examples from Delagoa Bay which I have recorded in S.-Afr. Butt. iii. p. 249, *e*; and four of the black-and-white form near the *hippocoon* ♀ of *P. merope* above referred to.

136. Papilio echerioides, Trim.

Papilio echerioides, Trim. Trans. Ent. Soc. Lond. 1868, p. 72 n. 2, pl. vi. figs. 1, 2.

Two specimens from Christmas Pass, a male taken on 19th February and a female on the 20th. The male differs from the southern type-form in having the common transverse band rather narrower and with the component spots more widely separated in the fore wings and narrower on costa in the hind wings; this band is also almost pure white instead of decidedly yellowish white, as are be-

sides the hind-marginal spots (smaller than in typical *echerioides*) of the hind wings. The female differs similarly from the typical female as regards the size of the spots just mentioned, and the large ochre-yellow marking on the upperside of the hind wings is less of a patch and more of a band, being slightly wider near costa and considerably wider on inner margin than in typical *echerioides*.

The points of difference here noted in the male are in the direction of the allied larger species *P. zoroastres*, Druce (Ent. M. Mag. xiv. p. 226, 1878, ♂), from Fernando Po. I have not seen this Butterfly; but from a comparison of Mr. Druce's description with that of *P. jacksoni*, E. M. Sharpe (Proc. Zool. Soc. 1891, p. 188), and with the figure of the latter (*op. cit.* pl. xvii. fig. 1), I think there can be little doubt that the two are identical. *P. jacksoni* is recorded as a native of Kikuyu, British East Africa.

The range of *P. echerioides* extends to Zanzibar, M. Ch. Oberthür having figured (Études d'Ent. xiii. p. 10, pl. 2. fig. 6, 1890) a female from "Ngourou" in that territory, which differs from more southern examples only in having the discocellular spot and submarginal spots in the fore wings, and the hind-marginal spots in the hind wings, all larger than usual.

Family Hesperiidæ.

Genus Cyclopides, Westw.

137. Cyclopides metis, Linn.

♂. *Papilio metis*, Linn. Mus. Lud. Ulr. p. 325. n. 143 (1764); and Syst. Nat. i. 2, p. 792. n. 245 (1767).

A single male from Christmas Pass. This is the most northern locality from which I have seen an example of this abundant South-African species, but Mr. Druce has recorded it from Angola, and Nyassa is given as the habitat of some specimens in the Hewitson Collection.

138. Cyclopides willemi (Wallengr.).

♂. *Heteropterus willemi*, Wallengr. Sv. Vet.-Akad. Handl. 1857—Lep. Rhop. Caffr. p. 47. n. 2.

Two males from Lusika River, captured on 1st April. One of these has the spots of the discal series in the fore wings much larger than usual on the upperside.

The first female of this species that I have seen was taken by Mr. A. W. Eriksson between the Cunenè River and Ovaquenyama Iron Mines in January–February, 1891. This example expands 1 in. 3 lin., and differs from the male in having the spots of the fore wing on the upperside larger and of a clearer and more decided yellow, especially those of the discal series; while on the underside the hind wing and apex of the fore wing are of a brighter unobscured pale yellow, with fine and more sharply-defined black neuration, and in the fore wing the spots of the discal series, though smaller, are as complete as on the upperside, the 4th and

5th spots being confluent with two of the hind-marginal series, but the 6th quite separate. Another distinctive character of the female is that the cilia are pale yellow, instead of dark brown, on both upperside and underside.

139. CYCLOPIDES MINENI, n. sp. (Plate VI. fig. 16.)

Exp. al. 1 in. $2\frac{1}{2}$ lin.

Fuscous; fore wing with two discocellular and a serpentine series of eight discal small but well-defined transparent spots. Fore wing: discocellular spots terminal, rounded, separate, placed transversely one above the other; discal series of spots flexed inwardly just below costa, then strongly outwardly to near hind margin, and thence directed inwardly to below extremity of cell, so that the spots are most irregularly placed—the second being a little before the first, the third a little beyond both these, the fourth (between radial nervules) not far from hind margin, the fifth almost directly below the third, the sixth directly below the second, the seventh (rounder and rather larger than the rest) close to and only a little beyond the lower discocellular spot, and the eighth (just above submedian nervure) directly below the discocellular spots. Cilia white, with black nervular marks. UNDERSIDE.—*Hind wing, and basicostal area of fore wing including discoidal cell, dull pale yellow. Fore wing*: spots as on upperside but all larger; a slight yellowish irroration along hind-marginal border. *Hind wing*: *a discal series of seven very conspicuous and irregularly disposed white spots in dull fuscous borders*, of which the first and seventh are largest and before the rest, and the fifth is nearest to hind margin; two moderate-sized fuscous spots—one near base between costal and subcostal nervures, the other at extremity of discoidal cell. Cilia as on upperside.

It is with some doubt that I place this Butterfly in the genus *Cyclopides*, as the only specimen, taken in Mineni Valley on March 25th, is not in good condition, and its sex cannot be determined. The antenna is rather longer and with a more elongate club than in *C. metis* (Linn.) and *C. malgacha* (Boisd.), but the first subcostal nervule in the fore wing runs free to the costal edge, and the tibia of the hind leg bears two pairs of spurs as usual. In general aspect and in the character of the markings this species reminds one of the West-African genus *Ceratrichia*, and the arrangement of the transparent spots in the fore wing is almost exactly like that in *Pamphila ophiusa* (Hewits.), from Old Calabar and Gaboon, while the colouring and spotting of the underside of the hind wing somewhat resemble those features in *P. callicles* (Hewits.).

Genus PYRGUS, Westw.

140. PYRGUS VINDEX (Cram.).

Papilio vindex, Cram. Pap. Exot. iv. pl. cccliii. figs. G, H (1781).

The only specimen, a male from the Mineni Valley, is of the

typical form, and not, as might have been anticipated, of the larger form (with paler, larger-spotted underside) prevalent throughout the greater part of Eastern South Africa.

141. Pyrgus dromus, Plötz.

Pyrgus dromus, Plötz, Mitt. naturw. Ver. Neu-Vorpomm. u. Rügen, 1884, p. 6. n. 13.

A male taken at Umtali on 8th March.

142. Pyrgus elma, Trim.[1]

Pyrgus elma, Trim. Trans. Ent. Soc. Lond. 3rd ser. i. p. 288 (1862).

One example, apparently a female, from Christmas Pass.

Genus Thymelicus, Herr.-Schäff.

143. Thymelicus wallengrenii, Trim.

Thymelicus wallengrenii, Trim. Trans. Ent. Soc. Lond. 1883, p. 361; and S.-Afr. Butt. iii. p. 304. n. 341, pl. xi. fig. 7 [♀] (1889).

Three specimens from Mineni Valley, taken from 9th to 22nd March. This species was hitherto known to me from Natal and Zululand only.

144. Thymelicus capenas (Hewits.).

Cyclopides capenas, Hewits. Descr. New Sp. Hesp. ii. p. 43. n. 7 (1868); and Exot. Butt. v. p. 111, pl. 59. figs. 2, 3 [♂] (1874).

Var. *Cyclopides derbice*, Hewits. Ann. & Mag. Nat. Hist. (4) xx. p. 327 (1877).

A male from Christmas Pass, taken on 6th February, and four males and a female from Mineni Valley, taken from 8th to 14th March. All these examples belong to the form without yellow neuration on apical half of the hind margin on the upperside, so agreeing with the description of *C. derbice*, Hewits. In one male the upperside spots are much reduced in size and of duller yellow. The female has the upperside of a less dark brown and its spots larger.

This Butterfly was originally described from Zambesi specimens, and the var. *derbice* from examples taken on Lake Nyassa by Messrs. Thelwall and Simons. It is distinguishable from its near ally the South-African *T. macomo*, Trim., by its darker upperside, with

[1] The Butterfly from Togoland, N. West-Tropical Africa, referred to *P. elma* by Karsch (Berl. ent. Zeitschr. xxxviii. p. 245, n. 177, 1893), appears from the figure (pl. vi. fig. 12) to be of a distinct species. This figure shows the upperside of a more uniform dark tint, with more inclination to a rufous tone; the median vitreous spots in the fore wings are larger and whiter, and the median white bar of the hind wings is prolonged superiorly almost to the costa and is acuminate at its inferior extremity. On the underside the colouring is much darker and has a reddish tinge; in the fore wings the submarginal whitish streak is wanting, and in the hind wings the median white stripe is more irregular and the inner marginal border is pale brown instead of whitish.

smaller (and in hind wings differently disposed) spots; and on the underside by the greatly reduced and broken-up apical yellow in the fore wings, and larger and more numerous black spots and black (instead of yellow) inner-marginal fold in the hind wings.

Genus Pamphila, Fabr.

145. Pamphila morantii, Trim.

♀. *Pamphila morantii*, Trim. Trans. Ent. Soc. Lond. 1873, p. 112; and ♂, S.-Afr. Butt. iii. p. 311, pl. 12. fig. 3 (1889).

A single male, captured in Mineni Valley on 8th March, belongs to the variation *P. ranoha*, Westw., in which the underside colouring is yellow-ochreous, without ferruginous tinge.

146. Pamphila harona, Westw.

Pamphila harona, Westw., App. Oates's Matabele-land, p. 353. n. 75 (1881).

The six males in the collection (two from Umtali River, 28th February, and four from Mineni Valley, 7th to 25th March) differ from Westwood's description (and from two examples agreeing with this which were taken by Mr. Selous in 1883–84 in some part of the South-Tropical tract not recorded) in the following particulars, viz.:—larger size; better development of the dark markings of its upperside (especially of the lower basal and discocellular markings of the fore wings, and the hind-marginal border of the hind wings), the two Umtali specimens and one of those from the Mineni Valley having them more strongly developed than the rest; and more or less reddish-tinged underside of the hind wings and apex of the fore wings, with a greater or less tendency to inter-nervular creamy longitudinal stripes. This pale striping is least apparent in a specimen from Mineni Valley which on the upperside is nearest to the type-form; it is better indicated in those already mentioned as most strongly dark-marked on the upperside; and in two Mineni Valley examples, which present intermediate upperside markings, it is strikingly pronounced.

The specimens on which this species was founded are recorded (*l. c.*) as taken by the late Mr. F. Oates near the Victoria Falls of the Zambesi, in January.

Mr. Selous notes this Butterfly as being rather numerous, very swift in flight, but frequently settling in bushes, or drinking at the water's edge.

147. Pamphila zimbazo, n. sp. (Plate VI. fig. 17, ♀.)

Allied to *P. harona* and to *P. morantii*.

Exp. al. (♂) 1 in. 1–2 lin.; (♀) 1 in. $1\frac{1}{2}$–$2\frac{1}{2}$ lin.

♂. *Blackish-brown, with in each wing an ochre-yellow transverse discal band, long and irregular in fore wing, short and regular in hind wing. Fore wing*: basal half of costa broadly clouded with ochre-yellow; discal band of moderate width, beginning well beyond middle just below costa, elbowed outwardly and narrowed

on radial nervules, thence widening and slanting inwardly as far as submedian nervure; at median nervure, on each side of its second nervule, a good-sized terminal discocellular ochre-yellow spot, subquadrate, is completely confluent with inner edge of discal band; below submedian nervure a very pale yellowish longitudinal streak from base meets termination of discal band. *Hind wing*: discal band obliquely-transverse, broad, indented irregularly on both edges, beginning abruptly on 2nd subcostal nervule with its outer edge very near hind margin, and ending above submedian nervure not far beyond middle; a longitudinal yellowish ray from base to hind margin, below submedian nervure, set with yellowish hairs; in discoidal cell a sparse clothing of yellowish hairs. *Cilia* broad, ochre-yellow, tinged with ferruginous in fore wing. UNDERSIDE.—*Hind wing and apical hind-marginal border of fore wing dull pale ochre-yellow with a tinge of olivaceous brown; the former with a submarginal series of more or less reddish spots with dark edges. Fore wing*: ground-colour pale ochre-yellow, fading into dull creamy towards inner margin; from base a broad black longitudinal stripe, traversed by median nervure and a small part of its first nervule, abruptly truncate before middle; at a little distance beyond termination of this stripe, and immediately beyond extremity of discoidal cell, an equally conspicuous wedge-shaped black marking narrowed outwardly, between first radial and 3rd median nervules; upper part of discal band of upperside indicated by thin interrupted fuscous edging lines, of which the long outer series defines the inner edge of the hind-marginal border as far as the 2nd median nervule, beneath which it abruptly expands into a broad fuscous or black marking extending to hind margin and (diffusedly) to posterior angle. *Hind wing*: submarginal series consisting of five spots, of which the first, between costal nervure and 1st subcostal nervule, is remote from the rest, which lie contiguously in an almost straight line between 2nd subcostal nervule and submedian nervure; these spots vary in their distinctness of tint from that of the ground-colour, are elongate-ovate, and are fuscous-edged both internally and externally without being completely ringed; a similar spot at extremity of cell, a less distinct one immediately below it, and a small subbasal fuscous spot between costal and subcostal nervures; at extremity of inner marginal fold, close to anal angle, a darker cloud, faint in two examples, but in the other two fuscous and conspicuous.

♀. Like male, but with the discal bands broader. UNDERSIDE.—Rather paler, with the black markings of the fore wing not so strongly developed.

This species most resembles *P. morantii*, Trim., on the upperside, but on the underside of the fore wings exhibits a remarkable likeness to the darker examples of *P. harona*, Westw., in the black markings; while the underside of the hind wings is altogether different from that of either of those species. The only palpus (that of a female) remaining shows the 3rd joint to be as in *P. harona*, long, slender, and erect.

The four males and four females described were taken in the Mineni Valley, from the 7th to the 25th March, settling on bushes in a wooded ravine.

148. PAMPHILA ZENO, Trim.

♀. *Pamphila zeno*, Trim. Trans. Ent. Soc. Lond. (3) ii. p. 179 (1864); and S.-Afr. Butt. iii. p. 313. n. 345, pl. 12. fig. 2 (1889).

Two males, from Christmas Pass and Revué River respectively.

149. PAMPHILA CHIRALA, n. sp. (Plate VI. fig. 18, ♀.)

Exp. al. 1 in. 4 lin.

♀. *Dull brown; fore wing with a few transparent whitish spots and one semitransparent yellow spot, hind wing with a suffusion of ochre-yellow from base to a little beyond middle; cilia uniform dull whitish-brown. Fore wing*: six transparent spots, viz.: two small ones in discoidal cell, near its extremity, disposed transversely one immediately above the other; two a little beyond and beneath these, only separated from each other by the 2nd median nervule, of which the upper is small and triangular and the lower large and quadrate; and two near costa, midway between discocellular spots and apex, only separated from each other by the 5th subcostal nervule, of which the upper is minute and subquadrate and the lower small and wedge-shaped; immediately above submedian nervure, about middle, a pale dull-yellow wedge-shaped spot, smaller than the largest of the transparent spots, with its narrow end baseward; from base to before middle a faint suffusion of ochre-yellow. *Hind wing*: without markings; ochre-yellow suffusion from base fading away beyond middle and not extending to costa. UNDERSIDE.—*Hind wing and apical area of fore wing rather bright yellow, varied with dull ferruginous. Fore wing*: transparent spots with a fuscous edging; field of wing fuscous-grey; costa narrowly and hind margin more widely bordered with pale dull reddish; a large subapical costal patch of yellow, beginning at extremity of discoidal cell and outwardly bounded by an oblique ferruginous streak from apex to 3rd median nervule; a hind-marginal series of small indistinct internervular brown spots; inner margin dingy-whitish. *Hind wing*: from apex to submedian nervure an oblique ferruginous band, narrowed on 3rd median nervule; hind margin evenly bordered by an even rather narrow dull-reddish band, externally brown-spotted as in fore wing, but internally edged with ferruginous; costa diffusedly edged with ferruginous; a minute subbasal ferruginous spot between costal and subcostal nervules; an ill-expressed transverse series of three very small similar spots before middle; and a small ring-spot rather beyond middle, between subcostal nervules.

Antennæ dark brown, with thin whitish rings marking the joints, and with outer third of club white. Palpi (except terminal joint) clothed with brown hair above and very densely with yellow hair beneath.

This Hesperid, though of small size, resembles in structure the

group of large species represented by *P. erinnys* and *P. dysmephila*, Trim., especially in its robust body, rather slender legs, and long antennæ with elongate but thick club (the tip of which is acute and curved but not hooked); the terminal joint of the palpi is short, very slender, acuminate, and pilose.

As regards colouring and marking, *P. chirala* on the upperside resembles *P. malchus* and *P. gillias* (Mab.), from Madagascar, but has an entirely different underside, much recalling that of the North-American group represented by *P. zabulon*, Boisd. & Le C., *P. peckius*, Kirb., and *P. mystic* (Scudd.), though unlike in the oblique disposition of the ferruginous stripes.

The only example was taken in Mineni Valley on 13th March.

150. Pamphila moritili (Wallengr.).

♀. *Hesperia moritili*, Wallengr. Sv. Vet.-Akad. Handl. 1857—Lep. Rhop. Caffr. p. 49. n. 4.

♂ ♀. *Pamphila moritili*, Trim. S.-Afr. Butt. iii. p. 319. n. 349, pl. 12. fig. 4 [♂] (1889).

Three examples captured in the Mineni Valley, during March—two males and a female.

151. Pamphila borbonica (Boisd.).

Hesperia borbonica, Boisd. Faune Ent. Madag. etc. p. 65. n. 3, pl. 9. figs. 5, 6 (1833).

Pamphila borbonica, Mab. in Grandid. Madag. etc., Lepid. i. p. 360, pl. lv. figs. 6, 6 *a* (1885–86).

The only example, a male from Christmas Pass, agrees with Natal specimens in possessing a small subterminal vitreous spot in the discoidal cell which is wanting in the type-form.

152. Pamphila inconspicua (Bertol.).

♂. *Hesperia inconspicua*, Bertol. Mem. Acad. Sci. Bologna, 1849–50 (sep. cop.), p. 15, pl. i. figs. 4, 5.

♀. *Hesperia mohopaani*, Wallengr. l. c. p. 48 (1857).

♂ ♀. *Pamphila micipsa*, Trim. Trans. Ent. Soc. Lond. (3) i. p. 290 (1862).

♂ ♀. *Pamphila mohopaani*, Trim. Rhop. Afr. Aust. ii. p. 304. n. 198 (1866); and S.-Afr. Butt. iii. p. 324. n. 353 (1889).

Bertoloni's description and figures are from a single male from Inhambane; there can be no doubt that his species is identical with *H. mohopaani*, Wallengr.

A single male from Christmas Pass is somewhat greyer (less greenish yellow) in tint on the underside, and has six spots in the discal series of the underside of the hind wings[1].

[1] A male *Pamphila* from Khasia Hills, Assam, received as "*Chapra prominens*" from Mr. de Nicéville in 1889, is inseparable from the male *P. inconspicua*. I have already (S.-Afr. Butt., iii. p. 325) expressed the opinion that *mohopaani* (= *inconspicua*) will eventually be recognized as merely a larger form of the Oriental *P. mathias* (Fabr.).

153. Pamphila roncilgonis (Plötz).

Hesperia roncilgonis, Plötz, Stett. ent. Zeit. 1882, pp. 450–51. ♂ ♀. *Pamphila roncilgonis*, Trim. Trans. Ent. Soc. Lond. 1893, p. 139, pl. viii. fig. 11 [♂].

Fourteen examples, three only of which are females, from Umtali (1), Christmas Pass (1), Mineni Valley (4), Lopodzi River (1), and Vunduzi River (7). All these specimens are more or less worn, the best being from the last-named locality (5th to 12th April).

The females differ from the Delagoa Bay example described by me (*l. c.* pp. 140–41) in wanting the minute additional transparent spot in the fore wings between the 5th subcostal and upper radial nervules; and the largest and freshest of them also is nearer to the male in the fulvous-ochreous violaceous-glossed hind wings and apex of fore wings on the underside.

Mr. Selous notes this species as chiefly observed on flowers—especially on the tall spikes of blue flowers above mentioned as attracting so many *Lycænidæ*. One specimen was captured while drinking at the water's edge.

154. Pamphila hottentota (Latr.).

♂. *Hesperia hottentota*, Latr. Encycl. Méth. ix. p. 777. n. 133 (1822).

♂ ♀. *Hesperia zetterstedti*, Wallengr. l. c. p. 49. n. 3 (1857).

♂ ♀. *Pamphila hottentota*, Trim. S.-Afr. Butt. iii. p. 314. n. 346, pl. 11. figs. 8, 8 *a* (1889).

Two specimens from Christmas Pass, two from the Mineni Valley, and one specimen from the Vunduzi River, all (3 males, 2 females) belonging to the var. *zetterstedti*, so widely spread over all Eastern South Africa.

Genus Ancyloxypha, Feld.

155. Ancyloxypha mackenii (Trim.).

♂. *Pamphila? mackenii*, Trim. Trans. Ent. Soc. Lond. 1868, p. 95, pl. vi. fig. 8.

♂ ♀. *Ancyloxypha mackenii*, Trim. S.-Afr. Butt. iii. p. 331. n. 357 (1889).

Three males from Christmas Pass (16th to 23rd February), and a male and a female from the Mineni Valley (6th and 8th March).

156. Ancyloxypha philander (Hopff.).

♂. *Pamphila philander*, Hopff. "Monatsb. Akad. Wissensch. Berl. 1855, p. 643"; and Peters' Reise n. Mossamb., Ins. p. 416, t. xxvii. figs. 1, 2 (1862).

♂ ♀. *Ancyloxypha philander*, Trim. S.-Afr. Butt. iii. p. 333. n. 358 (1889).

Five specimens: 2 males and 2 females from the Mineni Valley (6th and 7th March) and a female from the Vunduzi River (5th April). All have the lowest spot of the discal series of the fore wing on

the upperside smaller and much more widely apart from the spot immediately above it than in Hopffer's figure of the male from Querimbe; both the males have the white median bar on the upperside of the hind wings considerably narrower, but this marking is in the females about as wide as Hopffer figures it in the male. On the underside the dark anal angular and lower discal patch is larger in both sexes, extending to hind-marginal edge except just about extremity of submedian nervure.

Two females from Delagoa Bay, collected by the Rev. H. Junod in 1891, present this last-named character, and agree in other respects with the single example from the same locality noted by me *loc. cit.* p. 333[1].

Mr. Selous notes this Butterfly as very rapid in flight, but frequently settling in bushes in shady spots.

Genus Pterygospidea, Wallengr.

157. Pterygospidea djælælæ, Wallengr.

♂. *Pterygospidea djælælæ*, Wallengr. l. c. p. 54. n. 5 (1857).

♂ ♀. *Pterygospidea djælælæ*, Trim. S.-Afr. Butt. iii. p. 354. n. 368, pl. xii. fig. 7 [♀] (1889).

Eight specimens, two of which are females, from the Mineni Valley (5th to 16th March) agree with the Transvaal male noted by me, *l. c.* p. 355, in their larger size and darker underside colouring, only the females having the rufous tolerably developed.

158. Pterygospidea motozi, Wallengr.[2]

Pterygospidea motozi, Wallengr. l. c. p. 53 (1857).

Nisoniades motozi, Trim. Rhop. Afr. Aust. ii. p. 313. n. 206, pl. 6. fig. 3 (1866).

Four males and a female from the Mineni Valley (7th to 12th March), and a male from Vunduzi River (12th April).

When I described this species in S.-Afr. Butt. iii. p. 357, I had noted females only of the typical pattern, and associated with them males taken in the same locality which differed chiefly in the much smaller vitreous spots of the fore wings, the want of the discocellular vitreous spot in the hind wings, and the possession of a more or less well-defined darker fascia in the fore wings. I have since obtained both sexes of both forms, and can rectify

[1] Specimens from the Ogové Valley, Equatorial West Africa, are considerably smaller; the spots on the upperside of the fore wings are reduced in size—the lowest spot especially being very small and sublinear; the median bar on the upperside of the hind wings is, on the contrary, much broader in its upper portion; while on the underside of the hind wings the dark lower-discal patch is more reduced than in the figure of the Querimbe type and stops short at some little distance before the hind margin.

[2] The Butterfly from Bismarckburg, Togoland, figured by Karsch (Berl. ent. Zeitschr. xxxviii. pl. vi. fig. 11, 1893) as doubtfully the male of *P. motozi*, appears to be quite distinct, being very much smaller, with differently-shaped transparent spots (and 5 or 6 minute *additional* ones) in the fore wings, and having the underside of the hind wings brown with fuscous markings and without any of the characteristic yellow colouring.

the mistake as regards *motozi* by stating that the male differs scarcely at all from the female except in being darker on the upper-side, and having smaller and more separate yellow markings on the underside.

159. Pterygospidea galenus (Fabr.).

Hesperia galenus, Fabr. Ent. Syst. iii. 1, p. 350. n. 332 (1793); Latr. Encycl. Méth. ix. p. 773. n. 124 (1823).

Plesioneura galenus, Staud. Exot. Schmett. i. t. 100 (1888)[1].

Three examples from Christmas Pass, captured respectively on 15th, 17th, and 27th February. They are rather larger than the West-African specimens that I have seen, expanding 1 in. 6½ to 7½ lin., and the discocellular fulvous-yellow spot on the upperside of the hind wings is absent in two of the specimens and only just indicated in the third; on the underside this spot is faintly marked, and the other yellow spots (apart from the large discal hind-marginal patch) are also very much reduced and in two examples obsolescent. On both surfaces the large fulvous-yellow patch of the hind wings differs in each specimen both as to shape and size.

I have found this species recorded from numerous localities along the West Coast, from Assinie (in about 5° N. lat., and 3° W. long.) as far to the south as Angola; but Mr. Selous's captures give the first instance known to me of its occurrence in East Africa—unless Shoa in Abyssinia be one (see C. Oberthür, Ann. Mus. Civ. Genova, xv. p. 733, 1883). Mr. Selous describes the Butterfly as scarce; he found it settling on low bushes in shady places and so alert as to be caught with difficulty.

160. Pterygospidea flesus (Fabr.)[2].

Papilio flesus, Fabr. "Sp. Ins. ii. p. 135. n. 621" (1781); Ent. Syst. iii. 1, p. 328. n. 286 (1793).

Papilio ophion, Drury, Ill. Nat. Hist. iii. pl. xvii. figs. 1, 2 (1782).

The eight examples from Christmas Pass and one of the two examples from the Mineni Valley are remarkable for the complete and unvarying development of the entire discal series of black or brownish-black spots on the underside of the hind wings,—a series so variable in Natal specimens that it is by no means uncommon

[1] *Pardaleodes fulgens*, Mabille (Bull. Soc. Zool. France, 1877, p. 236), from the detailed description given, does not seem to be separable from *Pt. galenus*.

[2] In S.-Afr. Butt. iii. p. 365, I explained how from M. Mabille's description (Ann. Soc. Ent. Fr. (5) vi. p. 272. n. 21, 1876) I was disposed to consider that *Tagiades insularis*, Mab., from Madagascar, was probably not separable as a species from *P. flesus*. Having since been favoured by M. Mabille with two males of his *T. insularis*, I have, however, come to the conclusion that the Malagasy Butterfly may be held distinct from the Continental species, as besides the smaller size and the straighter hind margin of the hind wings (which M. Mabille points out in vol. i. p. 354 of the Lepidoptera in Grandidier's 'Madagascar, &c.'), I find that on the underside of the hind wings there is a very much broader and complete hind-marginal brown border from the radial nervule as far as the submedian nervure.

to find two, three, four, or all five spots wanting or but faintly indicated. In the exception from the Mineni Valley, four of these spots are reduced to mere dots and the fifth is wanting altogether.

Genus Hesperia, Fabr.

161. Hesperia forestan (Cram.).

Papilio forestan, Cram. Pap. Exot. iv. t. cccxci. figs. E, F (1782).

One specimen from Christmas Pass (27th February) and another from the Mineni Valley (27th March).

162. Hesperia unicolor (Mab.).

Ismene unicolor, Mab. Ann. Soc. Ent. Fr. (5) vii. p. xxxix. n. 47 (1887); Bull. Soc. Zool. Fr. 1877, p. 230.

Two examples: a male, in good order, captured at Christmas Pass on the 20th February, and an apparent female, very much damaged, near the Vunduzi River on 12th April.

The few specimens of this singularly dull-tinted species that have come under my notice were from Delagoa Bay and from Durban, Natal. Mabille's descriptions were from Congo examples.

Genus Abantis, Hopff.

163. Abantis zambesina (Westw.).

♂. *Hesperia* (*Oxynetra*) *zambesina*, Westw. Thes. Ent. Oxon. p. 183, pl. xxxiv. fig. 9 (1874).

Eight males: seven from Mineni Valley (13th to 29th March), and one from Vunduzi River (6th April).

This beautiful Hesperid is noted as not numerous, and always in open country; it was mostly captured while drinking at the water's edge, but some were found on the tall spikes of blue flowers already mentioned as the haunt of several *Lycænidæ* and *Hesperiidæ*.

I have not yet seen the female of this species, which is still rare in collections.

In addition to the species above mentioned, there are two forms of *Mycalesis* which I cannot with certainty refer to any described species without comparison with the types, but which I believe to be assignable to the species hereunder named.

164. ? Mycalesis campa, Karsch.

♂. *Mycalesis campa*, Karsch, Berl. ent. Zeitschr. xxxi. p. 206, t. v. fig. 4 (1893).

This species belongs to the *safitza* group, but is distinguished by the rather acute angulation of the common pale postmedian transverse streak of the underside in both fore and hind wings on the 3rd median nervule.

Two examples taken by Mr. Selous in Christmas Pass on 16th

February agree very well with Karsch's description of the male from Bismarckburg, Togoland, in Northern West-Tropical Africa, but have the angulation in question less pronounced (in one example very much less pronounced in the fore wing than is shown in the figure quoted), and also present a considerable acute dentation throughout, in both fore and hind wings, of the inner submarginal dark line. In these characters the Manica examples are nearer to *M. safitza*, but differ more than the figure of *M. campa* does from the same species in having the 4th ocellus of the series in the hind wings very much smaller than (instead of nearly as large as) the fifth [1].

165. ? Mycalesis ena, Hewits.

Mycalesis ena, Hewits. Ent. M. Mag. xiv. p. 107 (1877).

A single male from Christmas Pass, captured on 20th February, appears to me to agree with Hewitson's description of this Lake Nyassa species, the postmedian common transverse streak having the "undulated" form specified as far as the hind wings are concerned; but the brief diagnosis is too vague and of too general an application to enable any satisfactory identification to be arrived at.

EXPLANATION OF THE PLATES.

Plate IV.

Fig. 1. *Physcæneura pione*, Godm., ♂, p. 20.
2. *Melanitis libya*, Dist., ♂, p. 22.
3, 3*a*. *Acræa asema*, Hewits., ♂ ♀, p. 24.
4. *Acræa acrita*, Hewits., ♂ var., p. 28.
5. *Precis simia*, Wallengr., ♂, p. 33.

Plate V.

Fig. 6. *Charaxes lasti*, H. G. Smith, ♀, p. 39.
7. *Charaxes achæmenes*, Feld., ♀, p. 41.
8. *Charaxes guderiana*, Dewitz, ♀, p. 42.

Plate VI.

Fig. 9. *Charaxes manica*, n. sp., ♀, p. 43.
10. *Charaxes selousi*, n. sp., ♂, p. 45.
11. *Lycæna exclusa*, n. sp., ♂, p. 47.
12. *Lycænesthes lunulata*, n. sp., ♂, p. 51.
13. *Chrysorychia cruenta*, n. sp., ♂, p. 55.
14. *Durbania puellaris*, n. sp., ♀, p. 59.
15. *Alæna nyassa*, Hewits., ♀, p. 61.
16. *Cyclopides mineni*, n. sp., p. 72.
17. *Pamphila zimbazo*, n. sp., ♀, p. 74.
18. *Pamphila chirala*, n. sp., ♀, p. 76.

[1] I have a note referring to a Zambesi specimen in the Oxford University Museum in 1867, which seems to agree with the Manica examples here recorded.

5

1

2

3

3a

4

W.Purkiss chromo lith. West, Newman imp

Butterflies from Manica, S.E. Africa.

W. Purkiss, chromo-lith. West, Newman imp.

Butterflies from Manica, S.E. Africa.