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XLVII.—*A Concise Notice of Observations on certain Peculiarities in the Structure and Functions of the Araneidea.*
By JOHN BLACKWALL, F.L.S.

MUCH diversity of opinion being entertained by eminent zootomists and physiologists with regard to the structure and function of certain organs common to spiders belonging to several genera, which are situated near the extremity of the inferior surface of the abdomen, immediately before the spinning-mammulæ, I availed myself of recent visits of a friend, Mr. William Statham, to inspect under his excellent binocular microscope the parts in question, carefully prepared for the purpose by himself. When efficiently illuminated and viewed with a magnifying-power of about 125 diameters, they were distinctly perceived to be provided with very numerous and exceedingly delicate spinning-tubes, completely establishing the accuracy of the conclusion at which I had previously arrived by minute investigation, namely that the parts constitute an additional or fourth pair of spinners united throughout their entire length*.

The spiders submitted to examination were *Ciniflo atrox*, *C. similis*, and *Ergatis viridissima*. Between the proximate extremities of the fourth pair of spinners in the first two species there is a distinct septum; but in *Ergatis viridissima*, *Mithras paradoxus*, and some other small spiders provided with the additional spinners no septum is apparent, the entire area formed by their contiguous extremities being amply supplied with spinning-tubes.

The conjoined spinners composing the fourth pair are movable, and, when in action, present their extremities to the calamistra, which in passing over them draw out and card the excessively fine filaments proceeding from the spinning-tubes into the two delicate pale blue bands that enter into the composition of every flocculus in the complex snares of *Ciniflo atrox*, *C. similis*, and *C. ferox*.

The small spiders, the proximate extremities of whose additional spinners are without any definite mark of distinction, have the calamistrum (situated upon a ridge on the abdominal side of the upper surface of the metatarsal joint of each posterior leg) usually composed of a single row of curved movable bristles; but the calamistrum of the larger species of *Ciniflo* commonly consists of two parallel rows of fine spines.

I may here remark that the calamistra are frequently much

* Transactions of the Linnean Society of London, vol. xviii. p. 223 et seq.

less conspicuous on male than on female spiders, the occasions for their employment being fewer and of minor importance in the former than in the latter sex.

The prevalent opinion, that the very remarkable snare of *Mithras paradoxus* does not afford any evidence in its construction of the action of the fourth pair of spinners and the calamistra with which this spider is provided, is probably erroneous; for I have reason to believe that the transverse lines attached to the four radii in the snare of this species are formed by the agency of the calamistra in passing over the extremities of its spinners; and this agency is undoubtedly exercised in forming the external convex covering of its cocoon. A species of *Mithras* which inhabits the United States of North America evidently employs its fourth pair of spinners and calamistra in the fabrication of its cell.

Now, as I am disposed to attach much importance to the habits and economy of spiders with reference to their systematic arrangement, the fact that species provided with calamistra are always found to possess the additional spinners, and that these parts constantly cooperate to produce results affecting their economy in a very obvious manner, has not, I apprehend, had that consideration bestowed upon it by arachnologists to which it appears to be entitled.

The late Mr. Richard Beck communicated to the Microscopical Society of London, in the year 1861, some remarks on the formation of the viscid spiral line in the snare of *Epeira diadema*, commonly denominated the garden spider. In this paper, of which I have merely seen an abstract, the following statement occurs:—"With only a pocket-lens I could distinctly see that the viscid lines, as first drawn from the abdomen, were not dotted. On a careful examination with the microscope, the thread at first appeared only slightly thicker than an ungummed line; but after a very short time undulations appeared, and subsequently, at the most regular distances, the viscid matter formed into alternating large and small globules. The whole process is a beautiful illustration of molecular attraction."

Without questioning the accuracy of Mr. Beck's observations, several difficulties present themselves in connexion with his explanation of this curious subject, that carefully conducted investigation alone can dispel. To some of these difficulties I shall now direct attention.

The fine elastic line on which the viscid globules are distributed is *consolidated*; but it is perplexing even to conjecture how this consolidation is effected, since, according to Mr. Beck, the line is surrounded by a viscid fluid as it is drawn from the

abdomen ; the importance, therefore, of ascertaining by close inspection whether the line and the viscid fluid in which it is enveloped proceed from the same spinning-tube or not will be immediately apparent. It is evident, from the materials of which they are composed possessing such widely different properties, that they cannot be produced by the same organ of secretion.

There is a difficulty also in comprehending how a cylindrical body of *viscid* fluid can be resolved by molecular attraction into a series of large and small globules disposed on the line *alternately* at minute and most regular distances from one another.

Had Mr. Beck been spared to continue his researches, he might perhaps have been enabled, by his well-known skill as a microscopist and by the advantage he possessed in having superior optical instruments at his command, to throw some light on the obscure phenomena here submitted to the consideration of arachnologists, which remain as problems yet waiting a solution.

XLVIII.—*On the Invertebrate Marine Fauna and Fishes of St. Andrews.* By W. C. M'INTOSH.

[Continued from p. 315.]

Section II. MOLLUSCA (PROPER).

The Mollusca are chiefly procured by dredging, examination between tide-marks, or the deep-sea lines of the fishermen, though certain storms sometimes strew the sands with many species in great profusion. Not a few of the rarer forms are found in the stomachs of fishes, such as the cod, haddock, and flounder. The remarks on the class may be arranged in three divisions, founded on the economical value, peculiar habits, and rarity.

By far the most important species in the first group is the common mussel (*Mytilus edulis*), which occurs in vast numbers in the form of mussel-“beds” on muddy flats, chiefly situated on the right bank of the estuary of the river Eden. Attached to stones, sticks, and to each other, these shell-fish luxuriate in abundance of Diatomaceæ, Infusoria, and other minute forms of animal and vegetable life. From their special value as bait the city derives a considerable annual revenue ; and if the wise protection only lately enforced were supplemented by