

NOTE ON THE FLIGHT OF INSECTS.

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In a paper (1) on this subject, which was published a few years ago, I opposed the view held by Marey and others, that the changes in the shape of the wing during the flight was caused by the mechanical action of the resisting air without any muscular action of the insect itself coming into play. I found that the radial nerves of the wings of the dragon fly are extended centripetally into the body, and that they are in connection with numerous muscles and a complicated articulating skeleton, by means of which arrangement each ray can be moved more or less independently of the rest, whereby the shape of the wing is changed. This view of the matter has recently been opposed by some Physiologists who apparently did not take the trouble to investigate the anatomy of the organs in question.

Apparatus were constructed to demonstrate the mechanical theory, but these by no means prove the correctness of it.

I have recently made some interesting observations bearing on this point, which are particularly well adapted to prove the fallacy of the mechanical theory, and can easily be repeated by everyone.

If the animals are treated with certain poisonous substances, very often a tetanus is produced. Such a poison is strychnine. Insects are affected by substances, which are not injurious to other animals in the way mentioned. The aromatic oil contained in the blossoms of *Pyrethrum carneum*, *roseum* and *cinerariæfolium*--the essential part of "Insecticide," and turpentine are such substances. If a fly comes in contact with one of these substances a tetanus is produced, the consequence of which is that the wings although remaining in the ordinary position, change their shape in an extraordinary manner.

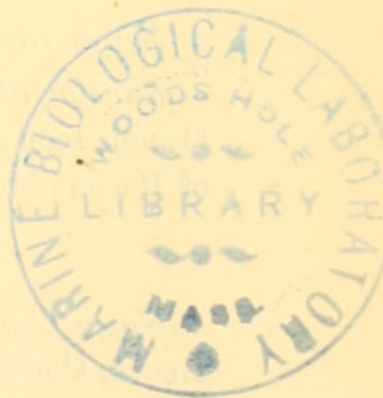
(1). *Von Lendenfeld*. Der Flug der Libellen. Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften in Wien, 1881.

When at rest the wings of Diptera are more or less askew. When a fly is immersed in turpentine it is immediately made insensible and lies motionless. Tetanic movements, after a short time, cause slight movements of the legs and then the wings, although remaining in the same position relative to the body, turn their face round in such a manner that they firstly become quite flat and then askew in the opposite direction to the original position. This movement is slow and can easily be observed. When the fly is dead the wings collapse again and return to their ordinary shape.

The same movement for which a mechanical action of the resistance of the air is considered the sole cause, is here executed in a manner which precludes the possibility of such a cause.

I think this proves my views in an equally simple and decisive manner.

In connection with this I would like to draw the attention of the reader to peculiar effect of the "insecticide" on the large viviparous flies. They invariably give birth to the maggots when under the influence of it at a time when the tetanus appears in other parts of the body. The maggots are not influenced by the insecticide to any great extent.





Lendenfeld, R. von. 1885. "Note on the flight of insects." *Proceedings of the Linnean Society of New South Wales* 9, 986–987.

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