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Inhalt:

I. Wissenschaftliche Mitteilungen.

1. The Movement of the Starfish, Echinaster, toward the Light.

By R. P. Cowles, Johns Hopkins University, Baltimore.

(With 1 figure.)

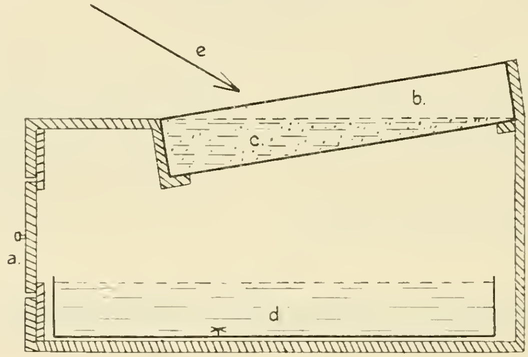
eingeg. 21. September 1909.

The purpose of this paper is to describe briefly some experiments undertaken to determine if it is the direction of the light rays or the relative intensity of the light that controls the direction of locomotion of *Echinaster crassispina*.

The apparatus used was a rectangular box 41 cm, by 26,5 cm. One end of the box was 26 cm and the other 22 cm high. The top of the box was covered for a distance of 10 cm at the shorter end. From this point to the higher end the top was left open. The box was perfectly light tight except for the opening just mentioned, and the inside surface was painted dead black. At one end of the box there was fitted a light tight door, (*a*) through which the starfishes were introduced. Into the open part of the top of the box a glass container, (*b*) with parallel sides was set and was supported by a shoulder around the inside of the box as shown in the figure. The glass container was partly filled with water mixed with a little Higgen's Waterproof Ink, (*c*) so that when the container was in position there was formed a prism of the solution, thick at one end and thin at the other. The surface of the liquid made an angle of 5° with the bottom of the container.

Direct sunlight was used in the experiments since it was the only kind of light obtainable that would answer. In the bottom of the box was placed a rectangular glass dish, (*d*) 36 cm long, 23,5 cm wide and 7,5 cm high almost filled with fresh sea water and lined with dead black paper.

By placing the apparatus so that the sun's rays entered the prism, as shown in the figure (*e*), it was possible by means of the layer of water



and Higgen's ink to obtain a lighted area in the dish of water which was of graded intensity.

The method employed in using the above apparatus was as follows: Echinasters of various ages were used and these were introduced into the dish, care being taken to vary the position of the rays, and to vary the manner of handling, so that these factors should not influence the direction of movement.

Several series of experiments were undertaken, some with the sun's rays directed toward the thin end of the prism, some with the rays directed toward the thick end and others with the rays practically vertical. In every trial the starfish moved apparently without hesitation to the brightest part of the graded field, except in the case of one individual the tips of whose rays had been amputated several days previous, and even this individual moved slowly into the brightest region. In all cases the starfish stayed at the lightest end some little time.

Finally a series of trials were made in which the apparatus was altered so that the layer of water and ink was of uniform thickness, thus casting an area of light of equal intensity into the experimenting dish. The trials were made with the sun's rays entering at various angles but in nearly every case the starfish moved about "aimlessly" sometimes in the direction of the rays, sometimes opposite to the direction of the rays, and often from side to side.

From these experiments it is evident that *Echinaster* moves from the region of least intensity to that of greater intensity without reference to the direction of the sun's rays.

It may be claimed that the ink particles at the thin end of the prism (see figure) scatter the sun's rays so that the starfish in moving toward the brightly lighted end of the field is really moving in response to rays reflected from these particles; but it is also true that there is a greater scattering of rays by particles at the thick end of the prism and a greater number impinging on the surface of the starfish from a direction opposite to which the creature is moving.

2. Die Fischelsche Alizarinfärbung und ihre Anwendbarkeit für die Polychaeten, speziell Pectinaria koreni Mgrn.

Von David Nilsson, cand. phil., Upsala, Zool. Institut.

(Mit 4 Figuren.)

eingeg. 27. September 1909.

In einem sehr interessanten Artikel, betitelt »Untersuchungen über vitale Färbung an Süßwassertieren, insbesondere bei Cladoceren« [1], teilt Prof. Fischel unter anderm die Resultate mit, die er mittels Alizarin erhalten hat, eines Stoffes, der bisher keine große Anwendung in der mikroskopischen Technik gefunden hat, und dessen Eigenschaft, specifische Gewebselemente im tierischen Körper vital zu färben, absolut unbekannt gewesen ist. Dem Verfasser ist es gelungen, dadurch, daß er Süßwassercladoceren (einige Arten von *Daphnia* und *Bosmina*) in einer stark verdünnten Alizarinlösung hielt, das Nervensystem oder wenigstens gewisse Teile desselben dunkelviolett bis schwarz gefärbt zu erhalten. Später (Okt. 1908) wird mitgeteilt, daß auch eine Copepode sich hat färben lassen [2]. Die Nerven nehmen den Farbstoff in Form von »Schollen und Körnchen von verschiedener Größe und Gestalt« an, und die Untersuchung ergibt, daß es die perifibrilläre Substanz sein

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[1] Fischel, A., Untersuchungen über vitale Färbung an Süßwassertieren, insbesondere bei Cladoceren. Internat. Revue der gesamten Hydrobiologie und Hydrographie. Bd. 1. 1908.

[2] Fischel, A., Zur Anatomie des Nervensystems der Entomostraken. Zool. Anz. Bd. XXXIII. S. 698. 1908.