

90 (1672)

The food reactions of the infusorian *Spathidium spathula*.

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Spathidium spathula is an holotrichous infusorian whose sole diet consists of smaller ciliates, chiefly species of *Colpidium*. If the truncated anterior end of a *Spathidium*, which is swimming forward and revolving on its long axis, happens to come into direct contact with a *Colpidium*, the latter usually becomes motionless at once and its protoplasm shows signs of pathological changes.

Paralysis and death of the prey is apparently brought about by the liberation of a specific substance from the oral region of *Spathidium* which is toxic to small ciliates. Various authors have ascribed this result to trichocysts about the peristome, but as a matter of fact none are present. However, a number of rod-like bodies can be demonstrated in the thickened rim of the peristome which may represent the seat of the poison. One is at liberty to interpret these bodies as "trichocyst material," though the poisonous nature of trichocysts, even in *Paramecium*, remains to be demonstrated.

The paralysis of a *Colpidium* by a *Spathidium* results in a marked change in the latter's behavior, which up to this instant has comprised random swimming movements. If the *Colpidium* happens to remain against the truncated anterior end, the *Spathidium* forthwith proceeds by means of the thickened edges of the peristome to force its prey down through the slit-like mouth into the interior of the cell. On the other hand, if the *Colpidium* is not instantly rendered motionless and becomes removed a short distance from the oral region of its captor, the latter institutes a series of rapidly repeated avoiding reactions. This behavior has a tendency to keep the animal in the general vicinity of its quarry because each time the *Spathidium* starts away its forward progress is checked by the reaction. It is obvious that sooner or later, merely on the basis of chance, the anterior end of the animal will again come in contact with the *Colpidium*, but a careful study of many captures shows beyond doubt that the apparently random

reactions are successively modified so that the peristome of *Spathidium* is brought gradually nearer and nearer until it grasps the *Colpidium*. In brief, *Spathidium* in the majority of cases recovers its lost prey, even though the latter may have become removed a distance equal to several times the length of the *Spathidium*.

The factors involved here may be products derived from the dead *Colpidium*, but more probably are directly related to the poisonous secretion liberated by *Spathidium* itself. In any event, the complex series of reactions exhibited by *Spathidium* afford, it is believed, a remarkable example of sensing at a distance by a unicellular organism.

The complete paper will appear in the Journal of Experimental Zoology.

91 (1673)

The rôle of the nervous system in the regulation against cold.¹

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One of us has shown that a dog placed in an ice-water bath up to the neck exhibits as one of the reactions to cold a concentration of the blood, losing approximately 10 per cent. of its blood fluid. Such extreme temperatures, however, even well-nourished dogs are unable to resist, the rectal temperature falling rapidly.

Investigating further the mechanism of regulation against cold we attempted to find first a bath temperature which, while not sufficiently cold to lower the body temperature, would arouse distinctly the regulation against cooling. Secondly, on dogs deprived of their nervous regulatory mechanism by section of the cord between the sixth and seventh cervical segment, it was attempted to determine whether the failure to resist the temperature of baths not too cold to be normally withstood is associated with inability to concentrate the blood.

It has been found that normal dogs will exhibit a fairly efficient

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