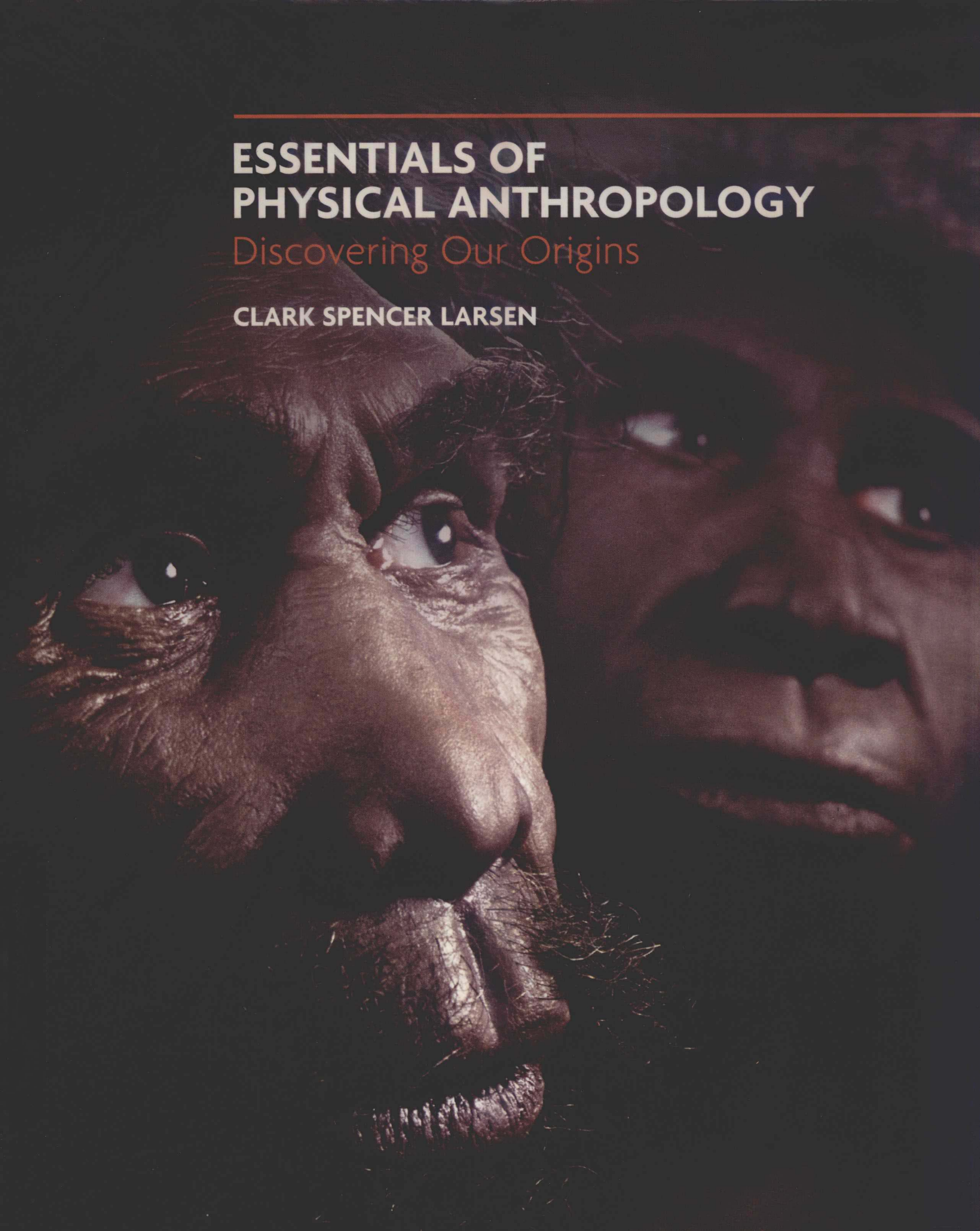


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# ESSENTIALS OF PHYSICAL ANTHROPOLOGY

Discovering Our Origins

CLARK SPENCER LARSEN



# ESSENTIALS OF PHYSICAL ANTHROPOLOGY

## Discovering Our Origins

**CLARK SPENCER LARSEN**

The Ohio State University



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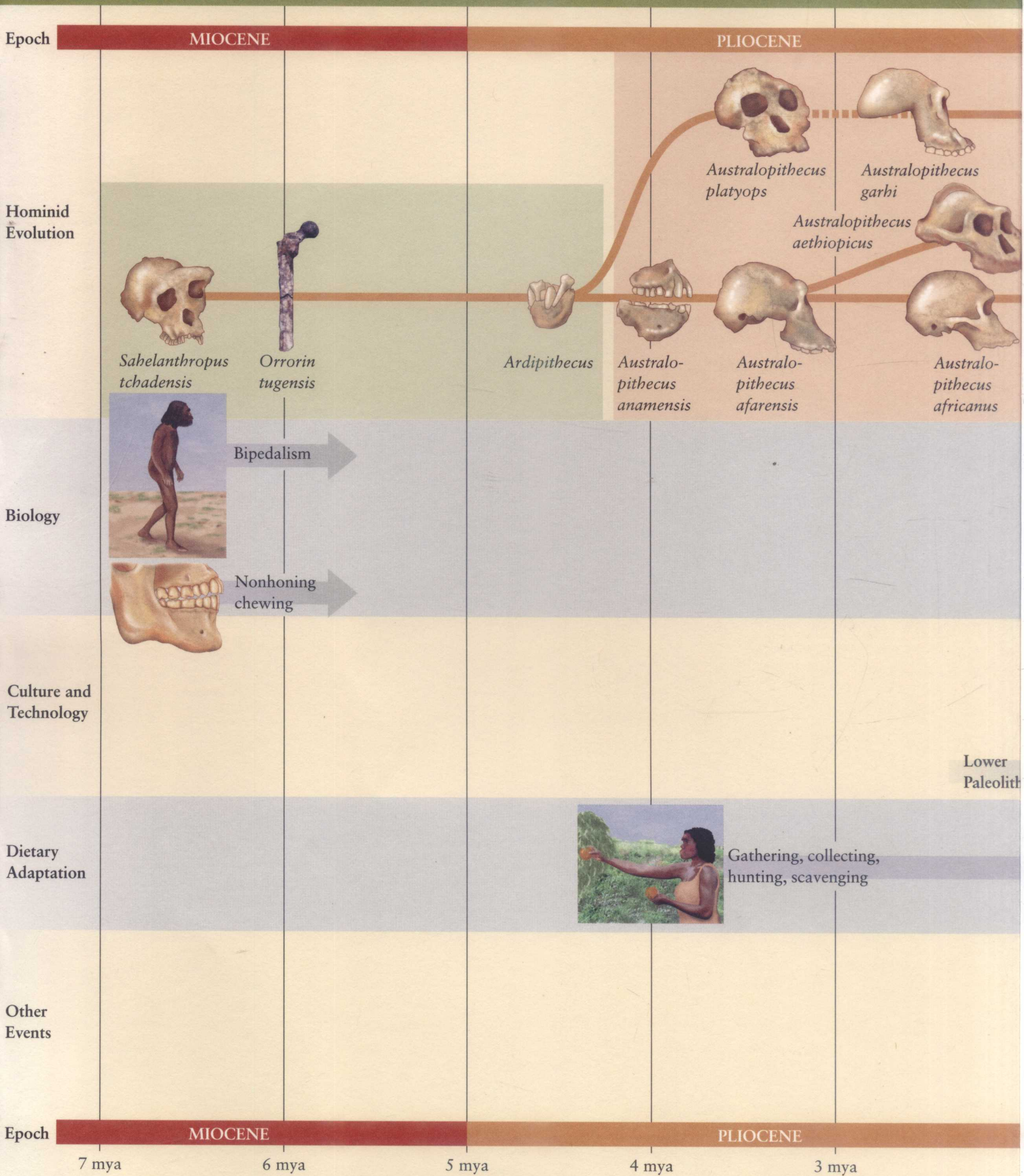
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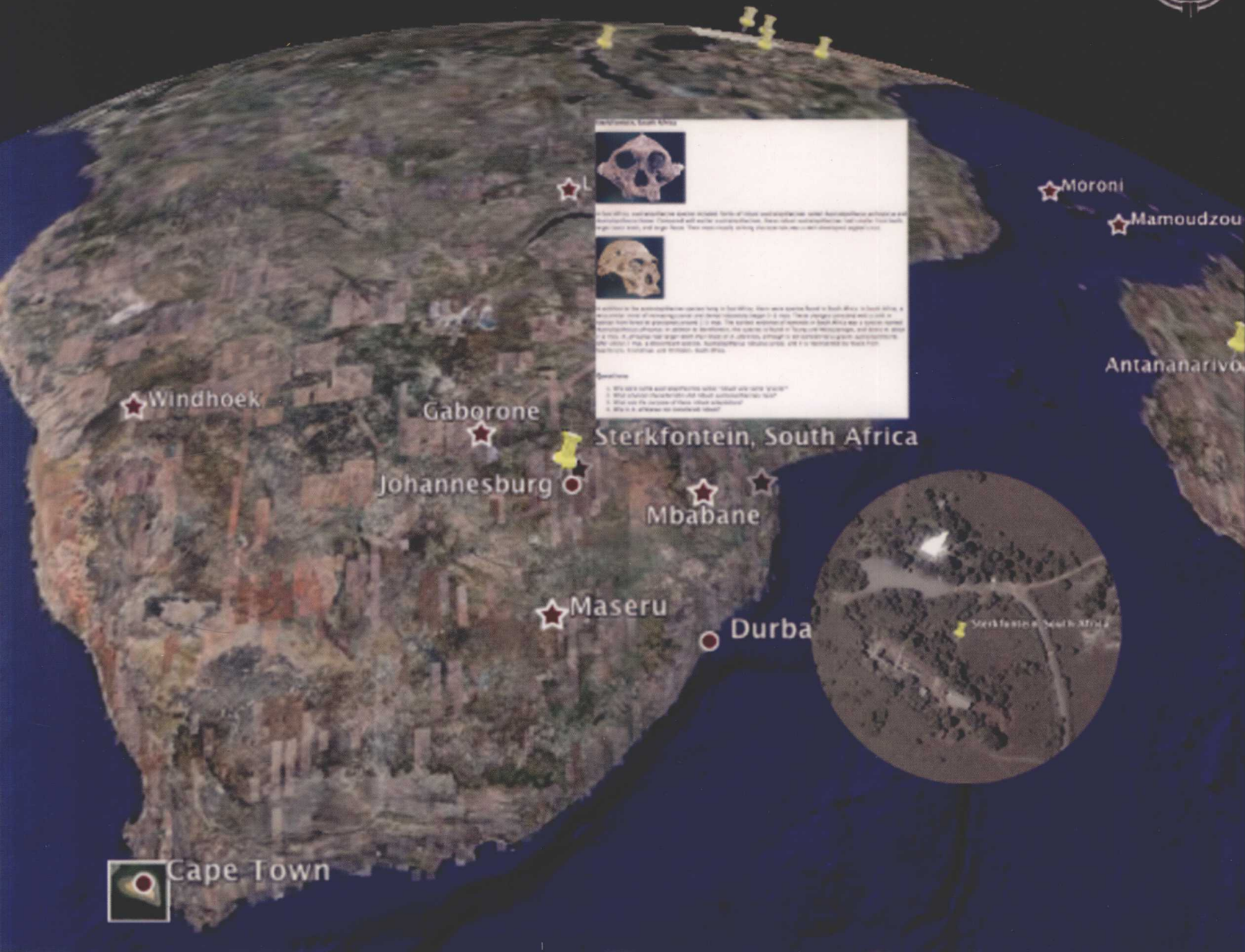


# TIMELINE OF HUMAN EVOLUTION



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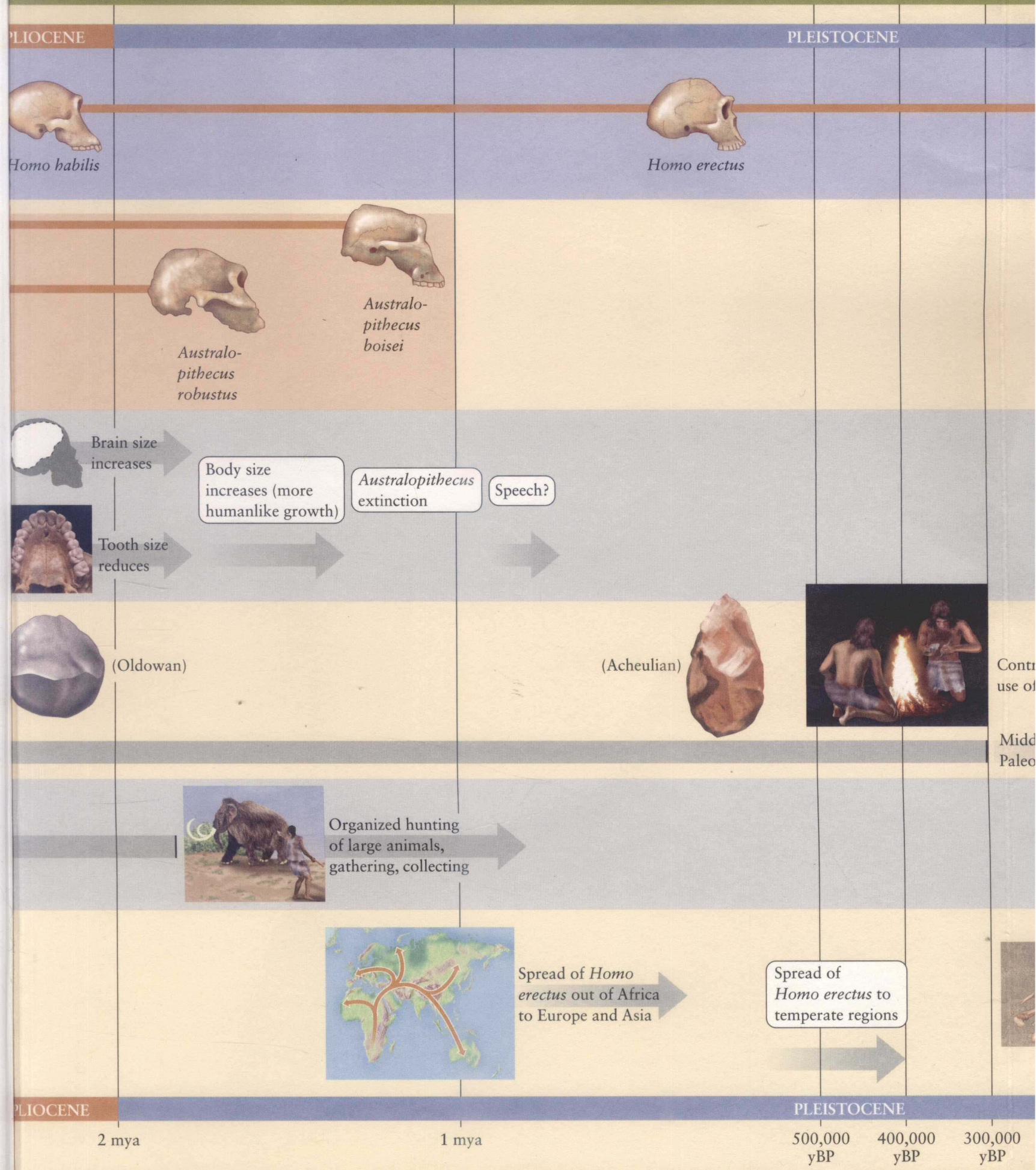




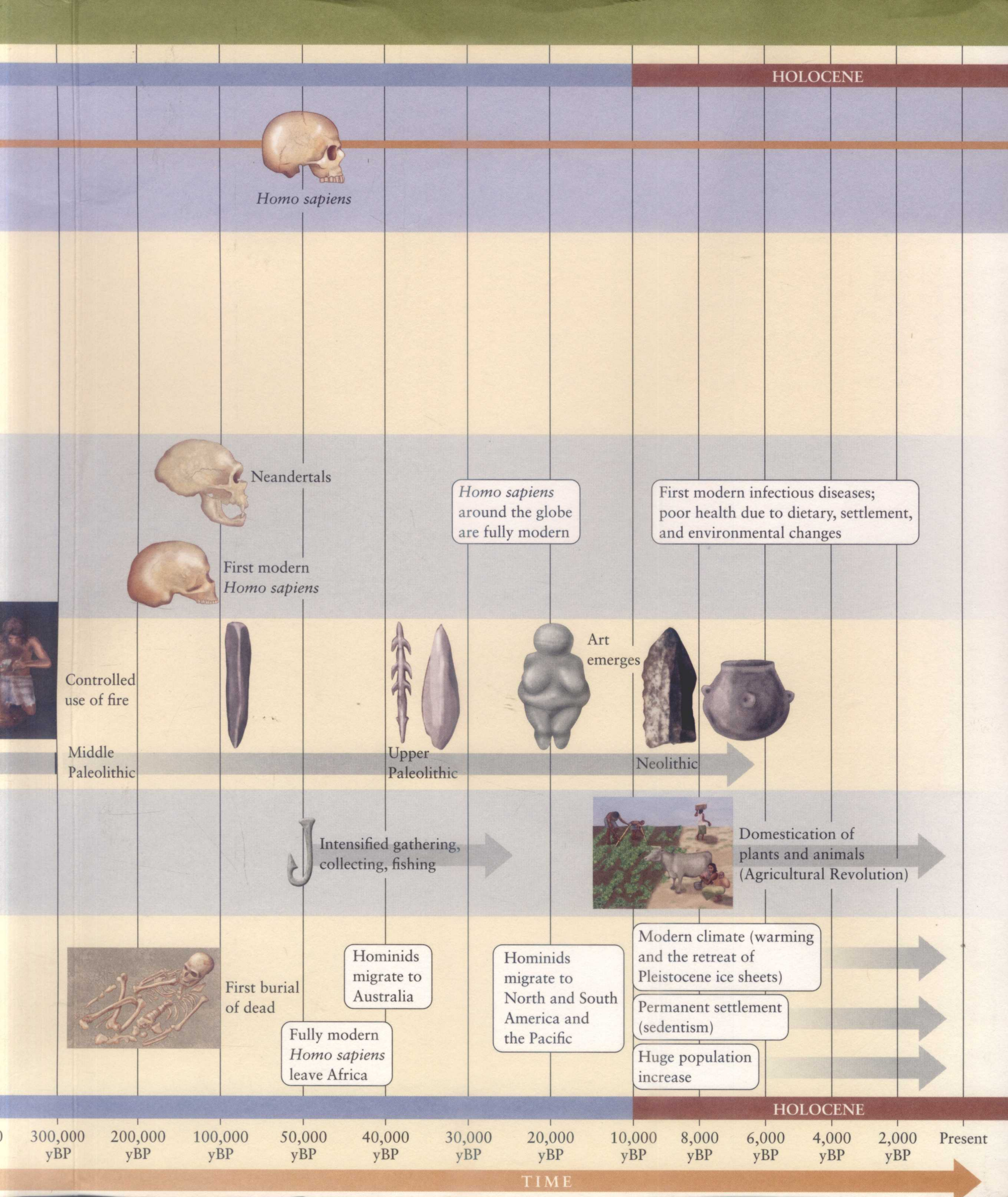
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# TIMELINE OF HUMAN EVOLUTION (CONTINUED FROM INSIDE FRONT COVER)











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# **ESSENTIALS OF PHYSICAL ANTHROPOLOGY**

Discovering Our Origins







# About the Author

## CLARK SPENCER LARSEN

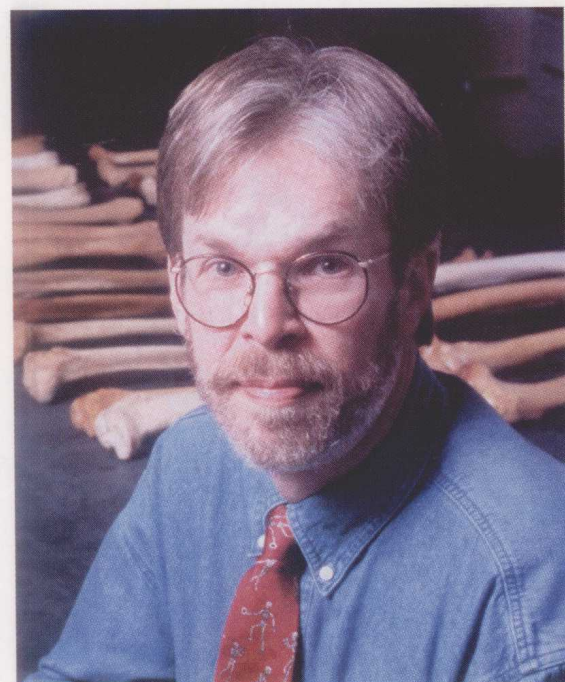
Clark Spencer Larsen is a Ph.D. in Anthropology from The Ohio State University, Columbus. A B.S. from Kansas State University and M.A. from the University of Michigan. Clark's research is in bioarchaeology, skeletal biology, and paleoanthropology. He has worked in North America, Europe, and Asia. He has taught at the University of Massachusetts, Northern Illinois University, Purdue University, and the University of North Carolina. Since 2001, he has been a member of the faculty at Ohio State, where he is Distinguished Professor of Social and Behavioral Sciences. He teaches introductory physical anthropology, osteology, bioarchaeology, and paleoanthropology. Clark has served as president of the American Association of Physical Anthropologists and as editor-in-chief of the *American Journal of Physical Anthropology*. In addition to *Our Origins* and *Essentials of Physical Anthropology: Discovering Our Origins*, he has authored or edited 25 books and monographs, including *Bioarchaeology: Interpreting Behavior from the Human Skeleton*, *Skeletons in Our Closet*, and *Advances in Dental Anthropology*.

*To Chris and Spencer,  
with my deepest thanks for their help, encouragement,  
and (unwavering) patience*



# About the Author

**CLARK SPENCER LARSEN** heads the Department of Anthropology at The Ohio State University, Columbus. A native of Nebraska, he received his B.A. from Kansas State University and M.A. and Ph.D. from the University of Michigan. Clark's research is in bioarchaeology, skeletal biology, and paleoanthropology. He has worked in North America, Europe, and Asia. He has taught at the University of Massachusetts, Northern Illinois University, Purdue University, and the University of North Carolina. Since 2001, he has been a member of the faculty at Ohio State, where he is Distinguished Professor of Social and Behavioral Sciences. He teaches introductory physical anthropology, osteology, bioarchaeology, and paleoanthropology. Clark has served as president of the American Association of Physical Anthropologists and as editor-in-chief of the *American Journal of Physical Anthropology*. In addition to *Our Origins* and *Essentials of Physical Anthropology: Discovering Our Origins*, he has authored or edited 25 books and monographs, including *Bioarchaeology: Interpreting Behavior from the Human Skeleton*, *Skeletons in Our Closet*, and *Advances in Dental Anthropology*.



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# To the Instructor

## HOW THIS BOOK CAN HELP YOUR STUDENTS DISCOVER PHYSICAL ANTHROPOLOGY

### It Is about Engagement

Teaching is about engagement—connecting the student with knowledge, making it real to the student, and having the student come away from the course with an understanding of core concepts. *Essentials of Physical Anthropology: Discovering Our Origins* seeks to engage the student in the learning process. Engaging the student is perhaps more of a challenge in the study of physical anthropology than in the study of other sciences, mainly because the student has likely never heard of the subject. The average student has probably taken a precollege course in chemistry, physics, biology, or geology. Physical anthropology, though, is rarely mentioned or taught in precollege settings. Commonly, the student first finds out about the subject when an academic advisor explains that physical anthropology is a popular course that fulfills the college's natural science requirement.

Once taking the course, however, that same student usually connects quickly with the subject, because so many of the topics are familiar—fossils, evolution, race, genetics, DNA, monkeys, forensic investigations, and origins of speech, to name a few. The student simply had not realized that these separately engaging topics come under the umbrella of one discipline, the subject of which is the study of human evolution and human variability.

In writing this book, I made no assumptions about what the reader knows, except to assume that the reader—the student attending your physical anthropology class—has very little or no background in physical anthropology. As I wrote the book, I constantly reflected on the central concepts of physical anthropology and how to make them understandable. I combined this quest for both accuracy and clarity with my core philosophy of teaching—namely, engage the student to help the student learn. While most students in an introductory physical anthropology class do not intend to become professional physical anthropologists, some of these students become interested enough to take more courses. So this book is written



for students who will not continue their study of physical anthropology, those who get “hooked” by this fascinating subject (a common occurrence!), and those who now or eventually decide to become professionals in the field.

The book is unified by the subject of physical anthropology. But equally important is the central theme of science—what it is, how it is done, and how scientists (in our case, anthropologists) learn about the natural world. I wrote the book so as to create a picture of who humans are as organisms, how we got to where we are over the last millions of years of evolution, and where we are going in the future in light of current conditions. In regard to physical anthropology, the student should finish the book understanding human evolution and how it is studied, how the present helps us understand the past, the diversity of organisms living and past, and the nature of biological change over time and across geography. Such knowledge should help the student answer questions about the world. For example: How did primates emerge as a unique group of mammals? Why do people look different from place to place around the world? Why is it important to gain exposure to sunlight yet unsafe to prolong that exposure? Why is it unhealthy to be excessively heavy? Throughout their history, what have humans eaten, and why is it important to know?

I have presented such topics so that the student can come to understand the central concepts and build from them a fuller understanding of physical anthropology. Throughout the book, I emphasize hypothesis testing, the core of the scientific method, and I focus on that process and the excitement of discovery. The narrative style is personalized. Often I draw on my own experiences and those of scientists I know or am familiar with through their teaching and writing, to show the student how problems are addressed through fieldwork or through laboratory investigations.

Scientists do not just collect facts. Rather, they collect data and make observations that help them answer questions about the complex natural world we all inhabit. Reflecting this practice, *Essentials of Physical Anthropology: Discovering Our Origins* is a collection not of facts for the student to learn but of answers to questions that help all of us understand who we are as living organisms and our place in the world. Science is a way of knowing. It is a learning process. In this way, it is liberating.

## HOW THE BOOK IS ORGANIZED

The book is divided into two parts. Following an introductory overview of anthropology and physical anthropology, Part I presents the key principles and concepts in biology,

especially from an evolutionary perspective. This material draws largely on the study of living organisms, including humans and nonhuman primates. Because much of our understanding of the past is drawn from what we have learned from the present, this part lays the foundation for the presentation in Part II—the past record of primate and human evolution. In putting the record of the living up front, this book departs from the style of most other introductory physical anthropology textbooks, which start out with the earliest record and end with the living. This book takes the position that most of what we learn about the past is based on theory and principles learned from the living record. Just as all of Charles Darwin’s ideas were first derived from seeing living plants and animals, much of our understanding of function and adaptation come from living organisms as models. Therefore, this book views the living as the window onto what came before. Individual chapters, however, can be taught in any order.

Part II presents evidence of the past, covering more than 50,000,000 years of evolution. Most textbooks of this kind end the record of human evolution at about 25,000 years ago, when modern *Homo sapiens* evolved worldwide. This textbook also provides the record since the appearance of modern humans, showing that important biological changes occurred in just the last 10,000 years, largely relating to the shift from hunting and gathering to the domestication of plants and animals. Food production was a revolutionary development in the human story, and Part II presents this remarkable record, including changes in health and well-being that continue today. A new subdiscipline of physical anthropology, bioarchaeology, is contributing new and profound insights into the last 10,000 years, one of the most dynamic periods of human evolution.

## AIDS TO THE LEARNING PROCESS

Each chapter opens with a *vignette* telling the story of one person’s discovery that relates directly to the central theme of the chapter. This vignette is intended to draw your students into the excitement of the topic and to set the stage for the Big Questions that the chapter addresses.

**BIG QUESTIONS** are introduced early in the chapter to help your students organize their reading and understand the topic.

**CONCEPT CHECKS** are scattered throughout each chapter and immediately follow a major section. These aids are intended to help your students briefly revisit the key points they have been reading.



**LOCATOR MAPS** are placed liberally throughout the book. College-level instructors tend to hope that students have a good sense of geography, but like a lot of people who do not look at places around the world on a daily basis, students often need reminders about geography. In recognition of this, locator maps in the book's margins show the names and locations of places that are likely not common knowledge.

**DEFINITIONS** are also presented in the text's margins, giving your students ready access to what a term means in addition to its use in the associated text.

At the end of each chapter, **ANSWERING THE BIG QUESTIONS** presents a summary of the chapter's central points organized along the lines of the Big Questions presented at the beginning of the chapter.

Physical anthropology is a visual field, in that anthropologists very commonly study objects, fossils, artifacts, and so on, by looking at them. This book helps your students visualize what they are reading about by including hundreds of images, many specially prepared for the book. These illustrations tell the story of physical anthropology, including key processes, central players, and important concepts. As much thought went into the pedagogy behind the illustration program as into the writing of the text. The highlight of these illustrations is six two-page spreads completed by the renowned biological science illustrator Kelly Paralís Keenan. These six stunning figures portray concepts, rather than just gathering facts about where or when fossils were found. One of my favorites involves the exciting discussion now playing out in physical anthropology regarding the origins of modern people. New discoveries in East Africa pinpoint the earliest modern humans as having lived in the modern country of Ethiopia, at a place called Herto. The two-page illustration of this important place in the human story tells what these people looked like and describes their behavior.

Join me now in engaging your students in the excitement of discovering physical anthropology.<sup>1</sup>

## WHO HELPED

I owe much to the many people who made this book possible. First and foremost, I thank my wife, Christine, and son, Spencer, who helped in innumerable ways. They were my captive audience: without protest, they listened to my ideas

at the dinner table, on family trips, and in other places where we probably should have been talking about other things. Chris read many drafts of chapters and gave great advice on when and where to cut, add, or rethink. I thank my parents, the late Leon and Patricia Larsen, who introduced me to things old and sparked my interest in the human past.

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<sup>1</sup>I am very interested in hearing your and your students' comments about the book, including problems, criticisms, and questions. Please feel free to contact me at Larsen.53@osu.edu.



of the book in so many ways. I am grateful to Patricia J. O'Brien and Milford H. Wolpoff, my respective undergraduate and graduate advisors. Both were instrumental in developing my interest in science and the great profession I work in. I especially thank Barry Bogin, Kristen Hawkes, Jim O'Connell, David Thomas, Bob Kelly, Jerry Milanich, Bruce Smith, Kris Gremillion, Bonnie McEwan, Matt Cartmill, Dale Hutchinson, Chris Ruff, Simon Hillson, Michael Schultz, Sam Stout, Doug Ubelaker, Dan Sellen, Clark Howell, Rick Steckel, Phil Walker, John Relethford, Mark Weiss, Margaret Schoeninger, Karen Rosenberg, Lynne Schepartz, Fred Smith, Brian Hemphill, Bruce Winterhalder, Meg Conkey, Desmond Clark, Erik Trinkaus, Katherine Russell, Vin Steponaitis, Mark Teaford, Richard Wrangham, Jerry Rose, Mark Cohen, William Bass, Loring Brace, Stanley Garn, Frank Livingstone, Phil Gingerich, T. Dale Stewart, Larry Angel, Mike Finnegan, Harriet Ottenheimer, Marty Ottenheimer, Roberto Frisancho, Randy Susman, Karen Strier, Joanna Lambert, Jim Hijiya, Cecil Brown, Bill Fash, Rich Blanton, Henry Wright, James Griffin, Bill Jungers, David Frayer, Bill Pollitzer, George Armelagos, Jane Buikstra, Elwyn Simons, Steve Churchill, Neil Tubbs, Bob Bettinger, Tim White, Dean Falk, Owen Lovejoy, Scott Simpson, David Carlson, Alan Goodman, Bill Dancey, Bill Bass, Debbie Guatelli-Steinberg, Clark Mallam, and Chris Peebles.

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Columbus, Ohio  
 January 2009



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