CYPRIS (*Müll.*) MUCRONATA. Plate XXII. fig. 15.

Ovate, green, one variety æruginous, scaly posteriorly with a minute aculeus curving upwards. Anterior legs with three subequal claws; posterior with short not much curved claws. Motion very slow.

This minute species was found with the last.

Fig. 15, *a*, *C. mucronata*, magnified.
b, The aculeus.
c, One of the claws on the hinder legs.

XLII. *Notes upon the Habits of various British Insects.* *By* J. O. WESTWOOD, *F.L.S., &c.*

[Read August 3, 1835.]

THE science which the entomologist cultivates may justly be deemed one of the most interesting of pursuits, constantly affording, as it does, fresh matter for gratification; for it fortunately happens that should he be unsuccessful during his rambles in the capture of objects of rarity, he has at command the means of endless observation upon the habits of those which do fall in his way, and which, from the comparatively little hitherto recorded, will delight him if new, and will not tire him, if even already noticed.

In some of my recent excursions, when tired with my walk and "heated in the chase," I have seated myself on some soft turfy spot near the residence of some of the sand-wasps, and have amused myself with watching their various employments.

Ammophila hirsuta first attracted my attention. The specimen was a female engaged in constructing her nest; she was very busily employed scratching in the sand with her fore legs, and soon formed a hole about a third of an inch deep. Whilst thus engaged I placed myself as near to her as possible; on withdrawing her head she discovered my proximity to her, when creeping upon a little stone close by, she reconnoitred and then flew away. I lost sight of her for some time, but on proceeding to the next sand-bank I found her flying about, and as she soon quitted this spot I fancied she might have returned to her old quarters, which I found to be the case on my returning there. In this manner we continued to play at hide-and-seek with each other for several times, until I fairly drove her

away by striking too hard at her with my net. This was at the beginning of June, when scarcely any specimens of this species were to be observed. More recently, however, towards the end of the same month, the insect became much more numerous, and one whose entire proceedings I observed was much more bold than the former. This one commenced digging a burrow, but being disturbed by me, she quitted it and proceeded to commence a fresh one close to the former; when she had proceeded about the depth of her head I observed that her jaws constituted her chief tools; with these she brought up particles of sand and bits of stone, creeping backwards to the mouth of the cell; when a little mound of sand had been accumulated she set about brushing it further from the orifice by means of her fore legs, and it was droll to see the celerity with which these limbs were moved, and the shortness of time required to remove the sand, which was thrown with force beyond the body of the insect, the head of which was kept near to the opening of the burrow. In this manner she proceeded to a depth greater than the length of her own body, so that she was entirely hidden from view for several moments at a time, re-appearing, backwards as usual, with her mouth laden with sand and stones. During the periods whilst thus hidden in the burrow I amused myself with pushing bits of stone larger than usual to the mouth of the hole in order to see her manœuvres in removing them; this she entirely effected by the assistance of her jaws, the legs not being employed in the task, even in cases where I placed pieces of stone much larger than her own body, which she removed in this manner. The largest of the three bits of stone which I now exhibit was even dragged to a short distance. During these operations a considerable buzzing noise was occasionally made. Notwithstanding these interruptions she proceeded in her work, and at length flew off. Thinking she had been frightened away I left the spot, but shortly returning, I observed her at about a yard distance from her burrow engaged in dragging along a large, smooth, green caterpillar, found, I think, upon the broom, and being that of one of the *Noctuidæ*; and I noticed that it was only by the assistance of her jaws and fore legs that she had secured her prey, the latter, which served her as arms, being clasped round the body of the caterpillar, and the four hind legs used in walking. When about half a yard distance from her burrows she set down her prey and flew off towards the nest to see that all was right, and returning again, seized the inactive caterpillar as before, and ascended the bank in a more direct and easy way than she had previously gone. On arriving at the mouth of the cell she again laid down her prey and crept into the hole, but instantly reappeared head foremost, seized the head of the caterpillar with her

jaws and dragged it down. As these proceedings did not occupy more than a quarter of an hour, I feel inclined to think that as there was not sufficient time to dig a deep burrow, the cell thus made was intended only for the reception of a single larva, and that, as the sand was very loose, and so little time occupied in the operation, a fresh nest is made for each larva. Lastly, I attribute the boldness of this specimen to the circumstance of her being further *advanced in pregnancy* than the former one was, which rendered her more urgent in completing her nest.

Another common species belonging to the same genus, *Amm. vulgaris*, was flying about the same situation; its attitudes when in flight are very droll, the abdomen being held out at an angle with the rest of the body. In walking I observe that the hind pair of legs are almost useless, being dragged along behind the others, and nearly motionless. This species differs from the former in the mode of digging its burrow. It, indeed, uses its jaws, like the *A. hirsuta*, in burrowing, but when they are loaded, it ascends backwards to the mouth of the burrow, turns quickly round, flies to about a foot's distance, gives a sudden turn, throwing the sand in a complete shower to about six inches' distance, and again alights at the mouth of the burrow.

The motions of *Oxybelus uniglumis* in constructing its burrow are still more droll. This is a bustling little creature, which seems to have much difficulty in finding an agreeable situation for its hole. I have seen it commence several within a very small space, and leave them after all. As soon as it has settled on the bank it raises itself almost into an upright position by elevating the hind part of the body and extending its four posterior legs, and immediately commences with amazing rapidity the digging of its hole, its two fore legs being moved alternately, and with such quickness that it is difficult to perceive them; by this means it very soon digs a hole more than sufficient to cover itself. Mr. Shuckard tells me that it carries its prey by means of its hind legs.

Osmia bicornis, one of the mason-bees which I have observed burrowing in sand-banks, the mortar in old walls, and in rotten wood, flies off with the particles of sand or other materials dug up in forming her cell to a much greater distance, I think about three yards, returning in a direct line to the mouth of the burrow.

To what is this variation attributable? If it were for the mere purpose of preventing these particles of sand, &c., from accumulating at the mouth of the burrow, one plan of operation would be sufficient; but in some of the *Odyneri* observed by myself on Barnes Common, and in *Epipone spinipes* as Mr. Shuckard informs me, so

far is this from being the case that we find them actually forming these particles into a funnel at the mouth of the cell, whilst in *Odyn. Antilope*, as described by me in the preceding Part of our Transactions, this is not the case.

Trochilium crabroniforme. This rare Lepidopterous insect has not, I believe, been found nearer London than Darenth Wood, where it is recorded by Mr. Stephens to have been seen flying heavily along in some profusion. Mr. Haworth gives the middle of July as the time for its appearance in the winged state, and Mr. Stephens says the beginning of the month. It has however been discovered by Mr. Stevens, junior, of King Street, Covent Garden, in the osier-beds on the Surrey side of the Hammersmith suspension bridge, in the last week of June, and that gentleman having kindly pointed out the spot to me, I have had the gratification of capturing the insect. The osiers are cut annually, and the stumps not above a foot high, so that when the young shoots grow up the bottom of the tree is completely hidden. It is therefore not upon the trunks of the trees, as is the case with the other species of this genus, (*Troch. bembeciforme*, which is found on the trunks of the aspen trees in Epping Forest,) but upon the leaves of the young shoots about breast-high, that the specimens which I have captured were seen. Here they sit sunning themselves, the abdomen occasionally being raised and depressed; on the least approach of danger however they fall to the ground, and are easily lost in the long grass. My specimens are males; perhaps the other sex is different in its habits.

Fœnus jaculator. This curious insect is to be observed in hot sunny weather flying about an old wall at the Kingston end of Wimbledon Common, in which *Osmia bicornis* breeds. I have met with them in this locality (first pointed out to me by Mr. Shuckard) for the three weeks preceding the July meeting of this Society. Their appearance on the wing is very remarkable; the abdomen is stretched out at full length and slightly elevated, and the hind legs are also carried at full length, and close together, the white tip of the ovipositor rendering it the more conspicuous. It flies but slowly, and Saint Fargeau states that it deposits its eggs in the larvæ of *Hymenoptera* which live in the ground in closed cells. In this instance I should rather consider that the eggs are deposited, like those of the cuckoo bees, in the nests of the *Osmia* whilst they are in progress of formation, rather than in the nest after it is completed.

Tipula longicornis, Curtis. I captured numerous specimens of this new and very striking species of *Tipula* during the first half of the month of June, in the low and damp part of Coombe Wood. Some of them were flying about the trunk of an oak tree, and I observed

that they alternately rose and fell in the same manner as the *Ephemeræ*. They rested on the neighbouring bushes, but again renewed these motions upon being disturbed.

Tipula gigantea. In walking home from Coombe at dusk one evening I heard a considerable rustling of insects' wings, like those of a *Libellula* when flying amongst twigs, and immediately perceived two specimens of this insect flying across my path. Supposing them to be engaged in amatory dalliance, I seized them, and was surprised to find that they were two individuals of the male sex. In like manner I captured two male specimens of a smaller species, allied to *T. oleracea*, in the evening flying together above my head and fighting, apparently with great violence. And this reminds me that some years ago I found two male specimens of *Trichiosoma lucorum* rolling about on the ground, having seized each other with their large and powerful jaws. Deadly battles between rival queen bees have been recorded, but I am not aware that any of these encounters between individuals of the opposite sex, incited as we may, perhaps justly, suppose by jealousy, have been recorded.

Sapyga punctata. Mr. Shuckard, in his interesting memoir upon the fossorial *Hymenoptera*, published in the First Part of the Transactions of this Society, has founded some of his arguments upon the assertion of St. Fargeau, that he had captured this insect in the act of carrying off its prey, adding, however, in a note, that Mr. Bakewell had seen it thrusting its abdomen into the nests of *Osmia cœrulescens*. I have lately met with numerous specimens of the female of this insect flying about walls exposed to the sun, and prying into the different holes, generally in the same manner as the Chrysides do; but I have never yet seen them engaged in forming a burrow, and indeed, from their motions, I am quite inclined to believe the assertion of Mr. Bakewell rather than that of M. Saint Fargeau, and to consider these insects as parasites, an opinion supported by the simple construction of the legs.

Methoca ichneumonides. I have captured this insect at Blackgang Chine in the Isle of Wight, in the month of August, and at Low-Cross Wood, between Dulwich and Sydenham. In both localities I have found it in hot sandy spots exposed to the noonday sun, where little clumps of short grass were to be observed. The insect is exceedingly wary, and endeavours, on being disturbed, to retreat amongst the roots of this grass.

Miscophus bicolor. On the 16th July, 1825, I captured the only two specimens recorded as British up to the present time, flying over hot sunny sand-banks at Coombe Wood. Since that period I have frequently, but in vain, sought for the insect in the same locality,

but during the present fine season I have been more successful. In the beginning of the month of July I noticed a small sand-wasp burrowing in one of the banks in the same place, which, although I was unable to secure it, had so much the appearance of the insect in question, that I was induced to repeat my visit to the spot, and at length, after several journeys, I had the pleasure to see three specimens flying over another of the banks. One of these at length settled, and I perceived it at its work of burrowing in the same manner as I have above described in the account of *Ammophila hirsuta*. So intent was the insect that I secured this specimen with my fingers. Immediately afterwards another settled precisely on the same spot as the former, which I also secured, as I did also the third, which in like manner flew to the same spot. Now, on examining the fore legs of the female of this rare species, the tarsi are not strongly spined at the sides, and the tibiæ scarcely exhibit any ciliæ at all. And yet this insect is a true sand-burrower.

Cerceris læta. This beautiful insect abounds on the northern extremity of the Vale of Health on Hampstead Heath. Here on the 24th July I observed numerous specimens of both sexes flying over the flat ridges of the sand-banks, in which were many of their burrows. It was not long before I perceived one of the females laden with her prey, which consists of *Strophosomus* —— ? (*one of the Curculionidæ*). Having captured this specimen in my net, I perceived that when walking up its sides she made use of all her legs, holding the snout of the weevil with her jaws alone. I endeavoured subsequently to ascertain the mode of the employment of the legs when on the wing, in order to ascertain the use of the spines upon the hind legs, respecting which, it will be seen on referring to Mr. Shuckard's memoir on the indigenous fossorial *Hymenoptera*, published in the first number of the Transactions of this Society, that some uncertainty exists. This, although difficult, I was enabled satisfactorily to ascertain by a little manœuvre. The females, on arriving with their prey, descend with it suddenly into the burrow, giving no opportunity of observing this; I therefore closed the mouth of one of the cells towards which one of the laden females was descending, so that when she approached she was unable to find her burrow, and kept flying very slowly about the spot, enabling me to perceive that the four fore legs are occupied in supporting the prey, the hind legs alone being extended. The males were less numerous than the females, but they kept hovering about the mouth of the burrows, flying upon the females when they approached to their work.

Crabro (*Corynopus*) *tibialis*. I observed this rare species of *Crabro*, whilst in company with the Rev. F. W. Hope, flying over the

laurels in the grounds at Netley in Shropshire, one of the seats of this gentleman's family; but the cause of my mentioning its capture at the present time is to notice the curious statement of MM. Saint Fargeau and Brullé, contained in their monograph upon this genus in the third volume of the 'Annales de la Société Entomologique de France,' p. 963, that (contrary to the universally received opinion of entomologists, that the antennæ of all male aculeate *Hymenoptera*, except *Ceramius* and *Masaris*, have 13 joints,) some species of *Crabro* form exceptions to this rule, the males having only 12 joints, whilst the abdomen has the ordinary number of joints of the male. Amongst the insects stated to be thus organized is the *Crabro tibialis*, Pz. F.G. 83.14, forming the genus *Corynopus* of this monograph, and of which the antennæ of the males are described thus, "Presque filiformes, de douze articles apparens, le quatrième fortement échancré en dessous," p. 803. Notwithstanding this description, with the assistance of a lens of very moderate power, thirteen distinct joints are to be perceived, as represented in Plate XXII., fig. B.; according to which figure it will be seen, from the description given by the French authors of the fourth joint being notched, that they must have overlooked the true third joint, as it is the fifth which is most strongly notched; the third is indeed small, but forms a very distinct cup, receiving the base of the fourth joint.

Another peculiarity exhibited by this insect exists in the curious structure of the basal joint of the anterior tarsi in the males, which is longer than all the remainder of the tarsal joints, united and furnished with a broad wing-like membrane of a thin consistence, quite unlike the dilatation observed in the males of some of the species of the genus *Crabro*. In their description of this insect MM. St. Fargeau and Brullé have not mentioned the construction of the male tarsi, but in their synoptical table of characters distinguishing the males of the group Crabronites, they incorrectly state that the anterior tarsi are simple.

This insect is placed in the English catalogues under the genus *Rhopalum* of Kirby, of which no description having been yet published, the name must sink into a synonym of *Physoscelus* employed by MM. Saint Fargeau and Brullé for the *Crabro rufiventris* of Panzer; but the differences between *Physoscelus* and *Corynopus* exclusive of the incorrect description of the antennæ noticed above, consist merely in a slight variation of the form of the extremity of the abdomen.

Trypoxylon figulus. The name of this genus was proposed by Latreille, in allusion to the supposed wood-boring habits of the insects of which it is composed. Of these habits the first indication

was given by Linnæus, who says of his *Sphex figulus*, upon the authority of Bergman, "Habitat Upsaliæ in parietum ligneorum foraminibus ab aliorum insectorum larvis factis relictisque quæ primo purgat circumroditque, deinde fundum argilla obducit, cui araneam imponit, eique ovulum concredit quo facto nidum argilla claudit. Larva apoda pallida larvisque apum similis, consumta aranea, membranam luteo fuscam et teneræ pupæ aptissimam net. Una mater perplurimos nidos construit et plerumque non ultra biduum in quovis adornando consumit: alæ abdomine breviores, abdomen petiolatum atrum, marginibus segmentorum lucidis, si quis eos a capite oblique intereatur*."

M. de Saint Fargeau however, finding that the legs of the female are not provided with ciliæ, and consequently, according to his theory, unfitted for the formation of a nest or the obtaining of a supply of food, has considered the statement of Linnæus, which has been adopted by subsequent authors, as erroneous, and as rather applicable to certain species of *Pompili*, especially *Pompilus petiolatus*, Vander Linden, which indeed the French authors regard as agreeing with the *figulus* of Linnæus both in characters and habits†.

Mr. Shuckard also, in the First Part of the Transactions of this Society ‡, has considered *Trypoxylon* to be parasitic; "as it is a very common insect constant opportunities occur for detecting it with its prey were it predatory." When the preceding observations were read by me before the Society I adopted the opinion of Saint Fargeau, having repeatedly watched the *Trypoxylon*, and observed it entering successively into the burrows of other insects upon a sand-bank, in the same manner as other parasitic species, having also captured *Pompilus petiolatus*, with its prey, consisting of a large spider §, and no instance being yet recorded of a fossorial species not constructing its own burrow, but making use of the habitation of other insects.

Since these observations were read, Mr. Shuckard has informed me that he has captured *Trypoxylon* carrying its prey, consisting of a spider; and within the last few days I have been yet more fortunate in watching the œconomy of this insect, and thereby ascertaining the complete correctness of the Linnæan account. On the 9th July, 1836, I discovered a large female *Tr. figulus* sitting on a leaf holding a spider with her jaws and fore legs, and with which she flew off. I watched her flight, and she appeared to enter the open hall-door of my residence, but the laurels which grow near it pre-

* Syst. Nat. ii. 943. † Encycl. Méthod. vol. x. p. 750. ‡ p. 56.

§ I have published an account of the habits of this insect in the 'Annales de la Société Entomologique de France,' for the present year.

vented me from seeing where she deposited her load. A few hours afterwards however, whilst standing at the door (in the side posts of which various fossorial *Hymenoptera* had taken up their abode), I heard a scratching noise in one of the open burrows, and immediately afterwards the *Trypoxylon* made her appearance at the mouth of the hole and flew off. I then stopped up the hole with a small pebble, and the next day I ascertained that I had been assisting the insect in so doing, as I saw her busily occupied in fetching small loads of moistened sand with which she was plastering up the little crevices which still remained.

Two days afterwards I observed another burrow, which I had not noticed before, filled with newly made powdered wood, and the *Trypoxylon* was now busily occupied in making a cell at the bottom of the hole with moistened sand. That the burrow was newly formed was evident from the quantity of fresh-powdered wood with which it was filled, and that the *Trypoxylon* was the architect I infer from there being no other fossorial species then at work in the perfect state in the door-post.

The spider which *Trypoxylon* selects appears to be the young of *Epeira diadema*, which is now of small size, and of a greenish colour, and which suspends its geometric web amongst the branches of shrubs. The prey of *Pompilus petiolatus* is a much larger silky species of *Lycosa*. As regards the doubts of M. de Saint Fargeau relative to the specific identity of *Trypoxylon figulus* with the *Sphex figulus* of Linnæus, it is quite evident from the shortness of the wings, and the lucid margins of the abdominal segments of the Linnæan description, that it, and not *Pompilus petiolatus*, is the insect described by Linnæus. I might have added some observations upon the effect which the facts thus confirmed will have upon the theory of M. de Saint Fargeau, but his views have been so much weakened by the memoir of Mr. Shuckard, as well as by some observations of mine read before the Entomological Society of France, that further discussion upon the merits of this theory seems uncalled for.

Species of Coccus infesting the Pine-apple.—On examining the leaves and fruit of the pine-apple exhibited by J. G. Children, Esq., at one of the meetings of the Entomological Society in 1835, I observed two distinct species of Coccideous insects parasitic upon them, belonging in fact to two different genera, and having very different modes of transformation and oviposition.

The species which infests the leaves, and which I should imagine from its smaller size must be the least obnoxious of the two, is more properly a scale insect, or true *Coccus*, than the other. The male larvæ when full grown are of an oval and flattened shape. They

then become stationary, and by degrees an elongated double pellicle, of a thin texture and white colour, is added to the extremity of the body in some way or other, I suppose by secretion. This pellicle becomes a true cocoon for the pupa, which is detached from it within, just as in the Muscideous pupæ the skin of the larva becomes the cocoon, inclosing a distinctly formed incomplete pupa within. In the specimens which I have examined, the pellicle (with the cast external skin of the larva attached) alone remained, the pupa and imago not being perceivable. Hence I have no doubt that the males had simultaneously arrived at the perfect state previously to the leaves being plucked, made their escape, impregnated the females, and died. Here indeed is clearly no continuous production of the individuals as asserted by Bouché in his account of the *Coccus Bromeliæ*; I should, on the contrary, say only an annual one. The female larvæ when full grown become stationary for the remainder of their existence, and cover themselves, as I imagine by secretion, with a thin scale or pellicle of a circular form, much larger than the male pellicle; beneath this pellicle the fleshy-bodied female is easily discovered, but dead, having in most cases several minute eggs or already hatched young ones beneath her body.

The species which infests the fruit continues active all its life; at all events this is the case with the females; the males I have not discovered; and at the time when this observation was made the females might be perceived in the act of depositing their eggs in the midst of the cottony mass which gives so unsightly an appearance to the fruit. The form of the body of this female is quite unlike that of the other species, being provided with numerous lateral rays and covered with a downy kind of powder. The insects which are at the crown of the fruit are of a smaller size than those at the bottom, and not occupied in depositing eggs. Hence we may suppose that the production is in this species continuous, but in as much as the body of the females and young is never covered with the scale-like secretion observable in the others, the application of remedies will be less difficult and more sure of success than in the latter; indeed it seems evident that the most effectual period for attacking the pine-leaf *Coccus* must be that when the young and tender larvæ are first bursting forth from beneath the scale of the female. M. de Wael tells me that an infusion of colloquint is very efficient in destroying these insects applied with a brush or syringe.