The Helgoland Manual of Animal Development: Notes and Laboratory Protocols on Marine Invertebrates
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The authors of this handbook sum up their combined experience gathered over decades of teaching developmental biology of marine invertebrates. Gary Freeman (University of Texas at Austin) states in his Foreword: “I have read through several sets of laboratory instructions for developmental biology laboratories over the years; this is the best set of instructions that I have seen. They are an excellent way to move from being a novice to a more sophisticated observer and thinker.”

What the last words of the above quotation will mean to a teaching biologist may be illustrated by the following anecdote. At the end of a day teaching experimental developmental biology using sea urchin eggs, a tired colleague once groaned: “These students are perfect in doing exactly the experiment I suggest, but when they have finished, they ask: ‘what can we do next?’ If only they were curious and imaginative enough to find out themselves what they could do!”.

The Helgoland Manual of Animal Development provides the essential elements a teacher trying to avoid “spoon-feeding”, and a student willing to “find out”, want to be given – starting out from:

A list of topics with brief descriptions of the main fields of developmental biology (Biology of reproduction, Embryogenesis, Stem cell biology, Larval biology); A reflection on “The mainstream” of present-day embryology and the meaning of “Comparative developmental biology” Criteria for “Selection of species” to be used and characteristics of the “Marine stations” that are indispensable; A short list of references; A separate section covers “Techniques”, from T1 “Seawater, temperature and light”, through T2 “Glass and plastic containers”, T3 “Pipettes and other tools”, to T4 “Microscopy” (plus T5 “References”).

There are 6 independent chapters covering the following subjects:
Developmental biology of the sea urchins (echinoids)
Developmental biology of sea stars
Developmental biology of the ascidians
Developmental biology of the cnidarian Hydractinia
Developmental biology of the Spiralia

Reproductive biology, larval settlement and metamorphosis in Spirorbis (Polychaeta)

To give an example of the lay-out, Chapter 1 covers “Diagnostic features”, “The course and physiology of development in the sea urchin” (“How and why the sea urchin embryo became prominent in both descriptive and experimental developmental biology”, “Fertilization”, “The cleavages”, “The early cleavages generate a polarized cell pattern”, “The blastula: The cells become uniform again, and differentiation sets in”, “The gastrula: Morphogenesis by cell migration and by formative movements of epithelia”, “The pluteus and metamorphosis”, “Cell lines are allocated early in the sea urchin embryo”, “Classic and modern experiments in sea urchin embryos are cornerstones for understanding the physiology of development”), “Sea urchins: Laboratory studies” (“The species”, “Sexual maturity”, “Lab requirements for artificial fertilization and maintenance of embryos”, “Artificial fertilization”, “Watching the process of fertilization”, “Watching the early embryo”, “Raising a large batch of sea urchin embryos”, “Microscopic study of immobilized blastulae, gastrulae, and larvae”, “Removal of the egg envelopes”, “Blastomere isolation experiments”, “Equalizing the size of blastomeres produced at fourth cleavage, and the consequences”), “References” (62, including the early studies by Driesch (1891) and Boveri (1901), and the classic studies by Hörstadius in the middle part of the 20th century).

Quite naturally, each chapter (respective lengths vary from about 15 to about 40 pages) has its own type of subdivisions and editorial characteristics; respective numbers of references also vary greatly.

Appendix 1 provides a list of “Textbooks of general developmental biology” and another one of “Textbooks of comparative developmental biology of animals, and manuals on reproduction and development of regional faunas.”
Appendix 2 indicates “Films” and offers a very helpful information on the film archives of the former IWF at Göttingen (closed in 2010): “IWF films can be downloaded. Click <www.getinfo.de> and <database selection>. Deselect all external and internal databases. Click <AV-Media> and enter for search “IWF” or the name of species.”

Appendix 3 lists “Marine Stations” in NW Europe (including Biologische Anstalt Helgoland). From the introductory note, one may quote the following information: “Europe’s marine stations cooperate within the MARS network – The European Network of Marine Research Institutes and Stations (www.marsnetwork.org). The CIESM (Commission internationale pour l'exploration scientifique de la mer Méditerranée) with headquarters in Monaco, is an initiative of Mediterranean and Black Sea institutions to coordinate their research activities (www.ciesm.org).”

The general “Index” has nearly 1000 entries.

One of the special characteristics to be emphasized is the outstanding quality of all the illustrations, from black and white line drawings, through colored diagrams, to microscopic and macroscopic b&w and color photographs.

Last but not least: the price of this excellent manual is certainly moderate!

Sigurd v. Boletzky
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