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Title
TRANSPORTATION NETWORKS - A QUANTITATIVE APPROACH - TEODOROVIC,D

Permalink
https://escholarship.org/uc/item/2b39m816

Journal
PROFESSIONAL GEOGRAPHER, 39(4)

ISSN
0033-0124

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Publication Date
1987-11-01

Copyright Information

Peer reviewed

On Geography and Its History. D.R. STODDART. Oxford and New York: Basil Blackwell, 1986. xi and 335 pp., 18 plates and two indexes. $29.95 cloth (ISBN 0-631-13488-3).

These scholarly, spirited essays are not only good reading, they are an uncommonly frank and informed view of the last 200 years of academic geography, primarily in Great Britain. The twelve chapters, which can stand alone as separate essays (some have been published in journals over the last twenty years), present a vital and coherent view of the subject.

Stoddart's broad perspective is shaped more along the lines of natural history than traditional geography, and is frequently enlivened through his extensive field work. The essays, some philosophical and theoretical, others more idiographic and anecdotal, bring a welcome sense of humor and intellectual integrity to the history of geography.

The first chapter is a historiography of geography. Kuhn's paradigm concept is analyzed critically and is found wanting as a framework for studying historical change. The alternative approaches advocated and employed here are conceptual analysis of particular geographical concepts and themes, and social and institutional analysis. That geography as a modern empirical science began in the second half of the eighteenth century in Europe is forcibly argued in Chapter 2. The argument is based on the appearance of set of attitudes, methods, techniques and questions, illustrated with examples ranging from botanical illustration to marine surveying, and from Cook to Kropotkin.

Institutional and professional history are the subject of the next three chapters. In tracing developments in research and education, primarily but not exclusively in Great Britain, and in the history of the Royal Geographic Society and of geography at Cambridge, many personal, biographical and anecdotal details keep the narrative from becoming dry. More important, academic and professional progress is treated in a larger social context. Countering the emphasis that the geographic profession gave to physical geography in its first 70 years, Stoddart shifts in the next chapter to the humanism of two figures of the mid-19th century, Kropotkin and Reclus. His appreciation of these "two gentle anarchists" speaks not only to the permanence of the human problems they addressed, but to Stoddart's breadth as a geographer.

The seventh essay champions the role of fieldwork, exploration and discovery in the practice, education and history of geography. Stoddart's commitment to active field-work, echoing and quoting the sentiments of Carl Sauer, provides the force behind this somewhat brief foray into the historiography of discovery.

"Darwin's Impact on Geography," originally published in the *Annals of the Association of American Geographers*, deserves to be published again and again. This careful analysis of the influences of 19th century evolutionary theories on geography shows how fundamental ideas have been interpreted in ways which at times subtly and at times blatantly diverge from Darwin's actual philosophy (p. 177)." The companion of this essay is Chapter 10, which insightfully probes some of Darwin's methods and ideas. The quantity of Darwin scholarship in recent years, although alluded to, might have been more thoroughly referenced; this is noted because throughout the book, the generous footnotes and references contained therein are of highest standards.

In between the two Darwin chapters is an essay dealing with T.H. Huxley, his textbook on physiography, and the various interpretations of its subject matter. The 11th essay reviews the role of the concepts of organism and ecosystem in geographic methodology, and recognizes the relevance of geosystems. The final chapter is a fair-minded analysis of traditional and vicariance biogeography. Stoddard's scholarship and ability to make salient features of theoretical science accessible and enjoyable is particularly impressive in these last two chapters.

The book includes a personal and general index, and 18 plates and a frontispiece that reflect the spirit and quality of the text. Stoddart's personal view of geography and its history may not please everyone, as it does not treat the subject comprehensively, but it should be read by all geographers. Key Words: *historiography, Darwin, British geography, biogeography.* **Jane R. Camerini,** University of Wisconsin-Madison.

Transportation Networks: A Quantitative Approach. D. TEODOROVIC. New York: Gordon and Breach Science Publishers, Inc., 1986. xi and 219 pp., tables, figs., refs. and index. $80.00 (ISBN 0-677-21380-8).

The title of this book does not reveal its rather specialized subject matter: a selection of

algorithms that determine optimal flow patterns or locations in a given transportation network. The book consists of a sequence of presentations each of which formulates a particular network problem, the algorithm which will solve it, and a simple, detailed, and well-illustrated numerical example. Occasionally the author includes mathematical arguments in support of mathematical statements, but for most of the major proofs only the relevant references are cited.

The first chapter covers basic concepts of network theory and selected algorithms for finding shortest routes through a network under a variety of conditions. The second chapter develops the Conservation Laws of transportation networks and describes an algorithm for finding the maximum possible flows in capacitated networks. By far the largest and most detailed chapter is the third which addresses various routing problems including the classical problems of the Chinese Postman and the Traveling Salesman: find the shortest route that will pass through every branch/every node of a network before returning to its node of origin. This basic theme has a multiplicity of extensions covered in subsequent sections: imposing particular scheduling requirements, designing optimal routes for a fleet of vehicles based in one depot/based in several depots, and even "optimal dispatching strategy on a transportation network after a schedule perturbation." Solution methods include both optimizing algorithms and heuristic procedures leading to (possibly) sub-optimal solutions. The last chapter presents methods for determining optimal locations in a network, for example, the sites for a given number of fire stations such that the distance of any point on the network from the nearest station is minimized.

The book is well organized, its style is, for the most part, highly readable and articulate, and all it requires as background is some high school algebra. According to the preface, the book "is primarily meant for those who are encountering transportation network problems for the first time." That would indeed have been the strength of this book were it not for several shortcomings significantly reducing its merits. It would have been helpful if the author had sketched out how his particular subject matter is embedded in the broader, more complicated framework of the dynamics of transportation flows (traffic flow theory). There is only a brief, insufficient introduction and no conclusion. Also, a number of major algorithms are simply presented as "cookbook" procedures, guiding the reader through the application of algorithmic routines, but keeping him in the dark why he is doing what he is doing (for instance, section 2.5). Most of the typographical or translational errors are just a nuisance; some however, mislead the reader (for instance, in table XVI the correct value in row two is 5, and the subscript of x should be different for each row). These minor deficiencies are overshadowed by the impressive price of $80.00 for a small book of 219 pages, almost all of which seem to be photocopies of the original manuscript sheets.

In summary, then, this book has considerable shortcomings and limitations, but it can be recommended as a useful supplement to introductory courses in transportation planning, in part because many of its theoretical arguments are simple and lucid and in part because of the many numerical examples worked out to the last detail. Key Words: *transportation, networks, planning, algorithms*. **Christian Werner**, University of California, Irvine.

Processes in Physical Geography. R.D. THOMPSON, A.M. MANNION, C.W. MITCHELL, M. PARRY, J.R.G. TOWNSHEND. London: Longman, distributed in U.S. by John Wiley, New York, 1986. xii and 380 pp., maps, diags., index and biblio. $31.95 paper (ISBN 0470-20661-6).

This text is an unexpected pleasure in that its organization and content overcome three basic problems that could easily have ended with a publication of limited utility. First, it was not published specifically for the U.S. market; second, it was written by no less than five authors; third, it uses a systems framework for presentation of the material. As most physical geographers teaching in the U.S. know, each one of these characteristics has placed limits upon the utility of some of the classroom texts currently available. *Processes in Physical Geography* succeeds where others have failed for a number of reasons.

The fact that the content focuses on processes overcomes the problem of regionality, and the authors pointedly exclude any detailed description of the results of the processes. They express the viewpoint that before world climates, soils zones and the like can be adequately understood, it is necessary to have a detailed knowledge of operating processes. While the philosophy of this approach to the entire realm of physical geography could be questioned,