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EXCLUSIVE WHAT LIES BENEATH

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REVEAL MONUMENTS
BURIED UNDER
STONEHENGE LANDSCAPE

9,000-YEAR-OLD MAN

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E.O. WILSON'S PLAN TO RETURN HALF
THE EARTH TO ITS NATURAL STATE

HOW TO CATCH A COMET

THE SPACECRAFT THAT WILL LAND
ON A SPEEDING SNOWBALL





BY **ED CAESAR**
PHOTOGRAPHS BY **HENRIK KNUDSEN**

WHAT LIES BENEATH

A BREAKING SURVEY OF THE LANDSCAPE SURROUNDING STONEHENGE HAS TURNED UP TANTALIZING NEW CLUES TO WHAT REALLY WENT ON THERE

September 2014



e walked the Avenue,

the ancient route along which the stones were first dragged from the River Avon. For centuries, this was the formal path to the great henge, but now the only hint of its existence was an indentation or two in the tall grass. It was a fine English summer's day, with thin, fast clouds above, and as we passed through fields dotted with buttercups and daisies, cows and sheep, we could have been hikers anywhere, were it not for the ghostly monument in the near distance.

Faint as the Avenue was, Vince Gaffney hustled along as if it were illuminated by runway lights. A short, sprightly archaeologist of 56, from Newcastle upon Tyne in northeast England, he knows this landscape as well as anyone alive: has walked it, breathed it, studied it for uncounted hours. He has not lost his sense of wonder. Stopping to fix the monument in his eyeline, and reaching out toward the stones on the horizon, he said, "Look, it becomes *cathedralesque*."

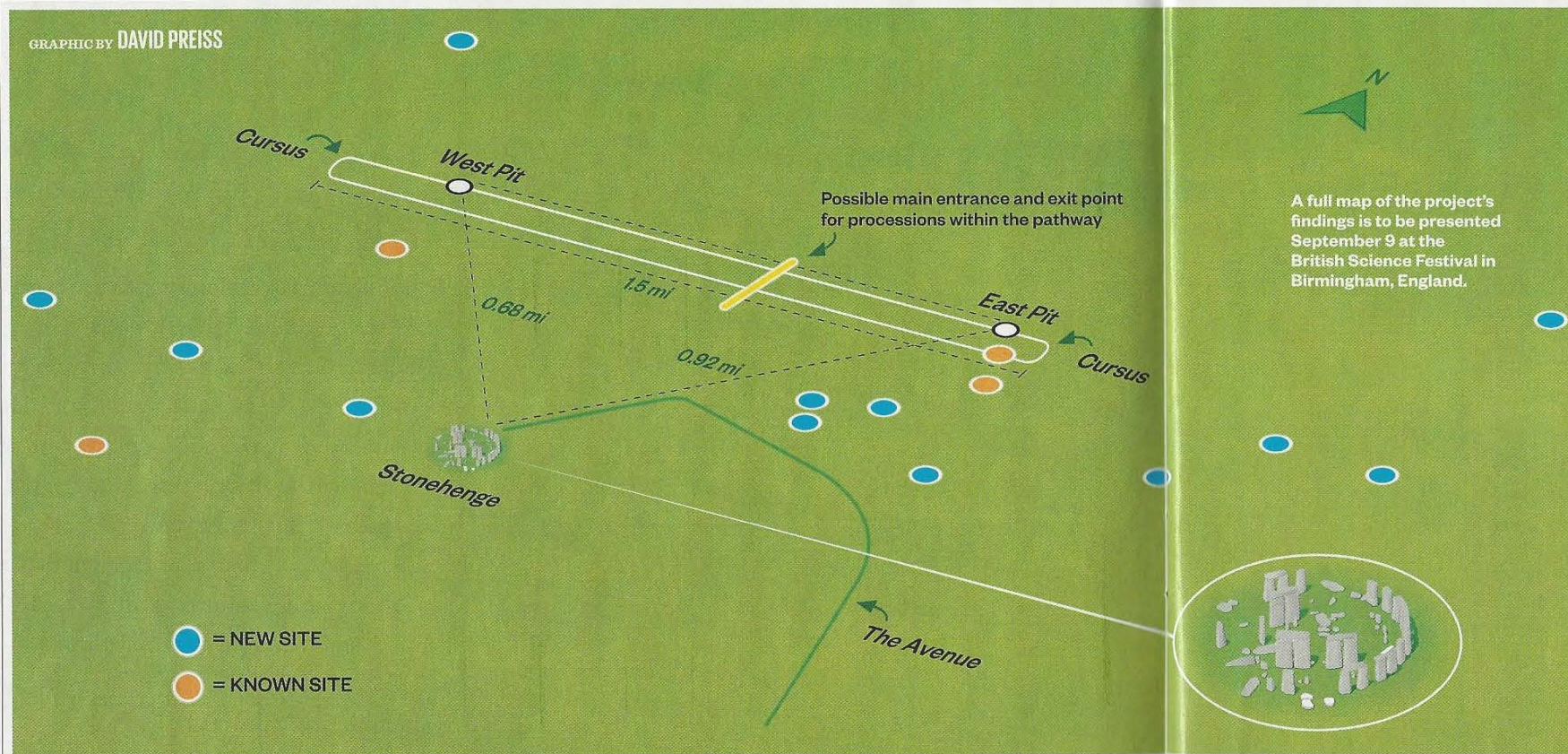
"A GEOPHYSICAL CIRCUS"

The Stonehenge Hidden Landscapes Project used ground-penetrating radars (far left) and GPS-guided magnetometers (left) to produce what amounts to a 3-D map of a four-square-mile area.

A NEW VIEW OF ANCIENT GROUND

SUBTERRANEAN FEATURES DETECTED BY THE STONEHENGE HIDDEN LANDSCAPES PROJECT

GRAPHIC BY DAVID PREISS



Gaffney's latest research effort, the Stonehenge Hidden Landscapes Project, is a four-year collaboration between a British team and the Ludwig Boltzmann Institute for Archaeological Prospection and Virtual Archaeology in Austria that has produced the first detailed underground survey of the area surrounding Stonehenge, totaling more than four square miles. The results are astonishing. The researchers have found buried evidence of more than 15 previously unknown or poorly understood late Neolithic monuments: henges, barrows, segmented ditches, pits. To Gaffney, these findings suggest a scale of activity around Stonehenge far beyond what was previously suspected. "There was sort of this idea that Stonehenge sat in the middle and around it

was effectively an area where people were probably excluded," Gaffney told me, "a ring of the dead around a special area—to which few people might ever have been admitted. . . . Perhaps there were priests, big men, whatever they were, inside Stonehenge having processions up the Avenue, doing . . . something extremely mysterious. Of course that sort of analysis depends on not knowing what's actually in the area around Stonehenge itself. It was terra incognita, really."

Nobody has yet put a spade in the ground to verify the new findings, which were painstakingly gathered by geophysicists and others wielding magnetometers and ground-penetrating radars that scan the ground to detect structures and objects several yards below the surface. But Gaff-

ney has no doubt of the work's value. "This is among the most important landscapes, and probably the most studied landscape, in the world," he says. "And the area has been absolutely transformed by this survey. Won't be the same again."

The joys and frustrations of all archaeological study—perhaps all historical inquiry—come into particularly sharp relief at Stonehenge. Even to the most casual observer, the monument is deeply significant. Those vast stones, standing in concentric rings in the middle of a basin on Salisbury Plain, carefully placed by who-knows-who thousands of years ago, must mean *something*. But nobody can tell us what. Not exactly. The clues that remain will always



prove insufficient to our curiosity. Each archaeological advance yields more questions, and more theories to be tested. Our ignorance shrinks by fractions. What we know is always dwarfed by what we can never know.

Take the big question: Was Stonehenge predominantly a temple, a parliament or a graveyard? Was it a healing ground? We don't know, for sure. We know that people were buried there, and that the stones are aligned in astronomically important ways. We also understand, because of the chemical composition of animal bones found nearby and the provenance of the stones, that people traveled hundreds of miles to visit Stonehenge. But we cannot say, with certainty, why.

Try a simpler question: How did

the bluestones, which weigh between four and eight tons apiece, arrive at the site, nearly 5,000 years ago, from 170 miles away in North Wales? Land or sea? Both alternatives explode with possibilities, and nobody has an impregnable theory. Mike Parker Pearson of University College London is working on a new idea that the bluestones might have been lifted onto huge wooden lattices and carried by dozens of men to the site. But it's just a theory. We can't know, definitively. We can only have better-informed questions.

The ineffability of Stonehenge has not dulled our appetite. The site has long proved irresistible to diggers. In 1620, the Duke of Buckingham had his men excavate right in the center of the monument. Although they did not

THE OVAL AND THE PITS

Vince Gaffney (above, in a special-effects scene in the film *Stonehenge Empire*) stands above the mysterious pit at the western end of the Cursus (top, also outlined in special effects).

know it at the time, they dug on the site of a prehistoric pit. Buckingham's men found skulls of cattle "and other beasts" and large quantities of "burnt coals or charcoals"—but no treasure, as they had hoped.

In the 19th century, "barrow-digging," or the excavation of prehistoric monuments and burial hills, was a popular pastime among the landed gentry. In 1839, a naval officer named Captain Beamish dug out an estimated 400 cubic feet of soil from the northeast of the Altar Stone at Stonehenge. As Parker Pearson notes



CHARMED CIRCLE
The Stonehenge landscape, the new evidence suggests, guided the movement of great crowds.

The Stonehenge landscape is a unique and powerful one. It is a landscape that has been shaped by the hands of man and the forces of nature. The stones are arranged in a way that suggests a great purpose, a great design. The landscape is a testament to the power of the human mind and the power of the natural world. The stones are a part of a larger whole, a whole that is still waiting to be discovered. The landscape is a mystery, a mystery that has captivated the imagination of people for centuries. The stones are a part of a story, a story that is still being written. The landscape is a part of a journey, a journey that is still being made. The stones are a part of a legacy, a legacy that is still being passed on. The landscape is a part of a future, a future that is still being created. The stones are a part of a dream, a dream that is still being pursued. The landscape is a part of a vision, a vision that is still being realized. The stones are a part of a hope, a hope that is still being held. The landscape is a part of a faith, a faith that is still being placed. The stones are a part of a love, a love that is still being given. The landscape is a part of a life, a life that is still being lived. The stones are a part of a death, a death that is still being mourned. The landscape is a part of a resurrection, a resurrection that is still being awaited. The stones are a part of a new beginning, a new beginning that is still being started. The landscape is a part of a new world, a new world that is still being created. The stones are a part of a new era, a new era that is still being entered. The landscape is a part of a new age, a new age that is still being dawning. The stones are a part of a new dawn, a new dawn that is still being breaking. The landscape is a part of a new day, a new day that is still being starting. The stones are a part of a new night, a new night that is still being falling. The landscape is a part of a new moon, a new moon that is still being rising. The stones are a part of a new sun, a new sun that is still being setting. The landscape is a part of a new star, a new star that is still being born. The stones are a part of a new galaxy, a new galaxy that is still being expanding. The landscape is a part of a new universe, a new universe that is still being created. The stones are a part of a new world, a new world that is still being created. The landscape is a part of a new era, a new era that is still being entered. The stones are a part of a new age, a new age that is still being dawning. The landscape is a part of a new dawn, a new dawn that is still being breaking. The stones are a part of a new day, a new day that is still being starting. The landscape is a part of a new night, a new night that is still being falling. The stones are a part of a new moon, a new moon that is still being rising. The landscape is a part of a new sun, a new sun that is still being setting. The stones are a part of a new star, a new star that is still being born. The landscape is a part of a new galaxy, a new galaxy that is still being expanding. The stones are a part of a new universe, a new universe that is still being created.

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in his book *Stonehenge*, Beamish's "big hole was probably the final blow for any prehistoric features . . . that once lay at Stonehenge's center."

Work at Stonehenge became less invasive. In 1952, Willard Libby—the American chemist and later a Nobel Prize winner—used his new radiocarbon dating technique on a piece of charcoal from a pit within Stonehenge to date the monument to 1848 B.C., give or take 275 years. That date has since been refined several times. The prevailing opinion is that the first stones were erected on the site around 2600 B.C. (although the building of Stonehenge was carried out over a millennium, and there were centuries of ritual activity at the site before the stones were in place).

In 2003, Parker Pearson conducted his own survey, concentrating on the nearby settlement at Durrington

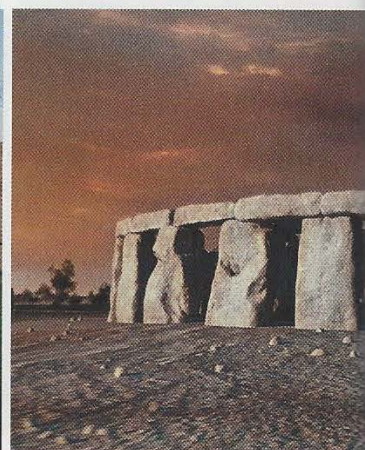
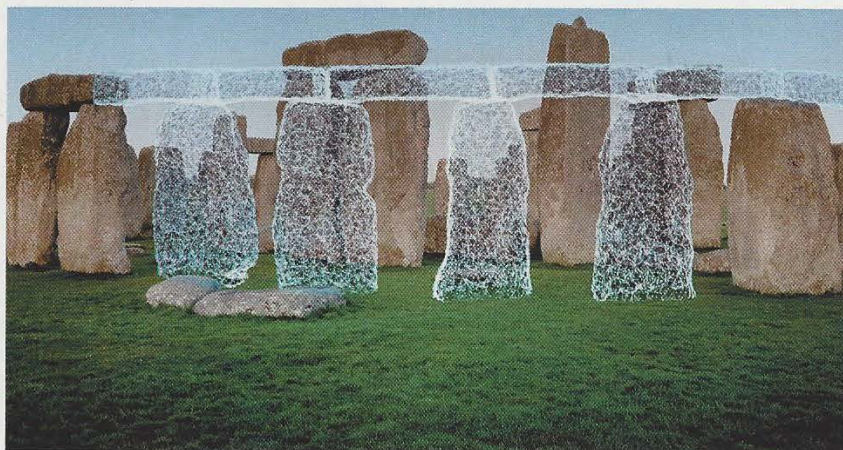
Walls and his team started their work, they were less interested in theories than in data. To that end, they concentrated on taking what amounts to a three-dimensional and yards-deep photograph of the entire landscape. "The perceived wisdom was driven by the monuments we knew about," says Gaffney. "We've put in the data *between* the monuments."

Chris Gaffney, Vince's younger, slighter and less voluble brother, was one of the instigators of this new approach. The duo's grandfather was a metal-work teacher from Newcastle with an interest in archaeology, who took his clever grandchildren on trips to Hadrian's Wall, the old barrier between the Roman Empire and the blasted north. Small wonder that Vince became an archaeologist and Chris a geophysicist, now at the University of Bradford.

Vince Gaffney recalled. "So we're constructing various hypotheses on the basis of something we don't know."

Around the same time, an Austrian archaeologist named Wolfgang Neubauer, now of the Boltzmann Institute, was hoping to conduct large-scale projects all over Europe using tools including GPS magnetometers and ground-penetrating radar. Neubauer's team had also developed software to process the 40 or 50 gigabytes of raw data that these instruments could create in a day. Suddenly, instead of waiting weeks or months to see what the machines had found, it was possible to cover several acres with magnetometers and radar in a day and to display that information on a screen almost instantaneously.

One of the areas Neubauer wanted to scan was Stonehenge, and in the spring of 2009 he contacted Vince



Walls and the area between there and the River Avon. Based on huts, tools and animal bones he uncovered, he concluded that Durrington Walls likely housed the workers who built Stonehenge. Based on an analysis of human remains he later excavated from Stonehenge, he also surmised that, far from being a site of quotidian religious activity, Stonehenge served as a cemetery—a "place for the dead."

The Stonehenge Hidden Landscapes Project is different from everything that came before it. When Gaff-

The Gaffney brothers' interest in new technologies that were becoming available to archaeologists led them to the first GPS-guided magnetometer systems. A magnetometer has sensors that allow a geophysicist to see evidence of historic building, and even ancient ditch-digging, beneath the soil by mapping variations in the earth's magnetic field. The GPS-guided versions were able to pinpoint some of those discoveries to within one centimeter. The Gaffneys believed that Stonehenge scholarship needed a massive magnetometer- and radar-led survey of the whole site. "We just didn't know if anything's there,"

Gaffney. A few months later, the Boltzmann Institute and the University of Birmingham—plus several other British and European universities, museums and companies that contributed expertise and resources—began their collaboration at Stonehenge.

Their first days on site, Gaffney recalled, were "like a geophysical circus has come to town." Tractors pushed the ground-penetrating radars, which looked like high-powered lawn mowers. All-terrain vehicles dragged the magnetometer sensors on long strings. Delicate instruments covering hard, uneven ground kept mechanics and technicians busy. "I have



This month on the Smithsonian Channel, Stonehenge Empire airs the new findings.

seen one of our magnetometers shear clear apart in front of me," said Gaffney. "It was back in service the next day." In all, the fieldwork took about 120 days, spread over four years.

In a multimedia room at the University of Birmingham there was a vast touch screen, six feet by nine, on which a new map of the Stonehenge landscape appeared. Gaffney pointed out the key features.

There was Stonehenge itself, marked by the familiar circles. To the north was the long, thin strip called the Stonehenge Cursus or the Greater Cursus, which was demarcated by ditches, and ran east to west for nearly two miles. (The Cursus was given its name by the antiquarian William Stukeley in the 18th century because it looked like an ancient Roman race course. Its construction predates the

decide where to start, like a child at the Christmas tree. "These are little henge monuments," he said, touching the screen to highlight a group of black smudges. "Nice little entrance there, and a ditch. These things we know nothing about."

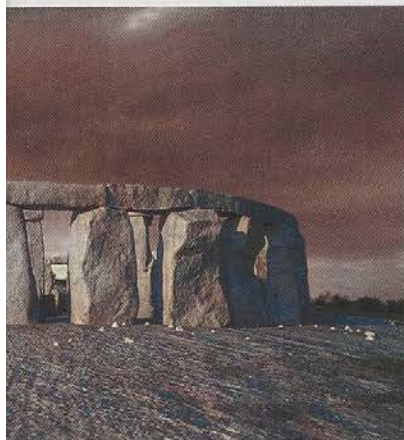
He saved his greatest enthusiasm for the discoveries that had been made in the Cursus. This feature, said Gaffney, had always been thought of as a "bloody great barrier to the north of Stonehenge." Nobody knew quite what it was for. Because the Cursus runs east to west, archaeologists have always believed that its presence owes something to the passage of the sun. The monument must be significant: It was dug in the fourth millennium B.C. using antler picks—hundreds of thousands of man-hours went into its construction.

The Hidden Landscapes Project's

the ground. Such a pit was much too large for a practical use—for instance, burying trash—because of the labor involved in digging it. In the archaeologists' minds it could only have ritual implications, as "a marker of some kind," Gaffney said. What's more, if you drew a straight line between the pit and the heelstone at Stonehenge, it ran directly along the final section of the Avenue, on the path of the sunrise on the summer solstice.

"We thought, That's a bit of a coincidence!" Gaffney recalled. "That was the point at which we thought, What's at the other end? And there's another pit! Two pits, marking the midsum-

MONUMENTAL STANDING
Frames from *Stonehenge Empire* show (left) stones whose locations were determined only in 2013 and (middle and right) the monument as it would have appeared in its Neolithic heyday.



first building work at Stonehenge by several hundred years.) Gaffney also pointed out the Cursus Barrows—hills containing mass human graves—just south of the Cursus itself, and King Barrow Ridge to the east.

Scattered all over the map were blotches of black: features without names. These were new finds, including the more than 15 possible new or poorly understood Neolithic monuments. Gaffney emphasized *possible*, acknowledging that it will require digging—"the testimony of the spade"—to discover precisely what was there.

Standing in front of this constellation of evidence, he seemed unable to

instruments discovered several new clues. First of all, they found gaps in the ditch, in particular a very large break in the northern side, to allow people to enter and exit the Cursus. Now, instead of seeing the Cursus exclusively as a monument that encouraged movement along the path of the sun, east to west, Gaffney began to consider these gaps as "channels through the landscape" to guide the movement of people north to south.

A bigger discovery, Gaffney says, was a "bloody huge" pit about five yards in diameter at the eastern end of the Cursus. Today it lies buried at least three feet below the surface of

mer sunrise and the midsummer solstice, set within a monument that's meant to be something to do with the passage of the sun."

With his hands passing over the map, Gaffney showed how—on the longest days of the year—the pits formed a triangle with Stonehenge marking sunrise and sunset.

"Nobody had ever seen these pits before," he continued. "But they link the area of Stonehenge with the Cursus directly. Either these things have been put inside the Cursus to mark these points, or the Cursus has been wrapped around them."

What was so interesting about the

Cursus pits was that they told a story about the landscape. The “sunrise” pit was visible from Stonehenge, but the “sunset” pit was not—it was nestled behind a ridge, and could have been seen only if there had been fire and smoke coming from it. (At some point the pits will have to be excavated for evidence of such activity.) These discoveries fed into a larger understanding of Stonehenge as “diachronic”—operating in light and dark, sunrise and sunset, day and night.

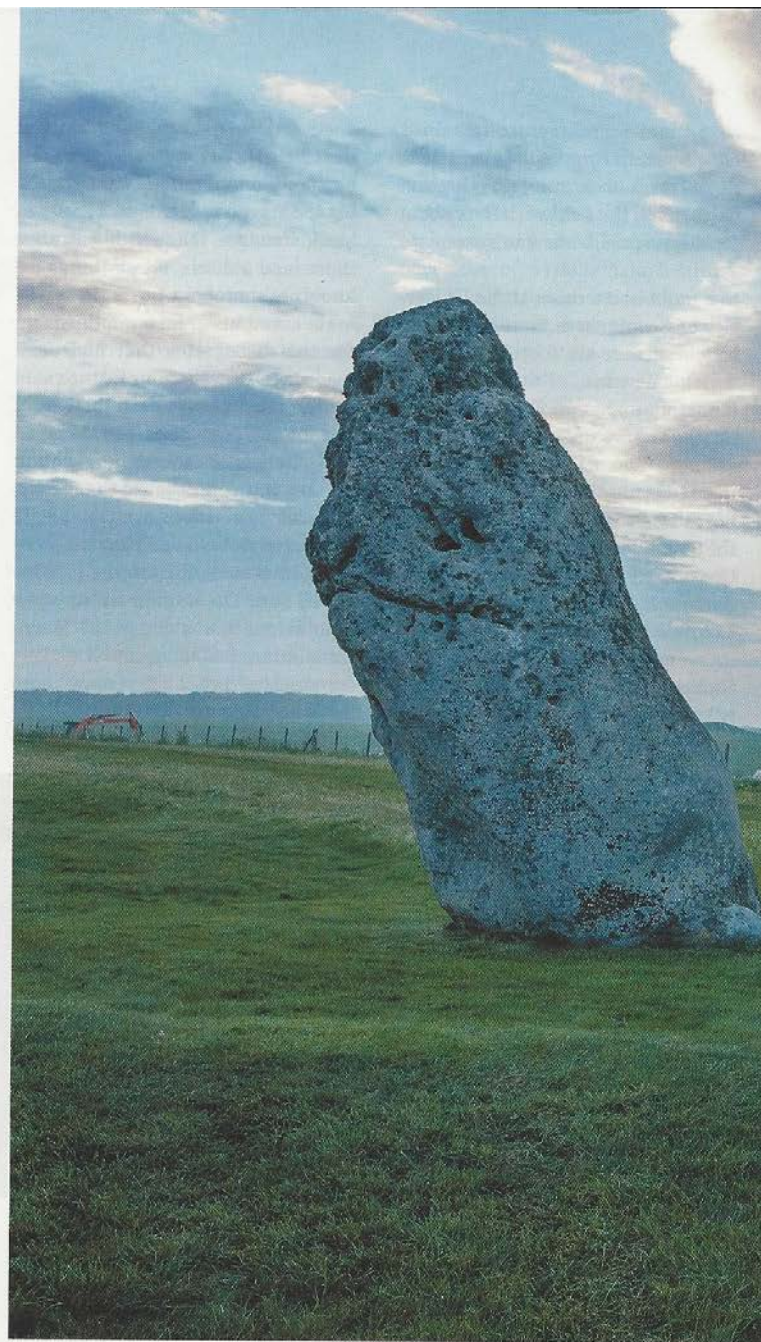
“The point I think we’re coming to,” said Gaffney, “is that increasingly we can see the area around Stonehenge as providing extensive evidence for complex liturgical movement—which we can now understand, largely because we know where things are.”

Parker Pearson, for his part, takes a cautious view of the new research. “Until you dig holes, you just don’t know what you’ve got,” he told me in his office at University College London. “What date it is, how significant it is. [There are] extraordinary new features coming up, and we’re thinking well, what are they?”

To be sure, he said the data from the Hidden Landscapes Project “backs up the pattern we’ve already been seeing for some years. We have an excessive number of solstice-aligned monuments in that landscape. Nowhere in the rest of Europe comes even close.” He added, “This is fantastic stuff that’s been done, and it’s raised a whole series of new questions,” he said. “It’s going to take years.”

The clouds shifted in front of the sun, dappling the landscape with shadow. Gaffney and I were walking the Avenue, 300 yards or so from Stonehenge, and in the distance a string of barrows gleamed like opals. Although he acknowledged the fallibility of all archaeological projection (“In the end,” he said, “we are all wrong”), his work has led him to a new interpretation of how Stonehenge was used.

Gaffney’s idea was not to focus on Stonehenge itself, but on “processionality” within the whole landscape. He imagined people moving around the area like Roman Catholics process-



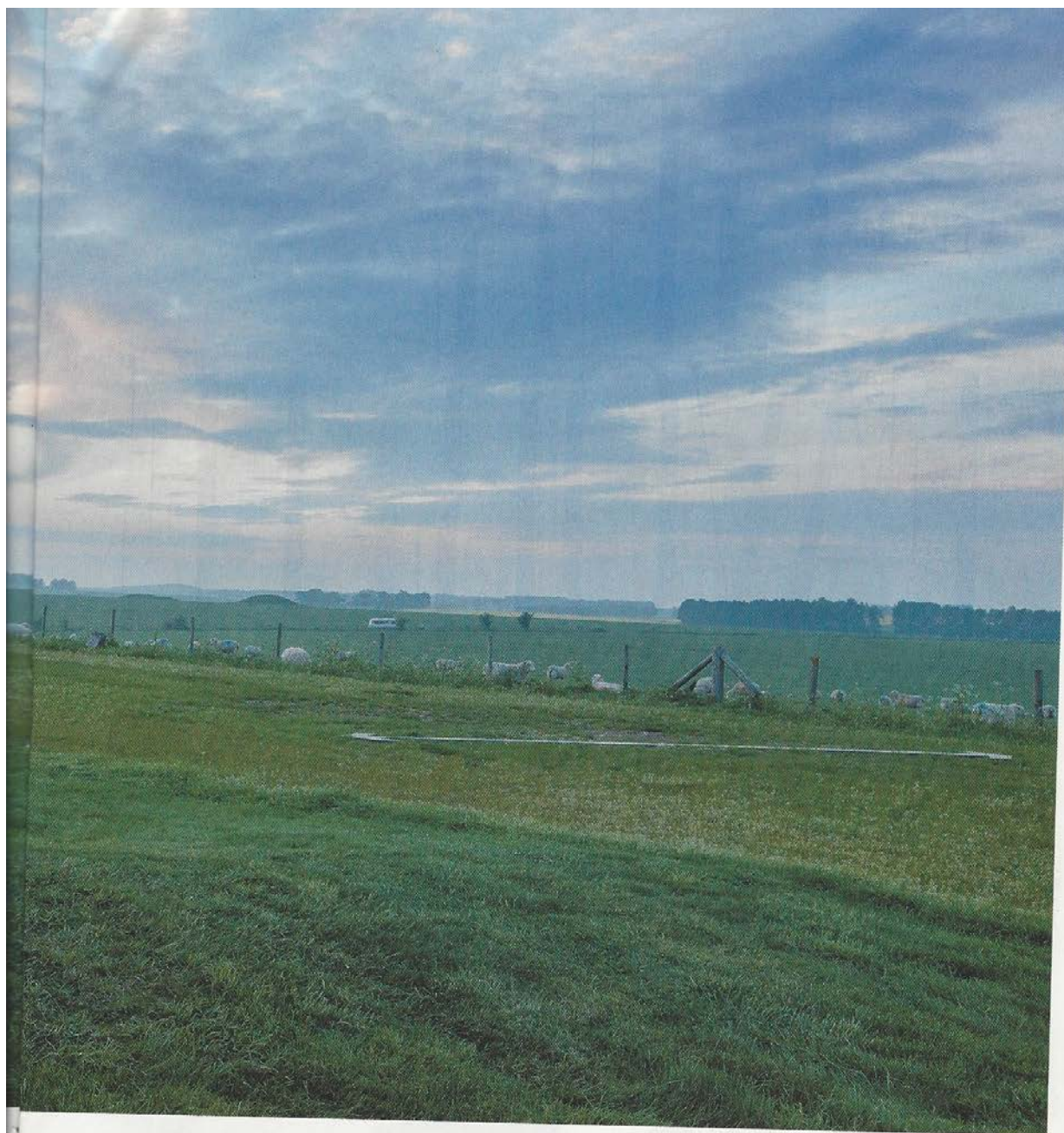
HERE COMES THE SOLSTICE

The heelstone aligns with the rising sun on the summer solstice as seen from the stone circle, about 80 yards away. It is one of “an excessive number” of such features in the Stonehenge landscape.

ing through the Stations of the Cross. He recalled an Easter Friday ritual he saw in Croatia, in which a “bloke with a cross” led fellow barefoot celebrants on a miles-long trip. In Gaffney’s view, the building of the great stone

circle was a “monumentalizing” of a similar, if heathen, procession.

As we walked downhill through the fields, Gaffney stopped from time to time to point out the hillocks in which “the illustrious dead” were buried. He also noted how the Avenue was not a straight line between the Avon and Stonehenge, but rather a series of tacks that brought the visitor to the Stonehenge site in a “theatrical” way, along the line of sunrise on the summer solstice.



He thrust himself into the mind of a Bronze Age visitor to the site. "You will have seen nothing like it," he said. "It would have been massively impressive." Soon we descended into a valley called Stonehenge Bottom, only a hundred yards or so from the great stones. "They're disappearing. . . . Watch, just watch!" he said.

Within a few yards, the monument became invisible. When you picture Stonehenge in your mind's eye, you

imagine the concentric rings of vast stones standing in a desolate open landscape, visible for miles around. But now, here we were, a hundred yards away, and the thing had gone.

We stood in a field, watched by some lethargic cows, and savored the strangeness of the moment. Then, as we stepped uphill, Stonehenge re-emerged on the horizon. It happened fast. The lintels, then the great sarsens, then the smaller bluestones were suddenly before us.

Gaffney's voice lifted. He spoke about Jerusalem Syndrome: the feeling of intense emotion experienced by pilgrims on their first sighting of the Holy City. In the prehistoric world, there was no conception of God as he was understood by the later Abrahamic faiths. But, said Gaffney, as Stonehenge reappeared before us, "whatever the ancient version of Jerusalem Syndrome is, that's what you're feeling now."

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