

## The Lifeways of Hunter-Gatherers

In this book, Robert L. Kelly challenges the preconception that hunter-gatherers should conform to a single type, be that of Paleolithic relics living in a raw state of nature, the original affluent society, or downtrodden proletariat. Instead, he crafts a position that emphasizes diversity in foraging lifeways and efforts to explain that diversity. Kelly reviews the anthropological literature for variation among living foragers in terms of diet, mobility, sharing, land tenure, technology, exchange, male–female relations, division of labor, marriage, descent, and political organization. Using the paradigm of human behavioral ecology, he analyzes the diversity in these areas and he argues for an approach to prehistory that uses archaeological data to test theory rather than one that uses ethnographic analogy to reconstruct the past.

Robert L. Kelly is Professor of Anthropology at the University of Wyoming. He has served as department head and as director of the Frison Institute. He is a past president of the Society for American Archaeology and a past secretary of the Archaeology Division of the American Anthropological Association. He has authored more than one hundred articles, books, and reviews, including two of the most widely used archaeology college textbooks. Kelly is internationally recognized as an expert in the ethnology and archaeology of hunting and gathering peoples. In the past forty years, he has worked on research projects throughout the western United States and Madagascar and has lectured in Europe, Asia, and South America. He is currently researching caves and high-altitude adaptations in Wyoming and the archaeology of ice patches in Glacier National Park, Montana.

# The Lifeways of Hunter-Gatherers

## The Foraging Spectrum

Robert L. Kelly  
University of Wyoming



**CAMBRIDGE**  
UNIVERSITY PRESS



CAMBRIDGE  
 UNIVERSITY PRESS

Shaftesbury Road, Cambridge CB2 8EA, United Kingdom  
 One Liberty Plaza, 20th Floor, New York, NY 10006, USA  
 477 Williamstown Road, Port Melbourne, VIC 3207, Australia  
 314–321, 3rd Floor, Plot 3, Splendor Forum, Jasola District Centre, New Delhi – 110025, India  
 103 Penang Road, #05–06/07, Visioncrest Commercial, Singapore 238467

Cambridge University Press is part of Cambridge University Press & Assessment,  
 a department of the University of Cambridge.

We share the University's mission to contribute to society through the pursuit of  
 education, learning and research at the highest international levels of excellence.

[www.cambridge.org](http://www.cambridge.org)

Information on this title: [www.cambridge.org/9781107024878](http://www.cambridge.org/9781107024878)

© Robert L. Kelly 1995, 2013

This publication is in copyright. Subject to statutory exception and to the provisions  
 of relevant collective licensing agreements, no reproduction of any part may take  
 place without the written permission of Cambridge University Press & Assessment.

First published as *The Foraging Spectrum* by Smithsonian Institution Press 1995

Revised Edition published by Percheron Press 2004

Second edition 2013

4th printing 2017

*A catalogue record for this publication is available from the British Library*

*Library of Congress Cataloging-in-Publication data*

Kelly, Robert L.

The lifeways of hunter-gatherers : the foraging spectrum / Robert L. Kelly. – 2nd ed.  
 p. cm.

Rev. ed. of : *The foraging spectrum*, c2007.

Includes bibliographical references and index.

ISBN 978-1-107-02487-8 (hardback) – ISBN 978-1-107-60761-3 (paperback)

1. Hunting and gathering societies. I. Kelly, Robert L. Foraging spectrum. II. Title.

GN388.K44 2013

306.3'64-dc23 2012042712

ISBN 978-1-107-02487-8 Hardback

ISBN 978-1-107-60761-3 Paperback

Cambridge University Press & Assessment has no responsibility for the persistence  
 or accuracy of URLs for external or third-party internet websites referred to in this  
 publication and does not guarantee that any content on such websites is, or will  
 remain, accurate or appropriate.

*For my parents, who showed me the paths in the forest.*

## Contents

<i>Tables</i>	<i>page</i> ix
<i>Figures</i>	xi
<i>Preface</i>	xv
<i>Acknowledgments</i>	xix
One: Hunter-Gatherers and Anthropology	i
Two: Environment, Evolution, and Anthropological Theory	24
Three: Foraging and Subsistence	40
Four: Mobility	77
Five: Technology	114
Six: Sharing, Exchange, and Land Tenure	137
Seven: Group Size and Demography	166
Eight: Men, Women, and Foraging	214
Nine: Nonegalitarian Hunter-Gatherers	241
Ten: Hunter-Gatherers and Prehistory	269
<i>Notes</i>	277
<i>References</i>	301
<i>Index</i>	353

## Tables

1-1. Foraging and work	<i>page</i> 14
3-1. Environment and diet	41
3-2. Hypothetical search and handling costs to calculate optimal diet	49
3-3. Ache diet over two months	51
3-4. Postencounter return rates of various food resources	54
3-5. Adult caloric consumption and mean body size	71
3-6. Meat consumption and hunting success	72
4-1. Hunter-gatherer mobility	80
4-2. Biotic zones and Murdock's settlement patterns	85
4-3. Mobility among temperate and boreal-forest groups	92
4-4. Tethered foraging trips of the Dobe Ju/'hoansi	92
5-1. Ju/'hoan technology	118
6-1. Hunter-gatherer meat sharing	141
7-1. Hunter-gatherer demography	168
7-2. Hunter-gatherer group size	171
7-3. Hunter-gatherer population densities	178
7-4. Mean age at first marriage	194
7-5. Birth interval, mean age of menarche, first birth, last birth, and total fertility rate	195
7-6. Weaning age	198
7-7. Child mortality	201
7-8. Hunter-gatherer homicide rates	203
7-9. Hunter-gatherer social type and warfare	206
7-10. Hunter-gatherer warfare and population pressure	207
8-1. Effective temperature (ET) and division of labor	216
8-2. Hunter-gatherer postmarital descent and residence	226
8-3. Explanations of postmarital residence rules	227
8-4. Hunter-gatherer marriage arrangements	235
8-5. Hunter-gatherer cousin marriage	235
9-1. Simple versus complex hunter-gatherers	242

## Figures

1-1. World map showing locations of the foraging societies discussed in the text.	<i>page</i> 3
1-2. A Southern Kua woman prepares to cook the head of a donkey for two female-headed households in the Western Sandveld of the Kalahari Desert in August 1975.	11
1-3. A family of nomadic Mikea, seasonal foragers in southwestern Madagascar, in July 1993.	17
2-1. Ache hunters.	35
3-1. Relationship between dependence on fishing and the difference between the expected and actual dependence on hunting.	47
3-2. Alice Steve, a Paiute woman, demonstrating traditional piñon pine nut (seed) processing.	49
3-3. A graphic representation of how a hypothetical diet (see Table 3-2) changes with decreases in high-ranked resources.	51
3-4. A diet-breadth model of Ache diet.	53
3-5. Graphic representation of the marginal-value theorem.	67
3-6. A field-processing model based on the marginal value theorem.	69
3-7. A Kua Bushman near Mosetlharobega butchers the rib portion of a scavenged eland in April 1978.	75
4-1. Settlement pattern of the Tüdüpihunupi, the Reese River Valley Shoshone.	79
4-2. Characteristics of a foraging subsistence-settlement system.	86
4-3. Characteristics of a collector subsistence-settlement system.	87
4-4. Number of residential moves per year plotted against primary biomass as a proxy measure of resource density.	88
4-5. A family of Penan walking through the Sarawak forest in 1985.	89
4-6. An Ahtna camp in central Alaska, about 1902.	91
4-7. The average distance moved per residential move plotted against effective temperature as a proxy measure of the distance between resources.	93
4-8. The size of foragers' annual ranges plotted against the percent dependence on hunting.	95
4-9. The relationship between the daily net return from foraging and distance to the foraging area as a function of the mean foraging return rate.	98
4-10. The relationship between the return rate experienced within a foraging area relative to that of the day of a move to a camp located at the edge of the current foraged area.	99
4-11. The relationship between the return rate experienced within a foraging area relative to that which could be expected if the foragers' only choice is to move to a new camp 5 or 10 km away.	100
4-12. Inuit coming down Tree River by sled in the Northwest Territories (Nunavut); women and dogs pull the sleds.	101
	xi

## Figures

4-13. The relationship between the return rate experienced within a foraging area relative to that which could be expected if the foragers moved the foraging radius to a new area at different camp-move times.	102
4-14. The effects of return-rate variance on decisions to remain in the current camp or move.	103
4-15. The curve in this illustration depicts a general depletion curve: the marginal return rate decreases the longer a forager remains in the patch.	105
5-1. A selection of Ju/'hoan technology.	117
5-2. A selection of Nuvugmiut technology.	121
5-3. Relationship between number of complex tools and Read's (2008) measure of risk: length of growing season times the number of residential moves per year.	123
5-4. Some Mikea containers, 1995.	125
5-5. A Mikea snare, 1994.	127
5-6. Diagram showing a hypothetical relationship between spear and gill-net fishing return rates.	129
6-1. A group of Ju/'hoansi in the Tsodilo Hills, Ngamiland, resting, working, and cooking near a hearth in April 1976.	139
6-2. Four sets of relationships between foragers defined by different combinations of interforager correlations in return rates and intraforager variance in day-to-day return rates.	145
6-3. Tolerated scrounging.	147
6-4. The complex relations among the factors that enter into sharing decisions.	151
6-5. The ranges of four Dobe Ju/'hoansi families (of Kumsa, Kxau, Oma//gwe, and Mahono) relative to those areas considered to be the Dobe and other band <i>n!ores</i> .	153
6-6. Four sets of relationships among foraging bands defined by resource predictability and density.	157
6-7. The economic-defensibility model applied to three Great Basin foraging societies.	159
6-8. The Winterhalder model of sharing relations between individual foragers translated into relations between groups of foragers.	162
6-9. Different spatial scales of resource variability create territoriality between some groups, social-boundary defense between others.	163
7-1. Relationship between postsharing variance in return rate and number of sharing foragers.	173
7-2. Madjemb, a thirteen-year-old Aka boy, checks a net for rips prior to a communal hunt in 1984 near the Lobandji River in southeastern Central African Republic.	175
7-3. Relationship between foraging group size and per capita return rate.	177
7-4. Hadza girls, aged 8–12, foraging for tubers in the area of Tli'ika, southeast of Lake Eyasi.	191
7-5. Ahtna women carrying camp equipment with tumplines.	199
7-6. The relationship between population pressure and warfare; the relationship between population pressure and homicide rates in a sample of foraging societies.	209
7-7. Potential relationships among factors that could lead sedentism to produce an increase in the rate of population growth.	211
8-1. Relationship between effective temperature and men's contribution to subsistence; relationship between the amount of meat in diet and the percent of nonhunting tasks accomplished by women.	218
8-2. Rabemainty, a Mikea man, digging for roots in July 1993.	219
8-3. Out hunting with bow and arrow near the Malibu River in the Cagayan Province in the northern Philippines in 1982.	221
8-4. Martu women and children, returning from hunting lizards.	225
8-5. The Mardudjara section system.	233

*Figures*

9-1. Interior of Nootka (Nuuchahnulth) house, Vancouver Island.	243
9-2. A Penan family in 1986 set up camp, fitting the image of egalitarian foragers.	245
9-3. A speculative model describing the development of inequality under conditions of spatially heterogeneous and spatially homogeneous resource fluctuations.	251
9-4. Ideal-free distribution.	253
9-5. One potential utility function describing the relationship between the utility of resources and amounts of that resource.	259

## Preface

I remember that I was amazed, amazed at the faces of Tasaday men and women looking back at me from the pages of *National Geographic* in 1972. To a young high school student who yearned to visit exotic places and to study prehistoric peoples, those photos of the Tasaday afforded the opportunity to do both vicariously. Here was the Stone Age! Hunters and gatherers, unsullied by civilization, who lived “much as our ancestors did thousands of years ago” (MacLeish and Launois 1972: 219).

Anthropology, the Tasaday, and, I like to think, I myself have come a long way since 1972. The Tasaday, of course, are not Pleistocene relics; frankly, I don’t know what they were or are – perhaps they were only, as some say, pawns in a hoax perpetrated by the Philippine government for geopolitical reasons (see Headland 1992; Hemley 2003). But their legacy continues in the public and, sometimes, anthropology’s perception of hunter-gatherers. The popular media likes to see hunter-gatherers as humanity stripped of its technological trappings, relics of the Paleolithic, people whom time forgot. Thus, they are often described by what they lack. The Tasaday, for example, apparently had “no agricultural implements . . . no woven cloth . . . no pipes . . . no pottery . . . no weapons . . . no word for war” (MacLeish and Launois 1972: 242). The Tasaday, and all hunter-gatherers, indeed *seem* to be “man in the raw state of nature” (Holmberg 1950: 261). And that is reason enough for us to know who foragers *really* are.

Opinions differ on whether humanity in the raw is a good thing. Some come down on the side of Jean-Jacques Rousseau’s Noble Savage, whereas others see humanity’s darker side in “primitive” society. Many use hunter-gatherers as a foil to our own industrialized society, to demonstrate its failures or successes. Some see in hunter-gatherers evidence of an evolutionarily ingrained propensity for savage hunting and bloodshed, a biological imperative for carnage (see Cartmill 1993), whereas others see in these same societies a kinder and gentler form of human organization that provides a model for corporate culture (Bernhard and Glantz 1992). In popular books such as *Clan of the Cave Bear* and movies such as *Quest for Fire*, *Dances with Wolves*, and *The Gods Must Be Crazy*, hunter-gatherers are schizophrenically portrayed as what we think we were in the distant past: the original hippies or the ultimate road warriors. They either represent the simpler, egalitarian past that we all yearn for or they testify to the fact that we are club-wielding troglodytes at heart.

So let’s make this clear: the hunter-gatherers we discuss in this volume are not the alter ego of Western civilization; they are not “simple” societies; they are not humanity in a state of nature; they are not Pleistocene relics; we cannot, as E. O. Wilson (1978) suggested, reconstruct ancient human society by extrapolating backward from living hunter-gatherers.

Unfortunately, social scientists are guilty of some of the same simplifications as the popular media. Portrayals of foragers in many theoretical formulations and textbooks ignore or downplay the importance of the modern social and economic contexts of foragers and of the variability among those who hunt and gather to obtain their food. I can appreciate that some simplification is necessary in teaching or building theory. But too much unwittingly lends itself to facile

## Preface

constructions of other people's lives and to erroneous understandings of both evolution and the factors that affect the lives of living foragers.

This book is a contribution to combating both of these problems, the tendency to simplify foraging societies and the tendency to misunderstand the factors that condition human differences. To achieve this goal, *The Lifeways of Hunter-Gatherers* focuses on variability in the foraging lifeway and on the factors that may account for this variability. To do so, I rely on the perspective of human behavioral ecology. I hope the reader finds this a useful approach. He or she will be disappointed, however, if they hope to find a thumbnail sketch of hunter-gatherers because it is not here. And it is not here because such a sketch would only propagate a new stereotype.

I have written this book for two audiences. First, it is for undergraduates, to direct their attention to the causal variables that lie behind behavior. I want students to understand that if some characteristic – sharing, for example – is common among hunter-gatherers, it is not simply because they are hunter-gatherers or because they preserve some ancient, core trait of humanity but rather because of a set of conditions that is prevalent among living hunter-gatherers. I strive to achieve this by focusing on how foragers differ in terms of subsistence, mobility, technology, demography, sharing, territoriality, and social and political organization. Rather than leave students with a yearning for another time or place, an approach that focuses on the relationships between behavior and environment, although less romantic, provides students with the tools to see how structural elements of their own society encourage (or discourage) certain behaviors.

Second, this book is also for graduate students, especially those in archaeology. It assumes some knowledge of anthropology, but it does not assume familiarity with the hunter-gatherer literature or human behavioral ecology. My goal is to help students of archaeology avoid using a modern hunter-gatherer people, or some amalgam of foraging societies, as an analogy for reconstructing the past. This does not mean that ethnographic data are useless to archaeologists; quite the contrary, in fact. But those data are useful only if we understand them from an explicitly theoretical point of view; otherwise, they will indeed “tyrannize” our reconstructions of the past (Wobst 1978). We cannot look to living foragers for analogues of prehistoric ones, but we can use data from them to test some ideas about human behavior. Simply put, I hope this book encourages students to think theoretically. My goal was to provide an overview, and, consequently, some fascinating topics have been shortchanged. I will leave them to the student to investigate further.

Finally, a word about words and a caution about data. In recent years, the term “hunter-gatherer” has been discarded by many in favor of the more generic term “forager” since that term avoids privileging the “hunter” in hunter-gatherer. I will use both terms interchangeably simply to avoid monotony. Also, the appellations given to different groups of hunter-gatherers change as anthropology educates itself, as the subjects of anthropology gain a greater voice, and as societies change and redefine themselves. I try to strike a balance between terms that will assist the student in exploring ethnographic literature and terms that will not insult members of foraging or formerly foraging societies who might read this book. Also, in some places, I use the ethnographic present tense, but the reader should not assume that the particular group has not changed between the time of ethnographic study and today. Conversely, where the past tense is used, the reader should not assume that a people no longer exist. Students should take care to not uncritically use the data presented in tables here. These data were collected under diverse conditions for different purposes. I have provided them to indicate some of the variability present among foragers and as a guide to potential sources of data. But I advise students to consult the original sources to determine the suitability of data for their analyses.

I wrote the first edition of this book when I was a fairly new professional. Although I am an archaeologist, in my first graduate course, Lewis Binford instilled a fascination of ethnography in me. When I was looking for my first academic post, I sold myself as a specialist in foraging societies. But once I began teaching, I realized that I knew next to nothing about them, and so I undertook this book in large measure to educate myself. The first edition was published in 1995,

*Preface*

by the Smithsonian Institution Press. After that press ceased to exist in about 2004, Eliot Werner published a slightly revised edition through Percheron Press (we fixed a few errors). What you have in your hands is a completely revised second edition. What has changed since then?

The second edition contains a new chapter on technology (Chapter 5), about which very little had been written prior to 1995 from the perspective of human behavioral ecology. The chapter on sharing is significantly updated and rewritten because there has been a large amount of research conducted on that subject since 1995. Likewise, the section on reproductive ecology in the demography chapter (Chapter 7) has been substantially updated, as has the chapter on the development of inequality (Chapter 9), although the 1995 model's essentials are unchanged. Throughout the book, I updated references, added some new photos and figures, corrected mistakes, and improved the writing. I hope you find this new edition worth reading.

It has been some forty years since I first looked in wonder at those pictures of the Tasaday. I no longer see in them the faces of ancient relatives. For the most part, I now see costs and benefits of resources, and differences in time allocation, caloric returns, opportunity costs, and utility curves. But occasionally I can see beyond these, to the aspirations and dreams and desires that help shape the evolutionary processes that create the diversity and trajectory of humanity. And I am still amazed.

## Acknowledgments

I have revised this book over several years, and I will undoubtedly leave out many deserving individuals from this list. To them, I say that your input has nonetheless been greatly appreciated. I would be remiss if I did not first acknowledge a large debt to David Hurst Thomas, who, through the archaeology of the Great Basin, introduced me to the anthropological study of hunter-gatherers, and to the late Lewis Binford, who has shaped much of the way I approach anthropology. Without their guidance and patience over the years, I would not be in a position to indulge in the pleasure of thanking them.

The first edition took shape while I was a Weatherhead Fellow at the School of Advanced Research in 1988–89. I am grateful to the school for that opportunity. I continued to write the first edition while teaching at the University of Louisville. It was finally completed on the island of Chuuk in Micronesia, where I was assisting my wife, Lin Poyer, in her ethnographic fieldwork. But Lin has given me far more assistance through her support, encouragement, and running commentary on evolutionary theory over the last thirty years; without it, I doubt this second edition would exist. Although I would have preferred a tropical island again, this edition was mostly written while sitting at our kitchen counter in Laramie, Wyoming, where the cats, Dusty and Pamina, and the dog, Xena, kept an eye on me. The final copyediting was completed in the fall of 2012, when I was a visiting scholar at St. John's College, Cambridge University. I am grateful to St. Johns for providing me with a quiet place overlooking the Master's garden to complete the work.

Many people have read and commented on the first- and second-edition manuscripts: Ken Ames, Jeanne Arnold, Robert Bettinger, Jane Collier, Robert Hard, Robert Hitchcock, Eric Ingbar, Julie Petee, Lin Poyer, Rachel Reckin, Russell Reid, Steve Simms, Eric Alden Smith, John Speth, Todd Surovell, Robert Tonkinson, Bram Tucker, Nicole Waguespack, and several anonymous reviewers. I would especially like to thank Eric Alden Smith. Eric reviewed the first- and second-edition manuscripts, each time giving them more of his time than they deserved, and improving them enormously, catching errors both small and embarrassing. Rebecca Bliege Bird, Peter Brosius, P. Bion Griffin, Barry Hewlett, Kim Hill, Robert Hitchcock, and Jim O'Connell graciously made photographs available to me. Heather Rockwell drew Figure 1-1. I also appreciate the assistance of the Cambridge University Press staff; Peggy Rote of Aptara, Inc.; and the copy editor, JoAnn "Annie" Woy. I should probably have taken all of the advice given to me, but I did not, and so I alone am responsible for errors and shortcomings.

Many people want to write a book, but those who do are always happy to close the covers, so to speak, on their own. I am no different. A book is a demanding master, and it takes the author away from the people he loves. But it is also a wise master, and it makes the author cherish them even more. So, to Lin, Matthew, and Dycus, I say, it's finished! But most of all, I say thank you.

R.L.K.  
Cambridge, U.K.