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Notes on the marriage-flights of *Lasius flavus* and *Myrmica lobicornis*

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numerous islets of annular muscular fibres which must act after the fashion of a sphincter.

The endoderm is composed of a cellular layer, which covers the inner surface of the mesoderm and extends over the septa.

The structure of the tentacles is similar to that of the walls of the body. These organs, however, are characterized by the presence of a layer of longitudinal muscular fibres situated beneath the ectoderm.

The septa originate from the mesodermic layer of the column. Their axis is a fibrous tissue covered with a layer of longitudinal muscular fibres. Upon one of its surfaces each septum bears a series of longitudinal folds, the totality of which represents a sort of fibro-muscular bundle.

The œsophagus, resulting from the turning back of the two primitive lamellæ, necessarily presents the structure of the wall of the body. The exterior cellular layer contains peculiar glandular elements.

In *Cerianthus* and the *Actinæ* the reproductive elements originate in a sort of doubling of the fibrous layer of the septa—that is to say, in the mesodermic region.—*Comptes Rendus*, August 25, 1879, p. 452.

Notes on the Marriage-flights of Lasius flavus and Myrmica lobicornis. By the Rev. H. C. McCook.

The author remarked that the first-named ant is one of the most familiar objects in nature. Its small dusky-yellow workers may be seen in every American lawn, walk, field, and yard, throwing up their fragile moundlets of sand pellets, and swarming upon particles of fruit, crumbs, bones, dead insects, and all manner of sweets. It is quite cosmopolitan in its distribution, and is well known in Europe. The following observation of the annual marriage-flight of the sexes was made September 5, 1878, in the vicinity of Philadelphia. The nests observed were located directly in and on the grassy border of a trodden path in a farmyard. At 4 P.M. the males and females were seen coming out and re-entering the gate, amid great excitement on the part of the workers. The females particularly were followed by workers who “teased” them occasionally by gently nipping them with their mandibles. The flight of the young queens was, with few exceptions, made from the top of stalks of grass, where they clung for several minutes, poisoning themselves, spreading their wings, and swaying up and down. Even to these elevations the workers followed them, hastening their flight by occasional “nips.” When the queen rose in flight, there was no evidence of feebleness or inexperience, except, in some cases, a slight tendency to a zigzag course for the first few yards. The flight was then, and in most cases from the very first also, strong and in a straight

course. The insect first rose to a height of about 20 feet, which was soon increased to 40, 50, and even 60 feet (estimated); and this latter height was maintained until the form was lost to sight. The author was able to follow the ants in several instances to a distance of more than 300 feet before they disappeared, at which time they gave no sign of alighting. Some were seen to alight at the distance of 60 and 80 feet; others flew into a large buttonwood-tree within 30 feet of the nest.

The flight was in every case solitary, and was in all directions, although generally in the direction of the breeze. The males were in the meantime continually taking flight, urged thereto by teasing workers, each separately, and wholly independent of other males and of the females, as to the time and direction of flight. This fact led Mr. McCook to infer that the pairing of the sexes must have occurred within the nest before departure therefrom. Except in the case of those individuals who lit upon the buttonwood-tree, there appeared no opportunity for a meeting after flight. There was nothing in all the facts to suggest the idea of a future consort. The same feature of independent and solitary flight of the sexes had been observed in the swarming of the shining slave-maker, *Polyergus lucidus*. This is in marked contrast with the habit of some other ants as illustrated in an observation subsequently given.

Before taking flight the *L. flavus* females spent some time in combing and cleansing themselves. A female was placed among the workers of another nest not more than a yard distant from her own, in order to test the treatment of an alien. She was immediately attacked fiercely, and would no doubt have been soon killed had she not been removed. In two formicaries from which the above marriage-flight occurred, it was observed that the doors were closed about half-past four p.m. by bits of dry grass and pellets of soil. They so remained during the night, or at least were found closed in the morning. Three days thereafter several males were found nestled under a chip by the roadside. As soon as the chip was turned up, two of these were seized by a couple of prowling ants of the species *Tetramorium cespitum* and *Formica Schauffussi*, and carried off as prey, a suggestion of the common fate of emmet masculines.

Mr. McCook's attention had been called to an article in a Hollidaysburg (Pennsylvania) journal, which reported a remarkable swarm of ants that had crossed that town on the 13th September, 1876. He immediately wrote to the Rev. D. H. Barron, a citizen of the place, and a gentleman of intelligence and prudence, giving certain points which it was desirable to ascertain. The ants, in the course of their flight, had come into contact with the mechanics at work upon the tower of the new court-house, whom it was reported they had assaulted vigorously. Mr. Barron visited these men, and, after a careful interview communicated the following facts:—The flight actually occurred substantially as reported; the day was clear, warm,

and calm; the ants came between 10 and 11 A.M., from the direction of the Chimney Rocks, a ridge of the mountain on the south-east of the town. As to numbers, the answers of the men were as follows:—"So thick you could hardly see through them;" "swarms;" "about 30,000!" The ants struck the building at the height of about 120 or 125 feet, and certainly assaulted the men. Whether the attack was a bite or a sting they could not tell; but it was something very uncomfortable, and they would not like to have it repeated. The ants were of two sizes—some larger, some smaller. One of the men had saved some specimens, which were sent to Mr. McCook, and proved to be the males and females of *Myrmica lobicornis*, Nylander. These ants can inflict a painful sting, but probably attacked the workmen simply in self-defence; that is, the men happened to obstruct their flight, and naturally vigorously brushed off the insects who lit upon them, who, in turn becoming irate, applied their stings. Such a vast horde as this swarm contained must have been composed of the winged inmates of many formicaries on the mountain-side. This is quite in contrast with the solitary flight of the *Lasius flavus* as previously described. The pairing of the sexes was probably in the air, or after alighting, as in the case of the agricultural ant*. Mr. McCook had taken ants of the same subfamily Myrmicidæ while they were in the act of pairing in the air.

In connexion with the above notes on the queen-life of ants, he presented an observation reported to him by Mr. Jos. Wilcox. This gentleman had seen a colony of some species of *Camponotus* occupying a large dead cypress tree standing in the midst of a cypress-swamp in Florida, at least 600 feet from the shore. The tree was wholly isolated from the land and from all surrounding vegetation, except another fallen cypress tree which leaned up against it. Evidently a fertilized queen had at some time flown from the land to this tree, where she had established the colony. The fact is interesting as indicating the origin of formicaries from single queens, as myrmecologists have supposed to be frequently, if not commonly, the case—further as showing the ability of a large number of ants (this nest was reported to consist of vast numbers) to maintain active life under quite circumscribed environment. The insects sheltered in such numbers by old trees may have furnished a large portion of the food supply. The specimens brought by Mr. Wilcox were taken from a colony on the land, which he supposed to be identical with the swamp-tree nest, and were examples of *Camponotus esuriens*, Smith.—*Proc. Acad. Nat. Sci. Philad.*, April 29, 1879.

* 'Agricultural Ant of Texas,' p. 143.