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XXX.—Rambles in Ceylon

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Holothuræ than those of the Sea Egg or *Echina*, for I cannot discover any regular perforations, such as are found in the ambulacra of the latter animals. They end abruptly, but there is an obscurely marked rather darker line, which extends from their extremity a greater or less distance towards the upper part of the tube. The aperture of the tube is circular, and I cannot find any trace of a second opening to the alimentary canal.

The animal is $1\frac{9}{12}$ long; the dilated body $\frac{8}{12}$ long and $\frac{5}{12}$ wide, $\frac{4}{12}$ thick from side to side.

The only specimen known may be designated *Rhopalodina lageniformis*.

In general external appearance it resembles a *Siphunculus* with a scaly covering like the scaly *Holothuriæ*, and with distinct ambulacra like those animals, but only covering the upper half of the club-shaped part of the body; but, unlike the *Holothuriæ*, which have the ambulacra limited to a part of the body, the part where these are situated is that which is the most convex. For the present I should be inclined to place it as the type of a new family between *Holothuria* and *Siphunculus*.

XXX.—*Rambles in Ceylon*. By EDGAR LEOPOLD LAYARD, Esq.

To Richard Taylor, Esq.

[Continued from p. 236.]

Allawattegodde, Top of Balacadua Pass,
April 23, 1852.

MY DEAR SIR,—I resume my narrative from this place—so much of my way back to Jaffna. I closed my last letter at Allagamo on the night of Sunday the 13th, after which we pushed on vigorously and got into Kandy safe and sound, in spite of all the ill-omened prophecies with which we started; though, absurdly enough, while standing at the farrier's door, giving him instructions about shoeing the horse, the back-band of the harness gave way, and down we came: fortunately neither of us was hurt. B. left the next morning by the mail, and I heard from him by return that he had arrived just in time for the Bombay steamer. I managed to get over my business in Kandy in one day, and loving the jungle more than the town, I left by daylight the next (Saturday) and came on here, intending to halt for my Sunday. Here I have been ever since, for my horse, who has never been among the hills but once before, and is therefore quite unused to them, has been quite lame, and I but little better; however, we are both getting well, and my friend C. (at whose house I am stopping) and I go down the Pass tomorrow to Matelle, the scene of the late rebellion. I ride one of his horses, and poor old Baba takes the buggy down this evening. I have not been idle during my stay here;

I have added largely to my collection, and ascertained many habitats that I did not know before. This morning I found the nest of *Merops erythrocephalus*, Lath., in a steep bank; it was merely a hole dug into the clay, about eighteen inches deep, terminating in a vaulted chamber; the eggs, two in number, of a pure white and rounded form, were laid on the bare ground; several of the adult birds were flying about, every now and then darting into their holes with flies for their young, of which, in other places in the same bank, we found several pairs. The only two other species we have in the island are *Merops viridis*, L., and *Philippinensis*, L.; the former is resident with us throughout the year, the latter is migratory, as I told you in my last. I do not think *erythrocephalus* migrates, but it is a bird so entirely confined to the jungle, that I cannot say much of its habits in this respect; they keep much about the tops of the highest trees, and never descend like the other species; they do not seem gregarious, like *viridis*, which roosts together in flocks of several hundreds, though several may be seen on the same tree, each occupying its separate throne, from which it darts off in quest of insects. *M. viridis* is almost confined to the northern province, where it is singularly abundant, much affecting the *Euphorbia* hedges about the open country. It is the only species I have ever seen actually perch on the ground, *M. Philippinensis* generally selecting a pebble, be it ever so small. All the species utter a pleasing note, particularly *viridis*, when selecting a place for their roosting quarters, generally a low tree or bush, to which they return night after night. I never found them occupying an elevated place.

I see that *Pomatorhinus melanurus*, Blyth, is not uncommon here; it has a curious creeping motion up the branches of trees, not unlike our English wryneck (*Tunx Torquilla*, L.). It is a bird more often heard than seen, delighting in the low dense thickets that clothe the sides of our Ceylon hills, creeping about in search of insects, and continually calling to each other to keep their small parties together. Another bird has fallen under my notice here for the first time, the discovery of which has given me great satisfaction; it is, I am sure, the long-lost *Treron Pompadoura** of Brown's wretched figures, in pl. 19, 20 of his 'Illustrations,' and of which Blyth has sent me fac-similes. It is abundant here, feeding on berries which it swallows whole; its cry is very like that of *T. bicincta*, and I should not have detected it had not C. shot some for the pot (where, by the way, they are superexcellent), and thus revealed to me that they were distinct from those in the low country.

It may not be amiss to tell you somewhat of our pigeons. First then, in the low country about Colombo, we have *Treron bicincta*, Jerd., *Chaleophaps indica*, L., and *Turtur suratensis*, Lath., abundantly; and I shot a young pigeon in the Pasdoom Corle (during a journey I once took thither with the late botanist, Dr. Gardner), which I am sure was *Turtur orientalis*, Lath.

* Since confirmed.

T. bicincta keeps to the high trees, on the berries of which it feeds, the teak being a very favourite one; they fly in large flocks, and I have frequently, when firing into a tree at one, killed half a dozen, which I never saw till they fell. They breed in lofty trees, making a rough nest of sticks, and lay two white eggs. Their note is a modulated plaintive whistle, like that of all our other *Trerons*.

Chalcophaps indica is a *ground dove*, and is rarely seen on trees; it is abundant about Colombo, and extends into the Kandy or Hill District and as far as Kodally-kallu, northward, but I never saw it at Pt. Pedro or round Jaffna. It is very abundant in the southern province; its plaintive *lowing* cry may be heard morning and evening from almost every thicket.

Turtur suratensis, Lath., is not uncommon about Colombo, but affects open lands and the palmirah topes of the northern province; there its numbers are prodigious, and I have often killed twenty-eight or thirty of a morning between six o'clock and nine, when, utterly tired of the unvarying round of seer-fish and tough chicken (all we could get to eat in our station), my wife has begged for a few pigeons to make a pie. I got to like these pigeon-pies, and was so much benefited by the exercise it gave me, that at length rarely a week passed without my sallying out once or twice to make up a bag, and yet I never saw the number of these birds diminish. They and *Turtur risorius*, L., are the commonest northern pigeons; the latter, however, abides more on the open lands and low jungle, and from its partiality to the *Euphorbia* hedges and jungles, is called by the Tamuls *Cally-praā*, *Cally* being the native name for the *Euphorbia*, and *praā* (the *āā* sounded as the final letter in *papa*) their name for pigeons of all kinds. In one palmirah tope near the village Warrany I discovered the elegant little *T. humilis*, Tem.; this species has not, that I am aware of, been found elsewhere, nor does it extend a mile on each side of its location. All three of these turtles were building their nests in the same tope, similarly constructed of twigs slightly laid together; their eggs the same in colour and shape and only distinguishable by their size. *T. risorius* and *T. suratensis* are also found along the western coast as soon as the traveller comes to the *Euphorbia* jungles, and they extend all round thence northward and eastward to Hambantotte, where *T. risorius* ceases.

Treron bicincta begins about a day's journey to the southward of Anarajahpoora, and extends up to the ford at Elephant Pass, a few straggling over; but in the peninsula it is replaced by *T. chlorigaster*, Blyth; this however never extends elsewhere, and is I believe a migratory *coast* bird, only visiting us when the banian-trees are laden with their scarlet fruit.

Down the central road from Tangutta, as far as Matelle, Blyth's *Carpophaga pusilla* is not uncommon, but is a shy and wary bird. On the western coast I frequently saw a pigeon which I feel sure is *Alsocomus puniceus*, Tick., and Kelaart has procured *Palumbus Elphinstonii*, Sykes, at Newera Ellia; and now this long list is done, and I suppose you are nearly tired of it. Ah, no! I had nearly for-

gotten the Trincomalee rock-pigeon, *Columba Livia*, Briss., which is the pigeon of that place, breeding in thousands in some rocks in the sea, near the shore.

But let me get back to Balcadua Pass. I have got many good shells here. *Helix Waltoni* is abundant in the early morning along the sides of the road; the mollusk is a fine shining black. A large variety of *Hæmastoma* is common on the coffee bushes. I have a minute little *Vitrina*¹, new to me, and a small *Helix*² with a multitude of close-set whorls, also new. *H. citrina*³, or a shell that poor Gardner gave me as such, is not uncommon about the rocks under decaying vegetation; and the curious *H. Rivolii*, Desh., lies in every direction, calcined by the burning of the forest for planting, and yet, curiously enough, I cannot find a single live specimen. *Achatina orophila*⁴ and another larger species⁵ whose name I do not know are abundant under dead leaves and at the roots of trees, and in the latter place I found a new *Carocolla*, but unfortunately lost it by my collecting-box falling from my pocket while jumping over a chasm, beneath which the river ran foaming and roaring. This little mountain stream has supplied me with *Paludomus nigricans*, Reeve, and two others⁶, neither of which I can identify with any figured by Reeve; but the larger bears a striking likeness to *P. conica*, R., which I have received from Sylhet. In the Mahawilla Ganga, on my road from Kandy hither, I procured *P. globulosus*, R.⁷, not on the stones, but on sand only! and there are some others, which I have left at Matelle, gathered hastily on my road down. A little tributary to this stream has furnished me with some strange varieties of *Melania elegans* and *M. pyramis*⁸, very stunted in growth and tinged with sulphate of iron, with which the water is strongly impregnated. I must not forget to tell you, I have also procured here *Cyclostoma zeylanicum*, Pfeiffer. There is also a *Pterocyclos*⁹, much larger than another species, from a cave at Tondemanāra in my district, which has a curious spiral operculum.

Our *Cyclostomacea* are, as far as I know, very little worked out as yet.

Cycl. cornu venatorium, the largeish dark brown species¹⁰ with a

[The following notes have been supplied by W. H. Benson, Esq.—Ed.]

¹ *Vitrina membranacea*, Bens. MSS.

² *Helix Puteolus*, Bens. MSS.

³ The only shell resembling *H. citrina* in form and size among the specimens received, is a pale *H. Juliana*, Gray, with a narrow brown band.

⁴ *Achatina Orophila*, Bens., is *A. Ceylanica*, Pfr.

⁵ Probably *A. inornata*, Pfr., which is in the collection.

⁶ *Paludomus abbreviatus*, Reeve, P.Z.S. ined. is one of these species; the other appears to be a somewhat smooth variety of *P. sulcatus*, Reeve.

⁷ *Paludomus globulosus* has not been received. *P. dilatatus*, Reeve, P.Z.S. ined. may have been intended.

⁸ *Melania elegans* is *M. spinulosa*, Lamarck, and *Melania pyramis* is *M. tuberculata*, Müll.

⁹ *Pt. Cingalensis*, Bens., Annals, vol. xi. p. 105.

¹⁰ This is *Cycl. (Aulopoma) Itieri* of Guérin.

reddish zone, is common about Caltura and the Pasdoom Corle, Kandy and Matelle;—the white variety¹¹ with the dark zone, in the high tree jungle about the central road, crawling on decaying leaves in moist situations;—the little uniform brown variety¹² with the zone very faint, only under one large banian-tree in the Academy Gardens at Colombo. Similar as these varieties are, I should not wonder if they are all distinct, the smaller variety in particular; this never exceeds half an inch in diameter, whereas the others often attain to one inch. [See Note A. at the end of the paper.]

The next we come to is *C. involvulus*; this exists in myriads at Galle, under cocoa-nut and other umbrageous trees, generally buried beneath the soil or dead leaves¹³.

We have a distinct species, or else a strongly marked variety of this, near Pt. Pedro, in a curious cave at Tondemanāra¹⁴. It seldom has the protruding lip of *involvulus*, but in most instances the peritreme is simple: I have examples in which the lip is decidedly reflected, as in some specimens received from Chittagaon, and marked *C. indicum*¹⁵. [See Note B.]

The cave variety is altogether a lighter-built shell than that from Galle; it is more finely striated, and its colours darker and more blended together. The white band so conspicuous on the underside of *involvulus* is wanting, the black band fading off to a yellowish brown. The aperture is *yellow*, whereas in the Galle specimen it is *pink*. Found under large stones and the crevices of rock, in the Tondemanāra cave. I should not omit to mention, I have a specimen from Galle nearly quite white, aperture pink as usual.

The next species we come to is *C. ceylanicum*¹⁶. I leave better judges than myself to determine whether this is separable from the last. I can but bear testimony to its being found in widely-different localities, being in fact confined to the hills. There is a nearly white variety of this also.

The opercula of *involvulus* and *ceylanicum* are multispiral, the last layer diminishing so as to form a circle. I have three more of this turbiniform group of *Cyclostoma*: one from Pt. Pedro, found after rain on the trunks of palmirah trees. This, Mr. Cuming writes me word, is a new species¹⁷. It may be briefly described thus: Diameter 3 lines, axis $4\frac{1}{2}$ lines; umbilicus open; whorls much rounded, minutely striated; spire rather long, subacute; peritreme simple; operculum round, multispiral, corneous, retractile. The colour varies

¹¹ This appears to be a mere variety of *Itieri*.

¹² This is *Cycl. (Autopoma) Helicinum*, Chemnitz, as defined by Pfeiffer.

¹³ The Galle species is *C. Menkeanum*, Philippi.

¹⁴ The Tondemanāra species is *C. involvulus*, Müll.

¹⁵ The Chittagaon species is *Cycl. Bensoni*, Pfr., of which the habitat was previously unknown. It comes from the N.E. angle of the Bay of Bengal, near the Mogra mouth of the Ganges and Burhampooter.

¹⁶ *Cycl. ceylanicum*, Pfr., which, with a curious white variety, is in the collection, is perfectly distinct from the Tondemanāra shell.

¹⁷ A large and finely coloured variety of *C. (Leptopoma) halophilum*, Bens.

from a darkish horn-colour, with one or more lines on the body-whorl, to a deep tortoiseshell, with black lines. The animal is brown, with a livid foot; tentacula short.

Another, allied to the foregoing, but larger, I have received in an imperfect state from Monegahagalla, in the hilly zone¹⁸. I wait to get living examples to describe it.

Another, nearly allied to *C. Listeri*, from the Mauritius, but a less solid shell: diameter $4\frac{1}{2}$ lines, height $4\frac{1}{2}$ lines; umbilicus closed; whorls five, rounded, smooth; spire rather long, subacute; peritreme white, double, the outer edge reflected; operculum corneous, retractile. The prevailing colour is a lightish ground, with dark brown transverse wavy lines; apex blackish. I have seen numerous examples of a dirty white, immaculate; the apex blackish, as in others. A cousin of mine, Mr. Charles P. Layard, obtained this in great abundance in the Saffragam district, in the Curuwitty Pass. At the same time, he procured four specimens of a very curious species: diameter 5 lines, axis 3 lines; spire exserted, covered with a dark brown epidermis, which is *ribbed*; ground colour of shell light yellowish brown, marked with close-set, dark, wavy lines; peritreme double; operculum retractile¹⁹.

Leaving this division we enter the flattened form, of which Lamarck's *Planorbulum* is an example. This species, as far as I can judge from description, without comparison of actual specimens, I have received from the hilly zone. Unfortunately none that I have are in good preservation²⁰.

We have also from the same localities a lesser species, but all I have seen are faded.

Of the curious Pupæform group of *Cyclostoma*, of which Benson's *C. funiculatum* is an example, we have two species, both found in the same localities in the Saffragam district, which is rich in mollusca.

The smaller species²¹ measures: diameter $3\frac{1}{2}$, length 10 lines; it is thick in the middle and tapers off towards the apex; and the mouth, which is circular and furnished with a deep circular sinus, communicating with a canal running along the base of the whorls and visible in all stages of growth; the peritreme is white, broad and reflected; general colour of shell reddish brown; the whole surface is finely striated and granulated, the granulations being more visible as the growth of the shell increases; the operculum is unlike any other I have seen, resembling in fact the thread of a wood-screw, varying from two to three revolutions; it is horny and retractile; shell abundant under moss and stones.

The larger species²² measures 6 lines in diameter, 14 in length, and tapers gradually to the apex; aperture, canal and peritreme as in the last species; operculum horny, dense, and retractile to a level with

¹⁸ *C. orophilum*, Bens., Annals, vol. xi. p. 106.

¹⁹ Those two species have not been received.

²⁰ *C. annulatum*, Pfr., which has been received, is probably the form here alluded to.

²¹ *Cataulus Thwaitesi*, Pfr.

²² *Cataulus pyramidatus*, Pfr.

the surface of the mouth; surface of shell finely streaked, between the canal and the umbilicus (which is closed) assuming a coarser character; general colour reddish brown. Found in the same locality and situations as the last.

Friday, April 25.

Here we are at Nalande, thirty-two miles from where I last wrote. C. is taking his cheroot, and I resume my pen.

On our way down the Balcadua Pass I found the nest of *Hirundo hyperythra* (Layard and Blyth). It was built under the arch of a drain, into which I had to creep on my hands and knees. In structure it precisely resembled that of the European swallow, *H. rustica*. There were four half-fledged young ones in it, and I found the remnants of broken eggs on the ground: from these I should say they were of a pale cream-colour speckled with dark spots, as in those of the English species. C. pointed out a nitre cave, which he said was worked by the natives; it appeared to be inhabited by myriads of bats. I procured the curious *Lyriocephalus scutatus*, L., from some low shrubs near it.

At Matelle we rested under the hospitable roof of the assistant-agent, Mr. T. He and his family were absent, but I had seen them on my way down, and left my bullock-cart there. In his garden I shot *Calliope cyana*, Hodg., and *Loriculus philippensis*, Briss., which is very common here; *Palæornis cyanocephalus*, L., *Pal. Calthropæ*, nobis, are also abundant; and I shot *P. Alexandri*, L., about five miles from the town, on my way hither: thus, with the exception of *P. torquatus*, which I did not observe, I obtained all our island parrots at this one place. *P. torquatus* is abundant about Jaffna, breeding in hollow trees and laying three or four white eggs. I saw them as far as Dambool, and doubt not they are sometimes found in Matelle.

We left Matelle this morning at daylight, and reached this about ten o'clock: C. rode and I drove. We got along pretty well, stopping now and then to go after birds, of which *Bucco flavifrons*, C., and *H. hyperythra*, L. & B., were what I principally wanted. *B. flavifrons* is strictly a hill species; the other three, *Bucco zeylanicus*, L., *B. indicus*, Lath., and *B. ruficapillus*, Gmel., being found equally in the high and low country. *B. flavifrons* does not seem to extend farther than this. Our drive was very lovely, and I had more time to admire the beautiful scenery than I had on my way down. We were gradually descending from the Kandian country over a succession of undulating hills clothed with vegetation and abounding in birds and insects. We passed through one magnificent forest of large timber trees, whose branches were laced together and festooned with gigantic flowering creepers and encircled by the broad bright green leaves of the sword-fern, or clothed with the dark tapering leaves of the finger-fern. In this forest I saw some of our most valued indigenous butterflies: *Minetra gambrisius*, *Papilio Helenus*, *Charaxes Bernhardus*, *Pap. Crino*, in abundance; *Thecla Narada*, a beautiful copper-coloured *Myrina*, *Iphia Glaucippe*, and many others. Unluckily, the bullock-driver had torn my net so much at starting,

that I had left it behind with the cart as useless ; I therefore could only capture a few specimens of *T. Narada* : these were so busily employed in thrusting their trunks into the buffalos' dung scattered about the road, that I simply had to take them by the wings, one after another, till I caught all I saw. I have captured this insect in Matura Galle and Jaffna ; it has therefore a wide distribution.

Between Kandy and this place I found the following *Papilionidæ* :—

<i>Papilio (Ornithopterus) Amphimedon</i> .	Abundant.
<i>Pap. Polymnestor</i>	Abundant.
<i>Pap. Erithonius</i>	Abundant.
<i>Pap. Agamemnon</i>	Not uncommon.
<i>Pap. Brathyces</i>	Common.
<i>Pap. Sarpedon</i> [See Note C.]	Rare.
<i>Pap. Pammon</i>	Common.
<i>Pap. Helenus</i>	Rare.
<i>Pap. Hector</i> . . } [See Note D.] . .	Very abundant.
<i>Pap. Diphilus</i> . }	
<i>Pap. Polytes</i>	Very rare.
<i>Pap. Romulus</i>	Very rare.
<i>Pap. Crino</i>	Abundant.

This last frequents the higher branches of the trees, and is consequently seldom captured : I have however procured a few, by finding them asleep and hanging to the underside of leaves, with their bodies in a line with the stems, so that their closed wings were quite protected from the dews. Some stress has, I believe, been laid on the extension of the green band into the discoidal cell on the upper wing of this species. I myself once thought that this seemed to be a *local* distinction, but since I have captured a large quantity I find it does not hold. I am now decidedly of opinion that it is quite an accidental variety.

After we had seen to our horses, we sallied out to look for snipe and specimens. In the forest over against the Rest House I found a *Carocolla* which I had not hitherto seen (but which I unfortunately lost from my box in some way), and a dead example of a remarkable *Achatina* with a multitude of whorls²³. I also procured a *Cyclostoma* new to me : diameter 12 lines, depth 3 lines ; peritreme double, reflected, spire flat, surface of whorls finely streaked ; operculum multi-spiral, retractile, colour a dark straw. Animal livid. Habitat, vegetable deposits in the clefts of rocks²⁴.

We found a pair of the large owls, *Retupa ceylonensis*, in a dark place near the river, but they were wide awake and flew away long ere we came within gun-shot of them. The natives all say they feed largely on fish ; they certainly relish that food in confinement.

On arriving at the ford I found the river very low, and was amazed to think how I had escaped an upset when I came over it on my way down, when it was swollen. It was full of large boulders, then quite

²³ *Ach. veruina*, Bens. MSS.

²⁴ Not recognized in the collection.

hidden by the water, which came up to the seat of the gig, but now, high out of the stream, they really look impassable. Tomorrow will decide.

The river furnished me with abundance of *Paludomus spiralis*, a species which I found at several of the rivers as far north as Madde-watchy.

Dambool, April 26.

Safe and sound so far, thank Heaven! over the worst day's journey of the whole road. The old time-worn rock, enfolding in its cavern temple hundreds of Buddhos of all sizes, from forty feet to as many inches, is frowning upon me in the dim moonlight: the night hawks sit churring and gobbling on the tumbledown rails of the Rest House fence: the large white bullocks of my cart lie ruminating at my side: and extended at full length, and covered with a single cloth, tucked under their heads and toes, repose my retainers; they look horribly like a line of corpses, but the nasal *involuntaries* that they play dispel the illusion. How fresh and beautiful the night is after the rain, and yet I cannot fancy myself in any place but the tropics, cool as it is! In Old England not a sound would break the stillness: in the words of a beautiful evening hymn, there "Night and silence reign," indeed; but here, the words of the Psalmist, "Thou makest darkness that it may be night, wherein all the beasts of the forest do move," strike one with double force. I certainly think the stillest season of the twenty-four hours is from 11 A.M. to 3 P.M. As I sit, there are such a variety of sounds that it is hardly possible to distinguish them one from another: stop, let me try. There's the lesser fern owl (*C. asiaticus*), the larger (*C. Mahrattensis*), the little *Scops Lempiji*, tree frogs, marsh frogs, crickets by scores, and seated on my table is an attenuated green grasshopper, whose pipe is as shrill as any of them despite his leanness. But there's a sound I can't make out; I think it is the cry of the *Brachystoma*. I heard it on my way down, but could not detect what made it, nor could I this evening, though I hunted well for it; it is very like the cry of the cuckoo. Oh! of course there go the jackals; a night in the East would not be perfect without them. "*Dead hindoo-ooooo*," howls one; "*Where, where, where*," draws a famished wretch, impatient for a bit; "*Here, he-re, he-e-er, he-ar*" (a mouthful rendering his articulation imperfect) yells a third; and then comes a general chorus, in which "*Hindoo-ooooo*," "*where*" and "*he-ar*" are happily blended. But what has checked the noisy wretches in their concert? "*a-a-arch! a-a-arch!*" That's a new note, and not far off either; whose is it I wonder? "Here, Muttu! Muttu! you lazy beast, Muttu!"—a shove, which sends him rolling over and over. "*Eh! d'ara?*" (who is that?) growls the sleeper, awakened. "Here, Muttu! *enna chattam?*" (what is that noise?) "Ah! *Dorray*" (master), and the winding sheet sits upright. "*A-a-arch, wa-a-arch*" again from the jungle. "*Pully*" (leopard), coolly replies Man Friday, and the winding sheet is resumed again. Such is habit! he is sleeping in the verandah of this lonely bungalow, with no protection in the world. Well, that loaded rifle yonder is some little comfort to me; so now for the events of the day.

C. and I parted this morning; he to inspect his work, I to return home: he however saw me safe over the river, which was indeed a difficult matter. How we blundered blindly through it the first time I have no conception. After passing this, near the fifth mile there is a very bad place; in fact, the road passes over a rock, on which the iron shoes of my poor horse were like so many skates, and we had to hold him up by main force. Getting safely over this, we drove down what appeared the half-dry bed of a river rather than a road, full of loose stones and with a stream of water down the centre: at one place was a deep hole filled with mud; luckily, a native passing with a caicatty (a crooked knife like a bill-hook) helped me to clear a space through the jungle a little to one side, and I managed to avoid it. Today's journey was fourteen miles, but owing to the bad state of the road I got in very late. At 4 o'clock, when the sun was not very hot, I sallied out to mount the rock again. I did not care about visiting the temples a second time, because I was disappointed when B. and I went into them on our way down. The priests pointed out the gigantic Buddhos with great satisfaction. I am sure the figures are not solid stone; there is a large amount of plaster about them, which the yellow paint hides. One thing connected with Buddhos always strikes me as ridiculous: however one may be placed, standing or lying, "the flame" issuing from the head is always in a *right line* with the body.

I was pleased to find the *Cypselus affinis* building under the shelter of the high cliff, their nests being placed in patches of fifty or sixty together against the overhanging face of the rock: they were composed of mud, of a hemispherical shape, with a round hole at the side for egress and ingress. While on the top of the rock, being in want of a specimen, I shot two of the birds, and found that the many hundreds I saw hawking all round were procuring food for their young ones; this consisted of minute green tree-hoppers (*Cercopidae*), which they carried in a ball under the tongue. While I was watching them one uttered a peculiar scream; the cry was taken up and echoed from the minute specks in the clear blue ether far above me; all seemed animated with a common purpose—that of uttering piercing cries and chasing each other round and round the rock a dozen times or more. Suddenly, in mid career, the cries ceased, and as each bird neared one spot it darted over the cliff, and I saw no more of them for the night. What could have thus led all of them to follow one common course so suddenly? A large swift (which I take to be *C. Melba*), *C. Balasiensis* and *Macropteryx coronatus* still kept on their airy gyrations, and so continued till my eyes could no longer follow them in the deepening shades of evening. On the summit of the rock, at the roots of some dead clumps of coarse grass that had once flourished in the scanty soil accumulated in the crevices, I found a new *Cyclostoma*²⁵: diameter 6 lines, axis $2\frac{1}{2}$; spire slightly exserted; whorls 5, finely striated; umbilicus very open; colour a uniform dark hair-brown; operculum spiral, thin, corneous, totally retractile;

²⁵ *Cycl. Parapsis*, Bens. MSS.

animal approaching to black. Lower down I detected none of these, but I procured several new *Helices* and the *Pterocyclos*, allied to that before mentioned found in the cave at Tondemanāar in my district, but larger and coarser, with the wing more free, the spire not exerted²⁶. The Tondemanāar shell measures: diameter 9 lines, axis 4; whorls 5; umbilicus very open; the ground colour is whitish, marked with transverse wavy reddish brown lines; spire slight, exerted; operculum pyramidal, rough, multispiral, hollow, partially retractile; animal livid brown²⁷. It is found in some abundance in a cave in the curious limestone formation of the Jaffna peninsula, which at Tondemanāar crops out in a large mass. The best idea I can give of this remarkable formation is comparing it to a huge wave of liquid mud, which has rolled over the country and been suddenly arrested and hardened in its course. The whole of this muddy stream appears to have been full of bubbles, and this cave merely a large one; I should say, 40 yards long by 10 broad: it is raised above the surrounding country, and the centre, where the crust was thin, has fallen in and lies in crumbled fragments below. A solitary banian-tree, planted doubtless by some passing crow, springs from the bottom of the cave, and among its roots and the crevices of the weather-worn fragments lie the *Pterocycli* I have described. In no other place in the whole of the Northern peninsula could I find a single specimen,—its dry and burning soil affords them no shelter; but down in the cave it is always cool and moist, and ferns (only, otherwise, found down deep wells in this province) abound in the wildest luxuriance. There are several of these caves about Jaffna; the most celebrated is that near Pootoor, called Nurahverri, which assumes the shape of a natural well, said to communicate with the sea. It is of a vast depth, and bottles previously corked have been lowered into it and brought up filled with salt water, though the upper surface is perfectly fresh. Of the *Helices* I defer giving you any information (I have observed about forty species here, many of which are undescribed) until Mr. Benson shall have examined them. I should probably only describe many well-known species, and run my letter to an enormous length: it has already exceeded the limits I had assigned to it, and I shall therefore close, and resume it again if I find anything to amuse you further on.

I do not think I shall be able to write till I reach Anarajahpoora, for there are no Rest-Houses along the road I am going, and I have neither table nor chair, and must trust to chance for accommodation. So, till you hear from me again, believe me yours very truly,

E. L. LAYARD.

NOTE A.—Since the above was written, Mr. W. H. Benson writes me word that a *Cyclostoma* in the British Museum (supposed to have been received from me, but sent by a cousin of mine, Mr. Fred. Layard) is not the true *C. cornu venatorium*, as labeled by him, but *C. Heli-*

²⁶ *P. Cingalensis*, B.

²⁷ The Tondemanāar *Pterocyclos* is *Pt. rupestris*, Benson, var. *picta*, Troschel.

cinum, Pfr. He also writes: "Pfeiffer informs me that specimens of *C. halophilum* found by Captain Templeman near Colombo are larger than those I got at Galle (described 'Annals,' vol. vii. p. 265)." Mr. F. Layard's *C. cornu venatorium* I never saw; I merely guess, therefore (recollecting that before I took to observing mollusca myself, I brought him many different species from Galle), that these may have been some Galle specimens: in which case my dark *cornu venatorium* may be *C. Helicinum*, and my small variety, the large variety of *halophilum* taken by Capt. Templeman*. (Quere: Should not this be *Dr. Templeton*, a well-known naturalist here?)²⁸

NOTE B.—Mr. Benson, as before quoted, writes: "With the little turbiniform *halophilum* I took *C. Menkeanum*, Pfr.²⁹, which is confounded in England with *C. involvulus*." In this case the Galle shell will probably be *C. Menkeanum* (mine were however named by Mr. Cuming); and may not my cave shell be *C. involvulus*, vera, sed?

NOTE C.—*P. Sarpedon* is a low-country species, and remarkably abundant about Colombo; it feeds principally on cinnamon; and the chrysalis is shaped like that of *Agamemnon*, which feeds on the sour-sop. *P. Brathycles* represents these two in the hills and is very abundant, while they are rare. The larva I do not know.

NOTE D.—*P. Hector* feeds on the *Aristolochia medica*, which is very abundant about Pt. Pedro: the caterpillar of this and *Diphilus* are extremely similar, and feed on the same plant. I have often thought of obtaining a fine brood of *Hector*, and procured *Diphilus*, and *vice versâ*. They are not however identical, for they appear at different times of the year, *Diphilus* in May and June, *Hector* end of July; and I have taken each species *in coitu* with one of its own family; in fact, copulation has gone on in my own breeding-cage among species reared from the same plant. The males have the upper wings more attenuated than the females.

Pammon and *Romulus* feed on various species of *Citrus*, and have a very differently shaped chrysalis from *Hector* and *Diphilus*.

A curious division might be made by separating the species according to the chrysalis, showing at once how little this can be depended on in the formation of groups. *Pap. (O.) Amphimedon* stands alone. Then *Hector* and *Diphilus*, in which the knobs on the body are largely developed: the caterpillars also resemble each other, and they feed on creeping plants. A large new species, somewhat resembling *Diphilus*, may be classed with these. Then follow, *Polymnestor*, *Erithonius*, *Pammon*, *Polites*, *Romulus*, and probably *Crino* and *Helenus*: in these the knobs are entirely wanting and the head bifurcate; the caterpillars are green, smooth (not spiny, like *Amphimedon* and *Hector*), and all feed on trees of the genus *Citrus*. Then *Aga-*

* Pfeiffer writes and prints Capt. Templeman.—W.B.

²⁸ Vide notes 10, 11, 12 and 17 supra.

²⁹ *Cycl. Menkeanum* is distinguished from *C. involvulus* by sculpture, wider umbilicus, smaller aperture, porrect and rugose interior lip, greater solidity, and further by a character previously overlooked, viz. the gradual descent, above, of the last whorl behind the aperture. Vide notes 13 and 24 supra.

memnon and *Sarpedon* (and probably *Brathycles*), which feed on cinnamon and sour-sop : the chrysalis is smooth, the head bluntly bifurcate, the thorax prolonged into a point and the back nearly straight ; whereas all the others are more or less bent into an angle : they differ also in position, being suspended to the undersides of *leaves* with the head *downwards*, whereas all the others are attached to the *stems* of plants with the head *upwards*.

I cannot at this moment call to mind what the larvæ are like ; it is several years since I saw and drew them (with many others), and my wife painted them. They are, or were, in the British Museum, placed there by Dr. Templeton ; you can refer and see, if you wish to follow this up.

Lastly, *P. dissimilis* carries its name with it into the chrysalis state : it is unlike any other, being indeed *sui generis* : it precisely resembles a piece of burnt stick, very elongated and ending abruptly as it were ; head hardly bifurcate ; thorax distinctly so.

Papilio Antipathes has only been captured once to my knowledge in the island, I therefore know nothing of its transformations. Besides this one which is in my collection, I saw two specimens only, and those on the road between Ambegammoa and Yatteantotte in the hills.

BIBLIOGRAPHICAL NOTICES.

Principles of the Anatomy and Physiology of the Vegetable Cell. By HUGO VON MOHL. Translated by ARTHUR HENFREY, F.R.S. &c. Van Voorst, 1852.

SOMEWHAT late in the day perhaps, but still we hope not too late, we call the attention of our readers to the above most valuable contribution to the science of vegetable physiology. There are others who have made more noise in the world, but perhaps no continental botanist has contributed so much, by careful, painstaking, and conscientious research to the development of his subject, and there is certainly none whose voice deserves to be more attentively listened to than Hugo von Mohl ;—a man of facts, whose theories have been his humble and useful servants, not his masters. It is hardly necessary for us to point out in addition, that Mr. Henfrey's name, as the translator, not only secures the fidelity of interpretation of Von Mohl's ideas, but is sufficient assurance that the doctrine of the vegetable cell is here at the level of the present state of knowledge.

As an admirable exposition of that doctrine, we cordially recommend it to the English reader, and regarding it in that point of view, there are one or two matters on which we shall venture to offer a few words of criticism.

The first of these is the very common notion which prevails, we might say among all botanists (with the exception of Von Mohl), with regard to the respective *activities* of the two great morphological elements of the vegetable cell,—the cellulose membrane, and the nitrogenous primordial utricle.