

year's brood may be destroyed. On the other hand, if the larvæ be allowed to be scattered over the fields or barn-yard, a plentiful supply of "weevils" for the next crop is secured. This method was proposed several years since by Prof. Henslow, but I have not been able to ascertain whether it has been used extensively in America.—*Proceedings of the Academy of Natural Sciences of Philadelphia*, vol. iv. p. 210.

On the Characters and Intimate Structure of the Odoriferous Glands of the Invertebrata. By Dr. LEIDY.

Nature has supplied most or all animals with some means of defence or protection, through which their destruction is rendered limited. The character of such means varies exceedingly: some are encased in hard armour; some are endowed with great muscular strength, some with great rapidity of movement; others trust to their minuteness, some to their colour; others feign death; many are furnished with formidable instruments, such as teeth, claws, aculei, &c.; others are supplied with organs which emit an odour so offensive that an aggressor is frequently compelled to leave what otherwise would have been its victim, &c. It is to the last-mentioned organs to which I at present wish to direct, for a few moments, the attention of the members; to the organs denominated odoriferous glands of animals. Bodies of this, or of a homologous character, are possessed by nearly all animals, but they are not in all used as a means of defence. They give origin to the odour which appears to be more or less peculiar to each species of animal, and which probably is in some way connected with the sexual instinct. The scent-bag of the *Moschus moschiferus* is the homologue of the glandulæ odoriferæ Tysoni of the human prepuce; the tegumentary mucous glands of mollusca, of annelides, of fishes, the tegumentary glands of reptiles, the perspiratory and sebaceous glands of birds, and of mammals, the odoriferous glands of insects, the anal sacs of carnivora, &c., are all probably of a homologous character.

Although varying in the degree of their complexity in different animals, and in the character of their secretion, yet the essential structure is the same throughout. Consisting of tubes or follicles of basement membrane, their complexity depends upon their greater or lesser length, their being simple or compound, straight or more or less convoluted, and isolated or aggregated, in connection with the mode of supplying to them their nutritive fluid.

On the interior these cavities or tubes are covered with a single layer of nucleolo-nucleated organic cells, the true elaborators or manufacturers of the secreted matters of the glandular bodies.

The secreted matter varies exceedingly in its properties in different animals; in odour being found from that of the perspiratory fluid of man, through a great variety of shades, to that most powerful and odious of all odours, the secretion of the anal glands of the *Mephitis Americana*; in consistence from a semi-fluid state to the gaseous fluid of the *Brachinus crepitans*, &c. It is this which constitutes

the material contained within the organic cells intermediate to the cell-wall and the nucleus.

The cell-wall and nucleus are the agents in connection with the organic force which produce or elaborate the contained matter. And, indeed, this is the ultimate fact of all organization; for all the innumerable objects of living nature, with such variety of form, composition, and colour, from the simplest to the most complex; from the vibrionic filament to the noble oak, from the Bodo, or Monas, up to man, are the result of a force in connection with an amorphous vesicle, the organic cell-wall, with the contained nucleus. Wonderful, indeed, is it that the human mind at length has been enabled to penetrate so deeply into the mysteries of nature as to discover the starting-point of life, the stile at which an invisible intangible cause operates in the production of all those beings we call organized. From this digression I return once more to the consideration of the odoriferous glands. In many of the higher animals, the structure of these has been carefully investigated, but not to the same extent in the lower animals.

In Hemipterous insects these bodies are situated within the posterior part of the metathorax or anterior part of the abdomen, and consist of one or two, more or less long and convoluted cæca, which open exteriorly usually between the coxæ of the middle and posterior legs.

In the carnivorous Coleoptera they are situated in the posterior part of the abdomen, on each side of the rectum, and usually open exteriorly upon the membrane, connecting the inferior and superior plate of the last abdominal segment on each side of the anal aperture. They generally consist of a number of follicles, which converge to one or more ducts, which join the neck of a reservoir for containing the secreted fluid. A number of these are figured by Dufour in the 'Annales des Sciences Naturelles' for 1826.

In the genus of Myriapoda, *Julus*, the odoriferous glands are placed upon each side of the body, every segment which has a double pair of legs possessing a pair of the glands, commencing anteriorly with the sixth segment, excepting the head, and terminating posteriorly with the penultimate segment. As the number of segments of the animal varies with its age, so will also the number of the odoriferous glands. The adult *Julus marginatus* has usually fifty pairs; the *Julus maximus*, from New Grenada, S. A., has fifty-eight pairs, &c.

The orifices of these glands opening exteriorly, correspond to a row of minute black dots on each side of the body, situated about midway between the superior and inferior median line.

The glands of *Julus* consist of a globular body or sac, with an elongated conical neck, and resemble in form a Florence flask with the mouth drawn to a point. In *Julus marginatus* they measure $1\frac{1}{4}$ line long, the body being $\frac{3}{4}$ of a line in diameter. In structure they consist of an amorphous transparent basement membrane covered upon the interior surface with a single layer of secreting cells. The cells are polygonal, from mutual pressure, measure $1\text{--}16\frac{1}{2}$ th inch in dia-

meter, and are filled with a yellowish fluid, and a fine purplish granular matter, which in mass gives them a dark purple colour, and which, in the aggregate of the cells, gives the glands a very deep purple or almost black colour. When the cells are compressed, or the contents pressed out, the granules exhibit lively molecular movement.

In the centre of the mass of granular matter of the cell, and only seen upon compressing the latter, is a round, translucent nucleus, measuring the 1-5000th inch in diameter, and containing a minute refractive nucleolus.

The secreting cells vary in colour in different insects, and in the aggregate give the colour to the glandular bodies. The reservoir also is lined with cells. In *Upis Pennsylvanica* they are brownish, or nearly colourless, measure the 1-750th inch in diameter, contain some finely granular brownish matter, and a large round or oval translucent, faintly granular nucleus, measuring 1-1250th inch, with a large, round or oval nucleolus 1-2727th inch in diameter.

The secretion of the glands of *Julus marginatus*, contained within the interior of the body, is deep yellow in colour, and contains a few of the purplish granules of the cells. It resembles oil in consistence, but is soluble in water and alcohol. It is neither acid nor alkaline; evaporates at a temperature of 250° F., without residue; is acrid to the tongue, Schneiderian membrane, and conjunctiva; smells like hydriodic acid, and stains the cuticle brown. The last two properties led me to suspect the existence of iodine, but the usual reagents presented none. It probably belongs to a class of peculiar organic compounds, found in the odoriferous principles of animals, not yet investigated.

Exteriorly the reservoirs of the odoriferous glands of insects are furnished with transverse muscular bands of a brownish colour, about 1-1578th inch in breadth, and separated by wide intervals.

In *Julus* the body of the glands possesses no distinct muscular bands, but the neck is provided with them.—*Proceedings of the Academy of Natural Sciences of Philadelphia*, vol. iv. p. 234.

JOURNEY TO EXPLORE THE NATURAL HISTORY OF SOUTH AMERICA.

To the Editors of the Annals of Natural History.

GENTLEMEN,

24 Bloomsbury Street, Jan. 19, 1850.

In the January Number of your valuable Magazine for 1849, you were good enough to insert extracts from a letter I had received from Messrs. Wallace and Bates, two gentlemen who are investigating the *Natural History* of the Amazon River and its tributaries in South America, and who consign their collections to me for sale. I now send you extracts from a letter just received from Mr. Wallace, dated Sautarem, Sept. 12, 1849, which, if you think sufficiently interesting, you may perhaps feel inclined to insert:—

“I have got thus far up the river, and take the opportunity of sending you a few lines. To come here, though such a short distance, took me a month. I am now waiting here to get to Montalegre, but the difficulties of getting men even for a few days are very great. Here



Leidy, Joseph. 1850. "On the characters and intimate structure of the odoriferous glands of the invertebrata." *The Annals and magazine of natural history; zoology, botany, and geology* 5, 154–156.

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