INTRODUCTION

In India, a number of species of marine and estuarine molluscs, gastropods and bivalves, must definitely be considered to be of economic importance since not only are these frequently used as food, but are regularly found in markets to meet other commercial demands. Indeed, molluscs represent one group of marine animals which is already serving to fulfill the need for proteins by a large percentage of the world's population.

The sole intent of this dissertation is to elucidate about the ciliate parasites of commercially important marine and estuarine molluscs of Indian waters. However, as the search of literature progressed, it became increasingly evident that very little is known about the more subtle, yet important, aspects of
parasitism among these invertebrate populations. As would be expected, many organisms have been reported to parasitic commercial molluscs and there have been some not too discrete statements as to the pathogenicity and lethality of certain of these parasites including protozoans. Unfortunately, these pieces of information hardly sufficed in assembling a continuous and natural description of parasitism so far as Indian molluscs are concerned. For this reason, the present topic has been chosen to include information that would exemplify the interactions involved in all types of symbiotic or parasitic associations and on all the different types of molluscs, but without losing sight that the estuarine and marine species are of primary concern in this communication.

Several mass mortalities of shellfish, particularly of oysters, throughout the world during the last five decades have aroused the concern of the industry and of the fishery biologists and shellfishermen. Many natural oyster beds were wiped out and have yet to recover. In addition to these major mortalities, numerous others have been reported and several zooparasites have been found in oysters and other commercially important pelecypods. Although the cause and effect relationship in most cases has not been established, there is a legitimate concern over such parasites as possible lethal agents.
The other important reason for the interest of shellfish biologists in parasites of marine molluscs lies in the possibility that certain protozoan parasites of predatory molluscs (such as the oyster drills, Urosalpinx cinerea, Euplectra caudata and Theis haemastoma), may be utilised as biological control agents. Until now, only limited and preliminary studies of this nature have been conducted (Cooley, 1958, 1962) and hence the effectiveness of these parasites as control agents remains unknown for the most part (Carzikor, 1955).

The present thesis deals with the observations on the holotrichous ciliates of the orders Hymenostomatida, Thyngotrichida and Peritrichida, including the descriptions of fourteen species, seven new to science, infesting at least eight molluscan hosts: Littorina (Littoriunopsis) scabra scabra, L. melanostoma, Callithyidae obtusa, C. cingulata, Crassostrea cucullata, Nectra luzonica, Mucillae (Mucillae) striatulus and Donax lubricus, inhabiting the littoral waters of Indian coasts.

One new species of Cristiger of the family Plooronematidae (order Hymenostomatida), three species of Ancistrocoma and one
species of Raabolla of the family Ancistrocomidae, six species from the family Hemispeiridae distributed over four genera - two each of Ancistrumina and Ronchella, and one each of Bovaria and Protophrya. four of these having been proposed to be new to the family, are described in the present dissertation. Under the order Peritrichida three species have been described of which two belong to the genus Scyphidia of the family Scyphidiidae and one to the genus Trichodina of the family Uroscolariidae, all the three ciliate parasites, as claimed in this thesis, are new discovery and first report from molluscan hosts from the eastern hemisphere.

The order Thigmotrichida which embraces the family Ancistrocomidae and Hemispeiridae along with six others (Conchophtheridae, Thigmophryidae, Hysterocinetidae, Nucleocorbulidae, Hypocordidae and Sphenophryidae) has been dealt with in details in this dissertation with a deliberate purpose. Thigmotrichida, a well established assembly of several families which are characterised by various adaptive changes, may prove to be a convenient material for the study of evolutionary trends in ciliates and which may contribute to elucidate the phylogenetic problems as well. Also, the strong morphological and physiological adaptations to the parasitic life allow to justify the interesting interdependence in the host parasite relations.
The general architecture and orientation of the Thigmotrichida body display great differentiation and many-sided specialization. Interpretations by various authors as to the orientation of the body are very controversial. In Hymenostomatida as well as in Thigmotrichida occurs a shifting of the cytostome not together with the ends of kineties, but between kineties along a line which constitutes the prolongation of the anterior suture of the kineties. Just secondarily, some kineties, the nearest to the cytostome, may be involved into its service. As a rule those are the adoral kineties situated on the right of cytostome. In this situation the body side or its margin or more exactly the 'body meridian' along which shifts the cytostome, should be accepted as the ventral one. The opposite margin is consequently the dorsal one and the division of the body into two lateral parts is indicated by: the anterior suture, the 'median' with the cytostome and the posterior suture. This system corresponds to the division of the system of kineties into the right and left parts. The thigmotactic area lies in the anterior part of the left body side and the buccal apparatus tends to shift to the right side. The disposition of kineties support very well and distinctly this orientation. The problem of spiralization is of special importance on account of the meaning of the spiralization
direction of the cortical elements for the systematic of ciliates and for some phylogenetic conclusions bound with this problem.

The classification of the described ciliates employed herein for the higher taxa (order and higher) and the familial designations are after R. R. Kudo (1966) or, those of original authors.