



The depths of the sea

Karl S. Matlin, Jane Maienschein and Rachel A. Ankeny (Eds): Why study biology by the sea? Chicago: University of Chicago Press, 2020, X + 355 pp, \$45.00 PB

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The twelve essays in this collection seek to answer the question posed by the title of the book, adopting different perspectives and considering different contexts, which makes it impossible to do justice to every single contribution. I will therefore follow the structure of the volume around “Places” and “Practices.” grouping the essays by common themes and concluding on future perspectives.

The section on places presents four examples of marine stations from three continents. Maienschein and Groeben summarize the whole history of the two most iconic institutions: the Woods Hole Marine Biological Laboratory (MBL) and the Naples Zoological Station, respectively. Whereas Groeben focuses on the founder of the Naples station (Anton Dohrn) and on how his vision durably informed the Neapolitan *genius loci*, Maienschein combines a history of the MBL and that of its historiography, guided by the question “why have biologists studied at the seashore?”. Her initial reference to a present crisis of marine institutions (6) and the concluding one to MBL’s 2013 affiliation with the University of Chicago (after more than 120 years of independence) define the scope of this book. At critical junctures in the life of an institution, questions about the future are best addressed with the help of historical wisdom, as the decision to change involves a clear sense of what is worth retaining.

Luk’s essay on the Marine Station of Amoy University, China, and Ericson’s on Misaki Marine Laboratory, Japan, share a focus on transnational circulation, national appropriation and local development of institutional models and scientific disciplines. Luk nicely shows how the local abundance of amphioxus, as a scientific, commercial and symbolic resource, contributed to defining the identity and mission of the “Chinese Woods Hole” (73) at Amoy (1930–1935) and of biological science in Republican China. Ericson’s longer story (1880s–1930s) follows the shaping of

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Misaki station as a research space by the interplay of two consolidating disciplinary perspectives, experimental biology and fisheries science, originating from the same root of applied systematic zoology.

The contributions by McCord (on teaching and research at Woods Hole) and Steiner (on the “Scientific Fishery” program at Naples in the late nineteenth century) share an amphibious nature; although placed in the practices section, they could just as well have been included in the institutional part. McCord’s analysis of the MBL’s “dual mission” of research and teaching, rooted in the local tradition and resulting in the “investigator-as-instructor” model, provides a glimpse of the constitutive relations between the original mission of the institute, its communitarian ethos and the connections between laboratory and field that grew out of it.

Steiner’s careful reconstruction of an understudied feature of the Naples station (the series *Fauna and Flora of the Gulf of Naples* and the project for a “Scientific Fishery”) complicates the image of the Zoological Station as a pure research space, taken to epitomize the laboratory/field divide (de Bont 2015). The reconstruction of the work by the Station’s assistant Wilhelm Giesbrecht on his *Fauna and Flora* monographs on marine invertebrates blurs the boundaries between pure systematics and applied fisheries (a theme resonating with Ericson’s story about Misaki Station, and Luk on Amoy), introducing an interrogation around the place of locality and internationality in the definition of scientific standards and practices.

Most of the remaining essays in this section share a focus on the social, ecological and structural specificity of marine laboratories and the distinctive variety of research strategies they make possible. Based on the Loeb-Jennings debate over animal tropisms, Muka shows how biological diversity, the “inter-dependence of field and lab” (139), and the malleability of the research environment defined marine stations as plastic epistemic spaces, capable of simultaneously nurturing contrasting research programs. In her exploration of F. O. Schmitt’s structural and biochemical work on the squid giant axon in the 1940s and 1950s, Maxson-Jones advances a similar argument about the importance of marine stations for the birth of the neurosciences, as frameworks for novel experimental systems, and as niches for the cultivation in parallel of both model-based and comparative approaches, “by necessity, convenience, or design” (202). A complementary perspective on the “conjunction of squid and scientists” (238), yearly taking place in Woods Hole, is provided by Matlin’s story of the discovery of kinesin, and the race to describe the mechanism of axonal transport (ca. 1970–1985). Emphasis on the logistic and ecological specificity of this laboratory is here supplemented by the keen attention paid to the importance of its “distinctive culture of collaboration and competition” (238) and, not least, to its role in preserving and reviving methods (light microscopy) that were growing unfashionable elsewhere. Grant and Aird’s essay on hagfish and vascular physiology is a direct testimony to the opportunities provided by epistemic niches (such as the Mount Desert Island Laboratory in Maine) for cultivating less conventional research approaches in biomedicine, such as their own strategic choice of hagfish as a model for the evolutionary study of endothelial development in vertebrates. The chapter by Dietrich et al. tackles the historiographic question of whether experimental biology in the twentieth century really departed from the “presumption of diversity” of general and comparative physiology in the nineteenth, leading

to a “presumption of generality” underlying twentieth-century model-based research (Logan 2002). To test this assumption empirically, the authors start from an international dataset of embryological research (the General Embryological Information Service 1949–1980), connecting classes of organisms to individual research projects, and construct an “organismal landscape” of embryology between 1951 and 1963, from which they select the case history of Jean Clark-Dan and Katsuma Dan’s comparative work on fertilization and cleavage in echinoderms. In themselves, the two parts of the essay are compelling: the organismal landscape is an enticing epistemic device, and the Dans’ story is a clear example of commitment to a comparative approach. Unfortunately, the methodological part and the case history are more juxtaposed than connected, so that one is left wondering whether the Dans’ comparative strategy is one instance in a real trend, or simply an exception.

Adopting a philosophical perspective on the transfer of practices in interdisciplinary contexts, Leonelli and Ankeny’s essay on coral research stands alone. To my knowledge, it has been the most detailed application so far of their “post-Kuhnian” concept of “repertoires” (Ankeny and Leonelli 2016). Through investigation of the recent epistemic, conceptual and especially organizational changes in the research on corals, as a response to a newly perceived threat to their survival, they show the depth to which this field was refashioned by borrowing the “infection repertoire” of public health research and intervention. The dimension of public outreach, which plays an important role in public and global health, is here disregarded. This is regrettable, as it would have further strengthened the authors’ effort at transcending Kuhnian internalism.

Sanchez Alvarado’s militant epilogue approaches Maienschein’s introductory argument from a different angle. Drawing direct connections between past and present, he makes a strong and principled plea for strengthening the “bio-” in “biomedicine” by recovering the wide-ranging comparative perspective that was so important to the birth and success of the nineteenth-century stations movement. His pragmatic argument against the model–organism bottleneck resonates with most of the historical analysis of the other essays, restating the value of a deep historical perspective to a critical consideration of the present and future of biomedicine.

Most of the essays in this volume would make excellent readings for master courses in the history, philosophy and epistemology of biology. The best way to approach this book, however, is to consider it in its entirety as a collective reflection on “the paradox of space and place” (Muka 2014) embodied by marine stations. Overarching themes then emerge, such as the relation between physical space, institutional type and model of epistemic community; the close intertwining of the national, international and transnational dimensions of many local, contingent instances of a global “stations movement”; and the potential offered by this very paradoxical identity for a reconsideration of the past, present and future of biology and biomedicine. The seashore is the liminal space par excellence, and even such strongholds of human design as scientific laboratories share this feature. The combination, presented by this book, of historical views on, and epistemological reflections arising from marine stations, holds out the promise of a much needed revision of taken-for-granted generalizations at both levels. If I were to choose the single most meaningful theme of the book, it would be that of “variety”: variety of local

instances of the same institutional type; variety of solutions to general biological constraints, opening up to different strategies of advancing and applying biological knowledge; variety of subjects partaking in the scientific endeavor; and variety of ways to connect the lessons of history with programs for the future. The greatest merit of this collection is to frame “variety” as a question, as well as a possible answer, both historically and epistemologically. Much remains to be done, not least to connect the different ways of questioning (“What has happened?”; “What can we learn from the past?”) in meaningful ways. Still, the message conveyed by this work is that liminal places such as marine stations still have much to offer.

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