

INTRODUCTION.

LIMITED CONDITION OF OUR KNOWLEDGE OF DIATOMS.

THE extreme difficulty of acquiring an adequate knowledge of Diatoms, owing to their small size and the impossibility of following attentively and registering every stage of their development under the microscope, renders the greatest care necessary in the observation of every phenomenon presented by the living species. As, however, the making of such useful observations is entirely fortuitous, the majority of the earlier investigators are found almost exclusively to have been satisfied with making a mere record of the different types occurring in their preparations, the most of which were purchased from traders in this department of microscopy, who vied with each other in procuring new or rare forms.

The eagerness of these observers to possess such novelties, with the view, in many cases, of designating new species by their own names, along with the too hasty work of the first discoverers of Diatoms, and especially of Ehrenberg, had the effect of introducing a nomenclature that was misleading, and of causing a confused synonymy that has been justly designated the opprobrium of the science. Against the continuance of this state of things Professor Walker Arnott raised an authoritative voice, going so far even as to declare that any researches relating to types found in the stomachs of molluscs and fishes, or obtained from marine soundings, were altogether useless. By thus acting it cannot be doubted that this naturalist exceeded all reasonable limits, but it is to be borne in mind that he did so with the view of putting a restraint on those who were too careless in conducting their investigations.

In the present state of our knowledge, one of the most important applications of an acquaintance with Diatoms lies in the field of Geology, where it serves as a guide in tracing the history of many formations which teem with their remains or impressions. Thus, although a siliceous bed may be found on the side of a mountain several hundred feet above the level of the sea, and although it may be in a position of notable inclination to the horizon, an accurate examination of the contained frustules may prove whether the deposit was laid down in fresh or salt water, and whether, in the latter case, it occurred in the open sea or in greater proximity to the land. Moreover, as the obliquity of the bed demonstrates the existence of subterranean forces of upheaval subsequent to its formation, so the presence in it of layers of chalk or clay point to a removal of