

light oblique streak running down from the anterior and posterior corners of the eye, and diverging to the rim of the upper jaw. Male without sound-bag.

Coromandel, near Auckland.

ART. XXVI.—*Notes and Observations on the Animal Economy and Habits of one of our New Zealand Lizards, supposed to be a new Species of Nautinus.*

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[Read before the Hawke's Bay Philosophical Institute, 12th May, 1879.]

HAVING had ample opportunities, during the past year, of observing the habits and manners of these elegant little animals in a state of captivity, and believing all such to be almost wholly unknown, I have thought it desirable to give a pretty full description of the same; seeing, too, that I succeeded better in rearing and keeping alive these lizards than I did with the larger one, *Hatteria punctata* (or *Sphenodon*), in 1840.

In the winter of 1878, I received a glass jar from Hampden, in this provincial district, containing three full-grown living green lizards. They were pretty nearly alike in size; two of them were spotted with large irregular-shaped light-green spots, or markings, and one was wholly green. They had been found together, a short time before, in a hole, with a fourth, which was accidentally killed; and, on their capture, were put carefully into a jar, and packed loosely in moss. On my receiving them I found them apparently very well, but unwilling to move or to face the light, seeking to bury themselves more and more in their mossy bed, so I left them alone, believing they were hybernating. Meanwhile, I made many enquiries, by letter, as to their "hole," its linings, etc., but gained little reliable information, save that "in it, and with them, was a lot of stuff like blasting powder;" this, I have reason to believe, was the fæcal debris. I greatly regretted the loss of the fourth, as I think that would have proved to be a green male.

During the winter I looked at them three or four times, but they always acted in the same manner, as if averse to having their quiet sleep disturbed. On again looking at them early in October, I found them wholly altered; they were now desirous of coming to the light, restless, and pawing against the glass, and had increased in number, having four little ones! two being spotted with white, and two entirely green; their lovely little bodies looking as if cased in silk velvet instead of scales; this appearance continued for some weeks. I now lost no time in removing them to more suitable

lodgings, placing them under a circular glass dome, of 10 inches diameter, with a few leafy twigs of koromiko (*Veronica salicifolia*), and giving them water in an oblong flint-glass salt-cellar, which, from its form and thickness, they could not upset. I knew they must be hungry, and I tried them with several things in the way of food, as bits of meat, both raw and cooked, of various fruits, of bread, of succulent roots and vegetables, and with small larvæ (caterpillars), but nothing would they touch. At last, as the warm weather came on, I tried them with a few flies, which were killed, or made motionless, in catching, these, also, they would not touch, or even look at. At length I put some living flies into their crystal palace, and these they soon caught and ate—that is the three adult lizards. For a long time I sought in vain for very small tiny flies for the young ones, and when I did succeed in getting a few, it was some time before the baby lizards managed to catch and swallow any (although the little things pursued them with longing eyes!) as the fly, when caught, in struggling, would often escape out of their tiny mouths, which was the more easily effected through the lizards not having any teeth to hold by, and the powers of the young ones were but feeble through their long fasting. One day I happened to give them three or four of the large red-brown viviparous flesh-fly (*Musca læmica*), thinking the large lizards, at least, would now have a good meal, and when I was not a little surprised to see them scuttle about in all directions, wholly turning away from these flies, and apparently endeavouring to hide themselves (or their heads) among the koromiko leaves. For some time I did not understand this new movement, and I subsequently noticed, that while some of these red-brown flesh-flies were eaten (being gone), others were left dead on the floor of their cage.

Early in November I was sorry to observe that the young ones, although all four had grown rapidly in length, were daily becoming more weak, especially the two entirely green ones; this, of course, was owing to their not eating. On the 3rd of November one of the young green ones died. At this time, too, the head of one of the adult lizards (as I believe, the female one) swelled much, changed to a livid colour, and grew to an unshapely size, with a bloody discharge distilling from its ears. I thought, that something being the matter with its head, the other lizards in their scrambling about over each other (which they commonly do) had fixed their sharp claws in its ears, being now tender, and so caused them to bleed, &c. The sick lizard, however, was very patient under it; and as its disorder increased, the skin of its head became more and more stretched with the swelling, and great and irregular throbbings or undulations were very apparent. (Here I should mention, that the regular pulsation in their throats is always prominently seen). And so, as this diseased lizard became

offensive, yet still living (though not eating), dirtying the others with its discharges, *anal* now as well as *aural*, I threw it out into the field.

On the 16th November I looked at my lizards, as usual, in the morning before going to town, and found them right; but on my return, at one o'clock, p.m., the biggest spotted one (which I believe to be a male) had cast its skin!—or epidermis!—it was nearly all got off, and almost entire. I helped it, by holding its scurf, to draw out its tail. I was much pleased at this for several reasons—some I may here mention: (1.) The beautiful new sparkling vivid green colour of the animal! now, for the first time seen in its living beauty. (2.) The cast-skin, or scurf, truly a curious object; showing, not only every scale, and joint, and spot, and marking, including the little fingers of its tiny gloves close down to its claws; but, also, the very outer skin or film of its labial scales, and of its eyes. (3.) The cast skin was not at all coloured green like the animal, but was merely of a light grey colour with lighter patches corresponding with its large white spots. (4.) It had commenced breaking away under the chin, and so peeled off from its snout regularly down its back and body to the tip of its tail. (5.) I might now expect to know something certain of this animal's economy (and of its congeners), as to how often in the year it would cast its skin.

One of the spotted young ones (which I shall term No. 1.) also cast its skin on the 6th December; like that of the large male it commenced at the snout, but it came away in fragments—perhaps owing to its being both young and tender.

On the 8th December the second young green lizard died, just as the former young one died, from starvation. This one had, in common with the two young spotted ones, plenty of small flies (now more easily obtained as the summer advanced), but it wanted the power to catch any.

About the 12th December the two remaining adult lizards seemed to be getting into a diseased state; the handsome male, which had so lately shed its outer skin, had something the matter with its ear, from which a bloody discharge was oozing (resembling in a smaller degree the early diseased state of the adult one that died), while the adult female was restless, swelled in the lower abdomen, and discharging a bloody mixture from its anus; finding this one getting rapidly worse, with its anus greatly swelled and blotchy—starred all round the margin as it were in a curious regular manner—I lost no time in putting it into a bottle of spirits, and, on my going to look at it some ten minutes after, I found, to my astonishment, no less than 26 large living larvæ of that red-brown flesh-fly had been discharged from its anus! These were each 5 lines long, and it was their posterior ends compacted together and jutting out from the lizard's anus which had given it in that part its peculiar appearance. Now it flashed across my

mind,—their evident dislike and dread on their first seeing that flesh-fly in their cage; and that this was also the cause of the death of my first lizard, into which the living larvæ had been deposited through its ears! causing its head to possess and show those ugly, unnatural throbbings or semi-undulations. I now hastened to the adult male lizard, and caught it, and on gently squeezing its head I saw the posterior end of a larva presenting itself within its ear; I took a needle and extracted it; it was much larger than those in the spirits, and gorged with blood. After this the male lizard soon recovered and became lively, though that aural orifice completely closed up, and so remained until the next shedding of its skin, when I was glad to find that it resumed its former appearance. From the time of this discovery I was careful not to give them any more viviparous female flesh-flies, consequently I have had no more similar diseases to notice.

The other young spotted lizard (No. 2) shed its skin for the first time on the 16th December, taking, however, until the 22nd ere it entirely got it off. This little animal interested me much in its undergoing its change of dress; for as the other young one (No. 1) had taken me by surprise, in its early disrobing, I had closely watched this one (No. 2), supposing its turn could not be far off; and first I noticed, that the day before that it began to cast its skin, its whole body assumed a whitish milky appearance, as if it had been dipped into milk and the milk had dried upon it; or, as if it were closely covered with very fine and transparent white muslin; second, just as in the case of the others, the epidermis first broke at the snout and chin, and subsequently gave way over the loins and hind-legs, peeling off in large flakes. After a day or two the lizard seemed to get impatient about the getting-off of its old coat, and every now and then would lay hold of the rags with its mouth and pull away, and sometimes try to force them off with its little claws, but I scarcely ever noticed that it effected anything; it would rub, too, against its water-pot (the salt-cellar), and sometimes against the large lizard, and the koromiko stalks—showing clearly that in their natural state they seek the aid of closely-growing grasses and other small herbage the more quickly to effect their deliverance; at last, on the 22nd, I caught the lizard, and helped it to get off its tattered stockings, gloves, and tail-case, and so put an end to its discomfort.

The big male lizard again shed its skin on the 24th January; this time, however, in fragments, yet done quickly, all being over within two hours. And again this lizard shed its skin on the 15th of March, this time in large pieces; finding that while it had extricated its hind-legs it could not draw out its tail, I caught it and helped it to do so. It was pleasing to see how quietly it remained in my hand, when it found out what I was doing, and how naturally it moved its long tail in an easy wriggling manner, and with

strong muscular power pulling against me, so that the whole outer skin of the tail came off, as at first, in one unbroken piece. The cast skin is damp, soft, and slightly clammy, on its being shed, but it quickly dries and hardens.

The young lizard (No. 1) next cast off its skin on the 31st December, having assumed the milky appearance already mentioned the day before; and to my great surprise this same lizard again put on the cloudy milky appearance on the 13th January, and again shed its skin on the following day when its scurf was just a fortnight old! As before, it began to break away at its snout, but on this occasion, somehow, possibly owing to its fineness, it got rolled up together and backwards behind its eyes, giving the animal with its white wig the drollest appearance imaginable, so that I often laughed outright! This time it was very slow in casting off its rags, as parts of its skin were still hanging on its sides on the 24th January—just ten days—when I caught it and helped it. This lizard again shed its skin on the 1st March, when it was two days in getting it wholly off: often biting it and tearing at it with its claws. The next time it did so was on the 19th April, having assumed the usual milky appearance two days before; on this occasion its old scurf first broke through over its back.

The other young lizard (No. 2) again cast off its outer skin on the 5th February, having the day before put on the peculiar milky appearance.

So that, during the past seven or eight spring and summer months, those three lizards have each shed their epidermis as follows:—

Big adult male, 1878, November 16; 1879, January 24; March 15.*
Young one, No. 1, 1878, December 6, December 31; 1879, January 14, March 1, April 19. Young one, No. 2, 1878, December 16; 1879, February 5.

Their manner of taking their prey (flies) is peculiar: When the lizard clearly sees the fly, and makes sure it is living, it steals towards it in the most stealthy manner. As the lizard nears the fly, and when within two inches of it, then is the time closely to notice its actions. First it arches its neck to a tolerably sharp angle, and its eyes swell and bulge out, or rather upwards, over their orbits, and the expression of its countenance alters greatly, taking on a fierce look; next it lifts its little hand-like paws and moves them, only a toe or a finger at a time and often in the air, very slowly and cautiously (much like a little child does its hands when stealing along on tip-toe), and then it nears its head towards its prey, but so very slowly that I have better detected its movement by watching its shadow cast on marked paper by strong sunlight,—reminding me of the almost imperceptible movement of the hour-hand of a clock. At last it has got to

* *Vide* Addendum.

about one inch, or a little less, from the fly, when as quick as light the dart is made, and the fly is caught; and then the little lizard rapidly knocks about its prey from side to side as a terrier with a rat, not however striking the fly against anything, merely shaking it. After a short time so spent the lizard proceeds to swallow the fly, which it does by half opening its mouth and drawing it in, and generally, after three or four movements of this kind, the fly is gulped down whole—legs and wings and bristles! Notwithstanding its struggles, I have been surprised at two things here: (1.) that it does not matter how the fly (or moth) is seized, whether by head or tail or side, down it goes, in despite of its long legs and wings; and (2.) that such a very small throat as the young ones have can so readily swallow a tolerably large fly (or moth) whole, and that, too, without showing any outward distention of the throat beneath; for although it keeps its head elevated, you cannot trace the prey going down the lizard's gullet! The larger adult lizards, however, do not knock about their heads with their prey in their mouths; they just give the usual two or three movements of their jaws, and the fly is swallowed! Sometimes it is one of the largest "blue-bottles." And the young ones, I notice, do not now knock about their heads when they have seized their prey so much as they did at first. On two or three occasions, when flies have been rather scarce, and the little lizards hungry, I have seen when one had got the fly into its mouth, the other would make up towards it, arch its neck, and put on the usual ferocious look, and, watching the time when the lizard with the fly in its mouth should open its jaws to make its swallowing movement, dart forwards and lay hold of the part of the fly outside of the mouth of the other. And now they both hold on to the fly—the fly getting the worst of it between them—and sometimes one and sometimes the other gets the prize; and, on more than one occasion, I have seen the fly get away from them after all its pinching! and fly and crawl about a little longer; showing that so far it was not greatly hurt. They often miss catching the fly when they make their dart upon it, for it flies away when the lizard looks stupidly about; the escaped fly flies around the glass, and sometimes comes back to the same spot or nearly so, and not unfrequently alights on the lizard's snout! When it does this, the lizard does not seek immediately to recapture it, and sometimes it even turns and runs away from the fly! On several occasions, when a fly has got into their water-trough, and is there struggling, I have seen them climb up and make a dart at it, and so take it in the water. I have mentioned moths. On a few occasions, when without flies, I have given the lizards a moth or two, of from 1 inch to $1\frac{1}{2}$ inches in length, and the lizards would catch and eat them just as they did flies, but the down would stick to their lips for some time ere they managed to swallow it,

which they also did. The large lizard often puts its tongue out ("licking its lips") when it goes after a fly, especially if a big one; I am inclined to think that it is hungry then. It is pretty to see the two young lizards going together after the same fly, especially if the fly is crawling above them, within, on the glass roof; to see them walking slowly, side by side, with measured gait, and step by step, like a pair of hounds in a leash or a couple of miniature fairy-like little creatures, with their heads up, and their little black eyes glistening; at such times, too, when they at last near the fly, they often trample on each other in their eagerness, but whenever they do so, they always take it very quietly, the one underneath neither struggling nor retaliating.

It has often seemed to me as if it were a natural law, or rule, of these lizards (a thing understood by them), that whenever they trample on, or walk slowly over, each other, or stand, or lie, or even sleep on each other, the under one, or ones, always take it patiently, and rarely ever move at all—not even when the sharp claws of the upper lizard are pressing on the eyes of the one under him: I have often been surprised at this. I have never once seen them fight or fall out, or attempt to bite each other, although confined in so small a compass. They often spend hours lying on each other's backs, which is a favourite posture with them, and sometimes sleep, or spend, the whole night thus. I have seen the whole seven thus together in one lump, with, sometimes, the little ones underneath.

They don't seem very timid nor easily startled to any great degree with noises, or sights, or sounds. I keep them on the table in my sitting-room, at which I take my meals, etc., and I have often thrown down a newspaper by their side, or struck the table with a book pretty strongly, yet they never start; it is the same when the candles are lit. They appear, too, as if they liked to snugly ensconce themselves in their cage under the koromiko branch, or (the two young ones) stretched out at full length on the upper side of the twigs.

I believe them to be inoffensive, peaceful, and sociable; and if, as I have already surmised, the fourth one (which was killed) was also a male, then there would have been two couples, at least, hybernating together in one "hole;" or that "hole" may have been their usual dwelling-place, seeing there were found in it "lots of black stuff"—no doubt their dry and hardened fæces, which could not, I think, have been so largely deposited during the short period then passed of their hybernation. An intelligent friend in the country, who is also an observer of nature, has informed me that he has found them, in clearing, "six or seven together, cuddled up under the roots of a flax-bush" (*Phormium*).

It is pretty to see them drinking, which they do but seldom; they lap water much like a cat, but very slowly, as if they were tasting it; every now

and then passing their broad, thin, and large tongue right over their eyes, as if washing them, and always so finishing their drinking. I have also seen them lick the wet koromiko leaves when fresh; and the young ones, more than once, lick the adult male. Their tongue and palate are of a deep purple colour, much like that of some plums, and the tongue, when fully extended (as in licking), has an emarginate appearance, which may, however, be owing to the action of the hyoid muscle.

They seem to like the water, as they often go singly into their water-trough, and remain extended in the water for some time. They can swim very fast, too, but clumsily, as if they were in a great hurry about it; I have occasionally tried them at swimming in a large vessel of water.

They can run very swiftly, as I have often proved. When they merely walk, their tails are always straight; but when they make haste their tails are undulated laterally throughout their whole length. Here, no doubt, their under-squamæ help them; this, indeed, I have in a measure ascertained, in my taking the large lizard into my hands and holding it vertically, when, to aid its ascent in crawling, all the squamæ below are used strongly, and one feels them curiously applied against the hand.* This, also, I think, will account for their being able to climb up on the *outside* of their glass dome, which they can do—in which feat they are no doubt also materially aided by the large transverse scales on their toes, which are a beautiful object, and admirably adapted for climbing purposes. Their claws, too, are exceedingly sharp, having a translucent or semi-crystalline appearance, and are set on at almost a right angle to their toes. One can hardly bear to hold them in one's hand when they struggle and use their sharp claws.

Their tails have also a strong prehensile power, as I have found in their clasping my fingers with them very closely, and so holding on. On one occasion I had to clear the tail of one which was fast, having taken a half-turn over itself in the sharp angle of a twiggy branch of half-withered and flaccid koromiko, which, I suppose, it had pressed down by lying upon it.

They sometimes spring a short distance very nimbly when they wish to get away from any little obstructions; and they also jump down fearlessly and without hesitation. I have taken them up and allowed them to run over a book, etc., held horizontally, 2–3 feet above the table, when they would run straight over the edge of the book and drop on the table on all-fours, like a weasel or a cat, and so continue to run as before.

They assume all manner of curious and grotesque positions, some of them being most extraordinary, and some apparently painful, but in reality I suppose are not so. Whatever posture they assume they both can and

* The sensation being just as if every single scale was being forcibly moved forwards in rapid succession by the muscles of the animal.

do keep it for a long time, often remaining motionless for hours, occasionally even days, in one position. I have often thought, that if a correct drawing were taken of the lizards when in such queer postures, the cry of "How unnatural!" would surely be raised on its being looked at. Sometimes they will take a peculiar position on the edge of their water-trough (glass salt-cellar), there, with their tails within it, and merely holding on by their hind-feet on the narrow outer edge, they will project themselves forward in the air, and so either keep themselves quietly extended, or paw about in the air with their fore-legs, for some time. The large one will stand up against the glass dome (on the inside) with its fore-feet spread out on the glass, and its long tail curled in under it in a perfect ring, and its two hind-feet clasping its tail on the opposite side of the ring! Sometimes the young ones will raise themselves against the glass (within) and there stretch out their four paws on the glass, and so support themselves on their tail, which is for this purpose bent a little below its base, having the lower portion extended on the floor (much as a kangaroo is sometimes drawn) and in this posture they will remain 2-3 hours without moving. I have seen one of the young ones lay itself along the edge of its water-trough having its two feet of one side just within it, with the two feet of the other side low down on the outside, and its tail passed around the end and further side above the floor, and so remain immovable for half-a-day! I have also noticed one of them stretched among the koromiko twigs, having one of its little fore-legs twisted up backwards over its back! apparently as if dislocated or broken, and so remain for several hours. I have also observed the young ones standing for a considerable time with the 5th (or outer) toe of each hind-foot turned in completely underneath the sole from the first phalanx, so that no vestige of that toe could possibly be seen. The joints of their legs and toes seem to be strangely formed, as if reversible at their will in action. Sometimes one of the young ones will stretch itself on the head of the adult male, looking towards its tail, just bringing its four paws and sharp-pointed claws into the head and eyes of the large lizard by which it holds on! at other times the young one will quite reverse that position, looking ahead of the large lizard, but with its feet and claws as before (only reversed) and so remain for hours; the big one under him not moving. It is pleasing to notice them when a fresh leafy branch of koromiko is put into their cage, then the two small ones will climb up and extend themselves along the branchlets, while the adult lizard will curl himself up among the leaves below, and so they will quietly remain. On one occasion in the spring, when the whole seven were alive together, I noticed, one evening, one of the adult lizards on its side in the salt-cellar with its legs and feet as if twisted unnaturally over the edge; I first observed it about 5 p.m., at

8 p.m. it had not moved, so also it was at 11 p.m., when I went to bed, and when I came down the next morning it was still in exactly the same strange position; I now thought it could not easily get out, so I lifted the glass to help it, but the moment I did so it scuttled away very fast.

They always take a most peculiar attitude to void their fæces, which, however, they do not perform frequently. I always know when they are about to do so (if on the lock-out), for with young and old their preparation is pretty much alike. They first lift up their tails in a semi-curve towards their backs, then they lift their hind-feet from the floor, and so slowly void their one pellet; which done they gently lower their hind-feet, and then their tail, and move away. On one occasion I saw the adult male lizard, which was quietly at ease among the koromiko twigs, leave its lair and climb up into the water-trough; at first I thought it was going to drink, or to bathe in the water, but I was agreeably surprised in noting its actions; having got into the salt-cellar, it placed its feet on both sides, cocked-up its big tail, and voided its pellet into the water! That over, it leisurely descended to its former resting-place. In their voiding the fæcal pellet the anus of the animal is produced much more than would be supposed. Their dung is of a long oval shape 4-5 lines long, and not unlike that of a sheep; it is black in colour, but always with a white adjunct (uric acid), somewhat resembling that of a fowl, which portion always appears first; they void rather slowly. Sometimes, especially after eating "blue-bottle flies," the portions of the fly in rather coarse fragments are very plain in the deposit.

It was highly curious to note what I believed to be the amorous manner of the adult male toward the female lizards. This happened early in the summer, but the loss of the two females (*supra*) of course put a stop to it. He would chase the female in a peculiar strutting manner round and round their cage, moving his head horizontally very regularly and constantly with a jerk from right to left, and left to right, until he should lay hold of her, which he invariably did by the loose skin on the nape of the neck, when, having so caught her, he was still—sometimes for half-an-hour or more—holding quietly on all the time, but on her trying to get loose, which she easily did, the same kind of pursuit would follow, to be ended in a similar way. As the summer advanced his teasing manner became so constant, and evidently to the annoyance of the two females—giving them all no rest in their little cage—that I had thoughts of removing him into another, which I suppose I should have done had the two females not died.

Although I have often handled and stroked them, only on one occasion did one of them bite me; this was the adult male, and I had teased him a bit,—but his bite was but a gentle pinch, scarcely perceptible! I have a

growing fancy that they know me, for now they often come to the side of the glass nearest to me when I am observing them, particularly the two young ones,—this they did not at first. Indeed it is interesting to watch them, when I have them in their glass cage on my writing-table, close to me, when engaged in writing, to see them come to the side of the glass nearest to me, and there paw the glass, or stand up quietly on their hind-legs against it, evidently watching me closely with their pretty bright eyes, sometimes turning their little heads just as I may move. Of course they will not take a fly from my hands, for, let them be ever so hungry, as I have said before, they must see the fly moving before they will touch it.

I believe them to be endowed with great powers of abstinence; I scarcely ever saw the two adult females that died take a fly, and I am sure they could not have had many during the months they were in confinement, yet they did not fall off much in size; so with those two young ones that died,—one of them never ate at all from its birth,—yet, they continued to grow in length, just as the other two young ones did which survived. The adult male has rarely ever eaten much, sometimes (as far as I know, and I have watched him closely) scarcely three flies in a week. On one occasion, however, in the summer, I saw him eat four large red-brown flesh-flies within ten minutes, as fast as I caught them singly and put them into the cage; this feat quite surprised me as I had never seen anything of the kind before or since. The two young ones will each now eat half-a-dozen of the common introduced house-flies in a day, but then, after doing so, they go some 2–3 days without eating; each of them certainly eats more than the adult, although they are not one-fifth of his size. I generally feed them twice in the week. Of the various kinds of flies I have given them, I think they prefer a shining green-bodied one (which is scarce), also a *small* kind of “blue-bottle.” I do not suppose they live on flies when in their natural habitat, rather on small *Coleoptera*. Their patience also, as I have already intimated, seems very great; speaking generally they like to remain in a quiet attitude, especially the adult; he, however, might also be widely different if he had a mate.

Cold-blooded as they are (and they do feel cold when handled), yet I think they like the heat of the sun; for when I place their glass cage in its rays they never seek to evade them. The pupils of their eyes, which normally are of a narrow lenticular shape, in strong sun-light contract to a mere line, like those of a cat; they dilate, however, when about to seize their prey, also by candle-light, but not much, the pupil never becoming full. Their eyes also appear fixed, so that I believe they cannot see any small object (as a fly) when straight before them and pretty close to their nose. I have not detected their possessing any sense of smell, and have

reasons for believing they are devoid of it. I have also never heard any cry or sound,* though the ancient New Zealanders would flee in terror from this animal (or an allied species, *N. elegans*), saying they had sometimes heard its cry, which they called *kata* (= laugh), which they also greatly disliked and considered ominous. But, though I have often seen *N. elegans* on shrubs, etc., in travelling in former years, I never myself heard its cry; possibly, it may only emit a cry at certain seasons. I should also mention that these lizards have had many opportunities of uttering a cry, if, like many other animals, sudden pain would extort such from them. For, in spite of all one's care, sometimes one of them will get its toe or tip of tail slightly caught in replacing the glass, when it twingles and twirls surprisingly until it is released, when it runs and jumps wildly around its cage for a few seconds—no doubt from pain—but it never makes a cry nor opens its mouth. In this way one of the young ones got its tail hurt, during my absence from home in the summer, and, although apparently it was only bruised, about 8–9 lines from the tip, it has not yet assumed the normal healthy appearance, and I much fear the tip may fall off; it has also lately lost part of one of its hind outer toes from the same cause.

I advance this as a new species of *Naultinus* with some degree of doubt; but it does not agree with those several descriptions of the various species of that genus in "Trans. N.Z. Inst.," Vols. III. and IV., neither with the drawing therein given, said to be of *N. punctatus*, the outline of which is different. Should, however, this one here described be found hereafter to belong to one of them, then its specific description, as there given, will have to be amended.

NAULTINUS PENTAGONALIS, *Col.*

This species is distinguished from its two nearly allied and described species (*N. elegans*, and *N. punctatus*), by its larger size, longer toes, form of scales, number of inter-nasal shields, etc.

Front of head, flat, somewhat depressed; eyes, large, broadly orbicular, very prominent in the upper region; the fine scales of the infra-orbital fold, or ring, protruding causes a ciliated appearance; aural apertures, large, elliptic; a strongly-marked median line, or groove, runs from the base of skull nearly to the end of tail; a large protuberance, or hemispherical swelling, immediately behind the vent.

Scales on body and legs most regular and pentagonal; those on lower part of head, towards the snout, and between chin and throat, and behind vent on the swelling, are much larger than those of the body; at base of tail, on each side of its junction with the thighs, and near the vent, are seven large transverse conical-pointed scales, in two rows, $\frac{3}{2}$, those of the

* *Vide Addendum.*

upper row the largest, and one on one side bifid; (the two young ones are also each showing a row of three transverse conical scales at base of tail); a large semi-circular patch of pre-anal pores, continuous, in three rows of scales, on both sides, in a long line ($\frac{3}{4}$ inch), under thighs; scales on tail imbricated, particularly towards the tip, where they are also smaller and slightly elongated; three inter-nasal scales; labial scales large, $\frac{8}{10}$, gradually decreasing in size, that on the snout largest and emarginate, that on chin same size.

Toes, long, narrow, fine, those of hind-legs nearly twice as long as those of the fore-legs, last three the longest, and about equal in length (5–6 lines), while the fourth toe is the longest of the fore-leg; toes with large transverse scales, but the middle (palm) of foot has granular-like scales.

General colour,—*adult*: bright emerald green, with large oblong irregular-shaped spots or splashes of dull white, diminishing in size in two broken but parallel lines running from head to tail, one on each side of the back bone; tip of tail, pink; belly, yellowish-green; labial scales on both lips, light green of one hue; mouth, throat, and tongue (of both old and young), dark plum colour between purple and port; feet, tawny-white, or light cinnamon colour below. The *young* ones are marked each with about ten pairs of pure white irregularly-shaped spots, and nearly opposite, in two parallel lines running from head to tail, half of their number being on the body; one has a semi-circular white streak, $3\frac{1}{2}$ lines long on both sides of its head over the posterior angle of the eye and ear; and one has two additional longitudinal rows, one on each side, of minute whitish spots; labial scales of under-lip, white; belly, light pea-green.

Length of adult, 7 inches 2 lines, of which the tail is nearly 3.6; of the young ones (one year old), 4 inches. The young, when first seen, were a little over one inch in length.

ADDENDUM.

Having obtained a few additional items of interest concerning those lizards since this paper was read, I give them here.

Those lizards commenced hibernating early in July. Possibly they would sooner have done so, but I had kept them in my sitting-room, where there was a daily fire; when, finding they did not care for food (flies), and remained still, I put them away in a dark back room, placing some soft hay in their house. They remained there until the 1st of October, when I brought them back—apparently thinner for their long fast, but healthy; the two young ones had also grown in length. They soon began to catch and eat flies as before. From the very small amount of faecal deposit found in their cage, I could not but think that the hole in which the original four were found must have been an old and often-used haunt.

On the 16th November, the young one, No. 2, cast its skin, much broken. (This one only shed its skin twice during the last summer.) On two occasions since, I have seen it have a kind of convulsion fit—once in its cage, and once on my hand—during which its writhings were strange, as if its little legs were disjoined; its head was thrown back and its mouth stretched wide open, showing its capacious throat; it also uttered two faint cries during the fit, and once tried to bite!—but such a little easy nip, scarcely perceptible.

The adult one also, while I was handling (examining) it, bit me—in its fashion!—and twice uttered a cry because it could not get away. Their cry was a grave sound, a little low croak, something like an attempt on our part at uttering the letter *a* (broad) with the mouth open.

I have since fully proved the strong prehensile power of their tails; they can hold on by them to a cord, or small branch, or to my finger, and thus suspend themselves for some time.

An acquaintance here looking at them observed, that he once saw two green lizards (*Naultinus* sp.) together near Auckland; in endeavouring to capture them, one got away among the fern, and the other was unfortunately killed. He, however, noticing that its abdomen was very large opened it, and found two small living lizards within. This statement strengthens me in my supposition that this lizard is viviparous.

The adult lizard is now casting its skin in the usual manner (November 26th).

ART. XXVII.—Description of a new (?) Genus and Species of Butterfly of the Sub-family Satyrinæ. By R. W. FEREDAY, C.M.E.S.L.

Plate IX.

[Read before the Philosophical Institute of Canterbury, 5th June, 1879.]

EREBIOLA, nov. gen.

Antennæ, the club much narrower and longer than in *Pernodaimon pluto*, but not so narrow or long as in *Erebia blandina*. *Eyes*, naked. *Labial palpi* rather longer, and densely clothed with much longer stiffish hairs than in *P. pluto*; the hairs of the tip forming an obtuse-pointed pencil. *Body* and *legs* clothed with rather longer hairs than in *P. pluto*.

Wings entire. *Primaries* rather more elongate, and hind margin more oblique than in *P. pluto*; the nervures and discoidal cells of both the primaries and secondaries very similar to those of *P. pluto*; except that in *P. pluto*, the first (c, fig. 3) sub-costal nervure is absent, and the space