

HISTOCHEMICAL LOCALIZATION OF ACETYLCHOLINESTERASE IN THE WHOLE MOUNTS OF *COTUGNIA* SP.

ONLY a few studies have been concerned with the demonstration of structure of nervous system and esterase distribution in the whole mount preparation of cestodes¹⁻⁵. The present communication is concerned with the demonstration of nervous system in the cestode *Cotugnia*, the only Davaineid genus with double genitalia, as a result of acetylcholinesterase (AChE) localization.

The cestode was collected from the intestines of fowl. Immediately after removal from the host, the worms were fixed in cold 4% formalin for 20 minutes. Following this procedure, the worms were washed in cold distilled water to remove all traces of fixative. After washing one group of worms were incubated in the medium of Holt and Withers⁶ to detect non-specific esterases. Some worms were incubated in acetylthiocholine iodide (AThChI) and butrylthiocholine iodide (BThChI) to localize acetylcholinesterase following the method of Karnovsky and Roots⁷. Incubation was followed by washing in distilled water and mounting in DPX. Control experiments were carried out simultaneously as described by Wilson³. As a result of AChE localization, the following nerves have been traced out (Fig. 1).

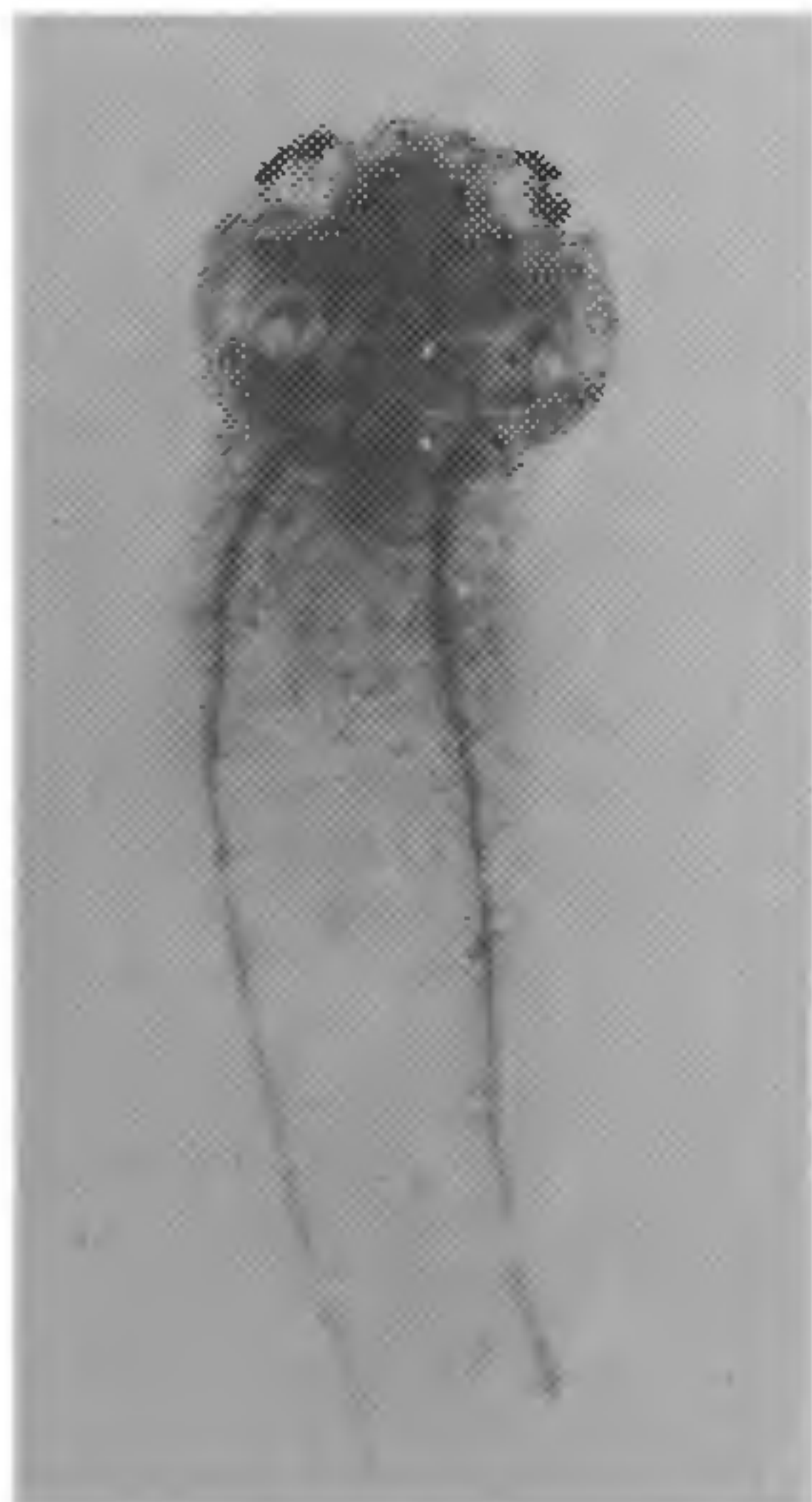


FIG. 1. The nerve arrangement in *Cotugnia* after incubation AThChI ($\times 18$).

The central nerve ring is situated below the scolex. The two cerebral ganglia give rise to two main longitudinal nerves on either side which continue posteriorly

lying parallel and external to the longitudinal excretory canal. The thicker nerve can be termed as laterodorsal and the thinner as lateroventral nerve. The suckers are supplied with fine branches of nerves. From each cerebral ganglion in the anterior region a nerve arises which ramifies into many branches in the suckers. Similarly, in the posterior region also, apart from the lateral nerves a pair of nerves arise from the cerebral ganglia which are supplied to the suckers. Just below the scolex, fine branches of transverse and longitudinal nerves are present, limited to that region only. In the segmented region of the body, each segment is separated by a transverse nerve. The laterodorsal nerve is ganglionated as the transverse nerves arise from it.

AChE activity in the reproductive system appears to be limited to the female reproductive organs. Non-specific esterase activity has been found in the muscularized organs of the male reproductive system as in *Hymenolepis*³ (Fig. 2). The rostellar hooks showed

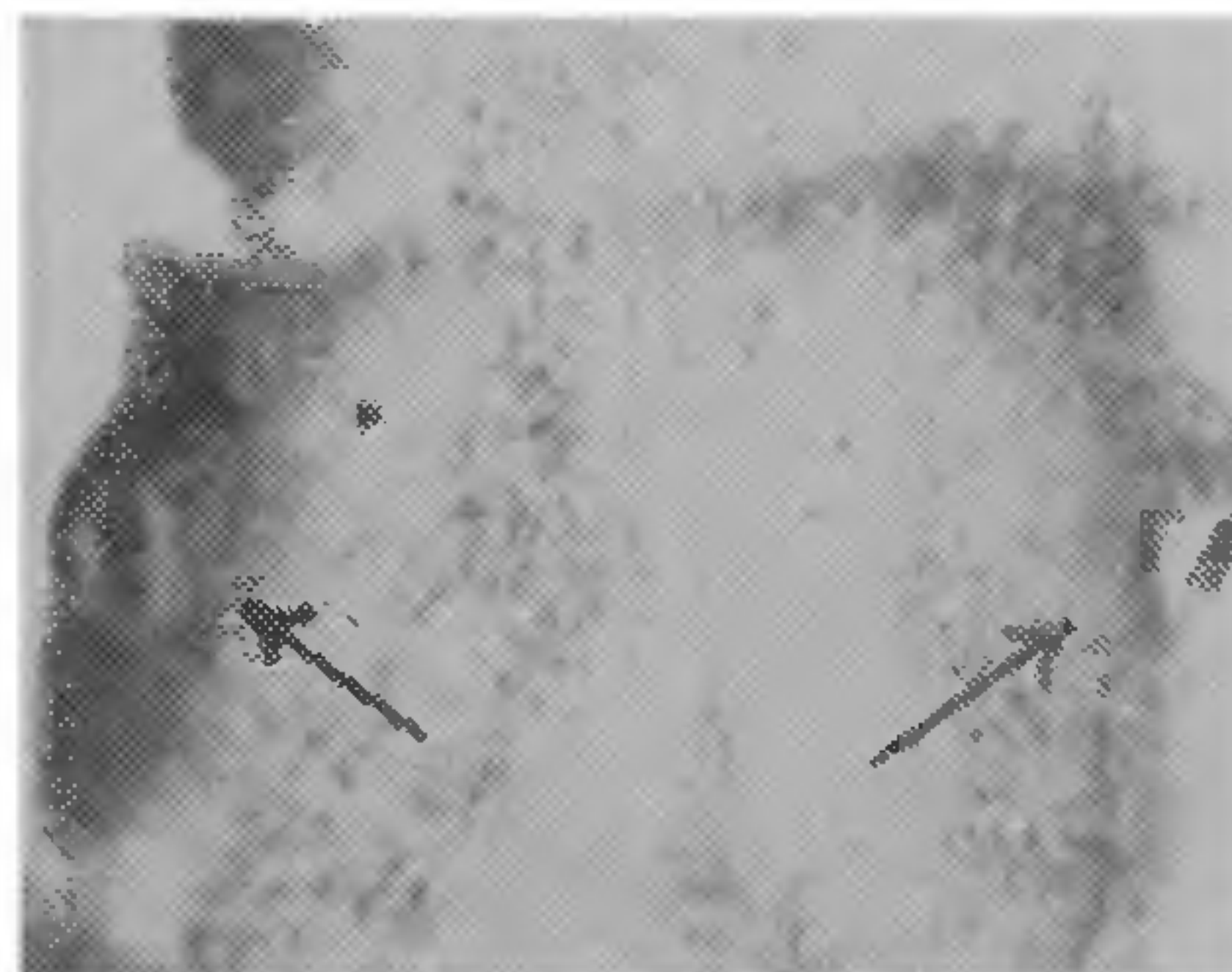


FIG. 2. The two cirrus sacs showing non-specific esterase activity. Note the absence of enzyme activity in female reproductive organs ($\times 60$).

both non-specific and AChE activity. The results clearly show that AChE is associated with nervous system in *Cotugnia* as in trematodes^{8,9} and other cestodes¹⁻⁵. The significantly stronger staining reaction observed when AThChI was used as substrate as compared with the substrate, BThChI suggests that the activity is chiefly due to AChE in the nervous system of both the species. The pattern of distribution of the reaction product in the scolex and strobila is generally similar to that described in other species^{3,4}. From the results, it is clear that indoxyl method is unsuitable for demonstrating gross anatomy of nervous system in whole mount preparations of *Cotugnia*. However, this technique may be more suitable for sectioned material. *Cotugnia* is characterized for possessing many neurosecretory cells in the body below the scolex. Contradictory results have been obtained

in the studies pertaining to the occurrence of acetylcholinesterase in the embryos of cestodes^{3,10-12}. In the present study the embryos of *Cotugnia* showed only non-specific esterase activity. But unless specific inhibitors are employed it is not possible to identify the esterase present in the cestode embryos.

The authors (G. V. R. K. and J. V. N.) are thankful to U.G.C., New Delhi, for the award of Junior Research Fellowships.

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June 23, 1978.

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REVIEWS

Indian Precambrian Stratigraphy, Volume 4.
By V. J. Gupta. [Hindustan Publishing Corporation (India), Delhi 110 007], 1977. Pp. x + 333.
Price : Rs. 75.00, \$ 19.00.

This book marks the culmination of a project on the revision of Indian Stratigraphy, initiated in 1972 by the author. Three volumes by the author on Phanerozoic stratigraphy have already been published. The strength of the present book lies in giving a bird's eye view of the recent (up to 1975) stratigraphic revisions in the vast Precambrian terrain of India. The book is usefully illustrated with some recent geological maps and cross-sections. The value of the book is enhanced by several tables showing the stratigraphic columns of various regions. Synthesising a large mass of data, which have started pouring in particularly from the sixties, is no mean task, and the author, who is probably not personally familiar with a large part of the Peninsular India, has made a valiant attempt. The book, however, bears the mark of haste, with authors' names and references quite often mis-spelt and misquoted.

One would have wished that the author had begun the book with the Peninsular India, which exposes the Indian Precambrian at its best, rather than with the Himalayan Precambrian. This is particularly so when the identification, classification and correlation of the Precambrian formations of the Himalayas are beset with a great deal of uncertainty in the absence

of adequate geochronological information. There has also been an unequal treatment of the Indian Precambrian, with the Himalayas getting 152 pages, the Peninsular Archaean (including the Proterozoic) 118 pages and the Purana a mere 58 pages.

The division of the Indian Precambrian under the obsolete scheme of Archaean and Purana does not do justice to the current advancements in the global Precambrian geology. The term Archaean is usually restricted to the period of about 2,500 million years, and most of the areas covered in this book under the Archaean will rightly belong to the Proterozoic. There has apparently been an uncritical evaluation of radiometric data, which has resulted in the lumping together of dates with variable accuracy and utility. A more purposive assessment of geochronological data would have enabled the author to arrive at a tentative chronostratigraphic correlation of the Indian Precambrian.

Pluralising stratigraphic names is forbidden by various stratigraphic codes, and one is surprised to find the author of "Precambrian Stratigraphical Nomenclature" using names like the Salkhalas, Haimantas, etc., in the present book.

At its present price, this book may be beyond the reach of most graduate students and research scholars. Nevertheless this book attempts to fulfil an urgent need for literature on Indian Precambrian geology, and therefore is a useful addition to the library.

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