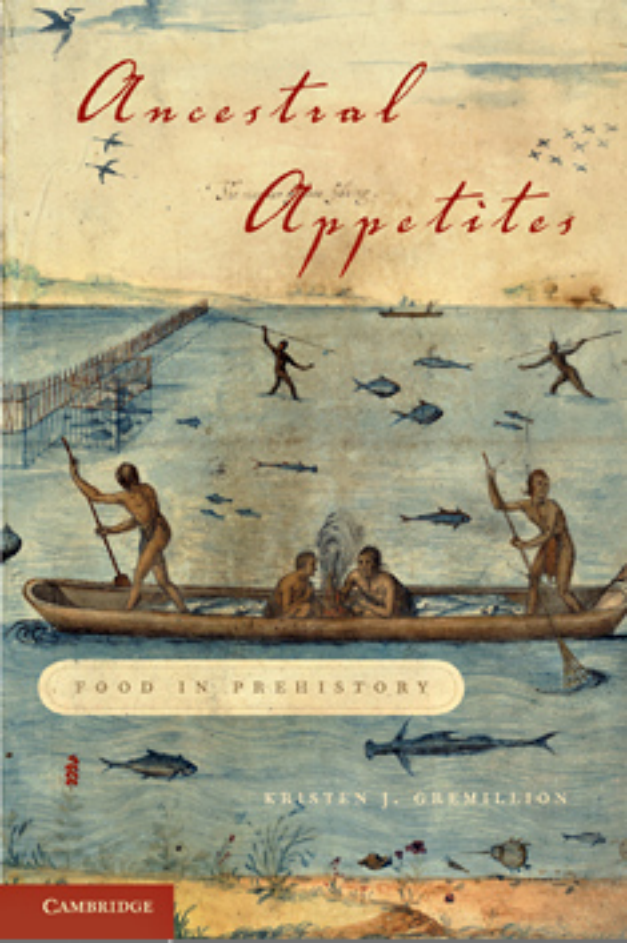

CAMBRIDGE www.cambridge.org/9780521898423

This page intentionally left blank

ANCESTRAL APPETITES

This book explores the relationship between prehistoric people and their food – what they ate, why they ate it, and how researchers have pieced together the story of past foodways from material traces. Contemporary human food traditions encompass a seemingly infinite variety, but all are essentially strategies for meeting basic nutritional needs developed over millions of years. Humans are designed by evolution to adjust our feeding behavior and food technology to meet the demands of a wide range of environments through a combination of social and experiential learning. In this book, Kristen J. Gremillion demonstrates how these evolutionary processes have shaped the diversification of human diet over several million years of prehistory. She draws on evidence extracted from the material remains that provide the only direct evidence of how people procured, prepared, presented, and consumed food in prehistoric times.

Kristen J. Gremillion is an Associate Professor in the Department of Anthropology at The Ohio State University. She has published many articles on human dietary variability in journals including *American Antiquity*, *Current Anthropology*, and *Journal of Archaeological Science* as well as chapters in several edited volumes.

ANCESTRAL APPETITES

Food in Prehistory

KRISTEN J. GREMILLION
The Ohio State University

CAMBRIDGE
UNIVERSITY PRESS

CAMBRIDGE UNIVERSITY PRESS
Cambridge, New York, Melbourne, Madrid, Cape Town,
Singapore, São Paulo, Delhi, Tokyo, Mexico City

Cambridge University Press
32 Avenue of the Americas, New York, NY 10013-2473, USA

www.cambridge.org
Information on this title: www.cambridge.org/9780521727075

First published 2011

Printed in the United States of America

A catalog record for this publication is available from the British Library.

Library of Congress Cataloging in Publication data

Gremillion, Kristen J., 1958–
Ancestral appetites : food in prehistory / Kristen J. Gremillion.
p. cm
Includes bibliographical references and index
ISBN 978-0-521-89842-3 (hardback) – ISBN 978-0-521-72707-5 (paperback)
1. Prehistoric peoples – Food. 2. Hunting and gathering societies.
3. Food habits – History. 4. Food preferences – History. I. Title.
GN799.F6G74 2011
394.1′209012 – dc22 2010044632

ISBN 978-0-521-89842-3 Hardback
ISBN 978-0-521-72707-5 Paperback

To Paul

Let me not to the marriage of true minds
admit impediments.

Shakespeare, Sonnet 116

CONTENTS

Illustrations *page* ix
Preface and Acknowledgments xi

Introduction 1

1 Ancestors 5
Our Ancient Heritage 6
Our Unique Heritage 9

2 Beginnings 12
The Australopithecines and Their Kin 13
Man the Hunter, Woman the Gatherer 15
Bones, Butchery, and the Scavenging Hypothesis 18
A Closer Look at the Fossil Record 19
History in the Body: Evolutionary Anatomy and Molecular Markers 22
Cooking 24

3 Foraging 31
The Upper Paleolithic Revolution? 31
The Late Pleistocene World 34
New Tools, New Tactics: The Food Quest in the Late Pleistocene 36

4 Farmers 48
The Questions 49
The Natural History of Agriculture 50
The Human Factor: Decisions and Revisions 56

Better Living through Chemistry 65
Agriculture: Adaptation, Strategy, and Tradition 69

5 Hunger 71

Food Supply in a Changing Environment 72
Hunger in Nature 73
Hunger and Human Societies 75
Fighting Hunger: Culture and Creativity 91

6 Abundance 93

Abundance in Nature 94
Surplus, Sharing, and Human Societies 98
The Uses of Abundance 101
Abundance, Diet, and Health: The Effects of Social Inequality 110
Beyond Storage and Sharing: Surplus as Symbol 112

7 Contacts 115

Acceptance and Dispersal of Novel Foods 116
The Spread of Agriculture in Prehistoric Europe 119
Eating, Drinking, and Roman Expansion 123
Peaches, Cowpeas, Melons, and Hogs: Old World Foods in Southeastern North America 126
The Global Reach of Foodways 130

8 Extinctions 132

Man versus Mammoth 136
Invasion of the Island Snatchers 139
Firestarters 143
Chewing the Scenery 144

Final Thoughts 146

Nostalgia for the Pleistocene 146
Hunger on a Crowded Planet 148
The Conservation Conundrum 149
Food, Prehistory, and Human Nature 151

Notes 153
References Cited 161
Index 177

ILLUSTRATIONS

1.1. Taxonomic relationships of humans and the great apes. *page* 10
2.1. Archaeological sites discussed in this book. 14
3.1. Comparative chart showing archaeological and geological periods and associated developments in food acquisition and food technology. 35
3.2. Method of using the spear thrower (atlatl). 38
3.3. Depiction of a bison from the cave of Altamira in Spain. 39
4.1. Maygrass (*Phalaris caroliniana*) from the Newt Kash rockshelter, Kentucky. 60
4.2. Archaeologist at work inside a dry rockshelter in Kentucky. 61
4.3. Map showing the relationship between length of the growing season and the importance of seed crop cultivation in eastern North America. 64
5.1. The intertropical convergence zone (ITCZ). 86

PREFACE AND ACKNOWLEDGMENTS

HUMAN DIETS AND THEIR CULTURAL AND EVOLUTIONARY ROOTS HAVE been at the center of my research efforts over the last two decades. In my own laboratory, I investigate paleodiet through the identification and analysis of ancient plant remains (an "arcane subspecialty," as one acquaintance described it). Perhaps it was the recognition that the more technical aspects of the work were of interest to only a small subset of my colleagues that initially kept me from seeing that research into ancient human diets has the potential to reach a wider audience. However, there was another factor – the enormous increase in the quantity and quality of relevant data over the past few decades. New techniques for extracting information from a wide variety of archaeological materials are featured with great regularity in journals such as the *Journal of Archaeological Science*. Both methods and theoretical frameworks for better understanding human diets have proliferated in recent years, making it difficult indeed to keep up with developments.

It was during the process of trying to help students understand and work with this vast array of new information that the idea for this book began to germinate. In developing a graduate seminar on paleodiet, I decided to emphasize the variety of methods now available and what they might be able to teach us. In particular, I wanted to provide some guidance on how the various techniques, currently springing up like mushrooms after rain, could inform students' own research. We also explored key controversies such as the role of human hunters in species extinctions, the importance of domesticates in the diets of incipient farmers, the role played by meat consumption in human evolution, and the documentation of cannibalism in the prehistoric record.

It occurred to me that most of the public was largely ignorant of these developments because so much of the information remained buried in

specialized journals. This book was designed to correct this state of affairs by giving readers a taste of the evidence, oriented around some major transitions in human diet and food technology. So although it covers several million years of human history, it is not intended to be comprehensive; rather, I hope the book serves as a kind of "consciousness-raising" exercise (yes, I was a college student in the 1970s) that might correct the misconception that we know very little about how and what prehistoric people ate. In addition, I wanted to show how evolutionary thinking might be applied to the important business of acquiring and consuming food. We enjoy greater dietary flexibility than most species; however, this ability to improvise itself evolved in the distant past, for reasons that are still imperfectly understood. Humans also "inherit" food customs, building bodies of knowledge that accumulate over many generations and depend on the subtleties of language to invest them with meaning. Human food choices have roots in biological needs, individual preferences, and evolutionary history, but their great diversity across the globe would not exist without the system of social learning known as culture.

Many people have helped me in various ways to bring this project to fruition. I thank my colleagues who read and commented on the book prospectus and the resulting manuscript (Paul Gardner, Clark Larsen, Ken Sassaman, Greg Waselkov, and one anonymous reviewer) for generously investing their time and offering many helpful comments. This book owes its origin to my role as a teacher, and the graduate students enrolled in my paleodiet seminar in the Department of Anthropology at The Ohio State University have enriched my understanding by asking many good questions and sharing their own specialized knowledge. Over the years, many colleagues have helped me refine my ideas, both through formal critique and informal (and often beer-fueled) discussions. Although I could not possibly name them all, they include William S. (Bill) Dancey, Julie Field, Gayle Fritz, Paul Gardner, Julia Hammett, Cecil Ison, Andrew Mickelson, Katherine (Kappy) Mickelson, Dolores Piperno, Bruce Smith, Bruce Winterhalder, Jean Black Yarnell, Richard A. (Dick) Yarnell, and Melinda (Mindy) Zeder. The rest of you, I hope, know who you are, and will also accept my grateful thanks.

This book would have taken many years to complete without the support of The Ohio State University in the form of a faculty professional leave, which allowed me to devote my time to writing. Ohio State, the USDA Forest Service, the National Science Foundation, the Kentucky Heritage Council, and the National Geographic Society have

all provided key financial support for my research projects over the years. Without it, I would not be the scholar I am today.

Beatrice Rehl of Cambridge University Press encouraged me to develop a proposal for this book and gave me valuable advice on how to make it better. Without her input and encouragement, I suspect that the road to publication would have been much longer and rougher than it turned out to be.

INTRODUCTION

EVERY MEAL WE EAT TELLS AN EVOLUTIONARY TALE WHOSE BEGINNINGS go back to the origin of life itself. That hot dog you ate for lunch has a surprisingly rich history, one that reflects the cumulative wisdom of natural selection, a multitude of human decisions, and the structured flow of information that we call human culture. Pursuing the origins of your lunch is not easy, for the farther back you go in time, the more sparse and ephemeral the evidence. Cattle were domesticated at least 9,000 years ago, and the wheat in the bun even earlier. The original wild forms of wheat were coaxed by incipient farmers into producing greater yields over generations of planting, harvesting, and planting again. The grinding stones used to make flour represent the accumulated knowledge of generations of skilled workers who learned from their elders what stones to select and what forms to create, adding their own improvements to pass on to their children. Is it a kosher hot dog? Behind its manufacture lies a deep cultural tradition of ethnic pride and religious observance. Keep going backward in time, and you find your distant ancestors acquiring a taste for meat and perhaps devising ways to unearth tubers and crush seeds and nuts. Eventually you will arrive at the evolutionary novelty of eating itself – extracting energy not directly from the sun, but from organic matter. All of this history, and more, is embodied in even the most hurried and unreflective act of eating.

All humans share a suite of dietary traits that have been retained over millennia of natural selection because of their survival value. Some of these traits are built into the animal lineages to which we belong – the digestive tract we possess as multicellular animals, for example, and the manual dexterity and keen vision characteristic of primates. However, these ancestral features cannot explain the great diversity of human

foodways. For that we must turn to two key human adaptations that together form a resilient, but flexible, system for generating and selecting among a multitude of feeding patterns. This system combines an open behavioral program that allows us to respond rapidly to changing environmental conditions with a uniquely complex form of cumulative social learning – culture.

Like most mammals, and especially as primates, we have a versatile behavioral repertoire; when it comes to inventing ways to catch, harvest, prepare, and consume food, we have no rivals. However, this level of creativity comes at a price: It costs us both time (for learning) and energy (the extra fuel needed to run a complex brain). For most animal species, these costs place an upper limit on behavioral flexibility, but humans have evolved a mechanism that breaks through this limitation: accumulation of cultural knowledge between generations. Children learn what counts as food, how to prepare a meal, and how to sharpen an arrow point or plant yams from their parents and other adults rather than having to figure things out by themselves each generation. In this way, culture allows us to perpetuate dietary solutions that work well in a given environment without having to follow a behavioral script closely specified by the genes. At the same time, systems of social knowledge remain open to innovations that might make for greater security and efficiency in the quest for food. We enjoy the best of both worlds: the wisdom of tradition coupled with the ingenuity of invention.

The genetically transmitted information we get from our parents and their parents, all the way back to the first life forms, sets the biological foundations for individual decisions about what to eat and how to go about getting it. The part of this heritage that varies from one individual to the next may explain why one likes anchovies or chocolate or beets and others do not. However, genes seldom explain dietary differences between groups of people; these correspond much more closely to the demands of local environments (which inspire technological innovation) and the accumulation of cultural knowledge than they do to biological inheritance. Evolutionary history does offer insights into some of the features of human diet that are widely shared or universal within our species. Many of these are also characteristics of broader groupings of animals, such as primates, mammals, vertebrates, and animals in general.

Consider broccoli, for example. You may not care for it, but your body's ability to convert it to energy at all is owing to shared ancestry

with other animals. Being a primate means it is likely that something green will seem edible to you. However, the fact that this curious cluster of immature flower buds qualifies as proper food you owe to social learning. Knowledge about broccoli, how to cook it (or not), what to serve it with, or whether to serve it at all – these bits of information are acquired from others, whether parents, peers, or celebrities. The culinary merits of broccoli were not simply handed down from nature, fully formed and ready to be implemented. People had to learn first about broccoli's wild relatives, members of the species *Brassica oleracea*. Trial and error revealed the best ways to cultivate this species and how to select for different varieties. Experimentation with methods of cooking produced broccoli steamed, boiled, raw, pureed to make soup, and dipped in tempura batter. These culinary customs, therefore, ultimately derive from the human facility for behavioral innovation, although they would never have accumulated without culture to pass on what individuals have learned over many generations. In this way, innovation is balanced and complemented by imitation – an efficient system that combines individual learning and experimentation with the less costly option of copying what others do.[1]

In this book, I explore how this complex system of dietary adaptation developed to generate the diversity of human foodways present today. The first few chapters cover several million years and emphasize the evolution of the dietary adaptations of the human species that shape foodways everywhere. The time scale is long, compared to later periods, and the geographic area restricted initially to Africa, the birthplace of the human lineage. The best-documented changes in diet have been inferred from human anatomy, bone chemistry, and traces of early material culture and are usually understood in terms of the evolutionary processes that affect all biological lineages. These processes remain important but have less explanatory power as human foodways begin to diversify along with the geographic expansion of the genus *Homo* out of Africa more than 1.5 million years ago. By 100,000 years ago – perhaps sooner – the two key human adaptations of behavioral innovation and culture begin to drive dietary diversity at a pace that could not have been matched by selection acting on genetic variation exclusively. Approaching the present, the archaeological record of human diet and subsistence grows in quantity and quality as food technology becomes more diverse and complex and as the likelihood of preservation of perishable remains increases. The diversity of behavior reflected

in archaeological assemblages requires a close look at how behavioral innovation and social learning operate to fine-tune dietary strategies to adjust to the local roster of flora and fauna, seasonal rhythms of food availability, and the social environment.

Both individual decisions about what and how to eat and the shifting frequency of different food habits at the group level are subject to the historical influences that affect every species – natural disasters, changes in global climate or local environmental conditions, and the fortunes of other organisms with which we coexist. For this reason, I approach the prehistory of food in a roughly chronological fashion, to show the developmental trajectory of shared human food habits and the divergence of foodways as people colonized new habitats and developed technologies to exploit them. I track major developments, including the refinement of hunting and gathering, the origins of agriculture, and the effects of social inequality on how people consume food. Finally, I discuss the relevance of food prehistory to contemporary concerns such as extinctions, environmental degradation, conservation, and nutrition.

Much of human activity is tied, either directly or indirectly, to the quest for food. Our need for nutrition constantly reaffirms our kinship with and dependence on other life forms, truths to which millions of years of evolution bear witness. But we also diverge from the rest of nature in the unique system that juggles biological inheritance, behavioral innovation, and culture to keep us fed. That same system has allowed humans to populate the Earth and dominate its ecosystems to an extent that no other species has replicated. How this came about is something only humans have the power, and the responsibility, to understand and remember.