

species of siliceous Infusoria have hitherto been met with, namely, *Fragilaria rhabdosoma*, *Fragilaria striolata*?, *Gallionella aurichalca*, and *Pyxidicula prisca*. They are very rare, and found only in the vicinity of the beds of flint.

[To be continued.]

XXXVI.—*Description of a South American Wasp which collects Honey*. By Mr. ADAM WHITE, M.E.S.; an Assistant in the Zoological Department of the British Museum.

[With a Plate.]

SOME of the Wasp tribe of the New World form their nests of a solid and rather thick pasteboard. Such structures have been met with in Pennsylvania*, while they occur frequently in the more tropical parts of South America as far as Buenos Ayres†, and very probably much to the south of that point: in the description of the Isthmus of Darien‡, Wafer mentions “the bird’s nest bee, the hives of which are black and hard, hanging from the trees like birds’ nests.”

The best known is that of the *Chartergus nidulans*§, which is formed “of a beautifully polished white and solid pasteboard, impenetrable by the weather||.” It has been fully described by Reaumur in the sixth volume of his ‘Mémoires’: in the British Museum there are two specimens of this nest. They are securely attached to the branch of a tree by their upper end, and vary much in length, from a few inches, as in the Museum specimens, to two feet or even more. In the former case they are more or less round and have but four or five combs, while in the latter they are of a long cylindrical shape, and have a

* Rymsdyk, Mus. Britannicum, tab. 1. f. 2.

† Mr. Cuming tells me he has seen specimens there, at least four feet long: in a deserted one a swallow had built her nest.

‡ Voyage and Description of the Isthmus of America (1704), p. 214.

§ The *Vespa nidulans*, Fab., is figured by Coquebert (Ill. Icon. tab. 6. fig. 3.), and Guérin (Iconogr. pl. 72. fig. 7.). In Saint Fargeau’s ‘Hist. Nat. des Hymenopt.’ i. p. 546, it constitutes, along with another black species, the genus *Chartergus*; I believe it is the type of Latreille’s *Epipone*. Cuvier (Bull. des Sc.) seems to have first pointed out, in 1797, the error into which Reaumur fell, of considering a Chalcididous parasite found in these nests as being the constructors of them. He regarded it as the *Chalcis annulata* of Fabricius, an insect found in the pupæ of nocturnal Lepidoptera. In 1798 Fabricius described the insect as *Chalcis conica* (Suppl. Ent. Syst. 242), having obtained specimens from the nest: the name he afterwards altered to *pyramidea* (Syst. Piez. 167), as his former specific name was pre-occupied. Mr. Sells has recently found the parasite in the nest (Journal of the Proceedings of Entomol. Society, ii. p. 30), and Mr. Westwood has published a more accurate figure than that given by Reaumur (Ent. Soc. Trans., ii. pl. 20. f. 6.).

|| Kirby and Spence, Introd. i. p. 506.

corresponding number of partitions; additional combs are added to the lower part as the occupants increase in number. These combs are horizontal, convex on the under side, and fixed to the walls of the nest by their whole circumference. The cells are hexagonal and open downwards, as in most other nests constructed by the *Vespidæ*. Each of the combs has a hole near the middle, through which access is obtained to the uppermost apartments. The outer entrance is by a small round orifice near the middle of the under side, which is more or less funnel-shaped.

In the Museum there is a nest from the West Indies of a greyish brown colour; it is bell-shaped, and attached to the branch of a tree in the same way as the other. The base, however, is flat, the entrance being by a small hole close to the edge: each stage of combs has a similarly situated orifice to give access to the various compartments. There are five straight horizontal partitions, fixed, as in the preceding, by their entire circumference; on the lowest there are no indications of cells, on the fourth there is a circular cell unfinished, while in the three upper combs the hexagonal cells are confined to the middle. The texture of this nest is coarse, the fibres on the surface and throughout being distinctly visible. It is seven and a half inches long, the base where its diameter is greatest having nearly the same dimensions.

This nest closely agrees with one from Cayenne figured by Cuvier*; the constructor is a small Vespidous insect of a shining black colour, with brown wings and a pedicellate abdomen, which the French naturalist has named *Vespa Tatua*†, from its local name "La Mouche Tatou." Burmeister‡ says this insect forms a nest, having "the superior surface covered with a multitude of conical knobs;" in Cuvier's figure it is perfectly smooth.

The insects which form these curious habitations have been observed by Lacordaire§ in their native country. Their societies are not dissolved each year, as happens with the wasps of our climates, which, on the approach of cold weather, are nearly all cut off.

The nests are found in copse-wood, principally near plantations (at least in Guiana), and are generally suspended at a height of three or four feet from the ground. During the rainy season, from January to the middle of June, only perfect

* Bull. des Sc. par la Soc. Phil., n. 8.

† The *Polistes morio* of Fabricius, who describes the nest from Cuvier's communication. It is the *Epipona Tatua* of Saint Fargeau.

‡ Man. of Ent., transl. by Shuckard, § 296. p. 523.

§ Introd. à l'Entom., ii. p. 508.

nests are to be met with; in January and February the cells are in great measure filled with larvæ; in March and April these decrease in number, and by the end of May scarcely any are to be found. These are thought to turn into females, which, not finding room in their old nursery, emigrate and form new colonies, as when the fine season returns, which is about the middle of June, nests are to be found in progress; but instead of only one female being at work, as is the case with our wasps, Lacordaire has observed as many as a dozen busily engaged in constructing their new abode. As soon as a series of cells is completed larvæ may be found in them, and the nest is gradually increased by the addition of new combs. In September the structure is half finished, and towards the end of November it is most frequently completed. The old nests of the preceding year continue peopled as before, but new larvæ were only observed in them in abundance in September or October; these are believed to turn into neuters: if this is the case, the reverse takes place with the European wasps, the neuters of which are first excluded.

Mr. Walter Hawkins has presented to the collection of the British Museum a pasteboard nest from the banks of the Rio Yancay (Uruguay?), which differs very materially from both the structures I have alluded to above. It seems to be of the same description as the fabric referred to by Burmeister,—by Westwood* as existing in the Berlin Museum, and appears to me to be identical with the nest of the “Chiguana” wasp referred to by Azara†.

As the accompanying figs., 1 and 2, drawn by Mr. Dinkel, give its shape and general appearance better than any description could do, it is only necessary to say, that, viewed sideways, it is of an oblong form, rounded at the base. The orifices at the side, near the bottom, bulge out considerably.

When viewed from beneath it is somewhat ovate. It is very generally covered with conical knobs of various shapes, nearly all of which are more or less rubbed at the end, but in some places, less exposed, they are pointed, and in many instances nearly three-quarters of an inch long. At the very top, and on the side above the entrance, there are but few of these projections; in two or three places the surface is very distinctly contracted, and in the concavities there are no projecting points; the knobs seem to run in irregular, generally transverse, ridges.

The entrances, as may be seen in fig. 2, are artfully protected by pent roofs from the weather, which, in the rainy season, is

* Introd. to Mod. Classif., ii. p. 251.

† Voyages dans l'Amér. Mérid., i. p. 171.

sometimes very violent ; they are also so intricately twisted, as to prevent the ingress of any moth or other enemy, at least of any size. The hardness of the whole mass must tend very much to protect its constructor from the attacks of insect or honey-seeking animals ; and the natives, with some degree of probability, believe, that feline and other animals are deterred from taking the nest by the pointed knobs with which it is covered ; Mr. Hawkins's correspondent in Buenos Ayres assured him of this.

The substance is hard, the texture close, and, when seen with a slight magnifying power, seems curiously matted*. The natives say that it is principally formed of the dried dung of the "*Capincha*," which, from the description, would appear to be some sort of Water Cavy.

On making a longitudinal section of this singular insect-structure down the middle, I found there were fourteen combs in it, exclusively of a globular mass at the top, seemingly the nucleus of the nest ; this is nearly encircled by the two nearest combs. The other twelve are arranged beneath these, the uppermost most nearly approaching a circle in their arrangement as they approximate to the mass at the top. The different "stories" of combs are attached to the common wall of the nest ; the entrances to the various compartments are at the sides, a small irregular-shaped space being left between the comb and the outer envelope in various parts of it. *All* the combs are covered to the very edge by the cells, except the parts of them that are immediately close to the orifices of the nest, where, if they existed, they would impede the entrance and exit of the inhabitants. The uppermost combs are thickest, being throughout from seven to five lines in thickness, whilst the lower are not half that depth. The cells are small, hexagonal, and, as in other wasps' nests, have the opening downwards ; they are formed of a light *papery* substance, similar in colour to the outer covering. This, as might be expected, is thickest at the top, where, internally, from the meeting of several combs, it is rather loose ; at the base it is thinnest. The knobs are solid throughout, and, like the external envelope from which they arise, are formed of numerous layers of "paper" so closely blended as to be hardly di-

* The structure of paper and pasteboard, as made by insects, would form an interesting subject of investigation. In several specimens which I have had an opportunity of examining under a powerful microscope, there seem to exist great differences, some consisting of particles of wood or other vegetable substances, simply agglutinated ; while in others these particles appear to have undergone a change within the body of the insect or some other animal, and to have lost all traces of their vegetable origin ; others again, as in the present instance, seem to combine both.

stinguishable: the solid wall of the nest at top is about a quarter of an inch in thickness. The nest is nearly sixteen inches long: the broadest part, which is on the same line with the orifices, is more than a foot long; the narrowest point is nine or ten inches. At the base, an imaginary straight line, drawn from the orifices to the opposite side, would be nearly a foot long. It would seem as if the nest was complete; indeed, unless the insects had the power of redissolving the matter at the base, or the inclination to gnaw it off, I cannot see how they could make additions to it.

Many of the uppermost combs have the cells, in the middle, filled with a brownish red honey, which, in its present state, possesses scarcely any smell or taste. The occurrence of honey in the combs is interesting, inasmuch as it still further confirms the accuracy of Azara's observation, and is made by a Vespious insect having the first joint of the abdomen elongated into a pedicel.

Azara, in the account of his residence in various parts of South America, mentioned the fact of several *wasps* of these countries collecting honey. The Baron Walckenaer, who edited the French translation of this work, published in 1809*, thought that the Spanish traveller, who was unskilled in entomology, had made some mistake with regard to the insects, and regarded the so-called wasps as belonging to some *bee* of the genus, of which the *Apis amalthæa* is the type (*Melipona*.) Latreille also believed that they must be referred to the genera *Melipona* or *Trigona*, insects which, in South America, take the place of our honey-bee. These authors were afterwards clearly convinced of the correctness of Azara's observations, by the circumstance of M. Auguste de St. Hilaire† finding near the river Uruguay, an oval grey-coloured nest of a *papery consistence, like that of the European wasps*, suspended from the branches of a small shrub about a foot from the ground. He and two other attendants partook of some honey, and found it of an agreeable sweetness, free from the phar-maceutic taste which so frequently accompanies European honey. He gives a detailed account of its poisonous effects on himself and his two men, in the paper referred to. A. de Saint Hilaire afterwards procured specimens of the insect, which was described by Latreille‡ under the name of *Polistes Lecheguana*.

* Voyages dans l'Amér. Mérid., i. p. 165, note.

† Mémoires du Muséum, xii. p. 293, etc.; see also Ann. des Sc. (1824), iv. p. 335, etc.

‡ Mém. du Mus., xi. p. 13; xii. pl. 12. fig. B. Mr. Shuckard says (Lardn. Cab. Cycl., Ins., p. 183) *Brachygastera analis* of Perty (del Anim., etc., p. 146. tab. 28. f. 6.) is synonymous, and on comparing descriptions I

Latreille has entered at some length into its history, correcting the mistake he had fallen into in a preceding memoir*. He is inclined to believe that the nest figured by Hernandez† under the name of "Yzaxalasmitl" belongs to the Lecheguana. If this be the case, "Chiguana" or "Lecheguana" must be a name applied to different sorts of wasps‡, as Azara's Chiguana is said expressly to inhabit a hard nest, having the surface covered with prominent inequalities.

In Latreille's insect, the mesothorax is strongly truncated at the end, and the scutellum is rather square and hollowed out behind, the upper portion of the base of the abdomen being applied to it; the pedicel of the abdomen is extremely short. In the insect, specimens of which I found on opening the knob-covered nest I have described, the mesothorax and its scutellum are gradually rounded off, and the first joint of the abdomen is elongated into a pedicel.

I am somewhat at a loss to which of the modern subgenera to refer it, as it seems in some respects to differ from them all. It would come nearest Saint Fargeau's genus *Epipona*, which seems not the *Epipone* of Latreille's former works. From *Polybia* of the same author it would appear to be not distantly removed. I cannot find a description of it in any work I have access to.

Myrapetra §, nov. gen.

Head transverse, wider than the thorax; *stemmata* placed in an equilateral triangle on vertex: *antennæ* (in neuter) 12-jointed, inserted in a depression of the face above the clypeus, rather closer to the edge of the emarginate eyes than they are to each other; torulus deeply punctured. *Mandibles* rather long and stout, with nearly parallel sides; the outer margin with a few hairs, beneath they are hollowed out, and viewed from above seem to have several longitudinal striæ; at the end they are obliquely truncated and furnished with four teeth: the inner, when the mandible is viewed laterally, appears broad and truncated, but when seen from beneath is small and rather sharp; it is not much removed from the other three, which are acuminate, and

can find no difference in them. He proposed in the above volume the name *Nectarina* for Latreille's and Perty's insect, as *Brachygastra* is preoccupied in Entomology; but *Nectarinia* being already used in Ornithology, Mr. Shuckard proposes in lieu of it *Melissaia*, the species being *M. Lecheguana*.

* On South American Bees, published in Humboldt and Bonpland's 'Rec. d'Observ. de Zoologie.'

† Nov. Hist., etc., p. 333. Latreille quotes the other as being in all probability the Lecheguana's nest, but his doing so seems to arise from an inadvertent misquotation.

‡ St. Hilaire speaks of two species being distinguished in the country, one making white and the other reddish honey.

§ A fanciful word compounded of the names of two ancient cities, one in Asia Minor, the other in Arabia.

rise gradually one above another, though, measuring from their base to the tip, they are nearly equal in length. *Clypeus* somewhat longer than broad, somewhat cordate; in front acuminate, and edged with short stiff hairs.

Thorax: mesothoracic scutellum and metathoracic præscutum neither particularly abrupt nor excavated. *Upper wings* as long as the entire insect, with the marginal cell extending considerably nearer to the apex of the wing than the *third submarginal*, which is *dilated on the outer side at the base*; *second submarginal cell contracted towards the marginal, but has a part of the radial nervure common to both*. *Legs* rather long; posterior pair having the tarsus longer than the tibia, which terminate in two calcaria, the interior of which is much longer than the other, dilated and obliquely cut at tip (a structure found in many of the neighbouring genera, so that it must play some important part in the œconomy of these insects); the spurs of the first two pair of tibiæ equal in length; the tip of the posterior femora and the base (at least) of the lengthened first joint of tarsus, have each a brush of short hairs.

Abdomen rather slender; the first segment narrowed into a turbinate pedicel, not quite so long as the other segments taken together, at base cylindrical*; second segment very slightly contracted at base, then suddenly campanulate (or rather acorn-cup-shaped) and much larger than the others which it encloses; the tips of it are simple†.

* In Mr. Shuckard's collection, a black Mexican insect, and one at least of St. Fargeau's genera, have this part much depressed.

† There exists in the collection of the British Museum, without locality attached to it, a somewhat longer-bodied but shorter-winged insect, with the first *abdominal segment* pedicellate, the second much broader than in *Myrapetra*, and appearing encircled at the apex by a coronet of short flattened equal processes placed close to each other, somewhat like the peristome of certain mosses; the second segment nearly conceals the other segments, from one of which, however, the processes may arise.

The *clypeus* in this is rather square in front, angulated in the middle, and furnished with several short stiff hairs; the sides in front also angulated.

The *mandibles* are somewhat elongate, rather thicker at base than the tip, which ends obliquely and appears to have four close teeth (the inner indistinct?). The *metathoracic scutellum* is longitudinally hollowed in the middle; the *anterior wings* have the *second submarginal cell somewhat lozenge-shaped, and slightly but distinctly petiolate towards the radial nervure*; the *third cubital is dilated exteriorly at base*. I propose to name this subgenus *Anthreneida*.

The only species (*A. coronata*, n. sp.) I have seen, is the one alluded to above, which has the thorax and abdomen deeply punctured; it is brownish black, with the first abdominal segment rufous; clypeus in front yellowish, rather smooth. Over the whole of the insect there is more or less of a brownish silky pubescence, more especially on the second large, campanulate, abdominal segment; the wings are clear, except the marginal cell, which is brown (the brown extends somewhat over the radial nervure on the outside of third submarginal cell), and a narrow line of the same colour below costal nerve widening towards the stigma; the flattened abdominal processes are yellowish and margined at the extremity.

The following description may serve to distinguish the species *Myrapetra scutellaris*, n. sp. (Pl. IV. t. 4-7) :

M. brunneo-fuliginosa, sericeo ubique pubescens, mesothoracis scutello, metathoracis præscuto flavescentibus ; alis hyalinis, stigmatibus nervisque brunneis.

Hab. Amer. Merid. In Mus. Brit.

It is smooth ; the scutellum has a fine impressed dark line down the middle ; the stemmata are of an amber colour.

The figure of the insect is lithographed from an outline made by Mr. Westwood at my request, which, however, is slightly altered, as the specimen, when Mr. Westwood drew it, was unset. The section of the nest, fig. 3, was most carefully drawn by Mr. Basire, jun. from the original. In the Museum collection there are two specimens seemingly identical with those I took from the nest, and Mr. Shuckard has shown me a larger specimen which may very probably be the female ; this has dark stemmata.

I have been unable to add a description of the maxillæ, palpi or tongue, the last of which, in an insect collecting honey as this does, must be particularly organized ; but hope, that when more specimens are met with, I may have an opportunity of doing so.

I may add, that in the nest I found the remains of a black-bodied, black-winged fly, with rufous thorax, allied to *Bibio* ; and of a neuropterous insect resembling the *Hemerobius nervosus* in size and markings of wings, but with a longer thorax : the nest described is the specimen alluded to by Mr. Gray, in the 'Synopsis of the British Museum,' p. 27 (ed. 42).

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The Principles of Botany. By W. Hughes Willshire, M.D. London, 1840. 8vo, pp. 232.

This work has been written with the immediate view of assisting students of medicine in the acquisition of the amount of botany supposed to be required by the various bodies before whom they present themselves for their licence or diploma. It is perhaps to be regretted that any work should be published professing to give the *minimum* amount of the knowledge of a science required by the members of a liberal profession, and especially of one which, in some points, is so intimately connected with medicine as that of botany. Of late years the structure and functions of all organic bodies have been shown to obey common laws, and a proper knowledge of physiology can only be acquired by studying the organic kingdom as a whole. In this point of view, structural and physiological botany ought to constitute a portion of the fundamental studies of the medical student. We mention



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