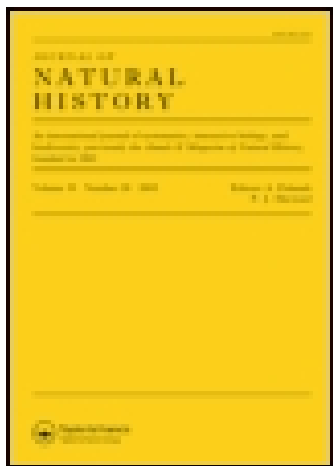


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### Reproduction of Hydra

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however, completely in relation to the repeated beatings of the wing-stump against the solid parts surrounding it, or of the corneous pieces which it contains (*osselets radicaux* of Chabrier), against each other.

If, in an animal treated as above, the wing-stump is coated with a slightly fluid substance which the air only dries slowly, the preceding sound is sensibly dulled, without the stigmata being in any way modified or the movement of the wings hampered.

When the section affects the stump itself, the sound produced becomes sharper and weaker. It is destroyed as soon as a sensitive part is reached; but this, as may be easily ascertained, is because the animal ceases to perform movements which have become painful.

To sum up, in the Hymenoptera and Diptera the buzzing is due to two distinct causes:—one, the vibrations of which the articulation of the wing is the seat and which constitute true buzzing; the other, the friction of the wings against the air, an effect which more or less modifies the former. It would not be impossible from these data to produce artificially the buzzing of these animals; and I have some hope of succeeding in this.

In the Lepidoptera of strong flight, such as the Sphinxes, the soft and full buzzing which those animals produce is only due to the friction of the air by the wings. This sound, which is always grave, is alone produced; it is not accompanied by the basal beatings, owing to a peculiar organization, and especially to the presence of the scales.

In the Dragonflies also, in which the base of the wings is furnished with soft fleshy parts, no true buzzing occurs, but a simple rustling due to the friction of the organs of flight.—*Comptes Rendus*, September 2, 1878, p. 378.

#### *Reproduction of Hydra.* By M. KOROTNEFF.

Notwithstanding its abundance, the freshwater *Hydra* presents many peculiarities which have been insufficiently studied, especially the reproduction of the several elements and the embryonic development of the individual itself. These phenomena have been described in detail by Kleinenberg in his monograph on *Hydra* \*. According to his investigation, the cells occur below the ectodermal elements (*interstitielles Gewebe*), and form an agglomeration serving to produce the ova as well as the spermatozooids. The development of the ovum takes place as follows:—One of the cells of the agglomeration increases remarkably, and swallows up the surrounding cells; in other words, it feeds upon them. The nucleus is transformed into a germinal vesicle; and finally the cell itself represents the ovum

\* *Hydra*, eine anatomisch-entwicklungsgeschichtliche Untersuchung: Leipzig, 1872, with four plates.

of the *Hydra*, which is thus, in its origin, a unicellular and ectodermic formation.

The granulations of a definitely formed ovum serve to produce the larger elements which Kleinenberg describes under the name of *pseudocells*.

After a detailed description of the segmentation, the German naturalist passes to the formation of the blastoderm, as a phenomenon immediately succeeding the segmentation. The blastoderm consists of a layer of cells, forming by itself the whole envelope of the ovum. Kleinenberg regards the blastoderm as an embryonic epithelium, taking no part in the ultimate formation of the *Hydra*, but rejected like an envelope at a certain period of development; for this reason the adult *Hydra* is an animal destitute of epithelium.

My own investigations, which were carried on upon *Hydra fusca*, completely contradict those of Kleinenberg. Nevertheless, in conformity with his researches, I have seen an agglomeration of cells of ectodermic origin, which I regard as simply embryonic cells, serving to reproduce different ectodermic elements. One of these cells increases, and its nucleus is converted into a germinal vesicle. At the same time the peripheral elements of the agglomeration separate, forming a row of cells with small very refractive granules, while the central cells unite to each other and to the enlarged cell; in this manner is formed a common plasmodium sprinkled with a considerable number of nuclei. The germinal vesicle begins to be degraded and disappears entirely (this last phenomenon agrees with Kleinenberg's observations); but the nuclei of the central cells undergo a transformation of another kind: they increase a little in volume, and degenerate into fatty bodies; at the same time some of them divide (their nuclei also take part in this division). The degeneration of a nucleus commences by a considerable increase of its nucleolus, which becomes very refractive, and finally fuses with the contents of the nucleus. It is these degenerated nuclei, which probably serve for the nutrition of the embryo, that Kleinenberg takes for pseudocells. The peripheral elements of the agglomeration, sprinkled with granules of chitinous origin, serve to form the shell (*écaille*) or envelope of the ovum.

Comparing my observations with those of Kleinenberg, I conclude that the German naturalist has taken the peripheral cells of the agglomeration for a blastoderm, and the mass of central cells for a result of the segmentation of the ovum. According to my observations the *Hydra* must evidently not be regarded as an animal destitute of epithelium; my previous investigations\* have proved that this epithelium is muscular.—*Comptes Rendus*, September 9, 1878, p. 412.

\* Archives de Zoologie expérimentale, 1876: "Histologie de l'Hydre et de la Lucernaire."