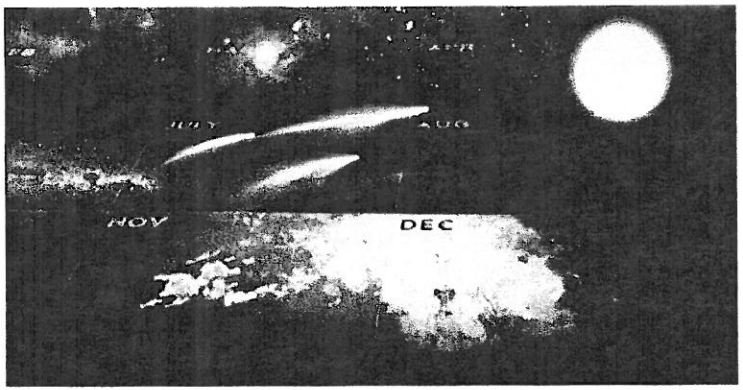
Carl Sagan: The Cosmic Calendar

BY JENNIFER WELSH

In Sunday's premiere of *Cosmos*, Neil deGrasse Tyson spent a good third of the show describing the sheer immensity of time on the cosmic scale. Our universe was born 13.8 billion years ago. If we condense that time down to one calendar year, we create what is called the "cosmic calendar."

In this cosmic calendar 1 day = 40 million years and 1 month = more than 1 billion years.

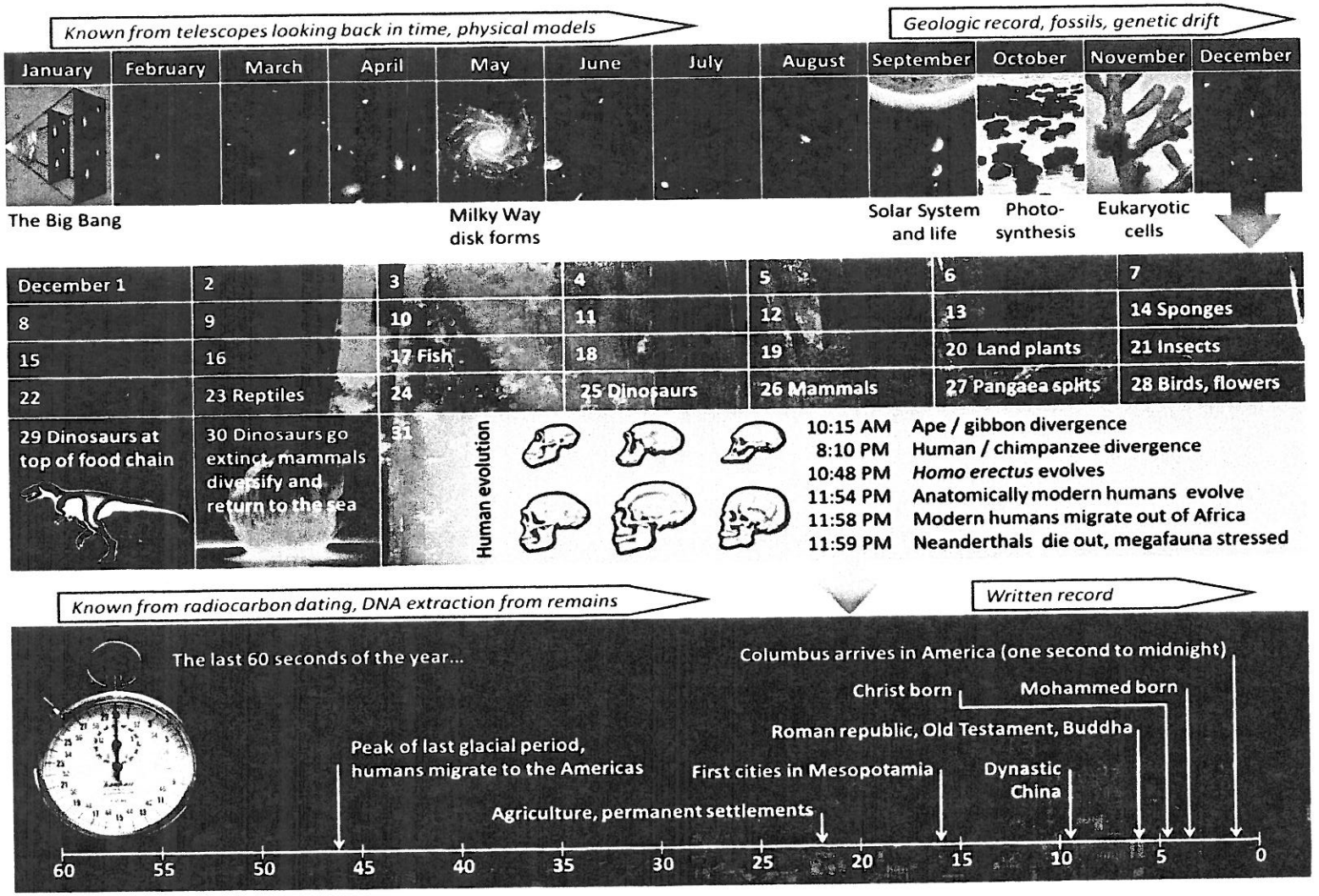


If the big bang happened at the beginning of the year, the first second of January 1, then, as it expanded, the universe cooled, and it was darkness for about 200 million years. Gravity was pulling together clumps of gas and heating them until the first stars burst into light on January 10. On January 13th, these stars coalesced to form the first small galaxies. These galaxies merged to form still larger ones, including our own Milky Way. We formed about 11 billion years ago, on March 15 of the cosmic year.
It took until September for the solar system to develop, and early earth to be created. Life on earth started at about that time too.

In this scale, humans didn't arise until the last day of the year, and modern civilization makes up about the last 14 seconds of the year.

Everyone we have ever heard of lived in those 14 seconds, deGrasse Tyson says: "Every person you've ever heard of lies right in there. All those kings and battles, migrations and inventions, wars and loves, everything in the history books happened here in the last seconds of the cosmic calendar."

Here's a detailed version:



From Jared Diamond: ***Guns, Germs and Steel*** (Pgs. 104-113)

AP World History Mr. Rhinehart

CHAPTER 6

TO FARM OR NOT TO FARM

FORMERLY, ALL PEOPLE ON EARTH WERE HUNTER-GATHERers. Why did any of them adopt food production at all? Given that they must have had some reason, why did they do so around 8500 B.C. in Mediterranean habitats of the Fertile Crescent, only 3,000 years later in the climatically and structurally similar Mediterranean habitats of southwestern Europe, and never indigenously in the similar Mediterranean habitats of California, southwestern Australia, and the Cape of South Africa? Why did even people of the Fertile Crescent wait until 8500 B.C., instead of becoming food producers already around 18,500 or 28,500 B.C.?

From our modern perspective, all these questions at first seem silly, because the drawbacks of being a hunter-gatherer appear so obvious. Scientists used to quote a phrase of Thomas Hobbes's in order to characterize the lifestyle of hunter-gatherers as "nasty, brutish, and short." They seemed to have to work hard, to be driven by the daily quest for food, often to be close to starvation, to lack such elementary material comforts as soft beds and adequate clothing, and to die young.

In reality, only for today's affluent First World citizens, who don't actually do the work of raising food themselves, does food production (by remote agribusinesses) mean less physical work, more comfort, freedom from starvation, and a longer expected lifetime. Most peasant farmers and

herders, who constitute the great majority of the world's actual food producers, aren't necessarily better off than hunter-gatherers. Time budget studies show that they may spend more rather than fewer hours per day at work than hunter-gatherers do. Archaeologists have demonstrated that the first farmers in many areas were smaller and less well nourished, suffered from more serious diseases, and died on the average at a younger age than the hunter-gatherers they replaced. If those first farmers could have foreseen the consequences of adopting food production, they might not have opted to do so. Why, unable to foresee the result, did they nevertheless make that choice?

There exist many actual cases of hunter-gatherers who did see food production practiced by their neighbors, and who nevertheless refused to accept its supposed blessings and instead remained hunter-gatherers. For instance, Aboriginal hunter-gatherers of northeastern Australia traded for thousands of years with farmers of the Torres Strait Islands, between Australia and New Guinea. California Native American hunter-gatherers traded with Native American farmers in the Colorado River valley. In addition, Khoi herders west of the Fish River of South Africa traded with Bantu farmers east of the Fish River, and continued to dispense with farming themselves. Why?

Still other hunter-gatherers in contact with farmers did eventually become farmers, but only after what may seem to us like an inordinately long delay. For example, the coastal peoples of northern Germany did not adopt food production until 1,300 years after peoples of the Linearbandkeramik culture introduced it to inland parts of Germany only 125 miles to the south. Why did those coastal Germans wait so long, and what led them finally to change their minds?

BEFORE WE CAN answer these questions, we must dispel some misconceptions about the origins of food production and then reformulate the question. What actually happened was not a *discovery* of food production, nor an *invention,* as we might first assume. There was often not even a conscious choice between food production and hunting-gathering. Specifically, in each area of the globe the first people who adopted food production could obviously not have been making a conscious choice or consciously striving toward farming as a goal, because they had never seen farming and had no way of knowing what it would be like. Instead, as we

shall see, food production *evolved* as a by-product of decisions made without awareness of their consequences. Hence the question that we have to ask is why food production did evolve, why it evolved in some places but not others, why at different times in different places, and why not instead at some earlier or later date.

Another misconception is that there is necessarily a sharp divide between nomadic hunter-gatherers and sedentary food producers. In reality, although we frequently draw such a contrast, hunter-gatherers in some productive areas, including North America's Pacific Northwest coast and possibly southeastern Australia, became sedentary but never became food producers. Other hunter-gatherers, in Palestine, coastal Peru, and Japan, became sedentary first and adopted food production much later. Sedentary groups probably made up a much higher fraction of hunter-gatherers 15,000 years ago, when all inhabited parts of the world (including the most productive areas) were still occupied by hunter-gatherers, than they do today, when the few remaining hunter-gatherers survive only in unproductive areas where nomadism is the sole option.

Conversely, there are mobile groups of food producers. Some modern nomads of New Guinea's Lakes Plains make clearings in the jungle, plant bananas and papayas, go off for a few months to live again as hunter-gatherers, return to check on their crops, weed the garden if they find the crops growing, set off again to hunt, return months later to check again, and settle down for a while to harvest and eat if their garden has produced. Apache Indians of the southwestern United States settled down to farm in the summer at higher elevations and toward the north, then withdrew to the south and to lower elevations to wander in search of wild foods during the winter. Many herding peoples of Africa and Asia shift camp along regular seasonal routes to take advantage of predictable seasonal changes in pasturage. Thus, the shift from hunting-gathering to food production did not always coincidewith a shift from nomadism to sedentary living.

Another supposed dichotomy that becomes blurred in reality is a distinction between food producers as active managers of their land and hunter-gatherers as mere collectors of the land's wild produce. In reality, some hunter-gatherers intensively manage their land. For example, New Guinea peoples who never domesticated sago palms or mountain pandanus nevertheless increase production of these wild edible plants by clearing away encroaching competing trees, keeping channels in sago swamps clear, and promoting growth of new sago shoots by cutting down mature

sago trees. Aboriginal Australians who never reached the stage of farming yams and seed plants nonetheless anticipated several elements of farming. They managed the landscape by burning it, to encourage the growth of edible seed plants that sprout after fires. In gathering wild yams, they cut off most of the edible tuber but replaced the stems and tops of the tubers in the ground so that the tubers would regrow. Their digging to extract the tuber loosened and aerated the soil and fostered regrowth. All that they would have had to do to meet the definition of farmers was to carry the stems and remaining attached tubers home and similarly replace them in soil at their camp.

FROM THOSE PRECURSORS of food production already practiced by hunter-gatherers, it developed stepwise. Not all the necessary techniques were developed within a short time, and not all the wild plants and animals that were eventually domesticated in a given area were domesticated simultaneously. Even in the cases of the most rapid independent development of food production from a hunting-gathering lifestyle, it took thousands of years to shift from complete dependence on wild foods to a diet with very few wild foods. In early stages of food production, people simultaneously collected wild foods *and* raised cultivated ones, and diverse types of collecting activities diminished in importance at different times as reliance on crops increased.

The underlying reason why this transition was piecemeal is that food production systems evolved as a result of the accumulation of many separate decisions about allocating time and effort. Foraging humans, like foraging animals, have only finite time and energy, which they can spend in various ways. We can picture an incipient farmer waking up and asking: Shall I spend today hoeing my garden (predictably yielding a lot of vegetables several months from now), gathering shellfish (predictably yielding a little meat today), or hunting deer (yielding possibly a lot of meat today, but more likely nothing)? Human and animal foragers are constantly prioritizing and making effort-allocation decisions, even if only unconsciously. They concentrate first on favorite foods, or ones that yield the highest payoff. If these are unavailable, they shift to less and less preferred foods.

Many considerations enter into these decisions. People seek food in order to satisfy their hunger and fill their bellies. They also crave specific foods, such as protein-rich foods, fat, salt, sweet fruits, and foods that

simply taste good. All other things being equal, people seek to maximize their return of calories, protein, or other specific food categories by foraging in a way that yields the most return with the greatest certainty in the least time for the least effort. Simultaneously, they seek to minimize their risk of starving: moderate but reliable returns are preferable to a fluctuating lifestyle with a high time-averaged rate of return but a substantial likelihood of starving to death. One suggested function of the first gardens of nearly 11,000 years ago was to provide a reliable reserve larder as insurance in case wild food supplies failed.

Conversely, men hunters tend to guide themselves by considerations of prestige: for example, they might rather go giraffe hunting every day, bag a giraffe once a month, and thereby gain the status of great hunter, than bring home twice a giraffe's weight of food in a month by humbling themselves and reliably gathering nuts every day. People are also guided by seemingly arbitrary cultural preferences, such as considering fish either delicacies or taboo. Finally, their priorities are heavily influenced by the relative values they attach to different lifestyles—just as we can see today. For instance, in the 19th-century U.S. West, the cattlemen, sheepmen, and farmers all despised each other. Similarly, throughout human history farmers have tended to despise hunter-gatherers as primitive, hunter-gatherers have despised farmers as ignorant, and herders have despised both. All these elements come into play in people's separate decisions about how to obtain their food.

As we already noted, the first farmers on each continent could not have chosen farming consciously, because there were no other nearby farmers for them to observe. However, once food production had arisen in one part of a continent, neighboring hunter-gatherers could see the result and make conscious decisions. In some cases the hunter-gatherers adopted the neighboring system of food production virtually as a complete package; in others they chose only certain elements of it; and in still others they rejected food production entirely and remained hunter-gatherers.

For example, hunter-gatherers in parts of southeastern Europe had quickly adopted Southwest Asian cereal crops, pulse crops, and livestock simultaneously as a complete package by around 6000 B.C. All three of these elements also spread rapidly through central Europe in the centuries before 5000 B.C. Adoption of food production may have been rapid and

wholesale in southeastern and central Europe because the hunter-gatherer lifestyle there was less productive and less competitive. In contrast, food production was adopted piecemeal in southwestern Europe (southern France, Spain, and Italy), where sheep arrived first and cereals later. The adoption of intensive food production from the Asian mainland was also very slow and piecemeal in Japan, probably because the hunter-gatherer lifestyle based on seafood and local plants was so productive there.

Just as a hunting-gathering lifestyle can be traded piecemeal for a food-producing lifestyle, one system of food production can also be traded piecemeal for another. For example, Indians of the eastern United States were domesticating local plants by about 2500 B.C. but had trade connections with Mexican Indians who developed a more productive crop system based on the trinity of corn, squash, and beans. Eastern U.S. Indians adopted Mexican crops, and many of them discarded many of their local domesticates, piecemeal; squash was domesticated independently, corn arrived from Mexico around A.D. 200 but remained a minor crop until around A.D. 900, and beans arrived a century or two later. It even happened that food-production systems were abandoned in favor of hunting-gathering. For instance, around 3000 B.C. the hunter-gatherers of southern Sweden adopted farming based on Southwest Asian crops, but abandoned it around 2700 B.C. and reverted to hunting-gathering for 400 years before resuming farming.

ALL THESE CONSIDERATIONS make it clear that we should not suppose that the decision to adopt farming was made in a vacuum, as if the people had previously had no means to feed themselves. Instead, we must consider food production and hunting-gathering as *alternative strategies* competing with each other. Mixed economies that added certain crops or livestock to hunting-gathering also competed against both types of "pure" economies, and against mixed economies with higher or lower proportions of food production. Nevertheless, over the last 10,000 years, the predominant result has been a shift from hunting-gathering to food production. Hence we must ask: What were the factors that tipped the competitive advantage away from the former and toward the latter?

That question continues to be debated by archaeologists and anthropologists. One reason for its remaining unsettled is that different factors may have been decisive in different parts of the world. Another has been the

problem of disentangling cause and effect in the rise of food production. However, five main contributing factors can still be identified; the controversies revolve mainly around their relative importance.

One factor is the decline in the availability of wild foods. The lifestyle of hunter-gatherers has become increasingly less rewarding over the past 13,000 years, as resources on which they depended (especially animal resources) have become less abundant or even disappeared. As we saw in Chapter 1, most large mammal species became extinct in North and South America at the end of the Pleistocene, and some became extinct in Eurasia and Africa, either because of climate changes or because of the rise in skill and numbers of human hunters. While the role of animal extinctions in eventually (after a long lag) nudging ancient Native Americans, Eurasians, and Africans toward food production can be debated, there are numerous incontrovertible cases on islands in more recent times. Only after the first Polynesian settlers had exterminated moas and decimated seal populations on New Zealand, and exterminated or decimated seabirds and land birds on other Polynesian islands, did they intensify their food production. For instance, although the Polynesians who colonized Easter Island around A.D. 500 brought chickens with them, chicken did not become a major food until wild birds and porpoises were no longer readily available as food. Similarly, a suggested contributing factor to the rise of animal domestication in the Fertile Crescent was the decline in abundance of the wild gazelles that had previously been a major source of meat for hunter-gatherers in that area.

A second factor is that, just as the depletion of wild game tended to make hunting-gathering less rewarding, an increased availability of domesticable wild plants made steps leading to plant domestication more rewarding. For instance, climate changes at the end of the Pleistocene in the Fertile Crescent greatly expanded the area of habitats with wild cereals, of which huge crops could be harvested in a short time. Those wild cereal harvests were precursors to the domestication of the earliest crops, the cereals wheat and barley, in the Fertile Crescent.

Still another factor tipping the balance away from hunting-gathering was the cumulative development of technologies on which food production would eventually depend—technologies for collecting, processing, and storing wild foods. What use can would-be farmers make of a ton of wheat grains on the stalk, if they have not first figured out how to harvest, husk, and store them? The necessary methods, implements, and facilities

appeared rapidly in the Fertile Crescent after 11,000 B.C., having been invented for dealing with the newly available abundance of wild cereals.

Those inventions included sickles of flint blades cemented into wooden or bone handles, for harvesting wild grains; baskets in which to carry the grains home from the hillsides where they grew; mortars and pestles, or grinding slabs, to remove the husks; the technique of roasting grains so that they could be stored without sprouting; and underground storage pits, some of them plastered to make them waterproof. Evidence for all of these techniques becomes abundant at sites of hunter-gatherers in the Fertile Crescent after 11,000 B.C. All these techniques, though developed for the exploitation of wild cereals, were prerequisites to the planting of cereals as crops. These cumulative developments constituted the unconscious first steps of plant domestication.

A fourth factor was the two-way link between the rise in human population density and the rise in food production. In all parts of the world where adequate evidence is available, archaeologists find evidence of rising densities associated with the appearance of food production. Which was the cause and which the result? This is a long-debated chicken-or-egg problem: did a rise in human population density force people to turn to food production, or did food production permit a rise in human population density?

In principle, one expects the chain of causation to operate in both directions. As I've already discussed, food production tends to lead to increased population densities because it yields more edible calories per acre than does hunting-gathering. On the other hand, human population densities were gradually rising throughout the late Pleistocene anyway, thanks to improvements in human technology for collecting and processing wild foods. As population densities rose, food production became increasingly favored because it provided the increased food outputs needed to feed all those people.

That is, the adoption of food production exemplifies what is termed an autocatalytic process—one that catalyzes itself in a positive feedback cycle, going faster and faster once it has started. A gradual rise in population densities impelled people to obtain more food, by rewarding those who unconsciously took steps toward producing it. Once people began to produce food and become sedentary, they could shorten the birth spacing and produce still more people, requiring still more food. This bidirectional link between food production and population density explains the paradox

that food production, while increasing the quantity of edible calories per acre, left the food producers less well nourished than the hunter-gatherers whom they succeeded. That paradox developed because human population densities rose slightly more steeply than did the availability of food.

Taken together, these four factors help us understand why the transition to food production in the Fertile Crescent began around 8500 B.C., not around 18,500 or 28,500 B.C. At the latter two dates hunting-gathering was still much more rewarding than incipient food production, because wild mammals were still abundant; wild cereals were not yet abundant; people had not yet developed the inventions necessary for collecting, processing, and storing cereals efficiently; and human population densities were not yet high enough for a large premium to be placed on extracting more calories per acre.

A final factor in the transition became decisive at geographic boundaries between hunter-gatherers and food producers. The much denser populations of food producers enabled them to displace or kill hunter-gatherers by their sheer numbers, not to mention the other advantages associated with food production (including technology, germs, and professional soldiers). In areas where there were only hunter-gatherers to begin with, those groups of hunter-gatherers who adopted food production outbred those who didn't.

As a result, in most areas of the globe suitable for food production, hunter-gatherers met one of two fates: either they were displaced by neighboring food producers, or else they survived only by adopting food production themselves. In places where they were already numerous or where geography retarded immigration by food producers, local hunter-gatherers did have time to adopt farming in prehistoric times and thus to survive as farmers. This may have happened in the U.S. Southwest, in the western Mediterranean, on the Atlantic coast of Europe, and in parts of Japan. However, in Indonesia, tropical Southeast Asia, most of subequatorial Africa, and probably in parts of Europe, the hunter-gatherers were replaced by farmers in the prehistoric era, whereas a similar replacement took place in modern times in Australia and much of the western United States.

Only where especially potent geographic or ecological barriers made immigration of food producers or diffusion of locally appropriate food-producing techniques very difficult were hunter-gatherers able to persist until modern times in areas suitable for food production. The three outstanding examples are the persistence of Native American hunter-gatherers in California, separated by deserts from the Native American farmers of Arizona; that of Khoisan hunter-gatherers at the Cape of South Africa, in a Mediterranean climate zone unsuitable for the equatorial crops of nearby Bantu farmers; and that of hunter-gatherers throughout the Australian continent, separated by narrow seas from the food producers of Indonesia and New Guinea. Those few peoples who remained hunter-gatherers into the 20th century escaped replacement by food producers because they were confined to areas not fit for food production, especially deserts and Arctic regions. Within the present decade, even they will have been seduced by the attractions of civilization, settled down under pressure from bureaucrats or missionaries, or succumbed to germs.

Name: _____ Block: _____

Peter Stearns: The Idea of Civilization in World Historical Perspective

Mr. Rhinehart AP World History

The Idea of Civilization in World Historical Perspective

The perception that there are fundamental differences between civilized and "barbaric" or "savage" peoples is very ancient and widespread. For thousands of years the Chinese, the civilized inhabitants of the "Middle Kingdom," set themselves off from neighboring peoples, including the pastoral or nomadic cattle- and sheep-herding peoples of the vast plains or steppes to the north and west of China proper, whom they regarded as barbarians. To the Chinese, being civilized was cultural, not biological or racial. If barbarians learned the Chinese language and adopted Chinese ways — from the clothes they wore to the food they ate — these outsiders were admitted into the exalted circle of the civilized.

A similar pattern of demarcation and cultural absorption was found among the American Indian peoples of present-day Mexico. Those who settled in the valleys of the mountainous interior, where they built great civilizations, lived in fear of invasions by peoples they regarded as barbarous and referred to as *chichimecs*, meaning "sons of the dog." The latter were nomadic hunters and gatherers who periodically moved down from the desert regions of North Mexico into the fertile central valleys in search of game and settlements to pillage. The Aztecs were simply the last, and perhaps the most fierce, of a long line of *chichimec* peoples who entered the valleys and either destroyed or conquered the urban-based empires that had developed there. But after the conquerors settled down in the mountain valleys, they adopted many of the religious beliefs and institutional patterns and much of the material culture of the vanquished peoples.

The word *civilization* is derived from the Latin word *civilis* meaning "of the citizens." The term was coined by the Romans to distinguish between themselves as citizens of a cosmopolitan, urban-focused civilization and the "inferior" peoples who lived in the forests and deserts on the fringes of their Mediterranean empire. Centuries earlier, the Greeks, who had contributed much to the rise of Roman civilization, made a similar distinction between themselves and outsiders. Because the languages that non-Greek

peoples to the north of the Greek heartlands spoke sounded like senseless blabber to the Greeks, they lumped all the outsiders together as barbarians, which meant literally "those who cannot speak Greek." As in the case of the Chinese and Aztecs, the boundaries between civilized and barbarian for the Greeks and Romans were cultural, not biological. Regardless of the color of one's skin or the shape of one's nose, it was possible for free individuals to become members of a Greek *polis* — city-state — or to become Roman citizens by adopting Greek or Roman customs and swearing allegiance to the polis or the emperor.

Until the seventeenth and eighteenth centuries C.E., the primacy of cultural attributes (language, dress, manners, etc.) as the means by which civilized peoples set themselves off from barbaric ones had been rarely challenged. But in those centuries, two major changes occurred among thinkers in western Europe. First, efforts were made not only to define systematically the differences between civilized and barbarian, but to identify a series of stages in human development that ranged from the lowest savagery to the highest civilization. Depending on the writer in question, candidates for civilization ranged from Greece and Rome to (not surprisingly) Europe of the seventeenth and eighteenth centuries. Most of the other peoples of the globe, whose "discovery" since the fifteenth century had prompted the efforts to classify them in the first place, were ranked in increasingly complex hierarchies. Peoples like the Chinese and the Arabs, who had created great cities, monumental architecture, writing, advanced technology, and large empires, usually won a place along with the Europeans near the top of these ladders of human achievement. Nomadic, cattle-and sheep-herding peoples, such as the Mongols, were usually classified as barbarians. Civilized and barbarian peoples were in turn pitted against various sorts of *savages*. These ranged from the hunters and gatherers who inhabited much of North America and Australia before the arrival of the Europeans to the slash-and-burn or migratory cultivators in the hill and forest zones on most of the continents.

The second major shift that European writers brought about in our ideas regarding civilization began at the end of the eighteenth century, but did not really take hold until a century later. In keeping with a growing emphasis in European thinking and social interaction on racial or biological differences, modes of human social organization and cultural expression were increasingly linked to what were alleged to be the innate capacities of each human race. Though no one could agree on what a race was or how many races there were, most European writers argued that some races were more inventive, more moral, more courageous, more artistic — thus more capable of building civilizations — than others. White, or Caucasian, Europeans were, of course, considered by white European authors to be the most capable of all. The hierarchy from savage to civilized took on a color dimension from white at the top, where the civilized peoples clustered, to yellow, red, brown, and black in descending order.

Some authors sought to reserve all the attainments of civilization for white, or as some preferred to call them, *Aryans*. Confronted with clear evidence of civilization in places such as China and the Middle East, these writers categorized Arabs as Caucasian and argued that Aryan migrants had carried the essence of civilization to places like India and China. As the evolutionary theories of thinkers such as Charles Darwin came into vogue, race and level of cultural development were seen in the perspective of thousands of years of human change and adaptation rather than as being fixed in time. Nevertheless, this new perspective had little effect on the rankings of different human groups. Civilized whites were simply seen as having evolved much further than backward and barbaric peoples.

The perceived correspondence between race and level of development and the hardening of the boundaries between civilized and "inferior" peoples affected much more than intellectual discourse about the nature and history of human society. These beliefs were used to justify European imperialist expansion, which was seen as a "civilizing mission" aimed at uplifting barbaric and savage peoples across the globe. In the last half of the nineteenth century, virtually all non-Western peoples came to be dominated by the Europeans, who were confident that they, as representatives of the highest civilization ever created, were best equipped to govern lesser breeds of humans.

In the twentieth century much of the intellectual baggage that once gave credibility to the racially embedded hierarchies of civilized and savage peoples has been jettisoned. Racist thinking has been discredited by twentieth-century developments, including the revolt of the colonized peoples and the persistent failure of racial supremacists to provide convincing proof for innate differences in mental and physical aptitudes between various human groups. These trends, as well as research that has resulted in a much more sophisticated understanding of the evolutionary process, have led to the abandonment of rigid and self-serving nineteenth-century ideas about civilization. Yet, even though non-European peoples such as the Indians and Chinese are increasingly given credit for their civilized attainments, much ethnocentrism remains in the ways social theorists determine who is civilized and who is not.

Perhaps the best way to avoid the tendency to define the term with reference to one's own society is to view civilization as one of several human approaches to social organization, rather than attempting to identify specific kinds of cultural achievement (writing, cities, monumental architecture, etc.). All peoples, from small bands of hunters and gatherers to farmers and factory workers, live in societies. All societies produce cultures: combinations of the ideas, objects, and patterns of behavior that result from human social interaction. But not all societies and cultures generate the surplus production that permits the levels of specialization, scale, and complexity that distinguish civilizations from the other modes of social organization. All peoples are intrinsically capable of building civilizations, but many have lacked the resource base, historical circumstances, or, quite simply, the motivation for doing so.

The Code of Hammurabi

Although it is not the earliest Mesopotamian law code, Hammurabi's is the most complete. The code emphasizes the principle of retribution ("an eye for an eye") and punishments that vary according to social status. Punishments could be severe. The following selections illustrate these concerns.

The Code of Hammurabi

25. If fire broke out in a free man's house and a free man, who went to extinguish it, cast his eye on the goods of the owner of the house and has appropriated the goods of the owner of the house, that free man shall be thrown into that fire.

129. If the wife of a free man has been caught while lying with another man, they shall bind them and throw them into the water. If the husband of the woman wishes to spare his wife, then the king in turn may spare his subject.

131. If a free man's wife was accused by her husband, but she was not caught while lying with another man, she shall make affirmation by god and return to her house.

196. If a free man has destroyed the eye of a member of the aristocracy, they shall destroy his eye.

198. If he has destroyed the eye of a commoner or broken the bone of a commoner, he shall pay one mina of silver.

199. If he has destroyed the eye of a free man's slave or broken the bone of a free man's slave, he shall pay one-half his value.

209. If a free man struck another free man's daughter and has caused her to have a miscarriage, he shall pay ten shekels of silver for her fetus.

210. If that woman has died, they shall put his daughter to death.

211. If by a blow he has caused a commoner's daughter to have a miscarriage, he shall pay five shekels of silver.

212. If that woman has died, he shall pay one-half mina of silver.

213. If he struck a free man's female slave and has caused her to have a miscarriage, he shall pay two shekels of silver.

214. If that female slave has died, he shall pay one-third mina of silver.

The Great Flood

ART & IDEAS

The great epic poem of Mesopotamian literature, *The Epic of Gilgamesh*, includes an account by Utnapishtim (a Mesopotamian version of the later biblical Noah), who had built a ship and survived the flood unleashed by the gods to destroy humankind. In this selection, Utnapishtim recounts his story to Gilgamesh, telling how the god Ea advised him to build a boat and how he came to land the boat at the end of the flood.

The Epic of Gilgamesh

In those days the world teemed, the people multiplied, the world bellowed like a wild bull, and the great god was aroused by the clamor. Enlil heard the clamor and he said to the gods in council, "The uproar of mankind is intolerable and sleep is no longer possible by reason of the babel." So the gods agreed to exterminate mankind. Enlil did this, but Ea [Sumerian Enki, god of the waters] because of his oath warned me in a dream, ". . . tear down your house and build a boat, abandon possessions and look for life, despise worldly goods and save your soul alive. Tear down your house, I say, and build a boat . . . then take up into the boat the seed of all living creatures. . . ." [Utnapishtim did as he was told, and then the destruction came.]

For six days and six nights the winds blew, torrent and tempest and flood overwhelmed the world, tempest and flood raged together like warring hosts. When the seventh day dawned the storm from the south subsided, the sea grew calm, the flood was stilled; I looked at the face of the world and there was silence, all mankind was turned to clay. The surface of the sea stretched as flat as a rooftop; I opened a hatch and the light fell on my face. Then I bowed low, I sat down and I wept, the tears streamed down my face, for on every side was the waste of water. I looked for land in vain, but fourteen leagues distant there appeared a mountain, and there the boat grounded; on the mountain of Nisir the boat held fast, she held fast and did not budge. . . . When the seventh day dawned I loosed a dove and let her go. She flew away, but finding no resting place she returned. Then I loosed a swallow, and she flew away but finding no resting place she returned. I loosed a raven, she saw that the waters had retreated, she ate, she flew around, she cawed, and she did not come back. Then I threw everything open to the four winds, I made a sacrifice and poured out a libation on the mountaintop.

Q *What does this selection from* The Epic of Gilgamesh *tell you about the relationship between the Mesopotamians and their gods? How might you explain the differences between this account and the biblical flood story in Genesis?*

Intro: The Epic of Gilgamesh was one of the first written stories in human history. It told the story of a Mesopotamian king of Uruk and hero Gilgamesh and his companion, Enkidu. The story recounts the history of the Uruk kingdom and the struggles of Gilgamesh as he battles the gods and attempts to discover the secret to eternal life.

Jared Diamond's answer to **Yali's Question** in *Guns, Germs and Steel*:

Diamond argues that geography and climate were the main factors that determined the relative balance of power between world civilizations. He notes that the Eurasian peoples (i.e. mainly European) had many distinct advantages over other areas of the world. First of all, when it came to the development of agriculture the proper kinds and amount of easily farmable cereal grains existed for Europeans to farm. These included wheat, barley and rice. Diamond also notes that it was easier for these new methods of farming technology to spread due to the fact that the Eurasian continental landmass is oriented in an East to West direction. Therefore, climate zones remain similar over a very large area of land. Thus, techniques and crops cultivated in one area could easily spread to others. The Americas and African landmasses, though, are oriented on a north to south axis. Therefore, different techniques and crops flourish throughout the landmass and farming technologies cannot spread as easily. Plants had to be genetically modified and/or re-domesticated. As a result, Eurasian peoples adopted farming more easily and their populations grew at a faster rate.

Secondly, Diamond points to the different kinds of animals available for domestication in different parts of the world. Diamond points out that there are approximately 148 species of animals that have the intelligence necessary for domestication, yet only 14 have been domesticated by humans => the "major 5" (sheep, goats, cattle, pigs and horses) and the "minor 9" (camel, llama, alpaca, donkey, reindeer, water buffalo, yak and mithian). Due to the relative environmental diversity and happenstance, Eurasians got the lion's share of the animals suitable for domestication. The only animals available for the Americas were the llama and alpaca and Africans got water buffalo and mithian. Eurasians, though, received horses, cattle, pigs, sheep, camels and goats – a cornucopia of opportunity. As Diamond points out, "Due to this availability of suitable wild mammals and plants, early people of Eurasia could quickly assemble a potent and balanced biological package for intensive food production and travel." (*Guns, Germs and Steel* 141-42) Due to the lack of wild plants that could be domesticated and spread and the almost complete lack of large herbivores for meat and transportation, the coming of agriculture to the Americas and Africa was much delayed and slower to develop when started.

Thirdly, Diamond notes that the large majority of diseases that spread through humans originate in animals. Smallpox, the flu and the Black Plague are but a few of the more deadly. Since Eurasians had frequent contact with the animals (i.e. cattle, pigs, sheep) that spread disease, they developed a natural immunity to these diseases early on. Africans and Americans did not and when the civilizations contacted one another later on in history, the results were disastrous for Native Americans in particular as up to 90% perished from the onslaught of new disease unleashed upon them.

Lastly, Diamond also argues that the Eurasians had one last advantage, mineral wealth. Minerals such as bronze, copper, lead and iron were available in large quantities in locations close to rivers and fertile soils. This gave Eurasians access to stronger and better adapted tools and weapons than Africans or Americans. When taken altogether, Diamond concludes, it is easy to see why Europeans developed civilizations that were more advanced and powerful than their African and American counterparts – it was their original geographic and environmental advantages, not their superior "racial" characteristics or their "superior" intelligence or ingenuity.

The Birth of Religion

We used to think agriculture gave rise to cities and later to writing, art, and religion. Now the world's oldest temple suggests the urge to worship sparked civilization.

By Charles C. Mann

Every now and then the dawn of civilization is reenacted on a remote hilltop in southern Turkey.

The reenactors are busloads of tourists—usually Turkish, sometimes European. The buses (white, air-conditioned, equipped with televisions) blunder over the winding, indifferently paved road to the ridge and dock like dreadnoughts before a stone portal. Visitors flood out, fumbling with water bottles and MP3 players. Guides call out instructions and explanations. Paying no attention, the visitors straggle up the hill. When they reach the top, their mouths flop open with amazement, making a line of perfect cartoon O's.

Before them are dozens of massive stone pillars arranged into a set of rings, one mashed up against the next. Known as Göbekli Tepe (pronounced Guh-behk-LEE TEH-peh), the site is vaguely reminiscent of Stonehenge, except that Göbekli Tepe was built much earlier and is made not from roughly hewn blocks but from cleanly carved limestone pillars splashed with bas-reliefs of animals—a cavalcade of gazelles, snakes, foxes, scorpions, and ferocious wild boars. The assemblage was built some 11,600 years ago, seven millennia before the Great Pyramid of Giza. It contains the oldest known temple. Indeed, Göbekli Tepe is the oldest known example of monumental architecture—the first structure human beings put together that was bigger and more complicated than a hut. When these pillars were erected, so far as we know, nothing of comparable scale existed in the world.

At the time of Göbekli Tepe's construction much of the human race lived in small nomadic bands that survived by foraging for plants and hunting wild animals. Construction of the site would have required more people coming together in one place than had likely occurred before. Amazingly, the temple's builders were able to cut, shape, and transport 16-ton stones hundreds of feet despite having no wheels or beasts of burden. The pilgrims who came to Göbekli Tepe lived in a world without writing, metal, or pottery; to those approaching the temple from below, its pillars must have loomed overhead like rigid giants, the animals on the stones shivering in the firelight—emissaries from a spiritual world that the human mind may have only begun to envision.

Archaeologists are still excavating Göbekli Tepe and debating its meaning. What they do know is that the site is the most significant in a volley of unexpected findings that have overturned earlier ideas about our species' deep past. Just 20 years ago most researchers believed they knew the time, place, and rough sequence of the Neolithic Revolution—the critical transition that resulted in the birth of agriculture, taking*Homo sapiens* from scattered groups of hunter-gatherers to farming villages and from there to technologically sophisticated societies with great temples and towers and kings and priests who directed the labor of their subjects and recorded their feats in written form. But in recent years multiple new discoveries, Göbekli Tepe preeminent among them, have begun forcing archaeologists to reconsider.

At first the Neolithic Revolution was viewed as a single event—a sudden flash of genius—that occurred in a single location, Mesopotamia, between the Tigris and Euphrates Rivers in what is now southern Iraq, then spread to India, Europe, and beyond. Most archaeologists believed this sudden blossoming of civilization was driven largely by environmental changes: a gradual warming as the Ice Age ended that allowed some people to begin cultivating plants and herding animals in abundance. The new research suggests that the "revolution" was actually carried out by many hands across a huge area and over thousands of years. And it may have been driven not by the environment but by something else entirely.

After a moment of stunned quiet, tourists at the site busily snap pictures with cameras and cell phones. Eleven millennia ago nobody had digital imaging equipment, of course. Yet things have changed less than one might think. Most of the world's great religious centers, past and present, have been destinations for pilgrimages—think of the Vatican, Mecca, Jerusalem, Bodh Gaya (where Buddha was enlightened), or Cahokia (the enormous Native American complex near St. Louis). They are monuments for spiritual travelers, who often came great distances, to gawk at and be stirred by. Göbekli Tepe may be the first of all of them, the beginning of a pattern. What it suggests, at least to the archaeologists working there, is that the human sense of the sacred—and the human love of a good spectacle—may have given rise to civilization itself.

Klaus Schmidt knew almost instantly that he was going to be spending a lot of time at Göbekli Tepe. Now a researcher at the German Archaeological Institute (DAI), Schmidt had spent the autumn of 1994 trundling across southeastern Turkey. He had been working at a site there for a few years and was looking for another place to excavate. The biggest city in the area is Şanlıurfa (pronounced shan-LYOOR-fa). By the standards of a brash newcomer like London, Şanlıurfa is

incredibly old—the place where the Prophet Abraham supposedly was born. Schmidt was in the city to find a place that would help him understand the Neolithic, a place that would make Şanlıurfa look young. North of Şanlıurfa the ground ripples into the first foothills of the mountains that run across southern Turkey, source of the famous Tigris and Euphrates Rivers. Nine miles outside of town is a long ridge with a rounded crest that locals call Potbelly Hill—Göbekli Tepe.

In the 1960s archaeologists from the University of Chicago had surveyed the region and concluded that Göbekli Tepe was of little interest. Disturbance was evident at the top of the hill, but they attributed it to the activities of a Byzantine-era military outpost. Here and there were broken pieces of limestone they thought were gravestones. Schmidt had come across the Chicago researchers' brief description of the hilltop and decided to check it out. On the ground he saw flint chips—huge numbers of them. "Within minutes of getting there," Schmidt says, he realized that he was looking at a place where scores or even hundreds of people had worked in millennia past. The limestone slabs were not Byzantine graves but something much older. In collaboration with the DAI and the Şanlıurfa Museum, he set to work the next year.

Inches below the surface the team struck an elaborately fashioned stone. Then another, and another—a ring of standing pillars. As the months and years went by, Schmidt's team, a shifting crew of German and Turkish graduate students and 50 or more local villagers, found a second circle of stones, then a third, and then more. Geomagnetic surveys in 2003 revealed at least 20 rings piled together, higgledy-piggledy, under the earth.

The pillars were big—the tallest are 18 feet in height and weigh 16 tons. Swarming over their surfaces was a menagerie of animal bas-reliefs, each in a different style, some roughly rendered, a few as refined and symbolic as Byzantine art. Other parts of the hill were littered with the greatest store of ancient flint tools Schmidt had ever seen—a Neolithic warehouse of knives, choppers, and projectile points. Even though the stone had to be lugged from neighboring valleys, Schmidt says, "there were more flints in one little area here, a square meter or two, than many archaeologists find in entire sites."

The circles follow a common design. All are made from limestone pillars shaped like giant spikes or capital T's. Bladelike, the pillars are easily five times as wide as they are deep. They stand an arm span or more apart, interconnected by low stone walls. In the middle of each ring are two taller pillars, their thin ends mounted in shallow grooves cut into the floor. I asked German architect and

civil engineer Eduard Knoll, who works with Schmidt to preserve the site, how well designed the mounting system was for the central pillars. "Not," he said, shaking his head. "They hadn't yet mastered engineering." Knoll speculated that the pillars may have been propped up, perhaps by wooden posts.

To Schmidt, the T-shaped pillars are stylized human beings, an idea bolstered by the carved arms that angle from the "shoulders" of some pillars, hands reaching toward their loincloth-draped bellies. The stones face the center of the circle—as at "a meeting or dance," Schmidt says—a representation, perhaps, of a religious ritual. As for the prancing, leaping animals on the figures, he noted that they are mostly deadly creatures: stinging scorpions, charging boars, ferocious lions. The figures represented by the pillars may be guarded by them, or appeasing them, or incorporating them as totems.

Puzzle piled upon puzzle as the excavation continued. For reasons yet unknown, the rings at Göbekli Tepe seem to have regularly lost their power, or at least their charm. Every few decades people buried the pillars and put up new stones—a second, smaller ring, inside the first. Sometimes, later, they installed a third. Then the whole assemblage would be filled in with debris, and an entirely new circle created nearby. The site may have been built, filled in, and built again for centuries.

Bewilderingly, the people at Göbekli Tepe got steadily worse at temple building. The earliest rings are the biggest and most sophisticated, technically and artistically. As time went by, the pillars became smaller, simpler, and were mounted with less and less care. Finally the effort seems to have petered out altogether by 8200 B.C. Göbekli Tepe was all fall and no rise.

As important as what the researchers found was what they did not find: any sign of habitation. Hundreds of people must have been required to carve and erect the pillars, but the site had no water source—the nearest stream was about three miles away. Those workers would have needed homes, but excavations have uncovered no sign of walls, hearths, or houses—no other buildings that Schmidt has interpreted as domestic. They would have had to be fed, but there is also no trace of agriculture. For that matter, Schmidt has found no mess kitchens or cooking fires. It was purely a ceremonial center. If anyone ever lived at this site, they were less its residents than its staff. To judge by the thousands of gazelle and aurochs bones found at the site, the workers seem to have been fed by constant shipments of game, brought from faraway hunts. All of this complex endeavor must have had organizers and overseers, but there is as yet no good evidence of a social hierarchy—no living

area reserved for richer people, no tombs filled with elite goods, no sign of some people having better diets than others.

"These people were foragers," Schmidt says, people who gathered plants and hunted wild animals. "Our picture of foragers was always just small, mobile groups, a few dozen people. They cannot make big permanent structures, we thought, because they must move around to follow the resources. They can't maintain a separate class of priests and craft workers, because they can't carry around all the extra supplies to feed them. Then here is Göbekli Tepe, and they obviously did that."

Discovering that hunter-gatherers had constructed Göbekli Tepe was like finding that someone had built a 747 in a basement with an X-Acto knife. "I, my colleagues, we all thought, What? How?" Schmidt said. Paradoxically, Göbekli Tepe appeared to be both a harbinger of the civilized world that was to come and the last, greatest emblem of a nomadic past that was already disappearing. The accomplishment was astonishing, but it was hard to understand how it had been done or what it meant. "In 10 or 15 years," Schmidt predicts, "Göbekli Tepe will be more famous than Stonehenge. And for good reason."

Hovering over Göbekli Tepe is the ghost of V. Gordon Childe. An Australian transplant to Britain, Childe was a flamboyant man, a passionate Marxist who wore plus fours and bow ties and larded his public addresses with noodle-headed paeans to Stalinism. He was also one of the most influential archaeologists of the past century. A great synthesist, Childe wove together his colleagues' disconnected facts into overarching intellectual schemes. The most famous of these arose in the 1920s, when he invented the concept of the Neolithic Revolution.

In today's terms, Childe's views could be summed up like this: *Homo sapiens* burst onto the scene about 200,000 years ago. For most of the millennia that followed, the species changed remarkably little, with humans living as small bands of wandering foragers. Then came the Neolithic Revolution—"a radical change," Childe said, "fraught with revolutionary consequences for the whole species." In a lightning bolt of inspiration, one part of humankind turned its back on foraging and embraced agriculture. The adoption of farming, Childe argued, brought with it further transformations. To tend their fields, people had to stop wandering and move into permanent villages, where they developed new tools and created pottery. The Neolithic Revolution, in his view, was an explosively important event—"the greatest in human history after the mastery of fire."

Of all the aspects of the revolution, agriculture was the most important. For thousands of years men and women with stone implements had wandered the landscape, cutting off heads of wild grain and taking them home. Even though these people may have tended and protected their grain patches, the plants they watched over were still wild. Wild wheat and barley, unlike their domesticated versions, shatter when they are ripe—the kernels easily break off the plant and fall to the ground, making them next to impossible to harvest when fully ripe. Genetically speaking, true grain agriculture began only when people planted large new areas with mutated plants that did not shatter at maturity, creating fields of domesticated wheat and barley that, so to speak, waited for farmers to harvest them.

Rather than having to comb through the landscape for food, people could now grow as much as they needed and where they needed it, so they could live together in larger groups. Population soared. "It was only after the revolution—but immediately thereafter—that our species really began to multiply at all fast," Childe wrote. In these suddenly more populous societies, ideas could be more readily exchanged, and rates of technological and social innovation soared. Religion and art—the hallmarks of civilization—flourished.

Childe, like most researchers today, believed that the revolution first occurred in the Fertile Crescent, the arc of land that curves northeast from Gaza into southern Turkey and then sweeps southeast into Iraq. Bounded on the south by the harsh Syrian Desert and on the north by the mountains of Turkey, the crescent is a band of temperate climate between inhospitable extremes. Its eastern terminus is the confluence of the Tigris and Euphrates Rivers in southern Iraq—the site of a realm known as Sumer, which dates back to about 4000 B.C. In Childe's day most researchers agreed that Sumer represented the beginning of civilization. Archaeologist Samuel Noah Kramer summed up that view in the 1950s in his book *History Begins at Sumer*. Yet even before Kramer finished writing, the picture was being revised at the opposite, western end of the Fertile Crescent. In the Levant—the area that today encompasses Israel, the Palestinian territories, Lebanon, Jordan, and western Syria—archaeologists had discovered settlements dating as far back as 13,000 B.C. Known as Natufian villages (the name comes from the first of these sites to be found), they sprang up across the Levant as the Ice Age was drawing to a close, ushering in a time when the region's climate became relatively warm and wet.

The discovery of the Natufians was the first rock through the window of Childe's Neolithic Revolution. Childe had thought agriculture the necessary spark that led to villages and ignited civilization. Yet although the Natufians lived in permanent settlements of up to several hundred

people, they were foragers, not farmers, hunting gazelles and gathering wild rye, barley, and wheat. "It was a big sign that our ideas needed to be revised," says Harvard University archaeologist Ofer Bar-Yosef.

Natufian villages ran into hard times around 10,800 B.C., when regional temperatures abruptly fell some 12°F, part of a mini ice age that lasted 1,200 years and created much drier conditions across the Fertile Crescent. With animal habitat and grain patches shrinking, a number of villages suddenly became too populous for the local food supply. Many people once again became wandering foragers, searching the landscape for remaining food sources.

Some settlements tried to adjust to the more arid conditions. The village of Abu Hureyra, in what is now northern Syria, seemingly tried to cultivate local stands of rye, perhaps replanting them. After examining rye grains from the site, Gordon Hillman of University College London and Andrew Moore of the Rochester Institute of Technology argued in 2000 that some were bigger than their wild equivalents—a possible sign of domestication, because cultivation inevitably increases qualities, such as fruit and seed size, that people find valuable. Bar-Yosef and some other researchers came to believe that nearby sites like Mureybet and Tell Qaramel also had had agriculture.

If these archaeologists were correct, these protovillages provided a new explanation of how complex society began. Childe thought that agriculture came first, that it was the innovation that allowed humans to seize the opportunity of a rich new environment to extend their dominion over the natural world. The Natufian sites in the Levant suggested instead that settlement came first and that farming arose later, as a product of crisis. Confronted with a drying, cooling environment and growing populations, humans in the remaining fecund areas thought, as Bar-Yosef puts it, "If we move, these other folks will exploit our resources. The best way for us to survive is to settle down and exploit our own area." Agriculture followed.

The idea that the Neolithic Revolution was driven by climate change resonated during the 1990s, a time when people were increasingly worried about the effects of modern global warming. It was promoted in countless articles and books and ultimately enshrined in Wikipedia. Yet critics charged that the evidence was weak, not least because Abu Hureyra, Mureybet, and many other sites in northern Syria had been flooded by dams before they could be fully excavated. "You had an entire theory on the origins of human culture essentially based on a half a dozen unusually plump seeds," ancient-grain specialist George Willcox of the National Center for Scientific Research, in France,

says. "Isn't it more likely that these grains were puffed during charring or that somebody at Abu Hureyra found some unusual-looking wild rye?"

As the dispute over the Natufians sharpened, Schmidt was carefully working at Göbekli Tepe. And what he was finding would, once again, force many researchers to reassess their ideas.

Anthropologists have assumed that organized religion began as a way of salving the tensions that inevitably arose when hunter-gatherers settled down, became farmers, and developed large societies. Compared to a nomadic band, the society of a village had longer term, more complex aims—storing grain and maintaining permanent homes. Villages would be more likely to accomplish those aims if their members were committed to the collective enterprise. Though primitive religious practices—burying the dead, creating cave art and figurines—had emerged tens of thousands of years earlier, organized religion arose, in this view, only when a common vision of a celestial order was needed to bind together these big, new, fragile groups of humankind. It could also have helped justify the social hierarchy that emerged in a more complex society: Those who rose to power were seen as having a special connection with the gods. Communities of the faithful, united in a common view of the world and their place in it, were more cohesive than ordinary clumps of quarreling people.

Göbekli Tepe, to Schmidt's way of thinking, suggests a reversal of that scenario: The construction of a massive temple by a group of foragers is evidence that organized religion could have come *before* the rise of agriculture and other aspects of civilization. It suggests that the human impulse to gather for sacred rituals arose as humans shifted from seeing themselves as part of the natural world to seeking mastery over it. When foragers began settling down in villages, they unavoidably created a divide between the human realm—a fixed huddle of homes with hundreds of inhabitants—and the dangerous land beyond the campfire, populated by lethal beasts.

French archaeologist Jacques Cauvin believed this change in consciousness was a "revolution of symbols," a conceptual shift that allowed humans to imagine gods—supernatural beings resembling humans—that existed in a universe beyond the physical world. Schmidt sees Göbekli Tepe as evidence for Cauvin's theory. "The animals were guardians to the spirit world," he says. "The reliefs on the T-shaped pillars illustrate that other world."

Schmidt speculates that foragers living within a hundred-mile radius of Göbekli Tepe created the temple as a holy place to gather and meet, perhaps bringing gifts and tributes to its priests and

craftspeople. Some kind of social organization would have been necessary not only to build it but also to deal with the crowds it attracted. One imagines chanting and drumming, the animals on the great pillars seeming to move in flickering torchlight. Surely there were feasts; Schmidt has uncovered stone basins that could have been used for beer. The temple was a spiritual locus, but it may also have been the Neolithic version of Disneyland.

Over time, Schmidt believes, the need to acquire sufficient food for those who worked and gathered for ceremonies at Göbekli Tepe may have led to the intensive cultivation of wild cereals and the creation of some of the first domestic strains. Indeed, scientists now believe that one center of agriculture arose in southern Turkey—well within trekking distance of Göbekli Tepe—at exactly the time the temple was at its height. Today the closest known wild ancestors of modern einkorn wheat are found on the slopes of Karaca Dağ, a mountain just 60 miles northeast of Göbekli Tepe. In other words, the turn to agriculture celebrated by V. Gordon Childe may have been the result of a need that runs deep in the human psyche, a hunger that still moves people today to travel the globe in search of awe-inspiring sights.

Some of the first evidence for plant domestication comes from Nevalı Çori (pronounced nuh-vah-LUH CHO-ree), a settlement in the mountains scarcely 20 miles away. Like Göbekli Tepe, Nevalı Çori came into existence right after the mini ice age, a time archaeologists describe with the unlovely term Pre-pottery Neolithic (PPN). Nevalı Çori is now inundated by a recently created lake that provides electricity and irrigation water for the region. But before the waters shut down research, archaeologists found T-shaped pillars and animal images much like those Schmidt would later uncover at Göbekli Tepe. Similar pillars and images occurred in PPN settlements up to a hundred miles from Göbekli Tepe. Much as one can surmise today that homes with images of the Virgin Mary belong to Christians, Schmidt says, the imagery in these PPN sites indicates a shared religion—a community of faith that surrounded Göbekli Tepe and may have been the world's first truly large religious grouping.

Naturally, some of Schmidt's colleagues disagree with his ideas. The lack of evidence of houses, for instance, doesn't prove that nobody lived at Göbekli Tepe. And increasingly, archaeologists studying the origins of civilization in the Fertile Crescent are suspicious of any attempt to find a one-size-fits-all scenario, to single out one primary trigger. It is more as if the occupants of various archaeological sites were all playing with the building blocks of civilization, looking for combinations that worked. In one place agriculture may have been the foundation; in another, art and religion; and over there,

population pressures or social organization and hierarchy. Eventually they all ended up in the same place. Perhaps there is no single path to civilization; instead it was arrived at by different means in different places.

In Schmidt's view, many of his colleagues have been as slow to appreciate Göbekli Tepe as he has been to excavate it. This summer will mark his 17th year at the site. The annals of archaeology are replete with scientists who in their hurry carelessly wrecked important finds, losing knowledge for all time. Schmidt is determined not to add his name to the list. Today less than a tenth of the 22-acre site is open to the sky.

Schmidt emphasizes that further research on Göbekli Tepe may change his current understanding of the site's importance. Even its age is not clear—Schmidt is not certain he has reached the bottom layer. "We come up with two new mysteries for every one that we solve," he says. Still, he has already drawn some conclusions. "Twenty years ago everyone believed civilization was driven by ecological forces," Schmidt says. "I think what we are learning is that civilization is a product of the human mind."