

and then transferred to a high one, since in some of these experiments 26° C was used as the higher temperature.

An experiment has therefore been performed in which flies were kept first at 25.5° C and then transferred to 20° C. The species can reproduce at both these temperatures, although the former is close to the maximum. F_1 hybrid males between the *B* and *K* inbred lines of *D. subobscura* were raised at 20° C, and afterwards kept, 2 males per vial, in 3 in. × 1 in. diameter shell vials containing food medium. The flies were transferred to fresh food vials every two days, since we have found that this procedure gives more repeatable results than our earlier practice of 4-daily transfers. Flies were kept for four days after emergence at 20° C and then, with the exception of a control group, were transferred to 25.5° C. A group of 110 males which were kept continuously at 25.5° C until they died survived for a mean of 43.1 days at that temperature. Other groups, each consisting of 20 flies, were kept at 25.5° C for 12, 16, 24, 28 and 32 days, and were then transferred to 20° C and kept at that temperature until they died. The mean ages at death, with standard errors, of each of these groups are plotted in Fig. 2 against days spent at 25.5° C. Also shown in Fig. 2 are the expectations according to:

(1) The threshold theory, assuming the rate of ageing to be independent of temperature; on these assumptions, all groups returned to 20° C should die at the same chronological age as the controls, regardless of how long they had previously spent at 25.5° C.

(2) The rate of living theory, that is, equation (2), assuming a mean longevity of 43.1 days at 25.5° C.

The results of the experiment contradict the rate of living theory, and are fully consistent with the threshold theory suggested in earlier papers.

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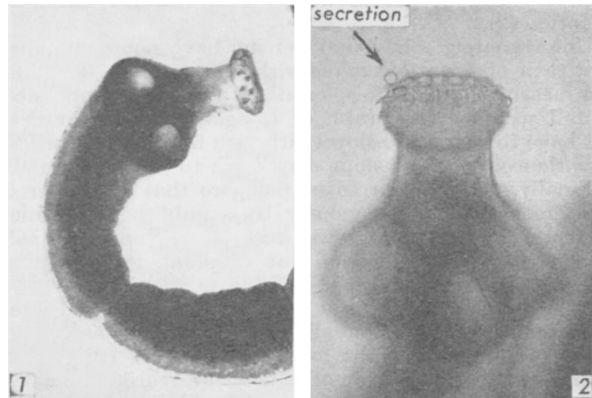
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Secretory Activity by the Scolex of *Echinococcus granulosus* in vitro

DURING recent work on the *in vitro* cultivation of the hydatid organism, *Echinococcus granulosus*, observations were made on living 35-day-old strobila freshly removed from the intestine of dogs. Strobila were examined as quickly as possible after autopsy on a warm stage in hydatid fluid or Parker's 199 medium. The scolex showed a very marked activity, one phase of which was characterized by the rostellum region being expanded to its limit—a process resulting in the hooks being raised to form an anterior disk (Fig. 1). This phase may be only momentarily observed for it rapidly changes to one in which the hooks are lowered. This represented a picture of the behaviour pattern of the *Echinococcus* scolex not evident from text-book illustrations, which appear to be based on fixed specimens.

Continual high-power *in vitro* observations of the living scolex has revealed a previously undescribed phenomenon—the secretion of small viscid droplets into the medium from the hook region (Fig. 2). This phenomenon was peculiarly difficult to observe due to the activity of the scolex, but once seen was found repeatedly in many specimens from different dog hosts; the precise site of secretion was not observed. The phenomenon has not been found in strobila earlier than 32-days' development in the dog, and the appearance of the secretion may be

related to the metabolism of the later stages of maturation only. Detailed cytological examination of the rostellar region of the scolex¹ has revealed the presence of a group of cells, lying just beneath the anterior tip of the rostellum apparently not figured in early morphological accounts. These cells contained droplets from which the secretions have clearly originated. The existence of gland cells in the scolices of some cestodes² has been described; but active secretion from the cestode scolex—nor indeed from any other region of a cestode—does not appear to have been observed or reported. It may prove to be a common phenomenon and may have implications necessitating a revision of our concept of cestode physiology.



Figs. 1 and 2. (1) Scolex of living *Echinococcus granulosus* freshly removed from the dog intestine showing characteristic expansion of rostellar region (electronic flash microphotograph); (2) anterior tip of rostellum of living *Echinococcus granulosus* showing release of a secretion droplet (electronic flash microphotograph)

The nature and possible function of this secretion from *E. granulosus* can be only a matter of speculation at this stage and these questions are being further investigated. In view of the close contact of the scolex with the intestinal mucosa¹, the secretion may be important from the immunological point of view, and for this reason, especially, warrants further investigation.

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VETERINARY SCIENCE

Nicotinamide Adenine Nucleotides in Ovine Liver

A KNOWLEDGE of the levels of nicotinamide adenine nucleotide coenzymes in ruminant liver may be of value in understanding the aetiology of bovine ketosis and ovine pregnancy toxæmia. In particular, the possibility that a deficiency of the reduced form of the dinucleotide phosphate (NADPH₂) may be associated with the hyperketonæmia which is characteristic of these metabolic disorders has been suggested by several workers¹⁻⁴. Because NADPH₂ is an essential cofactor for fatty acid biosynthesis⁵ a deficiency of it would result in impaired lipogenesis and consequently an increased ketogenesis^{6,7}.

There are few reports in the literature, if any, of the measurement of nucleotide coenzyme-levels in biopsy