



UNDERSTANDING THE CULTURAL LANDSCAPE



BRET WALLACH

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THE GUILFORD PRESS
New York London

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72 Spring Street, New York, NY 10012
www.guilford.com

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Printed in the United States of America

This book is printed on acid-free paper.

Last digit is print number: 9 8 7 6 5 4 3 2 1

Library of Congress Cataloging-in-Publication Data

Wallach, Bret, 1943–

Understanding the cultural landscape / by Bret Wallach.

p. cm.

Includes bibliographical references and index.

ISBN 1-59385-119-7 (pbk.) — ISBN 1-59385-120-0 (hardcover)

1. Human geography. 2. Human ecology. 3. Nature—Effect of human beings on. I. Title.

GF41.W354 2005

304.2—dc22

2004024793

Maps by Geoff Maas.

For JJP and WZ

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INTRODUCTION

Geography is a strange subject. You may think you know what it's about, but stick around.

To begin with, geography is primitive. It starts with every child looking around and making sense of the world. What's this? What's that? Why is it this way? Why here? Even when an adult takes it up, geography remains terminally childish. How do a dozen farmers in India share the water that runs periodically in the tiny ditch that irrigates their fields? Why do suburban streets in America curve? Why, wherever you look, are old airport terminals painted the same color?

Primitive, geographers begin and end with tangibles. This makes them a disgrace to the sophisticated branches of learning, which grapple first and last with intangibles: the historian's documents, the chemist's formulas, the mathematician's equations. Pity the object-driven geographer. Muddy boots never won anybody a Nobel.

And that's not all. Geographers are magpies. Even when they limit themselves to the cultural landscape, by which I mean the elements of landscape created by people, geographers trespass over a multitude of well-groomed disciplinary turfs. The Eskimo belong to anthropology, but human geographers are interested in them because the Eskimo are outside that mental window that geographers—all of us, really—have on the world. The Great Pyramids of Giza belong to history, but they're also in human geography because those stone-block mountains are outside that window. Fast-food restaurants are a topic for business school analysis, but they're in human geography, and you know why.

Look at a map legend. There are symbols for natural features: rivers, mountains, deserts, swamps. Call them the stuff of physical geography. Then there are symbols for cultural features: boundaries, roads, buildings, parks, monuments. They're the stuff of human geography. Look out an airplane window on a clear day and you see the same division. Natural features slide by: Niagara, the Grand Canyon, Cape Comorin at the southern tip of India. Overlaying them are the cultural ones: bridges, roads, villages, cities. Fly over the American West on a good day and with a good seat, and you can hardly miss the overlay of the cultural landscape atop the natural one. The High Plains are an immense natural table set with cultural center-pivot irrigation systems, neatly gridded towns, and lonely roads. It passes so slowly that it seems inconceivable you're going 500 miles an hour.

So much to look at, whether you're a physical or a human geographer. And you likely suffered at the hands of an embittered physical education teacher who was forced to teach geography on the side. Thanks to him, you habitually associate this grandly primitive, tactile, unrestricted inquiry with the dumb memorization of state capitals. Not likely.

Geography means earth description or, to put it less etymologically, studying the character of the earth's surface. That's a lot more than mnemonics to recall Augusta and Tallahassee.

Just think of the neglected stacks of *National Geographic* magazines that pile up in offices and attics coast to coast. Those yellow covers promise articles about one place after another. Nobody seems to read the articles, but the pictures talk. What do they say? More broadly, because I don't really want to talk about that magazine—in its bland way, another degrader of this discipline—how shall we handle a subject as vast as the cultural landscape, the world we have made?

One way is to attack it regionally. Begin anywhere—say, Russia. Then drift south to India or east to China. Eventually jump the Pacific and do the United States. This can be interesting, especially if the teacher is the rare bird with firsthand experience of these places, but it gets repetitive, because over and over you're talking about fields, factories, highways, and markets.

An alternative is to organize things topically, with agriculture one day, energy resources the next, cities a third, religion a fourth. Between these two approaches, I much prefer the topical, because it avoids repetition. Still, how should the topics be sequenced?

My answer is anything but original. I'm following the teacher who taught human geography to me almost 40 years ago. His approach was simple: Make human geography the story of how human beings have transformed the earth. It wasn't an original approach with him, either. He learned it from his teacher, Berkeley's Carl Sauer, who for several decades towered over American academic geography.

There is at least one big difference between Sauer's approach and mine. Sauer's geography was basically a German geography of the 19th century. This meant that it was a scholarly undertaking and that anyone who sought to make geography practically useful was suspect. German geography was very different, in other words, from the British geography of the period, which explicitly served the needs of empire. Look at the list of officers of the Royal Geographical Society a century ago, and you see a parade of military officers and colonial administrators, with no less than the king as patron. Not so with the imperially deprived German geographers. But though, in his maturity at least, Sauer had almost no interest in applied geography, he was not a disinterested scholar. He thought of himself as a child of late 19th-century rural Missouri and believed—this is hardly an exaggeration—that human history had peaked sometime before 1900. That was when people were wealthy enough to have food and books. It was before they had lost the ability to distinguish between freedom and the freedom to shop.

Naively, I once asked Sauer if he'd serve on a doctoral committee for a dissertation I hoped to write on some California oil fields. I was back in the hall before I had a chance to sit down. If I had proposed looking at fish poisons in Southeast Asia, things would have been different. If I had proposed a study of the diffusion of corn across Africa, Sauer would have said yes. He would have signed up straight away if I had wanted to study aboriginal burning of grasslands. But oil fields? No thanks. There wasn't even a thanks, just an "I don't think so," spoken in a tone suggesting that the topic was depressing.

This aversion to the modern world explains why Sauer's own courses in human geography (he called it cultural geography) stopped somewhere about 1850. Even as a student, I thought this was absurd. We'd learn a lot of interesting things—say, that pastoral nomadism was widespread across the Old World but unknown in the New—but we'd learn nothing about skyscrapers, shopping centers, or railroad networks. I shared Sauer's romantic sympathies—what American doesn't, bombarded as we are with advertising for home cooking, pies like grandma used to make, and spaghetti sauce from an old Italian

recipe?—but it just didn't make sense to me for geographers to close their eyes to the world outside today's window. That's why I've rebalanced things here. Perhaps I've gone too far the other way and treated the distant past so cursorily that I insult the Sauer tradition. Truth to tell, I have to work to get interested in the things I tackle up front, under the heading "Anthropological Foundations." It's probably because they're mostly things I can't see.

Throughout, whether discussing the distant past or the here and now, my presentation is both advanced and elementary. It's advanced in the sense that it's factually very dense, a real jungle. More about this in a moment. At the same time, however, I try to write the way I would like to talk. You can't find a better, surer way to raise sophisticated eyebrows. What I've written is elementary in another way, too, because I rarely use words such as hypothesis, data, and model. This may sound innocent, even charming. I like it myself, having never had the least interest in being a scientist. Almost without exception, however, human geographers today—especially the more celebrated among them—want more than anything else to be scientists. Accordingly, they shun description and plunge deeply into the production of theory. But, then, they've analyzed the production of so many things. Space, place, memory, love: you name it, they've investigated its production. For them, Chopin perfected the production of nocturnes.

It doesn't take a genius to see whose side I'm on. For me, human geography belongs with the humanities, and contemporary efforts to make a science out of it are just another chapter in the dismal story of the social sciences seeking respect. But now you see why high-flying insiders will dismiss what I've written as not merely elementary but regressive. It's also why a clever title for this book would be *An Old Geography of a New World*. Or maybe just *A New Old Geography*. My own working title was *The Great Mirror*, a title suggesting that the cultural landscape is useful as a way to see and understand ourselves. As well as any book or conversation, the cultural landscape shows us that Western civilization, uniquely powerful and uniquely secular, is also uniquely successful and uniquely destructive, uniquely rewarding and uniquely devastating. These are paradoxical pairings, but they're no odder than the fact that unhealthy food can taste good. What *is* odd is that geography's contribution to our understanding of the world continues to be ignored by academics who trust and perhaps enjoy words more than reality. The truly afflicted will say that words *are* the only reality.

Another warning: The evolutionary approach can be initially confusing. At the start, you'll think you somehow picked up a mislabeled book on anthropology. After all, I begin with human origins and our diffusion over the earth. We'll soon look at the beginnings of agriculture and the emergence of civilization. Sounds like archaeology to me. Then we'll get to Europe and the rise of what's become a global culture. We'll look at its roots and its expansion—and you'll look at the spine of this book and squint to find the word history. We'll spend a lot of time looking at how people make a living. By then you'll think this must be a book for novice investors trying to decide where to put their money. We'll get to social upheavals and environmental problems, and you'll think that this must be a study in political science or environmental studies. At some point, you'll ask where the geography is in all the topics that come flashing by—and flash they do in a survey such as this. But everything we touch is either there to be seen in the cultural landscape or needs to be understood to make sense of the cultural landscape.

You may also feel that you're drowning in facts, which are certainly here in abundance. Which brings me back to the advanced aspect of this book, its factual density. I like facts a lot more than generalizations—yes, yes, including this one. But I also want you to be able to follow things up, be able to dig more deeply. The old way of doing this was by taking a list

of further readings to the library. I'm not shy about offering bibliographical pointers—I've included enough to fill a big bookcase—but a lot of the information here is too current to be amplified from books. No problem. Nowadays you can dig amazingly fast on the internet. By supplying very specific names I'm hoping to give you search terms to ease your life on the prowl.

At some point, and however interesting you find the details, I hope you'll realize that my real interest is in their interconnections. I want you to see one thing—any thing—and an instant later see the strands leading off from it in every direction. "Everything in Every Thing" might be my mystical (or mystifying) motto. Odd for a geographer to have feelings: We're supposed to be supremely pedestrian, measuring the exact dimensions of rivers and mountains and cities and exports. But human geography finally produces, at least in a loose sense, a philosophy of human ecology. That's what Sauer had, as he shuffled up and down Berkeley's corridors, pipe in hand, smoke curling behind. It wasn't the fish poisons and crop diffusions and aboriginal burning that kept him going: it was our changing relationship with this planet. That's a long way from the wretched test handed to my seventh grader last year. Her social studies teacher wanted her to name all the states starting with "O."

PART I

ANTHROPOLOGICAL FOUNDATIONS

CHAPTER 2

HUMAN EVOLUTION, DIFFUSION, AND CULTURE

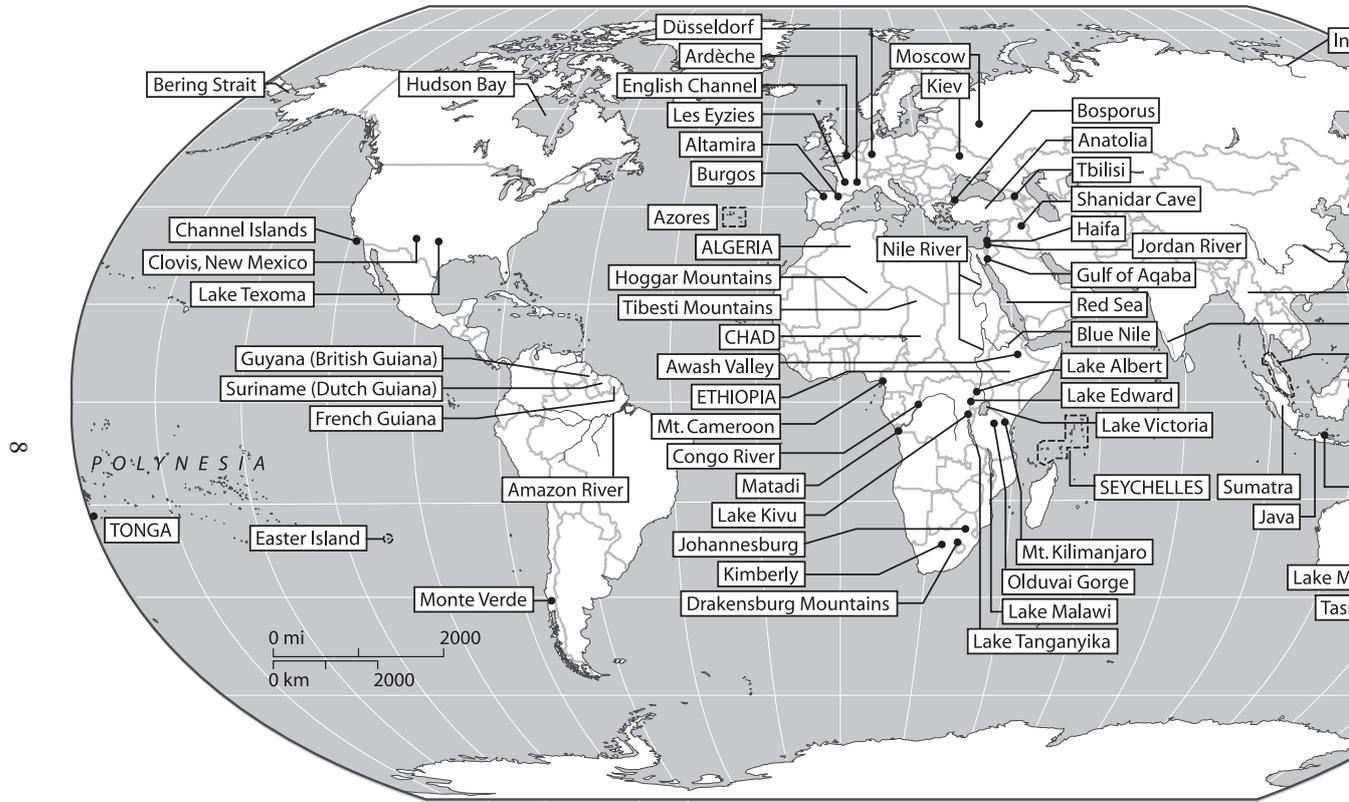
The mucky shores of Lake Texoma, on the Texas–Oklahoma border, are scattered with 30-pound snails a foot across. They're dead. They're more than dead: they're fossils. And they're not really snails: They're cephalopods, not gastropods. Still, they're about 100 million years old. That's old enough to get your attention, but these pseudo-snails are latecomers in the story of evolution. Worlds of multicellular life forms had come and gone by the time these creatures lived and died at the edge of a now-vanished shallow sea.

Thirty-five million years passed after the extinction of the snails. All the nonavian dinosaurs had gone with them. Then—it's hard not imagining this happening on a fine Spring day—the mammals began their own evolution. Among the emergent groups were the apes, once so widespread that they lived even in North America. Eventually, the quicker-breeding monkeys pushed them to refuges, primarily in Africa. There, some 6 million years ago, another group of primates appeared.

AFRICAN ENVIRONMENTS

Before we turn to the hominids, stop and look at a map of Africa. Looking at a map is an old-fashioned thing to do, but human geography begins with the physical earth, and you can't find a bigger chunk of ancient rock than Africa. There are recent mountains in the Northwest: they're the Atlas, part of the Alpine system that rims Asia all the way east to Burma. To the south, the continental bedrock is frequently masked by sedimentary debris, for example, desert sands. Patches of volcanic rock poke through, too. Some, like the Hoggar and Tibesti mountains of Algeria and Chad, lie deep in the Sahara. Another patch forms Mt. Cameroon, just inland from the angle of the Gulf of Guinea.

Dig through Africa's surficial sediment, however, and you'll almost always find precambrian basement, older even than the dinosaurs, let alone the mammals. Almost the whole continent is a precambrian block, lower in the north, higher in the south. The most dramatic edge is in South Africa's Drakensberg, or the dragon's mountain. Ocean-going ships that might head many hundreds of miles up the Amazon or the Yangtze can't get far up the Congo. About 100 miles from the sea, they're stopped by a waterfall over the



No substitute for an atlas (for its wealth of thematic maps I recommend _____), this map attempts to follow, to locate all but the most obvious places mentioned in its chapter.

plateau's edge. Such freight as there is—the Congo's economy is a wreck—must be carried by rail or road from the port of Matadi upstream to the river port at Kinshasa.

About 5 million years ago, Africa began to split. The separation was never completed, but the process left behind a scar, which can be traced from Turkey down the line of the Jordan River, Dead Sea, Gulf of Aqaba, Red Sea, and then inland across Africa. There the scar is a trench partly filled by narrow but very deep lakes: Albert, Edward, Kivu, Tanganyika, and Malawi, formerly called Nyasa. Lake Victoria sits in a bowl between two arms of the trench, and though its surface area is large, the lake is never more than a few hundred feet deep. Tanganyika, in contrast, is as much as 4,500 feet deep.

This geological rifting was filled by upwelling lava, most dramatically in Mount Kilimanjaro but also in the broad and rugged upland of Ethiopia. There the volcanic rock was eventually trenched by rivers like the Blue Nile. Great canyons were formed, which is why the country has sometimes been called Abyssinia.

The formation of the rift uplands changed the climate of East Africa. West of the rift, equatorial Africa is rain forest, moistened by winds drawn in from the Atlantic by the heat of the equatorial lowlands. Rifting and uplifting produced mountains that drained those winds of their moisture, so the equatorial plains and coast east of the rift became dependent on eastern winds. Normally, east coasts at this latitude receive generous amounts of rain. Think of the Guianas and the Malay Peninsula. Those places have thousands of miles of ocean to their east, however. East Africa's winds often originate over dry Arabia. Winds from the Indian Ocean do bring summer moisture to East Africa: Without them, there would be no annual flood on the Nile. But the water vapor in these winds does not condense until forced to rise by the inland mountains.

HUMAN ORIGINS

East of the rift, in short, Africa dried out, creating a new ecological niche. It was soon occupied by the new group of primates, the hominids. They were bipedal.

That's a very short sentence but a very big idea. There are 4,000 other mammals on the earth, including about 200 primates. None except the hominids regularly walk on two feet.

Why the hominids did so isn't clear. (Such is life. The most important questions never have indisputable answers.) In *Upright* (2003), Craig Stanford argues that the trait emerged in the forest, where it was advantageous to stand upright on branches and reach fruit with one hand, while the other held another branch for balance or support. Out in the hot savanna, or crossing patches of savanna between islands of forest, bipedalism remained helpful because the sun doesn't bake an upright animal quite as much as it does one on all fours. To live in the hot sun, the early hominids also lost their hairy coats and began to sweat over the whole of their bodies.

Like chimps, they ate meat. Stanford observes that they were probably better hunters than the chimps, whose knuckle-walking gait is inefficient for sustained hunting. That's why chimps will kill and eat monkeys in their path but won't spend a day looking for game. The bipedal hominids, however, could devote themselves to the chase or—more commonly than we'd probably like to admit—to finding a carcass to scavenge. It's tempting to link their reliance on meat to increasing brain size, but Stanford points out that hominids were on the savanna for 5 million years before brain size, relative to body size, began growing.

Apart from upright posture, sweating, hairlessness, and a probable tendency to undertake long hunts for meat, these first hominids—the australopithecines, to give them

their proper name—were more apelike than human. There’s no evidence that they regularly used tools, for example, even though chimpanzees do. Nor were their brains larger than those of contemporaneous apes.

From one australopithecine species, probably *Australopithecus afarensis*, the larger and tool-using genus *Homo* emerged about 2.5 million years ago in the species *Homo habilis*. The line of human descent may pass about 1.8 million years ago to what some experts recognize as the species *Homo ergaster*, which possessed for the first time a distinctively modern body shape, with the long legs that indicate a completely terrestrial rather than at least partly arboreal habit. Other experts consider *Homo ergaster* simply the earliest example of *Homo erectus*. (The significance given by the name *erectus* to upright posture is misleading, because the australopithecines also stood upright. Still, the name *Homo erectus* has stuck ever since it was coined in the 1940s by Ernst Mayr, who was consolidating the finds popularly known as Java Man and Peking Man.)

Homo erectus lived for well over 1 million years before disappearing about 200,000 years ago. Then, half a million years ago and for reasons that remain unknown, brain size began increasing rapidly. *Homo sapiens* now appeared, first in archaic forms like the Neanderthals. (The name is sometimes spelled without the “h,” as Neandertals.) Modern *sapiens*, indistinguishable from ourselves, appeared only about 150,000 years ago. There are experts (the best known is Milford Wolpoff) who believe that *Homo sapiens* emerged separately in several parts of the Old World from *erectus* stocks. Call it the multiregional hypothesis. The more popular theory—it’s summarized in Chris Stringer’s *African Exodus: the Origins of Modern Humanity* (1997)—holds that *Homo sapiens* emerged once, in Africa, then radiated outward about 100,000 years ago to the Middle East and beyond.

Experts in this field have a weakness for cute names. Stanford, for example, calls bipedalism the “heavenly gait.” Stringer, too, indulges himself and calls the African-origin story the Out-of-Africa Hypothesis. Cutely named or not, the hypothesis rests on the fact that of all the people now living on Earth, the ones genetically closest to the earliest modern *Homo sapiens* are Africans, specifically some of the !Kung San Bushmen and Biaha Pygmies. The matter’s still hotly debated, however, and there’s a middle position, too, combining an African origin with genetic blending as the African population spread across Eurasia. It’s tempting to hope that these alternatives are true, because one brutal implication of Out of Africa is that our ancestors killed the Neanderthals.

So much for a fiercely compressed summary of a complex subject. Let’s turn to some details. A nice one is the gap in the ridge brow, or torus. You can feel it between your eyebrows, where the skull goes flat. It’s the defining mark of modern *sapiens*.

We could also venture into the saga of the history of knowledge in this field. It’s been a detective story of epic proportions, surrounded by controversy since 1856, when the first Neanderthal bones were found near Düsseldorf, Germany. They were dismissed as pathological by Rudolf Virchow, the outstanding anatomist of the day. The publication of Darwin’s *Origin of Species* (1859), however, inspired a search for so-called missing links. In 1891 a Dutch physician, Eugene Dubois, made a spectacular discovery on the banks of the Solo River near Trinil, in East Java. It was just a skull and femur, but it was the first recovered remains of Java Man. (Dubois’s story is breathlessly recounted in Pat Shipman’s *The Man Who Found the Missing Link* [2002].) Dubois himself was embittered for the rest of his long life by the scientific establishment’s rejection of his claims. Several decades passed before the anatomically similar Peking Man was found near Beijing. This discovery, along with Java Man, was what Mayr in the 1940s would designate *Homo erectus*.

In Taung, north of Kimberley, South Africa, Raymond Dart in 1925 had meanwhile

found the first australopithecine. Like Dubois, his work was rejected by Europe's experts, who balked at tracing human origins to Africa. The importance of the australopithecines—and of Africa in the story of human evolution—did not become paradigmatic until the 1960s, when many fossils were dug from Tanzania's Olduvai Gorge. It's an erosional slice through an ancient lake bed, where sediments were deposited over a period of 2 million years. They have been famously worked by the Leakey family—Louis, wife Mary, and son Richard. Mary was the one who made the first big discovery, of an australopithecine the Leakeys called *Zinjanthropus boisei*. They reported their discovery in the *National Geographic Magazine* in 1960, but the real shocker came later, when potassium-argon dating revealed that their find was not, as the Leakeys thought, 600,000 years old, but 1.75 million years old.

Discoveries continue to be made, and some of them will no doubt upset the tidy history presented here. In 1998, an apparently very complete australopithecine skeleton was found at Sterkfontein, near Johannesburg and dated to nearly 3.5 million years ago. Early in 2001, another Leakey—Meave—discovered what she described as a new genus of the same age; she called it *Kenyanthropus platyops*. A few months later, a graduate student named Yohannes Haile-Selassie found some fossils in Ethiopia's Awash Valley. They were dated to more than 5 million years ago and apparently came from a creature close to the dividing point, 6 million years ago, between chimpanzees and hominids. Judging from its toe joint, the creature walked upright. Strikingly, however, the environment in which the creature lived was forest, not grassland. This fact threatens the conventional wisdom that human evolution is a story of the African grasslands. In the summer of 2002, parts of a chimp-like skull with human-like teeth were found in Chad and dated to 6–7 million years ago. Although the skull, classified as a new species nicknamed Toumai, may be from a chimp ancestor, it may also prove to be from a human one. If so, it jeopardizes what Stringer, still in good form, calls the East Side Story. Potentially, it reduces East Africa to a sideshow. In the summer of 2003, however, Tim White announced the discovery in Ethiopia of *Homo sapiens idaltu* or Herto humans, from the village where these anatomically almost modern humans were found and dated to 160,000 years ago. Multiregionalists were not persuaded, but Out-of-Africa supporters took this discovery as more evidence in favor of African origins.

There's no slacking to this tide. Early in 2004 a group of medical researchers led by Hansell Stedman published a paper in *Nature* in which they discussed a mutation to the gene MYH16, which builds the strong jaw muscles characteristic of primates. The mutation makes the gene inactive, is found in all humans, and can be dated to approximately 2.4 million years ago. They speculated that this reduction of jaw musculature might be linked to the change in skull shape and the enlargement of the hominid brain that also occurred at this time with the first species of the genus *Homo*.

We could venture, finally, into the controversy surrounding the idea of human races. There is more genetic variation between members of a given race than there is between members of different races, which is why anthropologists repudiate race as a tool to categorize people. Yet the idea of race, resting ultimately on skin color, continues to be rooted extremely deeply in most societies, despite its ruinous social consequences. It's not an American or European specialty, either. The name Sudan, for example, means land of the blacks and was used as a term of contempt by Arabs who encountered the Nilotic tribes upstream from Egypt.

I'm not going to dwell on any of this. Instead, I want to look at the spread of humanity across the earth and then take up the question of culture.

DIFFUSION

We're wanderers—always have been. It goes back to upright posture and our ability to outwalk our relatives.

Homo erectus walked to the Solo River in Java 1.8 million years ago; to Dmanisi, near Tbilisi, 1.7 million years ago; to Beijing about 1.3 million years ago; and to Europe about 800,000 years ago. The European date comes from the Gran Dolina, near Burgos, Spain, but the path taken there must have been indirect, because the Mediterranean—even the relatively narrow but deep channel at Gibraltar—was an insuperable obstacle until boats were invented. The ice ages, however, lowered sea levels by about 600 feet, and *Homo erectus* could walk into Asia through a now-flooded land passage across the narrow strait at the southern end of the Red Sea. (The strait is called the Bab al Mandeb, in Arabic literally the gate of tears.) The mountains of Anatolia probably blocked the route north and west into Europe, leaving the earliest hominids to enter Europe by backtracking across the flat lands of Central Asia. Once in Europe, they probably became the ancestors of the Neanderthals, who arose about 250,000 years ago only to disappear perhaps because they were less adaptable or competitive or belligerent than modern *Homo sapiens*.

The diffusion of modern *sapiens* is more important to us. There's good evidence from the Skhul cave near Haifa of this species living 100,000 years ago in present-day Israel, which was reached by diffusion across North Africa toward the Mediterranean at a time when the Sahara was not particularly dry. Puzzlingly, these modern *sapiens* seem to have coexisted with Neanderthals for perhaps 50,000 years. Then, starting more than 50,000 years ago, modern *sapiens* spread east along the Asian rim to Southeast Asia. There's not much evidence for this, but you wouldn't expect there to be, because the easiest path of diffusion would have been along coastlines now under water. Lower sea levels allowed early modern *sapiens* to walk not only across the Red Sea but also from the Malay Peninsula to Sumatra and Java—to walk, in other words, across the former land mass known as Sunda.

Australia is a different story. During periods of lowered sea level, Australia was part of Sahul, a continent including New Guinea and Tasmania. Sahul was separated from Sunda by about 50 miles of deep water south of Timor and its eastern neighbor, Tanimbar. Reaching Australia took boats, in other words, and that's why *Homo erectus* never got to Australia. It's also why 1 million years separate the first hominids on Sunda from the first on Sahul. We've had boats for about 60,000 years though, which is also the earliest firm date of Australian settlement. Another date comes from Lake Mungo in New South Wales, where a grave has been dated at more than 40,000 years ago. (Lake Mungo is also the site of the world's oldest known cremation, 25,000 years old.) Once in Australia, people could walk across Sahul to New Guinea and Tasmania, but boats were needed once again to get to more distant islands like New Zealand. The knowledge of how to build boats, or the ability to do so, sometimes disappeared, leaving people stranded. A very late example is Easter Island, only reached about 1,500 years ago. Descendants of the settlers apparently destroyed the island's forests. With the decay of the settlers' boats and the absence of wood on the island, the settlers were stuck.

There was diffusion west, too, bringing *Homo sapiens* at least 45,000 years ago to Europe, where they are familiarly known as the Cro-Magnons. That name comes from the name of a rock ledge near the French village of Les Eyzies, in the Dordogne Valley. Ancient bones were unearthed here during railway construction in 1868.

Once again, land bridges were important, both at the Bosphorus and the English Channel. But don't imagine that there was only one wave rolling north into Europe.

Genetic studies suggest that about 5% of the ancestry of modern Europeans dates back to a pioneer wave of settlement that took place about 45,000 years ago. About 80% dates to migrations occurring 20,000–30,000 years ago. The remainder comes from still later migrations.

Settlement eventually curved northeasterly to Russia, with its wealth of meat in the form of mammoths. The Ice Age climate required the development of specialized tools, such as needles to sew clothing, but these people were inventive. At Mezhirich, near Kiev, archaeologists have found houses framed about 25,000 years ago with mammoth tusks. Even the brutal climate of eastern Siberia was no bar to settlement: by 12,000 years ago there were people living at Berelekh, which is at the mouth of the Indigirka River and well above the Arctic Circle. It may just be that these people were genetically adapted to the climate. That's the finding of Douglas Wallace, who believes that the mitochondria of northerners generate unusual amounts of heat.

The most famous of the land bridges was the one across the Bering Strait, crossed by people drifting northeasterly from Siberia. It's not clear whether they came from the west or the south or both, but the idea that the first Americans came via the Strait goes all the way back to José de Acosta in 1589. When did the migration occur? In 1932, fluted points dated to about 13,000 years ago were found near Clovis, New Mexico. Since then, the conventional wisdom among archaeologists has been that the Americas were settled at about that time, when a gap opened in Canada between the great ice sheet that spread west from Hudson Bay and the smaller glaciers descending the eastern slope of the Rockies. It suddenly became possible for the Clovis Hunters to stream through the gap and spread over the Western Hemisphere.

Lately, this picture has been called into question. First, there is general agreement that a site called Monte Verde in southern Chile was settled 15,000 years ago. The site includes not only remnants of food and hides but familiar objects such as cords and tent pegs. The important implication is that the settlement of the Western Hemisphere had to begin when there was no passage between the ice lobes. Is there an alternative route? Coastal migration has been proposed, but again it's difficult to document because here, too, ancient campsites are now mostly under water. There are a few exceptions, though. Peru lacks a broad continental shelf, for example, and the remains of coastal settlements have been found there and dated to about 11,000 years ago. More support comes from a skeleton dated to 13,000 years ago from the Channel Islands off the southern California coast.

The astonishing thing is that people by 10,000 years ago had occupied just about the entire ecumene, or inhabited world. Only some islands and very high latitudes remained unoccupied. Even most of those empty places soon had people. The islands of the Mediterranean and Caribbean were settled about 4,000 years ago. The Arctic came later, although recent claims suggest that there were settlers in at least the European part of Arctic Russia as long as 35,000 years ago. Last of all was Polynesia, whose settlement required not only advanced navigation skills but also the possession of domesticated plants that could provide a food supply. It seems that Polynesia was settled very quickly by people from Southeast Asia who had settled for a time in Melanesia. A group of those people, almost unmixed with the local Melanesians, moved east to Tonga about 900 B.C. (The evidence for the Melanesia–Tonga connection is the so-called Lapita pottery, which is found both at Lapita, in Melanesian New Caledonia, and on Tonga.) From Tonga, groups radiated across Polynesia in outrigger canoes loaded with dozens of people and their domesticated plants and pigs. They sailed southwestward to New Zealand, eastward to Easter Island, and northeastward to Hawaii.

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