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THE FIELD NATURALISTS' CLUB OF VICTORIA.

THE monthly meeting of the Club was held at the Royal Society's Hall, on Monday evening, 9th December, 1889.

The president, Mr. C. A. Topp, M.A., F.L.S., occupied the chair, and about 50 members and visitors were present.

The hon. librarian reported the receipt of the following donations to the library:—"Prodromus of Zoology of Victoria," decade xix., from the Government; "List of Named Insects in the South Australian Museum," 2nd series, from Mr. J. O. Tepper, F.L.S.; "President's Address to Royal Society of Tasmania," from the Society; "Proceedings of the Australasian Association for the Advancement of Science," vol. i., Sydney, 1888, from the Association; and "Journal of Pharmacy," November, 1889.

The hon. secretary read a brief report of the excursion to Ringwood on Saturday, 30th November, which was only moderately attended, owing to the heat. Insects were not so numerous as anticipated. The principal captures were two species of skippers (*Telestus*), *Lycæna mærens* and *Lucia* (sp.) also several larvæ. Insects of other orders were scarce. Of flowering plants, the following species were noted as somewhat uncommon:—*Gompholobium huegellii*, *Aster myrsinoides*, and the orchid *Cryptostylis longifolia*, which latter was rather plentiful. The direction taken was northerly from Ringwood towards Anderson's Creek.

On a ballot being taken, the Rev. G. D. Hutton, Messrs. C. Merton and J. West were duly elected members of the Club.

Baron F. von Mueller, K.C.M.G., Government Botanist, forwarded for inspection an advance copy of the new edition of the "Census of Australian Plants;" also a copy of his essay on Sir William M'Gregor's "Highland Plants of New Guinea," containing descriptions of eighty species of plants.

PAPERS READ.

1. By Mr. C. Frost, entitled "On the Habits and Senses of Spiders—Part I." The author, in course of his remarks, stated that the value of spiders as destroyers of insect pests was hardly appreciated, and urged that they should be preserved rather than destroyed at every opportunity. He stated that from the result of his experiments very few spiders were capable of inflicting any injury to human beings.

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ZOOLOGICAL NOTES ON A TRIP TO WALHALLA.

BY ARTHUR DENDY, M.Sc., F.L.S.

(Read before the Field Naturalists' Club of Victoria,
 11th November, 1889.)

It is hardly necessary to say that the present paper does not pretend to be in any way an exhaustive account of the fauna of Walhalla. All that I aim at is to record a few very simple observations upon some of the lower forms of life met with in that locality during a visit of little more than a week.

Walhalla, as most of my audience are doubtless aware, at any rate after listening to Mr. Tisdall's paper at the last meeting of the Club, is a small gold-mining township in North Gippsland, rather more than 100 miles from Melbourne, and situated on a small creek which flows into the Thomson River a few miles below the township. Hemmed in on all sides by lofty and precipitous hills, the township lies in a very narrow valley, and a few years ago, before the existing coach road was made, was very difficult of access. The surrounding mountains, composed of silurian shales and sandstones, in which lie the gold-bearing quartz reefs, are heavily timbered with gum-trees. Within a radius of a mile or two from the centre of the township the hillsides have been cleared of all the larger timber, and in its place a dense growth of scrub has appeared. The wood-cutting is carried on principally by Italians, and an almost incredible quantity is annually consumed at the Long Tunnel and other gold mines. Tramways have been cut for miles along the hillsides in almost every direction for bringing the wood in to the mines. These tramways, with their accompanying steep "shutes," down which the wood is literally poured into the township below, form a conspicuous feature in the landscape, and being almost the only level ground available, form the principal walks of the neighbourhood. One great advantage about the tram lines is the impossibility of losing one's way upon them, which a stranger would be pretty sure to do if he struck into the bush for any distance.

Along the tram lines, then, many of my rambles were taken, and many of my specimens captured. Wherever I went, whether along the tramways or through the scrub, I might have been followed by the track of overturned stones and logs, for my attention was principally directed to the inhabitants of the dark

and narrow crevices which intervene between every stone or log and the ground on which it rests.

My scientific equipment was very simple, consisting of a number of small bottles of methylated spirits, and perhaps one large one, a pair of steel forceps for the benefit of any beast which looked as if it might bite, and last, but not least, paper and pencil, for it is of the utmost importance to accurately note and, if possible, sketch the size, form, and colour of the living animals. When placed in spirit many animals, and especially the delicate Planarian Worms, in which I was particularly interested, contract greatly and lose their natural colouring, when it becomes almost if not quite impossible to make specific determinations.

The fauna of the dark and narrow crevices to which I have alluded is a very distinct thing, much more so than is, I think, generally realized. Just as we have a special fauna characteristic of freshwater, and another special fauna characteristic of the seashore between tide marks, so we have also a special fauna characteristic of the dark, moist crevices beneath stones and dead logs and under the rotten bark of trees. Probably many of those present are acquainted with the following passage from "The Autocrat of the Breakfast Table," by Oliver Wendell Holmes, which was recalled to my memory last night by Mr. Lucas:—"Did you never, in walking in the fields, come across a large flat stone which had lain, nobody knows how long, just where you found it, with the grass forming a little hedge, as it were, all round it close to its edges; and have you not, in obedience to a kind of feeling that told you it had been lying there long enough, insinuated your stick or your foot or your fingers under its edge and turned it over, as a housewife turns a cake when she says to herself—'It's done brown enough by this time.' What an odd revelation, and what an unforeseen and unpleasant surprise to a small community, the very existence of which you had not suspected until the sudden dismay and scattering among its members produced by your turning the old stone over! Blades of grass flattened down, colourless, matted together as if they had been bleached and ironed; hideous crawling creatures, some of them coleopterous or horny-shelled—turtle-bugs one wants to call them; some of them softer but cunningly spread out and compressed like Lepine watches (Nature never loses a crack or a crevice, mind you, or a joint in a tavern bedstead but she always has one of her flat-pattern live timekeepers to slide into it); black, glossy crickets, with their long filaments sticking out like the whips of four-horse stage coaches; motionless, slug-like creatures, larvæ perhaps, more horrible in their pulpy stillness than even in the infernal wriggle of maturity! But no sooner is the stone turned and the wholesome light of day let upon this compressed and blinded community of creeping things than all of them that

enjoy the luxury of legs, and some of them have a good many, rush round wildly, butting each other and everything in their way, and end in a general stampede for underground retreats from the region poisoned by sunshine."

It is this hidden fauna, whose members are characterized above all things by their hatred of the light, that I wish more particularly to dwell upon to-night. It is composed of animals from numerous and divers classes—worms, insects, centipedes, molluscs, and so forth, and it offers a rich harvest to any field naturalist who will take the trouble to reap it.

Some of these light-aborring, lowly forms of life are exceptionally interesting as representatives either of now almost extinct groups, or of groups which are not characteristically terrestrial at all, but marine. These refugees or exiles, if I may so term them, are driven by competition or by the necessities of their organization to seek for shelter in the most obscure and inaccessible places which they can find. Were they to venture into the open air in broad daylight they would never be able to hold their own in the struggle for existence against the more highly specialized or better adapted animals by which they would be surrounded, or, in the case of the representatives of marine groups, their soft and sometimes almost gelatinous bodies would be shrivelled up by the scorching heat of the sun. As an example of a representative of an ancient and now almost extinct group of animals which has been driven by competition to conceal itself, I need only mention the singular caterpillar-like *Peripatus*. This unfortunate creature, supposed to more or less closely represent the ancestor alike of worms and insects, has been driven literally to the uttermost ends of the earth, being now found hiding away under logs and stones at the Cape of Good Hope, in Australia, New Zealand, South America, and the West Indies, while absent from the rest of the earth's surface. I shall have occasion later on to speak more in detail of some samples of typically marine groups which I found hidden under logs and stones at Walhalla.

It must not be thought that the animals which live under logs and stones in the daytime necessarily spend the whole of their lives in such situations, for this is by no means the case. Some of them, such as *Peripatus* and the Land Planarians, come out at night and move about actively in search of food, which they have various strange and ingenious methods of obtaining, while in the daytime they lie coiled up and dormant in their hiding places. Nevertheless their typical dwelling-place is in such hidden crevices as I have described, and the fact that they come out at night to look for food no more proves the contrary than the fact of one's wife going round to the butcher's to buy a leg of mutton proves that she habitually lives in the open air.

Now to these light-aborring animals, which live concealed under logs and stones and beneath the dead bark of trees, and venture forth from their hiding places, if at all, only at night or under exceptional circumstances, it will be convenient to give a distinct name indicative of their peculiar habitat, and though I have carefully studied the Greek dictionary I can find no more suitable term than "*Cryptozoic*," or living hidden, which, though by no means perfect, I think fairly expresses my meaning. By the *cryptozoic* fauna, then, I mean all that assemblage of animals which is found living habitually under logs and stones and under the rotten bark of trees. I had thought of including under the term also burrowing animals such as the mole and the earthworm, but decided finally that it was better not to do so. The line must be drawn somewhere, and if we draw it as I propose I think we shall circumscribe a fairly distinct and definite group of animals.

I must now say something about the *cryptozoic* fauna of Walhalla, and I will begin with the Land Planarians. The Planarians form a very well characterized and distinct group of lowly organized worms, of which the majority are inhabitants of salt or fresh waters. It is probable that the comparatively few genera which live on land are descendants of aquatic ancestors, and to this fact is probably to be attributed their hatred of light and air and their partiality to damp crevices under stones and dead wood. The terrestrial forms are elongated, very soft bodied worms, flattened on the lower surface, which is used for crawling on. When lying still they coil themselves up, and when they begin to crawl they stretch themselves out greatly, and the body becomes correspondingly narrower. The anterior extremity of the animal is narrow and horse-shoe shaped, and bears usually a large number of very minute eyes. When the animal is actively crawling this anterior end of the body is raised up off the ground as though the worm were trying to see its way, which is doubtless the case. The size of the animal varies with the species, but averages some three inches in length when crawling. The entire animal is covered with an intensely sticky coating of slime, which is left behind as a trail when the worm crawls. One of these worms, which I captured at Warburton, escaped from the bottle in which it was confined, and for some time I thought it had gone for ever, but at last I noticed a shiny track on the wall of the room, and following it up found that the worm had squeezed through the crack between the mantelshelf and the wall, and thence found its way on to the floor, where I speedily recaptured it.

In about the centre of the under surface of the body there is always a very small round hole. This leads into a spacious cavity within the body in which the animal keeps a large sucker neatly folded up and packed away when not in use. When it wishes to feed, however, it unpacks the sucker and puts it out through the

small round hole, just as we can put our tongue out of our mouth when we wish to. There is a difference, however, between our tongue and the tongue—if I may so call it—of a Planarian Worm, for while our tongue lies in the middle of our mouth, the mouth of a Planarian lies in the middle of its tongue; that is to say, the sucker is tubular and the cavity of the tube leads into the alimentary canal. This aperture in the middle of the sucker forms the only means of communication between the alimentary canal of the worm and the external world, so that all undigested food has to be passed out again through the same opening by which it was taken in.

One of our members, Mr. Brittlebank, has already described in the *Naturalist* the curious manner in which the Land Planarians feed. He observed one with the sucker inserted into the body of a wood-louse, from which it was contentedly sucking out all the nice juicy inside. I disturbed one at Walhalla which had evidently just been engaged in treating an unfortunate beetle in the same manner. The body of the worm was wrapped around the beetle, which was held fast by the intensely sticky slime.

Four or five different species of Land Planarians were found at Walhalla. By far the largest and handsomest, and at the same time the commonest, was *Geoplana spenceri*, a species whose anatomy I have already described in detail at the Royal Society, and which I have named after our vice-president, Professor Baldwin Spencer, who first discovered it at M'Mahon's Creek on the Upper Yarra. This handsome worm is of a very dark olive green or almost black colour on the upper surface and bright cobalt or Prussian blue on the lower, with a small pinkish tip at the front end. Some of the specimens found at Walhalla must have measured fully six inches in length when crawling. They were much larger than any Planarians I had seen before.

Another species was almost entirely of a sulphur-yellow colour; another (if indeed it be distinct), yellow with four dark-brownish stripes down the back; a fourth was dark olive green above and speckled brown below, while a fifth was very pale brownish yellow, with two red stripes down its back.

One day while hunting about on the hillside just above one of the tramways I came across a small slug-like animal lying quite still under a stone, with a quantity of slime around it. It was of a brownish orange colour, and looked as though it might possibly be some new kind of Planarian. Anyway, it looked as if it could not do anybody any harm, so I put it on the back of my hand, as I often do, to watch it crawl about. Suddenly, to my utmost consternation, the little beast, with lightning-like rapidity, shot out a great long slimy white thing from its front end larger than itself, and at the same time its body became much slenderer. The long white thing, which we may call the proboscis, lay upon my hand

for a short time, but was soon withdrawn right into the body of its owner again. It was then shot out three times in quick succession with great suddenness and rapidity, and each time (except the last) again completely withdrawn into the body. After shooting out its proboscis for the fourth time the animal seemed exhausted, and as the proboscis seemed inclined to remain out and stick to my hand, I thought it advisable to put it in spirits at once.

I shall never forget my astonishment and almost horror when the great white slimy-looking proboscis was shot out over the back of my hand without a moment's warning, and as quick as lightning. The animal which had thus startled me, however, proved to be a very lucky find, and after much careful searching on subsequent days I found two more. Like the Planarians they belong to a group of typically marine worms, the group to which they belong—the *Nemertinea*—being, indeed, nearly related to the Planarians. Terrestrial Nemertines are, however, very much rarer than terrestrial Planarians, and according to Jackson only four species are known. These are—*Tetrastemma agricola*, from the Bermudas; *Tetrastemma rodericanum*, from the Rodriguez Island; *Geonemertes palaensis*, from the Pelew Islands; and *Geonemertes chalicophora*, mentioned as doubtfully coming from Australia.

It is possible that the specimens found at Walhalla may belong to the last-named species, but as even the country of the latter is doubtful, it is probable that not very much is known about it, and pretty certain that it has never been studied in the living state. Unfortunately it was described by Graff in a publication—the *Morphologisches Jahrbuch*—which appears to be unobtainable in Melbourne.

The terrestrial Nemertines are distinguished from the terrestrial Planarians by the arrangement of the alimentary canal. Instead of having a medianly placed sucker perforated by an opening which serves alike for mouth and anus, they have, like the earthworm, a mouth at one end of the body and a distinct anus at the other. Their most characteristic feature, however, is the long protrusible proboscis. This, when not in use, is packed away in a long tubular sheath lying along the animal's back, and it can, as we have seen, be shot out with lightning-like rapidity from the anterior end of the body.

A distinguished naturalist, the late Dr. Van Willemoes Suhm, who accompanied the *Challenger* expedition, and unfortunately died on the voyage, discovered a terrestrial Nemertine (*Tetrastemma agricola*) living in damp earth on the Bermuda Islands. He states that the proboscis is shot out and its extremity then fixed to some object by means of a number of papillæ with which it is provided, and that the body of the animal is then drawn up

to this fixed point by the retraction of the proboscis. According to this statement the proboscis is used as an organ of locomotion. Now, in the case of the Walhalla species I do not think that this is the case. The proboscis was repeatedly shot out when the animal was irritated, as a gun is discharged when you pull the trigger, but I never saw it fixed to anything as described by Suhm. On the contrary, it was withdrawn into the body, which latter appeared to remain stationary. In my notes, written at the time, before I knew of Dr. Van Willemoes Suhm's observations, I have written:—"From the action of the proboscis it may be regarded as almost certain that it is used by the animal either as a weapon of offence or defence, or possibly both. It might certainly be of use in catching food, and it would assuredly frighten any bird who contemplated making a meal of its owner." Locomotion, on the other hand, is effected, as in the case of the Land Planarians, by crawling slowly, the proboscis being at the same time completely packed away in the body.

The following brief description of the last found of the three specimens is also taken from my notes, and may assist naturalists in recognizing this remarkable worm:—"Length when crawling, about two inches; colour dull orange, rather translucent. The animal crawls slowly on a somewhat flattened surface, elongating its body, and carrying the rounded end in front. It leaves behind a track of slime like that of a snail. At the anterior end is a small but distinctly swollen head, of a slightly paler colour than the rest of the body; but the extreme anterior face of the head is convex, and of a darker brown colour than the rest of the body. There is a ring of very small close-set spots* just behind the anterior face. Hinder end of body pointed. There is an elongated patch of irregular light-coloured spots, closely packed, down each side of the body, apparently caused by some internal organs showing through. When lying still the animal is not so much elongated and more slug-like than when crawling. When laid hold of it emitted proboscis for a great length, and again retracted it. When put in spirit it emitted proboscis further than ever, and the body was at first greatly swollen, like a sausage, and then contracted again."

Of the three specimens one was found under a piece of bark lying on the ground, and the other two under stones, the individual localities being, I should say, considerably over a mile apart from one another, so that the animal does not seem to be by any means common.

The time at my disposal for the preparation of these notes, as well as the time at your disposal for listening to them, forbids me to describe all the queer cryptozoic animals which I found at

* Doubtless eye-spots.

Walhalla. Conspicuous amongst these were several kinds of large cockroaches, one of which lays a very remarkable cocoon—sausage-shaped, and provided with a curious toothed crest, just like a saw, running along its length. Spiders and ants were also there in swarms; but all these, and more also, I must pass over, and hasten on to describe some other very remarkable forms which I think deserve special attention.

The first of these were found under stones, and one of them is represented in the first of the drawings which I have the pleasure of exhibiting this evening. Imagine a small oval creature, somewhere about a quarter of an inch in length; flat on the lower surface, and well rounded on the upper; white all over, except for a number of regularly-arranged brown warts on the back. The warts are arranged with great regularity as follows:—There is, first of all, one at each extremity of the body, just above the margin of the dorsal surface, and then between these two, and placed at about equal distances, come seven transverse rows, each composed of four warts—or I might with equal correctness say four longitudinal rows, each composed of seven warts. At one end of the body the two central warts of the transverse row of four are fused together in the middle line so as to form an elongated proboscis-like organ, which projects so as to hide the single terminal wart when the animal is viewed from above.

Round the margin of the body, at the junction of the dorsal and ventral surfaces, there is a very delicate narrow fringe. Microscopical examination shows that this fringe is composed of innumerable minute flattened branching hairs, placed so close together as to form a continuous band, and probably serving their owner as a means of slight attachment to the surface on which it lies, for the animal is excessively sluggish, and when touched only just shrinks a little. The entire body is invested by a horny or chitinous cuticle; this is more strongly developed on the dorsal than on the ventral surface, and is especially thick in the position of the warts, which seem, indeed, to be composed entirely of cuticular substance. On the ventral surface the cuticle forms innumerable short, pointed, microscopical hairs, and it also gives rise to the branching marginal hairs forming the fringe already described. On the dorsal surface, between the warts, the outermost layer of the chitinous cuticle exhibits under the microscope a very peculiar and beautiful sculpturing—consisting of a number of rounded knobs placed at some little distance from one another, with a great number of much smaller, more or less star-shaped, knobs filling up the gaps between them.

I was at first greatly puzzled with these little creatures, and what seemed the most possible suggestion as to their nature which occurred to me was that they might be some kind of slug (this was before I had made any microscopical examination). Subsequently,

however, I obtained from under dead wood, also at Walhalla, what was evidently a second species belonging to the same genus or to a very nearly related genus. This differed from the first in the arrangement of the brown warts on the back, which were very small, and formed a marginal row of twenty-six on each side, and two longitudinal rows of six—one on each side of the middle line—the two warts at one end of the series being again fused and elongated so as to form a proboscis-like organ. This species presented itself in various stages of development—not only were there individuals of various sizes, but also empty chitinous cases, presenting the exact form and markings of the body, but with an aperture at one end (remote from the proboscis-like organ), from which the animal itself had evidently escaped. So it was clear that the animal had cast its skin, and I at once came to the conclusion that it was probably some kind of insect.

On returning to Melbourne I showed my specimens to Professor M'Coy, and he tells me he thinks they are the larvæ of dipterous flies. I also showed them to Mr. French, the Government entomologist, and he tells me that he has never seen anything like them before. I hope that before long some of our members may come across some of these strange, apodous insect larvæ, and, by keeping them in captivity, find out definitely what they turn into. I obtained two specimens of what seems to be yet a third species at Walhalla, but these I have not yet had time to examine in detail.

I have now completed my remarks on the cryptozoic fauna of Walhalla, and I hope that these brief and imperfect observations may perhaps stimulate others amongst us to become active stone-turners, for I feel sure that they will be well repaid by a rich harvest.

While at Walhalla I paid little attention to any but cryptozoic animals. I brought away, however, one snake and two lizards, concerning which Professor M'Coy writes to me as follows:—"The snake is the White-lipped Snake (*Hoplocephalus coronoides*). The lizard I have not seen, and should be glad of one for the Museum. It most resembles the *Amphibolura*, or *Grammatophora angulifera*, but I cannot see any femoral pores, which form a distinct line in an example of that. I fancy I see in one two pores, as in *Diporophora*, but it is not any of the known species."

In conclusion, I have much pleasure in expressing my indebtedness to Mr. Henry Dendy, of Walhalla, whose hospitality I enjoyed during my visit, and who accompanied me on several occasions in the field, and greatly assisted me in finding specimens.