

ORIENTATION SYSTEMS OF THE NORTH PACIFIC RIM. By MICHAEL FORTESCUE. Copenhagen: Museum Tusulanum Press, 2011. Meddelelser om Grønland, Man & Society 42. 138 p., maps, appendices, sources. Softbound. US\$43.00.

For those of us with an interest in spatial cognition and indigenous wayfinding, Fortescue's latest contribution to the topic of orientation systems was long overdue. The extraordinary insight and methodical analysis of *Eskimo Orientation Systems* (1988), which was followed by his detailed analysis of *Language Systems across Bering Strait* (1998), are accomplished again in this new book, which covers a broader territory and a wider range of languages. Its territory is the north Pacific Rim, from Vancouver Island to northern Japan and Sakhalin, taking in the sweep of Arctic coasts, islands, rivers, and archipelagoes, up to Alaska and across to Chukotka. What do all those cultures, so seemingly different, have in common? The proximity of the ocean, the author tells us, through either direct or indirect contact, in the present or in the past.

Fortescue distinguishes five types of orientation systems in the Pacific Rim: a purely coastal or maritime type (e.g., Siberian Yupik); a purely riverine type (e.g., Central Alaskan Yupik); an inland nomadic type (e.g., reindeer Chukchi and Even); an archipelagoan type (Aleut); and a large island type (Haida). Fortescue undertakes a thorough survey of the linguistic structures that define spatial orientation in the languages in question, with a focus on terms related to either riverine or coastal orientation systems, but also with a view to landmark orientation and wind directions. The analysis uses "synchronic data for diagnostic evidence of diachronic shifts from one kind of geographical environment to another that have occurred in the past" (p. 9). In that way, Fortescue reveals a great deal about how the cultures in question have responded to their environments, using an approach that is highly suggestive beyond its immediate value to the discipline of linguistics, as it addresses (if briefly) the old anthropological debate of environmental versus cultural relativism.

Fortescue's book has a historical archaeological dimension, as the intricate features of language structure unveil a great deal of material evidence about the movement, migration, and intra- and inter-ethnic connections of Arctic peoples through space and time (as in the chapter on Eskimo-Chukchi interaction at the Bering Strait). For example, he makes fascinating arguments to infer how a culture may have transported and adapted a riverine orientation system to a coastal environment system (e.g., Eskimo groups from Nunivak and Kodiak) or vice versa (e.g., Interior Tlingit). The linguistic puzzle behind this movement is the fate of "orthogonality" in riverine systems, where the up/down axis (away/towards the river) is orthogonal to the out-to-sea/inland axis. In some cases where this system appears to have migrated down to the coast, the up/down axis turns to follow the coast and aligns with the out-to-sea/inland axis, creating ambiguity instead of orthogonality.

Untangling the meaning of this shift is one of the book's central concerns because it promises to be one of the keys to unlock the deep history of Arctic peoples' movements.

One of the most fascinating aspects of the book is the relationship established by Fortescue between the internal microcosm of the dwelling and the external macrocosm of the outside world: a connection that is manifest, both symbolically and practically, between fire (the hearth at the centre of the dwelling) and water (from the ocean or the river). Fortescue presents a comprehensive comparison of this relationship across the cultures of the North Pacific Rim and concludes that the terminology of spatial orientation within the dwelling reflects the origin of the cultural group's orientation system (either coastal or riverine). In other words, he establishes a connection between language and mobility or migration, hypothesizing (from the linguistic evidence) movements between geographic settings in prehistoric times. Curiously, the hearth-water relationships are not found (or no longer found) in the Eastern Arctic Inuit dialects.

Once his hypothesis has been laid out in the introduction, Fortescue devotes a chapter to the analysis of each individual sub-region (determined by language family) of the North Pacific Rim. He describes, case by case, how their orientation systems are organized with respect to both the geographic setting and the interior of the house, as well as the connections between the two. His analysis (throughout many cultural groups) of the connections between house-internal "towards the fire" and house-external "into the water" shows a remarkable element of each culture's cosmology, perception of the environment, and worldview.

Fortescue's treatment of orientation with respect to fire and water is not poetic or overly speculative. On the contrary, his book is very technical and measured in its treatment of a wealth of linguistic evidence. In this painstaking approach lies Fortescue's success at providing such an in-depth analysis of an exceedingly complex topic. The reward for such a highly nuanced picture is in part a close, critical engagement with Levinson's claim that all the Pacific Rim and adjacent Arctic coastal cultures—indeed, hunter-gatherer societies in general—embody absolute frames of reference (i.e., the terms are independent of an individual's orientation). On Fortescue's reading, the Inuit coastal system combines a "landmark" absolute system (e.g., prevailing winds) with a system that shifts with the direction of the coastline (*ug-/*kiv-) and is always "relative" to the right and left side of the speaker looking out to sea.

It should be noted here that the authors of this review are not linguists. It seems clear to us, however, that this book will be of great interest to linguists of all the languages concerned in this book, as well as to those concerned with the comparative analysis of orientation systems and what they can contribute to current debates about the relationships between culture, environment, and language. We are better positioned to explore the anthropological and historical implications of this work. Fortescue, like Levinson and Burenhult (2009), conjectures that there is a microcosm/

macrocosm orientation ‘semplate’ (i.e., semantic template) that corresponds to “prefabricated cultural systems that cut across a number of the semantic and linguistic domains” (p. 113)—notably, in this case, the movement between the interior of the house and the external geographical domain. In that sense, the concept of the semplate also provides an instrument for research in linguistics and other disciplines.

For example, archaeologists of the North Pacific Rim may be able to test their findings against Fortescue’s linguistic evidence and his hypothesis of inland-coastal movement and migration. However, Fortescue’s work ought to be significant beyond that, for anthropologists, historians, and geographers concerned with issues relating to cognition, mobility, and inter- and intra-ethnic contact and change.

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THE CRYOSPHERE. By SHAWN J. MARSHALL. Princeton, New Jersey: Princeton University Press, 2012. ISBN 978-0-691-14526-6 (pbk). Princeton Primers in Climate. 288 p., maps, b&w illus., glossary, notes, annotated bib., index. Softbound. US\$24.95.

Author Shawn J. Marshall, educated in engineering physics (BSc, Toronto) and geophysics (PhD, British Columbia), holds the Canada Research Chair, Climate Change, in the Department of Geography at the University of Calgary. His research as glaciologist and climatologist has focused on ice field dynamics at the regional scale and their sensitivity to climate change.

Marshall states in the preface that this brief introduction to the physics and character of the cryosphere is intended to “inspire others to further exploration of the cryosphere’s role in Earth’s climate” (p. viii). The introductory chapter lays the foundation for the rest of the book by exploring the global geography of snow and ice in their many forms, and their intrinsic link to earth’s climate.

The remainder of the book is structured in an agreeable way, beginning with a discussion of the material properties and thermodynamics of snow and ice.

As readers delve into the first few chapters, they may notice a slant toward snow and terrestrial forms of ice, which is only natural, given the author’s background. They may also begin to notice the author’s proclivity (which persists throughout the book) for expressing ideas mathematically when the chance arises. Some illustrative graphs might have greatly enhanced readers’ understanding of the ideas behind the formulae. Chapter two discusses many of the salient physical and chemical properties of water, ice, and water vapour, with an emphasis on their intrinsic energetics, providing a useful framing of the physical uniqueness of water and its integral role in earth’s climate system.

Chapter three introduces the surface energy balance at a generalized cryospheric surface and discusses flux components with a view to their place in regional and global energy balances. Many central ideas are discussed using equations, though a few well-thought-out analogies that readers will be observationally familiar with are also used. Marshall concludes the chapter with an example surface energy balance of a snow-covered glacier during its transition from melting snow to melting ice over one month in summer. He effectively interrelates these data and the thermodynamic concepts treated previously and provides a tabular summary of the surface energy balance components that helps to indicate their relative importance. This broadly applicable case study also serves as a nice link between the first three chapters of nearly universal cryospheric theory and the following four overview chapters dedicated to seasonal snow and freshwater ice, sea ice, glaciers and ice sheets, and finally, permafrost.

These chapters on specific parts of the cryosphere are interconnected, which means that they should not necessarily stand individually. These chapters also illustrate the enormity of the task at hand; the author has done well to prioritize the material presented, making the text informative and readable to the casual student, while providing further depth for the more curious reader in the annotated bibliography.

Further evidence of the author’s expertise shines through in these chapters. The chapters on snow and freshwater ice and glaciers and ice sheets are comparatively detailed and informative, having double the length of the sea ice and permafrost chapters. The section on seasonal snow is particularly good; it is a salient summary of the myriad properties and processes of this unique material present in many earth systems with a variety of causes and effects. In the chapter