Why Settle Down? The Mystery of Communities

NEWS

Archaeologists had long believed that farming prompted our nomadic ancestors into the first settlements. But how could the rudimentary agriculture of 9000 years ago have drawn 10,000 people to settle in Çatalhöyük?

ÇATALHÖYÜK, TURKEY—Archaeologist Shahina Farid can barely contain her excitement. While excavating an ancient rubbish deposit, her team of diggers found the skeleton of an adult male. Of course, many dozens of skeletons have been uncovered at this 9000-year-old site over the past few years. Yet this one is different. The others were all found buried under the floors of the mud-brick houses in which the people of this early farming settlement once lived. But this body seems to have been deliberately placed outside. Farid looks out at the wheat fields that surround this isolated mound in the middle of the Central Anatolian plain, wiping her brow against the heat. Would this be the exception that proves the pattern wrong?

The skeleton is carefully removed and taken down to the lab at the base of the mound. There, anthropologists working at the site discover a possible explanation. The man was terribly deformed and probably very ill when he died. An outcast, perhaps? Yet even if this riddle is solved and the burial pattern holds, so many other questions remain unanswered at Çatalhöyük: Why did they bury their dead under the floors? What is the meaning of the vivid painted murals on their walls? Why did thousands of people give up the itinerant life of hunting and gathering and cram themselves into houses so tightly packed that they entered through holes in the roofs? Indeed, why did people bother to come together at all, eventually building the towns and cities that so many of the world's people live in today?

Neolithic neighborhood. James Mellaart's excavations in the 1960s uncovered a vast but intimate community.

Earlier this century, archaeologists thought they had the answer: The rise of agriculture required early farmers to stay near their crops and animals. But these new excavations are challenging the long-held assumption that the first settlements and the transition from hunting and gathering to farming and animal domestication were part of a single process—one that the late Australian archaeologist V. Gordon Childe dubbed the "Neolithic Revolution" (see p. 1446). Çatalhöyük and other sites across the Near East are making it clear that these explanations are too simple and that other factors—including, possibly, a shared cultural revolution that preceded the rise of farming—might also have played a key role.

British archaeologist James Mellaart discovered Çatalhöyük, near the modern city of Konya, in 1958. In the 1960s his excavations of this Neolithic, or New Stone Age, settlement electrified the archaeological community. The age of the site, 4500 years older than the Egyptian pyramids, was staggering. At the time, only the traces of a few small villages could claim seniority as the world's oldest permanent settlements. Yet this was no tiny hamlet: Çatalhöyük covered more than 12 hectares and may have harbored as many as 10,000 people. Over the 1000 years the site was occupied, its inhabitants rebuilt their houses one on top of the other until they had created a mound 20 meters high. Some, including Mellaart, hailed it as the world's oldest known city.

The details of the find captured imaginations. Mellaart uncovered vivid painted murals on the plastered walls of the houses, sometimes in bas-relief: vultures attacking headless men, an erupting volcano, a band of hunters pulling the tongues and tails of wild deer. An animal bone expert declared that Çatalhöyük was a hub of cattle domestication, the earliest known in the Near East. And clay figurines of obese women found at the site prompted Mellaart to claim that Çatalhöyük had been a major religious center, where people worshiped a Mother Goddess—an assertion that today inspires regular pilgrimages of latter-day goddess worshipers from as far away as California.

Since Mellaart ended his work at Çatalhöyük more than 30 years ago, many more Neolithic settlements have been excavated in the Near East. Yet only a few of these sites—such as 'Ain Ghazal in Jordan, which covered the same area but probably had a smaller population (*Science*, 1 April 1988, p. 35)—can match Çatalhöyük's size and importance. And over the years, the mysteries of Çatalhöyük—most of all, the question of what brought so many people together on this isolated plain—have continued to nag at the minds of archaeologists.

Now, in the 1990s, an army of excavators has again descended upon Çatalhöyük, seeking answers to these questions. The 90-member team, directed by Ian Hodder of Britain's Cambridge University and including a large platoon from the University of California, Berkeley, led by Ruth Tringham, represents one of the greatest concentrations of scientific firepower ever focused on an archaeological site. Seasoned excavators, who are slowly sifting through at least 12 successive layers of occupation, have been joined by experts from every field of archaeological science, including specialists in human and animal remains, fossil plants, pottery, and stone tools. Moreover, the dig at Çatalhöyük has become a showcase for the relatively new field of micromorphology, which puts archaeological remains under the microscope to provide the maximum amount of information about how people lived—and how they died.

"Mellaart did a fantastic job at getting the big picture of Çatalhöyük," Hodder says. "But the techniques available back then were relatively limited. Times have moved on and the questions have changed." And although some of Hodder's interpretations of what his team is finding at Çatalhöyük may be controversial (see sidebar on p. 1444), archaeologists agree that the site could help solve some of the mysteries surrounding the origins of settled life.

CREDIT: ARLETTE MELLAART

An overgrown village?

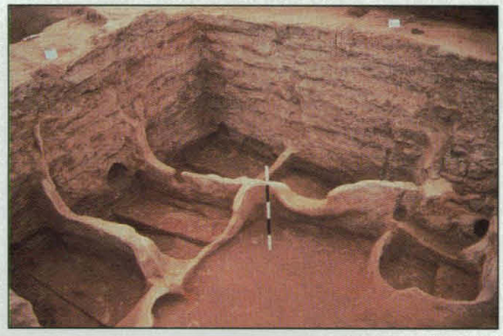
Permanent settlements developed independently in several parts of the world, including the Near East, China, and the Americas. The oldest village known, just outside present-day Jericho in Palestine, may have sprung up around a shrine used by roving bands of hunter-gatherers. By 10,500 years ago it had evolved into a small farming village. Yet many more millennia passed before the first undisputed cities—such as Uruk, in Mesopotamia—were established, about 5500 years ago. And although the expansion of these first settlements roughly coincided with the rise of farming, whether agriculture directly fueled their growth—as Childe proposed—is now hotly debated by archaeologists. Indeed, one of the great attractions of Çatalhöyük is that its multilayered remains—which are remarkably well preserved for a site so old—might help answer this critical question.

"Çatalhöyük is *the* dig of the new millennium," says Colin Renfrew, also of Cambridge University. Mark Patton, at the University of Greenwich in London, says that "people are watching very closely" as the excavations unfold—a vigilance made easier by the dig's detailed Web site (catal.arch.cam.ac.uk/catal/catal.html). Çatalhöyük watchers will need to be patient, however. In contrast to Mellaart, who excavated more than 200 buildings over four seasons, the new team is excavating only one or two houses each year. "We are going very slowly," says team member Naomi Hamilton of Edinburgh University in the U.K. "We have learned a huge amount about a few buildings, instead of a moderate amount about 200."

Because of its unusual size, Mellaart often referred to Çatalhöyük as a "Neolithic city," and the notion that the settlement was an early metropolis is often repeated in media accounts of the ongoing excavations. But the new dig has already reinforced a suspicion long held by many archaeologists: Çatalhöyük is not a city, nor even a town, even though many modern towns cannot boast its substantial population. "Çatalhöyük may be the largest Neolithic settlement in the Near East, but it's still just an overgrown village," says Guillermo Algaze of the University of California, San Diego. Which only makes the site all the more perplexing: Why did the people cram their houses together rather than spread them out across the landscape?

For archaeologists, the difference between a village and a city is not just a matter of size but hinges on the social and economic relationships within a population. Thus the earliest cities in Mesopotamia—such as Uruk—were made possible by agricultural surpluses that allowed some people to quit farming and become full-time artisans, priests, or members of other professions. Meanwhile, the farmers who provided food for these urban centers continued to live in outlying villages. "A key defining feature of a town or city is that farmers don't live in them," says Patton.

But the new excavations at Çatalhöyük have uncovered little evidence for division of labor. Although the layout of the houses follows a very similar plan, Hodder's team has found signs that the inhabitants did their own construction work rather than relying upon Neolithic building contractors. Microscopic studies of plaster and mud bricks from different houses done by Wendy Matthews, a micromorphologist at the British Institute of Archaeology in Ankara, show great variation in the mix of soils and plants used to form them—the opposite of what would be expected if they had been fashioned by specialist builders using standard techniques.



Life and death. Çatalhöyük residents kept their food and other supplies in storage bins *(top)*. When they died, they were buried under the house floors.

CREDITS: ÇATALHÖYÜK RESEARCH PROJECT

And although Mellaart believed that the production of the beautiful obsidian objects found at Çatalhöyük—such as finely worked blades and the earliest known mirrors—was carried out in specialist workshops, the new team has found what Hodder calls "masses of evidence" from microscopic residues of obsidian flakes on floors and around hearths that a lot of obsidian work was carried out in the individual dwellings. Nor has the new dig revealed another important feature of cities: public architecture, such as temples and other public buildings, which Uruk and other early urban centers had in abundance.

But Mellaart, who retired some years ago from the Institute of Archaeology in London, does not necessarily agree. He told *Science* that because he only dug about 4% of the settlement—and Hodder's team has so far excavated considerably less than that—it is too early to tell whether large communal buildings might be hidden in another part of the mound. Other observers, including Algaze, raise similar cautions. But Hodder says a detailed study of the entire mound suggests that there are no temples or other monuments waiting to be discovered. Using standard archaeological survey techniques—including meticulous scraping of the topsoil and searching for local variations in Earth's magnetic field that might be caused by buried structures—the team failed to find any structures other than the myriad small, mud-brick dwellings.

Based on this and other evidence about what was going on in the houses—including the pattern of burials under the plastered floors—Hodder has tentatively concluded that the basic social units at Çatalhöyük were extended families grouped together in clusters of four or five houses, which carried on their daily activities more or less autonomously. "It is hard to imagine that 10,000 people, minimally 2000 families, were going out and doing their own thing, but that is what we see."

The Neolithic Revolution

This new view of Çatalhöyük as a decentralized community with minimal division of labor is reinforced by evidence that agriculture was still at a relatively early stage here. A survey of the area surrounding Çatalhöyük by a team of physical geographers, led by Neil Roberts of Britain's Loughborough University, suggests that the site was founded on the bank of a now-dry river that flowed here during Neolithic times and that frequent flooding of its banks created a lush wetlands environment. The plant remains found in and around the houses suggest that the people ate both wild and cultivated plants and seeds, including tubers, wild grasses, lentils, hackberries, acorns, and pistachios. Even the cereals likely to have been under cultivation, such as wheat and barley, may not have required irrigation in these wet conditions, and there is no evidence that grain was ground for bread.

A reanalysis of animal remains adds to the impression that Çatalhöyük's agriculture was not terribly advanced. Çatalhöyük had long been heralded as an early center of cattle domestication, based on a study of animal bones from the site by the late American faunal expert Dexter Perkins Jr. (*Science*, 11 April 1969, p. 177). In general, domestic cattle are much smaller than the now-extinct wild oxen, or aurochs, from which they are descended. By comparing cattle bones

from Çatalhöyük with both earlier and later archaeological sites in Anatolia, Perkins concluded that cattle were probably domesticated early in the life of Çatalhöyük, and also that cattle represented the most numerous domesticated species.

But so far, at least, the animal bones emerging from the new excavations do not confirm this pattern. A study of the faunal remains by Nerissa Russell of Cornell University in Ithaca, New York, and Louise Martin at the Institute of Archaeology in London is showing that cattle made up only about 25% of the species present. Most of the animal bones represent sheep, which were domesticated much earlier than cattle across most of the Near East. Although Russell says it is too early to conclude whether the cattle were domesticated, "Çatalhöyük no longer appears to be a cattle-centered economy, which was a supporting argument for cattle domestication."

These findings, along with similar evidence from some other Near East sites, are challenging the original concept of the Neolithic Revolution. Many archaeologists are parting company with the view that settled life and agriculture were closely linked. "We have always thought that sedentism and agriculture were two sides of the same coin," says Algaze. "But as we start getting into the nitty-gritty details across the world, it becomes increasingly clear that while they are very much related, they are not necessarily coterminous."

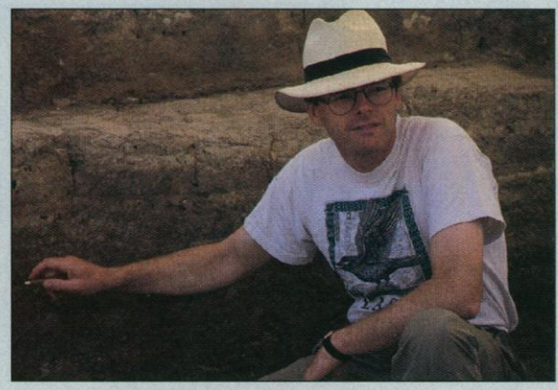
Even stronger evidence for this conclusion comes from excavations at another site, called Aşıklı in Central Anatolia. Since 1989, a team from the University of Istanbul, led by Ufuk Esin, has been excavating Aşıklı, a village that appears to be about 1000 years older than Çatalhöyük and was home to several hundred people at its height. Although it is smaller, Aşıklı has a more complex arrangement of buildings than Çatalhöyük. A large collection of mud-brick houses is partly surrounded by a stone wall, and Esin has found a large cluster of public buildings that may have been a temple complex, as well as a pebbled street running through the settlement. Most amazingly, Esin's team has

Digging Into the Life of the Mind

CAMBRIDGE, U.K.—As a student at London's Institute of Archaeology in the 1960s, Ian Hodder heard James Mellaart lecture about his excavations at Çatalhöyük, a huge Neolithic settlement in present-day Turkey. The aspiring archaeologist was entranced. "Mellaart was a fantastic speaker, and he left an indelible impression of the site on my mind," Hodder says. Now, 3 decades later, Hodder himself is in charge of major new excavations at Çatalhöyük, which are expected to take the next 25 years (see main text). The new dig is being closely watched by the archaeological community—yet as much for the way it is being dug as for what it is finding.

Hodder—now at Cambridge University—has spent much of his career leading a theoretical revolt against established archaeological thought. This movement of mostly British and some American archaeologists—which has been greatly influenced by postmodernist trends in the humanities—is usually referred to as "post-processualism." It puts much more emphasis on studying the symbolic and cognitive life of ancient peoples than did earlier approaches and argues for the need to accept and even welcome differing interpretations of an archaeological site.

The new school is in part a rebellion against what used to be called the New Archaeology, a movement sparked in the 1970s by Lewis Binford in the United States and the late David Clarke in the United Kingdom. The New Archaeology—which is now usually called processualism, because of its concern with processes of social change—was in turn a reaction against what was seen as the static, unscientific, and speculative approaches of the previous generation of archaeologists. But Hodder and others began to feel that the processualists were focusing too narrowly on questions that could most easily be answered by scientific method, such as adaptation to the environment, economy, and trade, to the neglect of religious and social beliefs. "Humans adapt to their environment partly through system of beliefs or preconceptions of the world," Hodder says. "Culture and mind contribute something; we don't just respond to the environment the way animals do."



Piecing together ancient beliefs. Archaeological rebel Ian Hodder sees Çatalhöyük as a test of his ideas.

The debate over these issues often turned acrimonious, with processualists accusing postprocessualists of embracing "relativism" and being antiscience, and the latter countering with charges of "scientism" and "positivism." More recently, however, the discussion has taken a calmer tone, although there are still occasional flare-ups in the pages of archaeological journals. Colin Renfrew of Cambridge University comments that "processual archaeology had its own rhetoric, and I think the 'post-processualists' have quite successfully deflated a little of that. But that hasn't prevented them from introducing whole balloonfuls of rhetorical wind of their own."

Hodder is putting a strong emphasis on scientific methods at Çatalhöyük, bringing in dozens of experts who are literally putting the site under the microscope—an approach that some archaeologists take as an ironical indication that he has at last seen the processual light. "Everybody is very impressed with Ian Hodder's descent from the lofty heights of theory to the nitty-gritty of actually getting something done," says Guillermo Algaze of the University of California, San Diego. But Hodder insists that he is using science in a much different way: Rather than focusing only on issues that can be resolved by hypothesis testing, such as the details of economy and trade, he is trying to understand ancient belief systems by using the scientific evidence as pieces of a "jigsaw puzzle" that can never be solved with certainty.

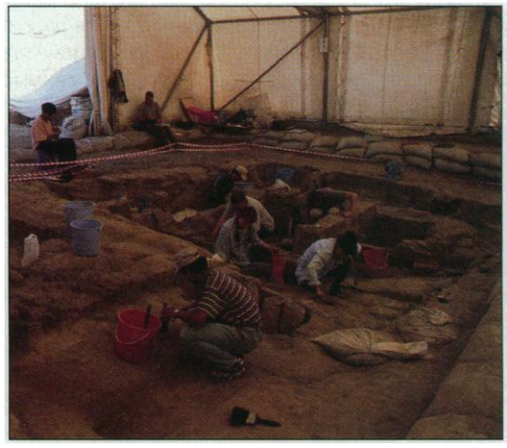
Thus unlike most digs, where excavators excavate and archaeological specialists make short visits to the site or stick to their labs and work on specimens, Hodder has brought in a large team of full-time experts who sometimes work side by side with excavators, interpreting what they see as they go along. Indeed, everyone is encouraged to try to make sense of what they uncover rather than simply collecting data. "People here are pushed to make their own interpretations, to look for patterns," says team member Nerissa Russell, an archaeologist at Cornell University in Ithaca, New York.

Hodder fully realizes that excavating the large and well-preserved site at Çatalhöyük is the best chance he will ever have to prove that the post-processual approach can work. "That's why I am prepared to spend the next 25 years of my life working here," he says. "This is really a test of whether we can do it." **–M.B.**

CREDIT: TIM READY/SCIENCE MUSEUM OF MINNESOTA

now excavated 10 successive occupation layers and found that the arrangements of the houses and the street are exactly repeated at each level. Yet, Esin told *Science*, most of the plant and all of the animal remains were wild. In essence, Aşıklı was a large, highly stable settlement that subsisted mostly on hunting and gathering.

"This is the new thing that Çatalhöyük is starting to give us, and that Aşıklı makes absolutely crystal clear," says Algaze. "You can have a major site, with a large population, on the basis of very little domestic agriculture. This goes against every paradigm we have ever had." It also runs counter to common sense, says Hodder. He argues that the rich wetland resources around Çatalhöyük would have been more easily exploited by a dispersed population in small settlements rather than by packing thousands of people into a village so crowded that they entered their houses through the roofs. "What you end up with," says Hodder, "is trying to understand why these people bothered to come together."



Team effort. Diggers and archaeological specialists work side by side to interpret Çatalhöyük.

Coming together

To get at this crucial question, Hodder says, "we first have to understand Çatalhöyük on its own terms. Let's not try to categorize it, as a city or a village, but first try to find out how it works." As a leader of the "postprocessual" movement in archaeology, Hodder believes that deciphering the symbolic and religious life of the settlement is key to understanding what held its social fabric together.

It may also be a clue to understanding the transition to farming in general, says Jacques Cauvin of the Institute of Eastern Prehistory in Jalès, France, who argues that the Neolithic Revolution in agriculture was preceded by a "cultural revolution" in religious practices and the use of symbolism. "The origin of these [farming] changes was more cultural than economic," Cauvin told *Science*. Hunter-gatherer societies underwent a "mental transformation" that allowed them to see their environment differently and exploit it "more selectively and more actively," he says—a transformation that may be recorded at Çatalhöyük.

That symbolism was a defining element of Çatalhöyük is clear from the large number of spectacular artworks unearthed at the site, including a few figurines—of which the most famous is a seated woman with her hands on the heads of two leopards—which Mellaart believed represented a Mother Goddess. Hodder and other archaeologists at Çatalhöyük say the evidence to support goddess worship is scant. Instead, the team has focused on two striking features of life and death at the site, which might give insights into how its people viewed the world and their place in it: the habit of burying the dead under the floors, and the murals painted on the plastered walls, which often featured wild animals and hunting scenes.

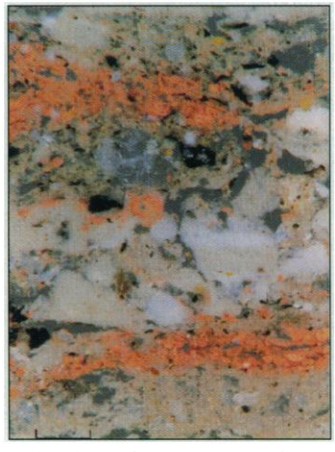
Mellaart's excavations had established that at some point during the life of a house, its roof was taken down, part of the walls dismantled, and the rooms filled in, leaving the burials, wall murals, ovens, storage bins, and other features intact. Last year, while excavating a large building, the team discovered more than 70 bodies buried under its floors. A study of the ages of the skeletons and the order in which they were buried, carried out by anthropologists Theya Molleson and Peter Andrews of the Natural History Museum in London, suggested that the life cycle of the house coincided with the life of an extended family. Thus the earliest burials appear to be of infants and children, while the later burials are mainly people who survived into adulthood and even old age.

In addition, all of the murals were found on the walls around a raised platform in one corner of the room that covered a large concentration of burials. Paintings were especially common on earlier layers of plaster that coincided in time with the burials of children. Hodder and Berkeley's Tringham believe that this close association between paintings and burials is no coincidence. Arguing from so-called ethnographic evidence, which uses knowledge of present-day cultures to shed light on past societies, they suggest that the art might have represented a ritualistic attempt to assuage the spirits that had taken the lives of the community's young people, or perhaps an effort to protect the living from the spirits of the dead. Similar practices exist today among the San hunters of southern Africa, nomadic tribes in northern Asia, and the Nuba of Sudan. There are also striking parallels with the burial practices of the Tikopia people of Polynesia, who buried their dead under the floors as well.

The habit of keeping the remains of the dead close to the living is mirrored at other digs across the Near East. At Jericho, for example, human skulls molded with plaster to represent real people were found during excavations there in the 1950s, and a recent dig at the site of Çayönü in southern Turkey, led by Mehmet Özdogăn of the University of Istanbul, uncovered piles of human skulls in the cellars of a building. In addition, extraordinary painted statues, which may represent mythical ancestors, were found buried under a house at 'Ain Ghazal.

Hodder also sees parallels between the murals of Çatalhöyük and the scenes of hunting and wild animals that dominate the earlier cave art produced by hunter-gatherers. He suggests that the transition to settled life required "the domestication of the wild by bringing it into the house, at least the symbolism of the wild, and controlling it." This shared cultural transformation, combined with the creation of large family groups tied together by their links to their ancestors, might have been the "glue" that held the early society at Çatalhöyük together.

Of course, archaeology, which attempts to understand past societies from the shards of bone and artifacts they left behind, cannot—and does not—claim to be an exact science. And Hodder admits that these ideas are only hypotheses, which may or may not be supported by further excavation. But if all goes as planned, archaeologists might not have to wait until the next millennium to learn more about what made the people of Çatalhöyük come together. Although Mellaart dug through a dozen successive occupation levels, core samples from the mound indicate that he stopped about 5 meters before reaching unoccupied virgin soil. Next year, if special funding for the project comes through, the team plans to extend its normal 2-month summer season to 8 or 9 months. This should be long enough to dig a deep trench through one section of the mound, right to its very bottom. There, by the bank of an ancient river, the founding mothers and fathers of Çatalhöyük may well lie buried.



Going in style. Microscopic layers of white plaster and red ochre from a ritual burial.

–MICHAEL BALTER

CREDIT: (TOP) TIM READY/SCIENCE MUSEUM OF MINNESOTA, (BOTTOM) WENDY MATTHEWS