

Fig. 5. Tip of the superior antenna.

6. Tip of the inferior.
7. The exterior of the first pair of legs or arms.
8. The inner surface of the first legs.
9. The manducatory apparatus detached; *a*, the mandibles?; *b*, the maxillæ?; *c*, *d*, palpi?; *d*\*, apex of the superior seen from below; *e*, part of the upper lip in situ carrying the minute palpiform process.
10. The mandibles? and maxillæ? from above; *n*, the penultimate joint.
11. The same from beneath; *m*, the lamella attached to the inferior surface of the penultimate joint *n*, fig. 10.
12. The same seen from inside.
13. The second pair of legs.
14. The third pair of legs.
15. Last joint of the swimming feet.
16. The apex of the caudal ring with the style.
17. The joint of the style which is concealed with the lateral part of the caudal ring.

Obs.—The organs on one side of the animal alone are delineated, in order to prevent confusion.

*XLII. Notes respecting the Nest of Cteniza nidulans. By*  
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[Read 2d January, 1837.]

HAVING received from the island of Jamaica at different times, in the course of the last twelve years, a number of the nests of *Cteniza nidulans*, with many specimens of the ingenious artisans which construct and inhabit them, I have been afforded favourable opportunities for making observations upon this curious and interesting structure, and which we may rank among the chef-d'œuvres of insect architecture. Those remarks are now brought together, and, with some sketches of the nest and insect, are submitted to the notice of the Society.

Large districts of the central parts of Jamaica, in which island I resided above twenty years, consist of a reddish argillaceous earth upon a limestone honey-comb rock, and the country is so hilly as to be termed mountainous; the red dirt, as it is commonly called, occupies the vallies, and more scantily covers the hills, where it is mixed with vegetable mould and nodules of the rock; the latter is in vast masses, and sometimes appears in large isolated portions, with perpendicular surfaces of from ten to thirty feet square; its cellular formation denotes its igneous origin, and

leads one to assent to Dr. Pinckard's opinion, that the West India islands are the products of a "vehement vomiting of volcanic explosion." The red soil is well adapted to the cultivation of coffee.

The *Cteniza nidulans* selects for the scene of its labours some spot under the rocks or trees in a sheltered situation, and where the soil is not exposed to the effects of the extremes of heat and moisture.

As from the want of the necessary care when digging out the nests by the rude hands commonly employed for the purpose, they are almost always so mutilated and torn as to preclude in a great measure our recognizing what is their actual shape in a perfect state, I, some years back, requested an old friend of mine to employ an intelligent person to obtain some specimens for me; my request was kindly acceded to, and consequently my next remittance contained, among others, two which were enclosed in large masses of the red dirt, one of which afforded a complete nest. In order to extricate it uninjured from its covering of earth, I filled the interior with melted wax, then immersed the mass in water for some hours, and afterwards divested it carefully of all the adherent earthy matter, and thus obtained the beautiful specimen, a drawing of which accompanies this paper. Never having seen any but finished nests before, to my agreeable surprise the other mass enclosed one in progress of formation, only the lid, neck, and about two inches and a half of the tube having been formed: the latter was of course quite open at the bottom. This specimen is an illustrative proof that the insect first forms the lid and neck of the nest, and then continues its substructural works, in the course of which some ounces of soil must be excavated and carried out. The remarkably robust and compact make of this spider is well adapted to its business as a miner. The delicate texture and unfinished state of the specimen in progress reminds one of the skeletons of houses which require to be plastered and lined, in order to strengthen and finish them before they are fit to be inhabited.

The nests I have received, about fifteen in number, several of which contained the dead insect, vary considerably in size, the smallest being scarcely five inches long, and the largest near nine inches; the diameter of the tube also varies from three quarters of an inch to one inch and a quarter, the aperture and neck being the widest parts; the outer layers of webbing are in every instance deeply coloured by the soil, and even the lining is slightly tinged of the same hue; the texture of the latter is beautifully fine, smooth, soft and silky; the body of the nest, which includes

about two-thirds of the whole length, is chiefly formed of two stout coats, each composed of numerous fine layers of webbing, but the entire thickness does not exceed that of strong cartridge paper. Those parts of its dwelling which would be liable to be injured by the effects of weather, pressure of the surrounding earth, or from the assaults of enemies, the insect forms particularly strong; as the lid, the neck of the tube, and the convex upper surface of the curved portion at the bottom, while all the remainder is comparatively very thin. The lid and the parietes of the neck for an inch from the aperture are at least an eighth of an inch in thickness, and have strata of the red dirt interposed between the layers of webbing, below which the latter becomes gradually thinner. It is remarkable that the strength bestowed upon the surface at the lower end, serves the important purpose of protecting the nest and its tenants from the downward pressure of the soil.

Those parts of this ingeniously contrived fabric which more strikingly call for our particular admiration are, the *lid*, and a *valvular apparatus* that is found inside, and immediately below the hinge.

The *Lid* bears some analogy to the upper shell of the oyster, inasmuch that the upper surface of it is rough, laminated, thick and strong near the hinge, and becomes gradually thinner towards the surrounding edges. The elastic force with which the lid, upon being opened, closes of itself, is principally accomplished by a fold or duplicature of the webbing at each end or angle of the hinge, so that upon raising the lid, which cannot be done without violence much beyond a right angle with the aperture, this fold is also opened, and the threads of the webbing are put upon the stretch in proportion to the extent to which the lid is elevated, and which, doubtless, in its proper use, by its lawful owner, never exceeds the insect's requirements.

The internal under-side of the lid is exceedingly firm and smooth, which contributes, in connection with the prominent convex form, and highly polished surface, of the thorax of the spider, to diminish friction and resistance as much as possible, and thus to facilitate at all times the expeditious exit and entrance of the insect.

*Valvular apparatus.*—About two months since I obtained a supply of four fresh nests, and, being tolerably well stocked before, I could afford to open them longitudinally, in order to examine their internal structure. One of them had no appearance whatever of any valves, but the other exhibited a beautiful instance of two regularly formed ones; one placed immediately be-

neath the hinge, and the other about three quarters of an inch lower down. At the moment, I conceived this to be the first discovery of the fact, but have since been informed that it has been spoken of by Mr. Kirby, although I have not succeeded in finding his notice of it. Now it is highly improbable that so complex an additional apparatus should be without its appropriate use; and yet, one nest has not the least vestige of it; therefore, in that case, it may be confidently presumed that it was not required. In order to explain this diversity of structure, the following suggestions have occurred to me as a plausible mode of accounting for it. In newly constructed nests the reacting elastic power of the hinge may be all-sufficient, and continue so for a considerable time; but from long continued use, the effect of weather, or other incidental causes, it may lose its spring, when the superadded construction of the valves may effectually restore its efficiency; as it is evident, upon close inspection, that the opening of the lid acts first upon the upper one, the decussating fibres of the crura of the upper valve act upon the lower one, which again sends out numerous elastic threads downwards. If this explanation be correct, it is calculated to double our admiration of this creature's workmanship, proving as it does that the great Architect of all has gifted this interesting insect with such a measure of accommodating instinct.

## PLATE XIX.

- Fig. 1. View of the interior of the upper part of the nest; *a*, the lid raised and kept back by a needle.
2. View of the interior of a section of the lower end of the nest; *a*, shows the cut surface of the thickened portion.
3. Upper surface of the lid; *a a*, angles of the hinge.
4. Section showing the internal structure; *a*, under-surface of the lid; *b b*, the cut surfaces of the upper portion of the nest, showing its great thickness and strength; *c*, the upper valve and the lower valve.
5. A perfect nest as preserved by injecting it with wax.
6. Specimen of *Cteniza nidulans*.
7. Internal view of the left mandible.
8. External view of the right mandible.
9. Magnified view of the eyes and the tuft of strong bristly hairs in front of the thorax.
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