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Cindy Lee Van Dover: The ecology of deep-sea hydrothermal vents

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“Deep-sea hydrothermal vents and their attendant faunas were discovered in 1977.” With this sentence commences the preface of this book. Since their first discovery, thousands of studies and several reviews have been published, but this is the first book aiming at summarising and integrating this accumulated knowledge. Despite the inaccessibility of deep-sea hydrothermal vents, the knowledge acquired during the past 20-or-so years is enormous, and even the present book cannot report on all findings related to the ecology of this unique habitat. Almost 10 years ago, a major review on the ecology and evolution of hydrothermal vents was based on about 340 primary references. The present book contains more than 1,000 references underlining the advances that have been made during this short time period.

The book consists of two main parts, one devoted to the geology, chemistry and physics of these vent systems and the other to the biological communities associated with them. Towards the end of the book the author places these two main parts in the context of the question of the origin of life on our planet, which may possibly have arisen in systems similar to the hydrothermal vents still existing in the deep sea. The book is divided into 13 chapters, each of which contains its own reference section.

In the first chapter an overview of the ecology of the non-vent deep sea is given in order to set the stage, emphasising the fact that hydrothermal vents are like an oasis in the vast plains of the deep sea. The second chapter explains the geological background, which is responsible for the occurrence of the deep-sea hydrothermal vents, while the third chapter illuminates how these particular settings affect the fluid composition at vent sites. How these fluids disperse after leaving the vents is laid out in

Chapter 4. In Chapter 5 the main players at vents, the microbial organisms, are introduced and subsequently, in Chapter 6, an important feature of vent ecosystems, the frequent occurrence of symbiotic relations, is presented. Most of the macroinvertebrates that dominate vent faunas are living in association with microbial symbionts, which becomes evident in Chapter 7, “Physiological Ecology”, and is further elaborated in Chapter 8 “Trophic Ecology”. Chapter 9 reviews the reproductive ecology of the vent fauna, while the following chapter discusses the community dynamics in this sometimes ephemeral habitat. The evolution of the vent fauna and its biogeography is treated in the subsequent chapter which itself leads into a description of “cognate communities”, i.e. communities that share some characteristics of deep-sea hydrothermal vents. The final chapter of the book then attempts to combine all of the above and place everything in a larger perspective i.e. the origin of life on our planet and possibly on other planets too.

The strength of the book, namely the integration of different disciplines (such as geology, physics, chemistry and biology) related to the ecology of deep-sea hydrothermal vents, might also be its weakness. While the overview on the geological, physical and chemical properties of these vent systems will be most welcome for biologists, these chapters may not be satisfying for geologists, physicists or chemists. Similarly, some biologists may find that the chapters on different aspects of the biology of the vent fauna do not fulfil their expectations. Some of the chapters in the book represent up-to-date reviews of knowledge on particular topics, in particular those that reflect the main research interests of Cindy Lee Van Dover, for example Chapter 8 “Trophic ecology”. Other chapters, despite being informative, appear rather to be lengthy accumulations of facts, which could have benefited from some synthesis. Yet, the strength of the book without doubt lies in the fact that it combines information from all these different disciplines and makes it available to the average scientist, who so far only may have learnt about these systems in occasional publications or film documentaries. There are probably few hab-

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itats on our planet, in which these different disciplines come so close together as in deep-sea hydrothermal vents and the book reflects this well.

In general, the book is well written, and it clearly benefits from the research experience of the author. Most of the illustrations are very well prepared, but there are a few that are difficult to understand or provide little useful information. Furthermore, the chapter on the anatomy of a tubeworm seems to lack a figure on the internal anatomy that would allow the reader to appreciate the anatomical adaptations of these species essential for the maintenance of their symbiotic relationship with microbial organisms. There are also several figures that lack a scale, which complicates their interpretation. However,

these observations diminish in light of the fact that this book represents a most welcome summary of present knowledge on the ecology of deep-sea hydrothermal vents and the biology of the associated fauna. The author points out the advances that have been made during the past 20-or-so years, but does not fail to direct attention to some imminent questions and topics that still require much research attention in the future. In this sense, it is to be expected that more books on the ecology of deep-sea hydrothermal vents and the biology of their associated fauna will be published in the future. For the moment, scholars of marine ecology are well advised to recommend the acquisition of this book to their institutional librarians.