

## THE LONGEVITY AND SWIMMING ABILITY OF SPERMATOOZA.

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**Abstract.** The spermatozoa and eggs of most marine invertebrates are shed into the sea water, where fertilization and development take place. The vigor with which the spermatozoa swim varies greatly in different species. Some scarcely move perceptibly, while others are extremely active.

While studying the longevity and vitality of unfertilized gametes, including the eggs and spermatozoa of several species of annelids, molluscs, and echinoderms, the writers undertook to learn how far a spermatozoid would swim when unassisted by currents. Gemmill, experimenting upon sea-urchin spermatozoa, came to the conclusion that they may swim a distance of seven inches in an open dish, but only a few centimeters if enclosed in capillary tubes.

After numerous trial experiments we selected glass tubes approximately one inch in diameter in place of capillary tubes. Without going into detail in a description of the apparatus used, it may be sufficient to say that we were able to introduce sperm at one end of the experimental tubes and unfertilized eggs at the other. By a series of experiments, using tubes of various lengths, we learned how far spermatozoa would swim to fertilize eggs so introduced.

The spermatozoa of the sea-urchin (*Arbacia*) were able to swim 29½ centimeters in five and one-half hours. The spermatozoa of *Cumingia*, (a lamellibranch mollusc) performed at the same rate. Some millions of spermatozoa were introduced and about 20 spermatozoa of each species swam the distance in the time specified. The spermatozoa of *Hydroïdes* (an annelid) were found to be inactive and swam very little except when stimulated by the proximity of eggs whose secretions excite them to a certain activity, but without which they would not swim.

Spermatozoa which fail to fertilize eggs usually die within seven hours from the time they are shed. They often become inactive after five hours, so that the results given above represent the approximate limit of their swimming ability.

The unfertilized eggs of these same species live somewhat longer than the spermatozoa. Thus, unfertilized eggs of *Cumingia* live from six to 22 hours; those of *Hydroïdes* from eight to 38 hours; those of *Nereis* from six to 24 hours; those of chiton from eight to 40 hours, and those of *Arbacia* live from 26 to 48 hours.

In conclusion it may be said that spermatozoa shed into water die within a few hours if they fail to meet an egg. The unfertilized eggs, on the other hand, live for longer periods, which vary with the species.

