Per Hage and Frank Harary, *Island Networks: Communication, Kinship, and Classification Structures in Oceania.* Cambridge: Cambridge University Press, 1996. Pp. xx, 296, tables, illus., maps, notes, references, index. US$60 cloth.

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This is a curious book, at once passé and avant-garde. Its authors simultaneously till fields long abandoned by contemporary sociocultural anthropology and provide fertile ground for future developments in archaeology, ethnology, and historical linguistics. In good measure, these contradictions derive from the current contradictory and fissiparous moment in which the discipline of anthropology finds itself, with core epistemologies (including the "four fields") discarded or under attack, and with contending camps of true believers lobbing shells at one another from behind rigid and fervently defended barricades. In this environment, book reviewers risk using certain words or phrases that others may employ to consign the work under review to one "side" or the other of the current canon wars. I hope to avoid this problem; however,

I believe that it is necessary to situate the present volume within the changing fashions of anthropological theory and method so as to assess its potential contribution, and in doing this I will not be able to avoid using certain "charged" words.

Two monumental and highly influential books in anthropology were published in 1949: George P. Murdock's *Social Structure* and Claude Lévi-Strauss's *The Elementary Structures of Kinship.* The former represented the culmination of a cross-cultural labeling, classifying, natural-history type of anthropology that used statistical correlations among isolated variables (characteristics of societies) to reach scientific generalizations based in part on models of social evolution; its focus was especially on systems of kinship terminology and social organization. The latter drew on structural linguistics and inaugurated at least a quarter century of serious anthropological exploration of structuralism; its focus was especially on systems of marriage and alliance. In the years following publication of these two books, both statistical cross-cultural comparison and structuralism were found seriously wanting, and they have long since been replaced in the theoretical mainstream of sociocultural anthropology.

The authors of the volume under review ground their analysis in a set of anthropological problems that derive from Murdockian and Lévi-Straussian approaches (indeed, the book is dedicated to Lévi-Strauss). Their creative contribution is to demonstrate how a form of qualitative mathematics called graph theory (itself a branch of geometry; Kemeny 1959) provides a set of analytical methods that offer precise, clear, parsimonious solutions to a set of structural, historical, and comparative problems. The problems they examine are located geographically in Oceania, with Micronesian examples prominently represented.

The authors note in their preface that this is their third co-authored book "in a comprehensive program of research on applications of graph theory to anthropology" (p. xv). Hage comes to the partnership from anthropology; Harary is a mathematician who has contributed to graph theory since the 1950s. Their first joint book, *Structural Models in Anthropology,* appeared in 1983; the second, *Exchange in Oceania,* was published in 1991. Graph theory applies most easily to network problems in anthropology, providing formal models (algorithms, theorems, corollaries) for representing and analyzing various relationships among sets of entities (individuals, kin groups, islands, societies, and so forth). As their title indicates, the authors intend their book to be "a general contribution to network analysis in anthropology" (p. xvii).

The book is organized around six graph theoretic models. Following an introductory chapter, in each of seven chapters one of these models is applied to a particular problem illustrated by data from Oceania. For example,

chapter 2 uses the graph theoretic model of trees to examine "a Microne-
sian prestige-good system" (the Yapese Empire) and to explore " 'recursive
dualism' in Austronesian classification systems." Likewise, in chapter 5 they
employ search trees to describe "The Marshallese Conical Clan" and to con-
jecture about "The Devolution of Social Organization in Nuclear Micro-
nesia." The book ends with a brief conclusions chapter (five and a half pages)
that simply summarizes what has gone before and argues for the "clarity and
insight" that can be gained "by drawing the graph of an empirical structure"
(p. 265).

   So what is wrong with this? From one perspective, "everything," and
from the other, "nothing at all." In the poststructuralist, postmodernist, de-
constructivist debates that have engulfed contemporary anthropology (and,
especially, sociocultural anthropology), many of the assumptions and pre-
suppositions that one must make in order to use graph theory seem unten-
able, even quaint. From this perspective, all knowledge is humanly con-
structed and it can only be partially grasped through the (always situated
and biased) position of each particular observer. But even as the above debates
have rattled, revolutionized, and perhaps even revitalized anthropology—
strengthening the discipline's ties to the humanities in the process—others
have reiterated their belief that anthropology is something quite different.
From their view, the world exists independent of "the social construction of
reality," it can be studied using a positivist scientific paradigm, and it can be
known objectively (discovered) independent of the particular observer. Inter-
estingly, given the kinds of graph theoretic applications illustrated in *Island
Networks*, this latter position holds much greater sway today in archaeology,
biological anthropology, and some branches of anthropological linguistics
than it does in sociocultural anthropology. Indeed, Knauft makes a strong
case that "[b]y the late 1980s and early 1990s . . . cultural anthropologists had
become wary of structure in *any* guise and wary of culture as an overly inte-
grated and positivist entity" (1996:128; emphasis in original). Apropos the
opening sentence of this review, structuralism has become passé, and in a
poststructuralist time structural models derived from graph theory have little
application to what are perceived to be the central concerns of contempo-
rary sociocultural anthropology.

   If this be so, then how can this book also be avant-garde? Certainly, if we
look at anthropology as a whole rather than at sociocultural anthropology
alone, many of the problems Hage and Harary engage fit nicely into con-
temporary work. For instance, their several analyses of voyaging and trade
networks, patterns of island settlement, and the locations of trade centers
connect well with current concerns in Pacific prehistory. Although he pre-
sumably did not have access to *Island Networks* at the time he wrote his new

book, *The Lapita Peoples* (1997), Patrick Kirch cites and makes use of Hage
and Harary's earlier volume, *Exchange in Oceania* (1991). This suggests that
ideas presented in *Island Networks* will fit easily into on-going analyses of
Lapita networks and other "hot" topics in the archaeology of Oceania (indeed,
Hage and Harary briefly engage archaeological studies of the Lapita cultural
complex on pp. 45–50, 87–89, and 121–122).

The authors demonstrate (pp. 52–66) that "all the dialect groups of the
Tuamotus are joined in a single connected network" (p. 66), and that these
dialect groups correspond to marriage isolates. As they note, "Networks such
as this one offer rich possibilities for interdisciplinary research in demography,
populations genetics, linguistics, and anthropology, with many useful appli-
cations of graph theoretic models" (p. 66). Such cross-disciplinary work has
an important place in contemporary anthropology—particularly in biological
anthropology and biocultural medical anthropology.

Many contemporary sociocultural anthropologists have sought ways to
move beyond the bounded "society" or "culture" construct of bygone days,
to study such things as regional systems or transnational migrations. To the
extent that graph theoretic models can be employed to analyze systems of
this sort (and there appear to be many ways in which this might be done), an
argument could be mounted that such models offer an avant-garde formal
methodology for ordering, visualizing, and examining the congeries of vari-
ables that must be taken into account in such studies.

One way that graph theory may enrich anthropology is illustrated at nu-
merous points in *Island Networks* where the authors develop hypotheses/
suggestions/proposals/conjectures based on the logical properties of these
formal models (e.g., chapter 6, pp. 165–203). In such cases, rather than being
just a tool for data analysis, graph theory also may contribute to the forma-
tion of educated guesses ("hypotheses") that subsequently can be researched
and explored on the basis of empirical data.

For the Pacific Islands specialist there are occasional frustrations when
the authors rely on limited or outdated material for their illustrations (e.g., the
vignettes of Micronesian societies on pp. 142–162, or reporting that Yapese
social organization is based on double descent, p. 31). There are also a few
gaffes (e.g., locating Ra'ivavae in the Southern Cooks instead of French
Polynesia, p. 60). And sometimes they simply make an assumption without
much evidence to back it up (e.g., "We do not necessarily assume that the
Marshalls were the first islands to be settled [in Nuclear Micronesia] but
only that PNM [Proto-Nuclear Micronesian] society was best preserved and
represented there," p. 146). But these are minor points, given the primary
purpose of the book.

The volume is filled with 121 figures illustrating different graphs, along

with 10 tables and 4 maps. The text is laced with numerous technical statements of algorithms and such from graph theory that are somewhat difficult to wade through for the uninitiated (even if perhaps essential to the technical integrity of their presentation).

   As indicated above, this book is a potentially useful demonstration of ways in which one major branch of qualitative mathematics can inform questions of interest to anthropologists. It will find greater resonance among archaeologists, historical linguists, and biological anthropologists than among most sociocultural anthropologists, although I have suggested some ways it may prove of interest to this last group as well. It is unlikely to be used in most classroom situations but should be an essential acquisition for major research libraries.

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