

XVII.—*A Catalogue of British Spiders, including remarks on their Structure, Functions, Economy, and Systematic Arrangement.* By JOHN BLACKWALL, F.L.S.

[Continued from vol. ix. p. 471.]

186. *Epëira signata*.

*Epëira signata*, Blackw. Ann. and Mag. of Nat. Hist. Second Series, vol. vi. p. 341.

This distinctly marked spider was taken at Broadstairs in Kent in the month of September, and occupies a place in Mr. Walker's cabinet. It is an immature male which had to undergo its final change of integument, as indicated by the tumid state of the digital joints of the palpi.

187. *Epëira umbratica*.

*Epëira umbratica*, Walck. Hist. Nat. des Insect. Apt. t. ii. p. 66 ; Sund. Vet. Acad. Handl. 1832, p. 238 ; Hahn, Die Arachn. B. ii. p. 24. tab. 46. fig. 112 ; Koch, Uebers. des Arachn. Syst. erstes Heft, p. 2 ; Blackw. Linn. Trans. vol. xix. p. 127 ; Koch, Die Arachn. B. xi. p. 128. tab. 389. fig. 930, 931.

— *umbraticola*, Latr. Gen. Crust. et Insect. tom. i. p. 105.

*Titulus* 9, Lister, Hist. Animal. Angl. De Aran. p. 44. tab. 1. fig. 9.

*Epëira umbratica* is much more abundant in various parts of England and Wales than it is generally supposed to be, its apparent scarcity being attributable to its nocturnal habits and the care with which it conceals itself during the day.

In June the female constructs, under the exfoliating bark of trees and in crevices in old rails, a subglobose cocoon of white silk of a slightish texture, measuring  $\frac{2}{3}$ ths of an inch in diameter, in which she deposits about 160 spherical eggs of a yellowish brown colour, agglutinated together in a lenticular mass. On the exterior surface of the cocoon small pieces of bark, wood, and other extraneous materials are distributed, which serve to assimilate it to surrounding objects.

This spider spins a large net, having wide intervals between the radii and the circumvolutions of the elastic spiral line, and preys chiefly on moths.

188. *Epëira solers*.

*Epëira solers*, Walck. Hist. Nat. des Insect. Apt. t. ii. p. 41.

— *agalena*, Hahn, Die Arachn. B. ii. p. 29. tab. 47. fig. 115 ; Blackw. Linn. Trans. vol. xix. p. 126.

*Atea sclopetaria*, Koch, Die Arachn. B. xi. p. 134. tab. 390. fig. 934, 935 ; Uebers. des Arachn. Syst. erstes Heft, p. 4.

In a catalogue of spiders, published in the 'Transactions of the Linnæan Society,' vol. xix. p. 113, this species is included under the name of *Epëira agalena*; the mistake originated in copying the appellation from M. Hahn's work, 'Die Arachniden,' where it is connected with a figure and description of *Epëira solers*.

The sexes pair in June, and in that and the succeeding month the female fabricates a subglobose cocoon of yellowish brown silk of a loose texture, about  $\frac{1}{2}$  an inch in diameter, and deposits in it 140 or 150 dark brown spherical eggs, agglutinated together in a globular form.

This spider occurs, but not abundantly, in pastures near Llanrwst, spinning among coarse plants and low bushes a net of moderate extent, between the centre of which and a slightly concave cell of white silk, constructed at a short distance from it, a communication is established by means of a strong line; concealed in this retreat, the vibrations of the connecting medium speedily convey intelligence to the watchful owner of the snare that a victim is involved in its meshes.

#### 189. *Epëira similis*.

*Epëira similis*, Blackw. Ann. and Mag. Nat. Hist. vol. xiii. p. 186.

The first specimen of *Epëira similis* which I had an opportunity of inspecting was an adult male taken at East Lodge, Enfield, and obligingly forwarded to me by Miss Gertrude Buller Elphinstone. I have since received specimens from Hampshire; and a collection of living spiders, transmitted to me in September 1843 from Ellesmere, in Shropshire, by Miss Margaret B. Lewis of Cichle, Anglesey, contained a young male of this species, which, as the digital joints of its palpi were very tumid, had to undergo its final change of integument before it arrived at maturity.

*Epëira similis* and *Epëira calophylla* are very closely allied; but the males may be distinguished from each other without difficulty by differences in the structure of their palpi and palpal organs.

#### 190. *Epëira calophylla*.

*Epëira calophylla*, Walck. Hist. Nat. des Insect. Apt. t. ii. p. 70; Latr. Gen. Crust. et Insect. tom. i. p. 108; Sund. Vet. Acad. Handl. 1832, p. 252.

*Zilla calophylla*, Koch, Die Arachn. B. vi. p. 148. tab. 216. fig. 538, 539.

*Eucharia atrica*, Koch, Die Arachn. B. xii. p. 103. tab. 419. fig. 1030, 1031.

*Titulus* 10, Lister, Hist. Animal. Angl. De Aran. p. 47. tab. 1. fig. 10.

This common spider, which is widely distributed in Great Britain, frequents shrubs, buildings, and crevices in rocks and walls. It pairs in autumn, and the female constructs a subglobose cocoon of soft pale brown silk of a loose texture, measuring  $\frac{1}{2}$  an inch in diameter, in which she deposits 80 or 90 spherical eggs of a brown colour, slightly cemented together in a subglobose mass. The cocoon is attached to walls and the inferior surface of stones by a thin covering of whitish web. I have observed that the female changes her integument five times before she arrives at maturity, once in the cocoon, and four times after quitting it.

In December 1842 and March 1843 I procured several cocoons of *Epëira calophylla* comprising larvæ of two distinct species of insects belonging to the family *Ichneumonidæ*, which fed upon the ova contained in the cocoons and increased rapidly in size; on being converted into pupæ, the females were observed to have the ovipositor turned over the posterior extremity of the abdomen. In the spring of 1843 both sexes of each species, in the imago or perfect state, issued from the cocoons, which I had placed in closed phials. These insects are very dissimilar in size and colour, and the eggs deposited by each in a single cocoon differ in number inversely as the dimensions of the females which produce them; occasionally I have noticed the larvæ of both species in the same cocoon, but I have never detected them in the cocoons of any other spider, however favourable the circumstances might be as regards time, condition, and locality under which they were examined.

*Epëira calophylla* usually employs a radius as a medium of communication between its net and a small tubular cell of white silk which constitutes its retreat, instead of spinning a separate line for that purpose; and this peculiar appropriation, whether the radius be in the plane of the net or whether it be withdrawn from that plane, as is frequently the case, imparts an unfinished appearance to the snare, as it prevents the spider from giving a spiral form to the elastic line on which the viscid globules are disposed, though this is sometimes attempted with a greater or less degree of success. No sooner does the spider arrive at one of the radii adjacent to that in connexion with its cell than it returns, traversing the framework of the snare till it arrives at the adjacent radius on the opposite side, when it retraces its steps, and thus, oscillating between the two, spins a number of curved, viscid lines or arcs of circles diminishing in length from the circumference of the net towards the centre. Lister was well acquainted with this peculiarity, so common in the snare of *Epëira calophylla*, but has fallen into the error of supposing that it occurs invariably. See his 'Tractatus de Araneis,' p. 48.

Sometimes this species places its net in situations not entirely surrounded by objects to which it can immediately proceed to attach boundary-lines. In such cases its operations are deserving of attention. After connecting several radii with the most accessible points, it fixes a filament to that extremity of one of them which is furthest from the centre of its net: along this radius the spider proceeds, drawing out the filament from the spinners and guiding it with the claws of a posterior leg, till the point of union with one of the adjacent radii is attained; upon this radius it steps, and passing to its other extremity there makes fast the filament, by this simple process connecting with marginal lines distant objects between which no direct communication previously existed.

*Epëira calophylla* presents a striking example of the insufficiency of the characters employed by M. Koch in distributing the *Araneidea* into genera and families: though connected with the *Epëiridae* by the closest relations of affinity, yet he has placed it in his genus *Eucharia*, which he includes in the family *Theridiidae* (Uebers. des Arachn. Syst. erstes Heft, p. 7).

#### 191. *Epëira cucurbitina*.

*Epëira cucurbitina*, Walck. Hist. Nat. des Insect. Apt. t. ii. p. 76; Latr. Gen. Crust. et Insect. tom. i. p. 107; Sund. Vet. Acad. Handl. 1832, p. 245.

*Miranda cucurbitina*, Koch, Die Arachn. B. v. p. 53. tab. 159. fig. 371, 372.

*Titulus* 5, Lister, Hist. Animal. Angl. De Aran. p. 34. t. 1. fig. 5.

In well-wooded districts this species is not uncommon. The sexes pair in June, and the female attaches to the stems or leaves of shrubs, in the vicinity of her snare, a subglobose cocoon of bright yellow silk of a loose texture, measuring  $\frac{2}{3}$  rds of an inch in diameter, which usually contains 150 or 160 spherical eggs of a yellow colour, cemented together in a subglobose mass, and enveloped in fine, soft, yellow silk.

Arachnologists affirm that the small net spun by *Epëira cucurbitina* is always placed horizontally; but this is a mistake, as I have frequently seen it in an inclined position.

#### 192. *Epëira ornata*.

*Epëira ornata*, Blackw. Ann. and Mag. of Nat. Hist. Second Series, vol. vi. p. 342.

A specimen of this showy *Epëira* is in Mr. Walker's cabinet. It was taken in April 1848, but in what locality is not stated.

193. *Epëira fusca*.

*Epëira fusca*, Walck. Hist. Nat. des Insect. Apt. t. ii. p. 84; Blackw. Linn. Trans. vol. xix. p. 127.

— *Menardi*, Latr. Gen. Crust. et Insect. tom. i. p. 108.

*Meta fusca*, Koch, Uebers. des Arachn. Syst. erstes Heft, p. 7; Die Arachn. B. viii. p. 118. tab. 285. fig. 685–687.

Caves, cellars, overhanging banks and other obscure places constitute the principal haunts of *Epëira fusca* in North Wales. In autumn the female fabricates a large oviform cocoon of white silk of so delicate a texture that the eggs, connected together by silken lines in a globular mass  $\frac{1}{4}$ th of an inch in diameter, may be seen distinctly within it. Its transverse axis measures about  $\frac{11}{10}$ ths, and its conjugate axis  $\frac{8}{10}$ ths of an inch, and it is attached by numerous lines, generally forming a short pedicle at one extremity, to the walls or roofs of the places it inhabits. The eggs, which are yellow and spherical, are between 400 and 500 in number.

In transferring this species and *Epëira antriada*, included in the genus *Meta* (Uebers. des Arachn. Syst. erstes Heft, p. 6), from the *Epëiridæ* to the *Theridiidæ*, and thus widely separating them from a species so closely allied as *Epëira inclinata*, which is suffered to remain in the former family, M. Koch appears to have lost sight of those principles of affinity and analogy which afford the only safe guide in the classification of natural objects.

194. *Epëira antriada*.

*Epëira antriada*, Walck. Hist. Nat. des Insect. Apt. t. ii. p. 83; Blackw. Linn. Trans. vol. xix. p. 128.

*Meta muraria*, Koch, Die Arachn. B. viii. p. 125. tab. 288. fig. 693, 694.

Obscure damp situations are generally resorted to by this spider, which is plentiful in many parts of England and Wales. It spins an extensive net with an open circular space at the centre, which it usually occupies when watching for its prey; from this station it drops quickly to the ground on being disturbed, regaining it when the danger is past by means of a line drawn from the spinners in its descent, and previously attached to the circumvolution of the unadhesive line bounding the central aperture. Like *Tetragnatha extensa*, it has the habit of extending the first and second pairs of legs in a line with the body.

Immature individuals of the species *Epëira antriada*, *Epëira inclinata*, *Epëira cucurbitina* and *Epëira diadema*, and adults of the species *Linyphia minuta* and *Linyphia tenuis*, are frequently infested by the *Polysphincta carbonaria* of Gravenhorst, which

feeds upon their fluids and ultimately occasions their death. Since the publication of my account of this parasite in the 'Annals and Magazine of Natural History,' vol. xi. p. 1, I have observed that the colour of the larva, after its final change of integument, becomes dark brown streaked and spotted with white, particularly on the sides, and that a series of dorsal prolegs is developed on the segments of its body comprised between the third and tenth, both inclusive. These dorsal prolegs are short, and, with the exception of that on the tenth segment, are more or less bifid at the summit; on their extremities are disposed numerous fine curved processes or claws, with which the larva, when about to fabricate its cocoon, attaches itself to the lines spun by its victim. Only two instances are noticed by Messrs. Kirby and Spence in their 'Introduction to Entomology,' sixth edition, vol. ii. pp. 227, 228, of the larvæ of insects having prolegs situated on their backs.

#### 195. *Epëira celata*.

*Epëira celata*, Blackw. Linn. Trans. vol. xviii. p. 668.

M. Walckenaer has disposed of *Epëira celata* as a synonym of *Epëira fusca* (Hist. Nat. des Insect. Apt. t. iv. p. 471); but it differs materially from that species in size, structure, colour and œconomy, and has a much closer affinity with *Epëira antriada*. It inhabits damp caverns and hollow banks in Denbighshire and Caernarvonshire, to the sides of which the female, in the month of May, attaches a subglobose cocoon of whitish silk of a loose texture, measuring about  $\frac{1}{2}$  an inch in diameter; in it she deposits between 200 and 300 spherical eggs of a yellow colour, agglutinated together in a lenticular form.

#### 196. *Epëira inclinata*.

*Epëira inclinata*, Walek. Hist. Nat. des Insect. Apt. t. ii. p. 82; Sund. Vet. Acad. Handl. 1832, p. 250.

*Zilla reticulata*, Koch, Die Arachn. B. vi. p. 142. tab. 214. fig. 532, 533.

*Titulus* 1, Lister, Hist. Animal. Angl. De Aran. p. 24. tab. 1. fig. 1.

*Epëira inclinata* abounds in many parts of Great Britain, but seems to prefer districts which are well-wooded. It spins in the intervals between the branches of trees and shrubs a net similar in design to that constructed by *Epëira antriada*, and like that species drops quickly, on being disturbed, from its station in the circular aperture at the centre of its snare, drawing from the spinners in its descent a line which enables it speedily to regain its former position.

In autumn the female attaches to the under side of stones, fragments of rock, and lichens growing on old trees, several globular cocoons of whitish silk of a loose texture, measuring, on an average,  $\frac{5}{8}$ ths of an inch in diameter; each contains from 80 to 140 spherical eggs of a pale yellow colour, cemented together in a globular mass.

I captured an adult female of this species in August 1842, which was entirely destitute of the left intermediate eye of the posterior row, and the right intermediate eye of the same row had not half of the usual size; and in another adult female, received from the Rev. Hamlet Clark in the autumn of the same year, the right intermediate eye of the posterior row had not one-eighth of the natural size, being merely rudimentary.

### 197. *Epëira diadema*.

*Epëira diadema*, Walck. Hist. Nat. des Insect. Apt. t. ii. p. 29; Latr. Gen. Crust. et Insect. tom. i. p. 106; Sund. Vet. Acad. Handl. 1832, p. 235; Hahn, Die Arachn. B. ii. p. 22. tab. 45. fig. 110; Koch, Uebers. des Arachn. Syst. erstes Heft, p. 2; Die Arachn. B. xi. p. 103. tab. 384. fig. 910.

— *lutea*, Koch, Die Arachn. B. v. p. 62. tab. 161. fig. 378; Uebers. des Arachn. Syst. erstes Heft, p. 3; Die Arachn. B. xi. p. 123. tab. 388. fig. 926, 927.

*Titulus* 2, Lister, Hist. Animal. Angl. De Aran. p. 28. tab. 1. fig. 2.

This spider is plentiful in Great Britain, constructing an extensive net, without any circular opening at the centre, among gorse, heath and bushes. Its tarsi, like those of *Epëira quadrata*, *Epëira apoclista*, and other species belonging to the same genus, are supplied with several small, curved, pectinated claws at their extremity, in addition to the three larger ones common to them all. There is, besides, a strong, moveable spine, inserted near the termination of the tarsus of each posterior leg, on the under side, which curves a little upwards at its extremity, and presents a slight irregularity of outline at its superior surface when examined under the microscope. These spines, which have been denominated *sustentacula* (Transactions of the Linnean Society, vol. xviii. p. 224 note\*), subserve an important purpose: by the contraction of their flexor muscles they are drawn towards the foot, and are thus brought in direct opposition to the claws, by which means the spider is enabled to hold with a firm grasp such lines as it has occasion to draw from the spinners with the feet of the hind legs, and such also as it designs to attach itself to. As the *Epëiræ*, when occupying a position at the centre of their snares, are supported chiefly by the *sustentacula* and a line connecting the spinners with their station, the

reason why their heads are always directed downwards on such occasions is apparent.

*Epëira diadema* and some of its congeners envelope their prey in a sheet of web by the following curious process. Causing the victim to rotate by the action of the third pair of legs and the palpi, the first pair of legs also being frequently employed in a similar manner, they extend the spinners laterally, and applying to them alternately the *sustentaculum* of each posterior leg, they seize and draw out numerous fine lines in the form of a fillet, which they attach to their revolving prey, and thus involve it in a dense covering of silk from one extremity to the other. By means of this stratagem they are capable of overcoming formidable and powerful insects, such as wasps, bees, and even large beetles.

In October the female of this species attaches to the inferior surface of stones a subglobose cocoon of yellow silk of a loose texture, measuring  $\frac{2}{3}$  of an inch in diameter, in which she deposits between 700 and 800 spherical eggs of a yellow colour, agglutinated together in a lenticular form. Withered leaves and bits of dry fern are frequently distributed on the exterior surface of the cocoon. After deserting this nidus, the young spin a few lines on which they group themselves into a compact mass, somewhat resembling the granulated fruit of the *Rubi*.

XVIII.—*Contributions to British Palæontology:—Some new Lower Palæozoic Mollusca.* By F. M'Coy, Professor of Geology and Mineralogy in Queen's College, Belfast.

*Sanguinolites decipiens* (M'Coy).

*Desc.* Elongate-oblong, dorsal and ventral margins subparallel; beak incurved, small, depressed, about one-fifth the length from the anterior end; hinge-line long, not elevated (the inflected edges forming a nearly horizontal posterior lunette extending its entire length); cardinal angle about  $115^{\circ}$ ; anterior end rounded, narrowed by an elongate, elliptic lunette; a strong sigmoidally contorted diagonal ridge extends from the beak to the respiratory angle; posterior slope steeply inclined; posterior end slightly oblique, subtruncate, rounded; ventral margin with a wide, rather deep sinus in the middle, from which a wide concavity extends nearly to the beak, and from the diagonal ridge to the anterior end, which is convex anterior to the beaks; surface marked with sharp concentric wrinkles from the anterior lunette to the diagonal ridge. Length 8 lines; in proportion to the length, greatest width



Blackwall, John. 1852. "XVII.—A catalogue of British spiders, including remarks on their structure, functions, œconomy, and systematic arrangement." *The Annals and magazine of natural history; zoology, botany, and geology* 10, 182–189. <https://doi.org/10.1080/03745485609495675>.

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